



ANIMAL CARE

REFERENCE MANUAL



"The rule to be observed in this stable at all times, toward the cattle,
young and old, is that of patience and kindness.
A man's usefulness in a herd ceases at once when he loses his temper and bestows rough usage.
Men must be patient. Cattle are not reasoning beings.
Remember that this is the Home of Mothers. Treat each cow as a Mother should be treated.
The giving of milk is a function of Motherhood: rough treatment lessens the flow.
That injures me as well as the cow.
Always keep these ideas in mind in dealing with my cattle."

W. D. Hoard – 1885

Hoard's Dairyman



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FOREWORD

The National Dairy FARM Program: Farmers Assuring Responsible Management™ was created to show our customers that we as dairy producers have a caring relationship with our animals. The successful adoption of the program among cooperatives, proprietary processors and independent producers demonstrates the program's value to the dairy industry. Today, over 70 percent of the U.S. milk supply is participating in the program. This high level of acceptance in just three years validates that the structure of the program is sound. However, that does not mean that this program is static; continuous improvement is occurring on the farm, and that improvement is reflected in the FARM Program.

In this second edition of the Animal Care Reference Manual, you will see changes that represent ongoing input from dairy producers, veterinarians and animal care experts. After an intense year-long process, the guidelines established in this manual reflect the consensus of that input, the latest research and information collected by the FARM Program over the last three years.

The FARM Program is a nationwide, verifiable animal well-being program that provides consistency and uniformity to best practices in animal care. Third-Party Verification of the program was initiated in 2011 and has continued each year since, providing proof of the credibility of the data collected by the certified Second-Party FARM Evaluators, as well as the overall integrity of the program. Third-Party Verification is a key component of the program that assures our customers that the data collected is accurate and can be used to identify practices currently being used on the farm.

The FARM Program is an important tool that demonstrates dairy farmers' commitment to animal care and quality assurance to our customers. Dairy farmers have a great story to tell, and the FARM Program allows us to do so in a consistent and verifiable manner. I encourage you to familiarize yourself with the new educational materials, including this Animal Care Reference Manual, and evaluate your management practices and how they relate to the quality of animal care on your farm. The FARM Program is an integral part of telling our story, confirming that the care you and I provide to our animals maintains their health and comfort.

Sincerely,



Randy Mooney
Chairman
National Milk Producers Federation



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CHAPTER 1

INTRODUCTION

A long tradition of animal care enables dairy farmers to provide a healthy, safe and wholesome milk supply to the global consumer. Milk production is not just a profession; it is a way of life. Dairy farmers live and work on their farms and treat their cows with respect and care, knowing that this is the proper and humane thing to do for the animal and for their livelihood.

OVERVIEW

This reference manual communicates the animal care and wellness guidelines of the National Dairy FARM Program: Farmers Assuring Responsible Management™ (FARM Program). Along with the guidelines, this document provides extensive information, resources and references that dairy farmers can use. While extensive, the information, resources and references are not complete, 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 dairy farmers across the United States.

Best practices identified in the manual are not the only practices that can meet the identified guidelines. Certain regional practices, weather, seasonal or other conditions may cause the application of some management practices to vary. Dairy farmers should work with their veterinarian or other trained professional to develop appropriate management approaches.

OUR MISSION

The FARM Program was created by the National Milk Producers Federation (NMPF), with support from Dairy Management, Inc. (DMI), to demonstrate and provide verification over time that U.S. dairy farmers are committed to providing a high level of animal care and quality assurance.

THE PROGRAM

Our customers and consumers want to know that dairy products are safe, wholesome and nutritious. They want to be assured that animals receive proper care. The FARM Program, voluntary and available to all dairy farmers, establishes an on-farm animal care program and a system for Third-Party Verification that demonstrates that commitment. Third-Party Verification ensures the integrity of the program to our customers and consumers. Our industry has an excellent track record of responsible management practices; this national effort strives to provide a continuous improvement process to ensure a high level of on-farm animal care and to provide reassurance to consumers that dairy farmers focus on dairy animal care.

This manual details guidelines and best practices for a variety of animal care issues including animal health from birth to end of life, environment and facilities, nutrition, and handling, movement and transportation. The manual is an educational resource for dairy farmers, Second-Party Evaluators and Third-Party Verifiers participating in the FARM Program.

BACKGROUND

Consumers are more informed and educated about the nutritional benefits of their food now than at any time in history, but are more removed from production practices than ever before. With this lack of knowledge about how food is produced comes an increasing need to know that the animals that provide meat, milk and eggs are raised and cared for in a humane and ethical manner. The dairy industry, through the National Milk Producers Federation with support from Dairy Management, Inc., responded to this need for assurance by initiating the National Dairy FARM Program: Farmers Assuring Responsible Management™ in 2009.

MANUAL FORMAT

The National Dairy FARM Program Animal Care Reference Manual is a comprehensive animal care resource tool. It has been formatted for ease of use by providing guidelines for (1) nutrition, (2) animal health, (3) environment and facilities, and (4) handling, movement and transportation. In each of these chapters you will find a Management Checklist, a description of best practices, a section for specific lifecycle considerations, and a list of other references and resources. Separate chapters cover the care of newborns and milk-fed dairy calves, and special-needs animals. Management and training are recurring themes throughout each chapter and are covered in the beginning of the manual.

The companion National Dairy FARM Program Animal Care Quick Reference User Guide is a condensed version of the manual for on-farm use and implementation. These materials are supplemented with additional educational resources for dairy farmers.

Additional information tailored for customers and consumers provides important communication about the program through the dairy value chain. Two key elements of the National Dairy FARM Program are the on-farm Second-Party Evaluations and the Third-Party Verification of the program. For program participants this is a two-step process. The first step is the on-farm Second-Party Evaluation, which provides the dairy farmer with an external review of animal care practices based on the FARM Program guidelines.

Once the Second-Party Evaluation step is complete the dairy farmer is eligible to be randomly selected, through statistical sampling, to undergo Third-Party Verification. A more detailed explanation of these two processes is provided in Chapter 2: On-Farm Second Party Evaluations and Chapter 11: Third-Party Verification.

Additional information on the National Dairy FARM Program is available online at www.nationaldairyfarm.com.

ACRONYMS

BCS Body Condition Scoring

DMI Dairy Management, Inc.

ADT Animal Disease Traceability

NDFP National Dairy FARM Program

NMPF National Milk Producers Federation

SOP Standard Operating Procedure

TMR Total Mixed Ration

USDA United States Department of Agriculture

DEFINITIONS

For the purposes of the National Dairy FARM Program Animal Care Reference Manual, the following words found in the text are defined as follows:

Action Plan: A written proposal that identifies an area(s) for improvement in animal care. It specifies actions to make the improvement and a timeline for completion.

Animal Caretaker: Trained personnel responsible for the care and welfare of the animals on the dairy farm.

Banding: The application of an elastic band to cut off blood supply to the scrotum and testicles, which eventually fall from the body.¹

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 Management Checklist Point.

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 (see Appendix A).

Bred Heifer: A young, pregnant dairy animal that has not yet given birth to her first calf; typically 13-to-24 months of age.

Breeding Bull: A male bovine used for breeding.

Burdizzo: The Burdizzo castration method requires the use of a Burdizzo clamp to crush the blood vessels for 10 seconds, interrupting the supply to and destroying the testicle.

Castration: The process of removal or destruction of the testicles.

Dehorning: Removal of the horn (using a hot iron, Barne's dehorner or gouging) after it has attached to the skull (approximately 8 weeks of age).

Disbudding: A procedure to stop the growth of or removal of the horn tissue before the horn bud has attached to the calf's skull (less than 8 weeks of age).

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

Dystocia: Difficult birth typically requiring assistance from the animal caretaker.

End of Life: On-farm death due to illness, euthanasia or death at a packing house.

Freemartin Heifer: A sexually imperfect, usually sterile, female calf twinborn to a male.

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

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

Incision (Open/Closed Surgical Castration): A procedure where testicles are removed completely through an incision through the scrotum.

Lactating Dairy Cow: Any bovine female that has had her first calf.²

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

Milking Cows: Cows that are lactating.

Milk-Fed Dairy Calf: A calf being fed milk or milk replacer.

Newborn: The young of the domestic cow, from birth up until the first 48 hours of life.

Open Heifer: A young bovine female that has not yet become pregnant.

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

Second-Party Evaluation: An external review of on-farm animal care practices on a participating farm based on the National Dairy FARM Program guidelines.

Second-Party Evaluator: A trained dairy professional certified by the FARM Program to complete on-farm Second-Party Evaluations.

Special-Needs Animals: Sick, injured or non-ambulatory dairy cattle.

Springing Heifers: A heifer that is in the last trimester of pregnancy.

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.

Transition Cows: Cows or heifers that are "transitioning" from the period of late gestation (pregnancy) through the period of early lactation, that is, about three weeks prior to and about three weeks after calving (periparturient period).

Waste Management: Management or handling of manure on the farm.

Weaned Animal: A young calf that is no longer being fed milk or milk replacer and has been transitioned to eating only dry feed.

Willful Mistreatment of Animals: Acts that maliciously cause pain, injury or suffering including, but not limited to: needlessly applying any type of prod to a sensitive part of the animal (prods are only used when animal or human safety is in jeopardy, and as a last resort), malicious hitting or beating of an animal, movement of non-ambulatory cattle in a manner inconsistent with National Dairy FARM Program guidelines, prolonged lack of access to feed and water, and inappropriate on-farm harvest or euthanasia.

Young Stock: Animals from weaning to 20 months of age.

¹Ontario Ministry of Agriculture and Food. "Castration of Calves." 2007.

²CVM Update – FDA Clarifies use of the Term, "Non-lactating Dairy Cattle." Online at www.fda.gov/AnimalVeterinary/NewsEvents/CVMUpdates/ucm292761.htm

CHAPTER 2

ON-FARM SECOND-PARTY EVALUATIONS

The on-farm Second-Party Evaluation provides an external review of animal care practices based on National Dairy FARM Program guidelines. The results of the initial Second-Party Evaluation will provide dairy farmers with a status report and enable them to develop an action plan (in consultation with trained professionals) for continuous improvement if necessary. Subsequent Second-Party Evaluations, at least once every three years, will enable the dairy farmer to track progress in on-farm care of the animals.

A veterinarian, extension educator, co-op field staff person, university personnel or otherwise qualified personnel who have completed National Dairy FARM Program training can perform Second-Party Evaluations. Second-Party Evaluators will use the Management Checklists provided in the National Dairy FARM Program to conduct the Second-Party Evaluation.

ACTION PLAN

At the conclusion of a Second-Party Evaluation an Action Plan is developed, if needed, by the dairy farmer and the herd veterinarian or other

qualified professionals for those areas identified as needing improvement. An Action Plan identifies opportunity areas for improving animal care, specific actions to implement the improvement and a schedule for completion. An Action Plan may include a recommendation for a re-evaluation by a specified time to assess progress.

MANAGEMENT CHECKLISTS

The Management Checklists provided in the following chapters highlight key on-farm guidelines and best practices.

The Management Checklist Points will be highlighted in the following way at the start of a given section:

 ***Management Checklist Points are formatted in bold italics throughout the document.***



FARMERS ASSOCIATION

CHAPTER 3 MANAGEMENT

STANDARD OPERATING PROCEDURES (SOPS), TRAINING AND RECORD KEEPING

When addressing management, it is important to describe the procedure, train to the procedure, document the completion of the training and monitor it over time. Written SOPs are reviewed annually and considered a best practice. The written information would benefit another employee stepping in to assist. Train and educate animal caretakers about animal care expectations and animal well-being policies. The operation must have a written Herd Health Plan, as well as training and protocols for handling, transportation and movement, and euthanasia for cattle for all ages and health conditions. Much of the information in this chapter is interdependent on criteria in other sections and/or animal observations.



VETERINARIAN/CLIENT/PATIENT RELATIONSHIP

 **The dairy has a documented Veterinarian/Client/Patient Relationship.**

To correctly diagnose, treat and prevent disease, dairy farmers establish a Veterinarian/Client/Patient Relationship (VCPR) with a licensed veterinarian. According to the American Veterinary Medical Association (2013), a VCPR means that all of the following are required:

- a. The veterinarian has assumed the responsibility for making medical judgments regarding the health of the patient and the client has agreed to follow the veterinarian's instructions.*
- b. The veterinarian has sufficient knowledge of the patient to initiate at least a general or preliminary diagnosis of the medical condition of the patient. This means that the veterinarian is personally acquainted with the keeping and care of the patient by virtue of:*
 - i. a timely examination of the patient by the veterinarian, or*
 - ii. medically appropriate and timely visits by the veterinarian to the operation where the patient is managed.*
- c. The veterinarian is readily available for follow-up evaluation or has arranged for the following:*
 - i. veterinary emergency coverage, and*
 - ii. continuing care and treatment.*
- d. The veterinarian provides oversight of treatment, compliance and outcome.*
- e. Patient records are maintained.*

A Herd Health Plan is developed by the dairy farmer and the herd 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. A dairy farmer should assure that a VCPR exists with the overall herd veterinarian. A dairy farmer should also consider the need for a VCPR for additional primary veterinarians for specific animal health management areas when the use of pharmaceuticals is involved.

TRAINING

 **Documentation exists of training for new and existing animal caretakers at least on an annual basis.**

A best practice is to train new animal caretakers on animal care promptly after hiring. All animal caretakers should be retrained at least yearly. Animal caretakers should be cross-trained for all situations they may encounter. Training encompasses care expectations for particular circumstances, such as how to move cattle or what to do in cases of emergencies, as well as general expectations, such as how to humanely handle animals. Animal caretakers must know and understand the negative consequences of deliberate disregard for animal care policies established by the dairy farmer. These animal care policies must be enforced by dairy farm management.

STANDARD OPERATING PROCEDURES

 **Written SOPs are readily available, and in many cases posted, in the native languages of personnel assigned animal care responsibilities.**

SOPs are written instructions for various aspects of animal care on the dairy. The SOPs provide enough detail to ensure that all animal caretakers empowered with a specific animal care assignment (consistent with their job description and training) can routinely and consistently perform their animal care duties. As a best practice, SOPs are reviewed at least annually and updated as necessary. Best practice SOPs include a Herd Health Plan, and address newborn management, feed and nutrition management, and non-ambulatory animal management. Sample written SOPs are available from the FARM Program.

EMERGENCY PREPAREDNESS

 **Emergency contact information is readily available to address animal care needs arising from unique circumstances such as a fire or natural disaster, equipment failures and power failures.**

A best practice includes arrangements for animal caretakers or temporary help to cover emergencies, weekends, holidays and unexpected absences of assigned animal caretakers. Animal caretakers are informed of animal care expectations and qualified to perform assigned duties. 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 is necessary to speed communications in an emergency.

IDENTIFICATION AND RECORD KEEPING

 **Each animal is permanently identified and an effective record-keeping system is employed for animal care and management decision making.**

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 (IDairy 2009).

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 (animal disease traceability rule). Under the ADT final rule, all dairy cattle females, regardless of age, and all male dairy cattle (including dairy steers) that are born after March 11, 2013, will be required to be officially identified (by a device or method approved by USDA) prior to interstate movement.

Additionally, all dairy cattle moving between states must be accompanied by an Interstate Certificate of Veterinary Inspection or other documentation as agreed to by the receiving state. The FARM Program recommends using 840-RFID ear tags, which USDA recognizes as an official identification device for the lifetime of an animal.

