



Humane Farm Animal Care
Animal Care Standards
January 2014

DAIRY COWS

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HUMANE FARM ANIMAL CARE

Humane Farm Animal Care is a non-profit charity whose mission is to improve the lives of farm animals by providing viable, credible, duly monitored standards for humane food production and assuring consumers that certified products meet these standards.

Humane Farm Animal Care is approved by a consortium of Animal Protection Organizations, Individuals, and Foundations, such as the American Society for the Prevention of Cruelty to Animals and the Humane Society of the United States.

The Humane Farm Animal Care Standards have been developed to provide the only approved standards for the rearing, handling, transport and slaughter of Laying Hens for use in the Certified Humane® program. These standards incorporate scientific research, veterinary advice, and the practical experience of farmers. The standards are based on the Royal Society for the Prevention of Cruelty to Animals (RSPCA) guidelines, current scientific information and other practical standards and guidelines recognized for the proper care of animals.

Animal welfare is improved when livestock managers adhere to the following:

- Access to wholesome and nutritious feed
- Appropriate environmental design
- Caring and responsible planning and management
- Skilled, knowledgeable, and conscientious animal care
- Considerate handling, transport, and slaughter

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PART 1: INTRODUCTION

A. The Certified Humane® Label

The Certified Humane® program was developed to certify products from animals of farms that adhere to these standards. Upon satisfactory application and inspection, farmers and ranchers will be certified and may use the Certified Humane Raised and Handled® logo. Program participants are inspected and monitored by *Humane Farm Animal Care* annually. Charges levied are to cover inspections and program costs which include promotional materials which help promote the products of the producers that are Certified Humane®.

B. Guide to the Use of the Welfare Standards

- The broad objectives of the standard are described at the beginning of each section.
- The numbered requirements are the standards, all of which must be complied with.
- These standards are written to cover facilities in varying geographic and temperature regions and facilities utilizing different systems. Therefore, not all sections in these standards will apply to each facility.
- Boxed sections provide additional information or may highlight areas where the standards will be reviewed in the future.
- Farmers must also comply with any local, state or federal requirements for dairy cow production that affect the environment or safety of their product as well as their State Veterinary Practices Act.

PART 2: NUTRITION - FOOD AND WATER

OBJECTIVES: Livestock must have access to fresh water and a diet formulated or assessed to maintain full health and promote a positive state of well-being. Feed and water must be distributed in such a way that livestock can eat and drink without undue competition.

A. Feed

FW 1: Wholesome, nutritious feed

- a. Cattle must be fed a wholesome diet, which is:
 1. Appropriate for their age and species;
 2. Fed to them in sufficient quantity to maintain them in good health; and
 3. Formulated or assessed to satisfy their nutritional needs as established by the National Research Council (NRC) and as recommended for the geographic area.
- b. Cattle must not be maintained in an environment that is likely to predispose them to nutrient deficiency.
- c. Managers must be aware of nutrient deficiencies and excesses on the farm and correct these as appropriate.

FW 2: Free access to food

Cattle must have free access to nutritious food each day, except when directed by an attending veterinarian.

FW 3: Feed records

- a. Producers must have written records and/or labels of the feed constituents, the inclusion rate and constituents of compound feeds, and feed supplements, including those records from the feed mill or supplier; and
- b. Make these available to the Humane Farm Animal Care Inspector during the inspection and at other times upon request.

FW 4: Substances prohibited in feed

- a. No feedstuffs containing mammalian or avian-derived protein sources are permitted, with the exception of milk and milk products.
- b. Dairy cows must not be treated with rBST.
- c. Cattle must not be fed antibiotics, including ionophores, coccidiostats or other substances deliberately to boost growth, feed efficiency or milk production.
- d. Antibiotics can be used in individual cattle only therapeutically (i.e. disease treatment) as directed by a licensed veterinarian.

FW 5: Body condition

- a. Cattle must be fed so that they sustain full health and normal reproduction capacity over their maximum foreseeable lifespan.

- b. Body condition change in cattle must be carefully planned, monitored and maintained according to the stage of production.
- c. At all times, animals must have a body condition score of at least 2. See Appendix 1 for Body Condition Scoring Guide.
- d. No animal with a BCS of less than 2 may be transported or leave the farm unless for veterinary treatment.

It is recommended that cattle be fed to attain the following body condition scores:

Growing heifers: 2.75-3.25

Dry period cows and heifers at calving: 3.25-3.75

Early lactation(1-120 days): 2.5-3.25

Mid lactation (120-304 days): 2.75-3.25

Late lactation (305+ days): 3.0-3.5

Score	Appearance	Condition
1	Severe underconditioning (Emaciated)	Spinous and transverse processes prominent, no fat cover, deep cavity around tailhead, deep depression in loin.
2	Frame obvious	Spinous and transverse processes prominent but smooth, slight fat cover, shallow cavity around tailhead with some fatty tissue lining.
3	Moderate, frame and covering well balanced	Spinous and transverse processes rounded, muscle development full, no cavity around tailhead, slight depression in loin area.
4	Frame not visible as covering	Spinous processes evident only as a line, fat cover considerable but firm, transverse processes cannot be felt, tailhead rounded with fat, no depression in loin area.
5	Severe overconditioning (Obese)	Spinous and transverse processes not detectable, fat cover dense and soft, tailhead buried under thick layer of fatty tissue.

FW 6: Avoiding changes in food

Efforts must be made to avoid sudden changes in the type and quantity of feed, except under the direction of a veterinarian.

FW 7: Providing fiber

- a. Adult cattle and calves over 30 days of age must be provided with feed or forage containing sufficient fiber to allow rumination.

- b. The fiber must be of such quality and length as to stimulate rumination and prevent acidosis.

FW 8: Pasture

- a. Where climate allows for quality grazing, dairy cattle may be able to obtain a large proportion of their nutritional requirements by grazing pasture. In these situations, regular assessment of cattle body condition is mandatory.

Care must be taken to ensure that pastured animals have an adequate, well-balanced, complete diet, through pasture nutrient analysis and estimation of average dry matter intake when necessary.

- b. When pasture quality is poor, nutritional maintenance through feeding of quality forage and concentrate is appropriate.
- c. Dairy systems which house cattle year round without access to the outdoors (pasture or exercise lot) are prohibited.
- d. All cattle, regardless of location, should have access to exercise areas for 4 hours per day, weather permitting.

FW 9: Easy availability of feed

- a. Cattle should be fed at or above floor level.
- b. Adequate bunk space shall be provided so that cattle do not need to compete for feed.
- c. Feed bunk space must be adequate to allow most animals in a pen to feed simultaneously
 - 1. At least 24 inches of feed bunk space must be provided per cow or heifer
 - 2. At least 30 inches per cow must be provided in pens housing pregnant dry cows and fresh cows (up to 21 days in milk).
- d. Feed must be pushed up regularly to ensure cattle have access to the feed provided

FW 10: Clean feeding equipment

- a. Feed troughs/bunks must be kept clean and stale or moldy feed removed.
- b. Automatic feed delivery systems (e.g. grain delivery systems in milking barns or in corrals) must be:
 - 1. Kept clean;
 - 2. Free of stale feed; and
 - 3. Maintained in good working order.

FW 11: Minimizing contamination of water and feed

Feeding and watering equipment must be designed, constructed, placed and maintained so that contamination of the animals' feed and water is minimized.

The footing surrounding the eating area should be free of mud in depths greater than fetlock (ankle) height.

FW 12: Avoiding unsuitable feedstuffs

Control practices must be in place to minimize:

- a. Livestock access to poisonous plants and unsuitable feedstuffs.

- b. Contamination of stored feeds by birds and vermin.

B. Food – specific provisions for calves

FW 13: Diet requirements for calves

- a. Calves must be fed a wholesome diet, which meets or exceeds the National Research Council requirements appropriate for their age, weight, behavioral and physiological needs.
- b. Antibiotics cannot be used except therapeutically (i.e. disease treatment) in individual animals as directed by a licensed veterinarian.
- c. All calves must have access to fresh water at all times.

It is recommended that all calves aged 3-28 days of age be offered a daily ration of at least 20% of their body weight (approximately 8 liters for Holstein calves) in whole milk or equivalent milk replacer. Milk should be between 60°F and 104°F. Milk rations should be increased by 25% when the ambient temperature drops below 50°F or rises above 80°F.

FW 14: Colostrum

- a. It is vital that every newborn calf, including bull calves, receive adequate, quality colostrum from its dam, from another fresh cow, or from a powdered or frozen colostrum source, as soon as possible after it is born and within the first 6 hours of life. 2-4 quarts of colostrum must be administered.

As a precaution to prevent the transmission of Johne's Disease, the pooling of fresh or frozen colostrum from multiple cows is strongly discouraged.

- b. At least 6 quarts of colostrum must be administered by bottle or esophageal stomach tube during the first 12 hours.
- c. Over the next 48 hours, calves should receive at least an additional 6 quarts (6 liters) of colostrum/whole milk daily (3 quarts [3 liters] daily for Jersey calves) divided into at least two feedings.

FW 15: First feeds; fiber and water

- a. All calves must receive milk or milk replacer at least twice daily through the first five weeks of life.
- b. If calves are bucket fed, each calf must have access to an individual bucket.
- c. Unweaned calves must have access to palatable calf starter after 8 days of age.
- d. Milk replacer must be mixed according to the manufacturer's instructions.
- e. Calves should not be weaned until they are eating adequate quantities of calf starter (at least 1.5 lbs/calf/day of a calf starter ration.).
- f. When a calf is more than more than 30 days old, it must have daily access to feed or forage material containing sufficient digestible fiber to stimulate the development of its rumen.

It is recommended that milk such as hospital milk be pasteurized prior to being fed to calves.

FW 16: Weaning

- a. Calves must not be weaned before five weeks of age. Nutritional weaning (ceasing to feed milk or milk replacer) must be accomplished gradually by either diluting the milk with water or reducing the milk volume over a period of at least 5 days.
- b. Removal of calves from individual pens into social groups should not coincide with weaning. Both of these practices are stressful to the animals and should be carried out separately.

FW 17: Brought-in calves

- a. On arrival, calves acquired to be raised as replacement heifers must not be mixed with calves from other sources until their health status has been determined.
- b. Acquired calves must be rested in comfortable conditions.

FW 18: Social groupings

- a. Individual stalls for suckling calves are acceptable from a health standpoint
- b. When suckling calves are housed in group pens, appropriate devices, such as artificial nipples, should be available to reduce inappropriate suckling behavior.
- c. The group socialization of calves should be completed by 8 weeks of age.

FW 19: Teat system of feeding

If a teat system of calf feeding is used, teats must be arranged so that a calf's neck is positioned at least horizontally or with a slight upward tilt.

FW 20: Preventing inappropriate suckling

- a. Calves must not be muzzled or physically altered to prevent suckling. Weaning nose rings and nose-tabs are prohibited.
- b. Alternative devices such as artificial nipples are encouraged.

C. Water

FW 21: Water supply

All cattle, including calves, must be provided with free access to an adequate supply of clean, fresh drinking water each day, except when directed by a veterinarian.

Providing water to calves promotes cooling in hot weather, and helps prevent dehydration due to diarrheal disease.

FW 22: Watering equipment

- a. Water troughs must be kept clean.
- b. Water sources must be protected from freezing.

- c. Automatic systems must be checked daily to ensure that they are dispensing water.
- d. Water troughs must not result in wetting/fouling of the bedded areas and must be accessed from concrete, or other non-slip footing, when possible.
- e. At pasture, the area around water troughs should be managed to avoid excessive accumulation of mud/moisture around the trough and, if necessary, troughs should be placed on concrete aprons.

Troughs should be at a height comfortable for the cow to drink from (24 inches -30 inches). Ideally, water temperature should be between 62°F and 82°F.

FW 23: Water for cattle on pasture

- a. When cattle are kept primarily on pasture, clean fresh water must always be available.
- b. Natural surface water sources are not recommended but, if used, care must be taken to avoid potential disease risk.
- c. Potential contamination of rivers, ponds or streams with cattle feces must be taken into account in planning water supply for cattle.
- d. Local, state and federal laws must be adhered to when allowing cattle access to running or still water resources.

FW 24: Emergency water supply

Provisions must be in place to ensure an emergency supply of suitable drinking water in case normal supplies fail (e.g., in cases of freezing or drought).

PART 3: ENVIRONMENT

OBJECTIVES: *The environment in which livestock are kept must take into account their welfare needs, be designed to protect them from physical and thermal discomfort, fear, and distress, and allow them to perform natural behaviors.*

A. Buildings

E 1: Facility design

Where management systems, designs or layout of facilities not covered in the HFAC Animal Care Standards are being employed or considered, these must be referred to, and discussed with the HFAC staff before they can be considered for certification.

