



Animal Care

Reference Manual Version 4
2020-2022



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This manual is not a legal document and is intended for educational purposes only.
Dairy farmers are individually responsible for determining and complying with all requirements of local, state and federal laws and regulations regarding animal care.

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01

Introduction

About FARM

Today's consumers expect and deserve safe, wholesome dairy products from people who are producing it responsibly.

U.S. dairy farmers have a strong track record of providing excellent animal care. The National Dairy Farmers Assuring Responsible Management (FARM) Program demonstrates dairy farmers' ongoing commitment to the highest standards in the industry. The FARM Program also demonstrates that **farmers are doing what's right for cows, customers and consumers** — consumers who are more curious and skeptical than ever before about how food is raised and produced.

As science and best practices evolve alongside public attitudes and perceptions, the dairy industry must continue to show customers and consumers that we're holding ourselves to the highest standards of animal care. The FARM Program does just that.

Launched in 2009, the FARM Program helps earn the public's trust, demonstrating that dairy farmers share their values and are committed not only to quality animal care, but also to ensuring safe, wholesome milk, high standards of environmental stewardship and exceptional work environments through its four program areas. The Animal Care Program is the cornerstone of the FARM Program. More than 98% of the U.S. milk supply comes from participating farms.

FARM Program Areas



ANIMAL CARE



ENVIRONMENTAL STEWARDSHIP



ANTIBIOTIC STEWARDSHIP



WORKFORCE DEVELOPMENT

FARM works with you, the producer community and industry partners, to provide comprehensive resources, ongoing training and other educational tools. These tools help create a culture of continuous animal care improvement.

The goal of FARM is to unite the dairy industry around best management practices and demonstrate the excellence that occurs on your farm every day through science and outcome-based standards that are facility, size and geography neutral. The on-farm evaluation serves as a snapshot in time of those best management practices. However, The FARM Program can only provide the foundation and framework of excellent animal care. Farmers must take forward and instill

daily excellence in animal care through their farms' culture by way of active leadership, oversight and management. FARM does not ensure a culture, guarantee best management practices are followed, or replace supervision or management.

Implementing FARM

Created by the [National Milk Producers Federation \(NMPF\)](#), with support from [Dairy Management, Inc. \(DMI\)](#), the FARM Program raises the bar for the entire dairy industry — creating a culture of continuous improvement.

The FARM Animal Care Program establishes:

- On-farm best management practices
- Standards for on-farm second-party evaluations
- Third-party verification to guarantee the rigor and integrity of FARM Animal Care Program implementation

The FARM Program provides comprehensive resources to implement the program at the farm and participant level, including manuals, templates, posters and videos available online at nationaldairyfarm.com.

Animal Care Standards



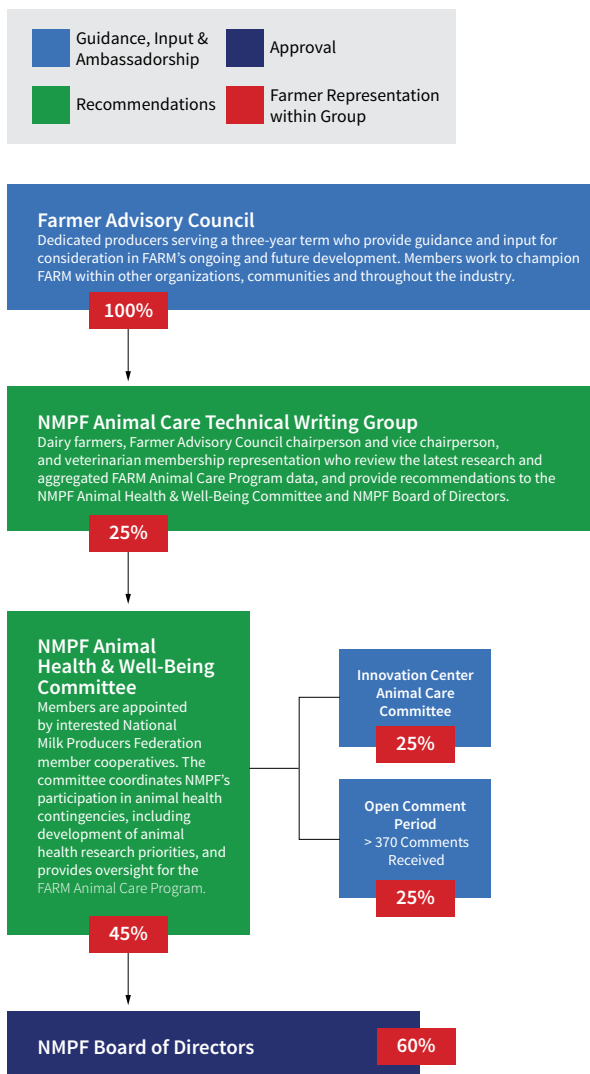
SCIENCE Based



OUTCOMES Based

Program Governance

The FARM Animal Care Task Force, which includes representation from dairy farmers, the veterinary community, co-ops, processors, dairy organizations and university animal care experts, guides the program — ensuring that it fosters a culture of continuous improvement and that the best management practices, which are the cornerstone of the program, evolve with the latest animal care research.



Participants

The FARM Animal Care Program participants include any cooperative, proprietary processor, milk handler or organization that has a signed current FARM participation agreement on behalf of their membership, patrons or direct shippers. Participants manage the FARM Animal Care Program on behalf of the farms and facilities belonging to the milk handling entity.

Second-Party Evaluation

The second-party evaluation, completed on every participating dairy facility at least once every three years, provides dairy farms with an external review of their animal care practices based on FARM Program guidelines.

The results of the second-party evaluation provide dairy farmers with a snapshot overview of the farm's current animal care practices. If the second-party evaluation identifies areas of improvement, action plans are generated to demonstrate continuous improvement toward the industry's best animal care practices and standards.

Only qualified individuals who have completed the annual FARM certification training are qualified to conduct evaluations. Typically, second-party evaluators are co-op/processor staff, veterinarians or independent dairy consultants.

Evaluators must have a minimum combination of five years of education – including animal science, dairy science or other relevant curriculum – and/or on-farm (dairy) experience. Evaluators must apply, complete a phone interview, attend classroom and on-farm training, pass competency exams and recertify annually.

Second-Party Evaluators

Trained second-party evaluators work with you to identify strengths and, if necessary, outline improvements. They work alongside dairy farmers to ensure the highest standards of animal care.

Facility Certification

A dairy facility is considered certified in the FARM Animal Care Program if it:

- Is up to date with the FARM Animal Care Program evaluation, in accordance with the program's evaluation cycle
- Does not have any overdue corrective action plans
- Is not subject to the FARM Willful Mistreatment or Neglect Protocol

Accountability Measures

At the conclusion of a second-party evaluation, if FARM Animal Care Program standards are not met, corrective actions may be generated. Corrective action accountability measures are categorized by level of significance:

- Immediate Action Plan (IAP)
- Mandatory Corrective Action Plan (MCAP)
- Continuous Improvement Plan (CIP)

Corrective actions can lead to conditional certification and conditional decertification if left unresolved beyond the timeframes designated by FARM, or sooner per the program participant.

Immediate Action Plan (IAP)

An IAP is triggered if a facility fails to comply with the FARM Program standard that bans routine tail docking. Failure to meet the standard will result in the facility being placed on conditional certification for resolution within 48 hours. If the facility meets the standard by resolving this action plan within 48 hours, a follow-up will be conducted by a second-party evaluator at one week, one month and three months to ensure routine tail docking has ceased.

If the facility continues to not meet the standard after this timeframe, the facility will be conditionally decertified until the standard is met.

Mandatory Corrective Action Plan (MCAP)

Additional best management practices have been identified as having significant importance in ensuring sound animal care. The following FARM Animal Care standards, if unmet at the time of an evaluation, will generate a MCAP.

MCAP

FARM Program standards require that MCAPs are met within nine months. However, a participant/evaluator may require that a standard be met before the nine-month deadline.

Failure to meet these standards within the allotted timeframe will result in the facility being placed on conditional certification, leading to conditional decertification if standards are not met in a 60-day period.

Veterinarian Review

- The facility has a written Veterinarian-Client-Patient Relationship (VCPR) form that is signed by the farm owner and Veterinarian of Record (VOR) annually.
- The written herd health plan is reviewed annually by the VOR.

Pre-Weaned Calves

- Pre-weaned calf protocols and practices must demonstrate that pre-weaned calves are:
 - Disbudded prior to 8 weeks of age
 - Moved using proper methods
 - Provided feed and water access by day 3
 - Provided quality and quantity colostrum/colostrum replacer and milk/milk replacer

Non-Ambulatory Animals

- Non-ambulatory animal protocols and practices must demonstrate non-ambulatory animals are:
 - Moved using proper methods
 - Provided prompt medical care
 - Provided access to feed, water, protection from heat and cold for typical climatic conditions, isolation from other ambulatory animals and protection from predators

Euthanasia

- Euthanasia protocols and practices demonstrate the following:
 - Criteria for the identification of animals to be euthanized are established
 - Euthanasia techniques follow the approved methods of American Association of Bovine Practitioners (AABP) and/or American Veterinary Medical Association (AVMA)
 - Carcass disposal is conducted using the appropriate method

Fitness to Transport

- Acceptable fitness to transport protocol

Water and Feed Access

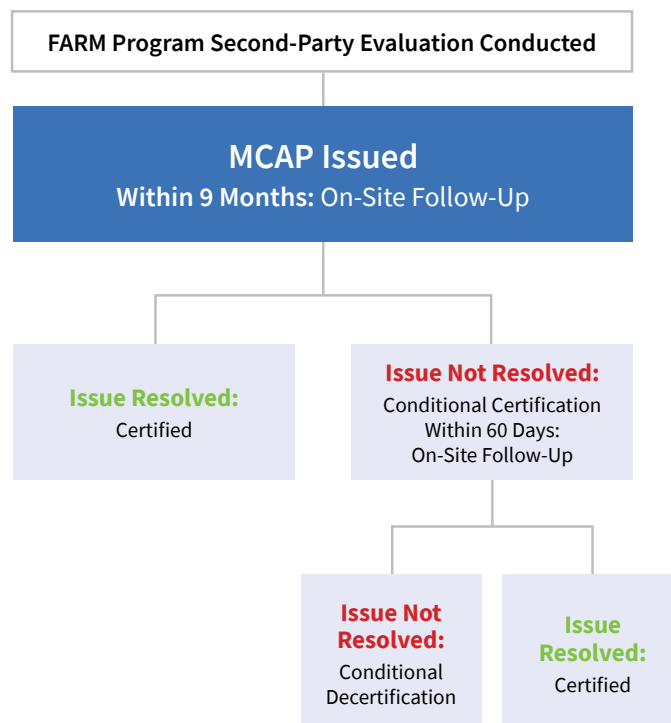
- Feed access for all age classes; pre-weaned calves by day 3
- Water access for all age classes; pre-weaned calves by day 3

Continuing Education

- Signed Cow Care Agreement for any **non-family employees** with animal care responsibilities
- Job-specific continuing education for **non-family employees** with animal care responsibilities, if they are responsible for:
 - Stockmanship/handling
 - Pre-weaned calf care
 - Non-ambulatory animals
 - Euthanasia
 - Determining animals that are fit for transport

The MCAP will be created with their second-party evaluator with a set timeframe for re-evaluation of progress toward completing all MCAPs, not to exceed nine months.

FIGURE 1: Mandatory Corrective Action Plan Overview



Continuous Improvement Plans (CIP)

Animal observation benchmarks and additional best management practices have been identified as areas that also demonstrate excellence in animal care.

The following FARM Animal Care standards, if unmet at the time of an evaluation, will generate a CIP.

CIP

FARM Program standards require that CIPs are met within three years or less, however, a participant/evaluator may require that a standard be met before the three-year deadline.

Failure to meet the standard within this allotted timeframe will result in the facility being placed on conditional certification, leading to conditional decertification if standards are not met in a 60-day time period.

Evaluators and participants can create CIPs for additional standards that have not been designated by FARM.

Animal Observation Benchmarks

- **Body condition score** | 99% or more of all animals 3 days of age and older have a body condition score of 2 or greater on the FARM body condition scorecard
- **Hock/Knee** | 95% or more of the lactating herd score 2 or less on the FARM hock/knee scorecard
- **Locomotion** | 95% or more of the lactating herd score 2 or less on the FARM locomotion scorecard
- **Broken tails** | 95% or more of lactating animals do not have broken tails

Pain Management

- Acceptable pain management protocols and practices for disbudding

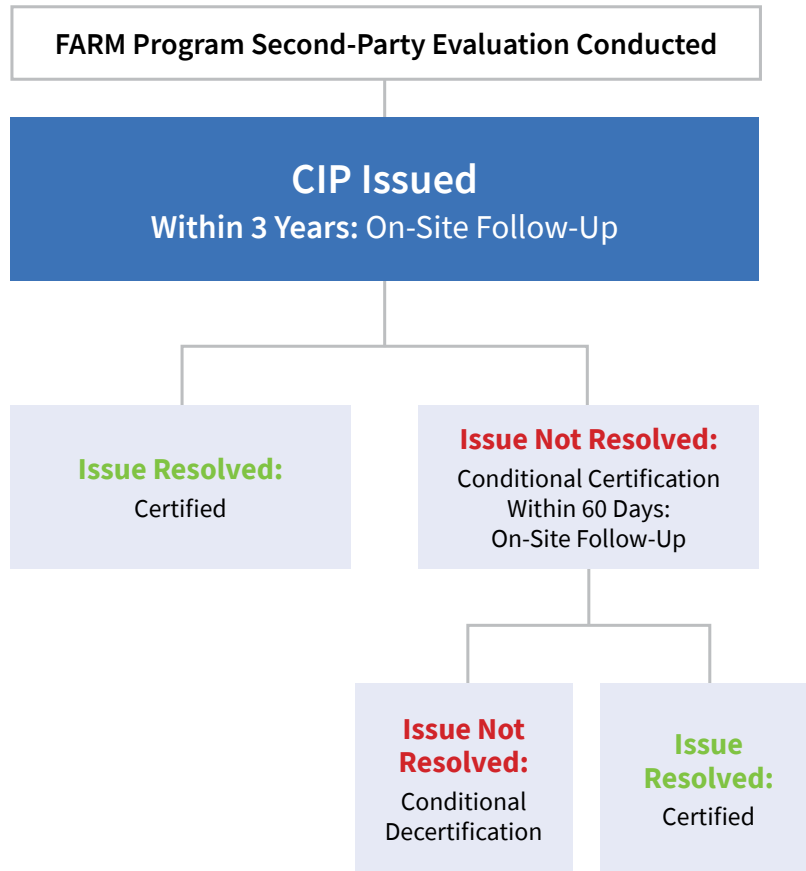
Treatment Records

- Maintain permanent written or electronic drug treatment records

Continuing Education

- Signed cow care agreement for any **family employees** with animal care responsibilities
- Job-specific continuing education for **family employees** with animal care responsibilities, if they are responsible for:
 - Stockmanship/handling
 - Pre-weaned calf care
 - Non-ambulatory animals
 - Euthanasia
 - Determining animals that are fit for transport

FIGURE 2: Continuous Improvement Plan Overview



Conditional Certification

If corrective action plans are not satisfactorily resolved by the date set by FARM or the FARM Animal Care participant, the facility will have a conditional certification for up to 60 days. A FARM Animal Care participant may continue to market milk from a facility with a conditional certification and remain in good standing with FARM. If the plan is resolved within the 60-day period, the facility will be returned to full certification status.

Conditional Decertification

If corrective action plans are not satisfactorily resolved by the date set by FARM or the FARM Animal Care participant, and the facility has had conditional certification for 60 days without satisfactorily resolving the plan, the facility will be considered conditionally decertified. A FARM Animal Care participant may not continue to market milk from a facility with a conditional decertification and remain in good standing with FARM. Evidence of plan resolution must be provided to FARM for the facility to be returned to full certification status.

Third-Party Verification

Once a second-party evaluation is complete, the dairy facility is eligible to be randomly selected, through statistical sampling, to undergo third-party verification. Statistical sampling includes selection criteria like FARM participant geographic location, size and operation type to ensure that the number of randomly selected dairy farms mirrors participants in the entire program.

Verification helps ensure the program accomplishes its goals and objectives by confirming the second-party evaluators are upholding the integrity of program implementation. Third-party verifiers must meet the same qualifications as second-party evaluators.

FARM Integrity

Qualified third-party verifiers evaluate a representative percentage of farms each year to ensure program integrity.

USING THE MANUAL

This Animal Care Reference Manual is an easy-to-use, comprehensive resource detailing animal care and management guidelines of the FARM Program. It's an educational tool for all participating dairy farmers, co-ops, proprietary processors, trained second-party evaluators and third-party verifiers.

Along with the guidelines, this document provides extensive information, resources and references that while thorough, are not exhaustive nor prescriptive for singular approaches toward meeting the guidelines of the program. This reference manual is not a legal or regulatory requirement for the dairy industry. It is intended to serve as a wide-ranging educational resource for the U.S. dairy industry.

Best practices identified in the manual are not the only practices that can meet the identified guidelines. Application of management practices may vary due to regional norms, weather or other conditions. Dairy farmers should work with their trusted advisors and management team members to develop appropriate management approaches to meet the identified guidelines.

FARM Program materials are living documents. Guidelines are reviewed every three years by the FARM governance committees and are subject to updates based on new, science-based animal care and well-being research. This is part of the FARM Program's commitment to continuous improvement.

Management Checklists

The management checklist details key on-farm guidelines and best practices. Management checklist points are listed at the beginning of each chapter and within the chapters under corresponding topics.

Here is one example of a management checklist point:

- ✓ **The facility has a written Veterinarian-Client-Patient Relationship (VCPR) that is signed by the farm owner and Veterinarian of Record (VOR) annually.**



Veterinarian Review

Management Checklist

- ✓ The facility has a written Veterinarian-Client-Patient Relationship (VCPR) that is signed by the farm owner and Veterinarian of Record annually within 12 months.
- ✓ The written herd health plan is reviewed annually by the Veterinarian of Record.
- ✓ The facility has permanent (written or electronic) treatment records for the treatment of the facility's common diseases.

Records include:

- *Date of treatment*
- *Animal treated identification*
- *Name of treatment used*
- *Disease/condition being treated*
- *Dosage administered*
- *Route of administration*
- *Duration of the treatment*
- *Specified withdrawal times for milk and meat to ensure food safety*

Expectations of the Veterinarian Community

Dairy veterinarians serve as trusted partners to farmers across the country. As continued research and innovation drive change in on-farm animal care, the veterinarian's role is more important than ever before. It's not just about treating sick animals. It's about working hand in hand with farmers to provide guidance when it comes to cow comfort, disease prevention, antimicrobial stewardship, herd health and overall animal care.

Dairy veterinarians must strive to be engaged, open-minded and forward-thinking team members who maintain open lines of communication with their clients. It's vital for veterinarians to stay up to date on the latest research-based practices and protocols for dairy animal welfare and judicious antibiotic use, and dedicate themselves to thorough on-farm observation of routine procedures to ensure the latest guidelines are in place and being followed.

Veterinarian-Client-Patient Relationship (VCPR)

- ✓ **The facility has a written Veterinarian-Client-Patient Relationship that is signed by the farm owner and Veterinarian of Record annually within the previous 12 months.**

The dairy farmer and farm veterinarian should have a robust relationship to ensure animal care.

The VCPR is one of the cornerstones of the FARM Animal Care Program and, as such, veterinarians must sign a VCPR annually to document their involvement and formalize the relationship. VCPR guidelines provide expectations of responsibility related to animal care for the farmer and veterinarian.

Farm visits and treatment record evaluation are an important component of a valid VCPR. Veterinarians should proactively work alongside farmers to develop herd health plans for all age groups of animals to prevent illness and injury.

There are many facets to a comprehensive VCPR. The AABP identifies the following areas that are critical components for establishing and maintaining a VCPR:

Maintain Written Agreements for Working Relationships

- A veterinary practice or individual should establish a written agreement with the client that identifies the farm veterinarian who is accountable for drug use and treatments administered to the cattle on the farm.
- If more than one veterinarian or veterinary practice has a working relationship on the operation, then the agreement should identify which one has the overall responsibility for treatment protocols, drug inventories, prescriptions, personnel training, oversight and drug use on the operation.
- The identified veterinarian is referred to as the VOR.

Have a Veterinarian of Record (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, establishing treatment protocols, personnel training, treatment records review, drug inventory monitoring and assuring appropriate labeling of drugs. Veterinary oversight of drug use should include all drugs used on the farm regardless of the distribution of the drugs to the farm.
- Regular farm visits are an essential component to providing such oversight, however this can be supplemented through laboratory data evaluation, records evaluation and communication via phone, email, text or other routine communication forms. The frequency of farm visits should be determined by the VOR based on the type and size of the operation.

Clarify Any and All Relationships With Consultants and Other Veterinarians

- 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.
- No protocols or procedures that have been established by the VOR should be changed unless or until there is an agreement by all parties about such changes. The agreement between the VOR and the client should establish which management groups of the farm operation are covered in the agreement. For instance, reproduction, milk quality, youngstock/replacement, feedlot, cow-calf and sick animal treatments are possible identifiable areas.

Provide Written Protocols

- Protocols and treatment guidelines for commonly occurring, easily recognizable conditions should be established in writing and agreed upon by all parties involved. They should be signed and dated.
- Training of personnel authorized to use drugs on the operation should be undertaken and periodically reviewed. The frequency of such training and review should be determined by the size and type of the operation, the rate of personnel turnover, and the changes in protocols and procedures.
- Treatment protocols and procedures should include all drugs used on the operation (over-the-counter, prescription, extra-label, veterinary feed directive (VFD) and water soluble). All protocols should clearly define when to quit treating and seek professional help (poor response, increase in severity of signs, etc.).

Ensure Written or Electronic Treatment Records Are Maintained

- 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:
 - Date of treatment
 - Animal treated identification
 - Name of treatment used
 - Disease/condition being treated
 - Dosage administered
 - Route of administration
 - Duration of the treatment
 - Specified withdrawal times for milk and meat to ensure food safety

Periodic and timely review of the treatment records, drug inventories and usage is an important part of oversight by the VOR.

Provide Drugs or Prescriptions for Specific Timeframes and for Specific Protocols

- Provision of drugs or drug prescriptions should be for specific timeframes appropriate to the scope and type of operation involved and only for the management groups within the operation over which the VOR has direct involvement and oversight. Additionally, failure to follow agreed upon protocols and procedures should be grounds for denial of provision of drugs or prescriptions except for an individual patient needing treatment at the time of examination.
- Routine examination of drug inventories on farm and product purchase records review (pricing information is unnecessary) are recommended. Cooperation with distributors is encouraged.
- Establishment of a VCPR for the sole purpose of drug sales or increased sales of a brand of drug is not a valid or ethical reason for having a VCPR.

Dairy farmers are encouraged to review treatment protocols and antibiotic stewardship principles or programs, including the AABP “Guidelines for Establishing and Maintaining the VCPR in Bovine Practice,” the FARM Program Milk and Dairy Beef Drug Residue Prevention Manual and Food Armor. Dairy farmers should consult their veterinarian.

A veterinarian may develop an area of animal health management expertise and may serve as the primary veterinarian for one specific part of a dairy farm. For example, there may be one primary veterinarian for reproduction protocols and another primary veterinarian for metabolic issues. Dairy farmers should ensure that any veterinarian providing prescription medication or protocols for use on a farm notify the designated VOR for that farm.



Food Armor offers an online learning platform to advance skills and knowledge around antimicrobial stewardship practices. Through a self-paced program, Food Armor comprehensively guides learners through developing the habits and tools to empower themselves and their on-farm teams. These courses are designed specifically for the veterinarian and farmer audiences and offer a practical framework for implementing antimicrobial stewardship plans on farms.

✓ **The written herd health plan is reviewed annually by the Veterinarian of Record.**

Written protocols and procedures should provide enough detail to ensure that all family and non-family employees with animal care responsibilities can routinely and consistently perform their animal care duties. As a best practice, written protocols are reviewed at least annually and updated as necessary with the VOR.

A comprehensive herd health plan that meets all outlined FARM Animal Care Program standards should include written protocols for the following management areas:

- **Pre-weaned calf management**
- **Non-ambulatory animal management**
- **Euthanasia**
- **Fitness to transport**
- Treatment of common diseases
 - Mastitis
 - Metritis
 - Milk fever
 - Ketosis
 - Displaced abomasum
 - Pneumonia
 - Diarrhea
- Vaccinations
- Milking procedures
- Lameness prevention and treatment
- Difficult calvings
- Biosecurity
- Fly control
- Parasite control
- Pest control
- Branding (if conducted)
- Castration (if conducted)

These animal care standards, if unmet at the time of an evaluation, will generate a MCAP.

Fillable written protocol templates are available from the FARM Program and Food Armor. Other protocols that meet the same content requirements as the templates are acceptable.

✓ **The facility has permanent (written or electronic) treatment records for the treatment of the facility's common diseases that include:**

- Date of treatment
- Animal treated identification
- Name of treatment used
- Disease/condition being treated
- Dosage administered
- Route of administration
- Duration of the treatment
- Specified withdrawal times for milk and meat to ensure food safety

Keeping adequate drug treatment records for food-producing animals may seem menial, but good control measures can help keep unsafe food from reaching consumers.

Keeping drug records can:

- Prevent an accidental violative residue
- Ensure an effective herd health plan
- Improve a veterinarian's effectiveness
- Reduce liability (drug records are required by law)
- Save money

Veterinarians must maintain written or electronic records for all animals treated for at least 2 years (or as otherwise mandated by federal or state law), to document that the drugs were supplied to clients in line with federal and state rules and policies. Record keeping allows for the veterinarian to have a history to which he/she can refer to prescribe effective therapy and to serve as protection in case of regulatory follow-up.¹

Farmers should also keep written or electronic records on all animals treated with drugs for at least 2 years per the Food and Drug Administration regulatory requirements. The records system should be easily accessible to everyone who works with the animals.

EXAMPLE RESOURCES

This form is titled "Veterinarian-Client-Patient Relationship Validation Form" and features the FARM logo. It includes sections for "Farm Owner/Manager" and "Validation" with various fields for signatures and dates. A detailed disclaimer is printed at the bottom of the form.

*Veterinarian-Client-Patient
Relationship Validation Form*

This form is titled "Drug Treatment Record Veterinarian Review Form" and features the FARM logo. It contains multiple rows for "Review Date" and "Veterinarian Signature", allowing for periodic reviews of drug treatments.

*Drug Treatment Record
Veterinarian Review Form*

This form is titled "Individual Animal Treatment Record" and features the FARM logo. It includes fields for "Animal ID Number" and "Date of Birth". The main part of the form is a table with columns for "Medication", "Dosage", "Frequency", "Route", "Start Date", "End Date", and "Remarks".

Individual Animal Treatment Record

This form is titled "Daily Treatment Record" and features the FARM logo. It includes fields for "Farm Name" and "Date". The main part of the form is a large grid with columns for "Date", "Animal ID", "Medication", "Dosage", "Frequency", "Route", and "Remarks".

Daily Treatment Record

This form is titled "Recommended or Approved Drug List for Dairy" and features the FARM logo. It includes a field for "Date" and "Signature". The main part of the form is a table with columns for "Drug Name", "Dosage", "Frequency", "Route", and "Remarks".