Effective record keeping shows compliance with training, inventory control, animal identification, disease prevention and control, residue withdrawal and avoidance, and disposal to help avoid liability from residue contamination or other animal health concerns. On a daily basis, it is necessary to identify animals treated with medications or healthcare products. Records are important for animal traceability in the event of an animal disease outbreak. They may include such items as:

- *Birth date*
- *Sex*
- *Origin*
- *Owner*
- *Location*

Production and reproduction records help monitor an animal's performance and well-being. Important management information may include:

- *Average daily weight gain for heifers and yearlings*
- *Milk production and composition*
- *Nutritional information and history where known*
- *Breeding dates*
- *Sire identification and calving dates*
- *Identification of the calf*
- *Ultimate disposition of the animal*

Equally important animal health information that may be recorded:

- **Vaccination dates**
- **Parasite control measures**
- **Blood tests and veterinary treatments, including:**
 - Treatment date(s)
 - Name of medication(s)
 - Amount(s) and route(s) of administration
 - Surgical procedure(s) performed
 - Condition diagnosed and being treated
 - Veterinary clinic information

MILKING ROUTINE

 **A specific milking routine, procedures and actions are followed to ensure cow comfort and well-being.**

Ensuring appropriate animal handling at milking is important for both animal well-being and productivity. Best practice in the parlor includes a number of features. Numerous studies have found that farms with quiet, confident animal caretakers have higher milk production (see Chapter 8: Animal Handling, Movement and Transportation), thus all animal caretakers should behave in a calm and controlled manner. Gates and restraining equipment operate smoothly, quietly and safely. Waiting time is minimized for each milking. The preparation routine that signals the beginning of milking is pleasant to the cow and consistent. The routine includes checking for abnormal milk, and thorough cleaning and drying of the teats. Avoid medical examinations or unpleasant experiences from being associated with the place of milking. Teat ends are periodically inspected to facilitate timely identification of any problems.

The pre-milking holding area on farms with milking parlors is the place of highest animal density on the farm. It is important that prevention of injury be considered in the design of the holding area's flooring, space, sidewalls and entrance to the milking parlor. Moderation of temperature extremes by use

of fans, sprinklers or other technology ensures animal comfort in the holding areas and the milking parlor (see Chapter 7: Environment and Facilities).

Milking equipment is regularly maintained and checked for vacuum level, pulsation rate and pulsation ratio. Equipment is also checked for stray voltage if unusual behavior is exhibited or milk production drops. To prevent disease transmission, milking equipment is maintained, cleaned and sanitized.

RESOURCES

Good Dairy Health Records. (Washington State University Extension, 2012) Online at www.goodhealthrecords.com

"Introduction to Dairy Stockmanship." Dairy Care365™ Training Series. (Merck Animal Health, 2012)

To request a copy email: Info@DairyCare365.com

"Moving Cows to the Milking Parlor." Dairy Care365™ Training Series. (Merck Animal Health, 2013)

To request a copy email: Info@DairyCare365.com

NYSCHAP Standard Operating Procedures. (NYSCHAP) Online at <http://nyschap.vet.cornell.edu/module/welfare/Section3/welfare3.asp>

Principles of Veterinary Medical Ethics of the AVMA. (American Veterinary Medical Association, April 2008) Online at www.avma.org/issues/policy/ethics.asp

See It? Stop It! (Center for Food Integrity, 2013) Online at www.seeitstopit.org

Why Animal Identification? Online at www.idairy.org (IDairy, 2009)

CHAPTER 4

NEWBORN AND MILK-FED DAIRY CALVES

Inadequate colostrum intake results in “failure of passive transfer” (FPT). Under best practice, all calves receive colostrum or colostrum replacer and are fed in a way that promotes health and reduces the risk of disease. Colostrum quality is highly dependent on early harvest (within two hours of calving). Health is maintained through preventive care programs augmented by rapid diagnosis and treatment when necessary. Animal caretakers are adequately trained to follow established protocols. Calves are provided space to stand, lie down, adopt normal resting postures and have visual contact with other calves, provided an environment that is clean and dry, and protected from seasonal weather extremes. Calves are handled, moved and transported in a manner that reduces the risk of the potential for injury, distress or disease.



NUTRITION

- ✓ ***All calves receive colostrum or colostrum replacer soon after birth, even if immediately transported off the farm.***
- ✓ ***Calves receive a volume and quality of milk or milk replacer to maintain health, growth and vigor until weaned or marketed.***
- ✓ ***Calves have access to palatable, clean, fresh water as necessary to maintain proper hydration.***
- ✓ ***Calves are offered fresh, palatable starter feed.***
- ✓ ***Identified animal caretakers are trained in calf care nutritional requirements, including use of esophageal tube feeders and other feeding mechanisms.***

Colostrum feeding has an important influence on the health and well-being of calves (Davis and Drackley 1998). Blood-serum concentration of immunoglobulin G (IgG) less than 10.0 grams per liter (g/L) (McGuirk and Collins 2004) or serum total protein less than 5.5 grams per deciliter (g/dL) have been equated with poor growth rates and increased prevalence of sickness and death. Adequate passive immunity is best served by assuring intake of at least four quarts (or 10 percent of body weight, whichever is greater) of good quality colostrum within 12 hours of birth (Davis and Drackley, 1998). The quality of colostrum can be measured with a colostrometer. Effective colostrum replacements provide at least 3.5 oz. (100 grams, with 5.3 to 7 oz. or 150 to 200 grams preferred) of IgG. In addition, ensuring that Ig concentrations in the blood are sufficient is an effective way of evaluating colostrum management practices.

An esophageal tube feeder may be used by trained animal caretakers to administer colostrum when necessary. After receiving immunity through feeding colostrum or colostrum replacer, calves are fed milk or milk replacer through weaning.

The recommendations for colostrum feeding, according to Drackley 2008, are:

1. *The calf ingests its first meal of colostrum before six hours postpartum.*
2. *The Ig content of the colostrum is of high quality (over 50mg/ml).*
3. *The calf receives four quarts (or 10 percent body weight) of good quality colostrum within the first few hours of birth.*
4. *To ensure good colostrum management practices dairy farmers are encouraged to work with their veterinarian to assess failure of passive transfer.*

MILK AND MILK REPLACER FEEDING

During the first weeks of life, solid feed intake is very low in calves, regardless of the amount of milk or starter provided. In addition to milk, water and starter are provided. Calves benefit especially 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 equivalent (Khan et al., 2011). Calves are motivated to consume large amounts of milk or milk replacer equivalent (for example, Holstein calves will drink in excess of eight quarts per day or more in two or more feeders per day). Feeding only four quarts per day of milk or milk replacer equivalent does not allow the calf to meet its nutritional requirements for maintenance, growth and development. There are no known negative side effects of feeding more milk/milk replacer.

Although feeding more milk results in lower initial starter intake, there are long-term benefits such as earlier breeding ages and higher milk yield later in life (Soberon et al., 2012).

Higher milk intakes fed in bucket or nipples are not associated with increased diarrhea or other health problems. In addition, delivering larger amounts of milk (eight quarts per day or more in two or more feedings per day) via nipple feeding is more natural and results in higher concentrations of digestive

hormones such as cholecystokinin and insulin, and is considered a best practice. In group housing situations, nipple feeding can reduce or in many cases eliminate cross sucking, depending on competition for access to nipples and the amount of milk fed (see Chapter 7: Environment and Facilities). The optimal amount of milk/milk replacer will vary with a number of factors. For example, the environment can have a substantial impact on calf growth. Calves will become cold stressed at 50 F, requiring additional energy for growth and maintenance.

Special attention to cleaning all calf-feeding equipment is necessary for calf health. Caution is taken 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 are followed.

See *A Guide to Modern Milk Replacers* (Bovine Alliance on Management & Nutrition, 2008) for guidance on choosing a milk replacer. Good milk replacer mixes easily in warm water and stays in solution after mixing. Water used with milk replacers needs to be fresh, palatable and free of contaminants. Animal caretakers take care to use the appropriate weight of powder, and volume and temperature of water to ensure consistency when mixing milk replacers.

WEANING

It is commonly thought that feeding less milk will encourage solid feed intake and thus facilitate weaning. Indeed, feeding calves less milk does increase starter consumption, but this practice also severely limits weight gains (reviewed by Khan et al., 2011). To date there has been little information available on how best to wean rapidly growing calves fed high milk rations. New work is showing that slowly reducing milk intakes in the days before weaning can be helpful (Khan et al., 2007). Diluting the milk with water or slowly restricting the amount of milk can successfully achieve gradual weaning; this

will increase starter intake and minimize the growth check at weaning (Khan et al., 2011). Gradual weaning over a 7- to 10-day period is preferred.

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CHAPTER 5 NUTRITION

As a best practice, animals have access to adequate feed and water on a daily basis, in a consistent manner, on a regular schedule and according to their specific requirements. Rations provide the required nutrients for maintenance, growth, lactation, health and pregnancy (based on an animal's life stage).

Nutritional management is greatly improved when dairy farmers take the time to observe their animals to maintain uniform groupings, and give attention to animals that are underperforming. In best practice, body condition scoring is used to monitor the energy balance and nutritional condition of the herd.



WATER

 **All animals have access to palatable, clean, fresh water as necessary to maintain proper hydration.**

Fresh, clean water is essential for the health and well-being of the animals. Access to waterers – large tanks, troughs, buckets or fountains – is essential for cattle to satisfy their need for water. Under best practice, waterers are convenient for the animals to reach on demand, and there are sufficient waterers (number, size and capacity) to accommodate the number of animals in the group. When continuous access is impossible for other classes of animals besides lactating cows and non-lactating cows, water must be made available to allow animals to drink to satiation at least twice per day (more often under heat stress conditions). In best practice, water is prevented from freezing in cold weather or animals are provided access to fresh water as soon as possible. See Table 1 for the estimated water consumption of dairy cattle.

FEED

 **Rations provide the required nutrients for maintenance, growth, health and lactation for the appropriate physiological life stage.**

 **Feed equipment is washed and disinfected after being used for non-feed purposes.**

 **Sufficient feed bunk space is provided that allows all animals to feed at the same time or sufficient quantities of feed are available for all animals during a 24-hour period.**

TABLE 1. ESTIMATED WATER CONSUMPTION OF DAIRY CATTLE

Table 1. 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)	40°F	Mean Minimum Temperature ^b			
			50°F	60°F	70°F	80°F
gallons per day ^c						
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.

Looper, Micheal I., Dan N. Waldner. Water for Dairy Cattle. New Mexico State University. February 2007. http://aces.nmsu.edu/pubs/_d/D107.pdf

Feed considerations include nutritional quality and quantity, feed bunk design and proper feed storage. Advances in ruminant nutrition and feeding behavior science have greatly improved our understanding of dairy cattle production. As a best practice, dairy farmers monitor feed quality and nutrient content of feed components and provide adequate bunk space to allow all animals to feed simultaneously. Feed for other species is never mixed with dairy animal feed.

As a best practice, the dairy farmer evaluates protocols to assure that feeding programs meet the basic nutritional requirements for the animals' maintenance, growth, production, health and reproduction. Qualified nutritional consultants normally assist in formulating rations that economically meet nutritional requirements of animals.

Managers:

- *check that feed and feed ingredients are carefully mixed and formulated according to the animals' dietary needs;*
- *periodically assess dry matter intake;*
- *adjust rations to assure the correct content of protein, energy and micronutrients in feed whenever forages are changed;*
- *if conditions warrant, check homegrown or purchased feed ingredients and commodities for nitrates, mycotoxins and other soil- or climate-induced problems, adjust diets to provide for production level and check feed quality to see if it matches the manufacturer's statement;*
- *check dry matter of wet feeds such as silages often and whenever large variations are noticed or anticipated.*

The daily removal of feeds not consumed will ensure freshness of feed, prevent mold and spoilage, and aid in insect control. This is a particularly important practice when high-moisture feeds such as silage

are used. A smooth feeding surface will facilitate cleaning. In best practice, feeders are far enough from any water source to minimize contamination of water. For example, sprinklers point away from the feed bunk to avoid adding moisture to the total mixed ration (TMR). Feed is pushed up several times daily (see special considerations for milking cows below for details about feed access). Sanitation of eating areas will improve if animal caretakers check them several times each day and remove any feed not eaten daily.

Safely store bulk supplies of feed in appropriately designed areas to avoid moisture, vermin, and bacterial or fungal contamination. Proper labeling of storage containers or areas, controlling moisture, and using an effective program of vermin control help assure maintenance of feed quality and safety. As a best practice, medicated feeds are stored separately and are properly labeled. Store toxic compounds outside of the feed storage area and outside of the animals' resting area.

SPECIFIC LIFECYCLE NUTRITIONAL CONSIDERATIONS (FEED)

Newborn and Milk-Fed Dairy Calves

Monitoring during the first 12 weeks of life is especially important as this is a period when calves are particularly vulnerable. Providing a solid foundation will ensure that the calves will grow, develop and eventually mature into healthy productive lactating dairy cows. Providing adequate nutrition early in life has been shown to provide long-term benefits for heifers, such as earlier breeding ages and higher milk yield later in life (Soberon et al., 2012). For more information refer to Chapter 4: Newborn and Milk-Fed Dairy Calves.

Growing Animals

Providing appropriate nutrition to the growing dairy heifer is key to ensuring a successful dairy replacement strategy for dairy operations. Provide

adequate bunk space that allows all heifers access to a nutritionally balanced diet at the same time. The recommended space at the feed bunk is 18 inches/head for heifers 6-to-12 months of age, 20 inches for calves 12-to-18 months, and 24 inches for heifers over 18 months of age (Dairy Calf & Heifer Association, 2012). These recommendations are believed, without direct empirical evidence, to allow heifers to feed simultaneously and, thus, reduce feed bunk competition. Competition for feed reduces feeding time (DeVries, 2010) across feeding strategies. Changes in feeding patterns associated with competition also increased the risk of heifers experiencing low rumen pH and associated effects on rumen health. Finally, competition for feed in dairy heifers also increases variability in weight gain between heifers.

Milking Cows

There are several aspects of the feeding environment that affect the cow's ability to access feed, including the amount of available feed bunk space per animal and the physical design of the feeding area (review by von Keyserlingk and Weary 2010; Cook and Nordlund, 2004). Competition is significantly reduced when cows are fed using a headlock barrier compared to a post and rail barrier. As well, regardless of barrier type, stocking density affects feeding time. Cows spend less time feeding and fight more when overstocked. These effects are greatest for the subordinate cow, particularly at high stocking densities at the feed bunk. Fighting for access to feed has also been shown to increase dramatically when cows are fed to an empty bunk (Collings et al., 2011). Adequate space and time to access feed is essential to minimize feed bunk competition in group housing systems.

There is considerable scientific evidence indicating that the provision of adequate feed bunk space during the transition period (three weeks before to three weeks after calving) is particularly important (see reviews by von Keyserlingk and Weary 2010).

Highly competitive feeding areas can significantly reduce feed intake before calving, which has been associated with increased risk for post-partum disease (e.g. metritis, sub-clinical ketosis) (reviewed by Sepúlveda et al., in press). Management of transition cows requires special consideration of the environmental and social factors that influence these behaviors. In best practice, transition cows have at least 30 inches of bunk space per cow and all other lactating cows at least 24 inches per cow.

Dry Cows

A substantial body of evidence now exists indicating that overcrowding during the pre-partum period can have detrimental effects in terms of post-partum health (reviewed by Sepúlveda-Varas et al, in press). In best practice, dry cows, particularly in the three weeks before calving, have at least 30 inches of bunk space per cow.

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CHAPTER 6

ANIMAL HEALTH

A good husbandry and animal care program on a dairy is essential to the health of the cattle. One of the foundations for animal care is to prevent or minimize pain, injury and disease. Disease is prevented by adherence to herd health, nutrition and management programs that enhance well-being. If disease is present, rapid diagnosis and treatment is instituted. A dairy maintains the health of the cattle by providing appropriate nutrition, housing, and disease prevention and detection, along with well-designed treatment programs. These programs are developed through consultation with a qualified veterinarian.



HERD HEALTH PLAN

An effective written Herd Health Plan emphasizes prevention, rapid diagnosis and quick decision-making on necessary treatment of all sick or injured dairy cattle on the farm. A licensed veterinarian, or other appropriately trained veterinary consultant, can help dairy farmers develop and implement a routine Herd Health Plan. A sample Herd Health Plan is available at www.nationaldairyfarm.com. Even with the best prevention programs, animals can become sick or injured. Observation is key to identifying health issues early in order to provide effective treatment. Adequate light is required for accurate animal monitoring.