E 2: Records of features of facilities that promote animal welfare

For all buildings, key points relating to welfare must be recorded in the farm logbook or on the farm site plan. These must include:

1. Total floor area;
2. Number of freestalls or size of bedded area;
3. Maximum capacity of cattle in relation to age, weight, feeding and drinking, and bedding space.

If practical, this information should be displayed at or near to the entrance to each building.

E 3: Preventing injuries from environmental causes

- a. There must be no physical features of the environment that cause injuries to the animals that can be avoided.
- b. In both indoor and outdoor systems, there must be no recurrent injuries on cattle that could be attributed to physical features of their environment (injury is defined as damage severe enough for the formation of granular scar tissue and to an extent significantly greater than would be caused by accidental bumps and scratches).

Excessive occurrence of the following may be indicators of environmental problems:

<i>Neck calluses</i>	<i>Chronic scar tissue</i>
<i>Knee, hock, swellings/callus</i>	<i>Soft feet</i>
<i>Teat/udder injuries</i>	<i>Interdigital infections</i>
<i>Broken tails</i>	<i>Laminitis</i>
<i>Hematomas</i>	<i>Abscesses</i>
	<i>Bruised soles</i>

E 4: Handling Pens

Particular attention must be paid to handling pens.

1. Floors must be made of non-slip material or be maintained so as to reduce the risk of slipping (sand, mats or other material applied when necessary).
2. Floors must never be so rough as to cause hoof damage or so smooth as to result in slipping.
3. Smooth concrete floors should be grooved approximately 1/3”- 1/2” or treated with a non-slip coating/belting.
4. Handling pens must be well maintained and free of broken parts and sharp edges.

It is recommended that rubber flooring be used in areas where animals spend the most time standing – particularly in front of the feedbunk, in the milking parlor and in the parlor's holding area.

E 5: Limiting the use of toxic substances in buildings

- a. Except when preservatives with an insecticidal or fungicidal role are used, cattle or calves must not come into contact with toxic fumes from surfaces with paints, wood preservatives, or disinfectants.
- b. Creosote must not be used in areas where the animals have direct contact with the material.

E 6: Electrical installations

All electrical institutions at main voltage must be:

1. Inaccessible to cattle;
2. Well insulated;
3. Safeguarded from rodents;
4. Properly grounded; and
5. Regularly tested.
6. In adherence with local building codes.

E 7: Height of buildings

Buildings must be of a height adequate to allow the normal expression of mounting behavior during estrus.

E 8: Design of passageways

- a. Passages must be of such design and width, and so constructed, to allow two animals to pass freely.
- b. Care should be taken to minimize the number of, and ideally exclude, blind alleyways in the buildings, to avoid bullying by dominant animals.
- c. Farm alleyways must be maintained to prevent damage to the animals' hooves.

E 9: Cleaning and disinfection

Internal surfaces of housing and pens must be made of materials that can readily be cleansed, disinfected or easily replaced when necessary.

B. Thermal environment & ventilation

E 10: Thermal conditions

The thermal environment must not be so hot or so cold as to cause distress. Appendix 2 contains the Temperature Humidity Index for lactating dairy cows, which contains the values at which cattle become distressed.

E 11: Ventilation

Buildings must be ventilated effectively, so as to permit air movement at low velocity while avoiding drafts and entrance of rain and snow.

C. Aerial Contaminants

E 12: Air quality

- a. Provisions must be made to ensure that, when cattle are housed, aerial contaminants do not reach a level at which they are noticeably unpleasant to a human observer (as specified by the Occupational Safety and Health Administration).
- b. Where climatic conditions require cattle to be housed for a period of time, the ammonia concentration should not exceed 25 ppm.

Inhalable dust should not exceed 10mg/m³).

E 13: Relative humidity

Building ventilation must aim to achieve a relative humidity below 80% when ambient conditions permit.

The objective is to provide a large volume of air and high ventilation rates to remove moisture produced by the stock and to reduce the number of airborne pathogens being passed from animal to animal.

Factors contributing to good ventilation include sufficient and correctly positioned air inlets and outlets and correct air inlet-outlet height differential.

Professional advice should be sought if ventilation problems are encountered.

E 14: Partially roofed shelters

When cattle are kept confined in partially roofed units they must be provided with:

1. Effective protection from the wind and
2. A dry comfortable, lying area.

E 15: Shade

- a. During hot summer conditions (daytime temperatures consistently above 85°F) a shaded area with proper ventilation must be accessible to all cattle simultaneously.
- b. If daytime summer temperatures are consistently above 85°F, shade, fans, misting/fogging systems or other cooling equipment must be provided.

- c. Shade structure must be designed to accommodate all animals simultaneously. Examples would be to allow animals back into buildings or to utilize natural shade such as trees.

D. Lying area/space allowances

E 16: Freedom of movement

- a. Except as noted in E21, all cattle must at all times have:
 - 1. Sufficient freedom of sideways movement to be able to groom themselves without difficulty;
 - 2. Sufficient room to lie down and freely stretch their limbs; and
 - 3. Sufficient room to rise and turn around.
- b. Tethering of cattle is prohibited.

E 17: Lying area

- a. Cattle kept in dry lots must have access at all times to a lying area that is well drained or well maintained and that is of sufficient size to accommodate all cattle lying down together in normal resting posture.
- b. During periods of prolonged wetness, mud must be managed so the depth of mud in the loafing area is not excessive or sufficient to cause cattle difficulty walking to and from feeding and watering areas. Mud over hoof depth is not allowed in lying areas, passageways, or adjacent to waterers or feeding areas.

E 18: Freestalls

- a. When using freestalls, group size must not exceed the number of available freestalls.
- b. Free stall housing must provide a clean, dry and comfortable bed.
- c. A 'loafing' area must be provided.
- d. Unbedded areas must be slatted, concrete, or packed earth, and manure must be removed at least once daily.
- e. Slats must not result in injury to hooves.

Cows nearing parturition should be offered 120% of the required space allowance (80% of the required stocking density).

E 19: Loose housing

- a. Loose-housed, growing cattle must be grouped according to size and age.
- b. The space allowance for cattle housed in groups must take into account:
 - 1. The presence or absence of horns.
 - 2. The size of the group.
- c. Minimum space allowance is 60 sq.ft. per mature cow, and all cows must be able to lie down simultaneously.

E 20: Space allowance

The space allowance for cattle housed in groups must be calculated in relation to the whole environment, the age, sex, live weight and behavioral needs of the stock, taking account of the presence or absence of horns and the size of the group.

E 21: Confinement

Cattle must not be closely confined except in the following circumstances. On these occasions cattle should not be confined for greater than 4 hours, unless directed by the veterinarian:

1. For the duration of any examination, routine test, blood sampling, veterinary treatment;
2. While they are being fed;
3. For the purpose of marking, washing, or weighing;
4. While facilities are being cleaned;
5. During artificial insemination;
6. Awaiting entry into the milking parlor
7. In the milking parlor; or
8. Awaiting loading for transportation.

E. Housing for Cattle

E 22: Housing Design

- a. Tie stall or stanchion barns are prohibited as a means of housing.
- b. Natural shelter with windbreaks, sunshades, a treatment facility for sick/injured cattle, and calf housing will be considered.
- c. All fencing including gates must be adequately inspected and maintained.
- d. In particular, electrical fences must be designed, installed, used and maintained so that contact with them does not cause more than momentary discomfort to the cattle.

Renovated tie stall barns may be used for milking procedures only, and HFAC will review and assess the individual farm for compliance with the standards.

E 23: Management of housing

- a. Animals must have access to housing that provides a clean, dry and comfortable bed, free from contamination with feces or urine.
- b. A cow must be able to lie down in a normal position without risk of being stepped on or kicked by other cows.
- c. Bedding:
 1. Adequate clean bedding must be provided at a minimum depth of 3 inches.
 2. Cow mattresses (not the solid type) may be used with a minimum of 1 inch of bedding to absorb moisture.

When handled properly, many fibrous and granular bedding materials may be used, including long or chopped straw, hay, sand, sawdust, shavings, and rice hulls. Inorganic bedding materials (sand or ground limestone) provide an environment that is less conducive to the growth of mastitis pathogens. Sand bedding may also keep cows cooler than straw or sawdust.

- d. Cows and calves must be kept clean.

There is a serious problem if more than 5% of the cows have soil on their bellies or udder. Bedding must not transfer soil onto the cows.

E 24: Design of freestalls

- a. The stall must be constructed so that it prevents the animal from standing so far forward that it consistently soils the back of the stall.

A 4% slope downward from front to rear is recommended.

- b. Cows must be able to change position from standing to lying and vice versa in a normal manner without difficulty or injury.
c. A forward lunging area must be provided of a minimum of 2 feet
d. When lying, all of the cow's body must fit on the bed including the hocks and the udder.
e. Freestalls must be designed to align cows properly, and must prevent interference with or injury to a cow's neighbor or herself.

E 25: Step design

- a. The step between the freestall bed and the dung passage must avoid slurry being pushed into the bed during scraping and must encourage cows to enter the cubicle head-first.
b. The height of the step must not be such that it results in increased incidence of concussion injuries to soles.

E 26: Preparation for calving and milking

Cows, especially heifers, must be adequately prepared for calving and subsequent milking by early introduction to:

1. Pre- and post-calving housing and
2. The production ration.

E 27: Monitoring introduced animals

Heifers should be closely monitored when introduced into an established herd of cows.

When problems exist with freestalls (e.g., animals refusing use, becoming stuck in or lying half-in and half-out of them, or recurring animal injury due to poor design), professional advice must be sought.

F. Lighting

E 28: Sufficient light in buildings

When cows are housed, adequate light, whether fixed or portable, must be available to enable them to be thoroughly inspected at any time.

E 29: Light intensity for cows housed indoors

Housed cows must be provided with light comparable intensity to natural light, during the normal period of daylight hours.

G. Calving Environment

E 30: Calving areas

Cows must calve in clean, dry areas with free access to water.

Cows should be moved to the maternity area when close to parturition.

When housed, there must be enough calving space to accommodate the number of cows calving.

E 31: Calving pen design

When calving cows are kept confined in a building, the following must apply:

1. They must be provided with a clean, dry bedded area that is equipped with a means of restraint and adequate lighting that permits a person to attend the cows and their calves safely if necessary;
2. Feed and water must be available;
3. Close-up cows must be kept separate from other cattle or other species of livestock.

E 32: Environmental conditions

Insulation, heating and ventilation of buildings must ensure that air circulation, dust level, temperature, air relative humidity, and gas concentrations are kept within limits which are not harmful to calves.

E 33: Surfaces suitable for cleaning

Internal surfaces of calving and hospital pens must be of materials that are easily cleaned. Surfaces should be smooth and impervious.

H. Milking Parlor

E 34: Milking parlor hygiene

The highest standards of hygiene must be practiced in the parlor to reduce risk of infection:

1. Cows must be clean at milking, paying particular attention to udders and teats;
2. Udder, teats and flanks should be clean, dry and free from sores on entry to the parlor;
3. Parlor staff must have clean hands when handling teats.

- a) Consideration should be given to the use of clean rubber gloves.
- b) Single-use udder cloths should be used;
4. All cases of mastitis must be treated promptly and underlying predisposing factors corrected;
5. When the mastitis rate exceeds the target figure of a 2-month period then the specific organisms involved must be identified;
6. Cows with mastitis should be marked and milked last with milk discarded or pasteurized. Alternatively, they may be milked with a separate cluster and bucket;
7. Herd somatic cell counts, individual clinical cases of mastitis and mastitis tube usage must be monitored and recorded. Records must be kept of all medications used and withdrawal times observed;
8. Milking machinery must be properly maintained;
9. All teats must be treated with an approved teat disinfectant. An emollient must be used when teats are dry, chapped or cracked;
10. Following completion of milking, cows must be encouraged to remain standing for approximately half an hour to allow the teat canal sphincter to close;
11. Measures must be in place to minimize the risk/incidence of mastitis in dry cows.

E 35: Milking machines

- a. Milking machine testing must be carried out at least once every 6 months.
- b. Proper application, function and maintenance of the milking machinery must be ensured, by practicing the following:
 1. Avoid under and over milking;
 2. Select appropriate teat cup liners;
 3. Check teat cup liners daily and replace damaged/rough teat liners;
 4. Exchange liners according to manufacturer's recommendations;
 5. Ensure correct pulsation rate and a correct release/squeeze ratio;
 6. The vacuum regulator must be functioning correctly and vacuum fluctuation must be prevented.

I. Dairy

E 36: Dairy requirements

The dairy must meet the State and Federal Milk Ordinance requirements.