Recommended or Approved Drug List

Visit nationaldairyfarm.com for record keeping, drug management record forms and other free resources



Continuing Education

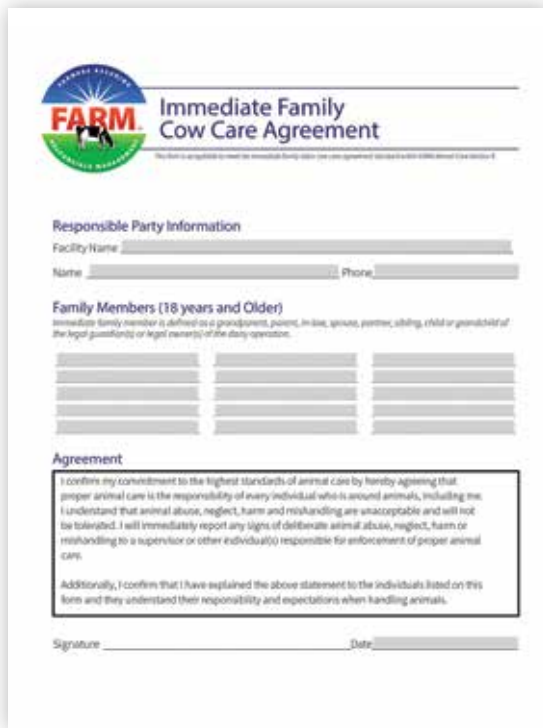


Management Checklist

- ✓ All family and non-family employees with animal care responsibilities must sign a cow care agreement annually.
- ✓ All family and non-family employees with animal care responsibilities are trained annually in proper stockmanship.
- ✓ Family and non-family employees with pre-weaned calf management responsibilities have been trained annually on the written protocol for pre-weaned calf management.
- ✓ Family and non-family employees with non-ambulatory animal management responsibilities have been trained annually on the written protocol for non-ambulatory animal management.
- ✓ Family and non-family employees with euthanasia responsibilities have been trained annually on written protocol for euthanasia.
- ✓ Family and non-family employees with determining fitness to transport responsibilities have been trained annual on written protocol for fitness to transport.

National Dairy FARM Animal Care continuing education standards are valid for all family and non-family labor (over age 18) with animal care responsibilities in the respective areas.

All non-family labor must have individualized documentation.



The form is titled "Immediate Family Cow Care Agreement" and features the FARM logo. It includes sections for "Responsible Party Information" with fields for Facility Name, Name, and Phone. The "Family Members (18 years and Older)" section includes a definition of family members and a table with columns for Name, Address, and Phone. An "Agreement" section contains a text box with a commitment statement and a signature line with a date field.

✓ All family and non-family employees with animal care responsibilities must sign a cow care agreement annually.

Humane handling and animal care should be part of the daily culture on the dairy – not just an annual training. Reinforce humane animal handling and animal care expectations throughout job expectations and daily functions. Animal abuse is never tolerated.

Continuing education and training give farm workers the opportunity to increase their knowledge and skill, which in turn makes them more valuable to the farm. No matter the size of the dairy, providing continuing education and training for family and non-family employees with 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 dairy's culture.

Continuing education and training should encompass care expectations for particular circumstances, like how to move cattle or what to do in case of emergency, as well as general expectations, like how to implement a specific protocol.

"Family" Defined

An immediate family member is defined as grandparent, parent, in-law, spouse, partner, sibling, child or grandchild of the legal owner(s) of the dairy operation.



When farm workers are given opportunities to broaden their knowledge and increase their skill level, they are more engaged and productive. Training and continuing education also allow a farm to hire entry-level workers and train them for the jobs for which they are needed, rather than trying to find workers that already have the needed skills and experience, which can be a challenge in communities with a limited labor pool.

Ultimately, training and developing workers is good for business and helps dairies remain competitive while dealing with a shortage of skilled, qualified workers.

Family Employees Continuing Education Criteria

On facilities with family employees, one family member can be accountable for and sign one cow care agreement on behalf of all family employees. Similarly, one family member can document and sign to confirm that other immediate family members (18 years and older) have been trained or provided continuing education in each required area.

Family and non-family employees with animal care responsibilities have been trained annually in proper stockmanship

- ✓ Family and non-family employees with pre-weaned calf management responsibilities have been trained annually on pre-weaned calf management written protocols. (See Chapter 7)
- ✓ Family and non-family employees with non-ambulatory animal management responsibilities have been trained annually on non-ambulatory animal management written protocols. (See Chapter 8)
- ✓ Family and non-family employees with euthanasia responsibilities have been trained annually on euthanasia written protocol. (See Chapter 9)
- ✓ Family and non-family employees who are responsible for determining fitness to transport have been trained annually on fitness to transport written protocol. (See Chapter 10)

Stockmanship

There are two primary concerns when handling dairy animals: animal comfort and safety, and animal caretaker safety. Animal caretakers should be trained or provided continuing education opportunities to learn proper handling techniques and appropriate use of restraint equipment. **Abuse is never tolerated.**

Animals should be handled by equipment appropriate for the procedure. Use of flags, plastic paddles and a stick with ribbon attached to it are appropriate for expanding the handler's presence but should not come in direct contact with the animal. **Management must be attentive to and correct excessive or routine aggressive contact, slapping or prodding.** In all cases, use the least amount of force necessary to control the animal while ensuring the safety of herd mates and animal caretakers.

All cattle restraint equipment and housing areas should have provisions for the humane release and removal of non-ambulatory or distressed cattle. Preferably, use equipment with emergency release devices.¹

For cattle, routine contact and gentle handling by humans beginning at birth will reduce fear and flight distance, make observation and treatment easier, improve productivity and enhance animal care. Cattle should be moved at a slow walk. Control the herd's speed in lanes and alleyways to prevent crowding at corners, gates and other narrow places in a facility.²

Never use a tail aggressively to move a cow. Tails can be broken through twisting, jacking or other rough handling. An observation of aggressive tail use can detect farm-wide problems in animal handling. A widespread presence of broken tails indicates that there is, or has been, a problem on the farm. Investigate patterns in tail breaks considering the age class affected, the location of the breaks within the tail, and by observing handling to determine when and how tails are being broken.

Noise

Loud noises are known to be unpleasant for cattle, so make every effort to minimize loud noises during routine management practices such as handling, milking and transport. In best practice, take care to minimize all noises, including noises from equipment and personnel. Dairy cows do not respond positively to excessive noise or yelling. Animal handlers should minimize noisy behavior and treat animals — and other employees — with respect.

Types of Continuing Education

Continuing education can be offered through a variety of methods. The following is a non-exhaustive list of opportunities and programs that can be used for annual continuing education and training:

- Discussions with or presentations from on-farm dairy industry stakeholder specialists
 - Veterinarians
 - Nutritionists
 - Technical service teams (pharmaceutical, reproduction, milk quality, etc.)
 - University and extension faculty and staff
 - Beef Quality Assurance state coordinators
- Attendance of dairy industry meetings
- Formal dairy employee training programs
- Job shadowing with management
 - Example: A newly hired milker job shadows a milking shift supervisor for a period of time. Management confirms with the milking shift supervisor that the new employee is appropriately trained and can begin milking independently.
- Formal education
 - Examples:
 - Animal husbandry classes at universities
 - Continuing education class offerings by dairy industry-led program (i.e., U.S. Dairy Education and Training Consortium, Penn State Online Dairy Production and Management, etc.)
- Print and digital media training
 - Examples:
 - Employees, over lunch break, watch the FARM stockmanship training video in 5-10 minute segments throughout the month.
 - Sharing relevant news articles in Dairy Herd Management on proper calf feeding techniques and nutritional requirements with a new weekend calf feeder.

A list of training aids and resources can be found on the National Dairy FARM Program website at nationaldairyfarm.com.

EXAMPLE RESOURCES

Immediate Family Cow Care Agreement

Responsible Party Information

Family Members (18 years and older)

Agreement

Cow Care Agreement

Stockmanship Training — Video and Quiz

1. What is the purpose of stockmanship?

2. What are the key components of stockmanship?

3. What are the key components of stockmanship?

4. What are the key components of stockmanship?

5. What are the key components of stockmanship?

6. What are the key components of stockmanship?

7. What are the key components of stockmanship?

8. What are the key components of stockmanship?

9. What are the key components of stockmanship?

10. What are the key components of stockmanship?

Stockmanship Training — Video and Quiz

PRE-WEANED CALVES

Agreement

1. What are the key components of stockmanship?

2. What are the key components of stockmanship?

3. What are the key components of stockmanship?

4. What are the key components of stockmanship?

5. What are the key components of stockmanship?

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8. What are the key components of stockmanship?

9. What are the key components of stockmanship?

10. What are the key components of stockmanship?

Pre-Weaned Calf Protocol

NON-AMBULATORY COWS

Agreement

1. What are the key components of stockmanship?

2. What are the key components of stockmanship?

3. What are the key components of stockmanship?

4. What are the key components of stockmanship?

5. What are the key components of stockmanship?

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8. What are the key components of stockmanship?

9. What are the key components of stockmanship?

10. What are the key components of stockmanship?

Non-ambulatory Cow Protocol

EUTHANASIA

Agreement

1. What are the key components of stockmanship?

2. What are the key components of stockmanship?

3. What are the key components of stockmanship?

4. What are the key components of stockmanship?

5. What are the key components of stockmanship?

6. What are the key components of stockmanship?

7. What are the key components of stockmanship?

8. What are the key components of stockmanship?

9. What are the key components of stockmanship?

10. What are the key components of stockmanship?

Euthanasia Protocol

FITNESS TO TRANSPORT

Agreement

1. What are the key components of stockmanship?

2. What are the key components of stockmanship?

3. What are the key components of stockmanship?

4. What are the key components of stockmanship?

5. What are the key components of stockmanship?

6. What are the key components of stockmanship?

7. What are the key components of stockmanship?

8. What are the key components of stockmanship?

9. What are the key components of stockmanship?

10. What are the key components of stockmanship?

Fitness to Transport Protocol

Visit nationaldairyfarm.com for more resources, and free continuing education and protocol templates

FARM encourages dairy producers to implement the **See it? Stop it!** program.

See it? Stop it! is a national initiative that confirms the culture of care that farm owners and managers demand of every person who comes in contact with their animals. The purpose is to:

- Highlight the integrity of the farm'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

Materials, both in English and Spanish, include a program overview, initiative values, poster, brochure, PowerPoint presentation and employee agreement and checklist. See it? Stop it! helps producers confirm their obligation to great animal care and their commitment to ensure those in contact with their animals do the same.





Facility Management

Management Checklist

Feed and Water

- ✓ All age classes of animals have access to clean water appropriate for climatic conditions.
- ✓ All age classes of animals have access to sufficient quantities of feed for maintenance, health and growth.

Protection from Heat and Cold

- ✓ All age classes of animals are protected from heat and cold for typical climatic conditions.

Housing

- ✓ All age classes of animals have housing that allows for the ability to easily stand up, lie down, adopt normal resting postures and have visual contact with other cattle without risk of injury.
- ✓ All age classes of animals have a resting area that is clean, dry, provides traction at all times when away from the milking facility and does not pose risk of injury.
- ✓ All age classes of animals have a method of daily exercise (weather permitting, if outdoors).

Facility Design

- ✓ Facilities are designed to prevent injuries, slips and falls of animals.
- ✓ Facilities are designed to prevent unnecessary contact with electrical currents.
- ✓ Facilities are designed to have adequate lighting for animal observation and family and non-family employees with animal care responsibilities safety.
- ✓ Facilities are designed to provide proper ventilation in all housing facilities that reduces odors, dust and/or noxious gas.

Emergency Preparedness

- ✓ The facility has names, telephone numbers and the site address posted in a prominent location, in the languages understood by family and non-family employees with animal care responsibilities, for emergency preparedness.
- ✓ The facility has a written emergency action/ crisis plan to effectively manage emergencies or crises that may occur.

Proper management of cattle housing environments has been linked to improved animal performance and overall well-being. Facilities include all housing structures, handling structures, lots, pens, stalls, alleys and pastures that are inhabited by cattle of any age.

Feed and Water

- ✓ All age classes of animals have access to clean water appropriate for climatic conditions.
- ✓ All age classes of animals have access to sufficient quantities of feed for maintenance, health and growth.

Nutritional management is key to excellent animal health. All animals should have consistent, daily access to adequate feed and water, according to their specific requirements. Rations should provide the required nutrients for maintenance, growth, stage of lactation, health and pregnancy based on an animal's life stage. Body condition scoring is a valuable outcomes-based measure that can be used to monitor the nutritional condition of the herd.

Water

Fresh, clean water is essential for animal health and well-being. Access to waterers — large tanks, troughs, buckets or fountains — is essential for cattle to satisfy their need for water. Waterers should be easily accessible for the animals to reach on demand and should accommodate the number of animals in the group (number, size and capacity).

Continuous access to water is best practice. When continuous access is not possible (i.e., in freezing climatic conditions), make water available at least twice per day and allow animals to drink to satiation. See TABLE 1 for the estimated water consumption requirements of dairy cattle.

Additional considerations for water include:

- Locate waterers near feed troughs and stalls
- Monitor and maintain water cleanliness through routine cleaning
- Provide access to water in return alleys from the milking parlor to promote consumption immediately after milking

TABLE 1: Estimated Water Consumption of Dairy Cattle

ESTIMATED DAILY WATER CONSUMPTION FOR A 1,500-POUND LACTATING COW PRODUCING 40 TO 100 POUNDS OF MILK DAILY. ^a						
Milk Production (lbs/day)	Estimated DM Intake (lbs/day)	Mean Minimum Temperature ^b				
		GALLONS PER DAY ^c				
		40°F	50°F	60°F	70°F	80°F
40	42	18.4	20.2	22.0	23.7	25.5
60	48	21.8	23.5	25.3	27.1	28.9
80	54	25.1	26.9	28.7	30.4	32.2
100	60	28.5	30.3	32.1	33.8	35.6

^aSodium intake = 0.18% of DM intake • ^bMean minimum temperature typically is 10 to 15°F lower than the mean daytime temperature • ^c1 gallon of water weighs 8.32 pounds.

Feed

As a best practice for animal health, routinely monitor feed quality and nutrient content of feed components.

By working with a dairy nutritionist, a dairy operation can evaluate its feeding program to ensure it meets the basic nutritional requirements for the animals' maintenance, growth, production, health and reproduction. Qualified dairy nutritionists can assist in formulating rations that economically meet nutritional requirements of animals. Dairy nutritionists can also:

- Check that feed and feed ingredients are carefully mixed and formulated according to the animals' dietary needs using dairy nutrition models
- Adjust rations to ensure the correct content of protein, energy, fiber, macro-minerals and micronutrients in feed whenever forages are changed
- Periodically assess dry matter intake
- Adjust diets to provide for production level
- If conditions warrant, check homegrown or purchased feed ingredients and commodities for nitrates, mycotoxins and other soil or climate-induced problems
- Check feed quality to see if it matches the manufacturer's statement

Feed Management

Animals should be provided feed on a continuous basis with new feed delivered several times daily or replenished through a push-up process.

Daily removal of non-consumed feeds ensures feed freshness, prevents mold and spoilage, and aids in insect control. This is a particularly important practice with high-moisture feeds like silage. A smooth feeding surface will enhance cleaning and routine sanitation of eating areas as refused feed is removed.

Safely storing bulk supplies of feed in appropriately designed areas will help avoid moisture, vermin and bacterial or fungal contamination. Proper storage will also help assure maintenance of feed quality and safety. As a best practice, **medicated feeds are stored separately and properly labeled**. Store toxic compounds outside of the feed storage area and outside of the animals' resting area.

Mycotoxins are secondary fungal metabolites that are toxic to animals and humans. Mycotoxin-producing molds are ubiquitous in nature and thus mycotoxin contamination of feeds is a potential consequence of normal mold plant interactions. Mycotoxin-related economic losses include reduced milk production, poor fertility, potential contaminated milk and increased disease susceptibility.

Protection from Heat and Cold

- ✓ All age classes of animals are protected from heat and cold for typical climatic conditions.

Environmental temperature affects an animal's thermal comfort, which in turn, affects an animal's behavior, metabolism and performance. The temperature that the animal experiences and the effect on the animal is the net result of air temperature, humidity, air movement, shade, insulating effects of the surroundings and the animal herself.

The thermoneutral zone (TNZ) is the range of temperatures between which the animal does not need to expend energy to stay warm or to cool. The TNZ for newborn calves is 50°-78° F; for month-old calves and adult cattle the TNZ is typically 32°-73° F. Except for newborn calves, cattle are quite cold tolerant. However, compared to humans, cattle become heat stressed at lower temperatures. To account for the impact of both temperature extremes and relative humidity, use the Temperature Humidity Index (THI) and begin heat abatement measures at a THI of 65°-72°. ^{1,2} Cold abatement should be provided promptly for calves starting at a THI below 50° and for adult cattle below 32°.

Heat Abatement

Monitoring cows' respiratory rates is the best way to determine if they are under heat stress. If 8 of 10 cows have respiratory rates of 60 beats per minute (BPM) or above, the group is suffering from heat stress.

A cow in severe heat stress can show respiration rates as high as 120 and 140 BPM and a rectal temperature exceeding 106° F.

With any amount of heat stress, milk yield losses are experienced and reproductive losses are detectable.

Under heat stress conditions, farmers should implement heat stress mitigation strategies.

These strategies may include:

Drinking Water

Cattle must have sufficient water access to meet their intake needs under heat stress conditions, which may exceed 30 gallons per cow per day for high-yielding cattle.³ Within housed conditions, at least two waterers are recommended per group with at least 2 inches of accessible trough perimeter per adult cow. Water troughs must also refill quickly for animals to continue drinking. Water flow should be at least 2.6 gallons per minute for bowls and 5-7 gallons per minute for troughs.

Shade

Cattle will readily use shade when solar radiation increases. Animals should have access to shade that allows for simultaneous use by the entire group to minimize competition.

Air Movement

Air movement speeds of 200-400 feet per minute are ideal for optimal cooling. To supply this fast-moving air in holding areas, pens and under shades, farmers can use mechanical ventilation systems like tunnel and cross ventilation or supplemental recirculation fans.

Soaking and Misting

Water can be used to cool the air before it reaches the cow. Evaporative cooling pad systems are one way to accomplish this. Water may also be used to enhance evaporative cooling by soaking the cow herself, often coupled with the application of fast-moving air over her skin. The parlor holding area is a priority area for cooling on most dairy farms.

Heat Stress: Factors & Management Tips

FIGURE 3

Heat Stress factors:








- Actual temperature and humidity** 
- Cow factors** (size, milk production, etc) 
- Degree of cooling that occurs at night** 
- Length of the heat stress period** 
- Ventilation and air flow** 
- Water Availability** 
- Hair coat depth** 

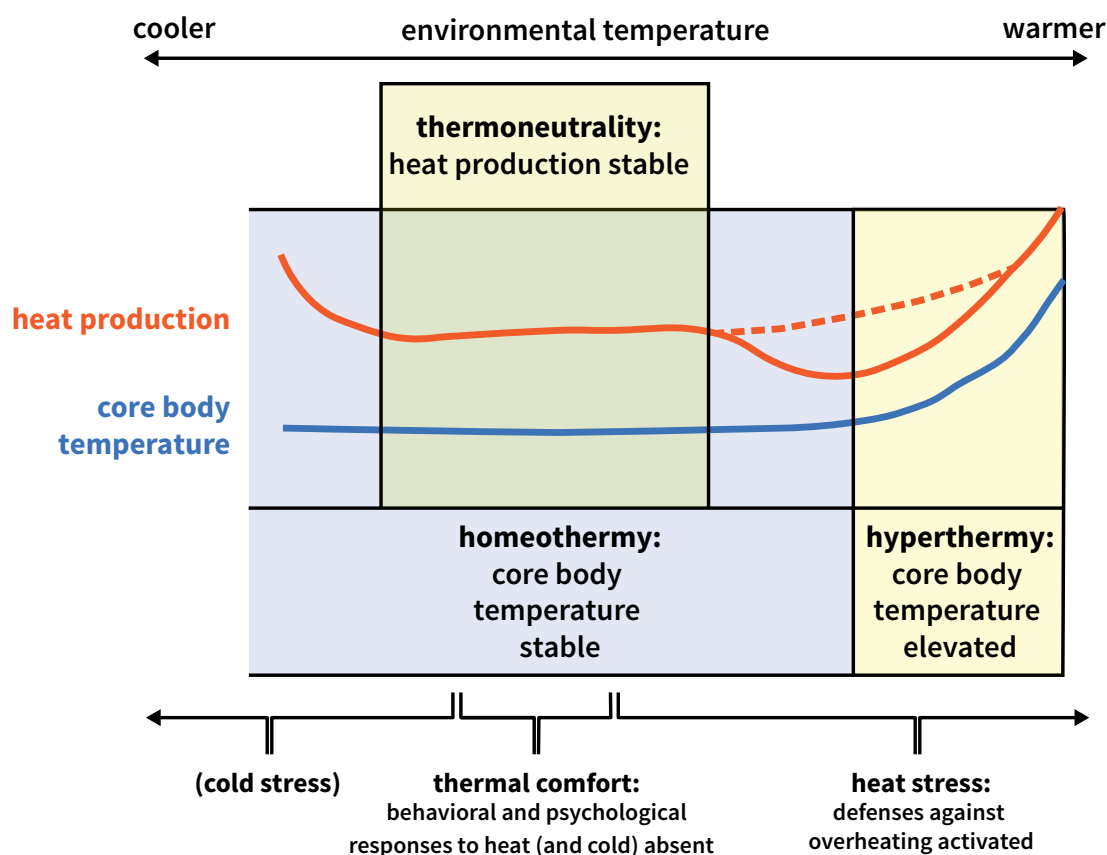
FIGURE 4

Management Tips:

- Provide shade** 
- Clean water tanks** 
- Feed during cooler hours** 
- Watch for inconsistent manure** 
- Ensure access to feed** 
- Use sprinklers and fans** 
- Reduce time in holding pens** 
- Don't lock up during midday** 

Source: Alltech (alltech.com/dairy-on-farm-support/resources)

FIGURE 5: Effects of Heat and Cold Stress



Source: "Considerations for Cooling Dairy Cows with Water" Jennifer M.C. Van Os, PhD

Cold Abatement

Cattle facing cold conditions, especially calves, should be provided with adequate feed to maintain body condition along with wind and moisture protection.

Cold abatement strategies may also include:

- Curtains
- Windbreaks
- Barns/sheds
- Additional bedding

It is important to shield a calf under 1 month of age from drafts, which typically are defined as air speeds of more than 50 feet per minute. The pre-weaned calf prefers dry bedding which is essential in cold weather climates. Consider higher milk feeding rates to supplement calories for growing calves and a deep bed of straw to allow for nesting. Clean calf jackets may also be used to supplement these strategies.

Housing

- ✓ All age classes of animals have housing that allows for the ability to easily stand up, lie down, adopt normal resting postures and have visual contact with other cattle without risk of injury.
- ✓ All age classes of animals have a resting area that is clean, dry, provides traction at all times when away from the milking facility and does not pose risk of injury.
- ✓ All age classes of animals have a method of daily exercise (weather permitting, if outdoors).

Cattle of all ages should be able to stand up, lie down and adopt normal resting postures within a given housing system. Factors that can affect these behaviors include the lying area surface, size and configuration.

Dairy cattle are highly motivated to spend time lying down and have been shown to reduce feeding time in order to secure a lying space.^{4,5} Therefore, it's important to provide a resting area that is clean, dry, provides traction at all times when away from the milking facility and does not pose risk of injury.

Social Environment

Cattle are herd animals. Socially isolated cattle show signs of stress:

- Increased heart rate
- Vocalization
- Defecation/urination
- Heightened cortisol levels^{8,9}

As a best practice, minimize isolation and maintain visual contact with other animals. The only exception is when cows approach calving.

Lying Area

Cattle have increased lying time in well-bedded environments, which reduces the risk for lameness.^{6,7} The most important indicator of an insufficient lying surface is the presence of hock injuries. Cows kept on deep, loosely bedded stalls of sand or dried manure solids, for instance, consistently have fewer hock injuries than those kept on sparsely bedded surfaces.¹⁰ In addition, appropriate bedding materials and manure removal help control mastitis. Bedding should be smoothed and groomed as often as is necessary to keep the surface clean, soft and dry.¹¹ Regardless of lying area surface, lack of adequate bedding reduces lying time and increases the risk of lameness and injuries.^{12,13,14,15}

Bedding should be dry in best practice. Several research studies provide strong evidence that cattle spend less time lying down in wet bedding or mud and will avoid wet surfaces if given a choice.¹⁶ Dryness is also important for bedding to provide insulating properties, which is particularly important for young calves in cooler weather. Dairy calves also show a clear preference for drier bedding and aversion to concrete lying surfaces, indicating that access to dry bedding is also important for growing calves.¹⁷

The lying area should be 1 to 2 feet higher than the pen surface and located under the pen shades, if used. Daily grooming is necessary if cattle cooling systems are used under the shade. A best practice is to provide bedding under the shade during extreme cold or wet conditions. Current recommendations for freestall design and space provision for heifers and mature cows are provided in **Tables 2 and 3** (see pages 36 and 37).

The tables and images on the following pages provide recommended guidance for space requirements of animals in various housing systems.

TABLE 2: Recommendations for lying space requirements by estimated body weight for bedded pack housing of adult cows.

ADULT COWS

Stall Dimensions (inches)	Body Weight Estimate (lbs)					
	1000	1200	1400	1600	1800	2000
Center-to-center stall divider placement (stall width) (A)	42	45	48	50	54	57
Total stall length facing a wall (B1)	96	108	108	120	120	126
Outside curb to outside curb distance for head-to-head platform (B2)	180	192	192	204	204	216
Distance from rear curb to rear of brisket locator (C)	64	66	68	70	72	75
Width of rear curb (D)	6-8	6-8	6-8	6-8	6-8	6-8
Horizontal distance between rear edge of neck rail and rear edge of curb for mattress stalls (E)	64	66	68	70	72	75
Horizontal distance between rear edge of neck rail and rear edge of curb for bedded stalls (E)*	58	60	62	64	66	69
Distance from rear edge of divider loop to point of curb (F)	9	9	9	9	9	9
Height of brisket locator above top of curb (loose bedded stall or mat/mattress surface) (G)	3	3	4	4	4	4
Height of upper edge of bottom stall divider rail above top of curb (loose bedded stall or mat/mattress surface) (H)	10	10	12	12	13	14
Interior diameter of the stall divider (loop) (I)	30	33	33	36	36	36
Height of neck rail above top of curb (loose bedded stall or mat/mattress surface) (J)	42	45	48	50	52	54
Obstruction height (K)	5-35	5-35	5-35	5-35	5-35	5-35
Horizontal distance from brisket locator to loop angle (L)	20-22	20-22	20-22	20-22	20-22	20-22
Rear curb height (M)	8	8	8	8	8	8

**E in deep, loose-bedded stalls is less than in mattress stalls to encourage cows to stand with rear feet in alley instead of on stall base. From The Dairyland Initiative: thedairylandinitiative.vetmed.wisc.edu*

TABLE 3: Recommendations for lying space requirements by estimated body weight for bedded pack housing of heifers.

