

AABP Guidelines for the Humane Euthanasia of Cattle

Meggan Hain, DVM

Organic Valley
Franklin, KY 42135

These proceedings are based on the AABP Guidelines for the Humane Euthanasia of Cattle developed by the AABP Animal Welfare Committee (2022).

Abstract

For stockman, farmers, veterinarians and animal caretakers who choose to work with cattle there are many rewards, but there is also the responsibility to provide the animals in their care with a good a life, and when that is no longer possible, to alleviating the suffering of a slow and painful death. This is not just between farmers and their cattle it is also part of the social compact farmers have with consumers to produce the food that consumers purchase for their families in a way that is ethical. The requirements for humane euthanasia are also codified in industry animal welfare standards. But in reviewing recent studies on the number of cows and calves that die unassisted or were shipped to slaughter with serious ailments, the realities on farm do not always live up to this expectation. To help to address this the AABP has developed and recently updated the American Association of Bovine Practitioners (AABP) *Guidelines for the Humane Euthanasia of Cattle* as a tool to help bovine practitioners and farmers provide timely and humane euthanasia for the cattle to prevent needless pain and suffering.

Key words: timely euthanasia, humane euthanasia, cattle

Importance of euthanasia

In the shared relationship of domestication, humanity is responsible for providing cattle feed, safety, care and the alleviation of unnecessary suffering in exchange for the sustenance of milk and meat which they provide. For an animal with severe disease or injury resulting in pain and suffering, there are 2 acceptable choices to either treat that animal to effectively alleviate the pain or to provide humane euthanasia. In many cases, the level of care needed to properly alleviate suffering is neither feasible, economical or practical on farm. In these cases, it is both kind and expected to end that suffering using humane euthanasia. Humane euthanasia by its description emphasizes the need to be “humane” and to provide a “good death”. In translation this means killing an animal in a way that does not cause additional pain or distress and results in rapid loss of consciousness and is reliably followed by death.⁹

While the general public has lost contact with the daily production of the food they consume, there is still the expectation that the farmers who produce that food will do so in a manner that is morally acceptable to the consumers. While there can be debate upon the finer points of these expectations, there is no ambiguity when it comes to the requirement to alleviating unnecessary pain and suffering. This has been demonstrated in the effectiveness of multiple animal rights undercover videos which have resulted in public outcry and ramifications for the farm and brands associated.¹³ As a recognition of this concern,

there are multiple industry and market animal welfare programs related to cattle which outline specific requirements for the euthanasia of cattle managed under the program. Both buyers and consumers rely upon these programs to provide assurance that their expectations are met.

Dairy animal welfare standards

The tables below list the euthanasia standards from the prominent dairy welfare standards in the US. The first is the National Milk Producer Federation’s F.A.R.M. program which is the industry-driven dairy welfare program and covers 99% of the U.S. dairy supply. The 2 additional tables list market-driven third-party animal welfare certifications which are only used by selective marketers.

Beef cattle animal welfare standards

In the U.S. beef industry, the primary industry welfare program Beef Quality Assurance (BQA) provides guidelines on euthanasia in beef cattle, but does not have a specific euthanasia standard which is evaluated by an evaluation or audit. That said, the *BQA Cattle Care & Handling Guidelines*³ provide a good resource for beef producers on both euthanasia and cattle care. In the beef industry there are fewer market third-party animal welfare programs; the 2 listed below are the most prominent but still represent a small portion of the U.S. beef supply.

Challenges to timely euthanasia on farm

Despite a general consensus on making timely euthanasia decisions and following accepted euthanasia techniques, there is still evidence that this is a challenge for the industry. A study looking at culling of beef and dairy cattle in the U.S., Europe and Brazil in 2014 found that of beef cattle, 5.24% were classified as low body condition (1/9 BCS scale), and 1.01% were severely lame (5/5 lameness scale), and of the dairy cattle, 4.15% were classified as low body condition (1/5 BCS scale), 1.65% were severely lame (5/5 lameness scale) and 1.64% had severe udder conditions.¹² A second study looking at dairy cattle sent to slaughter showed that 9% of animals (this equated to half a million dairy cows) were unfit for transport and should have been shipped much sooner or euthanized on farm.¹³ The animals represented in these studies were unfit for transport due to painful diseases and likely endured prolonged suffering during transport. So why were they sent to slaughter and not euthanized on-farm? The authors of the study provide an excellent review of the disincentive for ethical decision-making related to economics and displacement behavior.¹³

Looking now at euthanasia decisions, on-farm data from the 2014 NAHMS¹³ study of the dairy cattle showed that 1% of the half million dairy calves and heifers that died on a dairy were euthanized. The numbers for cows were a little better at 43% of cows that died were euthanized. Beef research was not

reviewed for this paper. Looking specifically at nonambulatory cows, the prognosis of recovery after 24 hrs was 8.2%, but only half of nonambulatory cows were euthanized, suggesting that many experience prolonged suffering.¹³ The high percentage of animals that died without the benefit of timely euthanasia suggests a lack of appropriate decision-making or implementation of euthanasia on farm.