J. Bull pens

E 37: Bull pen management

- a. Bull pens must be sited so as to allow the bull sight, sound and odor of other cattle and general farm activity.
- b. Bulls must be attended to at least daily by farm staff.

E 38: Bull pen design

- a. Individual accommodation for an adult bull of average size must include a bedded sleeping area of not less than 144 sq. ft. (e.g., 12' by 12').

- b. For very large bulls, the sleeping area must not be less than 9 sq. ft. for each 132 lbs. of live weight.
- c. An exercise area must be provided at no less than 300 sq.ft.
- d. The service area must have a non-slip surface.
- e. Bull pens must be safe for the stock keepers tending the bulls. Adequate restraining facilities and an escape route must be provided.

K. Handling facilities

E 39: Passageways

- a. Alleyways and gates must be designed and operated so as not to impede the movement of cows.
- b. When operating gates and catches, every effort must be made to reduce excessive noise, which may cause distress to the animals.
- c. If noise from the equipment is causing the animals distress, noise reduction mechanisms must be installed.
- d. Flooring must be non-slip.

L. Specific Provisions for Calves

E40: Dairy calves

On-farm killing or euthanasia of healthy dairy bull and heifer calves is prohibited.

E 41: Facilities for stressed calves

- a. Managers must take proper precautions to prevent and manage hypothermia in young calves.
- b. While healthy young calves can tolerate low air temperatures, newborn animals, calves that have been transported or deprived of food, and sick calves are particularly susceptible to hypothermia. Hypothermia and additional stress must be minimized in susceptible calves by housing them in a well-ventilated building, by the use of thick, dry bedding, and by avoidance of drafts or provision of supplemental heat.

E 42: Quarantining calves

When there is a high risk of infectious disease, consideration must be given to quarantine for a period of time as recommended by the veterinarian.

E 43: Light requirements for calves

- a. Calves must not be kept in total darkness.
- b. To meet their behavioral and physiological needs, appropriate natural or artificial light must be provided; if the latter, it must function for a period at least equivalent to the period of natural light normally available between 9 a.m. and 5 p.m.
- c. In addition, suitable lighting (fixed or portable) strong enough to allow the calves to be inspected at any time, must be available.

E 44: Locating calf pens for quarantine

Location or placement of individual calf pens used for quarantine must be such that each calf has an opportunity to see and hear other calves.

Group housing or pair housing of calves as early as two weeks is encouraged. Calves are social herd animals and group pens provide them with the opportunity to socialize and exhibit natural behaviors. Freedom of movement and exercise are also enhanced in group pens.

E 45: Outdoor access

After weaning, calves must be housed in groups of similar age and size and be allowed regular access to outside, weather permitting.

M. Calf hutches

E 46: Calf hutches or individual pens

- a. Calf hutches or individual pens must be of a size appropriate for the age, size and breed of the animal.
- b. Individual pens or hutches must not be used to house calves older than 8 weeks of age.
- c. The calf must be able to stand up, turn around, lie down, rest and groom itself without hindrance.
- d. Tethering of calves is prohibited.
- e. Calves must have access at all times to a lying area that is:
 1. Of solid construction (i.e. not perforated or slatted)
 2. Bedded to provide a comfortable, clean, dry area sufficient to avoid discomfort; and
 3. Sloped as necessary to provide drainage.
- f. There must be enough bedding in the hutch to exclude any drafts, and to keep the calves clean.

There is a serious problem if more than 5% of the calves are soiled on their belly. Bedding must not transfer soil onto the calves.

- g. Hutches or pens must be arranged so that calves may see and hear other calves in neighboring units.
- h. Hutches or pens must be made of material that minimizes heat stress and wide temperature fluctuations.
- i. Hutches or pens must be sufficiently ventilated to remove excess humidity, ammonia and condensation, while at the same time eliminating drafts but retaining constant air circulation.
- j. Hutches or pens must be placed on a free draining base and affixed to the ground, when necessary, to prevent movement in high winds.
- k. Hutches or pens must be sited in a sheltered location, away from prevailing weather.
- l. Hutches or pens must be made of materials that are constructed to facilitate cleaning and disinfection.
- m. An outdoor exercise area must be provided, weather permitting.

PART 4: MANAGEMENT

OBJECTIVES: *A high degree of caring and responsible management is vital to good animal welfare. Managers and caretakers must be thoroughly trained, skilled and competent in animal husbandry and welfare and have a good working knowledge of their system and the livestock under their care.*

A. Managers

M 1: Farm Plan

All records, checklists, health plans, contingency plans, farm pest control plans, written standard operating and emergency procedures, policies and publications that the HFAC Animal Care Standards for Dairy Cattle require the producer to keep and maintain, must be made available for the HFAC Inspector.

M 2: Understanding the standards

Managers must ensure that

1. All stockpersons have a copy of the *Humane Farm Animal Care Animal Care Standards for Dairy Cows*;
2. They and the stockpersons are familiar with the standards; and
3. They and the stockpersons understand the standards.

M 3: Management and record keeping activities

Managers must:

1. Develop and implement a suitable training program for stock keepers, with regular updates and opportunities for continuing professional development.
Producers/Managers must be able to demonstrate that staff with responsibilities for stock care have the relevant and necessary skills to perform their duties and, if necessary, are given the opportunity to participate in an appropriate form of training;
2. Develop and implement plans and precautions to cope with emergencies such as fire, flood, or interruption of supplies and post emergency contact numbers by phones and entrances to buildings;
3. Provide an Emergency Action Plan, highlighting procedures to be followed by those discovering an emergency such as fire, flood, or power failure, sited in an easily accessible location, which must include:
 - a) Procedures to be followed by those discovering such an emergency;
 - b) The location of water sources for use by the fire department;
 - c) An address, map grid (GPS) reference, and/or postal code to easily locate the unit.
4. Ensure the Animal Health Plan (see H1) is implemented and regularly updated and that the required data are recorded appropriately;
5. Maintain and make available to the *Humane Farm Animal Care* Inspector, records of production data and use of medications. These records must include

- documentation on all incoming and outgoing stock on the farm, as well as types and quantities of medicines used;
6. Ensure cull cows are fit for transport to their final destination.

M 4: Mitigating problems

- a. Managers must understand the times and circumstances in which cattle are prone to welfare problems on their unit.
- b. Managers must be able to demonstrate competence in recognizing and dealing with these problems.

M 5: Awareness of the welfare implications of management practices

- a. Managers must be aware of the welfare implications of calving, injection, oral dosing, dehorning, identification procedures, castration, foot trimming, breeding procedures, and extra teat removal.
- b. They must also be aware of welfare concerns related to breeding, particularly the selection of suitable bulls, semen and embryos for use in heifers.

M 6: Training

- a. Prior to being given responsibility for the welfare of livestock, employees must be properly trained and/or have enough experience appropriate to their job responsibilities, and:
 1. Be able to recognize signs of normal behavior, abnormal behavior, and fear;
 2. Be able to recognize signs of common diseases and know when to seek help;
 3. Have a basic knowledge of body condition scoring;
- b. In addition, any dairy herdsman or manager must be properly trained or have the experience appropriate to their areas of responsibility and be able to demonstrate the ability to achieve the above plus the following:
 1. Knowledge of what constitutes proper nutrition in cattle;
 2. Understanding of functional anatomy of the normal foot, and its care and treatment;
 3. Understanding of the functional anatomy of the normal teat and udder;
 4. Knowledge of calving and the care of the newborn calf;
 5. Understanding of fundamental principles of cattle breeding and genetics;
 6. Understanding the requirements for good parlor hygiene and a well-maintained milking machine.
- c. Formal or on-the-job training should be made available to staff (including temporary and part-time employees).

M 7: Compassionate treatment

- a. Managers must be able to demonstrate competence in handling animals in a positive and compassionate manner.
- b. Managers must be able to demonstrate their proficiency in procedures that have the potential to cause discomfort (e.g. injections, foot trimming, dehorning, castration, and marking).

M 8: Complaints to Operators

- a. To be certified, an Operation must maintain systems for receiving, responding to, and documenting complaints alleging the Operation's failure to comply with *Humane Farm Animal Care* standards (ISO §15).
- b. Whenever an Operator receives a complaint, the Operator must:
 1. Take appropriate action to respond to the complaint; and
 2. Correct any deficiency in products or services that affect their compliance with requirements for certification.
- c. Written records must be retained by the Operation for a minimum of 3 years from the date of the records' creation. Records must contain information documenting:
 1. All complaints received (written or verbal),
 2. Actions taken by the operator to respond to the complaint.
- d. These records must be made available to *Humane Farm Animal Care* upon request. *Humane Farm Animal Care* will review these records at least annually, during the operation's annual inspection.
- e. If a farm operation has "organic" or "natural" certification, operators must notify *Humane Farm Animal Care* if an adverse ruling related to the operation's status (such as suspension or revocation of certification, fine, or sanction) is levied against the operation by another certifier or by a governmental program that regulates the industry.

The complaints log is ONLY for recording if someone makes a complaint to a producer about their compliance with the HFAC Standards.

B. Handling

M 9: Quiet handling

Animals must be handled with care and in a manner that imposes the minimum possible stress on the animals. When moving cattle, facility design and the surrounding environment must be considered. Handlers should strive to move cattle at a slow, comfortable pace and refrain from using loud noises to move cattle or hitting them in a manner that might cause injury.

M 10: Anticipating animal stress factors

Animal handlers must be trained and must understand the likely stressors that cattle may be subjected to; be knowledgeable about how cattle react toward other cattle, toward humans and to strange noises, sights, sounds and smells.

Dairy cows have the following behavioral characteristics, which must be taken into consideration when cows are moved:

- *They have a wide field of vision and may startle if they see moving objects, even at long distances.*
- *They have acute hearing, so they should not be subjected to loud noises.*
- *They are herd animals and, if possible, should not be left in isolation.*

M 11: Handling in passageways

- a. Cattle must not be driven unless the exit or the way forward for the lead cow is clear.
- b. The animal must not be rushed or run along alleyways, passageways, or through gateways.

M 12: Benign handling

- a. Sticks and flags may be used as benign handling aids, i.e., as extensions of the arm.
- b. Sticks must not be used for hitting cattle.
- c. Animals must not be pulled or lifted by the tail, skin, ears, or limbs.
- d. Aggressive tail twisting (e.g. jacking) can cause tails to break, especially in young animals, and is prohibited.
- e. Calves may only be moved by lifting, walking them, or other conveyance; pulling or dragging is specifically prohibited.
- f. The use of electric prods is prohibited.

M 13: Equipment

A cattle handling unit must be available, comprising a collecting system and a method of restraint, appropriate to the type, environment, and number of stock to be managed.

M 14: Calving aids

- a. Calving aids must only be used to assist a delivery and not to produce a calf as quickly as possible.
- b. Before any type of calving aid is used, the cow must be examined to ensure that the calf is of a size when natural delivery can be reasonably expected, without causing undue pain and distress to either the dam or the offspring.

M 15: Dipping Navels

Newborn calves navels must be dipped in an effective antiseptic solution as soon as possible after birth.

M 16: Rapid diagnosis and treatment

- a. All efforts must be made to ensure a rapid and proper diagnosis/treatment of any sick animal.
- b. If the animal does not respond, euthanasia must be considered.
- c. No animal can leave the farm or be transported unless it is able to walk unassisted.

M 17: Non-ambulatory Animals

- a. All non-ambulatory animals must be treated or euthanized without delay.
- b. Appropriate equipment (e.g. sling or harness, sled, bucket of a front end loader, floatation tank, or stone boat) must be available on the dairy to move an injured or non-ambulatory animal. Whatever type of lifting gear is used on a recumbent animal, care must be taken not to cause unnecessary pain or distress to the animal.
- c. Hoisting by chain, dragging, lifting without complete body support, and other means that can cause further physical damage are prohibited.
- d. The use of hip-lifters is permitted only for emergency, short-term assistance.
 1. Cattle must never be left unattended when hip-lifters are in use.

- e. Hind leg hobbles may be used when necessary to prevent cattle from becoming non-ambulatory (splitters). Cattle that require hobbling to walk must not be transported.
- f. All non-ambulatory and injured animals must be provided with deep bedding, secure footing, shelter from adverse weather, and accessible water and feed.
- g. Where the prognosis for recovery of a non-ambulatory animal is poor, early intervention by euthanizing the animal on farm must be undertaken.

For acceptable methods of moving non-ambulatory cattle refer to the American Meat Institute's Guidelines (available at <http://www.animalhandling.org>).

C. Identification

M 18: Identification equipment

- a. If neckbands, tail bands, ear tags or leg bands are used for identification purposes, they must be fitted with care and adjusted as required to avoid unnecessary pain or distress.
- b. Face branding of any type is prohibited.
- c. Ear notching is prohibited (unless required for health testing by the state vet or the federal government).
- d. Wattling/waddling and ear splitting are prohibited.