HEIFERS

Weight (lbs)	<130	135	220	330	440	660	880	1100
Bedded resting area per animal in square feet	35	35	35	35	35	40	50	60

From The Dairyland Initiative: thedairylandinitiative.vetmed.wisc.edu

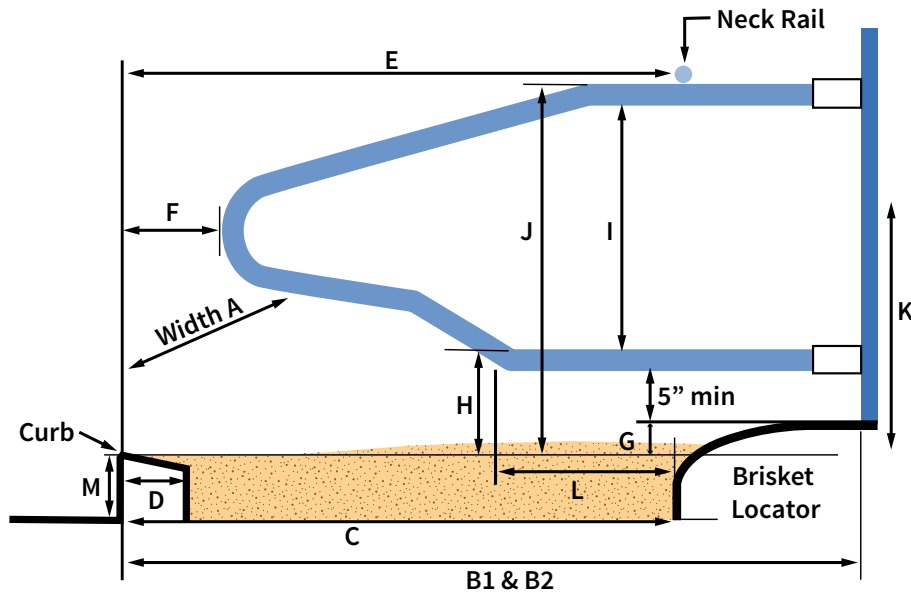
Stall Considerations

Stall dimensions should always be considered relative to the size of the animals using them, cattle genetic improvements and their effect on size of future herd members, and cattle behavior when using stalls. Sufficient space should exist for each animal to lie down without disturbance from neighbors, and stalls should be designed to allow for the normal rising and lying movements of the cow. Unobstructed lunge space is essential to allow cattle to complete the normal rising movement.

Longer stalls improve leg health and cows spend more time lying down in wider stalls.^{18,19} Stall dimensions (stall width, bricket boards and neck rail placement) and tiestall chain length should be set to maximize cow comfort and lying area use.

Keeping a tiestall clean should not mean sacrificing the ability for cows to use the stall for lying and standing. Less restrictive neck rails that are further from the curb and higher allow for the cow to move fully into the stall and have been shown to reduce lameness.²⁰

FIGURE 6: Stall Dimensions for Lying Space Requirements



From The Dairyland Initiative: thedairylandinitiative.vetmed.wisc.edu

Space Allowance

In loose housing systems, increased cow density in the pen increases competition among cows for access to feed,²¹ stalls²² and water. Cattle management must accommodate these challenges so that all animals within a pen receive adequate nutrition and water without competitive pressure. In best practice, all animals should have access to a sanitary and comfortable place to rest and eat at any given time.

The implications of overstocking barns are complex. In studies where only the number of freestalls are changed and feeding space is held constant, lying time is always reduced when there are fewer stalls than cows. However, on farms where stocking density affects both the number of stalls available and feeding space, overstocking is not an important predictor of lying time but does increase feeding rate.²³

Exercise

Regardless of age, all animals should be in an environment where they're able to turn around or locomote each day.

Exercise for tied animals provides opportunities for grooming the back of the body, social grooming and walking/trotting.^{24,25} Controlled studies show that exercise may also improve hoof health.^{26,27}

Exercise area quality is important and, in best practice, minimizes any risk for injury. Tied cattle should have daily exercise (weather permitting, if outdoors) in an area that is clean, dry and of appropriate flooring material.

Facility Design

Flooring

- ✓ **Facilities are designed to prevent injuries, slips and falls of animals.**

Concrete flooring surfaces should be appropriately grooved or textured to reduce the risk of animals slipping, which can result in injuries, and should be designed such that they do not cause injury. Skid-resistant surfaces reduce injuries and must retain their non-slip characteristic after cleaning, scraping or wear.

High-traction, rubber flooring is desirable in areas of the facility where cows stand for prolonged periods (i.e., holding area), in transfer lanes to reduce hoof wear and in other areas to reduce the risk of slipping and injury. Plans should exist to minimize the impact of seasonal changes that reduce traction, like ice. It is essential for all maternity areas to have high-traction flooring given the increased number of standing periods during labor.²⁸

Electrical Currents

- ✓ **Facilities are designed to prevent unnecessary contact with electrical currents.**

Crowd gates, electrical fences and stall trainers are among the many sources of electrical currents on farm. Ensuring the proper functioning of equipment with electrical current reduces the chances of negative animal care and health events. Tools should be regularly and appropriately adjusted, maintained and correctly located, so that cows are not subject to continuous electrical current. Stray voltage checks are also valuable as stray voltage can cause behavior changes and milk production loss.

Lighting

- ✓ **Facilities are designed to have adequate lighting for animal observation and family and non-family employees with animal care responsibilities safety.**

Lighting should allow inspection of animals by family and non-family employees and provide safe working conditions.

In facilities where animals are routinely observed or handled, like for milking or estrus observation, lighting should be evenly distributed. An outdoor light attached to a corral or building where animals congregate provides sufficient illumination for safety purposes.

Air Quality

- ✓ **Facilities are designed to provide proper ventilation in all housing facilities that reduces odors, dust and/or noxious gas.**

Air quality can be improved through manure management and good air movement provided by well-designed natural or mechanical ventilation systems. Adequate ventilation helps prevent respiratory and other diseases by removing heat, microbes, water vapor, air pollutants and odors from an enclosed animal facility and replacing contaminated air with fresh air.

Ventilation also modifies the indoor air temperature, so supplemental heating and cooling may be needed when temperature control is critical. Effective barn ventilation will provide a minimum of four air changes per hour in the winter and 40-50 air changes per hour in the heat of the summer.

The risk of infection from airborne pathogens may be minimized by segregating or isolating animals with highly contagious diseases from the air space occupied by the rest of the group/herd, and by ensuring adequate ventilation rates. As a best practice, ensure the ventilation system does not move air from infected animals to areas occupied by healthy animals.

Emergency Preparedness

- ✓ **The facility has names, telephone numbers and the site address posted in a prominent location, in the languages understood by family and non-family employees with animal care responsibilities, for emergency preparedness.**

Time is of the essence in emergency situations. Telephone numbers of emergency contacts (e.g., herd manager, owner, veterinarian, site address and co-op/processor) should be posted in a prominent place in the animal facility. The posting should be in employees' native languages to enhance communication and response time.

Emergencies can range from significant weather events to unexpected absences. Routine walk-throughs of emergency action plans with all involved individuals can help everyone understand their respective roles and ensure the emergency is managed as intended.

- ✓ **The facility has a written emergency action/ crisis plan to effectively manage emergencies or crises that may occur.**

Animal caretaker or temporary help arrangements should be made to cover emergencies, weekends, holidays and unexpected absences of assigned animal caretakers. All animal caretakers, including temporary help, must be informed of animal care expectations and qualified to perform assigned duties.

Emergency communications can be sped up by posting the names and telephone numbers of emergency contacts (e.g., herd manager, owner, veterinarian, site address, equipment dealers and power company) in a prominent place in the animal facility in employees' native languages.

Emergency action plans should include:

- Identification of potential emergency situations
- The following components for each potential emergency situation:
 - Actions to take for the situation
 - Designated people in charge of performing actions
 - Individuals given authority to perform specific action when 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 training documentation on the execution of the emergency plan for all involved, including employees and first responders
 - Response scenario options
 - Sheltering in place

Review the [Comprehensive Emergency Action Plan Guidance](#) in the **FARM Resource Library**.

EXAMPLE RESOURCES



FARM EMERGENCY CONTACTS

NAME: _____ PHONE: _____
ADDRESS: _____
OWNER/MANAGER: _____ PHONE: _____

FOR GENERAL EMERGENCY SERVICES, CALL 9-1-1

LOCAL HERO VETERINARIAN
NAME: _____ PHONE: _____

FEED DEALER
NAME: _____ PHONE: _____

MILK HANDLER/FIELD REPRESENTATIVE
NAME: _____ PHONE: _____

MILK HAULER
NAME: _____ PHONE: _____

MILK EQUIPMENT DEALER
NAME: _____ PHONE: _____

MACHINERY DEALER
NAME: _____ PHONE: _____

OTHER CONTACTS
NAME: _____ PHONE: _____
NAME: _____ PHONE: _____

Emergency Contact — Poster



FARM EMERGENCY CONTACTS

NAME: _____ PHONE: _____
ADDRESS: _____
OWNER/MANAGER: _____ PHONE: _____

FOR GENERAL EMERGENCY SERVICES, CALL 9-1-1

LOCAL VETERINARIAN
NAME: _____ PHONE: _____

FOR GENERAL EMERGENCY SERVICES, CALL 9-1-1
IN CASE OF EMERGENCY, CALL 9-1-1

Emergency Contact — Magnet



FARM Comprehensive Emergency Action Plan Worksheet

1. Name of Farm: _____

2. Name of Owner/Manager: _____

3. Address: _____

4. Phone: _____

5. Local Hero Veterinarian: _____

6. Feed Dealer: _____

7. Milk Handler/Field Representative: _____

8. Milk Hauler: _____

9. Milk Equipment Dealer: _____

10. Machinery Dealer: _____

11. Other Contacts: _____

Emergency Action Plan

Visit nationaldairyfarm.com for free forms and other resources.



05

Animal Management

Management Checklist

Herd Health Plan & Protocols

- ✓ All written protocols are translated into languages understood by family and non-family employees with animal care responsibilities.
- ✓ The written herd health plan includes an effective written protocol for treatment of the following **common diseases**:
 - Mastitis
 - Metritis
 - Metabolic diseases of milk fever, ketosis and displaced abomasum (DA)
 - Pneumonia, diarrhea and any additional routinely occurring diseases identified by the veterinarian
- ✓ The written herd health plan includes an effective written protocol for **vaccinations** that specifies:
 - Age(s) when vaccination given
 - Product used
 - Dosage administered
 - Route of administration
 - Withdrawal times
- ✓ The written herd health plan includes an effective written protocol for **lameness** prevention and treatment.
- ✓ The facility has an effective written protocol for **milking procedures**.
- ✓ The written herd health plan includes an effective written protocol for managing **difficult calvings (dystocia)**.
- ✓ The written herd health plan includes an effective written protocol to manage **pests**.
- ✓ The written herd health plan includes an effective written protocol to manage **flies**.
- ✓ The written herd health plan includes an effective written protocol to manage **parasites**.
- ✓ The facility has an effective written protocol to manage **biosecurity**.

Castration

- ✓ Bulls being raised as dairy steers are castrated at earliest age possible.
- ✓ Pain mitigation for castration is provided in accordance to the signed protocol by the Veterinarian of Record.
- ✓ The written herd health plan includes an effective written protocol for castration.

Branding

- ✓ Cattle are branded at the earliest age possible.
- ✓ Pain mitigation for branding is provided in accordance with the signed protocol by the Veterinarian of Record.
- ✓ The herd health plan includes an effective written protocol for branding.

Animal Management Observations

- ✓ Each animal is permanently identified.
- ✓ The facility complies with the ban on routine tail docking.

Outcomes-Based Animal Observations

- ✓ 99% or more of pre-weaned calves (>2 days old), post-weaned heifers and lactating cows observed have a body condition score of 2 or greater on FARM body condition scorecard.
- ✓ 95% or more of lactating cows observed do not have broken tails.
- ✓ 90% or more of pre-weaned calves (>2 days old), post-weaned heifers, pre-fresh heifers/dry cows and lactating cows observed score 2 or less on the FARM hygiene scorecard.
- ✓ 95% or more of the lactating cows observed score 2 or less on the FARM knee scorecard.
- ✓ 95% or more of the lactating cows observed score 2 or less on the FARM hock scorecard.
- ✓ 95% or more of the lactating cows observed score 2 or less on the FARM locomotion scorecard.

Herd Health Plan & Protocols

- ✓ **All written protocols are translated into languages understood by family and non-family employees with animal care responsibilities.**

Use written protocols to train family and non-family employees, and ensure job responsibilities are performed as intended. Protocols should provide enough detail to ensure that employees are empowered to implement their job responsibilities consistently and accurately. To ensure the best understanding of job expectations, protocols should be translated into languages understood by those with animal care responsibilities. Written protocols can use images or other learning tools to enhance the understanding of the protocol's content.

Common Diseases

- ✓ **The written herd health plan includes an effective written protocol for treatment of the following common diseases:**
 - *Mastitis*
 - *Metritis*
 - *Metabolic diseases of milk fever, ketosis and displaced abomasum (DA)*
 - *Pneumonia, diarrhea and any additional routinely occurring diseases identified by the veterinarian*

An effective herd health plan emphasizes prevention, rapid diagnosis and quick decision making on the necessary treatment of all sick animals. A licensed veterinarian should help dairy farmers develop and implement a herd health plan.

Vaccination

- ✓ **The written herd health plan includes an effective written protocol for vaccinations that specifies:**
 - *Age(s) when vaccination given*
 - *Product used*
 - *Dosage administered*
 - *Route of administration*
 - *Withdrawal times*

A very important component of antimicrobial stewardship is prevention of disease. Vaccinations can help prevent or reduce disease effects, which ultimately can decrease the need for antimicrobial therapy. The VOR is the ideal resource to assist the farm with developing a vaccination protocol. The protocol should include the type of vaccine to use, vaccine storage and administration.

In general, a basic vaccination program should be used on every farm to enhance immunity to disease. Further vaccination strategies can be implemented based on the veterinarian's knowledge of the herd's disease history and farm risk.

Lameness

- ✓ **The written herd health plan includes an effective written protocol for lameness prevention and treatment.**

Lameness is caused by painful lesions to the limb or foot and compromises animal welfare. Lameness interferes with normal resting behavior, movement to and from the milking area, and feeding activity. Lameness also limits the expression of estrus and influences general health.

Lameness should be a management priority for all dairy herds. Foot lesions most associated with dairy cattle lameness include infectious diseases like digital dermatitis (hairy heel wart) and foot rot, as well as non-infectious diseases like white line lesions and sole ulcers.

Lameness may be reduced by:

- Routine surveillance for lame cows coupled with prompt, effective treatment
- Routine use of foot baths
- Improved flooring
- Providing adequate time for daily rest by minimizing time out of the pen to less than three hours per day
- Avoiding overstocking
- Maintaining thermoneutral zone
- Preventive hoof trimming

Milking Procedures

✓ The facility has an effective written protocol for milking procedures.

Appropriate animal handling at milking is important for both animal well-being and productivity. Numerous studies have found that farms with quiet, confident animal caretakers have higher milk production. All animal caretakers with milking responsibilities should behave in a calm and controlled manner throughout the milking process. Milkers should be trained to load cows into the parlor in accordance with the stockmanship principles outlined in Chapter 3.

Specifically:

- Cows should be moved without excessive vocal or physical interaction, resulting in calm parlor movement.
- Animal handlers should walk against the flow of cows coming into the parlor, paying attention to the reaction of the cattle and adjust for balking or stopping. To return to their starting positions, animal handlers should use a path that does not impede the flow of cattle movement.
- Gates and restraining equipment should operate smoothly, quietly and safely.

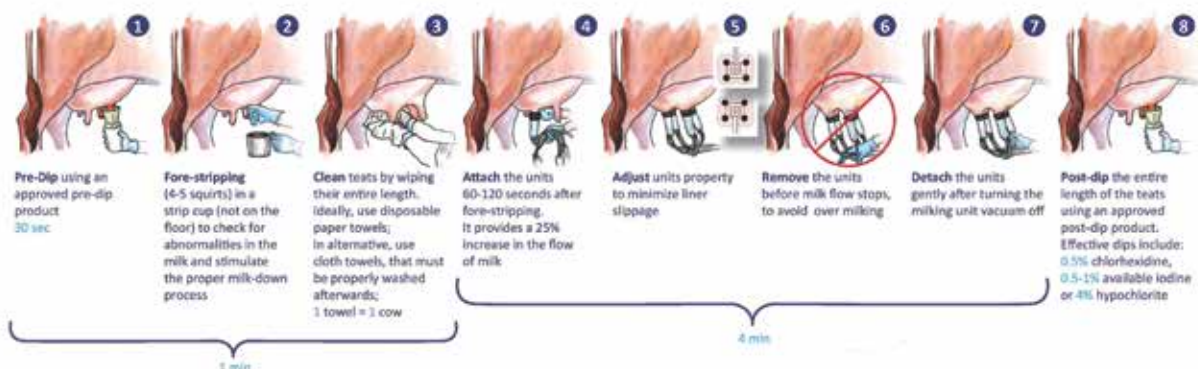
Ideally, the total time out of the pen for each milking should be less than one hour for the last cow milked. On farms with a parlor, the pre-milking holding area is typically the place of highest animal density on the farm and should be a focus for prevention of injury as well as cow comfort and movement. The design of the holding area's flooring, space, sidewalls and entrance to the milking parlor should take these factors into account. Animal comfort can be ensured in holding areas and the milking parlor by using fans, sprinklers or other technology to moderate temperature extremes.

The preparation routine that signals the beginning of milking should be consistent and as low stress to the cow as possible. The routine should include checking for abnormal milk, and thorough cleaning and drying of the teats. Avoid medical examinations or unpleasant experiences being associated with the place of milking.

Milking equipment should be regularly maintained and checked for vacuum level, pulsation rate and pulsation ratio. To prevent disease transmission, milking equipment must be maintained, cleaned and sanitized. Teat ends should be periodically inspected to facilitate timely identification of equipment problems.



FIGURE 7: Example Milking Procedure



Source: *Best Dairy Farming Practices*, published by SAFOSA

Difficult Calvings

- ✓ **The written herd health plan includes an effective written protocol for difficult calvings (dystocia).**

Dystocia is a difficult birth typically requiring assistance from the animal caretaker. The facility must have a herd health plan including an effective written protocol for animal caretakers to handle difficult calvings. The protocol should include items like when to intervene and what is appropriate equipment to use when assisting an animal that is experiencing a difficult calving.

Pest, Flies and Parasite Control

- ✓ **The written herd health plan includes an effective written protocol for pest control, flies and parasites.**

Pest, parasite and fly control are part of a thorough herd health program because they transmit diseases and interfere with animal comfort.

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.

Biosecurity

- ✓ **The facility has an effective written protocol for biosecurity¹.**

A biosecurity protocol helps prevent exposing cattle to diseases that may be transmitted from other animals, humans, vehicles or additional external sources. Sound biosecurity protocols allow for a dairy operation to maintain business continuity and animal health and well-being.

A biosecurity protocol may include processes around:

- Cleaning and disinfection
- Vehicles and equipment
- Personnel
- Animal movement
- Product movement
- Carcass disposal
- Manure management
- Parasite, pest and fly control
- Feed

Castration

- ✓ **Bulls being raised as dairy steers are castrated at earliest age possible.**
- ✓ **Pain mitigation for castration is provided in accordance to the signed protocol by the Veterinarian of Record.**
- ✓ **The written herd health plan includes an effective written protocol for castration.**

Castration is performed to prevent unwanted mating by stopping the production of male hormones and semen. In addition, castration produces cattle that are less aggressive and easier to handle, which promotes animal and human safety. Bulls being raised as dairy steers should be castrated at the earliest age possible.

There is scientific evidence that castration is acutely painful regardless of the method used. While obstacles to immediate implementation exist, research suggests that application of local analgesics have the potential to minimize or eliminate pain and stress associated with castration.

The most common methods of castration are surgical, banding and Burdizzo (physical crushing of the cord). Farmers should consult their veterinarian to determine the right methods of castration and pain management.

Although banding results in minor discomfort at the time of castration, numerous studies have found that cattle show signs of pain for up to several weeks following the application of the band or ring. Surgical and Burdizzo castration may be better options from an animal care perspective. The advantage of these two methods is that pain can be minimized by providing immediate pain mitigation at the time of surgery as well as post-operative analgesia.

Branding

- ✓ **Cattle are branded at the earliest age possible.**
- ✓ **Pain mitigation for branding is provided in accordance with the signed protocol by the Veterinarian of Record.**
- ✓ **The written herd health plan includes an effective written protocol for branding.**

In some cases, branding is required by state law or is used to prevent theft and identify ownership. A facility's herd health plan should include a written protocol for branding if it is conducted at the facility. Cattle should be branded at the earliest age possible. Brands must never be applied to the face. Pain mitigation should be provided in accordance with the signed protocol by the VOR.

Little is known about how to alleviate the pain associated with hot iron and freeze branding, although freeze branding has been shown to be less painful.² Recent research has shown that wounds incurred from branding are immediately painful regardless of anesthetics or non-steroidal anti-inflammatory drugs (NSAIDS) used at the time of procedure and remain painful for at least eight weeks afterwards.

Under best practice, farms should work with their veterinarian to evaluate the necessity of branding, opting to use other forms of identification such as tamper-proof radio-frequency identification (RFID) if possible.

Animal Management Observations

- ✓ **Each animal is permanently identified.**

Animal identification and record keeping are critical for making important management decisions about feeding, grouping, selecting, treating, breeding and culling an animal from the herd. In addition, food safety, foreign animal disease threats and bio/agro-terrorism concerns make premise and individual animal identification a necessity.

In 2012, the U.S. Department of Agriculture (USDA) finalized the Animal Disease Traceability (ADT) rules establishing general regulations for improving the traceability of U.S. livestock moving between states. Under the ADT final rule, all dairy cattle females, regardless of age, and all male dairy cattle, including dairy steers born after March 11, 2013, are required to be officially identified by a device or method approved by USDA³ prior to interstate movement. The FARM Program recommends using 840-RFID ear tags⁴, which USDA recognizes as an official identification device for the lifetime of an animal.

Other acceptable permanent individual animal identification include:

- Brite tags
- Vaccination tags
- Dangle tags
- Button tags
- Tattoo
- Ranch brand with cow number

✓ **The facility complies with the ban on routine tail docking.**

The National Dairy FARM Program opposes the routine tail docking of dairy animals, except in the extraordinary case of traumatic injury to an animal. This practice was phased out under FARM Program standards as of January 1, 2017.

Current scientific literature indicates that routine tail docking provides no benefit to the animal or quality of the milk. The AVMA, AABP and the National Mastitis Council all oppose the routine tail docking of cattle. Switch trimming is the recommended alternative.

Making the Switch

Switch trimming is the best management practice a farmer can use to transition away from tail docking. Evaluate the timing and method of the procedure to ensure it meets a farm's individual needs.

There are many switch trimming tools, including hand shears, scissors and clippers. Regardless of method, family and non-family employees should be appropriately trained on how to switch trim.

Successfully transitioning away from tail docking also includes being considerate and aware of cows' full tails.

Areas where additional training should be focused may include:

- Stall, alley, walkway and parlor cleanliness
- Attaching milking units: tails may need to be gently moved to the side to access the udder
- Animal movement around barriers (i.e., gates with latches)

Family and non-family employees should also wear eye protection to protect eyes from any foreign objects, liquids, etc.

Facility management is important to the transition as well. High-quality milk is achievable by following consistent milking procedure protocols. Also, routine cleaning, raking and scraping manure from stalls, alleys, walkways and the parlor during and/or in between each milking time will help maintain cleanliness of animals and facilities.

Source: nationaldairyfarm.com/wp-content/uploads/2018/10/Making-the-Switch_0.pdf



Outcomes-Based Animal Observations

Observing outcomes-based animal measures is the best way to evaluate the care of animals on the farm. Hygiene, locomotion, body condition, hock and knee lesions and broken tails are areas used to demonstrate care. The guidelines that follow are based on review of extensive data in all areas of observation and the opinion of experts in dairy cattle care. Thresholds are set based on consensus among a group of experts and available data. These thresholds and scoring systems are revisited every three years.

- ✓ **99% or more of pre-weaned calves (>2 days old), post-weaned heifers and lactating cows observed have a body condition score of 2 or greater on FARM body condition scorecard.**

Achieving heifer growth targets and monitoring change in body condition during gestation and lactation are very important. Body condition can change rapidly at and after calving and can be used to guide ration changes. Body condition scoring for dairy cattle is an important management tool for optimizing milk production and reproductive efficiency, while reducing the incidence of metabolic and other peripartum diseases. Heifers and cows overconditioned at the time of calving (BCS > 4) often have lower feed intake and increased incidence of peripartum problems. A BCS loss of more than 1 point during early lactation is excessive and requires farmer and nutritionist attention.

- ✓ **95% or more of lactating cows observed do not have broken tails.**

The tail must never be used aggressively to move a cow.

Calm and appropriate handling does not harm the animal. Tails can be broken through twisting, jacking or other rough handling. This animal observation is set to detect farm-wide problems in animal handling. The widespread presence of broken tails indicates that there is or has been a handling and stockmanship breakdown. Investigate

patterns in tail breaks, consider the age class affected, the location of the breaks within the tail, and observe handling to determine when and how tails are being broken.

- ✓ **90% or more of pre-weaned calves (>2 days old), post-weaned heifers, pre-fresh heifers/dry cows and lactating cows observed score 2 or less on the FARM hygiene scorecard.**

Proper sanitation and cleanliness helps keep animals dry, clean and free of manure, while also providing them with a comfortable environment. The goals of facility sanitation are to:

- Maintain a clean and dry resting area for the animal
- Minimize animal disease
- Minimize generation of odors and dust
- Minimize pests and parasites
- Minimize spread of pathogens

Basic sanitation practices include keeping facility interiors, corridors and storage spaces clean. Facilities should be free of standing water, excess manure, unnecessary farm items and clutter. Feed and bedding should be clean and dry, even in areas with minimal housing and rainfall. Animal caretakers should also maintain a level of cleanliness to minimize the spread of pathogens.

Open lot facilities may need to be scraped clean and refilled with uncontaminated materials. Removing cattle from an open lot for a short period of time may help eliminate muddy pasture areas.

Regularly remove manure from facilities. Clean walkways and ensure good traction. Standing manure not only impacts udder and leg cleanliness, but it also contributes to lameness problems described within the checklist items that follow. In best practice, all lying areas should be clean, dry and groomed.

Cleanliness of belly and flank are often an outcome of the dryness of the resting area. Cattle prefer dry lying areas and spend more time resting on dry surfaces.

✓ **95% or more of the lactating cows observed score 2 or less on the FARM knee scorecard.**

✓ **95% or more of the lactating cows observed score 2 or less on the FARM hock scorecard.**

Skin injuries on cattle tend to occur on areas that are in contact with housing elements, with the most common injuries observed on the knees and hocks. These injuries range from a small area of hair loss to open wounds and are sometimes accompanied by infection and swelling of the joint. A healthy hock is free from hair loss and swelling. Skin breakage provides an opportunity for infection to occur, which can lead to swelling, pain and lameness.

A series of studies shows that the risk of hock injuries can be greatly reduced by using deep bedding. Lesions are more common on farms using poorly bedded surfaces like mats and mattresses.^{5,6}

✓ **95% or more of the lactating cows observed score 2 or less on the FARM locomotion scorecard.**

Lameness is caused by painful lesions to the limb or foot and compromises animal welfare. Lameness interferes with normal resting behavior, movement to and from the milking area and feeding activity. Lameness also limits the expression of estrus and influences general health.

Lameness should be a management priority for all dairy herds. Foot lesions most associated with dairy cattle lameness include infectious diseases like digital dermatitis (hairy heel wart) and foot rot, as well as non-infectious diseases like white line lesions and sole ulcers.

Lameness may be reduced by:

- Routine surveillance for lame cows coupled with prompt, effective treatment
- Routine use of foot baths
- Improved flooring
- Providing adequate time for daily rest by minimizing time out of the pen to less than three hours per day
- Avoiding overstocking
- Maintaining thermal neutral zone
- Preventive hoof trimming

EXAMPLE RESOURCES

BIOSECURITY
Objective: To control the spread of disease by preventing or limiting contact with disease-causing organisms.

Additional Questions:

When do you have visitors?	
When is a visitor required?	
When should visitors be limited?	
When should visitors be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Biosecurity Protocol

BRANDING
Objective: To control the safety, quality, and consistency of branded products.