The same study went on to explore the potential causes of not providing timely euthanasia on farm which are listed below:¹³

- Avoidance due to unpalatability of euthanasia
- Poor measures and understanding of quality of life in cattle
- Lack of recognition of poor prognosis
- Lack of recognition of pain and suffering
- Lack of clear end-points specific to common illnesses
- Overly optimistic caretaker and human animal bond

- Lack of euthanasia protocols
- Lack of proper training of staff making decisions

As this study demonstrates, understanding and improving euthanasia practices on farm is complex and challenging. Fortunately, the veterinary profession is well positioned to work with their clients to build clear on-farm protocols and training programs to help provide more timely and humane euthanasia. Veterinarians understand the complexities of the decision-making, the realities of economic and logistics on farm, clinical indications, and prognosis and proper humane euthanasia methods. Veterinarians also understand the humans who are involved in humane euthanasia and the realities of the human-animal bond, moral disquiet of euthanasia, and compassion fatigue. Cattle veterinarians are in a key position to assure the welfare of cattle on farms specifically by improving timely

Table 1: Euthanasia standards from the common dairy animal welfare standards in the U.S.

FARM Version 5: Euthanasia Standard⁸

- The written herd health plan has a written protocol for euthanasia that includes language specific to areas of euthanasia: (1) Criteria for identification of animals to be euthanized are established. (2) Euthanasia techniques follow the approved methods of AABP and/or AVMA. (3) Carcass disposal is conducted using the appropriate method in accordance with applicable local ordinances (FARM also evaluates that on-farm practices match protocols).
- Confirmation of death following the approved methods of AABP and/or AVMA.
- Identify Primary and Secondary individuals for euthanasia implementation if off-farm service provider used for euthanasia, family/non-family employee of the dairy.

Validus: Animal Welfare Review Dairy Audit Standards: Euthanasia Standard¹¹

1. Euthanasia plan is written and includes: 1. Euthanasia is done by an AVMA (American Veterinary Medical Association) acceptable method (gunshot [rifle preferred], captive bolt with a secondary method if necessary, or needle injection of euthanasia solution by a veterinarian).
 - a. If gunshot (rifle) is used and it is a .22 magnum caliber or greater, the shell must be a solid point bullet (AVMA AABP recommendation with an insensibility check).
 - b. Blunt force is not a euthanasia method that is approved by AVMA guidelines or this program (CRITICAL).
2. Written protocol includes confirmation of insensibility (no eye reflex) and confirmation of death (lack of a heartbeat, lack of respiration).
3. Written euthanasia protocol includes the decision (and the euthanasia process itself) is to be made in a timely fashion (a daily review of sick animals and if the animal is not responding to treatment within 3 days, treatment is altered, or animal is considered for euthanasia).
4. Written protocol for terminally sick or severely injured (and not treatable) calves includes being euthanized in a timely manner (no longer than 4 hours from the time of the decision to euthanize) (CRITICAL).
5. Equipment is in good working order (written record of cleaning and usage).
6. Euthanasia equipment is stored and locked (only those trained have access).
7. Animals in extreme distress (the situation is determined to be irreversible) are euthanized in a timely manner (no longer than 4 hours) (CRITICAL).

Certified Human: Humane Farm Animal Care Animal Care Standards: DAIRY COWS: Euthanasia Standard⁵

- 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. In the beef side the Beef Quality Assurance has guidelines on euthanasia but not a specific standard. In addition in the beef industry the prominent beef welfare marketing programs have the following standards:

Table 2: Euthanasia Standards from two third-party beef animal welfare standards in the U.S.

Certified Human: Humane Farm Animal Care Animal Care Standards: BEEF CATTLE: Euthanasia Standard⁷

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 or euthanasia 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. As these animal welfare program standards demonstrate appropriate and timely euthanasia of cattle to prevent suffering is a shared expectation of both the industry and the market.