M 19: Marking

Marking of cattle for identification and other purposes must be done with care by trained, competent operators so as to avoid unnecessary pain or distress to the animals, both at the time of marking and subsequently.

Research has shown that while both hot branding and freeze branding are painful procedures, there is some indication that freeze branding may be less painful.

M 20: Temporary marking

Methods used for temporary marking must be non-toxic (e.g., crayons, paint, and chalk markers especially developed for livestock).

D. Equipment

M 21: Using equipment

When equipment is installed that affects animal welfare, managers must be able to:

1. Demonstrate their ability to operate the equipment properly;
2. Demonstrate their ability to carry out routine maintenance;
3. Recognize common signs of malfunction; and
4. Demonstrate knowledge of actions to be carried out in event of a failure.

M 22: Automatic equipment

All automatic equipment must be thoroughly inspected by a stock keeper or other competent person, not less than once each day to confirm that there are no defects. When a defect is found in automatic equipment:

1. The defect shall be rectified promptly; or
2. If this is impracticable, measures must promptly be taken (and must be maintained until the defect is rectified) as required to safeguard livestock from suffering unnecessary pain or distress as a result of the defect.

M 23: Automatic ventilation equipment

When automatic equipment includes a ventilation system, the system must contain:

1. An alarm that will give adequate warning of the failure of that system and will operate even if the principal electricity supply to it has failed;
2. Additional equipment or means of ventilation (whether automatic or not) which, in the event of a failure of the ventilation system, will provide adequate ventilation so as to prevent livestock from suffering unnecessary distress as a result of the failure.

E. Inspection

M 24: Monitoring

Managers must inspect their livestock and the equipment upon which such stock depend at least daily.

F. Farm Dogs

M 25: Managing stock dogs

- a. Dogs, including working dogs, must be properly trained, must not cause injury or distress to cattle and must be kept under control at all times.
- b. Dogs are not permitted in the milking parlor.

PART 5: HERD HEALTH

OBJECTIVES: *The environment in which livestock are housed must be conducive to good health. All producers must develop a health plan in consultation with their veterinarian.*

A. Health Care Practices

H 1: Animal Health Plan

- a. An Animal Health Plan (AHP) must be drawn up and regularly updated in consultation with a veterinarian.
- b. The AHP (which is part of the Farm Plan) must include details of:
 1. Nutrition program;
 2. Vaccination program;
 3. Parasite prevention;
 4. Biosecurity and infectious disease protocols, including tolerance limits on overall herd performance;
 5. Lameness prevention/foot care procedures;
 6. Mastitis prevention and treatment protocols;
 7. Non-ambulatory (downer) animal procedure; and
 8. Euthanasia for culling and emergencies.
- c. Records must be kept of all medical/animal health procedures that are performed.

H 2: Mitigating health problems

All sudden deaths, disease outbreaks and euthanasia must be recorded and investigated (in consultation with a veterinarian) when appropriate. The outcome of that investigation and any subsequent actions should be recorded.

H 3: Health monitoring

- a. The herd must be continually monitored for performance including: production diseases, infectious diseases, and injury as a result of housing/husbandry/handling. For example:
 - Metabolic Disorders (hypocalcemia, hypomagnesemia, ketosis, displaced abomasum, laminitis, bloat, acidosis)
 - Septicemia
 - Enteritis
 - Problems at calving
 - Repetitive physical injury
 - Lameness
 - Calf scours
 - Mastitis
 - Respiratory diseases
 - Body condition

- Non-ambulatory animals
- b. If any herd performance parameters fall outside tolerance limits identified by the producer and their veterinarian, the veterinarian must be informed and management practices adjusted to try to resolve the problem.

H 4: Segregation pens

- a. Provisions must be made for segregation and care of sick and injured animals.
- b. Any cattle suffering from illness or injury must be treated without delay, and veterinary advice sought when needed. If necessary, such animals must be euthanized.

In some circumstances, segregation is not feasible or may disrupt the social hierarchy or cause additional stress to the animal. The advantages of segregation should be weighed against its disadvantages, especially for mild illnesses or injuries that can be easily managed.

- c. Hospital pens must be of a size that is appropriate for the age, size and breed of the animal.
 - 1. The animal must be able to stand up, turn around, lie down, rest and groom itself without hindrance.
 - 2. Water, feed and shelter must be readily accessible at all times, unless otherwise directed by the veterinarian.
- d. Water and feed must also be readily available to non-ambulatory animals, even if they are not housed in a hospital pen.
- e. Urine and dung from hospital pens in which sick and injured animals are housed must be disposed of so as to not spread infection to other stock.
- f. Pens must be constructed to facilitate effective cleaning and disinfection of surfaces and the possible removal of a carcass from the area.
- g. Provisions for milking segregated lactating cows must be made.

H 5: Managing brought-in animals

Replacement animals brought in from other sources must be quarantined when necessary, vaccinated, and/or appropriately treated for disease, illness, parasitic infestation, or other health-related problems, in accordance with the AHP (or standard operating procedures or other written description of how this is to be done) before integration into the herd.

H 6: Mitigating behavioral problems

If abnormal behaviors develop repeatedly and inhibit normal functioning of the animal in any particular pen, a program of modification and enrichment must be agreed on with the farm veterinarian and pursued until the problem is overcome.

Abnormal behaviors include:

- *Repeated rubbing in the absence of disease (except for the repeated rubbing of brushes designed for that purpose).*
- *Tongue rolling/aerophagia*

- *Bar biting/chewing*
- *Pica (licking/chewing solid objects)*
- *Eating soil/sand/dirt*
- *Navel sucking*
- *Ear sucking*
- *Urine drinking*

H 7: Controlling parasites and predators

- a. It is essential that all practical measures be taken to prevent or control external and internal parasites as set forth in the Animal Health Plan.
- b. When developing and implementing farm pest and predator control plans, physical exclusion methods and the removal of elements in the vicinity of livestock that might encourage the presence of pests and predators must be included.

Methods of physical exclusion and discouragement of pests and predators include:

- *Construction/maintenance of fencing appropriate for excluding the pests/predators in question*
- *Removal of shelter/cover (e.g., weeds) in the area surrounding livestock buildings*
- *Removal/protection of obvious food sources*
- *Maintenance/proofing of buildings against pest and predators.*

H 8: Foot care – preventing lameness

- a. Close attention must be paid to the condition of the feet. The feet of all cattle must be inspected for signs of abnormal wear, infection or excessive growth at least annually, or as required by a competent hoof trimmer.
- b. Producers must demonstrate methods for prevention of acute hoof conditions. These methods include traditional footbaths, sponge baths or individual spray therapy.
- c. Preventive hoof care practices must be addressed in the Animal Health Plan.
- d. It is essential that every animal be inspected for hoof condition and lameness at least once annually.
- e. As an aid to assessing the status of lameness in the herd, locomotion scoring should be performed and recorded on a semi-annual basis. See Appendix 3, Locomotion Scoring Chart. The HFAC auditor will review locomotion scoring records.

Lameness in lactating cows should be under 5% of the cows. When scoring, a cow should be considered lame if she scores a 3, 4, or 5 using the ZinPro Locomotion Scoring Chart (Appendix 3).

Producers can reduce the occurrence of lameness in their herds by:

- *Minimizing exposure to concrete floors. In addition to increasing time on good quality, dry pasture, consider bedding pack and composting pack barns.*
- *Keeping all walking areas clean, dry and free of slurry.*
- *Ensuring stalls are spacious and comfortable, that cows are lying in the stalls and that they are able to rise and lie down without encumbrance.*
- *Balancing the feed ration to prevent sub-clinical rumen acidosis and providing excellent bunk management with good feed access and frequent feed push-ups.*
- *Avoiding feeding large amounts of concentrate in a single feeding.*
- *Providing fresh feed more often throughout the day.*
- *Develop a lameness prevention strategy with input from experts such as the producer's veterinarian and nutritionist.*

H 9: Drying off period

There must be a minimum dry period of 60 days.

H 10: Physical alterations

- a. The only potentially injurious husbandry procedures permitted under the *Humane Farm Animal Care* Animal Care Standards are as follows (exceptions include procedures performed for therapeutic purposes by a veterinarian):
1. Removal of supernumerary teats using pain control may be conducted up to breeding age.
 2. Disbudding may be conducted during the first 3 weeks of age, using a hot iron; pain control must be used.
 - a) Cautery paste may be used to disbud calves that are no older than 7 days of age, with the paste being applied by a person who is proficient in the process, and pain control must be used.

Great care must be taken in applying the paste: hair around the horn bud must be clipped, paste must be applied only to the horn bud and rubbed in well, and petroleum jelly must be applied in a ring around the horn bud to prevent the paste from running. It is not recommended to carry out this procedure in wet conditions.

- b) The following methods are prohibited:
1. Sawing
 2. Banding
 3. Embryonic wires; and
 4. Other methods not designed for the purpose of disbudding/dehorning.
- c) The removal of horns from mature cattle must:
1. only be performed by a veterinarian, using a combination of sedative, local anesthesia and anti-inflammatory.
 2. not be a routine procedure.

Use of polled sires avoids the need for dehorning.

3. It is strongly recommended that if bull calves are to be castrated, this should be performed at the earliest possible age.
 - a) Castration may be accomplished by the application of a band (rubber ring) up to 7 days of age.
 - b) Between 7 days and 6 months of age, other banding methods, such as “Calicrate” or “E-Z Bander” may be used only with pain control.
 - c) Calves up to 6 months of age may be castrated using surgical castration, emasculator, or spermatic cord crush (Burdizzo clamp), and pain control must be used.
 - d) Surgical castration of bulls over 6 months of age must be performed by a veterinarian using sedation, local anesthesia, anti-inflammatory medication for pain control, and provisions for controlling bleeding.
 4. Tail docking is prohibited. Switch trimming is allowed.
 5. Ear notching is prohibited (unless required for health testing by the state vet or the federal government).
 6. Wattling/waddling and ear splitting are prohibited.
- b. All of these practices must be performed in a way that minimizes suffering and by trained and competent managers. The above procedures:
1. Must not be performed on sick animals;
 2. May only be performed using appropriate, properly maintained equipment.
3. Pain Management: Metacam 20 (Meloxicam) is approved pain management in Canada and Canadian producers must use this for any of the procedures listed above. Metacom has a 96-hour milk withdrawal period.
4. In the U.S. see information below:

Pain management options should be considered keeping in mind that use of unapproved drugs must follow the AMDUCA regulations. Meloxicam tablets administered orally at the rate of 0.45 mg/lb (1 mg/kg) are reported to be a cost-effective means of providing analgesia in cattle. In European countries where Meloxicam is approved, 15-day meat and 5-day withdrawal time for milk is recommended. See Appendix 4 for additional information on pain control methods. In Canada Metacom 20 has a 20 day meat withdrawal period and a 96-hour milk withdrawal period.

Note: Derogation to this standard will only be granted if the farmer can show that they cannot legally obtain sedatives, local anesthetics or similar medications.

H 11: Medicines must be:

- a. Clearly labeled;
- b. Stored in accordance with label instructions;
- c. Kept in a secure store which is safe from animals and unauthorized people;

- d. Kept separate from food producing areas, including the milking parlor;
- e. A person responsible for the management of the medicine storage must be indicated and that person must keep the appropriate records for stock control purposes;
- f. Any medicines used in the U.S.A. must be licensed for use in the U.S.A.

H 12: Induction of parturition

Induction of parturition must never be used as a routine management procedure, but is acceptable on an individual cow basis.

H 13: Ultrasound for pregnancy detection

Non-veterinarians performing rectal ultrasound pregnancy detection must have received appropriate training.

H 14: The use of genetically modified and/or cloned cattle and their offspring is prohibited.

B. Casualty Animals

H 15: Euthanasia

- a. Each farm must have provisions for timely and humane euthanasia of casualty cattle. This can be accomplished on-farm by a named, trained, competent member of farm staff, a slaughterer, or a veterinarian. The method of euthanasia that will be used in each age group of animals must be specified in the Animal Health Plan.
- b. If there is any doubt as to how to proceed, the veterinarian must be called at an early stage to advise whether treatment is possible or whether humane slaughter is required to prevent suffering. If an animal is in severe pain that is uncontrollable, then the animal must be promptly euthanized.
- c. Nothing stated here is intended to discourage the prompt diagnosis and appropriate treatment of any ill or injured animal.

A copy of the AVMA Guidelines on Euthanasia is available on the HFAC website, www.certifiedhumane.org in the Standards section.

H 16: Carcass Disposal

- a. Disposal of carcasses must meet federal, state, and local requirements and regulations.
- b. Disposal of carcasses must be done in a timely manner and using procedures that minimize the impact on the environment and prevent the spread of infectious disease or pathogens.