Additional Questions:

When do you brand your products?	
When should branding be limited?	
When should branding be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Branding Protocol

CASTRATION
Objective: To control the safety, quality, and consistency of castrated products.

Additional Questions:

When do you castrate your products?	
When should castration be limited?	
When should castration be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Castration Protocol

Disease & Illness Treatment

When do you treat disease or illness?	
When should treatment be limited?	
When should treatment be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Disease & Illness Treatment Protocol

FLY CONTROL
Objective: To control the amount of fly infestation.

Additional Questions:

When do you control fly infestation?	
When should fly control be limited?	
When should fly control be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Fly Control Protocol

LAMENESS PREVENTION & TREATMENT
Objective: To control the amount of lameness in dairy animals to ensure animal welfare and milk quality.

Additional Questions:

When do you prevent or treat lameness?	
When should lameness prevention or treatment be limited?	
When should lameness prevention or treatment be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Lameness Prevention & Treatment Protocol

MILKING PROCEDURE
Objective: To control the amount of milk and ensure the safety and consistency of milk production.

Additional Questions:

When do you milk your animals?	
When should milking be limited?	
When should milking be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Milking Procedure Protocol

PARASITE CONTROL
Objective: To control the amount of parasite infestation.

Additional Questions:

When do you control parasite infestation?	
When should parasite control be limited?	
When should parasite control be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Parasite Control Protocol

PEST CONTROL
Objective: To control the amount of pest infestation.

Additional Questions:

When do you control pest infestation?	
When should pest control be limited?	
When should pest control be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Pest Control Protocol

VACCINATION
Objective: To control the amount of vaccine and ensure the safety and consistency of vaccination.

Additional Questions:

When do you vaccinate your animals?	
When should vaccination be limited?	
When should vaccination be restricted?	

Additional Protocol Specifications:

Additional Protocol Specifications:

Additional Protocol Specifications:

Vaccination Protocol

Visit nationaldairyfarm.com for free forms and other resources.



06

Antibiotic Stewardship

Management Checklist

- ✓ The facility adheres to all withdrawal times for milk. All official samples of sold milk have tested negative for antibiotics in the last three years.
- ✓ The facility adheres to all withdrawal times for meat. All meat tissues from animals sent for meat production have tested negative for violative residues in the last three years.

The U.S. dairy industry is committed to producing the highest quality, safe, abundant and affordable milk and dairy beef. Healthy animals help make for safe food, and disease prevention is the key to keeping cows healthy.

When dairy animals get sick and treatment is necessary, farmers and veterinarians use antibiotics and other drugs carefully. Antimicrobials must be used appropriately under veterinary guidance to

prevent residues from occurring in milk and dairy beef. The marketing of milk or dairy beef with drug residues, even unintentionally, is illegal and can result in financial and criminal penalties.

Dairy farmers realize the importance of eliminating drug residues in milk and dairy beef. Farmers can take the following steps to mitigate or lessen the chances of antibiotic residues.

FOOD ANIMAL RESIDUE AVOIDANCE DATABANK (FARAD)

FARAD is a university-based national program that serves as the primary source for scientifically based recommendations regarding safe withdrawal intervals of drugs and chemicals in food-producing animals. As such, FARAD is a key resource for protection of our nation's food supply, including milk and meat, against accidental contamination of animal-derived foods with violative residues of drugs, pesticides or other agents that could compromise food safety.

Modern animal agriculture relies heavily on the use of therapeutic drugs, pesticides and other agents that improve overall animal health and promote safe, efficient and humane production practices. Through the assimilation of a comprehensive drug database and the use of state-of-the-art pharmacokinetic modeling, FARAD scientists determine appropriate withdrawal periods for a wide array of chemical entities and provide this information to veterinarians, extension specialists and farmers through a toll-free call center as well as a publicly-accessible website (FARMWeb).

In addition, FARAD provides rapid response assistance regarding extra-label use of drugs in animal agriculture, and during food contamination emergencies which might arise from accidental exposure to environmental toxins, particularly pesticides, or intentional efforts to contaminate the food supply. Finally, FARAD aids in trade matters related to foreign drug approvals and trains future veterinarians in the principles of residue avoidance.

FARAD is a USDA-funded, university-based consortium, which is overseen and operated by faculty and staff within the Colleges of Veterinary Medicine at the University of California-Davis, the University of Florida, Kansas State University, North Carolina State University and Virginia-Maryland College of Veterinary Medicine.

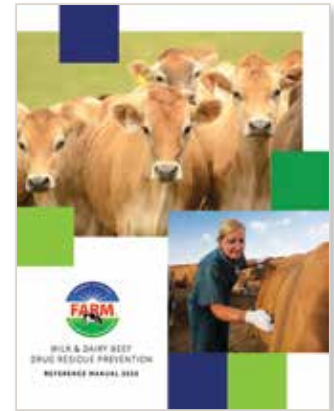
Visit farad.org for more information.

Those steps include:

- Establishing a valid VCPR to ensure proper diagnosis and treatment of disease. The agreement should be reviewed annually with the VOR who makes routine visits to the farm.
- Keeping records of antibiotic use and identifying all treated animals, including treatment protocols.
- Implementing a preventive herd health plan to reduce disease incidence.
- Maintaining milk quality and implementing an effective mastitis management program, including protocol development and review, to reduce the use of antibiotics.
- Implementing family and non-family employee training and awareness of proper animal drug use.
- Using drugs approved for specific disease indications according to labeled recommendations and withdrawal periods. If extra-label drug use is indicated by a veterinarian's prescription, the veterinarian must establish and document appropriate withdrawal periods.
- Not using drugs specifically prohibited for use in milking, dry or growing animals.
- Segregating and milking treated animals after, or in a separate facility from, all non-treated animals to ensure milk is not accidentally combined.
- Using drug residue screening tests specific for the drug used before marketing milk and/or meat from treated animals.
- Not marketing milk and/or culling treated animals when residue status is in question.
- Ensuring antibiotics are stored securely and are monitored for any suspicious activity.

FARM Drug Residue and Prevention Manual

The FARM Drug Residue and Prevention Manual and accompanying pocket guide are educational tools for dairy farm managers on the prudent and responsible use of antibiotics, including avoidance of drug residues in milk and meat.



These tools review antibiotics approved for dairy animals. They can also be used as to help inform on-farm best management practices necessary to avoid milk and meat residues.

Food Armor Program

Food Armor, an organization dedicated to improving antimicrobial stewardship practices in food animal agriculture, teaches residue prevention, food safety principles, responsible drug use practices and antimicrobial stewardship. A team based of food industry professionals, ranging from farmers and veterinarians to packers, processors and food marketers, this broad stakeholder consensus works to deliver a program that translates solid framework into proven on-farm results.



Food Armor offers an online educational platform providing high-quality stewardship education to veterinarians and farmers. Through this self-paced program, learners work to develop habits and use tools to implement antimicrobial stewardship plans.

- ✓ **The facility adheres to all withdrawal times for milk. All official samples of sold milk have tested negative for antibiotics in the last three years.**

Milk Drug Residue Testing

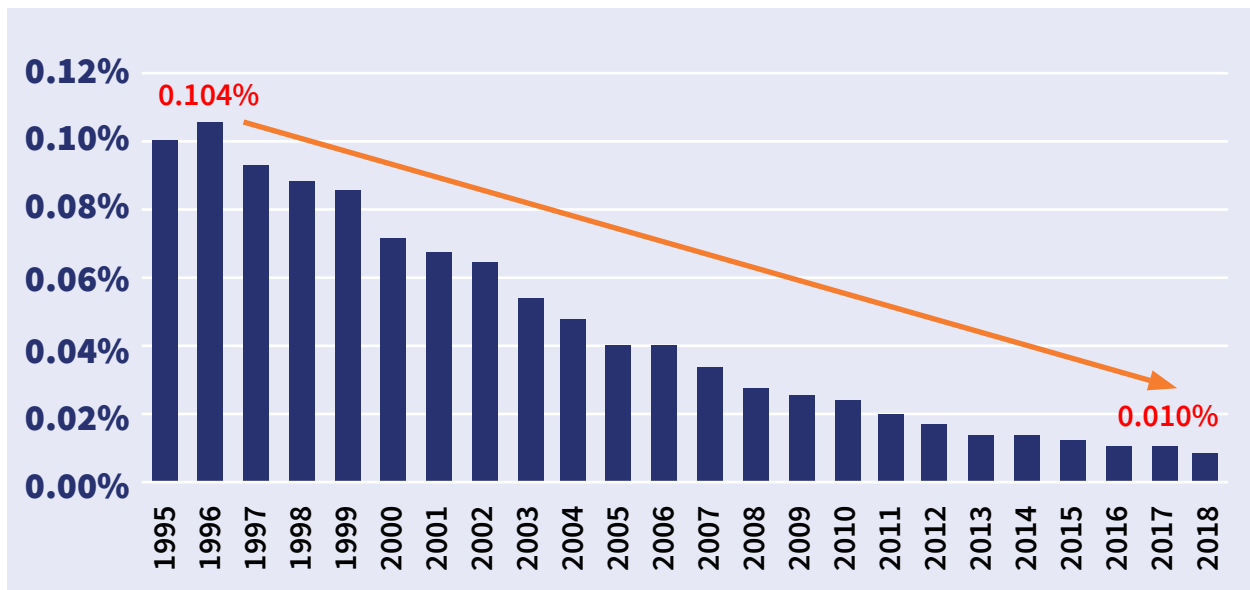
Pasteurized Milk Ordinance (PMO)

The Grade “A” PMO includes the rules that state regulatory agencies use to implement their Grade “A” milk programs, requiring that all bulk milk tankers be sampled and analyzed for beta-lactam drug residues before the milk is processed. The PMO also requires states to test farm-level milk samples at least four times every six months for antibiotics (called Section 6 testing). Most states use an inhibitor test, which shows sensitivity to

any antibiotic in milk. Additionally, customers (i.e., processors) may require additional testing for quality assurance purposes. Any tanker found positive for any antibiotic residue is rejected for human consumption.

In 1996, of the 3,384,779 bulk milk pickup tankers tested, 0.104% tested positive¹. Through increased education and industry advancements, of the 3,572,766 bulk milk pickup tankers tested by industry and state regulatory agencies from October 2018 to September 2019, 0.009% tested positive for drug residues. This signifies a dramatic decrease from an already low level of occurrence.²

FIGURE 8: Percent of Bulk Milk Tankers Positive for Antibiotic Residues



- ✓ **The facility adheres to all withdrawal times for meat. All meat tissues from animals sent for meat production have tested negative for violative residues in the last 3 years.**

Meat Drug Residue Testing

The U.S. Department of Agriculture Food Safety Inspection Service (USDA FSIS) conducts tests for chemicals — including antibiotics and other drugs, pesticides and environmental chemicals — in meat for human consumption. The USDA FSIS Annual Sampling Program Plan tests for chemicals through a random sampling of tissue from healthy-appearing food animals.

The development of the plan includes:

- Determining compounds of concern for food safety
- Using algorithms to rank selected compounds
- Pairing compounds with appropriate production classes
- Establishing the number of samples to collect

The USDA FSIS Hazard Analysis and Critical Control Point (HACCP) program implemented at slaughter facilities identifies the animals most likely to have drug residues. Animals that display lameness, injection site lesions or signs of illness are targeted for testing.

If there is any doubt about the potential for drug residues in an animal, it should be withheld from market. Each year, about three million adult dairy cows are slaughtered for beef. Of that amount, a very small percentage test positive for a residue. USDA FSIS has reported a 24% decline in the number of tissue residues in market dairy cows during the most recent five years for which data has been released.

USDA FSIS Residue Repeat Violator Lists

The USDA FSIS maintains a Residue Repeat Violator List for Use by FSIS Inspection Personnel³ that contains the names and addresses of farmers who have more than one meat residue violation in a 12-month period in animals presented for slaughter. Specific information about the violation can also be found in this list, including the plant where the violation was determined, the drug residues identified, and their concentrations and tolerances. Violators listed may have had multiple violations documented in the same processing facility or in separate facilities. This list is intended to aid inspectors in discovering residue tolerance violations before they reach consumers. The USDA FSIS provides a user guide that explains the information contained in the list.

The USDA FSIS also maintains a Residue Repeat Violator List for Use by Livestock Markets and Establishments that contains similar information intended to assist plant owners and operators in identifying residue history of livestock suppliers. This list documents only the source name and address information of repeat violators, so that livestock marketers and buyers may use precaution when marketing and processing animals from listed suppliers. The USDA FSIS provides a user guide that explains the information contained in the list.

Conditions that Warrant Additional Testing at USDA Slaughter Facilities

The following list contains descriptions, directly from USDA documents, of conditions that may warrant testing of carcasses for drug residues:

Mastitis: Signs of mastitis can vary based on the severity and duration of infection and may exhibit varying degrees of clinical signs, from pus-like or discolored discharge from the teats and redness and swelling of the udder, to no visible change in the udder.

Metritis: USDA inspectors will look for this postmortem indication. Be mindful of sending animals to slaughter that show signs of metritis such as high fever, major drops in milk production, or eye or nasal discharge.

Signs of Treatment: Leakage around jugular veins, subcutaneously, intramuscularly or intraperitoneally, or clinical signs indicative of treatment by mouth, such as discoloration from particles found in any part of the digestive tract, are important signs when examining veal calves for testing. Inspectors are aware of common industry practices that could indicate an animal was recently treated. Dairy cows arriving for slaughter with fetlock or ankle bands indicate that the animal has previously received treatment for a medical condition. When observed, inspectors are instructed to determine the appropriateness of additional testing or removal from the food supply.

Peritonitis and Surgery: Signs of recent surgical procedures or findings of surgical devices (e.g., suture, toggles, fistula devices) are only significant if they are associated with active peritoneal or subcutaneous inflammation.

Injection Sites: Live animals and carcasses with lesions or abscesses associated with injections on any part of the animal are of potential concern.

Other Disease Symptoms: Any signs of the following diseases or conditions can lead to an animal being tested for potential chemical residues or to determine fitness for harvest:

- Depression
- An elevated or subnormal body temperature
- Hyperemic skin
- Congested mucous membranes
- Dehydration
- Poor body condition in association with an injury or inflammatory condition, such as abscesses, arthritis, pneumonia, mastitis, metritis or diamond skin

Tolerance Limits

The regulatory tolerances for milk and meat antibiotic residues vary depending on the type of drug used and route of administration. The withdrawal times and tolerances are **only valid if a drug is used according to the label directions and in the class of animal listed on the label.**

If a drug is used in a class of animal not on the label, then there is **NO TOLERANCE** established for that drug and any trace amount, even if it is below the target testing/tolerance level established for the labeled class, is a violation.

Drugs not approved for use in lactating dairy cattle do not have FDA-established tolerances for residues in milk. Further, the tissue tolerances for drugs approved for beef cattle do not apply to lactating dairy cattle. Extra-label drug use if used, must be prescribed by a veterinarian. A complete list of the tolerances can be found in the FDA Green Book⁴, which lists all approved animal drugs. Questions or concerns about potential residues or withdrawal times should be addressed with a VOR.

Drugs Not Approved for Use in Food-Producing Animals

The following drugs are **not approved** for use in any species of food-producing animal:

- Chloramphenicol
- Clenbuterol
- Diethylstilbestrol (DES)
- Dipyrone
- Gentian violet
- Glycopeptides (example vancomycin)
- Nitrofurans (including topical use)
- Nitroimidazoles (including metronidazole)

Following a thorough literature review, the AVMA, the AABP and the Academy of Veterinary Consultants (AVC) recommend that veterinarians refrain from using aminoglycosides (amikacin, gentamicin, kanamycin and neomycin) in cattle except where approved for use by the FDA, as these antibiotics can cause very prolonged tissue residues.

Extra-Label Drug Use

“Federal law restricts this drug to use by or on the order of a licensed veterinarian.”

This statement is on every prescription drug sold. Any use of a drug not specifically listed on the label is called extra-label drug use and is regulated by the FDA under the Animal Medicinal Drug Use Clarification Act (AMDUCA). Using a prescription 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.

Any extra-label use of antibiotics must be used as a prescription and include the written instructions for the specific lifecycle of animals to be treated, including dose, route of administration, frequency of use and withdrawal times for milk and/or meat. Extra-label use generally requires an extended withdrawal time.

Examples of extra-label drug use:

- Changing the dose, such as giving more penicillin than is listed on the label
- Changing the route of administration, such as giving flunixin intramuscularly (IM) or subcutaneously (SQ) instead of intravenously (IV)
- Giving a drug to a different production class of animal, such as using Nuflo[®] in a lactating dairy cow
- Giving a drug for an indication (disease) not listed on the label, such as using Excede[®] for diarrhea
- Changing the withholding times, such as not following milk withholding times for fresh cows after dry treatment administration
- Changing the amount of drug per injection site
- Changing the duration of therapy

Milk and Dairy Beef Drug Residue Prevention Reference Manual

The FARM Antibiotic Stewardship module provides ongoing education for the dairy community on the responsible use of antibiotics to keep cows healthy and our milk supply safe.

FARM’s **Milk and Dairy Beef Drug Residue Prevention Reference Manual** is the primary educational tool for dairy farms on the judicious and responsible use of antibiotics, including avoidance of drug residues in milk and meat.

Updated each year, the manual and accompanying pocket guide are convenient resources detailing which antibiotics and other drugs are approved for treatment of dairy animals.

8-STEP PLAN FOR SOUND RECORD KEEPING

■ **Step 1: Recommended or Approved Drug List**

Make a narrow list of drugs to be used on your dairy with your VOR. The intent is to reduce the scope of drugs used. A short list will permit you to focus your knowledge and will help prevent an accidental violation of antibiotic residue laws.

■ **Step 2: Animal Treatment Plan**

When practicing preventive medicine or treating early symptoms of a disease or infection, stay consistent. Establish a treatment plan for your herd health practices to maintain consistency. Review with your VOR and document protocols in the herd health plan.

■ **Step 3: Beginning Inventory**

Discard all old drugs and drugs not on your approved drug list (Step 1). Inventory remaining drugs and other appropriate information annually.

■ **Step 4: Record Medicated Feed Purchases**

Feeding practices can result in accidental antibiotic residues. Clean feed equipment between batches, and avoid feeding leftover feed from feeder calves, hogs, etc., to lactating dairy cattle.

■ **Step 5: Record of Drug Purchases**

Promptly record every purchase of drugs on the day they are purchased. The FDA requires a paper trail of all drugs used on the dairy.

■ **Step 6: Daily Treatment Record**

Refer to your daily treatment records before milking or selling market cows. Use the record to properly identify treated cows. Develop good habits to properly manage antibiotics.

■ **Step 7: Monthly Economic Comparison**

Review the investment you are making in each cow in the milking string on a monthly basis. Review expenses by using the daily treatment records.

■ **Step 8: Disposal**

Periodic review of drugs in storage will mean you occasionally throw away drugs that have expired. By recording your daily animal treatments and any discarded drugs, a paper trail of what has happened to all drugs purchased is generated.

This 8-step antibiotic management system may prevent you from incurring a costly and embarrassing antibiotic accident!

EXAMPLE RESOURCES



*Milk and Dairy Beef Drug Residue
Prevention Reference Manual*

Visit nationaldairyfarm.com for free forms and other resources.



07

Pre-Weaned Calves

Management Checklist

- ✓ Facilities are designed to have a calving area that is clean, soft, dry, well-lit and well-ventilated.
- ✓ All pre-weaned calves are moved by lifting, walking or the use of clean, properly designed mechanical transport devices.
- ✓ All pre-weaned calves (heifers and bulls) receive colostrum or colostrum replacer within 6 hours after birth, even if immediately transported off the farm.
- ✓ All pre-weaned calves (heifers and bulls) receive a volume of milk or milk replacer to maintain health, growth and vigor until weaned or marketed.
- ✓ All pre-weaned calves (heifers and bulls) are offered fresh, palatable starter feed by day 3 to maintain health, growth and vigor.
- ✓ All pre-weaned calves (heifers and bulls) have access by day 3 to clean, fresh water appropriate for climatic conditions.
- ✓ All calves are disbudded before 8 weeks of age.
- ✓ Pain mitigation for disbudding is provided.
- ✓ The written herd health plan has a written protocol for pre-weaned calf care that includes language specific to areas of pre-weaned calf management.

- ✓ Facilities are designed to have a calving area that is clean, soft, dry, well-lit and well-ventilated.

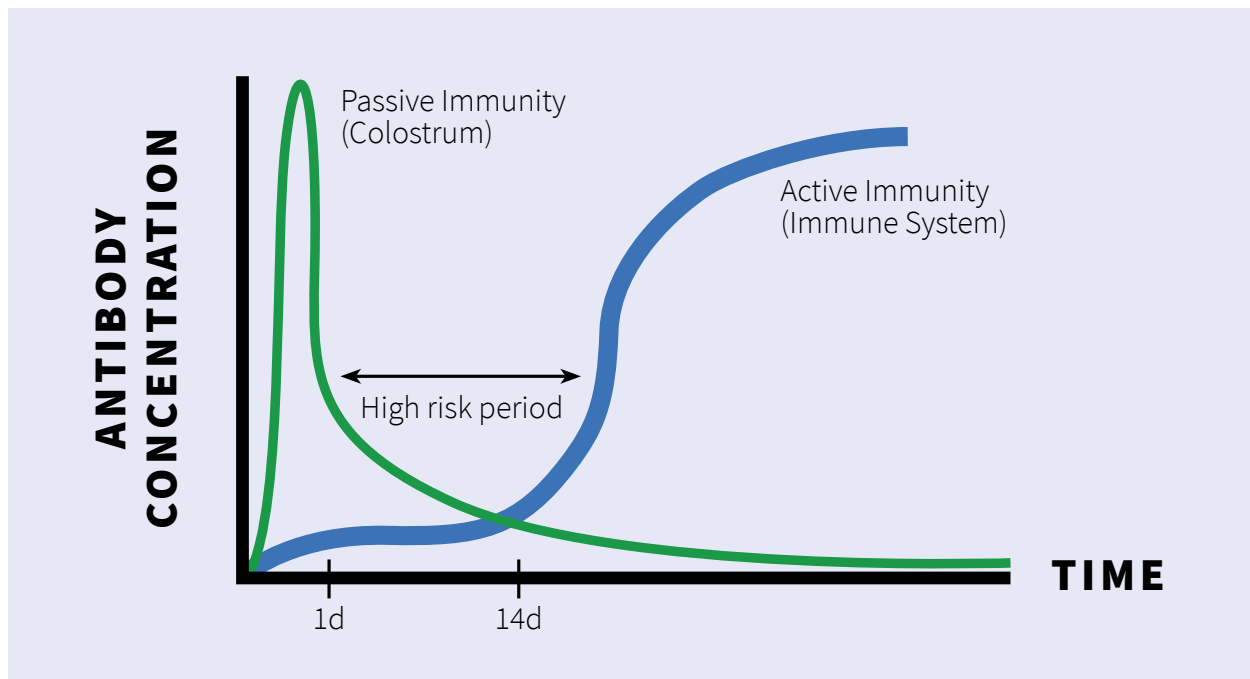
Recent work indicates that cows prefer social isolation beginning about eight hours prior to calving.¹ A clean, soft, dry, well-lit and well-ventilated calving area has many health benefits for the calf at the time of birth. A separate calving area that is designed to be comfortable, functional and hygienic allows for close observation of the cow and easier, more effective assistance at calving.

Wet, dirty calving areas foster bacteria that can enter a newborn calf's navel or mouth and create a disease load that overwhelms the calf's naive immune system. A best practice is to clean pens or paddocks between calvings.

- ✓ All pre-weaned calves are moved by lifting, walking or the use of clean, properly designed mechanical transport devices.

Calves should be handled in a calm, controlled and gentle manner. Animal caretakers should receive continuing education or training in animal handling, and the unique ways in which calves should be handled. Calves should be moved by a clean, properly designed transport device such as a calf cart, clean wheelbarrow or similar device with appropriate restraint that ensures calf safety and care. Manual movement of calves is also acceptable and can include walking calves or lifting them from their underside with all four legs gathered. Calf flight zones are different than that of adult dairy cattle and they should be handled with that in mind. Calves should never be dragged, pulled or caught by the neck, ears, limbs, tail or any other extremities, or thrown.

FIGURE 9



Source: Penn State "Feeding the Newborn Calf"

- ✓ **All pre-weaned calves (heifers and bulls) receive colostrum or colostrum replacer within six hours after birth, even if immediately transported off the farm.**

Colostrum feeding influences the long-term health and well-being of calves.² Calf care and feeding should be based on the counsel of a qualified nutritionist and the herd veterinarian. Calves should receive 4-5 quarts of high-quality colostrum or colostrum replacer (3-4 quarts for smaller dairy breeds) or an amount equivalent to 10% of the calf's body weight in one or two feedings within the first six hours of life.

Monitoring colostrum quality before feeding (e.g., using a Brix refractometer or colostrometer) is considered best practice.³ Colostrum quality is highly dependent on early harvest. The immunoglobulin G (IgG) content of the colostrum is of high quality if it is over 50 grams per liter. This equates to a Brix value greater or equal to 22%.⁴ Colostrum replacements should provide at least 100 grams, 150- 200 grams is preferred, of IgG.

One way to monitor the effectiveness of colostrum management practices is to take calf-side blood samples and measure IgG concentrations. The blood serum concentration of IgG goal should be greater than 10 milligrams per milliliter, or serum total protein greater than 5.5 grams per deciliter, to support positive growth rates and reduced prevalence of sickness and death.

Inadequate colostrum intake results in failure of passive transfer (FPT), which influences calf health and welfare as well future performance as a lactating cow.⁵ Dairy farmers should work with their veterinarian to assess FPT.

Esophageal Tube Feeder⁶

Newborn calves are sometimes too weak to suckle or nurse from a bottle. The esophageal tube feeder is an excellent device for feeding colostrum to calves. Proper training on the use, cleaning and sanitation of the feeder is essential for calf health.

The esophageal feeder consists of an esophageal probe, tube, clamp and fluid container. The probe is a rigid or semi-flexible tube made of plastic or stainless steel. It has a tear-shaped end designed to be easily inserted into the esophagus but not into the trachea (windpipe). The esophageal feeder should be thoroughly cleaned to prevent bacterial growth, especially after it has been used for colostrum.

The first step in using an esophageal feeder is to determine the length of tube to be inserted. Measure from the tip of the calf's nose to the point of its elbow, which is the approximate location of the diaphragm. This distance is about 20 inches in most Holstein calves (Figure 10). The proper length can be marked on the tube with a piece of tape. In young calves, only about 20 inches of the tube should be passed into the mouth and down the esophagus (Figure 11).

The tube should first be lubricated by dipping it in the colostrum or milk. A calf will likely suck the end of the tube into its mouth, which makes the tube easier to pass.

Open the calf's mouth by applying pressure to the corner of the mouth or by grabbing over the bridge of the nose and applying pressure to the upper palate or gums. Once the mouth is open, pass the tube slowly along the tongue to the back of the mouth. When the tube is over the back of the tongue, the calf starts chewing and swallowing. The tube should then be passed down the esophagus. A correctly passed tube can be felt in the esophagus; the ball on the end of the tube can be felt easily.

If possible, the calf should be standing before feeding so fluids are less likely to back up and enter its lungs. Calves should be properly restrained for this process.

After the tube is passed and before any liquids are given, the tube should be checked for proper positioning in the esophagus (Figure 12). If it is properly positioned, the rings of the trachea and the rigid enlarged esophagus can be felt easily. Check the exposed end of the tube for spurts of air, which indicate that the tube is in the trachea.

Next, unclip the tube to allow the liquid to drain out of the bag. Hold the bag above the calf or hang it on a nail; it will take several minutes to drain. Liquids should be at body temperature to prevent temperature shock to an already weak calf.