 **The dairy has a written Herd Health Plan, developed in consultation with the herd veterinarian, to prevent common diseases or conditions such as mastitis, lameness, metritis, metabolic diseases, displaced abomasum, pneumonia and infectious diarrhea.**

 **The written Herd Health Plan includes:**

- *Veterinarian/Client/Patient Relationship. (See Chapter 3: Management – Standard Operating Procedures (SOPs), Training and Record Keeping)*
- *Vaccination protocols.*
- *Daily observation of all cattle for injury or signs of disease.*
- *Protocols for newborn calf management. (See Chapter 4: Newborn and Milk-Fed Dairy Calves)*
- *Protocols for painful procedures.*
- *Protocols for cattle that develop disease or are injured.*
- *Protocols for dystocia.*
- *Protocols for prevention, detection and action for common diseases, and parasite and pest control.*
- *Protocols for fly control.*

- *Protocols for non-ambulatory animal management. (See text box in Chapter 9: Special-Needs Animals)*
- *Protocols for euthanasia. (See Appendix B)*
- *Protocols to ensure food safety.*
- *Training programs for animal caretakers involved in detecting disease and injury, which include recording the cases and actions to be taken.*

 **The Herd Health Plan is reviewed and updated annually.**

STORAGE AND CARE OF MEDICINAL AGENTS

(FROM THE CENTER FOR DAIRY EXCELLENCE)

- Observe and obey the manufacturers recommended storage instructions for each animal health product.
- Where refrigeration is needed, be sure the unit is kept clean, that the internal temperature is monitored and that the unit is located in a safe place – not likely to be overheated or contaminated by dirt or grime.
- Store animal health products away from feed ingredient or mixing areas unless regularly mixed with feed additives.
- Storage of partially used medication or vaccine bottles is discouraged because they may become contaminated and could cause infections or tissue reactions if re-used.

NEWBORN AND MILK-FED DAIRY CALVES

 **The dairy has a written Herd Health Plan, developed in consultation with the herd veterinarian, which includes specific areas pertaining to newborn and milk-fed dairy calves.**

The written Herd Health Plan, developed in conjunction with a licensed veterinarian through a Veterinarian/Client/Patient Relationship, includes information specific to the care of newborn and milk-fed dairy calves. Topics in the Herd Health Plan relevant to newborn and milk-fed dairy calves include colostrum management, navel dipping, identification and record keeping, and protocols

for vaccination, dehorning, supernumerary teat removal, castration, tail docking (to be phased out by 2022) and euthanasia.

Navel Dipping



Navels are dipped in an effective antiseptic solution as soon as possible.

Dip navels in disinfectant as soon as possible after birth. If the umbilical cord is not severed immediately after birth, it may be tied two-to-three inches from the calf's body. Wet cords are entry points for pathogens into the calf's body. An effective preventive treatment is to dip the navel repeatedly into an effective antiseptic solution (discard used solution).

MEDICAL PROCEDURES

Certain painful medical procedures are necessary to ensure the safety of the workers and the animals on the farm. A best practice is for dairy farmers to work with their licensed veterinarian to develop an SOP that works best for the individual farm while providing appropriate relief from stress and pain to the animal. In addition, any animal caretaker responsible for performing the procedure receives adequate training.



Calves are disbudded at eight weeks of age or earlier and with appropriate use of analgesics and/or anesthetics.



All other planned medical procedures are performed at the earliest age possible and with appropriate use of analgesics and/or anesthetics.

Disbudding and Dehorning

Disbudding and dehorning are performed for the safety of cattle and their caregivers. For disbudding, a best practice is to complete this procedure at the earliest age possible, before eight weeks of age, following pain control protocols agreed upon by the dairy farmer and the herd veterinarian. This

procedure may include use of local anesthesia and/or longer-term pain management.

Caustic paste can also be used to prevent horn growth. This method causes discomfort, but less is known about the degree of pain or how long it lasts. As discussed above, a best practice is to develop a pain management protocol with your veterinarian. Additional management, such as protecting treated calves from rain and limiting social interactions to ensure paste only affects the horn bud area, are considered a best practice.

As a best practice for dehorning, cows that have either been missed or have developed scurs are monitored and, if deemed necessary, the bulk of the horn is removed to prevent horns from growing into the skull and to prevent a growing horn from injuring other cows. Any attempt to permanently remove the horn is considered a surgical procedure and must be done by a licensed veterinarian.

The use of polled genetics may be an option. Currently there are challenges in the diversity of available genetics.

Castration

Castration is performed to stop the production of male hormones and semen to prevent unwanted mating. In addition, castration produces cattle that are easier to handle or less aggressive, which promotes animal and human safety.

The most common methods of castration are surgical, banding and Burdizzo. Although banding results in little discomfort at the time of castration, numerous studies have found that cattle show signs of pain in the hours, days and weeks that follow the application of the band or ring. Currently, there is no way to adequately manage the pain associated with this method.

Surgical and Burdizzo castration are better options from an animal care perspective. There are anecdotal downsides to each method. Some surgical incision sites can become infected and require medical intervention with antibiotics. Castration with Burdizzo is not always successful and is dependent on the skill of the operator. When these two approaches have been compared directly, the results are mixed and are dependent on age of the animal. The advantage of these two methods is that immediate pain relief can be provided. In best practice, castration occurs at the youngest age possible and, regardless of the age of the calf, the immediate pain is managed following pain control protocols agreed upon by the dairy farmer and the herd veterinarian. Protocols may include use of local anesthesia and/or longer-term pain management.

Branding

In some cases branding is required by state law or to prevent theft and assure ownership. Little is known about how to alleviate the pain associated with hot-iron and freeze branding. In consultation with the herd veterinarian, branding may be done concurrently with dehorning and castration in order to take advantage of long-term pain relief provided for these procedures. Under best practice, farms work with their veterinarian to evaluate the necessity of branding, opting to use other forms of ID such as tamper-proof RFID if at all possible. Brands are never applied to the face for on-farm ID purposes.

Extra Teat Removal

In best practice, extra teats are removed at the youngest age possible to minimize the amount of tissue damage and the vascularization of the area. The removal of extra teats can also be addressed concurrently with disbudding to have the animals benefit from the pain relief provided at that time. Ideally, sharp scissors or scalpels are used with young calves.

Tail Docking

The National Dairy FARM Animal Care Program opposes the routine tail docking of dairy animals, except in the case of traumatic injury to an animal. This practice is recommended to be phased out by 2022. Current scientific literature indicates that routine tail docking provides no benefit to the animal or quality of the milk (reviewed by Sutherland and Tucker 2012). The American Veterinary Medical Association (AVMA), the American Association of Bovine Practitioners (AABP), and the National Mastitis Council all oppose the routine tail docking of cattle. Switch trimming is a recommended alternative.

Euthanasia

At times, euthanasia for a newborn may be necessary to humanely deal with complications from birth or other conditions. Euthanasia is consistent with recommendations from the American Association of Bovine Practitioners and the American Veterinary Medical Association (see Appendix B).

ANIMAL OBSERVATIONS

One of the key components of the FARM Program is the animal observations recorded during the Second-Party Evaluation. Viewing the animals is the best way to evaluate outcomes from animal care practices on the farm. Second-Party Evaluators are trained to score animals in four areas – hygiene, locomotion, body condition and hock and knee lesions. The guidelines that follow are based on review of three extensive data sets in all the observation areas and the opinion of experts in dairy cattle care. Thresholds are set based on consensus among a group of experts and available research data. The thresholds are revisited every three years.

HYGIENE

 **Ninety percent or more of all animals in all pens score 2 or less on the NDFP Hygiene Scorecard (1 is clean, 4 is dirty). (See Appendix C)**

Proper sanitation and waste management keep animals dry, clean and free of manure and provide them with comfortable surroundings. The goals of sanitation for animal facilities are to:

- *Minimize animal disease through clean facilities*
- *Minimize generation of odors and dust*
- *Minimize pests and parasites*
- *Minimize spread of pathogens*

Basic sanitation practices include keeping the interiors, corridors and storage spaces of animal facilities clean, and emptying waste containers. Facilities are free of standing water, excess manure, unnecessary farm items and clutter.

Feed and bedding is clean and dry, even in areas with minimal housing and rainfall. Animal caretakers maintain a level of cleanliness to minimize the spread of pathogens. If a serious, specific pathogen has been identified, it is best to consult with your veterinarian on the most appropriate sanitation process to use. This is likely to include disinfection of the animals' immediate environment and thorough cleaning of enclosed housing facilities, followed by chemical disinfecting. Dry-lot facilities may need to be scraped and refilled with uncontaminated materials. Removal of cattle for a short time may be a means of eliminating muddy areas in pastures.

Manure is removed regularly from facilities and freestalls, and walkways are clean and have good traction. In addition to affected udder and leg cleanliness, manure in the alleyway contributes to lameness problems described below. In best practice, all lying areas are clean and groomed.

LOCOMOTION

 **Ninety-five percent of the lactating and dry dairy herd scores a 2 or less on the NDFP Locomotion Scorecard (1 is sound, 2 is moderately lame, 3 is severely lame). (See Appendix D)**

 **The dairy farmer is taking action to improve animals with severe lameness.**

 **A lameness prevention protocol is in place.**

Lameness, caused by painful lesions to the limb or foot, seriously compromises well-being and is a management priority for the dairy herd. Foot lesions most commonly associated with lameness in dairy cattle include infectious hoof diseases such as digital dermatitis and foot rot, and non-infectious claw horn diseases that include white line lesions and sole ulcers. Lameness interferes with normal resting behavior, movement to and from the milking area, and feeding activity, limits the exhibition of estrus and influences general health.

Lameness may be reduced by preventive hoof trimming performed to both balance weight bearing between the claws and restore a more upright foot angle, and by surveillance for lame cows coupled with prompt, effective treatment. Routine use of antibacterial foot baths assists in the control of infectious hoof disease, while improved flooring reduces trauma, slipping and wear, which lowers the risk for white line lesions.

Sole ulceration may be reduced by providing adequate time for daily rest (with a target of 12 hours per day for lactating dairy cows). This involves strategies such as minimizing time out of the pen milking to less than 3 hours per day, avoiding overstocking and providing an appropriate thermal environment. Other steps include providing adequate heat abatement in hot climates, shelter in cold climates, and comfortable bedding (see

Chapter 7: Environment and Facilities). Feeding to avoid sub-acute ruminal acidosis, combined with adequate provision of trace minerals and vitamins, will optimize claw horn quality and assist in the prevention of lameness.

Currently, the only objective method to evaluate the prevalence of lameness within a herd is the use of locomotion scoring. In the United States, the most commonly used scoring methods use either 4 or 5 points. Scoring is recommended to improve lameness detection and to regularly assess the distribution of cows at each score level. However, scoring is subjective and will vary with each observer. Methods also are difficult to implement in some management systems, such as tie stall barns. The FARM Program will therefore monitor the prevalence of severely lame cows in the lactating and dry dairy herd, with a severely lame cow being defined as an animal either unable to move, or able to move, but barely able to bear weight on the affected limb (1=sound, 2= moderately lame, 3=severely lame). Associated signs may also include back arch, poor body condition, head bob and an inability to flex the lower leg joints. Surveys suggest that the median herd has fewer than five percent of severely lame cows, and this is the target for the program. Herds aspire to have zero severely lame cows.

BODY CONDITION SCORING (BCS)

 **Ninety-nine percent of all classes of animals score a body condition score of 2 or more on the NDFP Body Condition Score Scorecard (1 is thin, 5 is fat). (See Appendix A)**

 **The dairy farmer is taking action to improve animals with body condition scores less than 2.**

Achieving growth targets for heifers and monitoring change in body condition during gestation and lactation are very important. Body condition can change rapidly at and after

calving and is 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. Over-conditioning at the time of calving (BCS > 4) often results in lower feed intake and increased incidence of peripartum problems. BCS loss of more than 1 during early lactation is excessive. Cows with a BCS less than 2 should be evaluated for fitness to transport.

HOCK AND KNEE LESIONS

 **Ninety-five percent or more of lactating and dry dairy herd score a 2 or less on the NDFP Hock and Knee Lesion Scorecard (1 is no hair loss/swelling, 2 is some hair loss; no swelling, 3 is severe swelling and/or abrasion through hide). (See Appendix E)**

Hock lesions (swelling, abrasion and even ulceration) are an important indication of inadequate bedding and lack of animal comfort. Dairy farms with a higher prevalence of hock lesions also tend to have a higher number of lame cows. A healthy hock is free from hair loss (the hair coat is smooth and continuous with the rest of the leg) and swelling. Skin breakage provides an opportunity for infection to occur, which can lead to swelling, discomfort and lameness. The incidence of hock lesions is reduced with adequate bedding and proper stall design (length and width of stall, stall partition placement and improved lameness management; e.g. von Keyserlingk et al 2012). The scoring for the FARM Program focuses on the animals afflicted by significant hock and knee injury involving swelling of the joint and/or ulceration of the skin. The target is 5 percent or less.

Body Abrasions and Injuries

Under best practice, cattle are housed in environments that prevent injury. Often, the location of a given injury can provide insight

into where the problem lies. For example, obvious swelling on the neck can be caused by inappropriate feeder design, where the overhead rail traumatizes the tissue and causes severe swelling. The tail must not be used to move or restrain a cow in such a way that the tail becomes injured or broken, as this is a sign of inhumane handling. Abrasions can also be the result of aggressive interactions with other animals and, even in some cases, from health measures such as injection-site abscesses. By monitoring the location and prevalence of these injuries across the entire herd, management will be able to identify and address specific problems, in consultation with their veterinarian.

Best practices require that information is known about the importance and meaning of injuries to the legs, specifically hock and knee injuries, thus, these injuries are given a dedicated sub-section. The FARM Program will review the data collected after three years and decide if a guideline for body abrasions needs to be developed. The scoring system will target animals with an obvious swelling, lacerations or severe lesions of the skin.

Pest Control

Pest control is part of a herd health program because vermin transmit diseases and interfere with the animals' comfort. Under best practice, dairy farmers adopt procedures to control flies, mosquitoes, lice, mites, ticks, grubs, fleas, rodents, skunks and pest birds (e.g., starlings, pigeons and sparrows). Exercise particular caution to avoid contaminating feedstuffs, 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. In some regions, rabies and other diseases are spread to dairy animals by skunks, raccoons, foxes, bats and other wildlife. If cats and dogs are kept on the facility, be certain that their rabies immunization status is current and protocols are in place to minimize flea infestation, as fleas can kill baby calves (Parasites and Pests—Management for 1038 Profit, 2000).

SPECIFIC LIFECYCLE CONSIDERATIONS

Breeding Bulls

Consult with your veterinarian on breeding bull management.

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Johne's Disease Risk Assessment. (University of Wisconsin, 2012)
Online at <http://jdrap.org/>

Milk and Dairy Beef Drug Residue Prevention Manual. (National Dairy FARM Program, 2012) Online at www.nationaldairyfarm.com/residue-prevention.html

Top 10 Considerations for Culling and Transporting Dairy Animals to a Packing or Processing Facility. (NMPF, DMI, & AABP, 2008) Online at www.nationaldairyfarm.com/sites/default/files/Top-10-Considerations.pdf

CHAPTER 7

ENVIRONMENT AND FACILITIES

Proper management of the environment enhances animal performance, comfort and well-being. Facilities include all housing structures, handling structures, lots, pens, stalls, alleys and pastures that are inhabited by cattle of any age and health status. Facilities provide sufficient protection from temperature extremes and ensure the safety and care of the animals.



ANIMAL ENVIRONMENT

Temperature

 **Protection from heat and cold are provided for all age classes; tools include the use of shade, fans, water cooling and windbreaks.**

Environmental temperature affects an animal's 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's age, sex, weight, adaptation status, activity level, posture, stage of lactation, body condition and diet. For example, mature dairy cattle are generally able to tolerate low temperatures better than high temperatures. When facing cold conditions, cattle (including calves) are provided with adequate feed and protected from wind and moisture.