PART 6: TRANSPORTATION

Objectives: Animal transport systems must be designed and managed to ensure livestock are not subjected to unnecessary distress or discomfort. The transport and handling of livestock must be kept to an absolute minimum. Personnel involved in transport must be thoroughly trained and competent to carry out the tasks required of them.

T 1: Loading facilities

- a. Loading facilities
 1. Should provide a ramp of no more than 25% incline.
 2. Must be clean, and
 3. Must be well lit.
- b. Both loading ramps and tailboards must be fitted with means of preventing the cows from slipping and falling off.
- c. Ramps should be of non-slip footing.

Consideration must be given to providing a loading bay and/or ramp that is well lit and enables animals to walk straight into or out of the vehicle on a level or slight gradient.

T 2: Passageways

- a. Alleyways and gates must be designed and operated so as not to impede the movement of cows.
- b. When operating gates and catches, every effort must be made to reduce excessive noise, which may cause distress to the animals.
- c. If noise from the equipment is causing the animals distress, noise reduction mechanisms must be installed.

T 3: Transport personnel

- a. Personnel in charge of cattle transporters must be able to demonstrate competence in handling cattle when loading and unloading them, and while in transit.
- b. Animal handlers must be knowledgeable about likely stressors and how cattle react toward other cattle, toward humans and to strange noises, sights, sounds and smells.

Dairy cows have the following behavioral characteristics, which must be taken into consideration when cows are moved:

- *They have a wide field of vision and may startle if they see moving objects, even at long distances.*
- *They have acute hearing, so they should not be subjected to loud noises.*
- *They are herd animals and, if possible, should not be left in isolation.*

T 4: Handling in passageways

- a. Cattle must not be driven unless the exit or the way forward for the lead cow is clear.

- b. The animal must not be rushed or run along alleyways, passageways, or through gateways.

T 5: Benign handling

- a. Sticks and flags may be used as benign handling aids, i.e., as extensions of the arm.
- b. Sticks must not be used for hitting cattle.
- c. Animals must not be pulled or lifted by the tail, skin, ears, or limbs.
- d. Aggressive tail twisting (e.g. jacking) can cause tails to break, especially in young animals, and is prohibited.
- e. Calves may only be moved by lifting, walking them, or other conveyance; pulling or dragging is specifically prohibited.
- f. The use of electric prods is prohibited.

T 6: Pre-transport feed and water

- a. All cattle, including calves, must have access to water up to the point of transport.
- b. All cattle, including calves, must have access to food until at least 5 hours prior to loading onto the truck.

T 7: Transport time

The timing of transport for any purpose must be planned between the transporter and producer, and slaughterhouse, if applicable, to minimize traveling and waiting time for the cattle.

T 8: Records of transport

Producers must keep records of transport of animals off their farm, including:

- a. Date of transport
- b. Number of animals transported and their destination
- c. Trucking company
- d. Type of vehicle used

T 9: Casualty animal transport

- a. A sick or injured ambulatory animal may only be transported:
 - a. If it is being taken for veterinary treatment or it is being taken to the nearest available place for humane slaughter; or
 - b. If the said animal is suitable for loading, traveling and unloading (can walk unassisted).
- b. No animal with a BCS of less than 2 may be transported or leave the farm unless for veterinary treatment.

PART 7: PROCESSING

A: Traceability

P 1: Processing Systems (where milk is further processed into dairy products such as milk, butter, cheese, yogurt, ice cream, etc.)

- a. All processing systems where milk from Certified Humane® farms goes to be further processed must be inspected by HFAC for traceability to ensure that:
 1. There is no commingling with non-certified milk or milk products, and
 2. That the Certified Humane® logo is only being used on milk and milk products from Certified Humane® farms.
- b. Standards for processing systems are include in the HFAC Program/Policy Manual, which can be found at www.certifiedhumane.org.

PART 7: SLAUGHTER

A: Slaughter procedures

S 1: For dairies that want to sell their dairy cows as Certified Humane® Dairy Beef, the following must be met:

- a. The slaughter plant must meet the American Meat Institute (AMI) Guidelines (as written by Dr. Temple Grandin). AMI Guidelines can be found at www.certifiedhumane.org under the Standards section.
- b. The slaughter plant must be inspected by Humane Farm Animal Care's inspectors to verify compliance with the AMI Guidelines.
- c. HFAC will also audit the slaughter plant for traceability to ensure that all the product that is labeled with the Certified Humane® logo originates from Certified Humane® farms.

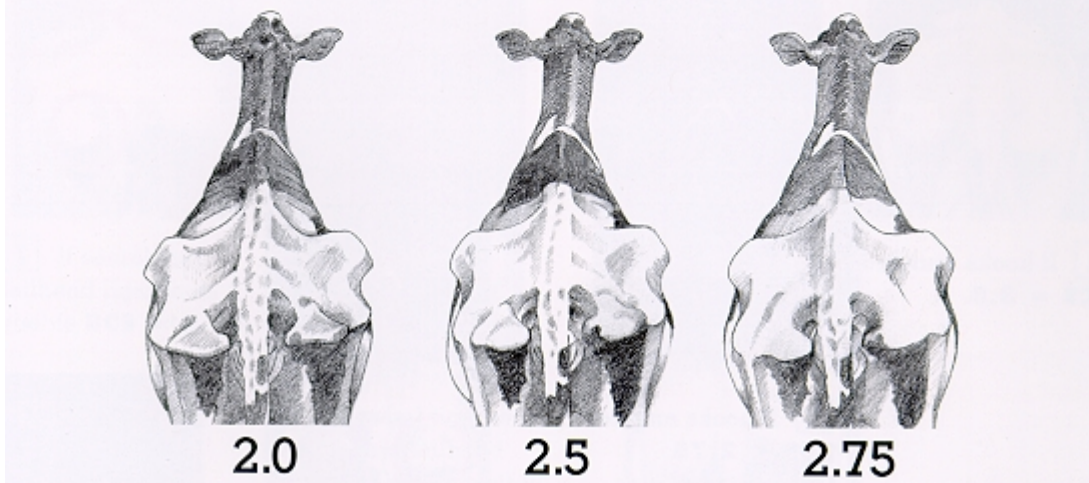
S 2: For dairies that are not marketing their dairy cows as Certified Humane® Dairy Beef, milk and milk products are the only products that carry the certification. Once the farmer sells the dairy cattle and they leave the farm, these cattle are no longer certified and HFAC has no authority to track or monitor these cattle.

PART 8: APPENDICES

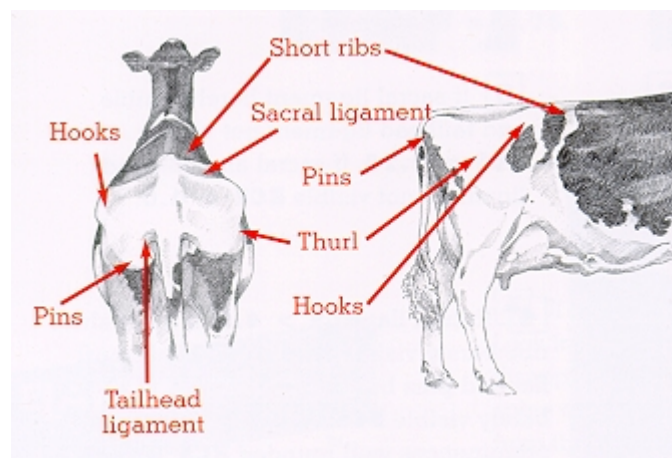
Appendix 1: Body Condition Scoring Guide

UC Davis Veterinary Medicine Extension

Body Condition Scoring in Dairy Cattle

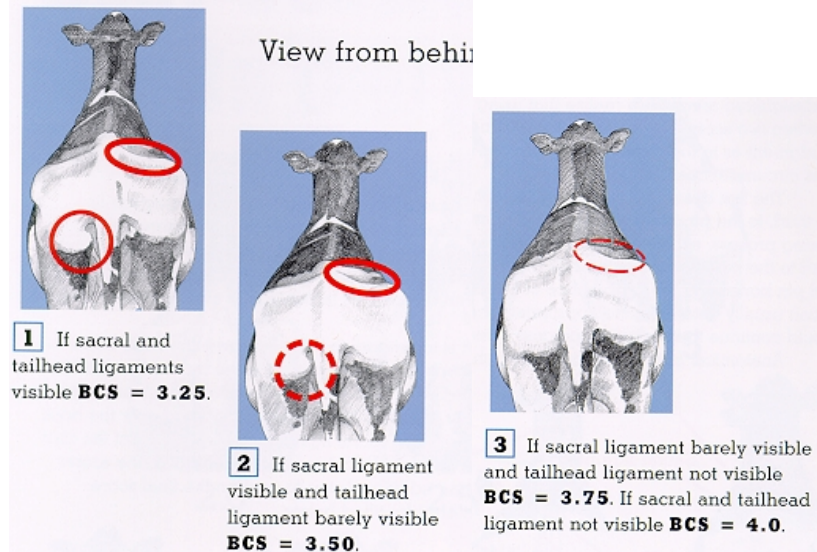
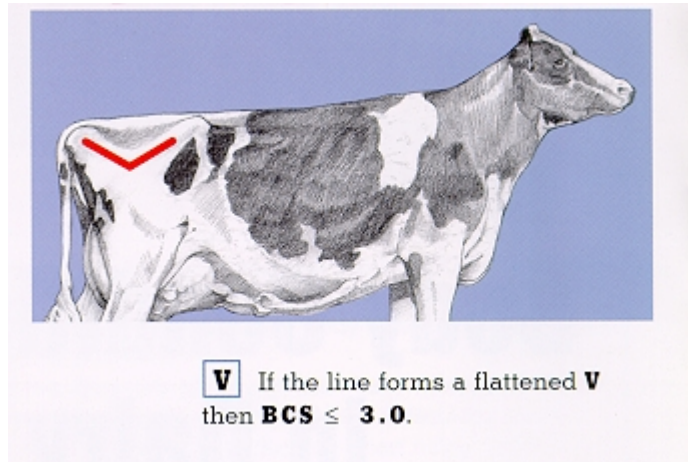


Begin by a review of the general names for the various body locations which will be referred to in the systematic approach to body condition scoring. Keep in mind that this system is designed to be done from behind the animal. Also you may have to discard your old system of BCS as the scores will probably be different. However, once this approach is accepted, it will allow repeatable BCS even when several different people do the scoring.

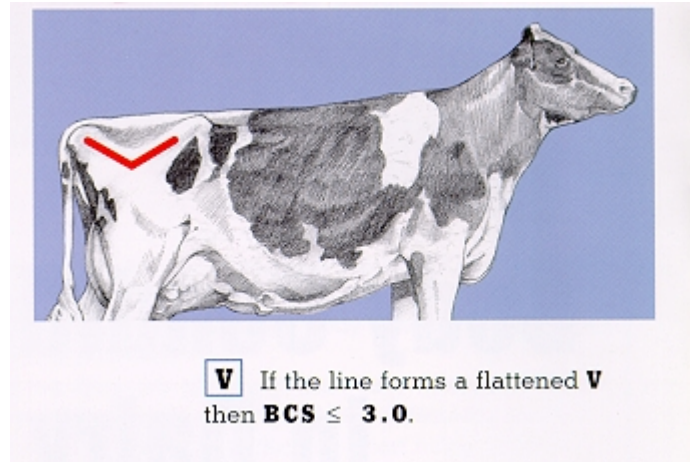


First view the pelvic area from the side.
Check line from hooks, to the thurl, to the pins.

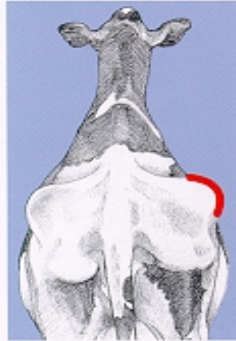
Make a decision about the line over the thurl, this is the cut point between 3.0 or less and 3.25 or greater scores.



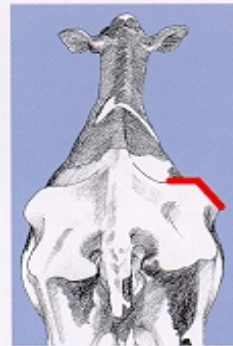
Then view from behind.



View from behind.



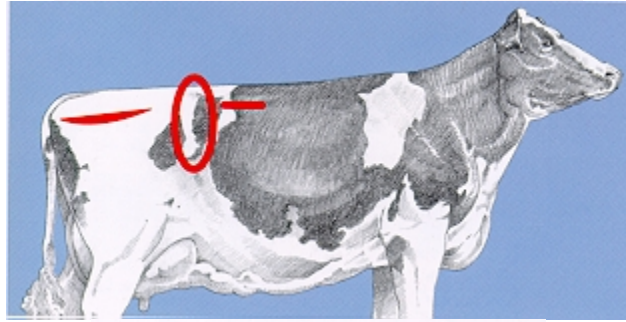
1 If hooks rounded
BCS = **3.0**.