When feeding is over, slowly remove the tube. Clean and sanitize the feeder, and then allow it to drain and dry.

FIGURE 10: Hyperextension of a calf's neck and points for estimating length of esophageal tube.

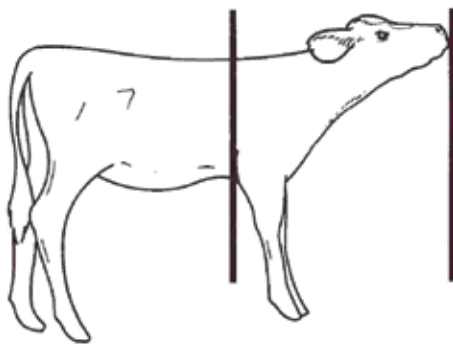


FIGURE 11: Internal view of mouth and esophagus

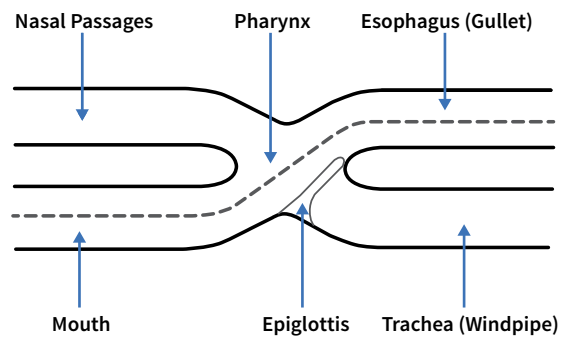
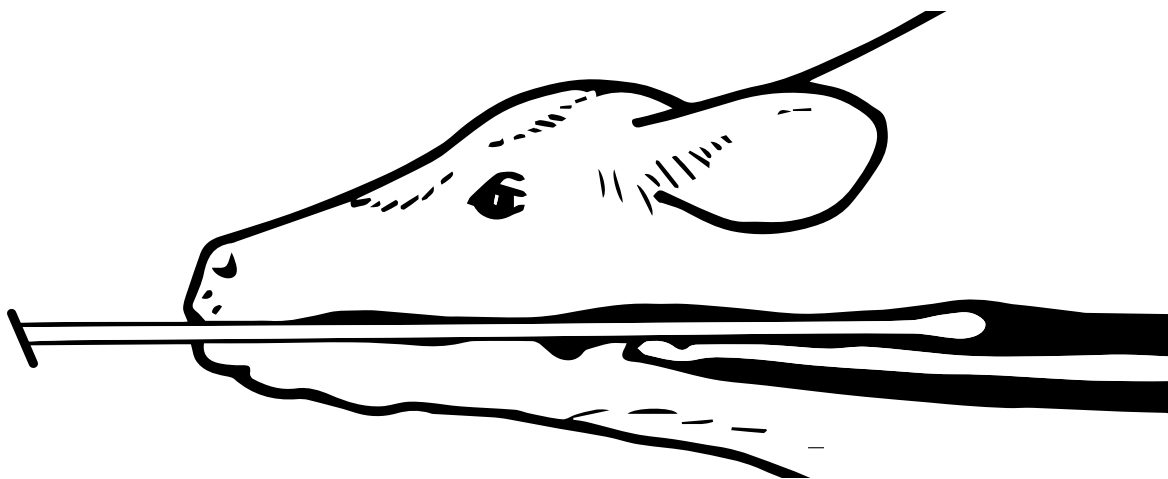


FIGURE 12: Position of esophageal feeder in relationship to the trachea



Source for Figures 10-12: Penn State "Feeding the Newborn Calf" — extension.psu.edu/feeding-the-newborn-dairy-calf

✓ **All pre-weaned calves (heifers and bulls) receive a volume of milk or milk replacer to maintain health, growth and vigor until weaned or marketed.**

After receiving immunity through colostrum or colostrum replacer, calves should be fed milk or milk replacer through weaning. The goal of calf nutrition is to promote healthy, efficient, rapid growth with milk or milk replacer and enhance rumen growth and function by initiating grain intake.

Calves benefit from higher milk/milk replacer intakes during the first four weeks of life when their ability to digest solid feed is limited. Benefits of improved growth and reduced hunger can be achieved by feeding calves more milk or milk replacer.⁷

Calves are motivated to consume large amounts of milk or milk replacer. Holstein calves will drink in excess of 8 quarts or more in two or more feedings per day. Providing an increased volume of milk/milk replacer can lead to earlier breeding ages and higher milk yields later in life.⁸ There are no known negative side effects of feeding more milk/milk replacer.

Higher milk intakes will result in looser manure, but this is not associated with increased diarrhea or other health problems. Newborn calves are susceptible to neonatal calf diarrhea (calf scours), especially during their first 28 days of life. Acquired immunity from colostrum is the first and most important control measure for diarrhea.

Feeding only 4 quarts per day of milk or milk replacer equivalent does not allow the calf to meet its nutritional requirements for maintenance, growth and development and is associated with hunger behavior.⁹

Good milk replacer should mix easily in warm water and stay in solution after mixing. Animal caretakers should use the appropriate weight of milk replacer powder volume, temperature, freshness and cleanliness of water to ensure consistency when mixing milk replacers, and use clean feeders.

Take caution if calves destined for sale or slaughter are fed a medicated milk replacer or milk from cows treated with antibiotics. This will prevent problems associated with antibiotic residues in the meat of slaughtered calves. All withdrawal times for medicated feeds must be followed.

✓ **All pre-weaned calves (heifers and bulls) are offered fresh, palatable starter feed by day 3 to maintain health, growth and vigor.**

Introducing small amounts of fresh, palatable, high-quality starter feed by day 3 allows for a calf to meet its nutritional needs and enhance rumen development.

As the calf's body size is expanding in response to milk feeding, it needs more nutrients to maintain itself, which is where starter feed becomes an essential part of the diet. Starter feed fills the nutritional gap between the growing animal and fixed nutrients coming from milk.¹⁰ It is important that calves consume starter early to prepare the rumen in physical size and metabolic activity to be able to sustain on dry feed post-weaning. Starter feed should be replaced daily to maintain freshness and feed intake.

✓ **All pre-weaned calves (heifers and bulls) have access by day 3 to clean, fresh water appropriate for climatic conditions.**

Calves should have access to clean, fresh water by day 3 of life to maintain proper hydration. The proper quantity and quality of colostrum/colostrum replacer and milk/milk replacer must also be provided. Feeding free-choice water to pre-weaned calves has been proven to improve rate of gain from birth to weaning by 33% compared to calves receiving no water.¹¹ Additionally, calves receiving daily water changes have been shown to have a 5% weight gain advantage compared to calves whose water was changed once a week.

Feeding milk or replacer should not be a substitute for water. When milk is consumed, it goes directly to the abomasum, bypassing the rumen via the esophageal groove, while water goes into the rumen. Without water in the rumen, rumen development slows dramatically.¹⁰ Free-choice water intake is essential for proper rumen function and for early intake of dry feed.

In cold weather, feed water that is close to a calf's body temperature of 102° F and provide water amounts close to their predicted consumption.

✓ **All calves are disbudded before 8 weeks of age.**

Horned cattle are a major management concern on farms, causing significant risks for other animals and animal caretakers. Removing the horns, or disbudding, has benefits for both cattle and human safety.

The term disbudding refers to the destruction or excision of horn-producing cells before skull attachment, while dehorning involves the excision of the horn after skull attachment. Time of attachment varies, but scientific literature indicates that this occurs around 8 weeks of age.¹² Therefore, best practice is to conduct disbudding at the earliest age possible, before 8 weeks of age.

There is scientific evidence that both disbudding and dehorning are painful procedures. Administration of local anesthesia,^{13,14} NSAIDs^{15,16,17} and sedatives¹⁸ all have been shown to provide benefits to calf welfare. An effective pain management protocol is required and should be implemented with veterinarian guidance.

Acceptable methods for disbudding include application of caustic paste or an electric/gas iron to destroy the horn producing cells. Caustic paste should be applied within the first few days of life and is less effective and discouraged after the calf is 2 weeks of age.

Additional management is required for caustic paste disbudding, including protecting treated calves from rain and limiting social interactions to ensure paste only affects the horn bud area. Effective pain management is still required with this method of horn removal.

Cows that have either been missed or have developed scurs should be monitored and, if deemed necessary, dehorned. Any attempt to permanently remove the horn after 8 weeks of age is considered a surgical procedure and should only be performed by a licensed veterinarian.

The use of polled genetics may be an option for farmers depending on the dairy's breed of cattle and the genetic diversity of polled genetics. Currently there are challenges in the diversity and availability of polled genetics available in the U.S. dairy herd.

✓ **Pain mitigation for disbudding is provided.**

All methods of disbudding and dehorning cause pain.^{19,20} AABP recommends that pain management be considered the standard of care during all dehorning and disbudding procedures. Farmers are encouraged to work with their VOR, who is best able to develop the most appropriate, individualized pain management protocol for their operation. Scientific evidence supports that it is possible to enhance animal welfare associated with these necessary procedures with the implementation of pain management protocols.

Local Anesthesia

Use of a local anesthetic mitigates the immediate pain associated with disbudding and dehorning and provides up to five hours of post-procedural analgesia. There are a variety of local anesthetic techniques including:

- Cornual nerve block
- Horn bud infiltration

Local anesthetic protocols should be determined and prescribed by the VOR. Federal law restricts the use of local anesthetics to use by or on the order of a licensed veterinarian.

Systemic Pain Relief

NSAIDs should be used to provide additional, longer lasting pain relief. The use of injectable, topical or oral NSAIDs are acceptable for pain mitigation in the immediate post-operative period. The type of NSAID used should be prescribed by the VOR. NSAID considerations include:

- 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.
- Oral, IV or IM administration is difficult although further study is warranted to determine its effectiveness in mitigating dehorning pain.

There are currently no approved drugs in the U.S. for use in cattle with an indication to provide analgesia associated with dehorning pain. Regulations under the AMDUCA allow extra-label drug use provided a valid VCPR exists and the drug selection process, records and withholding times outlined in the AMDUCA regulations are followed.

When it comes to pain mitigation, the prescribing veterinarian must assign an adequate meat and milk withdrawal interval (WDI) in instances of in instances of extra-label drug use as prescribed by AMDUCA. The best resource for veterinarians to find an appropriate WDI is the FARAD.

Veterinarians should submit the required information (dose, route, frequency, duration, weight of animal) and FARAD will provide a WDI. Veterinarians should then save this in their records as evidence of due diligence in assigning a WDI.

Pre-Weaned Calf Management Protocol

- ✓ **The written herd health plan has a written protocol for pre-weaned calf care that includes language specific to areas of pre-weaned calf management.**

The written herd health plan must have a written protocol for pre-weaned calf care that includes language specific to all of the areas outlined within this chapter.



08

Non-Ambulatory Animals

Management Checklist

- ✓ Non-ambulatory animals are moved using proper methods, including the use of special equipment.
- ✓ Non-ambulatory animals are provided prompt medical care.
- ✓ Non-ambulatory animals are provided access to feed, water, protection from heat and cold for typical climatic conditions, isolation from other ambulatory animals and protection from predators.
- ✓ Facilities are designed to have a location to segregate weak, sick or injured animals.
- ✓ The location for weak, sick or injured animals provides animals with: feed, water, protection from heat and cold for typical climatic conditions, isolation from other ambulatory animals and protection from predators.
- ✓ The written herd health plan has a written protocol for non-ambulatory animal management that includes language specific to areas of non-ambulatory animal management.

Moving Non-Ambulatory Animals

- ✓ **Non-ambulatory animals are moved using proper methods including the use of special equipment.**

The prognosis of an animal should always be considered before the decision is made to move an animal. If the animal is highly unlikely to become ambulatory again, with little chance of recovery or good quality of life, the animal should be promptly euthanized in accordance with the herd health plan (See Chapter 9: Euthanasia).

Prevention, preparation and prompt action are keys to the proper handling of non-ambulatory animals.

Animals that are at high risk for becoming non-ambulatory are:

- Post-fresh animals (calcium deficiency, calving injury, etc.)
- Animals weak due to prolonged sickness or age
- Severely lame animals
- Animals emaciated due to prolonged sickness or nutritional deficiencies

Facility risk factors that may lead to non-ambulatory animals:

- Slippery floors
- Improperly designed loading areas into parlors and trucks
- High-density situations

Non-ambulatory animals that cannot be carried should be moved using an appropriate mechanism.

Appropriate mechanisms for movement include:

- Sled
- Belting with reinforced sides
- Sling
- Skidsteer bucket
 - Must be large enough to hold the entire animal
- Palletted forklift
 - Construct a pallet platform to fit over the forks
 - Angle the pallet's leading edge to form a ramp for rolling the cow onto the pallet
 - Equip the pallet with straps to prevent the animal from falling off
 - Never use exposed forks

In all situations, animals must be restrained appropriately as to not risk or cause additional injury.

Appropriate Procedure for non-ambulatory animal movement:

- Best practice is to have at least three people available to transfer an animal onto the movement mechanism.
 - One person should run the equipment being used.
 - The other two individuals should move the animal onto the selected movement device.
 - To ensure the safety of the animal, individuals should walk alongside the animal and the movement device.
- Gently roll a non-ambulatory animal onto the movement device.
 - If the animal goes down in a pen or alley, plywood or belting may be attached to a truck or tractor that can be driven slowly and carefully to a transfer point.
 - Carefully transfer the animal from the plywood or belting to an appropriate movement device as listed above. When using any of these methods, proper restraint of the animal should be utilized.

Proper Care For Non-Ambulatory Cows

PREVENT

1. Ensure cows are **consuming a balanced ration** to prevent metabolic disease and manage body condition
2. Ensure cows are able to **rise soon after calving**
3. **Observe cows daily** for any abnormal activities
4. Ensure employees are trained in low-stress cow handling and that alleyways are properly maintained to **prevent cows from slips and falls** and for proper feet and leg support

PLAN

1. Identify **who is trained** and should be called in a non-ambulatory cow situation. *The FARM Program requires annual animal care employee trainings.*
2. Have a team **trained to properly move** a non-ambulatory cow
3. Have a written non-ambulatory cow **protocol**. *The FARM Program requires written protocols for managing non-ambulatory cattle.*
4. Have an identified hospital area
5. **REMAIN CALM**

CARE

1. Provide **deep bedding** at least 6" deep — sand is best
2. Provide **safe shelter** from the elements and away from other cows
3. Put feed and water in tubs that do not tip over and are within easy reach — **check availability at least twice a day**
4. Lift the cow using **proper protocol** or roll her onto her other side twice a day
5. Consult with your herd veterinarian about a **proper treatment plan** for the cow
6. **Never drag cow**

COMMON CAUSES 5 Ms

M MILK FEVER
Symptoms: dull/weak; trembling/twitching; temperature below 101F; cold, droopy ears

M TOXIC MASTITIS
Symptoms: dull/weak; temperature extremes (high or low); sunken eyes; abnormal milk; heat, pain and swelling of one or more quarters

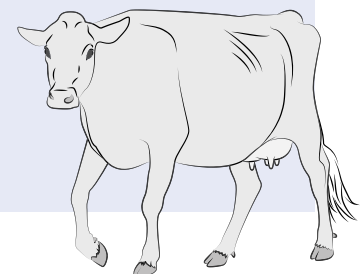
M TOXIC METRITIS
Symptoms: dull/weak; temperature extremes (high or low); sunken eyes; watery, colored or cloudy vaginal discharge and odor

M MUSCULOSKELETAL DAMAGE
Symptoms: abnormal angle and/or swelling to limb; suspect fracture or dislocation; paralysis

M MASSIVE INFECTION
Symptoms: dull/depressed; sunken eyes; temperature extremes (high or low); difficulty breathing

ASSIST THE COW TO STAND IF a physical exam and initial treatment have been completed and she:

- ✓ Is bright and alert
- ✓ Is not severely trembling or twitching
- ✓ Does not have evidence of severe disease
- ✓ Does not appear severely weak
- ✓ Appears to have normal and functioning limbs



Source: *The Proper Care for Non-Ambulatory Cows* poster at NationalDairyFarm.com

Non-Ambulatory Animal Movement: Sled/Belting



1

Animal Restraint

When moving a non-ambulatory animal, a halter should be correctly placed on animal's head with a high-quality lead rope. The lead rope should be tied above the hock on the same side the animal's head is turned toward. Two additional ropes should be tied: 1.) Above the knee on the opposite side of the head 2.) Above the hock on the opposite side of the head.



2

Movement Onto Transporting Device

With all three team members working together, slowly roll the animal onto the transportation device.



3

Movement to Hospital Pen

Secure the transportation device to a tractor or similar vehicle with the ability to slowly pull the transportation device with the animal safely in place. Have at least two individuals walk alongside of the animal to ensure its safety.



4

Hospital Pen

Once the animal reaches the hospital pen, gently slide it off the transportation device into a clean, well-bedded area.

Source: Dairy Care 365, Merck Animal Health

Non-Ambulatory Animal Movement: Skidsteer/Bucket Loader



1

Follow the step (left). Bring the bucket to the animal. Ensure padding is at the bucket lip edge to eliminate risk of injury by bucket. Ensure the bucket size is large enough for the animal needing to be moved.



2

Using at least two individuals, slowly slide the animal fully into the bucket.



3

The bucket operator should slowly lift the bucket while at least two individuals slowly slide the animal fully into the bucket.



4

Once the animal is secured in the bucket, At least two individuals should walk alongside of the bucket loader while it is in motion, constantly monitoring the cow.

5

Once in the hospital pen location, the bucket should be slowly lowered with at least two individuals ensuring the animal remains secure. Slowly back the bucket loader away from the animal placing it onto a clean, well-bedded area.



Improper Movement



Animals should never be dragged using mechanical force.



Animal should never be moved horizontally with hip lifts or lifted vertically where their feet cannot touch the ground.

Except for emergency cases where an animal must be moved a few feet before an appropriate movement device can be used (i.e., if a cow becomes non-ambulatory in the milking parlor and the animal is likely to recover and have a good quality of life), cattle are not to be pulled, dragged or moved horizontally or vertically by mechanical force applied directly to the animal. Hip lifts/clamps should never be used to move animals, only to lift and lower them, and the animal should never be raised with any device to where her feet cannot touch the ground.

If the animal must be dragged because no other moving alternative exists or because it can only be saved by dragging (i.e., if a cow falls into a manure pit where the likelihood of drowning is imminent), pad non-injured limbs and use padded belts to which a rope, chain or cable can be attached. Drag the animal the shortest possible distance to a point where a better method of moving can be employed. If this procedure cannot be done humanely, then the animal is to be euthanized in place and then moved.

Using an adequate number of trained people along with the appropriate equipment and handling devices will ensure the safety of the non-ambulatory animal and animal caretakers, and increase the likelihood of recovery.

Non-Ambulatory Animal Care

- ✓ **Non-ambulatory animals are provided prompt medical care.**
- ✓ **Non-ambulatory animals are provided access to feed, water, protection from heat and cold for typical climatic conditions, isolation from other ambulatory animals and protection from predators.**

When an animal becomes non-ambulatory, it should receive prompt medical care.

Non-ambulatory animals should be separated from the ambulatory animals in the herd and protected from heat, cold and predators to prevent further damage to the animal and enhance medical treatment.

A non-ambulatory animal should have access to clean water and feed. Water should be provided multiple times and brought directly to the non-ambulatory animal throughout the day and night in order to maintain hydration, especially when water in buckets may be knocked over. The diet of a non-ambulatory animal may need to be adjusted from its healthy counterparts based on its feed intake abilities and special considerations for its illness or injury. Consult with a veterinarian or nutritionist to determine a proper feed ration. The recovery of a non-ambulatory animal is enhanced through appropriate nutrition.

Facility Considerations for Weak, Sick or Injured Animals

- ✓ **Facilities are designed to have a location to segregate weak, sick or injured animals.**
- ✓ **The location for weak, sick or injured animals provides animals with: feed, water, protection from heat and cold for typical climatic conditions, isolation from other ambulatory animals and protection from predators.**

A hospital or sick pen that isolates the animal(s) from the herd is best practice. Because weak, sick or injured animals are more susceptible to discomfort than healthy animals, the pen should be equipped to maximize animal comfort. The location should provide feed and water, protection from heat, cold and predators, and isolation from ambulatory animals.

Herd Health Plan

- ✓ **The written herd health plan has a written protocol for non-ambulatory animal management that includes language specific to areas of non-ambulatory animal management.**

Even with the best care and adherence to a herd health plan, animals can become ill, requiring medical treatment. It is essential that animal caretakers are prepared to handle non-ambulatory animals and make prompt decisions to treat or euthanize. Having a written protocol for non-ambulatory animal management allows for consistency of training and helps ensure proper execution of the steps for the most desirable outcome for the animal.



09

Euthanasia

Management Checklist

- ✓ Criteria for identification of animals to be euthanized are established.
- ✓ Euthanasia techniques follow the approved methods of AABP and/or AVMA.
- ✓ Carcass disposal is conducted using the appropriate method in accordance with applicable local ordinances.
- ✓ The written herd health plan has a written protocol for euthanasia that includes language specific to areas of euthanasia.

Euthanasia is an unfortunate but necessary part of life on a dairy farm. No one wants to lose an animal or see an animal suffer.

When an animal's quality of life has decreased or when pain and suffering cannot be alleviated, euthanasia is the ethical and humane thing to do.

✓ **Criteria for identification of animals to be euthanized are established.**

Animal caretakers must be provided with guidance and continuing education or training to recognize situations where euthanasia is the best option for an animal.

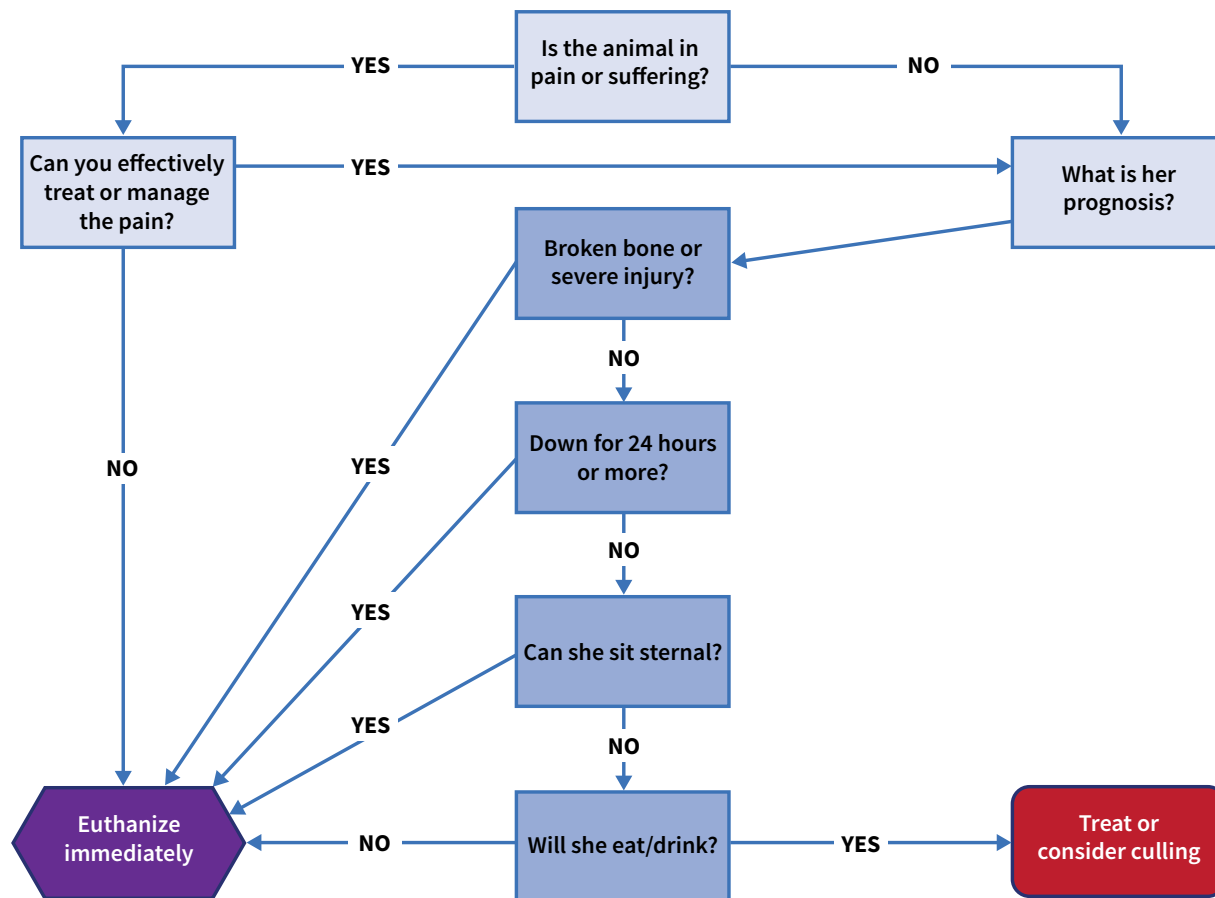
If an animal becomes non-ambulatory, the animal caretaker must determine immediately whether the injured animal is otherwise healthy and can be nursed back to health or cannot be saved.

If there are indications that the non-ambulatory animal can recover, and quality of life can be re-established, dairy operations should follow their non-ambulatory animal protocol.

However, when an animal's quality of life is decreased or when pain and suffering cannot be alleviated, euthanasia is appropriate.

Below is an example of a decision tree. This tree should be customized for a farm with a veterinarian's assistance.

FIGURE 13: Euthanasia Decision Tree



Source: Adapted from Dr. Brandon Treichler, DVM

Indications for Euthanasia

The following conditions or situations¹ may lead to an animal being compromised to such an extent that euthanasia should be performed:

- Catastrophic fracture, trauma or disease of the limbs, hips or spine resulting in immobility or inability to stand
- Bleeding uncontrollably from a major blood vessel
- Inability to maintain sitting upright position with head held up (sternal recumbency)
- Inability to move and raise front legs once lifted under assistance
- Loss of quality of life. Examples may include but are not limited to:
 - Disease conditions that produce a level of pain and distress that cannot be managed adequately
 - Emaciation and/or debilitation from disease
 - Age or injury that result in an animal being too compromised to be transported or marketed
 - Disease conditions for which no effective treatment is known (e.g., Johne's disease, lymphoma)
 - Diseases that involve a significant threat to human health (i.e., rabies)
 - Chronic repeated bloating of the abomasum or rumen
 - Chronic pneumonia and difficulty breathing/gasping for air
 - Advanced ocular neoplastic conditions ("cancer eye")
 - Disease conditions for which treatment is cost prohibitive
 - Extended drug withdrawal time for clearance of tissue residue
 - Poor prognosis or prolonged expected recovery

Euthanasia Decision Making Considerations

The following criteria should be considered for the care of compromised cattle:

- Pain and distress of animal
- Likelihood of recovery
- Ability to get to feed and water
- Drug withdrawal time
- Economic considerations
- Condemnation potential
- Diagnostic information



TABLE 4: Recommended Methods for Practical Euthanasia

Method	Risk to Human Safety	Skill Required	Potential Public Perception Issues	Adjunctive Method Required
Gunshot	high	moderate*	moderate	no
Penetrating captive bolt	moderate	moderate*	some blood and motion	yes
Barbiturate overdose	low	moderate*	perceived well	no

*Operator Training Required Reference: *Practical Euthanasia of Cattle* (Animal Welfare Committee of AABP, 2013)
 Online at aabp.org/Resources/AABP_Guidelines/EUTHANASIA-2019.pdf

✓ **Euthanasia techniques follow the approved methods of AABP and/or AVMA.**

If an animal appears to be suffering from any of the indications requiring immediate euthanasia, the procedure should be performed by designated animal caretakers trained to perform euthanasia. The technique must follow the approved methods of the AABP or the AVMA. Proper euthanasia techniques include initial method, how to confirm death and a secondary method (if needed).