Heat abatement is particularly important in many dairy regions. Cattle are motivated to use shade and will readily do so when solar radiation increases (Tucker et al., 2009). Shade is the first step in heat abatement. A best practice is for all animals to have access to shade that allows simultaneous use by the entire group. In addition to shade, many dairies use fans and water to either cool the air before it reaches the animal or soak the animal to enhance evaporative cooling. Recent research indicates that cooling with water and fans is beneficial to adult cattle at lower temperatures than previously thought. For example, cattle benefit from the use of soakers in the morning (if available); this change corresponds with lower body temperature later in the day. Using heat abatement sooner (e.g. 73 F or THI of 69), provides both cooling and production benefits (Kendall et al., 2007; Bryant et al., 2007). It is generally recommended that recirculation fans used for cooling be activated at 65-70 F and, in best practice, soaking systems be activated at 70-75 F.

Air Quality

 **Protocols are in place to minimize airborne particles as a way to reduce odors and dust.**

Control of microbes in the air can be achieved by segregating or isolating animals with highly contagious diseases. As a best practice, care is taken to ensure that the ventilation system does not move air from infected animals to an area occupied by healthy animals. Other ways to improve air quality are with manure management, husbandry practices and good air movement provided by well-designed natural or mechanical ventilation systems.

Adequate ventilation, be it natural or mechanical, helps to prevent respiratory and other diseases by removing heat, water vapor, air pollutants and odors from an enclosed animal facility and at the same time introduces fresh air. Ventilation also modifies the indoor air temperature, but supplemental heating and cooling may be needed when temperature control is critical. The increase in temperature in a building can be controlled by the rate of air movement (i.e., the ventilation rate). The mechanical ventilation rate is at least 10 times higher in summer than in winter, and general guidelines recommend four air changes per hour during the winter and 40-to-60 air changes per hour in the summer.

LYING AREA

 **Housing allows cattle to easily stand up, lie down, adopt normal resting postures and have visual contact with other cattle.**

 **Cattle have a bed that provides comfort, insulation, warmth, dryness and traction.**

During their life, dairy animals make use of a variety of resting, feeding and exercise areas. At all ages, in best practice, cattle are able to stand up, lie down and adopt normal resting postures within a given

system. Factors that can affect these behaviors include the size and configuration of the freestall or tie stall and the space provided to calves. In best practice, stalls are large enough to accommodate the animal (see Table 3). Both comfort and health are improved in less restrictive stalls. For example, when the neck rail is moved higher and further from the curb, cows spend more time standing with all four hooves in the stall. This additional time spent standing on non-concrete, bedded surfaces reduces lameness (Bernardi et al., 2009).

Similarly, unobstructed lunge space allows cattle to complete the normal rising movement. Also, longer stalls improve leg health and cows spend more time lying down in wider stalls (Zubrigg et al., 2005; Tucker et al., 2004). Well-used lying areas are more likely to be soiled and require appropriate manure management.

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 (Jensen et al., 2005; Munskgaard et al., 2005). It is therefore important to provide a bed that provides comfort, insulation, warmth, dryness and traction. Concrete, rubber mats, water beds and mattresses can be acceptable resting surfaces when they are adequately bedded. Cattle are more comfortable in well-bedded environments, as indicated by higher lying times, willingness to lie down and improved leg health (Tucker and Weary, 2004; Cook et al., 2004). Unbedded concrete, hard rubber mats, water beds or mattresses are not an acceptable lying surface, as they compromise lying behavior, are avoided by cattle given the choice and result in injury (e.g. Haley et al., 2001; Rushen et al., 2007). The most important predictor of hock injuries, for example, is the lying surface. Cows kept on sand, for instance, consistently have fewer hock injuries than those kept on mattresses. 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.

Bedding is also dry in best practice. A number of 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 (Fregonesi et al., 2007). Dryness is also important for bedding to provide insulating properties. This 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 soft and dry bedding is also important for growing calves (Camiloti et al., 2012).

Exercise for tied animals provides opportunities for grooming the back of the body, social grooming and walking/trotting (Krohn et al 1994; Loberg et al 2004). Controlled studies show that exercise improves hoof health (Gustafson, 1993), but comparisons across farms indicate that access to an outdoor area is a risk factor for some hoof health issues, including sole ulcers and digital dermatitis (Bielfeldt et al, 2005; Cramer et al 2009). In the latter study, all hoof problems were more pronounced in tied cattle that had year-round (compared to seasonal) access to the outdoors. These results indicate that the quality of the exercise/outdoor area is important and, in best practice, minimizes any hoof damage. In best practice, tied cattle have outdoor access/exercise and the quality of the area provided for this is clean, dry and of appropriate flooring material (see section on flooring later in this chapter).

Space Allowance

In loose housing systems such as freestall barns, increased cow density in the pen increases competition among cows for access to feed, water and stalls (e.g. Fregonesi et al., 2007). 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 have access to a sanitary and comfortable place to rest (see Tables 2 and 3).

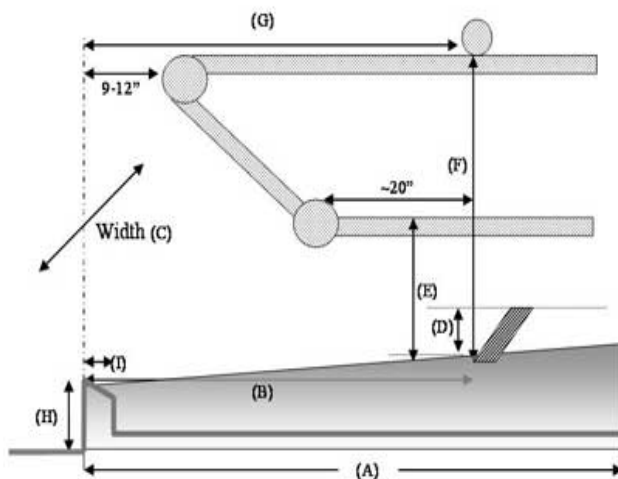
Proper open-lot systems begin with a design that assures proper site drainage (Armstrong 2010). Current recommendations suggest 600 ± 50 square feet of open-lot space per cow (Overton et al., 2009), fence line to fence line. The lying area should be 1-to-2 feet higher than the pen surface and located under the pen shades, if used. If cattle cooling systems are used under the shade, daily grooming is necessary. A best practice is to provide bedding under the shade during extreme cold or wet conditions.

TABLE 2. ESTIMATED HEIFER FREESTALL DIMENSIONS

Heifer Freestall Dimensions					
US	Metric				
Stall Dimensions (inches)		Body Weight (lb)			
		400-600	600-800	800-1000	1000-1200
Approximate Age, months (large-size Holsteins)		~6 to 10	~11 to 13	~14 to 16	~17 to 21
Approximate Age, months (small-size Holsteins)		~6 to 10	~11 to 14	~15 to 18	~19 to 22
Stall Length		72	84	96	96
Stall Width (on center)		32	38	42	46
Height to the bottom of the neck rail		32	38	42	46
Distance of the neck rail from the rear point of the curb		46	55	62	66
Distance of the rear curb to the brisket locator (max height 4 in)		Not Recommended		62	66
Interior diameter of the stall divider loop		24	28	31	31
Height of upper edge of the lower divider rail		8	8	10	12
Rear curb height		6	8	8	8
Distance from rear edge of divider loop to point of curb		9	9	9	9

For details about feeding space see Chapter 5: Nutrition.

Reference: The Dairyland Initiative. “Heifer Freestall Dimensions”. Accessed May 16, 2013. www.thedairylandinitiative.vetmed.wisc.edu/tdi/h_freestall_dim.htm

TABLE 3. ESTIMATED STALL DIMENSIONS BASED ON WEIGHT (LBS)

Stall Dimension (inches)	Body Weight Estimate (lbs)				
	1000	1200	1400	1600	1800
Total stall length facing a wall (A)	96	96	108	120	120
Curb to curb distance for head-to-head platform	192	192	204	204	216
Distance from rear curb to brisket locator (B)	64	66	68	70	72
Center-to-center stall divider placement (Stall width) (C)	44	46	48	50	54
Height of brisket locator above stall surface (D)	3	3	4	4	4
Height of upper edge of bottom divider rail above stall surface (E)	11	11	12	12	12
Height below neck rail (F)	44	46	48	50	52
Horizontal distance between rear edge of neck rail and rear curb for mattress stalls (G)	64	66	68	70	72
Horizontal distance between rear edge of neck rail and rear curb for deep loose bedded stalls (G=B-I)	58	60	62	64	66
Rear curb height (H)	8	8	8	8	8
Rear curb width (loose bedded stalls) (I)	6	6	6	6	6

Reference: The Dairyland Initiative. "Freestall Dimensions" Accessed May 16, 2013. www.thedairylandinitiative.vetmed.wisc.edu/tdi/ac_freestall_dimension.htm

Flooring

 ***The dairy farmer monitors and takes action for slips and falls.***

Under best practice, concrete flooring surfaces are appropriately grooved or textured to reduce the risk for animals slipping, which can result in injuries. Skid-resistant surfaces reduce injuries and must retain their non-slip characteristic after cleaning, scraping or wear. Rubber flooring is desirable in areas of the facility where cows stand for prolonged periods (e.g. holding area), in transfer lanes to reduce hoof wear, and in other areas to reduce the risk of slipping and injury. A plan is in place to minimize the impact of seasonal changes that impact traction, such as ice (see Appendix L).

Social Environment

Cattle are herd animals. Socially isolated cattle show signs of stress: increased heart rate, vocalization, defecation/urination and cortisol levels (Herskin et al., 2007, Rushen et al., 1999). As a best practice, isolation is minimized and at least visual contact with other animals maintained.

Management of Facilities

Properly designed and maintained facilities operated by trained animal caretakers greatly facilitate efficient movement of animals. In best practice, fences and gates are made of strong, smooth material and are devoid of sharp objects that can cut, puncture or bruise an animal. Their height and ground clearance prevent animals from trying to go over or under them.

Fences hold animals in designated areas. Corrals, holding pens and feeding areas generally are permanently fenced, whereas temporary electric fences are often used around pastures.

Gates let an animal easily pass through. It is beneficial to locate gates in the corners of pens.

Install them to swing inward and outward so that the animals can easily enter or leave the pen. Under best practice, the latching mechanisms on gates are foolproof so that animals cannot open the gate. The latching mechanism on a stationary post does not create a sharp point when the gate is open, because this may injure passing animals.

SPECIFIC LIFECYCLE CONSIDERATIONS

Newborn and Milk-Fed Calf Housing

 ***A clean, dry, well-lit, well-ventilated calving area is used.***

A clean, dry, well-lit, well-ventilated calving area has many health benefits for the calf at the time of birth. Wet, dirty calving areas foster the growth of bacteria that can invade the newborn calf's navel or mouth and create a disease load that overwhelms the calf's naïve immune system. A separate calving area (maternity pen or paddock) that is designed to be comfortable, functional and hygienic allows for close observation of the cow and easier, more effective assistance at calving. Patience and gentle firmness in handling calves and cows generate a better response than does force. Calves should be removed from the cow immediately to prevent transmission of diseases such as Johne's. A best practice is to clean pens, corrals or paddocks between calvings.

Lighting should allow inspection of animals and provide safe working conditions. In facilities where animals are routinely observed or handled, such as for milking or estrus observation, lighting should be diffused evenly. An outdoor light attached to a corral or building where animals congregate provides sufficient illumination for safety purposes.

Pre-Weaned Calf Housing

Individual Housing

Each calf is housed in separate pens or hutches. This method facilitates detection of health issues, minimizes the risk of spread of disease, avoids competition for feed and prevents cross sucking. Individual housing allows for ease of monitoring of dry starter intake. The hutch provides appropriate shelter for the climate conditions of the region.

Group Housing

There is a growing interest in group housing, particularly with the advances made in computerized calf-feeding equipment. Group housing does provide more space for calves and allows for social interactions.

Calves are social animals that need exercise and keeping dairy calves in groups may provide a number of advantages to both dairy farmers and their calves. Successful adoption of group housing will mean avoiding problems such as increased disease and competition for access to food resources. Successful group rearing requires appropriate management, including feeding method and group size. Adherence to appropriate cleaning of milk feeding equipment is essential (see Chapter 3: Management – Standard Operating Procedures).

New Animals

New animals are to be handled in a way agreed upon by the dairy farmer and veterinarian that are consistent with the biosecurity needs in the herd health plan.

Breeding Bulls

Breeding dairy bulls are known to be aggressive towards humans. As a best practice, workers are trained in safety issues when breeding bulls are housed with the milking herd. In consultation with the veterinarian, bulls are managed in such a way that they have appropriate rest when rotating through breeding pens. Breeding bulls are included in the herd health plan to deal with any health issues that may arise such as lameness, body condition and infectious disease.

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CHAPTER 8

HANDLING, MOVEMENT AND TRANSPORTATION

Under best practice, cattle are handled in a calm, controlled and gentle manner. Animal caretakers are properly trained in animal handling and the consequences of inhumane handling are understood and enforced. Animal caretakers are assessed and retrained on a regular basis. Prods, canes and other cattle handling aids are only used in situations when needed to reduce greater damage, injury or harm to the animal caretaker or the animals. Cattle are moved in a manner that reduces the risk of slips and falls.



STOCKMANSHIP

 ***Animal caretakers working in animal movement are trained on the principles of flight zones and flight distances to know the importance of controlling the animal movement in lanes, alleyways and other parts of the complex. (See Appendix F)***

 ***Animal caretakers have signed a cow care agreement.***

When handling and transporting dairy animals, the animals' comfort and safety, as well as the animal caretaker's safety, are the primary concerns. Dairy farmers ensure that animal caretakers are trained and qualified in proper handling techniques and in the appropriate use of restraint equipment. When using any handling device, abuse is not tolerated. In addition, dairy farmers ensure that an adequate number of animal caretakers is available to perform assigned tasks. Injuries can be prevented if facilities are properly designed and maintained.

Animals are handled humanely at all times. Routine contact with humans from birth, including regular gentle handling, will reduce fear and flight distance, make observation and treatment easier, and enhance animal care and productivity. Cattle are moved at a slow walk, particularly if the weather is hot and humid, or if the flooring is slippery. It is particularly important to control the herd's speed in lanes and alleyways to prevent crowding or crushing at corners, gates and other narrow places in a facility (Grandin, 2000).

In addition to these guidelines, the tail must not be used to move or restrain a cow in such a way that the tail becomes injured or broken. Willful mistreatment of cattle is unacceptable. The FARM Program does not tolerate abusive behavior. Observation of any abusive behaviors during Second-Party Evaluation must be addressed and corrected immediately.

Noise

Noise is a stressor within housing environments and during routine management practices such as handling, milking and transport. In best practice, care is taken to minimize noise of all types, including equipment and personnel.

EQUIPMENT

In best practice, animals are handled by equipment appropriate for the procedure. Use of flags, plastic paddles and a stick with ribbon attached to it are appropriate for handling animals that refuse to move through facilities, but only if minimal force is applied. Any force used must be applied calmly. Excessive or routine slapping or prodding indicates an underlying problem that requires management attention and correction.

In all cases, use the least amount of force necessary to control the animal and still ensure the safety of herd mates and animal caretakers. Aggressive behaviors in dairy cattle can be modified and their impact reduced by using acceptable practices and restraint devices (e.g., palpation rails, head chutes, nose leads, squeeze chutes and stanchions). All equipment used to restrain cattle and all cattle housing areas have provisions for the humane release and removal of cattle that go down or are otherwise in distress. Preferably, use equipment with emergency release devices (Palmer, 2002).

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. In best practice, three measures are taken to minimize stress: (1) train animal caretakers in proper loading and unloading practices, (2) properly locate and design loading areas, and, (3) minimize the number of directional changes an animal must take (Grandin, 2000).

Animal caretakers observe proper loading densities and plan to load or unload animals at the time of day that is best for moving the animals. Animals grouped together for the first time are not to be crowded or otherwise stressed. In best practice, sufficient labor and appropriate equipment are available for loading or unloading animals. Sick or injured animals require special handling.

In best practice, marketing decisions are made in a timely manner such that the animals are fit for transport. Non-ambulatory animals or animals that are so weak or debilitated that they are likely to go down during transit are treated or euthanized on-farm and are never to be shipped to a processing facility.