2 If hooks angular
BCS < **2.75**.
Check pins. If pins padded **BCS** = **2.75**.

4 If no fat pad on pins **BCS** < **2.50**. View the short ribs. Look for corrugations along the top of short ribs as fat covering disappears. If corrugations visible 1/2 way between tip and spine of short ribs, **BCS** = **2.25**. If corrugations visible 3/4 way from tip to spine **BCS** = **2.0**. If thurl prominent and saw-toothed spine **BCS** < **2.0**.

4 If thurl flat **BCS** > **4.0**. If tip of short ribs barely visible **BCS** = **4.25**. If thurl flat and pins buried **BCS** = **4.5**. If hooks barely visible **BCS** = **4.75**. If all boney prominences well rounded **BCS** = **5.0**.



This system of body condition scoring in dairy cattle was developed with the support of Elanco Animal Health and taken from their bulletin AI 8478 (Rev. 9/96).

Appendix 2: Temperature Humidity Index for Lactating Dairy Cows

Temperature		% Relative Humidity																				
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
°F	°C	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
72	22.0	64	65	65	65	66	66	67	67	67	68	68	68	69	69	70	70	70	71	71	72	72
73	23.0	65	65	66	66	66	67	67	68	68	68	69	69	70	70	71	71	71	72	72	73	73
74	23.5	65	66	66	67	67	67	68	68	69	69	70	70	71	71	72	72	73	73	74	74	74
75	24.0	66	66	67	67	68	68	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75
76	24.5	66	67	67	68	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75	76	76
77	25.0	67	67	68	68	69	69	70	70	71	71	72	72	73	73	74	74	75	75	76	76	77
78	25.5	67	68	68	69	69	70	70	71	71	72	73	73	74	74	75	75	76	76	77	77	78
79	26.0	67	68	69	69	70	70	71	71	72	73	73	74	74	75	76	76	77	77	78	78	79
80	26.5	68	69	69	70	70	71	72	72	73	73	74	75	75	76	76	77	78	78	79	79	80
81	27.0	68	69	70	70	71	72	72	73	73	74	75	75	76	77	77	78	78	79	80	80	81
82	28.0	69	69	70	71	71	72	73	73	74	75	75	76	77	77	78	79	79	80	81	81	82
83	28.5	69	70	71	71	72	73	73	74	75	75	76	77	78	78	79	80	80	81	82	82	83
84	29.0	70	70	71	72	73	73	74	75	75	76	77	78	78	79	80	80	81	82	83	83	84
85	29.5	70	71	72	72	73	74	75	75	76	77	78	78	79	80	81	81	82	83	84	84	85
86	30.0	71	71	72	73	74	74	75	76	77	78	78	79	80	81	81	82	83	84	84	85	86
87	30.5	71	72	73	73	74	75	76	77	77	78	79	80	81	81	82	83	84	85	85	86	87
88	31.0	72	72	73	74	75	76	76	77	78	79	80	81	81	82	83	84	85	86	86	87	88
89	31.5	72	73	74	75	75	76	77	78	79	80	80	81	82	83	84	85	86	86	87	88	89
90	32.0	72	73	74	75	76	77	78	79	79	80	81	82	83	84	85	86	86	87	88	89	90
91	33.0	73	74	75	76	76	77	78	79	80	81	82	83	84	85	86	86	87	88	89	90	91
92	33.5	73	74	75	76	77	78	79	80	81	82	83	84	85	85	86	87	88	89	90	91	92
93	34.0	74	75	76	77	78	79	80	80	81	82	83	85	85	86	87	88	89	90	91	92	93
94	34.5	74	75	76	77	78	79	80	81	82	83	84	85	86	86	87	88	89	90	91	92	93
95	35.0	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	35.5	75	76	77	78	79	80	81	82	83	85	86	87	88	89	90	91	92	93	94	95	96
97	36.0	76	77	78	79	80	81	82	83	84	85	86	87	88	89	91	92	93	94	95	96	97
98	36.5	76	77	78	80	80	82	83	83	85	86	87	88	89	90	91	92	93	94	95	96	98
99	37.0	76	78	79	80	81	82	83	84	85	87	88	89	90	91	92	93	94	95	96	98	99
100	38.0	77	78	79	81	82	83	84	85	86	87	88	90	91	92	93	94	95	96	98	99	100
101	38.5	77	79	80	81	82	83	84	86	87	88	89	90	92	93	94	95	96	98	99	100	101
102	39.0	78	79	80	82	83	84	85	86	87	89	90	91	92	94	95	96	97	98	100	101	102
103	39.5	78	79	81	82	83	84	86	87	88	89	91	92	93	94	96	97	98	99	101	102	103
104	40.0	79	80	81	83	84	85	86	88	89	90	91	93	94	95	96	98	99	100	101	103	104
105	40.5	79	80	82	83	84	86	87	88	89	91	92	93	95	96	97	99	100	101	102	103	105
106	41.0	80	81	82	84	85	87	88	89	90	91	93	94	95	97	98	99	101	102	103	104	106
107	41.5	80	81	83	84	85	87	88	89	91	92	94	95	96	98	99	100	102	103	104	106	107
108	42.0	81	82	83	85	86	88	89	90	92	93	94	96	97	98	100	101	103	104	105	107	108
109	43.0	81	82	84	85	87	89	89	91	92	94	95	96	98	99	101	102	103	105	106	108	109
110	43.5	81	83	84	86	87	89	90	91	93	94	96	97	99	100	101	103	104	106	107	109	110
111	44.0	82	83	85	86	88	90	91	92	94	95	96	98	99	101	102	104	105	107	108	110	111
112	44.5	82	84	85	87	88	90	91	93	94	96	97	99	100	102	103	105	106	108	109	111	112
113	45.0	83	84	86	87	89	91	92	93	95	96	98	99	101	102	104	105	107	108	110	111	113
114	45.5	83	85	86	88	89	92	92	94	96	97	99	100	102	103	105	106	108	109	111	112	114
115	46.0	84	85	87	88	90	92	93	95	96	98	99	101	102	104	106	107	109	110	112	113	115
116	46.5	84	86	87	89	90	93	94	95	97	98	100	102	103	105	106	108	110	111	113	114	116
117	47.0	85	86	88	89	91	93	94	96	98	99	101	102	104	106	107	109	111	112	114	115	117
118	48.0	85	87	88	90	92	94	95	97	98	100	102	103	105	106	108	110	111	113	115	116	118
119	48.5	85	87	89	90	92	94	96	97	99	101	102	104	106	107	109	111	112	114	116	117	119
120	49.0	86	88	89	91	93	95	96	98	100	101	103	105	106	108	110	111	113	115	117	118	120

Stress Threshold:
Respiration rate exceeds 60 BPM. Milk yield losses begin. Repro losses detectable. Rectal Temperature exceeds 38.5°C (102.2°F).

Mild-Moderate Stress:
Respiration rate exceeds 75 BPM. Rectal Temperature exceeds 39°C (104°F)

Moderate-Severe Stress:
Respiration rate exceeds 85 BPM. Rectal Temperature exceeds 40°C (104°F)

Severe Stress:
Respiration rate 120-140 BPM. Rectal Temperature exceeds 41°C (106°F)

Appendix 3:




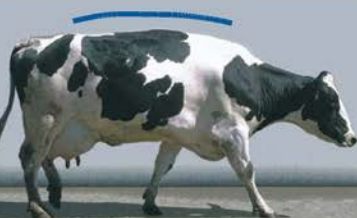








LOCOMOTION SCORING OF DAIRY CATTLE*

Locomotion scoring is based on the observation of cows standing and walking (gait), with special emphasis on their back posture. This system is intuitive and, therefore, easy to learn and implement. Use of locomotion scoring is effective for early detection of claw (hoof) disorders, monitoring prevalence of lameness, comparing the incidence and severity of lameness between herds and identifying individual cows for functional claw (hoof) trimming.

Animal observations should be made on a flat surface that provides good footing for cows. Cows scoring 2 or 3 should be examined and trimmed to prevent more serious problems. Trimming should be done by a competent trimmer with the goal of returning the claws to functional weight bearing and conformation.



<p>Locomotion Score 1</p> <p>Clinical Description: Normal</p> <p>Description: Stands and walks normally with a level back. Makes long confident strides.</p>	 <p>Back Posture Standing: Flat</p>	 <p>Back Posture Walking: Flat</p>
<p>Locomotion Score 2</p> <p>Clinical Description: Mildly Lamé</p> <p>Description: Stands with flat back, but arches when walks. Gait is slightly abnormal.</p>	 <p>Back Posture Standing: Flat</p>	 <p>Back Posture Walking: Arched</p>
<p>Locomotion Score 3</p> <p>Clinical Description: Moderately Lamé</p> <p>Description: Stands and walks with an arched back and short strides with one or more legs. Slight sinking of dew-claws in limb opposite to the affected limb may be evident.</p>	 <p>Back Posture Standing: Arched</p>	 <p>Back Posture Walking: Arched</p>
<p>Locomotion Score 4</p> <p>Clinical Description: Lamé</p> <p>Description: Arched back standing and walking. Favoring one or more limbs but can still bear some weight on them. Sinking of the dew-claws is evident in the limb opposite to the affected limb.</p>	 <p>Back Posture Standing: Arched</p>	 <p>Back Posture Walking: Arched</p>
<p>Locomotion Score 5</p> <p>Clinical Description: Severely Lamé</p> <p>Description: Pronounced arching of back. Reluctant to move, with almost complete weight transfer off the affected limb.</p>	 <p>Back Posture Standing: Arched</p>	 <p>Back Posture Walking: Arched</p>

* Adapted from Sprecher, D.J.; Hostetler, D.E.; Kaneene, J.B. 1997. Theriogenology 47:1178-1187 and contribution from Cook, N.B., University of Wisconsin.

Appendix 4: Pain Control

Recommendations for Castration and Dehorning of Cattle

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Abstract

Pain associated with routine husbandry procedures such as dehorning and castration is increasingly being scrutinized by the public. The results of a survey of AABP and AVC members suggest that surgical castration with a scalpel followed by emasculator (>200 lb or 90 kg) or twisting (<200 lb or 90 kg) is the most common castration method used by practitioners in the United States. Risk of injury to the operator, calf size, handling facilities, and experience were the most important considerations in selecting a castration method. Non-surgical castration is perceived to cause more adverse events than surgical castration. One in five veterinarians currently report using anesthesia or analgesia at the time of castration. Ninety percent of veterinarians vaccinate and dehorn at the time of castration. The Barnes dehorning tool appears to be the most common method of dehorning used in the US. Results of studies that use plasma cortisol or weight gain to determine the optimal timing and method of castration and use of analgesia are often equivocal or conflicting. The preliminary findings of a study using electroencephalography to examine the effect of age at the time of castration on brainwave activity show a more prominent shift toward high-frequency, low-amplitude brain activity in older calves compared with six-week-old calves. Meloxicam tablets administered orally at 0.45 mg/lb (1 mg/kg) may provide a convenient and cost-effective means of providing analgesia in cattle. A mean peak plasma concentration (C_{max}) of 3.10 µg/mL (Range: 2.64 – 3.79 µg/mL) was recorded at 11.64 hours (Range: 10 – 12 hours) with a half-life (T_½) of 27.54 hours (Range: 19.97 – 43.29 hours) after oral meloxicam administration. In recent studies we found that meloxicam administered prior to dehorning at 0.23 mg/lb (0.5 mg/kg) IV significantly increased average daily weight gain in calves after dehorning. A second study found that calves receiving oral meloxicam 24 hours prior to surgical castration tended to have a lower incidence of bovine respiratory disease.