Approved primary methods of euthanasia recommended by AABP include:

- **Gunshot:** When properly executed, gunshot induces instantaneous unconsciousness and death, is inexpensive and does not require close contact with the animal. It should be emphasized that this method should only be attempted by individuals trained in the use of firearms and who understand the potential associated dangers. Firearm options include handguns (pistols), rifles or shotguns. Current recommendations suggest that the .22 caliber handgun or rifle loaded with a solid-point bullet is sufficient for calves but may not be the best choice for consistent use on adult animals.

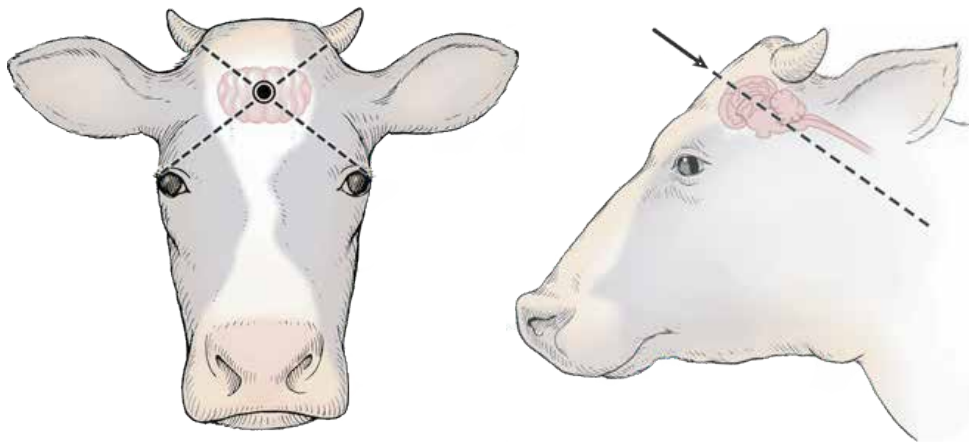
- **Penetrating Captive Bolt:** Captive bolt devices (“guns” or “stunners”) are either penetrating or non-penetrating. Only penetrating captive bolt devices are approved for euthanasia of mature bovines and, according to AVMA Guidelines for Euthanasia of Animals, must not be used as the sole method of euthanasia. The bolt gun must be placed firmly against the skull at the same entry point previously described for a gun shot. Since use of the captive bolt gun requires close proximity to the animal, adequate restraint and prior sedation or tranquilization may be required. It is critical to maintain and clean the bolt gun as described by the manufacturer. Additionally, selection of cartridge strength may vary among manufacturers and the appropriate type and strength for the size of the animal must be used. Store cartridges in a cool dry area, away from humid environments. Exposing cartridges to moisture can affect burning of the propellant and thus lower the bolt speed and penetrating force.

- **Barbiturate Overdose:** When properly administered by the intravenous route, barbiturate overdose results in rapid loss of consciousness and death. When using sodium pentobarbital for this purpose, an appropriate dose is typically 60-80 milligrams per kilogram. When choosing a barbiturate for euthanasia, the barbiturate selected should be potent, long acting and stable in solution. The carcass of barbiturate-treated animals is considered

unfit for human or animal consumption. Barbiturates can persist for long periods of time in the environment, which poses a risk to scavenging wildlife or companion animals. Ingestion of pentobarbital contaminated tissues by wildlife or rendered material consumed by domestic pets can induce toxicities. Finally, the use of pharmaceuticals limits carcass disposal options as renderers are less likely to accept animals euthanized by these methods.

Barbiturates are a controlled substance regulated by the Drug Enforcement Administration (DEA). Use of barbiturates are restricted to use by or on the order of a licensed veterinarian with a valid DEA license.

NOT BETWEEN THE EYES!



Gunshot Recommendations

The AVMA Guidelines for the Euthanasia of Animals recommends the use of solid-point bullets. The 12-, 16-, and 20-gauge shotguns are a good choice for euthanasia of adult cattle. The 28 or .410-gauge shotgun is an excellent choice for use in calf euthanasia. If using a shotgun loaded with shot shells, the operator should be very conscious of the distance from the gun barrel to the animal as projectiles will spread out into a larger pattern. Ideally, to obtain maximum consistency and efficacy of euthanasia, it is desired that the BBs from the shot shell make contact with the skull as a compact mass. When using a handgun, the firearm should be held within 1-2 feet of the intended target and the bullet should be directed perpendicular to the front of the skull to minimize the likelihood of ricochet. In cattle, the point of entry of the projectile should be at the intersection of two imaginary lines, each drawn from the outside corner of the eye to the base of the opposite horn.

Source: vetmed.iastate.edu/vdpam/about/production-animal-medicine/dairy/dairy-extension/humane-euthanasia/euthanasia-downloads

Determination of Unconsciousness

A state of unconsciousness must be established immediately following the initial euthanasia procedure. It is critically important to confirm unconsciousness and then confirm death.

Secondary or adjunctive euthanasia methods must not be used until the animal has been determined to be unconscious. Signs may include:

- Absence of corneal reflex
- Absence of vocalization
- Absence of gag reflex
- Lack of rhythmic respiration
- No coordinated attempt to rise or right itself

Confirmation of Death

Confirmation of death is necessary regardless of what method of euthanasia is chosen. The primary indicator for death is cardiac arrest. Lack of a heartbeat and respiration for 3-5 minutes should be used to confirm death. Using a stethoscope placed behind the left elbow is the best method to confirm cardiac arrest. If the animal is unconscious but death cannot be confirmed, a secondary method of euthanasia must be immediately employed.

Examples of a secondary method include:

- Exsanguination (cutting the jugular veins and carotid artery in the neck or aorta rectally)
- Pithing (inserting a rod into the brain stem to cause destruction)
- Administration of a saturated salt such as potassium chloride, magnesium chloride or magnesium sulfate
- A second shot

It is inappropriate and inhumane to exsanguinate, pith or administer a saturated salt solution to an animal that is conscious. A second shot should be immediately administered to an animal that is not rendered unconscious from the first gunshot or captive bolt.

✓ **Carcass disposal is conducted using the appropriate method in accordance with applicable local ordinances.**

Dead animals, either euthanized or expired from natural causes, are potential sources of infection. Their carcasses must be promptly disposed of using appropriate methods, which may include rendering, burial, composting or incineration in accordance with applicable local ordinances. Consultation with local ordinances and the state veterinarian should be conducted to determine the appropriate method of disposal.

Dead animals should quickly be moved to a designated location away from healthy animals and away from public view. Where warranted and feasible, waste and bedding of an animal that has died should be removed from the facility to an area inaccessible to other animals.

A postmortem examination on well-preserved animals can provide important animal health information and prevent further losses to the herd.

✓ **The written herd health plan as a written protocol for euthanasia that includes language specific to areas of euthanasia.**

A written herd health plan that includes a protocol for euthanasia helps ensure that the decision to euthanize an animal can be made in order to reduce any unnecessary pain and suffering. Additionally, a protocol also allows for those animal caretakers to be trained to conduct euthanasia according to AABP/AVMA guidelines, allowing for a humane death.



10

Fitness to Transport

Management Checklist

- ✓ The facility has an effective written protocol for fitness to transport that includes the definition of animals that are eligible to be marketed and outlines adherence to milk and meat withdrawal times.

Dairy animals are an important source of beef in the U.S. Approximately 20% of the nation's total beef production on an annual basis comes from the dairy sector, including fed dairy cattle and marketed cows and bulls. This chapter specifically focuses on considerations for the marketing of dairy animals for beef production. For information on animal care for beef animals (including dairy steers), follow the guidelines of the Beef Quality Assurance (BQA) program.

Dairy Beef

Marketing a dairy animal as beef is an important part of dairy farming. A dairy farmer must ensure the appropriateness of transitioning a dairy animal to the beef sector. In best practice, an animal should NOT be marketed if:

- It is non-ambulatory
- There is a reasonable chance it will become non-ambulatory at any time from leaving the farm to the slaughter facility
- It does not meet the food safety requirements for withdrawal periods or disease
- It is in poor body condition (less than BCS 2)
- It has not met all treatment withdrawal times for milk and meat
- Calving is imminent and likely to occur during the transportation or marketing process
- It has bone fractures of the limbs or injuries to the spine
- It has a condition that will not pass pre-slaughter inspection at a packing or processing facility.
 - If unsure, consult with your veterinarian before transporting an animal to a packing or processing facility.

USDA inspectors are instructed to look for animals that present a possible risk to the food supply. They're also trained to look for signs of disease or recent animal health product administration to determine if an animal should be subjected to additional testing and possible removal from the food chain. In best practice, the dairy retains treatment records for at least two years.

Dairy farmers should not transport animals with conditions that are unlikely to pass pre-slaughter inspection.

These conditions include, but are not limited to:

- Cancer eye, blindness in both eyes
- Drug residues
- Fever greater than 103° F
- Peritonitis
- Cows that are calving or have a high likelihood of calving during transport
- Fractures or lameness (3 or greater on the FARM locomotion scale)
- Distended udders causing pain and ambulatory issues
- Unreduced prolapses
- Visible open wounds
- Suspected central nervous system symptoms

Conditions that Warrant Additional Testing at USDA Slaughter Facilities

The following list contains descriptions, directly from USDA documents, of conditions that may warrant testing of carcasses for drug residues:

- Mastitis
- Metritis
- Peritonitis and surgery
- Injection sites
- Other disease symptoms
- Signs of treatment

Additional considerations that should be followed to ensure a safe beef supply:

- The facility maintains permanent (written or electronic) treatment records, available for review by the VOR, for the treatment of the facility's common diseases that include:
 - Date of treatment
 - Animal treated identification
 - Name of the treatment used
 - Disease/condition being treated
 - Dosage administered
 - Route of administration
 - Duration of the treatment
 - Specified withdrawal times for milk and meat to ensure food safety
- The herd health plan includes written protocols for the treatment of common diseases including:
 - Mastitis
 - Metritis
 - Milk fever
 - Ketosis
 - Displaced abomasum (DA)
 - Pneumonia
 - Diarrhea
 - Any other routinely occurring diseases identified by the veterinarian
- The facility has a written protocol for fitness to transport that includes the definition of animals that are eligible to be marketed and outlines adherence to milk and meat withdrawal times.
- All family and non-family employees who determine fitness to transport have documented annual continuing education on the written fitness to transport protocol.
- Each animal is permanently identified.
- All meat tissues from animals processed for meat production have tested negative for violative residues in the last three years.

Transportation

Transporters play a critical role in the health and welfare of dairy cattle. Proper handling and transport can reduce sickness and injury, prevent bruises and improve the quality of meat from these animals. In best practice, animal transporters are trained in how to properly move cattle up and onto the trailer, distribute cattle correctly on the trailer, employ hauling techniques that reduce cattle stress and handle emergency situations. For additional resources related to transportation best practices, please refer to the BQA transportation modules.

Dairy farmers are encouraged to have transporters sign a cow care agreement indicating that they have received basic stockmanship training and agree to treat all animals humanely. Using a transportation company that is knowledgeable about your animal care expectations provides safety and comfort of the animals during transport.

Loading and Unloading

Under best practice, animals are loaded and unloaded for transit in a manner that minimizes stress. The process of being moved, especially if it involves a loading chute, is a potentially stressful experience to many animals. Three measures should be taken to minimize stress:

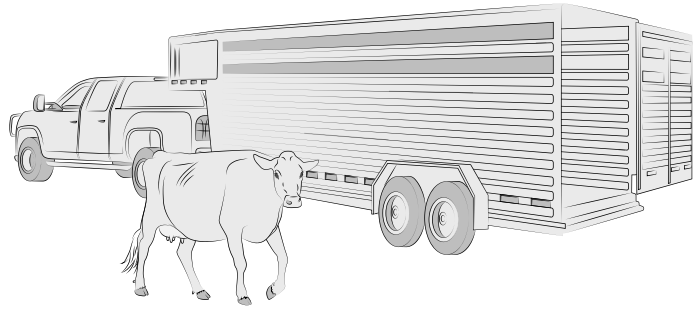
1. Train animal caretakers in proper loading and unloading practices
2. Properly locate and design loading areas
3. Minimize the number of directional changes an animal must take.¹

Prods, canes and other cattle handling aids are only used as a last resort, in emergency situations, and not in routine animal handling.

Animal caretakers should observe proper loading densities and plan to load or unload animals at the time of day that is best for moving the animals. In best practice, sufficient labor and appropriate equipment and/or facilities (i.e., ramps) are available for loading or unloading animals.

Considerations When Transporting Dairy Animals

Make decisions in a timely and efficient manner, always considering animal well-being first.

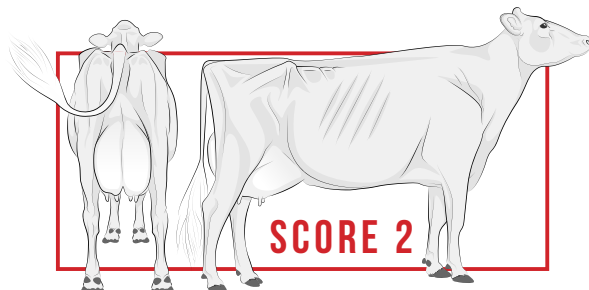
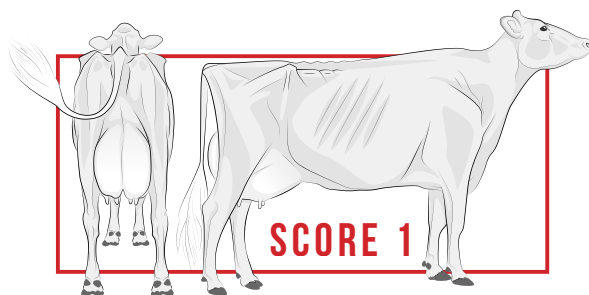


DO:

- Treat, cull or euthanize animals promptly. Segregate sick, injured and non-ambulatory animals from the rest of the herd.
- Use a BQA Transportation (BQAT)-certified company that is knowledgeable about your animal care expectations and provides safe and comfortable transport for animals. To become certified visit: www.bqa.org.
- Delay transport of animals that appear exhausted or dehydrated. Cows experiencing heat stress or exhaustion may exhibit open-mouth panting and be reluctant to move. Transport once the animal is rested, fed and rehydrated.
- Milk lactating cows just prior to transport.

DON'T TRANSPORT ANIMALS:

- That are non-ambulatory.
- Until all proper milk and meat withdrawal times have been followed. Refer to the **FARM Milk & Dairy Beef Residue Prevention Manual** for proper withdrawal times.
- With bone fractures of the limbs or injuries to the spine.
- Animals with recent fractures unrelated to mobility should be culled and transported directly to a packing or processing facility.
- In poor body condition, generally a body condition score of less than 2:
 - Emaciated animals
 - Cancer eye
 - Blindness in both eyes
 - Fever greater than 103°F
 - Drug residues
 - Peritonitis
 - Visible open wounds
 - Suspected central nervous system symptoms
 - Fractures or lameness (*a score greater than 2 using the FARM locomotion scoring system*)
 - Unreduced prolapses
 - Cows that are calving or have a high likelihood of calving during transport
 - Distended udder causing pain and ambulatory issues



Always consult with your veterinarian if you are unsure if an animal should be transported. And, remember, abuse is never tolerated – including pre-transport and during transport.

Download the transport poster in the [FARM Resource Library](#)

Trucks and Trailers

Trucks and trailers have an impact on animal care. Even though transport vehicles are not stationary, they are facilities that require the same consideration for cow comfort and needs, including:

1. A clean/disinfected truck or trailer when moving young stock or cull cows
2. Sides high enough to prevent animals from jumping over them
3. Non-slip flooring that provides secure footing (avoid abrasive floor and wall surfaces)
4. Ventilation and proper bedding to protect animals from weather extremes
5. Adequate vehicle covering to protect animals from adverse weather

In-Transit Care

Proper in-transit care will minimize animal injuries, bruises and carcass damage, which can impair an animal's well-being and value. Transport crews should be knowledgeable about animal care expectations and skilled in handling animals properly. In general, chances for injuries decrease when animals on a truck are confined in several smaller groups. Weak or unhealthy animals are only shipped to a veterinarian (not to a processing facility) and segregated from healthy cows during loading and transit. Additional care should be provided to weak or unhealthy cows during transport.

An adequate amount of time for the trip should be allotted to include periodic checking of the animals' condition. Drivers should start and stop the vehicle smoothly and slow down for curves and corners. If an animal falls in transit, it should be helped to its feet, provided it does not pose a risk to the handler, and possibly segregated from the other animals for the rest of the trip. Provisions for water should be made immediately upon arrival at the destination and provisions for feed should be made if the trip takes more than 24 hours. Feeding high-fiber dry feed for 48-72 hours before shipping reduces the moisture content of manure and improves air quality, animal comfort and hygiene.

All workers and handlers should be properly trained in handling dairy animals and have a basic understanding of typical dairy cattle behavior. All state and national regulations regarding transportation should be followed.



Appendix, Glossary and References



Appendix A: Governance Chart

Appendix B: Animal Observation Scoring

Appendix C: Willful Mistreatment or Neglect Protocol Overview

Appendix D: Training Resource Library & Website

Glossary

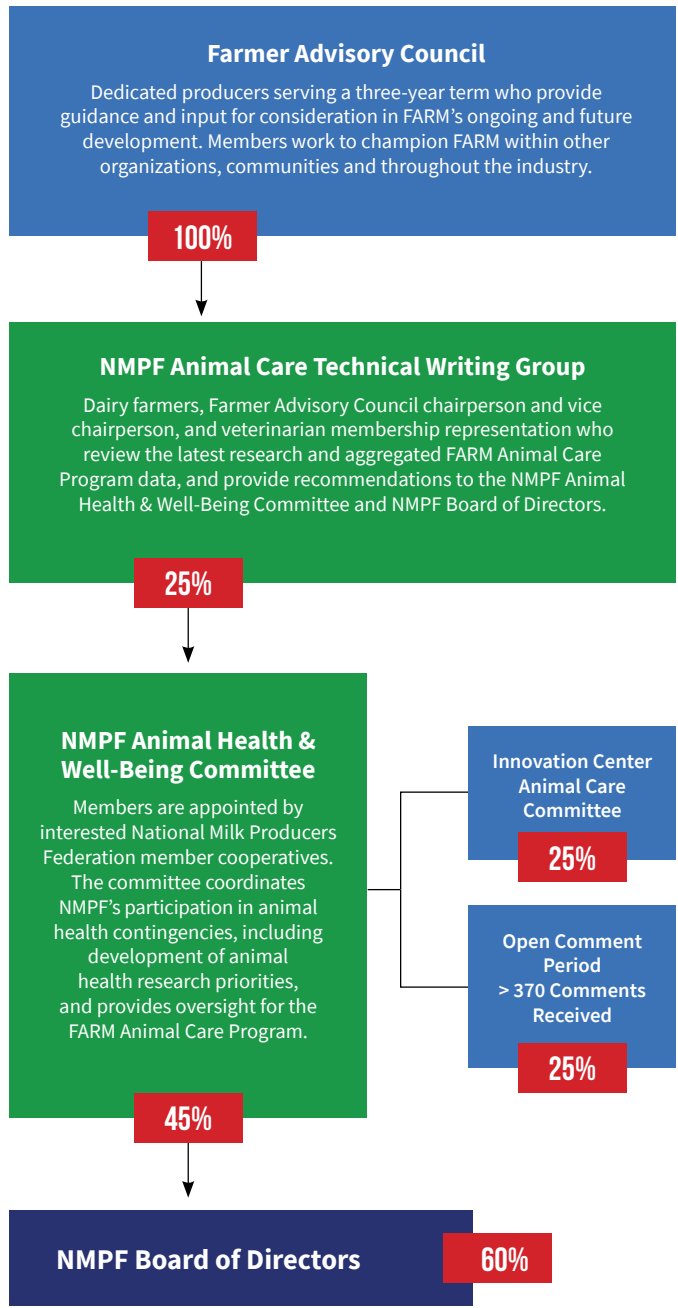
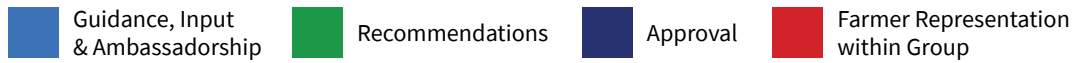
References

Appendix A: Governance Chart

FARM Animal Care Guidelines

The National Dairy FARM Animal Care Program standards are formally revised every three years through a strenuous, year-long process.

Who Drafts and Approves FARM Animal Care Program Guidelines?



NMPF Animal Care Technical Writing Group

Nate Chittenden*, Agri-Mark, Inc.
Nigel Cook, BVSc, University of Wisconsin-Madison
David Darr, Dairy Farmers of America
Chase Decoite, National Cattlemen's Beef Association
Richard Doak, DVM, Mid-Maryland Dairy Veterinarians
Marcia Endres, PhD, University of Minnesota
Fred Gingrich, DVM, American Association of Bovine Practitioners
Paul Humphrey, Foremost Farms USA
Karen Jordan*, DVM, Dairy Farmers of America
Steve Maddox*, California Dairies, Inc.
Antone Mickleson, Northwest Dairy Association/Darigold
Tim Raasch, Land O' Lakes
Kris Scheider*, Foremost Farms USA
Brandon Treichler, DVM, Select Milk Producers, Inc.
Cass Tucker, University of California, Davis

NMPF Animal Health & Well-Being Committee

Mike Barnes*, Agri-Mark, Inc.
Doug Chapin*, Michigan Milk Producers Association
David Darr, Dairy Farmers of America
Dan deGroot*, Northwest Dairy Association/Darigold
Garrett DeVries*, Dairy Farmers of America
Zack Dombek, DVM, Land O' Lakes
Rodney Ervin, Lone Star Milk Producers
Stephen Ford, Southeast Milk, Inc.
Alan Gerratt*, Dairy Farmers of America
Fred Gingrich, DVM, American Association of Bovine Practitioners
Walt Guterbock*, DVM, Select Milk Producers, Inc.
Jerrel Heatwole*, Dairy Farmers of America
Karen Jordan*, DVM, Dairy Farmers of America
Henry Kamagy, DVM, Upstate Niagara Cooperative, Inc.
Kelly King*, FarmFirst Dairy Cooperative
Kate Lott, DVM, Tillamook County Creamery
Josh Luth, Foremost Farms USA
Antone Mickleson, Northwest Dairy Association/Darigold
Randy Mooney*, Dairy Farmers of America
Mike Myatt, Cooperative Milk Producers Association
Chuck Nelson, First District Association
Mike O'Brien, Foremost Farms USA
Kevin Olson, Prairie Farms Dairy, Inc.
Dawn Raymond, First District Association
Lindsay Reames, Maryland & Virginia Milk Producers Cooperative Assn, Inc.
Patti Schaefer, First District Association
Dan Senestraro*, DVM, Dairy Farmers of America
Tom Thompson*, United Dairywomen of Arizona
Kim Torrey, Upstate Niagara Cooperative, Inc.
Brandon Treichler, DVM, Select Milk Producers, Inc.
Bill Wavrin*, DVM, Northwest Dairy Association/Darigold
Leon Weaver*, DVM, Select Milk Producers, Inc.

Innovation Center Animal Care Committee

Rob Byrne, Schreiber Foods
Dave Carlin, International Dairy Foods Association
David Darr, Dairy Farmers of America
Brian Esplin*, Dairy Farmers of America
Gary Germaine, Leprino Foods Company
Marilyn Hershey*, Dairy Management, Inc.
James Jacquier*, Agri-Mark, Inc.
Jack Jeffers, Dean Foods
Michael John, Maryland & Virginia Milk Producers Cooperative Assn, Inc.
Josh Luth, Foremost Farms USA
Steve Maddox*, California Dairies, Inc.
Randy Mooney*, Dairy Farmers of America
Stan Ryan, Northwest Dairy Association/Darigold

NMPF Board of Directors

Brad Anderson, California Dairies, Inc.
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Beth Ford, Land O' Lakes
Tony Graves*, Prairie Farms Dairy, Inc.
Brian Hardy*, Dairy Farmers of America
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Cornell Kasbergen*, Land O' Lakes
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Jackie Klippenstein, Dairy Farmers of America
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Jeff Lyon, FarmFirst Dairy Cooperative
Mike McCloskey*, DVM, Select Milk Producers, Inc.
Sheryl Meshke, AMPI
Scot Meyer, Ellsworth Cooperative Creamery
Andrei Mikhalevsky, California Dairies, Inc.
Randy Mooney*, Dairy Farmers of America
Keith Murfield, United Dairywomen of Arizona
Ken Nobis*, Michigan Milk Producers Association
Brad Nosbush*, First District Association
Doug Nuttleman*, Dairy Farmers of America
Tom Pittman, Premier Milk, Inc.
Leroy Plagerman*, Northwest Dairy Association/Darigold
Neal Rae*, Agri-Mark, Inc.
Jeff Raney*, Dairy Farmers of America
Levi Ransom*, Land O' Lakes
Brian Rexing*, Dairy Farmers of America
Dennis Rodenbaugh*, Dairy Farmers of America
Stan Ryan, Northwest Dairy Association/Darigold
David Scheevel*, Foremost Farms USA
Steve Schlangen*, AMPI
Nic Schoenberger*, Land O' Lakes
Dan Senestraro*, DVM, Dairy Farmers of America
Rick Smith, Dairy Farmers of America
Dennis Tonak, Midwest Dairywomen's Company
Case van Steyn*, Dairy Farmers of America
Rob Vandenheuvel, California Dairies, Inc.
Jonathan Vander Dussen*, Select Milk Producers, Inc.
Simon Vander Woude*, California Dairies, Inc.
Mike Visser*, Select Milk Producers, Inc.
Larry Webster, Upstate Niagara Cooperative, Inc.
Greg Wickham, Dairy Farmers of America
John Wilson, Dairy Farmers of America
Joe Wright*, Southeast Milk, Inc.

Note that this is as of June 2019

** Committee member is also a farmer*

Appendix B: Animal Observation Scoring

Animal Observations Summary

OBSERVATION SUMMARY					
	LACTATING COWS	PRE-WEANED CALVES <i>(heifers, bulls, steers)</i>	POST-WEANED HEIFERS	PRE-FRESH COWS/ HEIFERS/ DRY COWS	HOSPITAL PEN
SIGNS OF NEGLECT	✓	✓	✓	✓	✓
HYGIENE	✓	✓ <i>(3 days of age and older)</i>	✓	✓	
BODY CONDITION SCORE	✓	✓ <i>(3 days of age and older)</i>	✓		
LOCOMOTION	✓				
HOCKS	✓				
KNEES	✓				
BROKEN TAILS	✓				

Signs of Neglect

Observe all age classes

HOW	Walkthrough of the facility <i>(not assessing all animals at the individual level)</i>
WHAT TO RECORD	<ul style="list-style-type: none"> • Non-ambulatory cattle, including protection from ambulatory animals* • Emaciated cattle* • Severe lameness* • Catastrophic injury* • Water provision • Food provision • Protection from heat and cold provision <p><i>*Record random sample of animal ID and check if they are receiving treatment</i></p>
IDEAL EVALUATOR LOCATION DURING OBSERVATION	Some measures may require being inside the pen



PRE-WEANED CALVES

Observations:

- ✓ Hygiene
- ✓ Body condition scores
- ✓ Signs of neglect (pg. 96)

IDEAL OBSERVATION TIME	During milk feeding time, otherwise it is difficult to see all relevant body parts	
IDEAL EVALUATION LOCATION DURING OBSERVATION	Outside calf hutch or pen	
WHICH CALVES TO OBSERVE	LESS THAN 100 ON SITE Observe all	MORE THAN 100 ON SITE Observe 100. Divide evenly across age groups from birth to weaning. Score first animals seen.
	DO NOT OBSERVE CALVES DAY 0-2 EXCEPT FOR SIGNS OF NEGLECT	

Hygiene Scoring

PRE-WEANED CALVES		
SCORE 1: CLEAN	SCORE 2: MODERATE	SCORE 3: VERY DIRTY
Mud or manure does not exceed 5.5 inches in length in areas A or B	Mud or manure exceeds 5.5 inches in length in a single area of A or B	Mud or manure exceeds 5.5 inches in length in both areas A and B

Notes:

- If both sides of animal are visible, score the worst side
- You could use an 8.5" x 11" paper to and fold the sheet of paper in half to gauge the 5.5" for calves
- Do not count feed and dust
- Look for a continuous patch or nearly continuous patch in order for it to count; do not aggregate or sum smaller, disconnected, demarcated patches
- Mud and manure can be wet or dry, moisture does not matter
- Do not count discolored hair with clean texture that would not be visible on a black animal
- Evaluator stands in an upright position, with a view of the side of the animal; do not bend over to see the underside of the belly

Body Condition Scoring

Focus on Scores 1-3 for Calves



SCORE 1

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



SCORE 2

Thin animal, with minimal coverage around the tailhead and short rib region. Minimal coverage over back, hooks and pins.