TRANSPORTATION FACTORS

 ***The dairy uses the “Top 10 Considerations for Culling and Transporting Dairy Animals” in handling and transportation decision making. (See Appendix G)***

Transportation factors related to animal care include: facilities that are safe and comfortable to the animal, in-transit care provided by knowledgeable crews and drivers, uniformity of the animals loaded and duration of the trip. The Master Cattle Transporter Guide provides an extensive educational program on all aspects for transporting cattle.

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 type of safety and comfort features of other facilities. These include (1) clean/disinfected truck or trailer when moving young stock or cull cows, (2) sides high enough to prevent animals from jumping over them, (3) nonslip flooring that provides secure footing (avoid abrasive floor and wall surfaces),

(4) ventilation adequate for the weather conditions, (5) proper bedding (to protect animals from weather extremes), and (6) adequate (vehicle) covering to protect animals from adverse weather.

In-Transit Care

Proper in-transit care will prevent animal injuries, bruises and carcass damage, which can impair the animals' well-being and value. In best practice, transport crews are knowledgeable about animal care expectations and skilled in handling animals properly. Chances for injuries are reduced when animals on a truck are confined in several smaller groups. Weak or unhealthy animals are only shipped to a veterinarian and segregated from healthy ones during loading and during transit; care is provided for their special needs (see Chapter 9: Special-Needs Animals).

An adequate amount of time for the trip is allotted to include periodic checking of the condition of the animals. Drivers start and stop the vehicle smoothly and slow down for curves and corners. If an animal falls in transit, it is helped to its feet, provided that 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 are made immediately and provisions for feed are made if the trip takes more than 24 hours. Follow any state regulations regarding frequency and amounts. Feeding high-fiber dry feed for 48-to-72 hours before shipping reduces the moisture content of manure and improves air quality, animal comfort and hygiene. In best practice, all workers and handlers are properly trained in handling dairy animals and have a basic understanding of typical dairy cattle behavior (see section on stockmanship above).

NEWBORN AND MILK-FED DAIRY CALF HANDLING

 **Animal caretakers are trained to handle and restrain calves with a minimum of stress to the animal.**

 **Calves are moved by lifting, walking or mechanical conveyance.**

 **Transport devices used to move calves are clean, and properly designed and maintained.**

Calves are handled in a calm, controlled and gentle manner. Animal caretakers are properly trained in animal handling, and the consequences of inhumane handling are known and enforced, as discussed above in the section on stockmanship.

Calves are moved from the dairy onto the truck or in the auction market by walking or lifting them. Willful mistreatment of calves is unacceptable. Calves can be injured if they are dragged, pulled or caught by the neck, ears, limbs, tail or any other extremities, or if they are thrown. The FARM Program does not tolerate abusive behavior. Observation of any abusive behaviors during a Second-Party Evaluation must be addressed and corrected immediately.

SPECIFIC LIFECYCLE CONSIDERATIONS

Transition Cows

To avoid the possibility of calves being born in marketing channels, cows near expected calving date are not shipped. In the event a late gestation cow needs to be transported for reasons other than marketing, special considerations are made.

Milking Cows

Under best practice, lactating cows are milked just before transportation.

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CHAPTER 9

SPECIAL-NEEDS ANIMALS

Even with the best care and adherence to the Herd Health Plan, animals can become ill, require medical treatment or euthanasia, or die. If an animal becomes sick, non-ambulatory or dies, it is critical to protect the other animals from potential diseases and to provide special care for the sick or recovering animal. A best practice on dairy farms includes being prepared to handle these conditions through proper employee training, segregation and prompt decision making to treat, market or euthanize an animal.



NUTRITION

 ***Special-needs animals are not restricted from feed and water for more than four hours.***

When an animal becomes sick or injured requiring separation from the herd for medical treatment (special-needs animal), the recovery of that animal is enhanced through appropriate nutrition. In best practice, the animal has access to clean water (or milk or milk replacer in the case of a pre-weaned calf) and food. The diet of a special-needs animal may need to be adjusted from its healthy counterparts based on its feed intake abilities and special considerations for its illness or injury. These animals are also protected from inclement weather in all seasons, including shade provision in summer.

ANIMAL HEALTH

 ***The dairy has a written Herd Health Plan, developed in consultation with the licensed herd veterinarian (or veterinary consultant), which includes specific areas for non-ambulatory animal management:***

- *Proper movement, including use of special equipment.*
- *Husbandry and nursing care that provides shelter, water, feed, isolation from other animals and protection from predators.*
- *Prompt medical care.*
- *Euthanasia if warranted.*

 ***The dairy has a written Herd Health Plan, developed in consultation with the licensed herd veterinarian (or veterinary consultant), which includes specific protocols for euthanasia consistent with recommendations from the American Association of Bovine Practitioners and the American Veterinary Medical Association:***

- *Training of animal caretakers on the need for and recognition of animals to be euthanized.*
- *Designated animal caretakers trained in proper technique(s).*
- *Confirmation of death.*
- *Record keeping of euthanized animals.*
- *Disposal of carcasses in compliance with local regulations.*

Prompt decisions and actions are necessary if an animal becomes non-ambulatory. The dairy farmer or animal caretaker in charge must determine immediately whether the injured animal is otherwise healthy and can be nursed back to health or cannot be saved. If the non-ambulatory animal can be nursed back to health, protect it from further injury, provide it with shelter, food and water, and give it care to minimize its pain and discomfort during the recovery process.

Euthanasia is appropriate when an animal's quality of life is decreased or when pain and suffering cannot be alleviated. Personnel who routinely work with cattle need to be trained to recognize situations where euthanasia is the best option for the animal. Designated animal caretakers are trained to perform euthanasia through a preferred technique consistent with recommendations from the American Association of Bovine Practitioners and the American Veterinary Medical Association (2013). If the animal appears to be experiencing severe pain or distress, can't be saved or moved properly, has been chronically ill, or was recently treated with antibiotics requiring an extended withholding period, it is euthanized by a person appropriately trained in the procedure.

Dead animals, either euthanized or expired from natural causes, are potential sources of infection. They are promptly disposed of by a commercial rendering service or other appropriate means (e.g., burial, composting or incineration) in accordance with applicable ordinances. In best practice, dead

animals are moved quickly to a designated location away from healthy animals and away from public view. Various state biohazard laws now regulate the disposal of infectious wastes. A postmortem examination on well-preserved animals can provide important animal health information and prevent further losses to the herd. Where warranted and feasible, waste and bedding of an animal that has died is removed from the facility to an area inaccessible to other animals.

ENVIRONMENT AND FACILITIES

 ***Facilities are provided to segregate sick or injured animals; these facilities provide protection from weather.***

 ***Self-locking stalls provide an emergency release for a non-ambulatory situation.***

A hospital or sick pen that isolates the animal(s) from the herd is part of best practice. Because sick or injured animals are more susceptible to discomfort than are healthy animals, it is important that the pen be equipped to maximize animal comfort. It provides adequate shade, bedding, air movement and accessibility to feed and water.

HANDLING, MOVEMENT AND TRANSPORTATION

 ***Timely and prompt marketing of animals is part of the management plan.***

 ***Designated animal caretakers have been trained and proper equipment is available to move non-ambulatory animals. Special equipment for injured or non-ambulatory animals is available.***

 ***Trained animal caretakers are available when sick, injured, non-ambulatory or dead animals must be moved.***

Non-ambulatory cattle that cannot be carried are moved with an appropriate sled, sling or bucket, with the exception of cases where an animal must absolutely be moved a short distance before an appropriate movement aid can be used (e.g. if a cow becomes non-ambulatory in a parlor). Cattle are not pulled, dragged or otherwise moved through mechanical force applied directly to the animal, with the exception of specifically designed equipment for such purposes. In best practice, the prognosis of an animal is 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, the animal is euthanized and then moved (in accordance with the Herd Health Plan).

Prevention, preparation, and prompt action are keys to their proper handling. Weak and emaciated animals often become non-ambulatory. Conditions that increase an animal's susceptibility to injury – slippery floors, improperly designed loading ramps and excessive loading densities on trucks – are minimized in best practice. A commitment to prevent animal injuries includes shipping promptly. Clearly defined policies requiring appropriate handling practices are established and followed, and animal caretakers are trained and supervised in proper animal handling, especially during parturition.

If moving a non-ambulatory animal becomes necessary, such movement requires the proper equipment and trained animal caretakers. An animal may become injured on the dairy or during transportation. Use an adequate number of people along with equipment and handling devices that are appropriate to the animal's size. If these techniques are not practical, euthanasia is recommended. Euthanasia is strongly recommended if an animal goes down in the belly compartment of a semi-trailer that does not have side doors, because humane removal is nearly impossible.

RECOMMENDED PROCEDURES FOR MOVING A NON-AMBULATORY ANIMAL:

- Gently roll a non-ambulatory animal onto a large piece of plywood or conveyor belting. If belting is used, reinforce one side with smooth-edged metal strips to prevent it from buckling and bending when moving the animal. If the animal goes down in a pen or alley, tow it on the plywood or belting with a truck or tractor to a transfer point. To offload a non-ambulatory animal from the center compartment of a semi-trailer equipped with side doors or from a low stock trailer, drag the belting with the animal on it to a transfer point.
- Carefully transfer the animal to a properly equipped forklift or to the bucket of a large loader, or move the animal with a special lifting harness.
- If a forklift is used, 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, and equip the pallet with straps to prevent the animal from falling off. Never use exposed forks.
- Specialized hoists can fit into tight spaces and are built to gently lift and lower a non-ambulatory animal.
- When using the bucket of a large loader, a best practice is to have at least three people available to transfer the animal into the bucket. One person runs the loader, and the other two roll the animal onto the bucket.
- Do not drag or lift an animal by its limbs unless there is no other alternative and only if the animal must be moved a few feet, such as in a milking parlor. If the animal must be dragged because no other moving alternative exists or because it can be saved only by dragging, 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.
- If a mature animal is discovered to be down, it may need to be moved. If the animal is down in a stanchion, tie stall or freestall, frequently the rear leg on the down side is cramped in an unnatural position. Often, moving an animal so the legs are properly positioned will allow the animal to stand on its own. If, following treatment, the animal is unable to rise, it is imperative that it be moved so that its legs can be extended. The only practical way to move such an animal is with a strong halter on the head or a padded chain around the neck. If a single rear limb is used to move the animal, further injury may be incurred.

RESOURCES

AVMA Guidelines for the Euthanasia of Animals: 2013 Edition. (AVMA, 2013) Online at www.avma.org/KB/Policies/Documents/euthanasia.pdf

Carcass Disposal Options. (National Biosecurity Resource Center for Animal Health Emergencies, 2012) www.biosecuritycenter.org/article/carcass

Disposal Disabled Livestock Policy. (AVMA) Online at www.avma.org/KB/Policies/Pages/Disabled-Livestock.aspx

Preventing Crippled and Non-Ambulatory Animals. (Grandin, 2000) Online at www.grandin.com/welfare/lci/lci.html

Practical Euthanasia of Cattle. (Animal Welfare Committee of AABP, 2013) Online at www.aabp.org/resources/euth.pdf

CHAPTER 10

DAIRY BEEF

Dairy animals are an important source of beef in the United States. Approximately 20 percent 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 marketed dairy cows, bull calves and freemartin heifers during their time on the dairy farm and considerations for their marketing as beef animals. For information on animal care for beef animals (including dairy steers) please follow guidelines of the Beef Quality Assurance Program.



DAIRY BEEF

 ***The dairy uses the “Top 10 Considerations for Marketing and Transporting Dairy Animals” in marketing, handling and transportation decision making. (See Appendix G)***

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 is not marketed if there is a reasonable chance it will become non-ambulatory at any time from leaving the farm to the harvest facility. Animals in poor body condition have an increased likelihood of becoming non-ambulatory during transport to or at a processing facility. Dairy farmers must also take care to observe all treatment withdrawal times.

Before a lactating marketed dairy animal is shipped, she is milked to reduce potential udder discomfort.

DAIRY BULL CALVES AND FREEMARTIN HEIFERS

 ***Calves receive colostrum or colostrum replacer soon after birth, even if immediately transported off the farm.***

 ***Calves receive a volume and quality of milk or milk replacer to maintain health, growth and vigor until weaned or marketed.***

 ***Calves have access to palatable, clean, fresh water as necessary to maintain proper hydration.***

In best practice, all calves, whether they are raised as a replacement heifer, veal or dairy steer, receive colostrum or colostrum replacer and are fed in a way that promotes health and reduces the risk of disease. Please refer to Chapter 4: Newborn and Milk-Fed Dairy Calves for additional information on newborn calf animal care practices.

RESOURCES

Beef Quality Assurance Program. Online at www.bqa.org

The Cattle Industry's Guidelines for the Care and Handling of Beef Cattle. (NCBA, 2012) Online at www.bqa.org/CMDocs/bqa/GuidelinesfortheCareandHandlingofCattle.pdf

Top 10 Considerations for Culling and Transporting Dairy Animals to a Packing or Processing Facility. (NMPF, DMI, & AABP 2008) Online at www.nationaldairyfarm.com/sites/default/files/Top-10-Considerations.pdf

CHAPTER 11

THIRD-PARTY VERIFICATION

Confirmation by Third-Party Verifiers of the practices used by FARM Program participants demonstrates the integrity of the program's animal care guidelines module and provides evidence to our stakeholders documenting the dairy industry's commitment to ethical care and well-being of dairy animals. The objective of the FARM Program is to set guidelines for care of dairy animals and to provide statistically verified data demonstrating that proper animal care is an expectation in the dairy industry.



PROGRAM INTEGRITY THROUGH THIRD-PARTY VERIFICATION



As part of the National Dairy FARM Program, the evaluated farm will participate in the random statistical sampling Third-Party Verification program.

Third-Party Verification is not to identify winners and losers in animal care, but to test the integrity of FARM Program animal care guidelines. In essence, when the dairy industry makes assertions about animal care based on participation in the FARM Program animal care on-farm evaluation, Third-Party-Verification ensures those assertions are measurably true.

Through a statistical sampling, an appropriate number of dairy farms participating in the FARM Program are randomly selected for Third-Party Verification. The Third-Party Verification is administered at the randomly selected sites, and is not intended to imply preference for those operations or give them permission to use the verification as an advantage over other operations. The statistical sampling includes selection criteria such as geographic location, size and operation type to ensure that the small number of randomly selected dairy farms mirrors participants in the entire program. The program uses an annual Third-Party Verification process. The complete statistical sampling program and Third-Party Verification process are available on the FARM Program website.

Third-Party Verification is conducted by someone who does not have a conflicting interest in the operation or the outcome of the verification process. From a pool of certified and trained qualified Third-Party Verifiers, the FARM Program has retained the services of an ISO-certified Third-Party Verification company. Verification by outside parties helps ensure that the program accomplishes its goals and objectives, and provides customers and consumers with a statistically valid

demonstration that dairy farmers are meeting their ethical obligation for on-farm animal care.

A Third-Party Verifier conducts an on-farm examination of each dairy farm that is randomly selected in the verification process. There are only two ways to be automatically removed from the FARM Program: (1) refusal to participate in Third-Party Verification, or (2) if willful mistreatment of animals is observed at any time. The FARM Program animal care module is a collective program for all participants, so an individual dairy farm that is randomly selected for Third-Party Verification will not be responsible for the cost of the on-farm verification process. Details of the Third-Party Verification process are available on the FARM Program website.

OTHER VERIFICATION OPTIONS

An individual dairy farmer, cooperative or proprietary processor may choose to have Third-Party Verification conducted on their farm(s) outside of the statistical sampling that occurs among all FARM Program participants. A dairy farmer, cooperative or proprietary processor who chooses additional Third-Party Verification will be responsible for associated costs. A cooperative or proprietary processor may use statistical sampling or conduct Third-Party Verification on all of its dairy farmers.

In any of these cases, Third-Party-Verification should be conducted by someone who does not have a conflicting interest in the operation or the outcome of the verification process. Third-Party Verification services should be obtained from a pool of certified and trained or otherwise proven qualified Third-Party Verifiers. The FARM Program can assist in identifying Third-Party Verification service providers.