Résumé

La douleur résultant d'opérations routinières comme l'écornage et la castration retient de plus en plus l'attention du public. Une étude réalisée auprès des

membres de l'American Association of Bovine Practitioners (AABP) et de l'Academy of Veterinary Consultants (AVC) montre que la méthode de castration la plus employée par les vétérinaires américains est la castration chirurgicale, effectuée par incision au scalpel suivie de l'enlèvement des testicules avec l'émasculateur (sur les veaux de plus de 90 kg, ou 200 lb) ou par torsion (veaux de moins de 90 kg, ou 200 lb). Les facteurs les plus considérés dans le choix de la méthode de castration étaient le risque de blessures pour le manipulateur, la taille du veau, les installations et outils disponibles et l'expérience du manipulateur. La castration non chirurgicale est perçue comme une méthode causant davantage d'inconvénients que la castration chirurgicale. Actuellement, un vétérinaire sur cinq dit avoir recours à l'anesthésie ou à l'analgésie lors de la castration. De plus, 90 % des vétérinaires interrogés disent pratiquer la vaccination et l'écornage en même temps que la castration. L'écorneur Barnes semble être l'outil d'écornage le plus utilisé aux États-Unis. Les études visant à déterminer le meilleur moment et la meilleure méthode pour l'écornage et l'analgésie d'après le dosage du cortisol plasmatique du sang ou le gain de poids donnent des résultats souvent équivoques ou contradictoires. Les résultats préliminaires d'une étude par électroencéphalographie de l'effet de l'âge à la castration révèlent que les veaux plus âgés tendent à avoir une activité cérébrale de fréquence plus élevée et d'amplitude plus faible que les veaux âgés de six semaines. La méloxicame, administrée par voie orale sous forme de comprimés à une dose de 1 mg/kg (0,45 mg/lb), semble une méthode d'analgésie pratique et rentable chez les bovins. Dans le plasma sanguin, le sommet de concentration moyen (C_{max}) de la méloxicame était de 3,10 µg/mL (pour une variation de 2,64 à 3,79 µg/mL) et fut observé 11,64 heures (pour une variation de 10 à 12 heures) après l'administration orale de ce médicament, dont la demi-vie moyenne (T_½) était de 27,54 heures (pour une variation de 19,97 à 43,29 heures). Dans une étude récente, nous avons observé que les veaux recevant 0,5 mg/kg (0,23 mg/lb) de méloxicame par voie intraveineuse avant l'écornage affichaient, après l'écornage, un gain de poids quotidien moyen significativement supérieur. Une seconde étude a montré que les veaux recevant la méloxicame par voie orale 24 heures avant la castration chirurgicale étaient moins fréquemment affectés par le complexe respiratoire bovin.

Introduction

Castration of male calves is one of the most common livestock management practices performed in the United States, amounting to approximately 15 million procedures per year.¹⁹ Methods of castration are associated with either physical, chemical or hormonal damage to the testicles.¹⁶ In many production settings, physical castration methods are the most common. These are subdivided into procedures involving surgical removal of the testes, or methods that irreparably damage the testicles by interruption of the blood supply using either a castration clamp^a, rubber ring^b, or latex band^c.

Benefits of castration include reduction in aggression and mounting behavior of males, causing fewer injuries in confinement operations and reduced dark-cutting beef.^{2,18} Steers have higher quality meat with increased tenderness and marbling. Carcasses from steers therefore command higher prices at market when compared with bulls.¹ Castration also prevents physically or genetically inferior males from reproducing and prevents pregnancy in commingled pubescent groups.² Although the benefits of castration are widely accepted, all methods of castration produce physiological, neuroendocrine, and behavioral changes indicative of pain and distress.¹⁶

Societal concern about the moral and ethical treatment of animals is becoming more common.¹⁴ In particular, negative public perception of castration and dehorning is increasing, with calls for the development of practices to relieve pain and suffering in livestock. Production agriculture is charged with the challenge of formulating animal welfare policies relating to routine management practices such as castration. To enable the livestock industry to respond to these challenges there is a need for data on management practices that are commonly being used in typical production settings.⁸

We conducted a web-based survey of members of the American Association of Bovine Practitioners (AABP) and Academy of Veterinary Consultants (AVC) who were asked to provide information about castration methods, adverse events, and husbandry procedures conducted at the time of castration. Invitations to participate in the survey were sent to e-mail addresses belonging to 1,669 AABP members and 303 AVC members. After partially completed surveys and missing data were omitted, 189 responses were included in the analysis. Surgical castration with a scalpel followed by testicular removal using manual twisting (cattle < 198 lb [90 kg]) or an emasculator (cattle > 198 lb [90 kg]) were the most common methods of castration. The potential risk of injury to the operator, size of the animal, handling facilities, and experience with the technique were the most important considerations used to determine the castration method. Swelling, stiffness, and increased

lying time were the most prevalent adverse events observed following castration. One in five practitioners reported using an analgesic or local anesthetic at the time of castration. Approximately 90% of respondents said they also vaccinate and dehorn cattle at the time of castration. Equipment disinfection, prophylactic antimicrobials, and tetanus toxoid are commonly used to minimize complications following castration. The results of this survey provide insight into current bovine castration and management practices in the US.

AVMA guidelines suggest that animals should be dehorned and castrated at the "earliest age practicable". Everyone probably agrees that this is a good idea based on observations that animals castrated younger suffer less performance setback than those castrated at an older age. However, it is interesting to review the science supporting this recommendation. For the most part, this recommendation is based on studies evaluating plasma cortisol concentration and performance effects.

Reviewing the literature highlights several deficiencies. These include that age and method effects are rarely examined under the same set of experimental conditions. This requires extrapolation between studies done in six-week-old calves and studies done in three-month-old calves, which is very risky. Furthermore, the effect of performing dehorning and castration at the same time has not been evaluated until our group studied this fairly recently. The concurrent measurement of multiple novel indicators of pain and distress in the same population of animals is also currently deficient in the literature.

Age Effects

Table 1 shows the Cmax, which is the maximum cortisol concentration in serum, and the Tmax, which is the time after castration when maximum cortisol concentration occurred. When we consider rubber ring castration in six-day-old calves, we see the cortisol concentration was much lower and occurred much earlier than in two to four-month-old animals. However, the opposite is found for surgical castration, where there was a much higher cortisol concentration in six-day-old calves compared to two to four-month-old calves. This does not really fit with the hypothesis that surgical castration should be less stressful in younger calves. The literature suggests those six-day-old calves have a higher cortisol concentration than those older calves. This does not imply that we should wait and castrate them older, instead it illustrates that cortisol responses are an imperfect measure of pain associated with castration.

Table 2 shows the duration of plasma cortisol response elevation above pre-treatment levels. With rubber ring castration in six-day-old calves and two to four-month-old calves, the time above baseline cortisol

Table 1.

Method	Age				
	6 days	21 days	42 days	2-4 months	5.5 months
Rubber ring	60 (36 min)	45 (48 min)	45 (60 min)	76 (90 min)	
Latex band					101 (30-60 min)
Burdizzo	80 (24 min)	50 (24 min)	60 (24 min)	64 (30 min)	87 (30 min)
Surgery (pull)	105 (24 min)	65 (24 min)	110 (24 min)	68 (30 min)	
Surgery (cut)					129 (30 min)

Adapted from: Stafford K, Mellor D: The welfare significance of the castration of cattle: a review. *New Zealand Vet J* 53:271-278, 2005. (Reproduced with permission.)

Table 2.

Method	Age				
	6 days	21 days	42 days	2-4 months	5.5 months
Rubber ring	132 min		96 min	132 min	180 min
Latex Band				180 min	
Burdizzo	60 min	60 min	72 min	90 min	90 min
Surgery (pull)	132 min	84 min	132 min	180 min	
Surgery (cut)					360-600 min

Adapted from: Stafford K, Mellor D: The welfare significance of the castration of cattle: a review. *New Zealand Vet J* 53:271-278, 2005. (Reproduced with permission.)

response is identical. The duration of cortisol response was the same in those two age groups of calves, even though we currently recommend doing them as early as possible. The take home message is that measurement of plasma cortisol is not a perfect measure of pain in animals. Cortisol measurement will not answer the questions we need answered to address animal welfare concerns. In Table 2 we see that surgical castration in six-day-olds produces a much shorter duration of cortisol response than surgical castration in two to four-month-old animals. This is, typically, what we would expect. However, there are also aspects of these data that do not fit with our hypothesis. For example, the AVMA back-grounder⁴ states that elastrator rubber ring techniques have been associated with chronic pain and should be discouraged, but six-day-old calves had the same duration of cortisol as two to four-month-old calves.

Growth and Performance

Recently, Dr. Dan Thomson, Director of the Beef Cattle Institute at Kansas State University, concluded a study to evaluate the effects of surgical and banding castration on behavioral responses and growth characteristics of postpubertal bulls.¹⁵ Fifty mixed-breed bulls,

weighing 660 to 880 lb (300-400 kg), were randomly assigned to one of five treatment groups as follows: 1) untreated control (CONT); 2) band (BAND); 3) band with local anesthesia (BANDL); 4) surgical castration with twisting of cord utilizing the Henderson tool (SURG); and 5) surgical castration with twisting of cord utilizing the Henderson tool with local anesthesia (SURGL). Behavioral assessment of the cattle was conducted the day before castration, the day of castration, and every day post-castration for 30 days. Bulls were weighed on days 0, 7, 14, 21, and 28 to determine average daily gain (ADG). Data are in the early stages of analysis but initial findings are reported herein. This study found no interactions between local anesthetic treatments and castration methods. Scrotal circumference was similar between treatment groups. Vocalization was higher in the surgically castrated animals than the banded animals ($P = 0.03$). There was no difference in vocalization at the chute with animals treated with local anesthetic prior to castration relative to animals that did not receive local anesthetic ($P = 0.65$). There was no difference in overall feed intake between banded and surgically castrated animals ($P = 0.84$). Cattle that were castrated surgically had lower feed intakes than cattle castrated with bands for the first seven days ($P = 0.02$). However,

at day 14 of the study the intakes were reversed. Cattle that were banded tended to have lower feed intakes than cattle castrated surgically from day 14 to the end of the study ($P = 0.16$). At this point, 50% of the cattle that were banded had lost their scrotum from banding. The other 50% still had their scrotum. There was a marked behavioral pain response noted in animals when necrotic testicles were sloughing after banding.

Castrated cattle had significantly lower rate of gain than control cattle over the course of the study ($P < 0.05$). Cattle castrated surgically had overall higher ADG than cattle that were banded ($P = 0.08$). There was no difference in average daily gain due to castration method during the first week after processing ($P = 0.59$). Cattle surgically castrated had significantly higher ADG during the third week after processing ($P = 0.01$) relative to the banded cattle. This study shows the importance of observing animals for at least two weeks when doing castration studies. These preliminary data suggest that the effect of surgical castration is more pronounced over the first seven days after castration. Banding has a pronounced negative effect on performance during the later part of the feeding period. This coincides with the time when necrotic scrotums are sloughing. Due to the short study duration, the longer term relationship between surgical technique and ADG could not be determined in this study.

Production parameters are often too imprecise to reflect the pain experienced by animals following castration.¹⁶ Furthermore, weight gain following castration may be negatively influenced by a decrease in testosterone following removal of the testes.¹⁶ However, assessment of production parameters is critical if animal well-being research is to have relevance to livestock producers. These assessments may take the form of a cost-benefit analysis or a measure of animal performance. In some studies, Burdizzo or surgical castration had no effect on average daily gain (ADG) over a three-month period following castration.^{6,11} The ADG of seven-week-old calves during the five weeks following castration using rubber rings, clamp or surgery have been reported to be lower than non-castrated calves, but similar between the different castration methods.⁶ Rubber ring and surgical castration were reported to cause a decrease in ADG of 50% and 70%, respectively in cattle aged eight to nine months.²⁰ When eight, nine, and 14-month-old cattle were castrated surgically or using latex bands, cattle castrated later had poorer growth rates than those castrated at weaning. Cattle castrated with latex bands also had lower growth rates than those castrated surgically during the following four to eight weeks.^{7,12} In a study conducted by Oklahoma State University, 162 bull calves were used to determine the effects of latex banding of the scrotum or surgical castration on growth rate. Bulls that were banded at weaning gained less weight than bulls

that were banded or surgically castrated at 2 to 3 mo of age.¹³ In a second study, 368 bull calves were used in two separate experiments to examine the effect of method of castration on receiving health and performance. In the first experiment, latex banding intact males shortly after arrival was found to decrease daily gain by 19% compared with purchasing steers, and by 14.9% compared with surgically castrating intact males shortly after arrival. In the second experiment purchased, castrated males gained 0.58 lb (0.26 kg) more and consumed 1.26 lb (0.57 kg) more feed per day than intact males surgically castrated shortly after arrival.²

Recently, a Canadian group conducted a large, pen-level study to investigate the effect of castration timing, technique and pain management on health and performance of young feedlot bulls in Alberta.³ This study was conducted through close-out when cattle were harvested, therefore providing long-term comparison data between castration techniques are various attempts at pain control. A total of 956 feedlot bulls were assigned to eight castration groups receiving combinations of banding and surgical castration, epidural and systemic analgesia performed either on arrival or 70 days post-arrival. Bulls castrated on arrival tended to have a higher occurrence of undifferentiated fever ($P = 0.086$) and a higher proportion of Canadian yield grade 3 carcasses compared with calves castrated at 70 days. Bulls castrated with a band were found to have a lower occurrence of undifferentiated fever and improved ADG and carcass weight than bulls castrated surgically. There was no significant difference between animals receiving analgesia and anesthesia and those that did not. These findings suggest that band castration is superior to surgical castration and delayed castration is beneficial in bull calves at high risk of developing UF. This study failed to demonstrate any economic benefit to providing analgesia at the time of castration; however, it should be noted that the analgesic drugs used had a relatively short $T_{1/2}$ (< 12 hours).