SCORE 3

Good conditioned animal with coverage around the tailhead and short rib region. Back, hooks and pins are not pronounced.



POST-WEANED HEIFERS

Observations:

- ✓ Hygiene
- ✓ Body condition scores
- ✓ Signs of neglect (pg. 96)

IDEAL OBSERVATION TIME	Lockup time, if it occurs or is arranged	
IDEAL EVALUATION LOCATION DURING OBSERVATION	Where vision is not obstructed	
WHICH HEIFERS TO OBSERVE	LESS THAN 100 ON SITE Observe all	MORE THAN 100 ON SITE Observe 50 from oldest to youngest group(s); from as few pens as possible

Hygiene Scoring

SMALL HEIFERS			LARGE HEIFERS		
SCORE 1: CLEAN	SCORE 2: MODERATE	SCORE 3: VERY DIRTY	SCORE 1: CLEAN	SCORE 2: MODERATE	SCORE 3: VERY DIRTY
Mud or manure does not exceed 5.5 inches in length in areas A or B	Mud or manure exceeds 5.5 inches in length in a single area of A or B	Mud or manure exceeds 5.5 inches in length in both areas A and B	Mud or manure does not exceed 11 inches in length in areas A or B	Mud or manure exceeds 11 inches in length in a single area of A or B	Mud or manure exceeds 11 inches in length in both areas A and B

Notes:

- If both sides of animal are visible, score the worst side
- You could use an 8.5" x 11" paper to gauge the 11" in large heifers and fold the sheet of paper in half to gauge the 5.5" for small heifers
- Do not count feed and dust
- Look for a continuous patch or nearly continuous patch in order for it to count; do not aggregate or sum smaller, disconnected, demarcated patches
- Mud and manure can be wet or dry, moisture does not matter
- Do not count discolored hair with clean texture that would not be visible on a black animal
- Evaluator stands in an upright position, with a view of the side of the animal; do not bend over to see the underside of the belly

Body Condition Scoring



SCORE 1

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



SCORE 2

Thin animal, with minimal coverage around the tailhead and short rib region. Minimal coverage over back, hooks and pins.



SCORE 3

Good conditioned animal with coverage around the tailhead and short rib region. Back, hooks and pins 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 pins 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, hooks and pins have significant coverage and unable to see bone structure to amount of coverage.



PRE-FRESH COWS & HEIFERS/DRY COWS

Observations:

- ✓ Hygiene
- ✓ Signs of neglect (pg. 96)

IDEAL OBSERVATION TIME	Lockup time, if it occurs or is arranged	
IDEAL EVALUATION LOCATION DURING OBSERVATION	Where vision is not obstructed	
WHICH ANIMALS TO OBSERVE	LESS THAN 100 ON SITE Observe all	MORE THAN 100 ON SITE Observe 100 from as few pens as possible

Hygiene Scoring

PRE-FRESH COWS & HEIFERS/DRY COWS		
SCORE 1: CLEAN	SCORE 2: MODERATE	SCORE 3: VERY DIRTY
Mud or manure does not exceed 11 inches in length in areas A or B	Mud or manure exceeds 11 inches in length in a single area of A or B	Mud or manure exceeds 11 inches in length in both areas A and B

Notes:

- If both sides of animal are visible, score the worst side
- You could use an 8.5" x 11" paper to gauge the 11" in pre-fresh cows and heifers/dry cows
- Do not count feed and dust
- Look for a continuous patch or nearly continuous patch in order for it to count; do not aggregate or sum smaller, disconnected, demarcated patches
- Mud and manure can be wet or dry, moisture does not matter
- Do not count discolored hair with clean texture that would not be visible on a black animal
- Evaluator stands in an upright position, with a view of the side of the animal; do not bend over to see the underside of the belly



LACTATING COWS

Observations:

- ✓ Hygiene
- ✓ Body condition scores
- ✓ Locomotion
- ✓ Hocks
- ✓ Knees
- ✓ Broken tails
- ✓ Signs of neglect (pg. 96)

Body Condition, Hygiene, Broken Tails and Knee Observation

IDEAL OBSERVATION TIME	Lockup time	
IDEAL EVALUATION LOCATION DURING OBSERVATION	In pens	
WHICH LACTATING COWS TO OBSERVE	LESS THAN 100 ON SITE Observe all	MORE THAN 100 ON SITE Observe entire pen or at least 100 from as few pens as possible

Hock Observation

IDEAL OBSERVATION TIME	Milking time	
IDEAL EVALUATION LOCATION DURING OBSERVATION	In parlor behind cows	
WHICH LACTATING COWS TO OBSERVE	LESS THAN 100 ON SITE Observe all	MORE THAN 100 ON SITE Observe entire pen or at least 100 from as few pens as possible

Locomotion Observation

IDEAL OBSERVATION TIME	Walking back from the milking facility	
IDEAL EVALUATION LOCATION DURING OBSERVATION	Outside the exit lane, flat surface, hooves visible, do not disrupt the cows, being able to view four strides is ideal	
WHICH LACTATING COWS TO OBSERVE	LESS THAN 100 ON SITE Observe all	MORE THAN 100 ON SITE Observe entire pen (oldest and highest producing) or last 100 while walking; otherwise 100 from as few pens as possible
TIESTALL LACTATING COWS	<ul style="list-style-type: none"> • Ideal when cows are untied • If tied, cows must be standing, focus on score 3 animals 	

Hygiene Scoring

LACTATING COWS		
SCORE 1: CLEAN	SCORE 2: MODERATE	SCORE 3: VERY DIRTY
Mud or manure does not exceed 11 inches in length in areas A or B	Mud or manure exceeds 11 inches in length in a single area of A or B	Mud or manure exceeds 11 inches in length in both areas A and B

Notes:

- If both sides of animal are visible, score the worst side
- You could use an 8.5" x 11" paper to gauge the 11" in lactating cows
- Do not count feed and dust
- Look for a continuous patch or nearly continuous patch in order for it to count; do not aggregate or sum smaller, disconnected, demarcated patches
- Mud and manure can be wet or dry, moisture does not matter
- Do not count discolored hair with clean texture that would not be visible on a black animal
- Evaluator stands in an upright position, with a view of the side of the animal; do not bend over to see the underside of the belly

Locomotion Scoring



SCORE 1 NORMAL

Animal walks easily with no gait or only minor changes. Steps may be slightly uneven.



SCORE 2 MODERATE

Asymmetric gait. Exhibits any of the following: shortening of the stride, slight limp, weight transfer while moving, but may bear weight evenly while standing.



SCORE 3 SEVERE

Difficulty bearing weight on a limb and may also exhibit obvious back arch or head bob. Animals in this category may be unable to move or be extremely reluctant to move even when encouraged by a handler.

Notes:

- Hooves must be visible while scoring, if not, then may only be able to score 3s
- If in tiestalls, only score 3s and make a note of this
- Visit FARM database library for locomotion scoring videos

Body Condition Scoring



SCORE 1

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



SCORE 2

Thin animal, with minimal coverage around the tailhead and short rib region. Minimal coverage over back, hooks and pins.



SCORE 3

Good conditioned animal with coverage around the tailhead and short rib region. Back, hooks and pins 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 pins have more than average coverage and bone structure difficult to see due to amount of coverage.

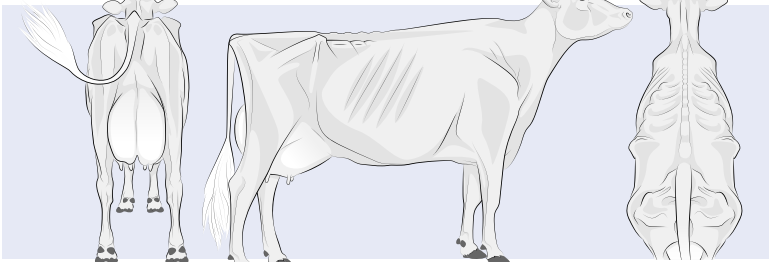


SCORE 5

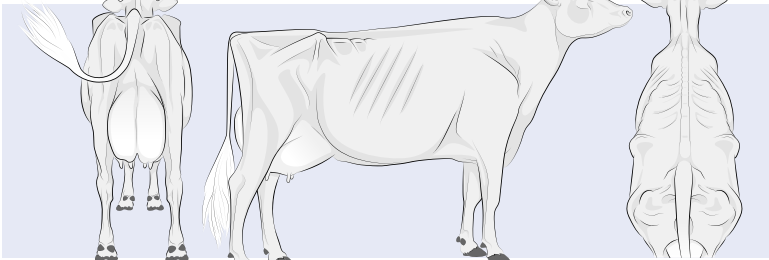
Over-conditioned animal with thick coverage around tailhead and short rib region, short ribs cannot be felt or seen at all. Back, hooks and pins have significant coverage and unable to see bone structure to amount of coverage.

Body Condition Scoring

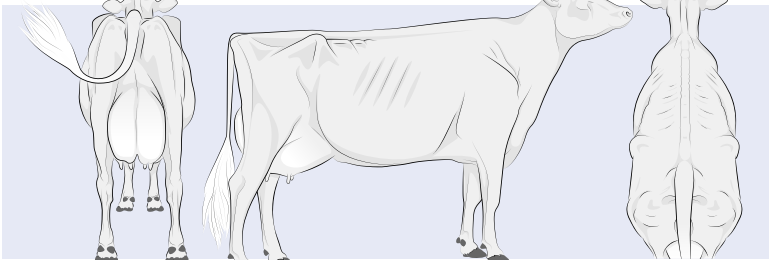
SCORE 1



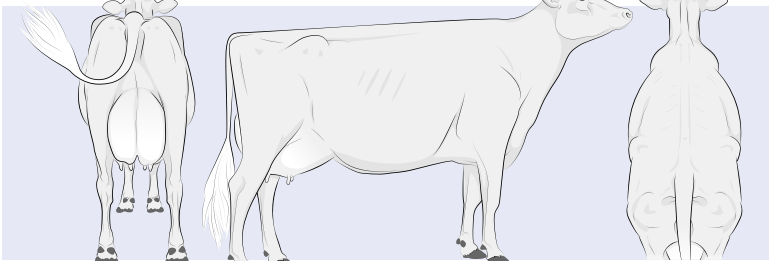
SCORE 2



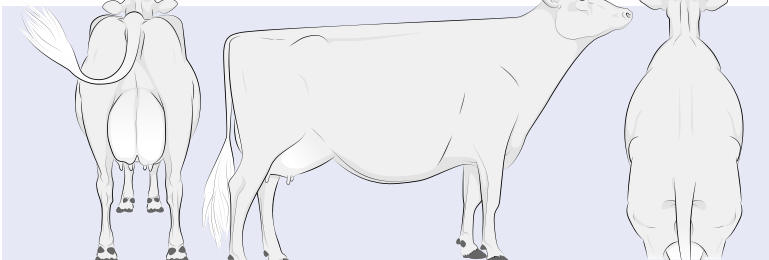
SCORE 3





SCORE 4



SCORE 5

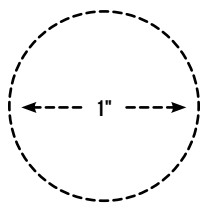


Knee Scoring

<p>SCORE 1: NORMAL</p> <p>Complete hair loss is less than the size of quarter (1" or 2.5 cm in length or width)</p>	<p>SCORE 2: MODERATE</p> <p>Complete hair loss is greater than or equal to the size of quarter (1" or 2.5 cm in length or width), or a dried scab or moderate swelling less than or equal to a quarter in height (1" or 2.5 cm)</p>	<p>SCORE 3: SEVERE</p> <p>Swelling greater than a quarter in height (1" or 2.5 cm)</p>
		




Notes:

- If both sides are visible, score the worst side
- Area of hair loss must be completely bald, no hair inside
- Size of hair loss can be evaluated by length or width, it does not need to be round
- Score size of swelling by looking at deviation from the line of the leg, either from the side or from head on
- If front of knee is not visible, score only 1 or 3, based on what can be seen and make a note



A quarter can be used as an approximate 1" measurement.

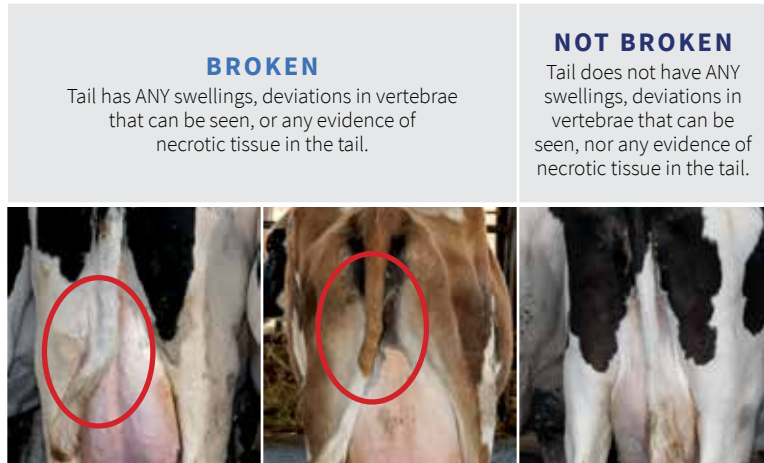
Hock Scoring

<p>SCORE 1: NORMAL</p> <p>Complete hair loss is less than the size of quarter (1" or 2.5 cm in length or width)</p>	<p>SCORE 2: MODERATE</p> <p>Complete hair loss is greater than or equal to the size of quarter (1" or 2.5 cm in length or width), or a dried scab or moderate swelling less than or equal to a quarter in height (1" or 2.5 cm)</p>	<p>SCORE 3: SEVERE</p> <p>Swelling greater than a quarter in height (1" or 2.5 cm)</p>
		

Notes:

- Evaluate both the inside and outside of each hock, if visible
- If both left and right legs are visible, score the worst side
- Area of hair loss must be completely bald, no hair inside
- If there are several areas of hair loss on a hock, apply the size rules to each area, do not sum them
- Size of hair loss can be evaluated by length or width, it does not need to be round
- Score size of swelling by looking at deviation from the line of the leg, either from the side or from behind

Broken Tail Scoring



Notes

- If the tail is docked, score the portion of the tail that is present
- Any form of necrotic tissue counts, regardless of reason (e.g. manure build up on tail causing self docking)
- Need to be able to see the tail in order to score this from behind the cow

Appendix C: Willful Mistreatment or Neglect Protocol

The FARM program takes all allegations of willful mistreatment or neglect of animals seriously. FARM has established this protocol to investigate credible allegations to determine if substantial evidence supports neglect or willful mistreatment of animals.

This protocol also establishes procedures, including successful implementation of an animal care improvement plan, that are required to reinstate the facility into good standing in FARM in the case of a non-egregious act of neglect or willful mistreatment.

The focus of this process is to ensure a facility's practices are consistent with FARM's standards.

Neglect is defined as a failure to carry out or perform essential management practices that ensure sound animal care. Willful mistreatment is defined as a violation, resulting in a conviction of state or local ordinance related to animal care or inflicting unnecessary and/or malicious pain, suffering or injury. Multiple incidents that establish a pattern of neglect or willful mistreatment, shall be considered egregious conduct.

Initiation of Protocol

The FARM Program will initiate the protocol when:

- Credible allegations of willful mistreatment or neglect are reported to FARM
- Credible evidence of willful mistreatment or neglect is presented or reported to FARM
 - If video is evidence provided, a third-party review of the video will be conducted
- Willful mistreatment or neglect is observed by any participant representative

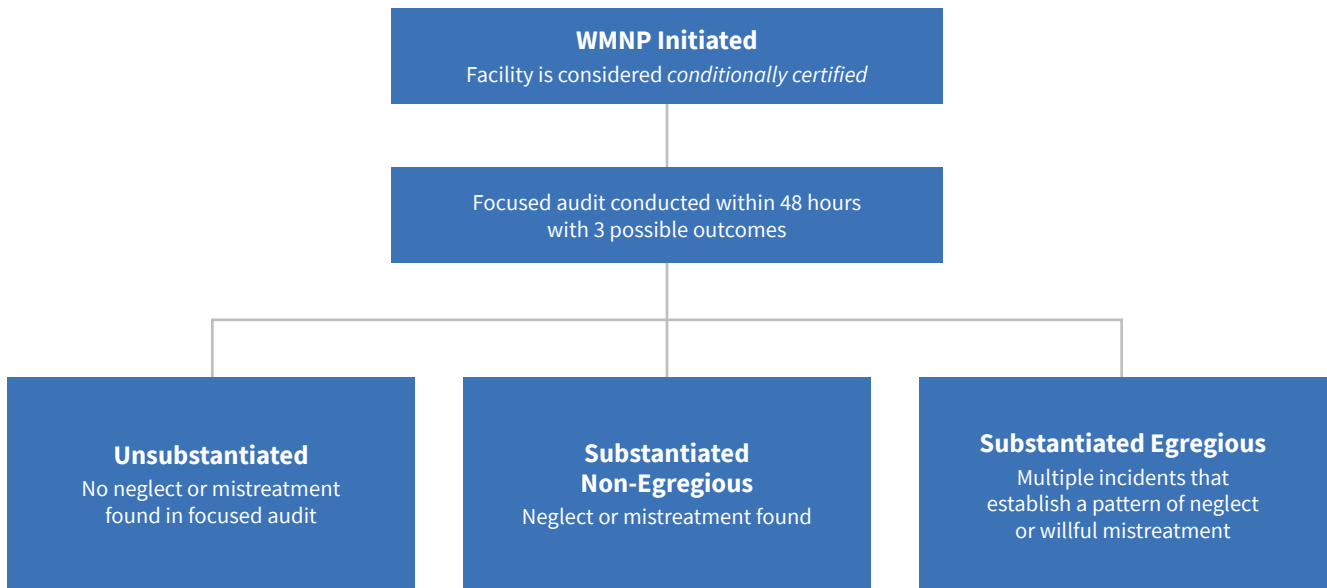
Credibility of the allegation, evidence or observation will be determined by FARM in consultation with an ad hoc internal review panel. Allegations, evidence or observations determined to be misrepresented for apparent disparagement of the dairy industry will not be considered credible.

FARM will contact the participant to discuss the credible allegation or evidence presented against their supplying facility.

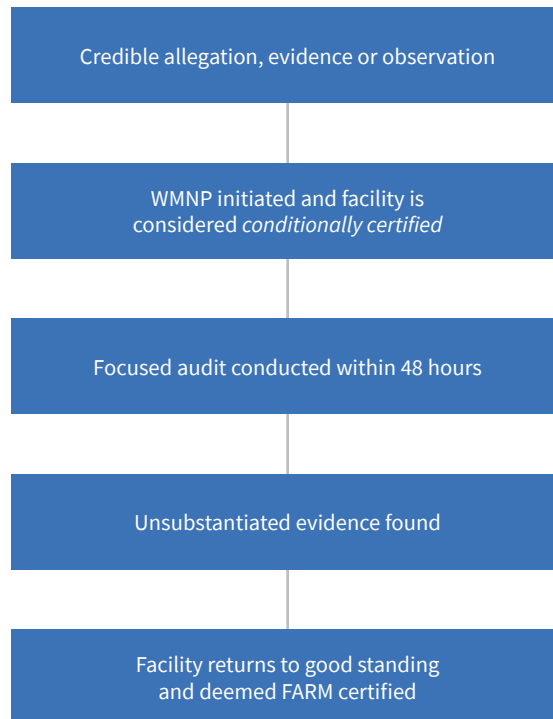
Protocol process

1. The facility will have conditional certification once the protocol is initiated.
2. An audit is required to occur within 48 hours.
3. Based upon the audit, if the allegation or evidence is **found to be unsubstantiated**, the facility will be reinstated to good standing in FARM. The facility returns to the normal evaluation cycle as outlined by FARM's participation agreement.
4. Based upon the audit, if the allegation or evidence is **found to be substantiated but non-egregious**:
 - a. Auditor will provide report of findings to FARM, the participant, and the facility; the facility is placed on probation.
 - b. The facility and the participant will be provided notification that will detail corrective actions that the facility is required to implement within a defined timeframe as determined by the audit and farm.
 - c. During the timeframe while the facility is implementing corrective actions, the facility will remain on probation.
 - d. Audit(s) must be conducted to determine that all corrective actions have been satisfactorily addressed within the designated timeframe.

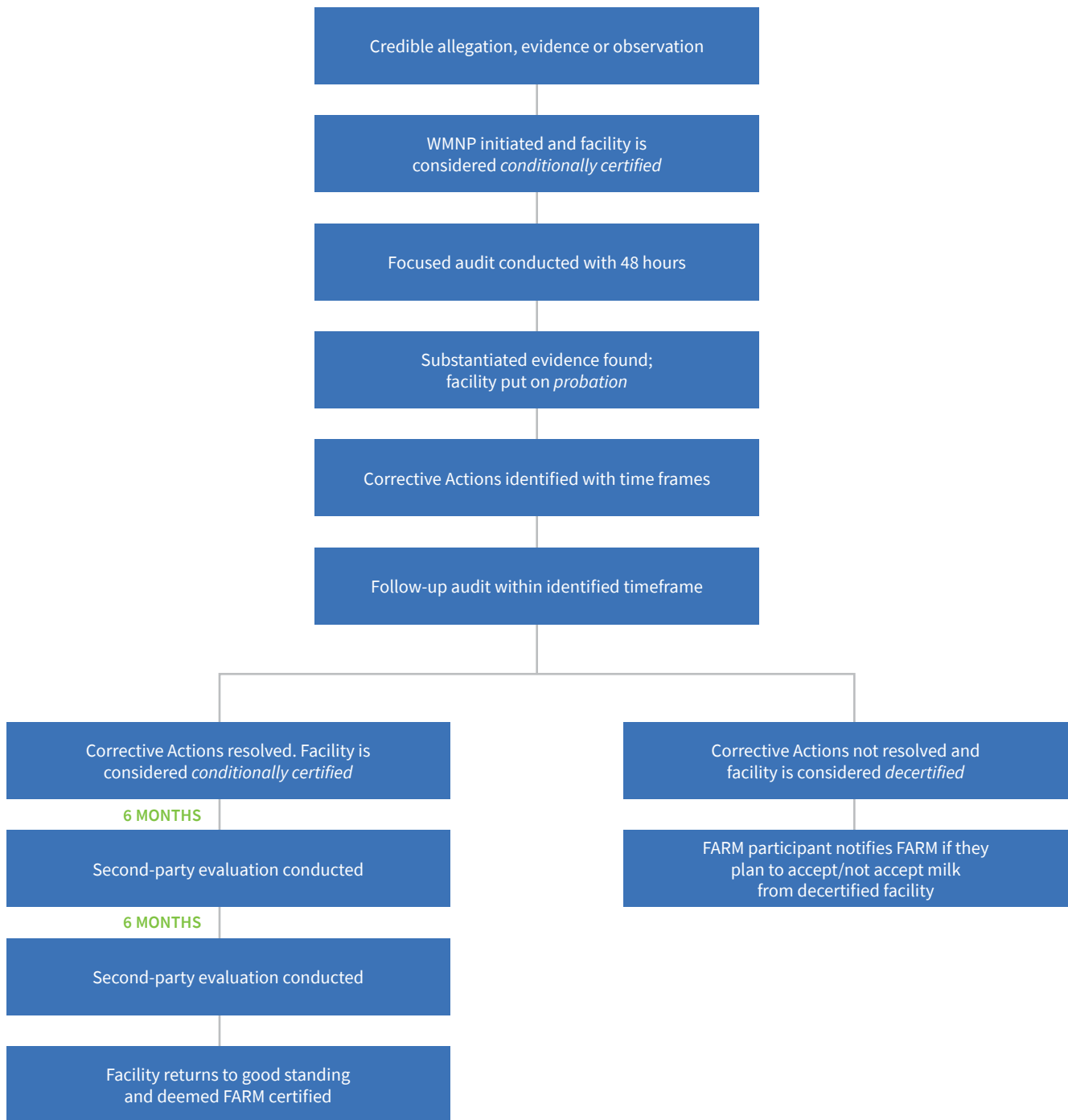
After Initiating Willful Mistreatment or Neglect Protocol (WMNP)



Unsubstantiated Evidence Found



Substantiated Non-Egregious Evidence Found



- e. If all corrective actions have been addressed satisfactorily according to the follow-up audits(s):
 - i. The facility will be moved from probation to conditional certification and remain within the protocol.
 - ii. Follow-up evaluations, preferably conducted unannounced, are required to be conducted 6 months and 12 months after the final audit. Reports from the evaluations are to be provided to FARM, the participant, and the facility.
 - f. If corrective actions have been satisfactorily addressed based upon the follow-up audit(s) and evaluations
 - i. The facility will be moved from conditional certification to good standing and the protocol will be satisfactorily completed.
 - ii. The facility will return to the normal evaluation cycle as outlined by FARM's participation agreement.
 - g. If corrective actions have not been satisfactorily addressed based upon the follow-up audit(s) and evaluations:
 - i. Auditor/evaluator will provide report of audit/evaluation findings to FARM, the participant, and the facility.
 - ii. FARM will notify the participant and the facility that the facility has been decertified.
5. Based upon an audit, if the allegation or evidence is **found to be substantiated and egregious**:
- a. Auditor will provide report of findings to FARM, the participant, and the facility.
 - b. FARM will notify the participant and the facility that the facility has been decertified.

Decertified Facilities

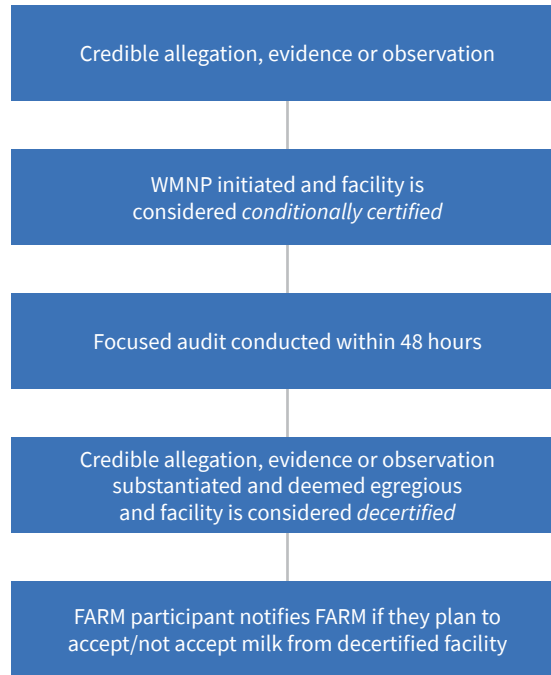
1. Decertified facilities **may not** be accepted into any participant's membership if the participant wishes to remain in good standing with FARM.
2. If a decertified facility is accepted into the membership of a participant, that participant will be immediately delisted as a FARM participant.