Global Animal Partnership 5-Step™ Animal Welfare Rating Standards for Beef Cattle: Euthanasia Standard⁴

3.2.3 (All Steps) If an animal is suffering from a non-recoverable illness, injury, or condition, it must be promptly euthanized on-farm using an approved method.

euthanasia to prevent unnecessary suffering. The *AABP Guidelines on Humane Euthanasia of Cattle*¹ provide a great starting point for veterinarians who are working with their cattle clients to develop farm specific protocols, training and on-going support.

Review of the updated *AABP Guidelines for the Humane Euthanasia of Cattle*

The current *AABP Guidelines for the Humane Euthanasia of Cattle* were updated in 2022. The guidelines are intended to provide direction for animal caretakers, veterinarians and the broader industry in determining when euthanasia and acceptable methods is appropriate to ensure it is humane. The guideline is an excellent source of information and can be found at https://aabp.org/Resources/AABP_Guidelines/EUTHANASIA-2023.pdf. This paper will just touch on some highlights.

The updated guidelines provide a detailed review of the indications for immediate euthanasia followed by the indications for considering euthanasia. Because this will not match all situations there is also criteria for decision-making to help guide veterinarians and animal care takers in building reliable decision-making practices for their farms. Finally, it defines the primary driver for euthanasia which is the prevention of unnecessary pain and suffering and defines timely euthanasia as being performed within 4 hours or less from when the decision is made.

The *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*² defines humane euthanasia methods as those which do not produce additional distress or pain and produce immediate loss of consciousness followed by death without a return to consciousness. The AVMA guidelines define acceptable methods of euthanasia as those which consistently produce a humane death, conditionally acceptable methods as those which require specific conditions to be met in order to ensure humane euthanasia (i.e., if untrained personnel or poor execution these methods could result in significant pain or suffering), and unacceptable methods of euthanasia as those which are inhumane.

The *AABP Guidelines for the Humane Euthanasia of Cattle* include detailed directions on approved euthanasia methods and criteria for deciding which methods are appropriate in which situations. There is also a detailed discussion of primary and

secondary methods for euthanasia and the requirements of confirmed unconsciousness before any secondary methods are used. The following are signs of unconsciousness:

- Absence of corneal reflex
- Absence of vocalization
- Absence of gag reflex
- Lack of rhythmic breathing
- Collapse and no coordination or attempt to right itself

The table below provides a summary of the acceptable euthanasia methods outlined in the *AABP Guidelines for the Humane Euthanasia of Cattle*.

Unacceptable methods of euthanasia

Just as important as the approved methods, the guidelines also include a list of methods which may be seen on farm, but are unacceptable methods of euthanasia:

- Manually applied blunt trauma
- Injection of unapproved chemical agents
- Sedation with Alpha2 agonists as a substitute for full anesthesia
- Air embolism
- Electrocution with 120V
- Drowning
- Exsanguination of conscious animals
- Inappropriate caliber or bullet size for size of animal
- Puntilla

There is also a review of euthanasia considerations of specific groups of animals including bulls, calves, bison, buffalo and calves in utero (fetotomy). Finally, the guidelines include the requirement to confirming of death by confirming the following: sustained cessation of rhythmic breathing, loss of heart beat and cessation of movement. If euthanasia fails and consciousness is regained, or death is not confirmed, there are recommendations for prompt action based on the primary method used. While the *AABP Guidelines for the Humane Euthanasia of Cattle* provide a great starting point, it is the responsibility of veterinarians and farm team to build reliable protocols and training on farm to ensure that timely humane euthanasia is achieved consistently.

Table 3: Acceptable methods of Euthanasia in cattle based upon the *AABP Guidelines for the Humane Euthanasia of Cattle*.