APPENDIX A

BODY CONDITION SCORING DAIRY COWS

The FARM Program goal for Body Condition Score in a herd is that 99 percent or more of all classes of animals score 2 or more on the NDFP BCS Scorecard (1 is thin, 5 is fat). If this guideline is not met on the farm, the producer must take action to improve the animal's body condition.

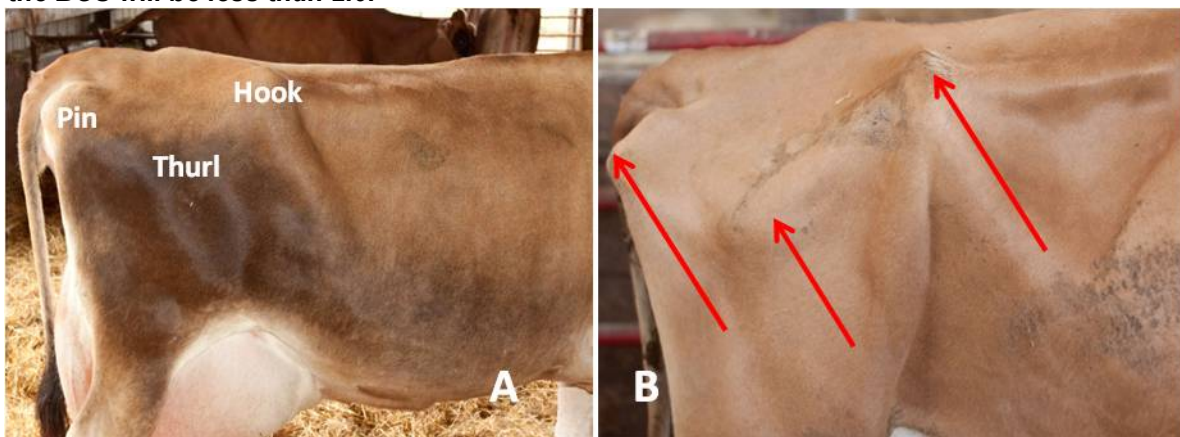
The scale used to assess Body Condition Score is 1 to 5, where 1 is thin and 5 is fat.

- 1 Gaunt animal, having no fatty tissue around the tail head or short rib region
- 2 Thin animal, with a shallow cavity around the tail head region
- 3 Good condition
- 4 Animal with no depression in the loin area and one where the short ribs cannot be felt
- 5 Animal having a thick layer of fatty tissue around her short ribs and over her tail head region

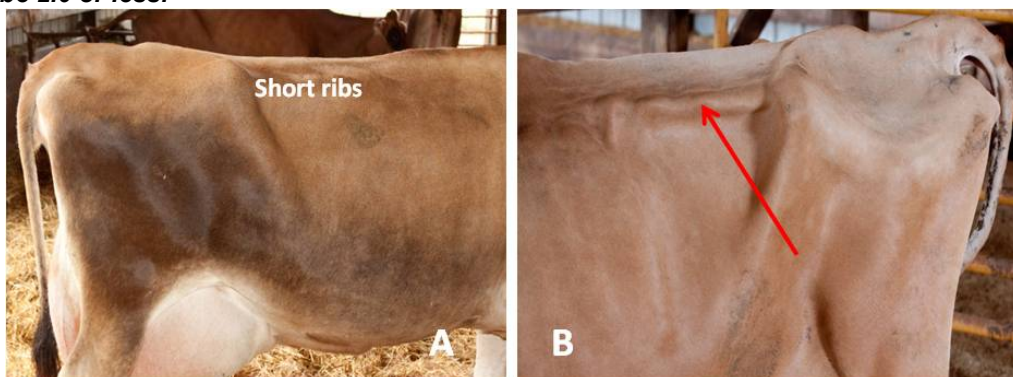
For purposes of evaluating animal well-being, the FARM Program goal targets identifying the percentage of cows in the herd that have a BCS less than 2. View each of the areas shown below to determine body condition. Below, key areas are identified on the left picture and referenced with red arrows on the right picture for clear viewing.

The cow in Picture B demonstrates BCS of 2.0. If the animal being scored has more fat cover than the animal in Picture B, the BCS will be greater than a 2.0. If the animal being scored has less fat cover than the animal in Picture B in all the areas viewed, it will score less than 2.0. An animal with a BCS of 1.0 will have very prominent (angular) tail head, backbone and short rib areas.

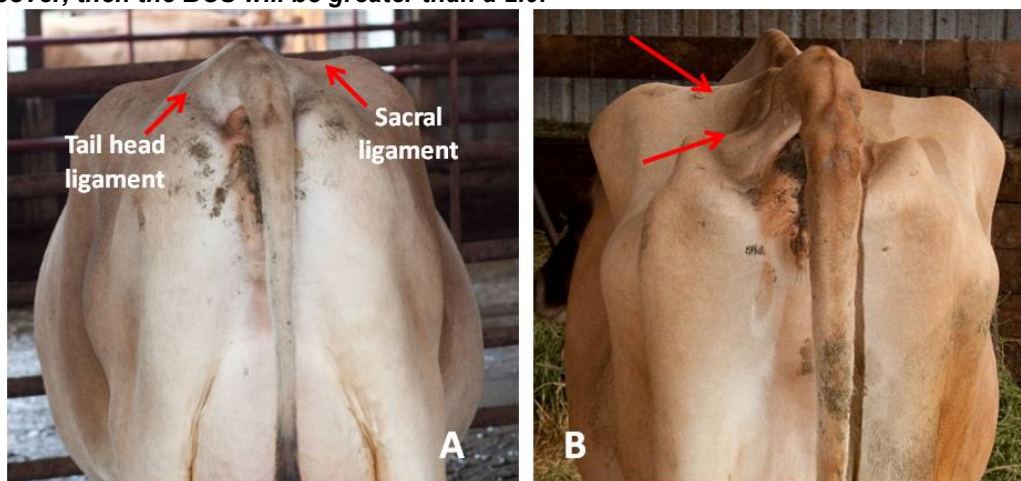
View the hook-thurl-pin section from the side. If this section has any fat cover, then the BCS will be greater than 2.0. If the hook-thurl-pin section is devoid of any fat cover, then the BCS will be less than 2.0.



View the short ribs from the side. If the short ribs have a fat pad cover, then the BCS will be greater than 2.0. If the short ribs are independently visible, with no fat covering, then the BCS will be 2.0 or less.

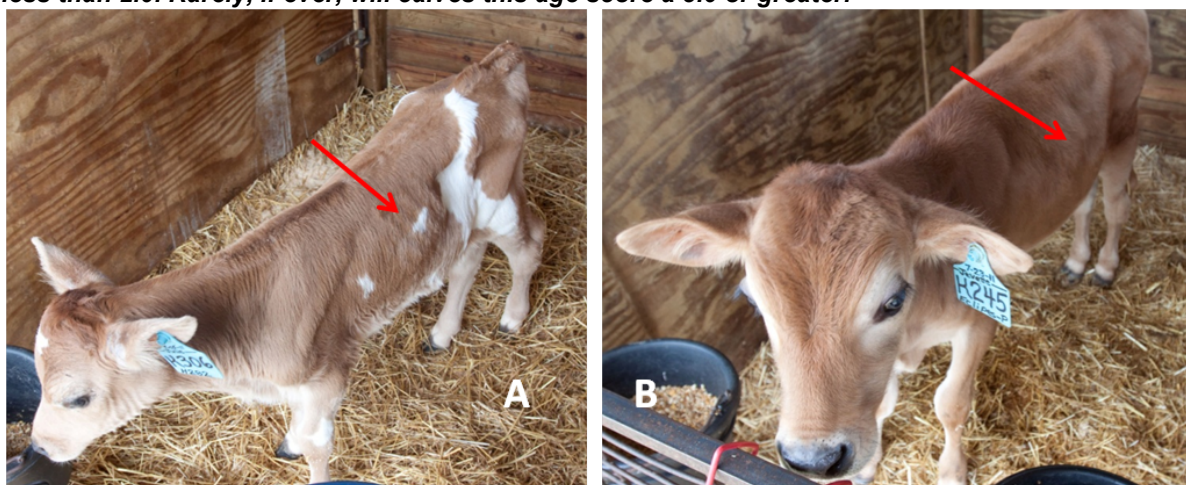


View the tail head and sacral ligaments from the rear. If both of these ligaments are clearly visible, then the BCS will be less than 2. If these ligaments are not clearly visible, and have fat cover, then the BCS will be greater than a 2.0.



Body Condition Scoring Dairy Calves

View the calf from the top and side. If ribs are clearly visible, as in Picture A, then the BCS will be less than 2.0. Rarely, if ever, will calves this age score a 3.0 or greater.



The following pictures illustrate each body condition score:



This cow represents a **BCS 1**. Notice how bony her tail head, hooks and pins are. Her short ribs are very prominent. She has relatively no fat cover on her frame.



This cow represents a **BCS 2**. While her hooks, pins and short ribs are clearly seen they are not as prominent as those in the cow above. Her thighs are flat. She is thin, but can still be a healthy cow if she is in peak lactation.



This cow represents a **BCS 3**. While her hooks, pins and short ribs are seen, they have a more obvious fat cover than those in the cows above. This is reflective of a cow after she starts to regain body condition post-peak lactation.



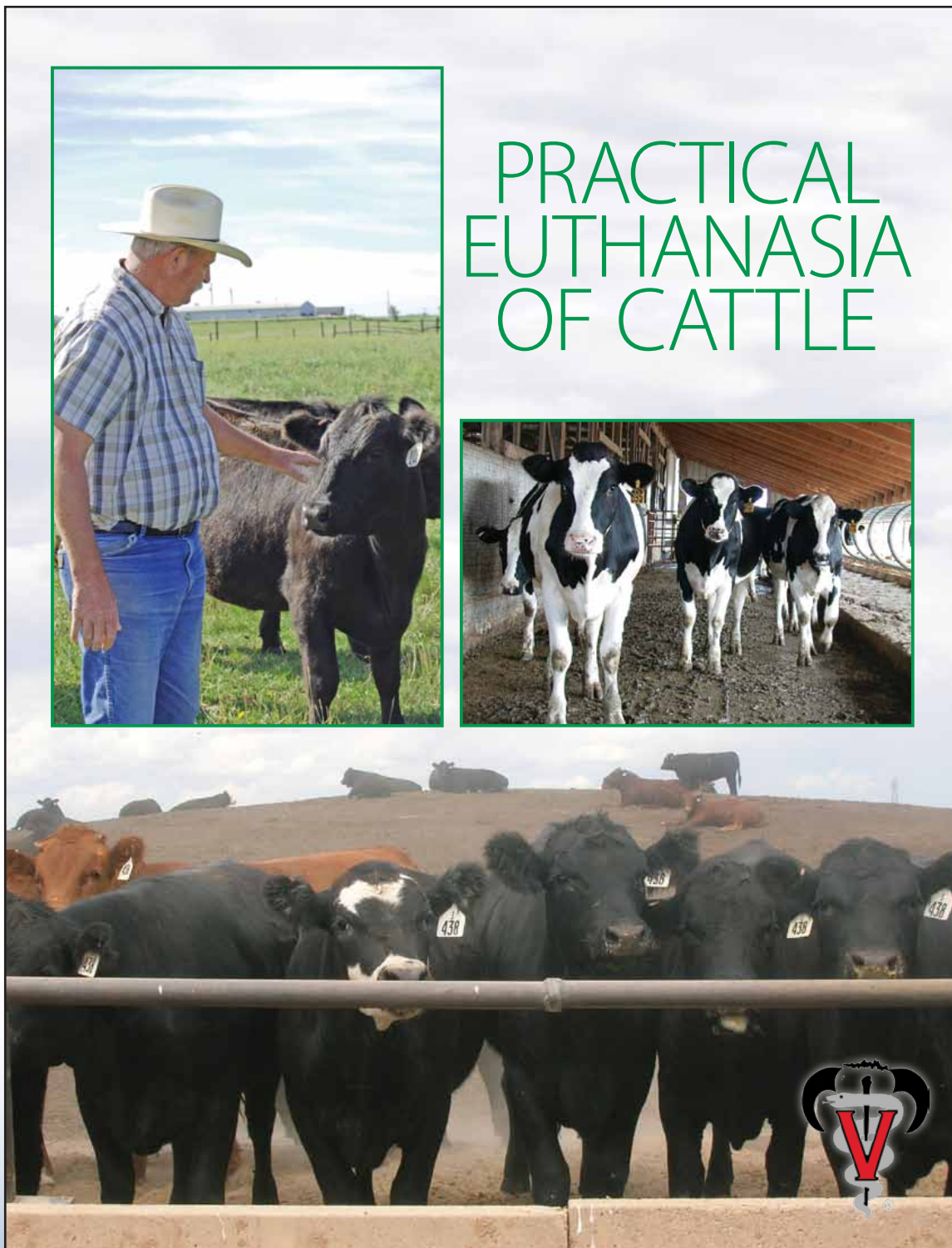
This cow represents a **BCS 4**. She is carrying a heavy fat layer over her hooks, pins and short ribs. This is reflective of a cow in late lactation, as she is approaching dry off.



This cow represents a **BCS 5**. She is carrying a very heavy fat layer over her hooks, pins and short ribs. Notice the fatty bulges over her tail head region.



APPENDIX B PRACTICAL EUTHANASIA OF CATTLE



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OVERVIEW

Livestock caretakers have an obligation to ensure the welfare of animals under their care. Euthanasia of an animal that is suffering from irreversible disease or injury is a primary responsibility caretakers assume. As per the “AVMA Guidelines for the Euthanasia of Animals (2013)” euthanasia is defined as: “A method of killing that minimizes pain, distress, and anxiety experienced by the animal prior to loss of consciousness, and causes rapid loss of consciousness followed by cardiac or respiratory arrest and death”. The contents of this pamphlet are intended to aid caretakers, animal owners, livestock market operators, animal transporters, and veterinarians in choosing effective euthanasia methods.

The “AVMA Guidelines for the Euthanasia of Animals (2013)” recognizes and accepts three primary methods (two have conditions) of euthanasia for cattle:

- Intravenous (IV) administration of a lethal dose of a barbiturate or barbituric acid derivative to induce a transition from consciousness to unconsciousness and then death.
- Gunshot using an appropriate firearm and ammunition to cause physical disruption of brain activity by direct destruction of brain tissue.
- Penetrating captive bolt to induce unconsciousness in combination with an adjunctive step such as exsanguination, administration of IV potassium chloride, or pithing (increasing destruction of brain and spinal cord tissue) to ensure death.

When properly applied, the above euthanasia methods can cause rapid loss of consciousness and death with no detectable distress to the animal.

Cover photos: Top left, Adams Ranch by Bud Adams; top right, Donson breeding heifers by Leo Timms, DVM; bottom, Renee Dewell.

CONSIDERATIONS FOR SELECTION OF METHOD OF EUTHANASIA

When euthanasia is the most reasonable option for a compromised animal, the following elements should be considered to aid in the selection of the appropriate method:

- 1. HUMAN SAFETY:** The first consideration in the choice of euthanasia method is human safety. For example, the use of a firearm carries greater safety risks when compared to other methods.
- 2. ANIMAL WELFARE:** All methods of euthanasia should produce a rapid death with no detectable pain and distress. Select a euthanasia technique that considers human safety as well as animal welfare and is appropriate for the specific situation.
- 3. RESTRAINT:** When performing euthanasia procedures, appropriate methods of restraint should be used. Some methods, such as captive bolt, require excellent restraint of the animal. Quality and availability of cattle chutes, halters, gates or other forms of restraint make certain forms of euthanasia more practical than others.
- 4. PRACTICALITY:** An appropriate euthanasia technique must also be practical to use. For example, not all individuals responsible for carrying out euthanasia procedures have access to pharmaceuticals or firearms.
- 5. SKILL:** Certain techniques require skill and training to accomplish correctly. Individuals responsible for conducting euthanasia should be trained in proper euthanasia protocol and should have access to appropriate, well-maintained equipment and/or medications.
- 6. COST:** Euthanasia options vary in cost. Certain techniques, such as the use of firearms or captive bolt, require a larger initial investment, which may be defrayed over time if used often.
- 7. AESTHETICS:** Certain euthanasia techniques, such as use of a barbiturate overdose, may appear more humane to the general public when compared to other techniques. Some methods, such as a penetrating captive bolt, may cause significant involuntary movements by the animal that may be misinterpreted as a voluntary painful response to those inexperienced in bovine euthanasia. When selecting a euthanasia method, potential negative reactions by the animal or observer should be considered.
- 8. DIAGNOSTICS:** The selected euthanasia method should not compromise diagnostic sample collection.