Cooperative/Proprietary Processor Contract Agreement

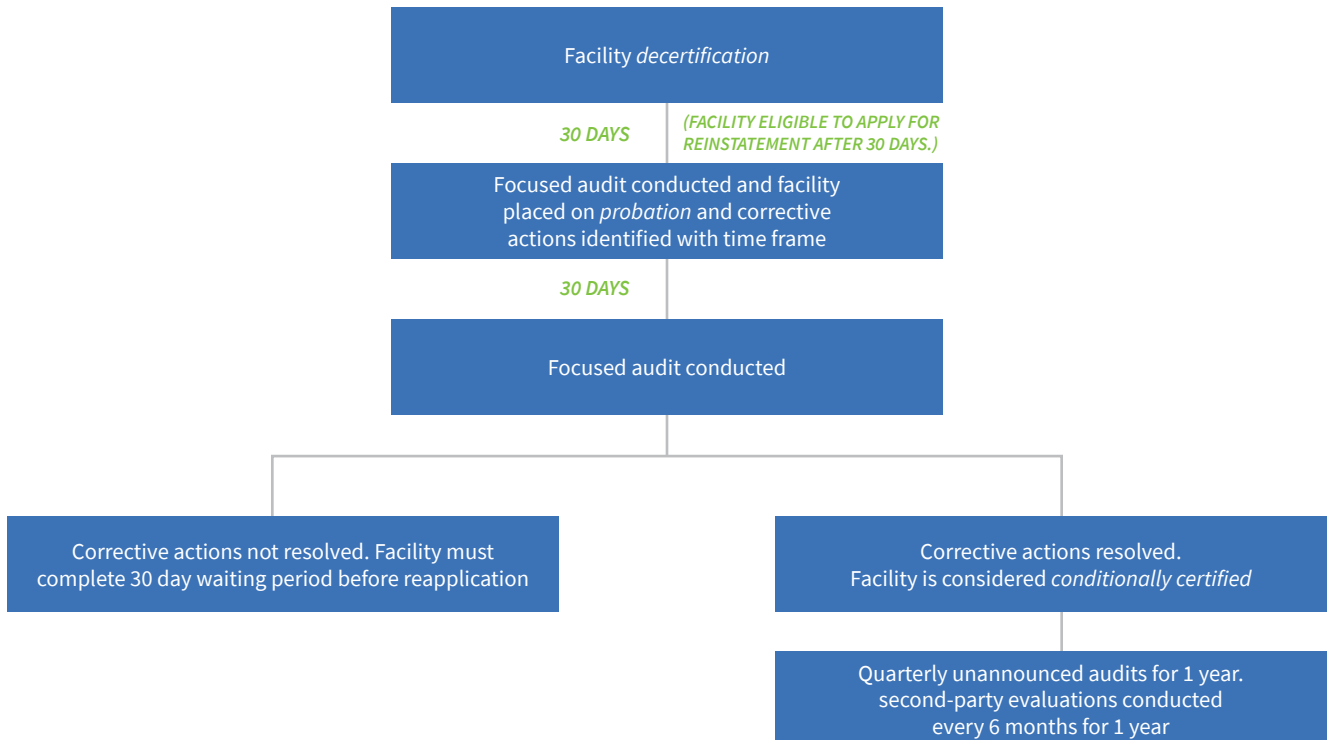
1. Notwithstanding, FARM recognizes that a participant may immediately terminate a facility's milk supply agreement based upon willful mistreatment or neglect in accordance with their contractual relationship. If the facility's milk supply agreement is terminated for such reason, the facility is no longer in good standing with FARM.
2. If a facility's milk supply agreement has been terminated by a participant based upon willful mistreatment or neglect without previous protocol execution, and then enters into a contract agreement with a different participant, the facility will be considered conditionally certified, and required to undergo the protocol.

Please see the
**National Dairy FARM Program
 Animal Care Participant Handbook**
 for the full Willful Mistreatment
 or Neglect Protocol.

Egregious Evidence Found



Decertified Reinstatement



Appendix D: Training Resource Library & Website

Training Resources & Educational Library

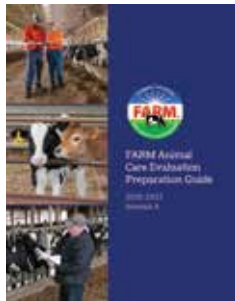
nationaldairyfarm.com/training-resources/

This online resource contains links to external tools for on-farm implementation.

Resource Library

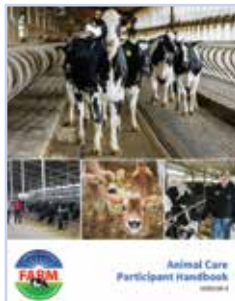
nationaldairyfarm.com/producer-resources/resource-library/

This online library provides comprehensive resources to ensure success in the FARM Program.



Animal Care 4 Evaluation Preparation Guide

This document speaks to the second-party evaluators and third-party verifiers to explain protocols and processes during audits.



Animal Care 4 Participant Handbook

This guide describes the management of the FARM Animal Care Program for participants, the cooperatives or proprietary processors that have signed current participation agreement contract.

For more information, visit the National Dairy FARM Program Website at nationaldairyfarm.com.

For questions, contact dairyfarm@nmpf.org.

ACRONYMS

AABP	American Association of Bovine	DMI	Dairy Management, Inc.
AMDUCA	Animal Medicinal Drug Use Clarification Act	FARAD	Food Animal Residue Avoidance Databank
AVC	Academy of Veterinary Consultants	FDA	Food and Drug Administration
AVMA	American Veterinary Medical Association	MCAP	Mandatory Corrective Action Plan
BCS	Body Condition Scoring	NMPF	National Milk Producers Federation
CIP	Continuous Improvement Plan	VCPR	Veterinarian-Client-Patient Relationship
DEA	Drug Enforcement Administration	VOR	Veterinarian of Record
		WDI	Withdrawal interval

GLOSSARY

For the purposes of the FARM Animal Care reference manual, the following words are defined as follows:

Animal Welfare: How an animal is coping with the conditions it lives in. 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 and distress. Good animal welfare requires disease prevention and veterinary treatment, 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.

Banding: The application of an elastic band to cut off blood supply to the scrotum and testicles, which eventually fall from the body.

Best Practice: An animal care guideline, protocol or practice that achieves the desired outcome described by the corresponding management checklist point. More than one best practice may exist for a corresponding outcome. For example, a best practice for an effective record keeping system, which is a FARM Program guideline, may be achieved by keeping written animal health logs or a computer record system like DairyComp 305.

Body Condition Scoring (BCS): A common dairy practice used to determine the nutritional status of an individual heifer or cow, or to evaluate the average condition for a group. Animals are evaluated on a 5-point scale, with 1 being extremely thin and 5 being extremely fat.

Castration: The process of testicle removal or destruction.

Continuous Improvement Plan (CIP): A written plan that identifies animal care improvement area(s). A CIP requires action to be taken to meet the standard within a maximum of three years, but the FARM Animal Care participant/evaluator may set a deadline sooner than three years. Failure to meet the standard within the allotted timeframe will result in the facility being placed on conditional certification, leading to conditional decertification if standards are not met in a 60-day time period. Evaluators and participants can create CIPs for additional standards that have not been designated by FARM.

Cow Care Agreement: An agreement signed by all family and non-family employees with animal care responsibilities indicating that: (1) they have received annual training in animal handling and stockmanship; (2) they agree to care for all animals humanely and with respect and will not participate in animal abuse of any kind, and (3) they will report any abuse to the farm owner or manager should they witness it. This document must be signed annually.

Dehorning: Removal of the horn, per AABP guidelines, after it has attached to the skull (at approximately 8 weeks old).

Disbudding: A procedure, per AABP guidelines, to stop the growth of the horn bud or remove the horn tissue before the horn bud has attached to the calf's skull (less than 8 weeks old).

Distress: Occurs when livestock are injured, sick or in pain.

Dry Cows: Non-lactating pregnant cows from the end of lactation until next parturition. A pregnant cow is generally dry (non-lactating) for a period of 40 to 60 days before the next calving.

Dystocia: A difficult birth typically requiring assistance from the animal caretaker.

Employee with Animal Care Responsibility:

A family or non-family employee on the farm responsible for the care of dairy animals.

Failure of Passive Transfer (FPT): The condition when calves do not receive enough colostrum immunity from their dam. In the cattle industry, a common criterion to define FPT is when calves have a serum (or plasma) IgG concentration less than 10 grams per liter at 24 hours of age.

Growing Animals: The period between weaning and first parturition during which an animal grows through puberty and begins to approach maturity, from approximately 6 weeks to 24 months old. See also Bred Heifer, Open Heifer and Springing Heifer.

Herd Health Plan: An animal health management system developed with a veterinarian to prevent, diagnose, control and treat disease or injury of all dairy cattle on a farm.

Hock and Knee Scoring: An assessment for adequacy of bedding and stall comfort for an individual animal or the average condition for a group. Animals are evaluated on a 3-point scale, with 1 being no hair loss or swelling and 3 being severe swelling or lesion.

ISO-Certified Company: A company that has gone through a certification process approved by the International Organization for Standardization (ISO). ISO is a worldwide federation of national standards bodies that creates consistent rules or guidelines of technical specifications.

Lactating Dairy Cow: Any bovine female that has had her first calf.*

Licensed Veterinarian: Licensed by one or more state boards of veterinary medical examiners to practice veterinary medicine within their respective state(s).

Locomotion Scoring: An assessment of lameness for an individual animal or the average condition for a group. Animals are evaluated on a 3-point scale, with 1 being sound and 3 being severely lame.

**This definition is written in such a way that allows FARM Program second-party evaluators to easily separate different classes of animals for observation and analysis. It is important to note that this definition differs from that of the FDA classification of animals for approved drugs. The FDA classifies such animals as follows: "The term 'non-lactating dairy cattle' includes replacement dairy heifers, replacement dairy bulls, and dairy calves, according to current animal industry standards and a long-standing FDA practice. These classes of dairy cattle have not yet, or would never produce, milk for human consumption. The term non-lactating dairy cattle does not include dry dairy cows. Dry dairy cows have previously produced milk for human consumption and will again in the future after completion of the 'dry period' between lactations."*

Mandatory Corrective Action Plan (MCAP):

An MCAP is a written plan that identifies animal care improvement area(s). The timeframe for completion of an MCAP is different than that of a CIP or IAP. MCAPs must be completed within nine months. However, a participant/evaluator may require that a standard be met before the nine-month deadline. Failure to meet these standards within the allotted timeframe will result in the facility being placed on conditional certification, leading to conditional decertification if standards are not met in a 60-day period.

Newborn Calf: A young cow, from birth through colostrum feeding, typically in its first 48 hours of life.

Pain: An unpleasant physical sensation occurring in varying degrees of severity because of injury, disease or from a medical or management procedure.

Patient: An animal that receives medical attention, care or treatment.

Pre-Weaned Calf: A calf fed milk or milk replacer from birth through weaning.

Protocols: Written processes that provide specific instructions to cow-side personnel for performing a single, specific task. As a training tool, written protocols improve communication and work consistency. They may include instructions provided by the VOR for the management of dairy cows in various situations and under various conditions.

Second-Party Evaluation: An external review and assessment of on-farm animal care practices on a participating farm based on the FARM Program guidelines. Participating farms must undergo a second-party evaluation at least once every three years.

Second-Party Evaluator: A trained dairy professional certified by the FARM Program to complete on-farm second-party evaluations. Only qualified individuals who have completed annual FARM certification trainings are qualified to conduct second-party evaluations. Typically, second-party evaluators are co-op/processor staff, veterinarians or independent dairy consultants.

Evaluators must have a minimum combination of five years of education — including animal science, dairy science or other relevant curriculum — and/or on-farm dairy experience. Evaluators must apply, complete a phone interview, attend classroom and on-farm training, pass competency exams and recertify annually.

Pre-Fresh Heifers: A heifer that is in the last few weeks of pregnancy.

Stockmanship: The knowledgeable and skillful handling of cattle, based on accepted animal behavior principles, in a safe, efficient, effective and low-stress manner.

Third-Party Verification: A process by which third-party verifiers inspect a representative percentage of participating farms each year to provide statistically verified data regarding adherence to FARM Program guidelines. Once a second-party evaluation is complete, a dairy facility is eligible to be randomly selected, through statistical sampling, to undergo third-party verification. Statistical sampling includes selection criteria like FARM participant geographic location, size and operation type to ensure that the number of randomly selected dairy farms mirrors participants in the entire program. Verification helps ensure the program accomplishes its goals and objectives by confirming the second-party evaluators are upholding the integrity of program implementation.

Third-Party Verifier: A trained and qualified person who does not have a conflict of interest in the operation or the outcome of the verification process. Third-party verifiers must meet the same qualifications as second-party evaluators.

Veterinarian-Client-Patient Relationship (VCPR): The FARM Program uses the AABP definition of VCPR. See Chapter 2: Veterinarian Review for the full definition.

Veterinarian of Record (VOR): The VOR is the party responsible for providing appropriate oversight of drug use on the farm. Oversight is a critical component of establishing, maintaining and validating a VCPR. Oversight should include, but may not be limited to: establishing treatment protocols, personnel training, treatment records review, drug inventory monitoring and assuring appropriate labeling of drugs.

REFERENCES

Chapter 2: Veterinarian Review

- ¹ Code of Federal Regulations 21 CFR 530.5. Food and Drug Administration. April 1, 2017. <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=530.5>

Chapter 3: Continuing Education

- ¹ RW Palmer “Design of large scale dairy cattle units in relation to management and animal welfare” in Knowledge Transfer in Cattle Husbandry, ed. A Kuipers, M Klopčič, and C Thomas. 2005 ISBN: 978-90-76998-80-0
- ² Grandin, T. 2000. Livestock Handling and Transport, 2nd ed. CAB International, Wallingford, UK.

Chapter 4: Facility Management

- ¹ Kendall, P.E., Verkerk, G.A., Webster, J.R. and Tucker, C.B. 2007. Sprinklers and shade cool cows and reduce insect-avoidance behavior in pasture- based dairy systems. *J. of Dairy Sci.* 90:3671-3680.
- ² Bryant, J.R., López-Villalobos, N., Pryce, J.E., Holmes, C.W., and Johnson, D.L. 2007. Quantifying the effect of thermal environment on production traits in three breeds of dairy cattle in New Zealand. *New Zealand Journal of Agricultural Research* 50: 327–338.
- ³ Huzzey, J.M., Veira, D.M., Weary, D.M., von Keyserlingk, M.A.G. 2007. Parturition behavior and dry matter intake identify dairy cows at risk for metritis. *J. of Dairy Sci.* 90: 3220-3233.
- ⁴ Jensen, M. B., Pedersen, L.J., and Munksgaard, L. 2005. The effect of reward duration on demand functions for rest in dairy heifers and lying requirements as measured by demand functions. *Appl. Anim. Behav. Sci.* 90:207-217.
- ⁵ Munksgaard, L., Jensen, M.B., Pedersen, L.J., Hansen, S.W., and Matthews, L. 2005. Quantifying behavioural priorities-effects of time constraints on behaviour of dairy cows, *Bos taurus*. *Appl. Anim. Behav. Sci.* 92:3-14.
- ⁶ Tucker, C. B., and Weary, D.M. 2004. Bedding on geotextile mattresses: how much is needed to improve cow comfort? *J. of Dairy Sci.* 87:2889-2895.
- ⁷ Cook, N. B., Bennett, T.B., and Nordlund, K.V. 2004. Effect of freestall surface on daily activity patterns in dairy cows with relevance to lameness prevalence. *J. of Dairy Sci.* 87:2912-2922.
- ⁸ Herskin, M.S, Munksgaard L., and Andersen, J.B. 2007. Effects of social isolation and restraint on adrenocortical responses and hypoalgesia in loose- housed dairy cows. *J. Anim. Sci.* 85:240-247.
- ⁹ Rushen, J., Boissy, A., Terlouw, E.M., and de Passille A.M. 1999. Opioid peptides and behavioural and physiological responses of dairy cows to social isolation in unfamiliar surroundings. *J. Anim. Sci.* 77:2918-2924
- ¹⁰ Barrientos, A.C., Chapinal, N., Weary, D.M., Galo, E., and von Keyserlingk, M.A.G. 2013. Herd-level risk factors for hock injuries in freestall housed dairy cows in the Northeastern US and California. *J. Dairy Sci.* 96:3758-3765
- ¹¹ Drissler, M., Gaworski, M., Tucker, C.B., and Weary, D.M. 2005. Freestall maintenance: Effects on lying behavior of dairy cattle. *J. Dairy Sci.* 88:2381– 2387.
- ¹² Haley, D.B., de Passille, A.M., and Rushen, J. 2001. Assessing cow comfort: effects of two floor types and two tie stall designs on the behavior of lactating dairy cows. *Appl. Anim. Behav. Sci.* 71:105- 117.
- ¹³ Rushen, J., Haley, D. and de Passille, A.M. 2007. Effect of softer flooring in tie stalls on resting behavior and leg injuries of lactating cows. *J. Dairy Sci.* 90:3647-3651.
- ¹⁴ Chapinal, N., Barrientos, A., von Keyserlingk, M.A.G., Galo, E., and Weary, D.M. 2013. Herd-level risk factors for lameness in freestall farms in North Eastern US and California. *J. Dairy Sci.* 96: 318-328.
- ¹⁵ Barrientos, A.C., Chapinal, N., Weary, D.M., Galo, E., and von Keyserlingk, M.A.G. 2013. Herd-level risk factors for hock injuries in freestall housed dairy cows in the Northeastern US and California. *J. Dairy Sci.* 96:3758-3765
- ¹⁶ Fregonesi, J.A., von Keyserlingk, M.A.G., Viera, D.M., and Weary, D.M. 2007. Effects of bedding quality on lying behavior of dairy cows. *J. of Dairy Sci.* 90:5732–5736.

- ¹⁷ Camiloti, T., V. Fregonesi, J. A., von Keyserlingk, M. A. G., and Weary, D. M. 2012. Effects of bedding quality on the lying behavior of dairy calves. *J. of Dairy Sci.* 95: 3380-3383.
- ¹⁸ Zurbrigg, K., Kelton, D., Anderson, N., and Millman, S. 2005. Tie-Stall Design and its Relationship to Lameness, Injury, and Cleanliness on 317 Ontario Dairy Farms. *J. of Dairy Sci.* 88:3201– 3210.
- ¹⁹ Tucker, C.B., Weary, D. M., and Fraser, D. 2004. Free-Stall Dimensions: Effects on Preference and Stall Usage. *J. of Dairy Sci.* 87:1208–1216.
- ²⁰ Bernardi, F., Fregonosi, J., Veira, D.M., Winkler, C., M.A.G. von Keyserlingk, and Weary, D.M. 2009. The stall design paradox: neck rails increase lameness but improve udder and stall hygiene. *J. Dairy Sci.* 92:3074-3080.
- ²¹ Huzzey, J.M., DeVries, T.J., Valois, P., and von Keyserlingk, M.A.G. 2006. Stocking density and feed barrier design affect feeding and social behavior of dairy cattle. *J. Dairy Sci.* 89:126-133.
- ²² Fregonesi, J. A., Tucker, C.B., and Weary, D.M. 2007. Overstocking reduces lying time in dairy cows. *J. of Dairy Sci.* 90:3349-3354.
- ²³ Proudfoot, K.L., Veira, D.M., Weary, D.M., and von Keyserlingk, M.A.G. 2009. Competition at the feed bunk changes the feeding, standing, and social behavior of transition dairy cows. *J. Dairy Sci.* 92:3116-3123.
- ²⁴ Krohn, C.C. 1994. Behaviour of dairy cows kept in extensive (loose housing/pasture) or intensive (tie stall) environments. III. Grooming, exploration and abnormal behavior. *Appl. Anim. Behav. Sci.* 42:73-86.
- ²⁵ Loberg, J, Telezhenko, E. , Bergsten, C., and Lidfors, L. 2004. Behavior and claw health in tied dairy cows with varying access to exercise in an outdoor paddock. *Appl. Anim. Bhav. Sci.* 89:1-16.
- ²⁶ Gustafson, G.M. 1993. Effects of daily exercise on the health of tied dairy cows. *Prev. Vet. Med.* 17:209-223.
- ²⁷ Hernandez-Mendo, O., von Keyserlingk, M.A.G., Veira, D.M. and Weary, D.M. 2007. Effects of pasture on lameness in dairy cows. *J. Dairy Sci.* 90:1209-1214.
- ²⁸ Huzzey, J. M., von Keyserlingk, M.A.G., and Weary, D.M. 2005. Changes in feeding, drinking, and standing behavior of dairy cows during the transition period. *J. Dairy Sci.* 88:2454–2461.

Chapter 5: Animal Management and Observation

- ¹ Secure Milk Supply. Self-Assessment Checklist for Enhanced Biosecurity for FMD Prevention: Dairy. 2017.
- ² Schwartzkopf-Genswein, Stookey, K.S., and J.M., Welford, R. 1997. Behavior of cattle during hot-iron and freeze branding and the effects on subsequent handling ease. *J. Anim. Sci.* 75, 2064–2072.
- ³ U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Official Eartags – National Uniform Eartagging System (NUES). 2018.
- ⁴ U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Animal Disease Traceability Framework, Official Eartags – Criteria and Options. 2013.
- ⁵ Barrientos, A. K., Chapinal, N., Weary, D. M., Galo, E., and von Keyserlingk. M. A. G. 2013. Herd- level risk factors for hock injuries in freestall- housed dairy cows in northeastern United States and California. *J. Dairy Sci.* 96: 3758-3765.
- ⁶ von Keyserlingk, M.A.G, Barrientos, A., Ito, K., Galo, E., and Weary, D.M. 2012. Benchmarking cow comfort on North American freestall dairies: Lameness, leg injuries, lying time, facility design, and management for high-producing Holstein dairy cows. *J. of Dairy Sci.* 95:73399-7408.

Chapter 6: Antibiotic Stewardship

- ¹ National Milk Drug Residue Data Base. Fiscal Year 1996 Annual Report. 1997.
- ² National Milk Drug Residue Data Base. Fiscal Year 2018 Annual Report. 2018.
- ³ U.S. Department of Agriculture, Food Safety and Inspection Service. Residue Repeat Violators List. Accessed Aug. 12, 2020. fsis.usda.gov/wps/portal/fsis/topics/data-collection-and-reports/chemistry/residue-chemistry
- ⁴ U.S. Food & Drug Administration. Approved Animal Drug Products (Green Book). Accessed Aug. 12, 2020. [fda.gov/animal-veterinary/products/approved-animal-drug-products-green-book](https://www.fda.gov/animal-veterinary/products/approved-animal-drug-products-green-book)

Chapter 7: Pre-Weaned Calves

- ¹ Proudfoot, K., Weary, D.M., and von Keyserlingk, M.A.G. 2014. Maternal isolation behavior of Holstein dairy cows kept indoors. *J. Anim. Sci.* 92:277-281.
- ² Davis, C.L., Drackley, J.K. 1998. The development, nutrition, and management of the young calf, ed 1. Iowa State University Press. 13:179-206.
- ³ Bartier, A. L. , Windeyer, M.C., and Doepel, L. 2015. Evaluation of on-farm tools for colostrum quality measurement. *J. Dairy Sci.* 98:1878–1884.
- ⁴ Biemann, V., Gillan, J., Perkins, N.R., Skidmore, A.L., Godden, S., and Leslie, K.E. 2010. An evaluation of Brix refractometry instruments for measurement of colostrum quality in dairy cattle. *J. Dairy Sci.* 93:3713 – 3721.
- ⁵ Heinrichs, A.J., Jones, C.M., Erickson, P.S., Chester-Jones, H., Anderson, J.L. 2019. Symposium review: Colostrum management and calf nutrition for profitable and sustainable dairy farms. *J Dairy Sci.* 103:5694-5699.
- ⁶ Penn State Extension. Feeding the newborn dairy calf. 2017.
- ⁷ Khan, M., Weary, D.M., and von Keyserlingk, M.A.G. 2011. Invited review: Effects of milk ration on solid feed intake, weaning and performance in dairy heifers. *J. of Dairy Sci.* 94:1071–1081.
- ⁸ Soberon, F., E. Raffrenato, R. W. Everett, and M. E. Van Amburgh. 2012. Preweaning milk replacer intake and effects on long-term productivity of dairy calves. *J. Dairy Sci.* 95:783-793.
- ⁹ de Paula Vieira, A., Guesdon, V., de Passillé, A.M., von Keyserlingk, M.A.G., and Weary, D.M. 2008. Behavioural indicators of hunger in dairy calves. *Appl. Anim. Behav. Sci.* 109:180-189.
- ¹⁰ Cullens, F. 2018. Michigan State University Extension. Starter for pre-weaned calves.
- ¹¹ Hanson, M. 2018. Dairy Herd Management. Tips for feeding water in the winter.
- ¹² Stafford, KJ and Mellor, DJ. 2005. Dehorning and disbudding distress and its alleviation in calves. *J. Vet.* 169: 3377-349.
- ¹³ Graf, B., and Senn, M. 1999. Behavioral and physiological responses of calves to dehorning by heat cauterization with or without local anesthesia. *Appl. Anim. Behav. Sci.* 62:153–171.
- ¹⁴ Doherty TJ, Kattesh HG, Adcock RJ, Welborn MG, Saxton AM, Morrow JL, Dailey JW. 2007. Effects of a concentrated lidocaine solution on the acute phase stress response to dehorning in dairy calves. *J Dairy Sci.* 90:4232–4239.
- ¹⁵ Heinrich, A., Duffield, T.F., Lissemore, K.D., Squires, E.J., and Millman, S.T. 2009. The impact of meloxicam on post-surgical stress associated with cautery dehorning. *J. Dairy Sci.* 92:540–547.
- ¹⁶ Huber, J., Arnholdt, T., Möstl, E., Gelfert, C.C., and Drillich, M. 2013. Pain management with flunixin meglumine at dehorning of calves. *J. Dairy Sci.* 96:132-140.
- ¹⁷ Faulkner, P.M., and Weary, D.M. 2000. Reducing pain after dehorning in dairy calves. *J. Dairy Sci.* 83:2037–2041.
- ¹⁸ Hokkanen, Ann-Helena, Raekallio, Marja R., Salla, Kati, Hänninen, Laura, Viitasaari, Elina, Norring, Marianna, Raussi, Satu, Rinne, Valtteri M., Scheinin, Mika, and Vainio, Outi M. 2014. Sublingual administration of detomidine to calves prior to disbudding: a comparison with the intravenous route. *Vet. Anaesth and Analg* 41: 372–377.
- ¹⁹ Stock, M.L., Baldrige, S.L., Griffin, D., Coetzee, J.F. 2012. Bovine dehorning: Assessing pain and providing analgesic management. *Veterinary Clinics: Food Animal Practice.* 29:103-133.
- ²⁰ Adcock, S.J.J. and Tucker, C.B. 2018. The effect of disbudding age on healing and pain sensitivity in dairy calves. *J. of Dairy Sci.* 101:10361-10373.

Chapter 9: Euthanasia

- ¹ American Association of Bovine Practitioners. Guidelines for the humane euthanasia of cattle. 2019.

Chapter 10: Fitness to Transport Dairy Beef

- ¹ Grandin, T. 2000. *Livestock Handling and Transport*, 2nd ed. CAB International, Wallingford, UK.



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