Provision of Analgesia: Meloxicam

Meloxicam is a NSAID of the oxicam class that is approved in the European Union for adjunctive therapy of acute respiratory disease; diarrhea, and acute mastitis when administered at 0.23 mg/lb (0.5 mg/kg) IV or SC. Meloxicam is considered to bind preferentially to cyclooxygenase-2 (COX-2) inhibiting prostaglandin synthesis although definitive evidence of COX-selectivity in calves is deficient in the published literature. Heinrich *et al*¹⁰ demonstrated that meloxicam IM (0.23 mg/lb) combined with a cornual nerve block reduced serum cortisol response for six hours in six to 12-week-old calves compared with calves receiving only local anesthesia prior to cautery dehorning. Furthermore, calves receiv-

ing meloxicam had lower heart rates and respiratory rates than placebo-treated control calves over 24 hours post-dehorning. Stewart *et al.*¹⁷ found that meloxicam administered IV at 0.23 mg/lb mitigated the onset of pain responses associated with hot-iron dehorning in 33 ± 3-day-old calves compared with administration of a cornual nerve block alone, as measured by heart-rate variability and eye temperature. These findings indicate that administration of meloxicam at 0.23 mg/lb IV or IM decreases physiological responses that may be linked to pain and distress associated with cautery dehorning in preweaning calves.

The purpose of this study was to investigate the pharmacokinetics and oral bioavailability of meloxicam in ruminant calves.⁴ Six Holstein calves (319 to 374 lb or 145 to 170 kg) received either meloxicam IV at 0.23 mg/lb or oral meloxicam at 0.45 mg/lb (1 mg/kg) in a randomized cross-over design with a 10-day washout period. Plasma samples collected up to 96 hours post-administration were analyzed by LC-MS followed by noncompartmental pharmacokinetic analysis. A mean peak plasma concentration (C_{max}) of 3.10 ug/mL (range: 2.64 – 3.79 ug/mL) was recorded at 11.64 hours (range: 10 – 12 hours) with a half-life (T_{½ λz}) of 27.54 hours (range: 19.97 – 43.29 hours) after oral meloxicam administration. The bioavailability (F) of oral meloxicam corrected for dose was 1.00 (range: 0.64 – 1.66). These findings indicate that oral meloxicam administration could be an effective and convenient means of providing long-lasting analgesia to ruminant calves.

In the United States, meloxicam administered to cattle by any route constitutes extra-label drug use (ELDU). Under the Animal Medicinal Drug Use Clarification Act (AMDUCA), ELDU is permitted for relief of suffering in cattle provided specific conditions are met. These conditions include that 1) ELDU is permitted only by or under the supervision of a veterinarian, 2) ELDU is allowed only for FDA-approved animal and human drugs, 3) ELDU is only permitted when the health of the animal is threatened and not for production purposes, 4) ELDU in feed is prohibited, and 5) ELDU is not permitted if it results in a violative food residue. Therefore, use of oral meloxicam to alleviate suffering associated with dehorning and castration in calves in the United States would be required by law to comply with these regulations. Currently, the only NSAID approved for use in cattle in the United States is flunixin meglumine. The plasma elimination half-life of flunixin is reported to be three to eight hours, therefore requiring once-daily administration. Although this drug class is recognized as having analgesic properties, flunixin is only indicated for control of fever associated with respiratory disease or mastitis, and fever and inflammation associated with endotoxemia, rather than for control of pain. Studies demonstrating the analgesic effects of flunixin at the

approved dose of 1.0 mg/lb (2.2 mg/kg) are deficient in the published literature. Use of flunixin meglumine is further complicated by the requirement for intravenous administration, which is more stressful on the animal and involves more skill and training on the part of the operator. Several reports have suggested that the IM administration of flunixin may result in significant myonecrosis and tissue residues. In the absence of data demonstrating that flunixin reduces signs of pain and distress associated with dehorning and castration in calves, it could be argued that use of oral meloxicam for this purpose can be justified under AMDUCA. Meloxicam (20 mg/mL) is approved for use in cattle in several European countries with a 15-day meat withdrawal time and a five-day milk withdrawal time following administration of 0.23 mg/lb IM or SC. An oral meloxicam suspension (1.5 mg/mL) and injectable formulation (5 mg/mL) are approved in the United States for the control of pain and inflammation associated with osteoarthritis in dogs. Furthermore, an injectable formulation (5 mg/mL) is approved for the control of post-operative pain and inflammation in cats. Several generic tablet formulations containing meloxicam (7.5 and 15 mg) have recently been approved for relief of signs and symptoms of osteoarthritis in human medicine. The cost of administering IV meloxicam to calves in the present study was approximately US \$58.00/220 lb (100 kg) bodyweight and the cost of administering oral meloxicam was US \$0.30/220 lb bodyweight.

Conclusions

Pain associated with routine husbandry procedures such as dehorning and castration is increasingly being scrutinized by the public. The results of a survey of AABP and AVC members suggest that surgical castration with a scalpel followed by emasculator (>200 lb or 90 kg) or twisting (<200 lb or 90 kg) is the most common castration method used by practitioners in the United States. One in five veterinarians currently report using anesthesia or analgesia at the time of castration. Results of studies that use plasma cortisol or weight gain to determine the optimal timing and method of castration and use of analgesia are often equivocal or conflicting. The preliminary findings of a study using electroencephalography to examine the effect of age at the time of castration on brainwave activity show a more prominent shift toward high-frequency, low-amplitude brain activity in older calves compared with six-week-old calves. Meloxicam tablets administered orally at 0.45 mg/lb (1 mg/kg) may provide a convenient and cost-effective means of providing analgesia in cattle. A mean peak plasma concentration (C_{max}) of 3.10 ug/mL (Range: 2.64 – 3.79 ug/mL) was recorded at 11.64 hours (Range: 10 – 12 hours) with a half-life (T_{½ λz}) of 27.54

hours (Range: 19.97 – 43.29 hours) after oral meloxicam administration. In recent studies we found that meloxicam administered prior to dehorning at 0.23 mg/lb (0.5 mg/kg) IV significantly increased average daily weight gain in calves after dehorning. A second study found that calves receiving oral meloxicam 24 hours prior to surgical castration tended to have a lower incidence of bovine respiratory disease.

Endnotes

^aBurdizzo castration

^bElastrator rubber ring

^cCallicrate Bander, No Bull Enterprises LLC, St. Francis, KS

^dAVMA Policy, 2008: "Elastrator rubber banding techniques have been associated with increased chronic pain and should be discouraged."

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Pain Management in Calves and Cattle

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Castration and dehorning are painful, but necessary husbandry procedures. Castration is necessary to reduce injuries in cattle associated with aggression and mounting behavior in males. It is also necessary to prevent mis-mating by genetically inferior males. Dehorning is required to avoid injury to animals and humans. Not all cattle have horns, but those that do quickly learn that they have a distinct advantage over their polled counterparts in battles over dominance. So, the question regarding castration and dehorning is not should we perform these procedures; but how should we perform them in a way that minimizes pain and distress to the animals?

Careful adherence to the procedures outlined in the Beef, Dairy and Young Dairy Beef standards will minimize the pain and discomfort associated with these important management practices. However, when conditions arise that make it necessary to implement pain management beyond local anesthesia, participants of the Certified Humane program should be cognizant of the following.

At the present time there are no drugs labeled for the control of pain in cattle. For example, Flunixin Meglumine (Banamine) is a non-steroidal drug labeled as having anti-pyretic (fever reducing) and anti-inflammatory activity in cattle, but it is not an analgesic (capable of providing pain relief). Furthermore, according to the label directions, Banamine is for intravenous use only. To use it for pain in cattle or by any other route than intravenously constitutes extra-label use of this drug (ELDU) which until passage of the Animal Medicinal Drug Use Clarification Act (AMDUCA) in 1996 was illegal. AMDUCA amended the Federal Food, Drug, and Cosmetic Act, legalizing extra-label drug use by and under the order of a licensed veterinarian within the context of a valid veterinarian-client-patient relationship. So, what does this mean? In short, it means that the use of Banamine or Meloxicam or any other drug used for pain that is not specifically labeled for use in cattle or for this purpose (i.e. ELDU) in the United States requires strict adherence to the provisions of AMDUCA which include the following:

Extra-label drug use (ELDU):

- Is permitted only by or under the supervision of a veterinarian.
- Is allowed only for FDA approved animal and human drugs.
- Requires a valid Veterinarian/Client/Patient Relationship as a prerequisite for all ELDU.
- Is for therapeutic purposes only (when the animal's health is threatened). It does not apply to drugs for production use.
- Rules apply to dosage form drugs and drugs administered in water. ELDU in feed is prohibited.
- Is not permitted if it results in a violative food residue, or any residue which may present a risk to public health.
- FDA prohibition of a specific ELDU precludes such use

When and if these conditions can be met, ELDU is permissible provided that the accurate records of the animals treated are maintained according to the following:

In addition, strict record-keeping of ELDU is required:

- Identify the animals, either as individuals or a group.
- Animal species treated.
- Numbers of animals treated.

- Conditions being treated.
- The established name of the drug and active ingredient.
- Dosage prescribed or used.
- Duration of treatment.
- Specified withdrawal, withholding, or discard time(s), if applicable, for meat, milk, eggs, or animal-derived food.
- Keep records for 2 years.
- FDA may have access to these records to estimate risk to public health.

Finally, whenever drugs are used in an ELDU manner, the bottle or drug container must include the following information on the label:

- Name and address of the prescribing veterinarian.
- Established name of the drug.
- Any specified directions for use including the class/species or identification of the animal or herd, flock, pen, lot, or other group; the dosage frequency, and route of administration; and the duration of therapy.
- Any cautionary statements.
- Your specified withdrawal, withholding, or discard time for meat, milk, eggs, or any other food.

In summary, castration and dehorning are health management procedures that cause discomfort in cattle. Conducting them at the earliest age practicable should be a primary objective. In those infrequent situations where these procedures may need to be conducted in older calves, pain management options should be considered keeping in mind that use of unapproved drugs must follow the AMDUCA regulations. Meloxicam tablets administered orally at the rate of 0.45 mg/lb (1 mg/kg) are reported to be a cost-effective means of providing analgesia in cattle. In European countries where Meloxicam is approved a 15-day meat and 5-day withdrawal time for milk is recommended. Flunixin meglumine used as an anti-inflammatory in post-surgical conditions provides limited analgesia. It is important that if used for reducing inflammation that it be administered intravenously, otherwise it constitutes ELDU. The use of Flunixin meglumine by the intramuscular route causes significant damage to tissues at the injection site and may significantly alter withdrawal times for meat and milk. Persons considering ELDU should work closely with their veterinarians for appropriate guidance in the safe and proper use of drugs in livestock.

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**CODE OF PRACTICE FOR THE CARE AND HANDLING OF DAIRY CATTLE:
Review of Scientific Research on Priority Issues
March 2009**

PAIN RELIEF DURING AND AFTER SURGICAL PROCEDURES

Conclusions:

- 1. All surgeries are likely to be painful.**
- 2. A combination of treatments, including analgesics and anesthetics can greatly reduce this pain.**

The use of analgesics on farm animals is low for reasons that include fear of residues, legislation, cost, tradition, and lack of knowledge about their use (Stafford et al. 2006).

Pre-emptive analgesia is preferable to reactive analgesia when conducting surgical procedures, reducing or preventing hyperalgesia, allodynia, or wind-up. The most effective analgesia is often provided using a combination of agents that act on different pathways. For example, the use of an epidural containing local anaesthetic and xylazine, combined with a systemic nonsteroidal anti-inflammatory drug (NSAID), provides appropriate analgesia in cases of dystocia (Hudson et al. 2008).

Non-steroidal anti-inflammatory drugs (NSAIDs) such as flunixin, meglumine, tolfenamic acid, ketoprofen, carprofen, and meloxicam are indicated for diseases likely to be associated with pain in cattle include respiratory disease, mastitis, periparturient inflammatory conditions such as metritis, and inflammatory limb lesions such as joint ill, sole ulceration, and white line disease (Barrett 2004). Traumatic insults and physiological states such as parturition may also be expected to result in the animal experiencing pain, as will surgical procedures such as laparotomy, foot surgery, castration, disbudding, and dehorning.

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