9. CARCASS DISPOSAL: Carcass disposal is a critical consideration when selecting a euthanasia technique. Carcasses must be handled and disposed of in accordance with state and federal regulations. Options may include rendering, burial, composting, incineration and potentially landfills. Cattle euthanized using a barbiturate overdose may not be accepted at rendering facilities since the drug persists in residual material following the rendering process. In some regions, regulations require animals euthanized with barbiturates to either be incinerated or buried. Appropriate disposal of the carcass prevents scavenging and potential toxicity issues among wildlife. Gunshot or captive bolt is often a viable option that may facilitate ease of disposal.

DECISION MAKING

Actions involving compromised cattle include treatment, slaughter or euthanasia. The following criteria should be considered when making a decision:

1. Pain and distress of animal
2. Likelihood of recovery
3. Ability to get to feed and water
4. Drug withdrawal time
5. Economic considerations
6. Condemnation potential
7. Diagnostic information

INDICATIONS FOR EUTHANASIA

The following conditions or situations may lead to an animal being compromised to such an extent that euthanasia is indicated:

- Fracture, trauma or disease of the limbs, hips or spine resulting in immobility or inability to stand
- Loss of production and quality of life (advanced age, severe mastitis, etc.)
- Disease conditions for which no effective treatment is known (i.e. Johne's disease, lymphoma)
- Diseases that involve a significant threat to human health (i.e. rabies)
- Advanced ocular neoplastic conditions ("cancer eye")
- 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 resulting in an animal being too compromised to be transported or marketed
- Disease conditions for which treatment is cost prohibitive
- Extended drug withdrawal time for clearance of tissue residue
- Poor prognosis or prolonged expected recovery



Bud Adams, Adams Ranch

MECHANISMS OF EUTHANASIA

The agents of primary or adjunct euthanasia cause death by one of the three following mechanisms:

- 1. Direct depression of the central nervous system or organs necessary for life function (barbiturate overdose, intravenous administration of saturated potassium chloride or magnesium sulfate).
- 2. Hypoxia associated with agents or procedures that displace or block the uptake of oxygen (such as that caused by exsanguination).
- 3. Physical disruption of brain activity (such as that caused by gunshot, penetrating captive bolt, or pithing).

TABLE 1: APPROVED METHODS FOR PRACTICAL EUTHANASIA

Method	Risk to Human Safety	Skill Required	Potential Public Perception Issues	Adjunctive Method Required
Gunshot	High	Moderate*	Moderate: Some blood and motion	No
Penetrating Captive Bolt	Moderate	Moderate*	Moderate: Some blood (and motion)	Yes
Barbiturate Overdose	Low	Moderate*	Perceived well	No

* Operator training required

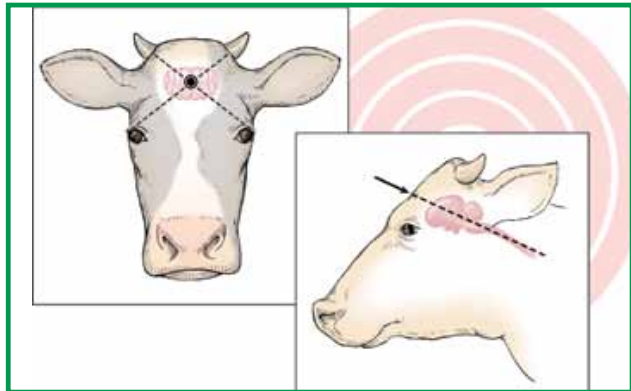


Figure 1. Optimal point of entry for bovine euthanasia with gunshot or captive bolt described as on the intersection of two lines each drawn from the lateral canthus (outer corner) of the eye to the center of the base of the opposite horn (or where horn would be).

ACCEPTED PRIMARY EUTHANASIA METHODS

1. 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 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.

The “AVMA Guidelines for the Euthanasia of Animals (2013)” recommends the use of solid-point bullets. Muzzle energy available from a .22 LR is in the range of 100 to 150 ft./ lb. (135 to 216.8 joules), whereas larger calibers such as the .38 Special, .357 magnum or 9 mm will push muzzle energies well above the 300 lb. (407 joules or greater) range. Rifles are capable of higher muzzle energies compared with handguns and are often a better choice in situations where a fractious animal must be shot from a distance. Finally, shotguns are very lethal at close range (less than 2 feet from point of intended entry) whether

loaded with shot-shells or slugs. 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 that can greatly increase the risk of ricochet and operator and bystander injury. The firearm should be held within 1 to 2 feet from 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 as shown in Figure 1.

2. 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 (2013)”, 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 gunshot. 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





Grant Dewell, DVM

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. The optimal point of entry

for the penetrating captive bolt is depicted in Figure 1.

3. BARBITURATE AND BARBITURIC ACID DERIVATIVES: When properly administered by the intravenous route, barbiturate overdose (60–80 mg/kg sodium pentobarbital IV) produces rapid unconsciousness and anesthesia followed by respiratory depression, hypoxia, and cardiac arrest. The barbiturate selected should be potent, long acting, and stable in solution. The carcass of barbiturate treated animals is considered unfit for human or animal consumption. Ingestion by wildlife or other animals can induce toxicities. (FDA-CVM 2003 <http://www.fda.gov/AnimalVeterinary/NewsEvents/CVMUpdates/ucm119205.htm>).

Finally, as mentioned previously, the use of pharmaceuticals limits carcass disposal options as renderers are less likely to accept animals euthanized by these methods.

DETERMINATION OF UNCONSCIOUSNESS

A state of apparent unconsciousness must be established immediately following the initial euthanasia procedure. In the field, the surrogate to unconsciousness is “lack of response” described below, as true unconsciousness can only be determined by EEG. The person performing euthanasia must be prepared to immediately apply an accepted euthanasia technique if any sign of consciousness is detected by the observer or demonstrated by the animal.

SIGNS OF UNCONSCIOUSNESS

- Absence of corneal reflex
- Absence of vocalization
- Absence of gag reflex (no voluntary tongue movements or swallowing)
- Lack of rhythmic respiration
- No coordinated attempt to rise or right itself

Secondary or adjunct euthanasia methods must not be performed until the animal has been determined to be unconscious.

SECONDARY OR ADJUNCT EUTHANASIA METHODS

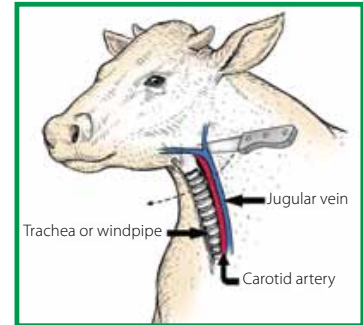
A second shot, exsanguination, pithing and rapid intravenous injection of a concentrated solution of potassium chloride or magnesium sulfate may serve as adjunct

methods to ensure death following use of an acceptable primary euthanasia method.

EXSANGUINATION

This method can be used to ensure death subsequent to stunning, anesthesia, or unconsciousness. It must not be used as the sole method for euthanasia.

The most common exsanguination method in the bovine is to lacerate both the jugular vein and carotid artery. A 6-inch long sharp knife is fully inserted behind the point of the jaw and directed downwards until blood



J.K. Shearer

Figure 3. Exsanguination technique

is freely flowing. Brachial vasculature can be lacerated by lifting a forelimb, inserting the knife deeply at the point of the elbow and cutting skin and vasculature until the limb can be laid back against the thorax of the animal. The aorta can be transected via the rectum, by a trained individual, so that blood pools within the abdominal cavity.

PITHING

Pithing is an adjunctive technique designed to cause death by increasing the destruction of brain and spinal cord tissue. It is performed by inserting a pithing rod or similar tool through the entry site produced in the skull by a bullet or penetrating captive bolt device. The operator



Dr. Dee Griffin

manipulates the pithing tool to destroy both brain stem and spinal cord tissue, which results in death.

POTASSIUM CHLORIDE (KCL)

Rapid IV administration of a saturated solution potassium chloride (KCl) induces cardiac arrest. Cattle must be anesthetized or unconscious prior to administration. The injection of xylazine or any other alpha-2 agonist has not been shown to induce anesthesia and must not be used alone. The use of a captive bolt is also acceptable if a state of unconsciousness is achieved. The specific dose of KCl will vary according to the size of the animal, but an injection of 250 ml of a saturated KCl solution is appropriate for most mature cows. The KCl solution should always be given to effect (i.e., until death).

MAGNESIUM SULFATE

Similar to potassium chloride (KCl), magnesium sulfate is approved for use only in anesthetized animals. Compared to the use of IV KCl, death is usually much slower.

CONFIRMATION OF DEATH

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

The following combination of criteria recommended by the AVMA includes: "...lack of pulse, breathing, corneal



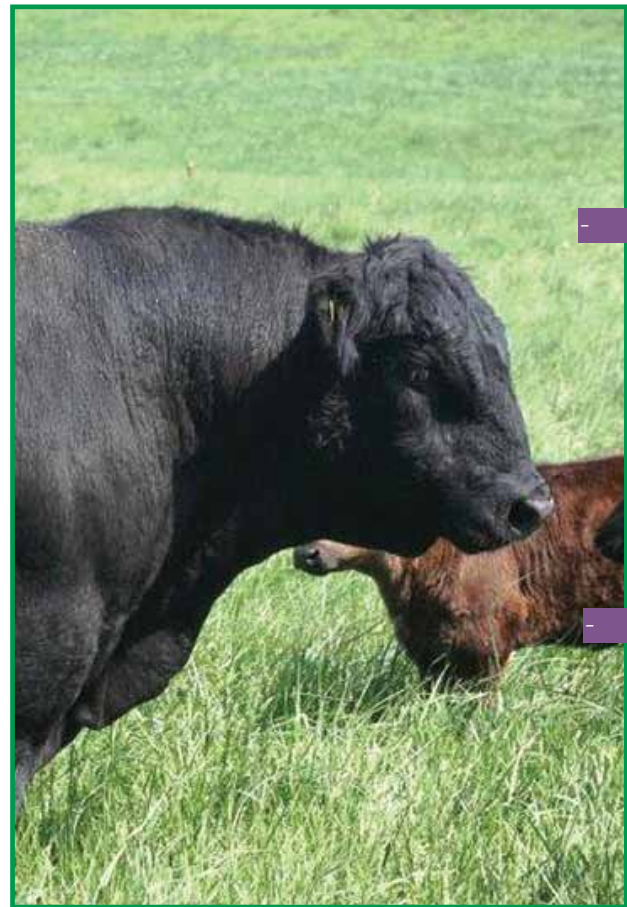
Renee Dewell

reflex and response to firm toe pinch, inability to hear respiratory sounds and heartbeat by use of a stethoscope, graying of the mucous membranes and rigor mortis. None of these signs alone, except rigor mortis, confirms death."

The presence of a heartbeat can be best evaluated with a stethoscope placed under the left elbow. Observation for movement of the chest indicates respiration. However, respiration rates may be very erratic in unconscious animals; therefore, one must be cautious in the interpretation of respiration for confirmation of death. Lack of heartbeat and respiration for three to five minutes should be used to confirm death. The corneal reflex may be tested by touching the surface of the eye. Normal or conscious animals will blink when the eye's surface is touched. Lack of a corneal reflex alone is not sufficient for confirmation of death. Continued monitoring of animals for a period of 20 to 30 minutes after euthanasia has been performed is also good advice to livestock owners and managers.

CONSIDERATION FOR EUTHANASIA OF CALVES AND BULLS

Calves and bulls require special consideration in selecting the proper method of euthanasia. Ethical considerations do not change for the calf because it is small or more easily handled. Blunt trauma by physical blow to the head is not acceptable for euthanasia of calves because the skull is too hard to consistently achieve immediate and lethal destruction of brain tissue. This method is also difficult to apply



Michelle Christianson

consistently because of restraint and complications in positioning the calf for effective use of blunt trauma methods. In addition to the methods outlined in Table 1 for mature bovines, the use of a purpose-built non-penetrating captive bolt stunner is an acceptable (with conditions) method of euthanasia for calves.

Euthanasia of bulls presents unique challenges because of their size, temperament, and thickness of their skull. Operator safety is of primary concern in euthanasia of bulls, and for certain techniques such as barbiturate overdose or captive bolt, proper restraint is critical. Bulls may be euthanized with specialized heavy-duty captive bolt guns or firearms capable of muzzle energies of 1000 ft. / lb., or by barbiturate overdose.

UNACCEPTABLE METHODS OF EUTHANASIA

Based on ethical and humane considerations, the "AVMA Guidelines for the Euthanasia of Animals (2013)" considers the following methods unacceptable techniques:

- Manually applied blunt trauma to the head of calves or mature cattle
- Injection of unapproved chemical agents or substances (e.g. disinfectants, non-anesthetic pharmaceutical agents)
- Sedation with alpha-2 agonist such as xylazine followed by potassium chloride, magnesium sulfate, or any other euthanasia method that requires the animal to be unconscious prior to its use
- Air injection into the vein
- Electrocuting with a 120-volt electrical cord
- Drowning
- Exsanguination of conscious animals

CONCLUSION

Personnel at sites that routinely handle cattle should be prepared with the knowledge, necessary skills, and well-maintained equipment to conduct euthanasia. Penetrating captive bolt and gunshot are the only two acceptable methods typically available to non-veterinarians for emergency euthanasia of cattle. Animal transporters should also be properly trained in euthanasia techniques and should have contact information for appropriate personnel in case of an emergency. An action plan for routine and emergency euthanasia should be developed and followed wherever animals are handled. Persons who perform this task must be technically proficient, mentally capable and possess a basic understanding of the anatomical landmarks and equipment used for humane euthanasia of animals. If there is any degree of question or discomfort with a proposed euthanasia procedure, a veterinarian should be consulted.

Livestock markets and sale yards should have written euthanasia protocols to follow and trained personnel should be available for emergency euthanasia during all shifts. When practical, select a location where the carcass can be easily reached by removal equipment.

Dead animals should be disposed of promptly and in accordance with all federal, state, and local regulations.



Bud Adams, Adams Ranch



APPENDIX C

HYGIENE SCORING DAIRY COWS

The FARM Program goal for Hygiene Score is that 90 percent or more of animals should score 2 or less on the NDFP Hygiene Scorecard (1 is clean, 4 is dirty).

Good housing management will keep animals dry, clean and free of manure. The goal of evaluating animal hygiene is to gauge the on-going sanitation management in both the beds and the traffic lanes.

Feed and bedding areas should be maintained clean and dry, even in areas with minimal housing and rainfall.

The Hygiene Scale is a 1 to 4 scale, where 1 is clean and 4 is dirty.

- 1 = Clean
- 2 = Manure splatters on lower leg
- 3 = Manure splatters on upper leg, udder and belly area
- 4 = Manure splatters on udder/belly area and toward top of cow (alley cow)

Below are pictures that illustrate the different scores.



Hygiene Score = 1. This cow is clean, with few manure stains on her legs. Her belly and udder area are very clean.



Hygiene Score = 2. This cow is quite clean on her belly and udder area; however, upon close observation, she has manure on her legs up to her knee area.



Hygiene Score = 3. This cow has significant manure on her legs, thigh and her udder. Manure extends up to her rear end.



Hygiene Score = 4. This cow has manure extending up her sides. Her belly and udder are dirty. Dirt and manure extend onto her back.



APPENDIX D

LOCOMOTION SCORING DAIRY COWS

The FARM Program has several evaluation points for foot health:

- ✓ 95 percent of the lactating and dry dairy herd scores a 2 or less, where 1 is sound, 2 is moderately lame and 3 is severely lame.
- ✓ The dairy farmer is taking action to improve animals with severe lameness.
- ✓ A lameness prevention protocol is in place.

Locomotion scoring is recommended to improve lameness detection and to regularly assess the distribution of cows at each score level. ***The FARM Program monitors the prevalence of severely lame cows in the lactating and dry dairy herd, with a severely lame cow being defined as an animal either unable to move, or able to move, but barely able to bear weight on the affected limb (1=sound, 2=moderately lame, 3=severely lame).*** Signs may also include back arch, poor body condition, head bob and an inability to flex the lower leg joints.



Locomotion Score 2 is moderately lame. Upon close examination, this cow is sore on her left front leg.



Locomotion Score 3 is considered severely lame. This cow is sore on her right rear leg. She favors it both standing and walking.





APPENDIX E

HOCK & KNEE LESION SCORING IN DAIRY COWS

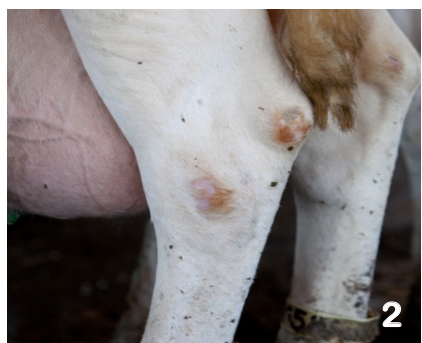
The FARM Program goal is that 95 percent of the lactating and dry dairy herd scores a 2 or less on the NDFP Hock and Knee Lesion Scorecard (1 is no hair loss/swelling, 2 is some hair loss/no swelling and 3 is severe swelling and/or abrasion through the hide).

Hock and knee lesions (swelling, abrasion and even ulceration) are an important indication of inadequate bedding and lack of animal comfort. Dairy farms with a higher prevalence of hock lesions also tend to have a higher number of lame cows. A healthy hock is free from hair loss (the hair coat is smooth and continuous with the rest of the leg) and swelling. Skin breakage provides an opportunity for infection to occur, which can lead to swelling, discomfort and lameness.

The scoring for the FARM Program focuses on the animals afflicted by significant hock or knee injury involving swelling of the joint and/or ulceration of the skin. The scale used to evaluate hock and knee lesions is:



1 = Any hair loss less than a quarter, as long as there is no lesion or swelling.



2 = Hair loss at least the size of a quarter; no swelling.



3 = Severe swelling and/or abrasion through the hide. Lesion may have been purulent or bleeding.

The scoring system is the same when looking at the front knees.



This cow would score a 1, based on the hair loss on her front knees, which is less than the size of a quarter.



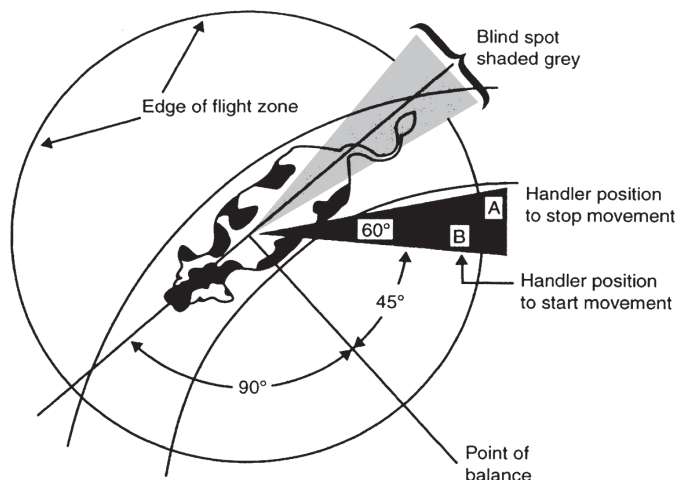
Whereas this cow would score 2, given hair loss is greater than the size of a quarter.

FLIGHT ZONE

The flight zone is the animal's safety zone, and its size varies depending on the animal's degree of wildness or tameness. Cattle that seldom see people have a large flight zone, varying from a few feet to 100 yards or more. When a person enters the flight zone, the animal will turn away. If a person is outside the animal's flight zone, it will turn and look at him or her. The size of the flight zone is determined by three interacting factors:

- genetic traits (excitable versus calm),
- amount of contact with people (see them every day or only twice a year)
- and the quality of the contact with people (negative versus positive).

Animal Handling - Figure 1



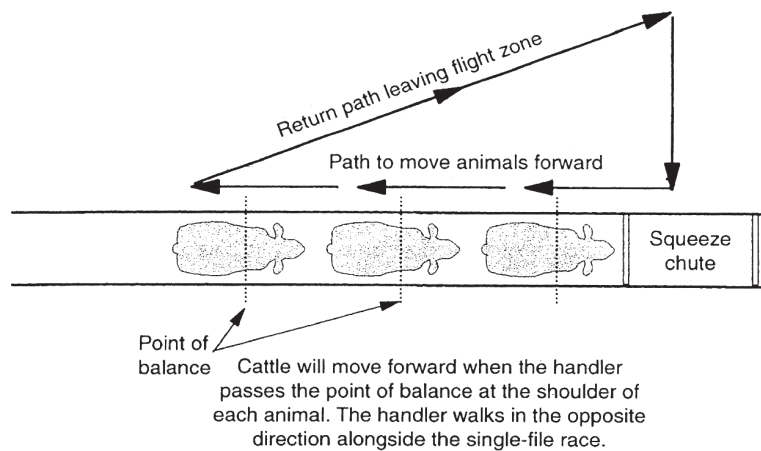
Handling is safer when animals are moved quietly. Handlers should not yell or flap their arms, because this may agitate the animals. Excessive use of electric prods increases animal agitation, as well as hazards to handlers. Animals that have a large flight zone move more quietly and with less agitation when the handler works on the edge of the flight zone. The handler penetrates the edge of the flight zone to make the animal move and retreats outside the flight zone to induce the animal to stop moving. Excited, agitated animals have a larger flight zone than calm animals. A handler must be behind the point of balance (line at animal's shoulder) to make an animal go forward.

Reference: Temple Grandin, Safe Handling of Large Animals (Cattle and Horses).
Online at www.grandin.com/references/safe.html

POINT OF BALANCE

Handlers need to understand **the point of balance**. The point of balance is an imaginary line at the animal's shoulders. To induce the animal to move forward, the handler must be behind the point of balance. To make the animal move backward, the handler must be in front of the point of balance. Grazing animals move forward when a handler walks past the point of balance in the opposite direction of desired movement

Animal Handling - Figure 2



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



APPENDIX G

TOP TEN CONSIDERATIONS

Top 10 Considerations for Culling and Transporting Dairy Animals to a Packing or Processing Facility

Culling and transporting decisions are an important part of dairy farming. Occasionally, an animal that is ambulatory on the farm may not be suitable for transport to a packing or processing facility. These "Top 10 Considerations for Culling and Transporting Dairy Animals to a Packing or Processing Facility" are designed to assist dairy producers in making the decision on the suitability for an animal to be transported.

1
Do not move non-ambulatory animals to market under any circumstances.

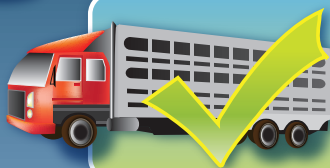


2
Make the decision to treat, to cull, or to euthanize animals promptly. Sick and injured animals should be segregated from the herd.



3
Delay transport of an animal that appears to be exhausted or dehydrated until the animal is rested, fed, and rehydrated.

4
Milk all cows that are still lactating just prior to transporting to a packing or processing facility.



5
Use a transportation company that is knowledgeable about your animal care expectations and provides for the safety and comfort of the animals during transport.



6
Do not transport animals to a packing or processing facility until all proper treatment withdrawal times have been followed.



7
Do not transport animals with a poor body condition, generally a Body Condition Score of less than 2 (1-5 scale).



8
Do not transport animals that require mechanical assistance to rise and are reluctant or unable to walk, except for veterinary treatment. When using any handling device, abuse must not be tolerated.

9
Do not transport animals with bone fractures of the limbs or injuries to the spine. Animals with a recent fracture unrelated to mobility should be culled and transported directly to a packing or processing facility.



10
Do not transport animals with conditions 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.

If you would like to order up to five additional copies or would like more information on the dairy animal culling and transporting sheet, please call (703) 224-1381 or email: poster@nmpf.org.





APPENDIX H EXTRA-LABEL DRUG USE

FOLLOWING INFORMATION PROVIDED BY THE CENTER FOR DAIRY EXCELLENCE

Extra-Label Drug Use Decision Flow-Chart for Food Animals

You made a careful diagnosis in the presence of a Valid Veterinarian/Client/Patient Relationship. You are contemplating extra-label drug use. You must ask yourself...

Are the animals to be treated, food animals?

YES

Does a drug labeled for food animals exist which fulfills all of the following:

- ▶ contains the needed ingredient
- ▶ in the proper dosage form
- ▶ labeled for the indication
- ▶ and is clinically effective?

YES

You must use this drug per label, as extra-label drug use is unnecessary. Observe label directions and withdrawal time.

NO

Is there a drug approved for food animals which could be used in an extra-label manner?

YES

Proceed with the extra-label use of food animal drug. Establish extended withdrawal time. Ensure food safety. Maintain required records. Label drug appropriately.**

NO

Is there a human drug or drug approved for non-food animals which could be used in an extra-label manner?

YES

Is there adequate scientific information available to determine withdrawal time?

YES

Proceed with extra-label drug use of human or non-food animal drug. Establish extended withdrawal time. Ensure food safety. Maintain required records. Label drug appropriately.

NO

If compounding of approved drugs will prevent pain and suffering, refer to CPG 608.400 for compounding guidance.***

NO

Drug must not be used or treated animal must not enter the food supply.

*** Compounding of bulk drugs is generally illegal



VETERINARY CLIENT/PATIENT RELATIONSHIP VALIDATION FORM



I. Producer

Producer Name: _____

Address: _____ City: _____ Zip: _____

Farm Name and Location: _____

Section: _____ Township: _____ County: _____

Premises ID Number (optional): _____

Producer Signature: _____

Date: _____

II. Veterinarian

Name: _____

Address: _____ City: _____ Zip: _____

Clinic Name: _____

Phone Number: (_____) _____

I hereby certify that a valid Veterinarian/Client/Patient Relationship (VCPR) is established for the above listed owner and will remain in force until canceled by either party.

Veterinarian's Signature: _____

Date: _____



APPENDIX J BODY ABRASIONS

The FARM Program is interested in collecting data on body abrasions to evaluate the prevalence of these in various housing systems. ***The collection of this data is for informational purposes only and is not intended as a guideline at this time.***

Dairy animals housed in facilities that are not built properly have numerous opportunities for body lesions. In the adult animal, these may include lesions from neck rails that are not properly installed, bad brisket board design, rapid exits that are too small for the size of the animal, etc. View the entire animal for body lesions. If any exist, note the location on the body and degree using the above scale on the observation form.

The tail must not be used to move or restrain a cow in such a way that the tail becomes injured or broken, as this is a sign of inhumane handling.

Abrasions can also be the result of aggressive interactions with other animals and, even in some cases, from health measures such as injection-site abscesses.

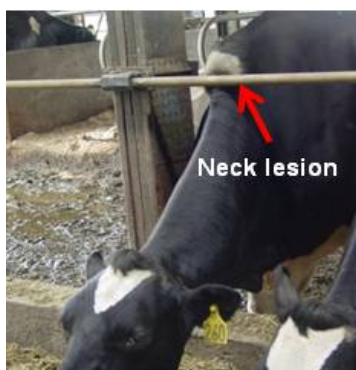
By monitoring the location, degree and prevalence of these injuries across the entire herd, management will be able to identify and address specific problems, in consultation with their herd veterinarian.

The FARM Program scale for evaluating body abrasions is similar to the one used for leg lesions:

- 1 = Any hair loss less than a quarter, as long as there is no lesion or swelling.
- 2 = Hair loss at least the size of a quarter; swelling smaller than the size of a quarter.
- 3 = Severe swelling (greater than the size of a quarter) and/or abrasion through the hide; lesion may have been purulent.



Example: A cow with an abrasion on her thigh that resulted from her rubbing on the concrete curb. No swelling is present; however, the hair loss is larger than a quarter and would score a 2.



Example: A cow with an abrasion on her neck as a result from her rubbing on the neck rail. The severe swelling (larger than the size of a quarter) would make this score a 3.



APPENDIX K

FARM FOOTING SCORE SHEET

FARM Footing Score Sheet

Pen	Observed	Total number observed in each pen	Percentage of animals observed to slip or fall
	Slips (score a hatch mark for each animal observed to slip)		<i>(Number of slips/number observed) * 100</i>
1			
	Falls (score a hatch mark for each animal observed to fall)		<i>(Number of falls/number observed) * 100</i>
1			
	Slips (score hatch mark for each animal observed to slip)		<i>(Number of slips/number observed) * 100</i>
2			
	Falls (score hatch mark for each animal observed to fall)		<i>(Number of falls/number observed) * 100</i>
2			
	Ave % Slips		
	Ave % Falls		

Observation of animals can be made as any group of animals is moved through the facility, i.e. as cows exit the parlor, as heifers are moved between pens, etc. The above form is for scoring 2 different groups, but can be duplicated to score more. As a group is scored, note each slip or fall with a hatch mark. Mark the total number of animals in the group observed in the middle column for calculation purposes. Calculations can be made using the formulas above and the summary of both pens can be calculated in the bottom row.



APPENDIX K

FARM FOOTING SCORE SHEET

FARM Footing Score Sheet **EXAMPLE**

Pen	Observed	Total number observed in each pen	Percentage of animals observed to slip or fall
	Slips (score a hatch mark for each animal observed to slip)		<i>(Number of slips/number observed) * 100</i>
1	 	50	$(12 / 50) * 100 = 24\%$
	Falls (score a hatch mark for each animal observed to fall)		<i>(Number of falls/number observed) * 100</i>
1		50	$(2 / 50) * 100 = 4\%$
	Slips (score hatch mark for each animal observed to slip)		<i>(Number of slips/number observed) * 100</i>
2	 	30	$(7 / 30) * 100 = 23\%$
	Falls (score hatch mark for each animal observed to fall)		<i>(Number of falls/number observed) * 100</i>
2		30	$(1 / 30) * 100 = 3\%$
			Ave % Slips $(19 / 80) * 100 = 24\%$
			Ave % Falls $(3 / 80) * 100 = 4\%$

Observation of animals can be made as any group of animals is moved through the facility, i.e. as cows exit the parlor, as heifers are moved between pens, etc. The above form is for scoring 2 different groups, but can be duplicated to score more. As a group is scored, note each slip or fall with a hatch mark. Mark the total number of animals in the group observed in the middle column for calculation purposes. Calculations can be made using the formulas above and the summary of both pens can be calculated in the bottom row.



APPENDIX L

EMPLOYEE CODE OF ETHICS

EMPLOYEE CODE OF ETHICS

Ethical practice is the cornerstone of the business of MILK4U Dairy.

While mistakes may be forgiven, violation of our ethical code will never be tolerated.

Ethics

This dairy conducts business honestly and honorably, and expects the employees to do the same.

Duty of animal care

Actions of all people on this dairy, either employed on this dairy or visitors, must conform to the basics of animals care and well-being. We believe that we have a responsibility to the animals in our care to provide a calm, comfortable place for our animals to live in. We know that healthy and comfortable cows produce the highest level of milk and we are committed to providing that opportunity to each animal.

Professional conduct

The employees of MILK4U Dairy will conduct all activities professionally and with integrity. Any deliberate neglect, abuse or mishandling of animals (whether by employee, a contractor, or a visitor on the farm) will not be tolerated. Any animal neglect, abuse, or mishandling will be reported to a supervisor or the owner immediately. Confirmed cases of willful acts of abuse or neglect is means for immediately dismissal.

Employee: _____

Date: _____

Dairy Manager: _____

Date: _____



**To learn more about the National Dairy FARM Program,
log on to www.nationaldairyfarm.com**

**or call the National Milk Producers Federation at
(703) 243-6111**