Method	Types/Common sources	Implementation	Caveats/Safety	Mechanism of death
Primary One Step Methods				
Gunshot	Handgun Rifle Shotgun	When properly executed a gunshot induces immediate unconsciousness and swift death; handguns must be at close range 1-3 ft and high caliber (33 or 45); Rifles can be close or long-range; good choice for poor restraint or fractious animal; must be 22 Magnum or above; solid point bullet only; Shotguns if shot then max 3ft range, slugs high power good for longer range, 12-20 gauge. Calves: Lower caliber (22 handgun or rifle or 28 shotgun) can be used for calves <4mo. See Figure 1 for location; must be at least 1ft from skull and aimed perpendicular. Ensure clear line behind animal; risk of ricochet of concrete or hard surfaces.	Does not require restraint; Inexpensive, requires training; High risk to human safety; No special disposal risk	Central Nervous System Destruction
Barbiturate and Barbituric acid derivatives	Sodium pentobarbital Euthasol	Proper administration IV results in rapid loss of consciousness and death; controlled substance, only given IV so only performed by veterinarians or under direct veterinary supervision; only method recognized by AVMA as acceptable without condition.	Controlled substance; Requires restraint and IV only; Risk to wildlife and environment; Disposal difficult	Central Nervous system depression
Primary Method Requiring Secondary or Adjunctive Method				
Captive bolt	Penetrating Non-Penetrating	Nonpenetrating captive bolt only acceptable in calve <4mo; Penetrating captive bolt acceptable in adult cattle; Captive bolt placed directly against the head so good restraint or sedation required; Can result in significant paddling so avoid injury from animal limbs; See Figure 1 for location; Captive bolt requires one of the following secondary method to ensure death: Pithing, KCl, MgSO ₄ , or MgCl given IV, Exsanguination, secondary shot	Requires restraint; close range; No ricochet risk; Requires adjunctive step	Central Nervous System Destruction
Secondary Methods Requiring Unconsciousness				
** Alpha-2 Agonist do not produce appropriate level of unconsciousness to be acceptable. ** Confirmation of unconsciousness required before any of these methods are used.				
Pithing	Pithing Rod	Secondary method to Captive Bolt or Gunshot; Insert rod at entry site for shot drive deep to ensure sufficient destruction of brain, brain-stem and spinal corde to cause death; Note: Agitation of rod can increase limb flailing so stay clear.	See risk for primary method; Risk of injury during pithing	Central Nervous System Destruction
Second Shot	Gunshot Captive Bolt	A properly placed primary shot (See Figure 1) should result in immediate unconsciousness; Secondary shot creates additional brain trauma to ensure death; placement either frontal (See Figure 1) or Poll shot placed just behind poll aimed at base of tongue.	See risk of primary method; May require additional shots	Central Nervous System Destruction
Exsanguination	Laceration of Carotid and Jugular, Brachial Plexus or Caudal Aorta	Secondary method to Captive Bolt, Gunshot, Anesthesia; Use a 6-inch sharp knife driven in just behind the jaw and drawn swiftly down to incise the carotid and jugular veins; Or the knife can be inserted behind the elbow and cutting the skin, muscle and vasculature until the limb is retracted fully from the thorax; or a skilled practitioner can enter rectally and use a scalpel to incise the caudal aorta resulting in bleeding in the abdominal cavity; Only Acceptable in unconscious animals.	See risks for primary method; Bloody	Hypoxia secondary to blood loss

Table 3 Cont'd:

Intra-Thecal Lidocaine	Lidocaine 2%	Requires anesthesia; position animal laterally and flex head to facilitate identification of atlantooccipital space, advance spinal needle perpendicular to skin at mid-line until cerebrospinal fluid is aspirated; inject 4-5ml/kg of 2% lidocaine rapidly.	Requires full anesthesia; requires advanced skill; potential contamination risk due to anesthetics	Central Nervous System Depression
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Secondary Methods using Saturated Solutions

** All solutions are temperature sensitive so may precipitate in cold weather.

Potassium Chloride	Water Softener Salt	Secondary to anesthesia, captive bolt, or gunshot; Administration: Following unconsciousness, administer rapidly IV until death confirmed. Dose: 75-100mg/kg (~250ml/mature cow); Mix: Grind salt to fine powder, mix 20g per 60ml of warm water to make a saturated solution. Warm if precipitates.	See risk of primary method; Requires skill to IV; Solution is temperature sensitive	Cardiac arrest
Magnesium Sulfate/ Magnesium Chloride	Epsom Salts	Secondary to anesthesia, captive bolt, or gunshot; Confirm unconsciousness; Use large gauge needle 14-gauge or larger, IV simplex and 500ml bottle of saturated solution; administer slowly until death confirmed; may cause muscular fasciculation, spasms or agonal breathing; slower onset of death than KCL Dose: varies estimate 500ml saturated MgSO4 per 450kg Mix: Add 2kg of Epsom Salts to 5L of hot water, mix, unmixed layer at bottom evidence of saturation; top off as needed	See risk of primary method; Requires skill to IV; Solution is temperature sensitive	Central and peripheral nervous system block; cardiac arrest

Figure 1: Location for captive bolt placement or target for gunshot.

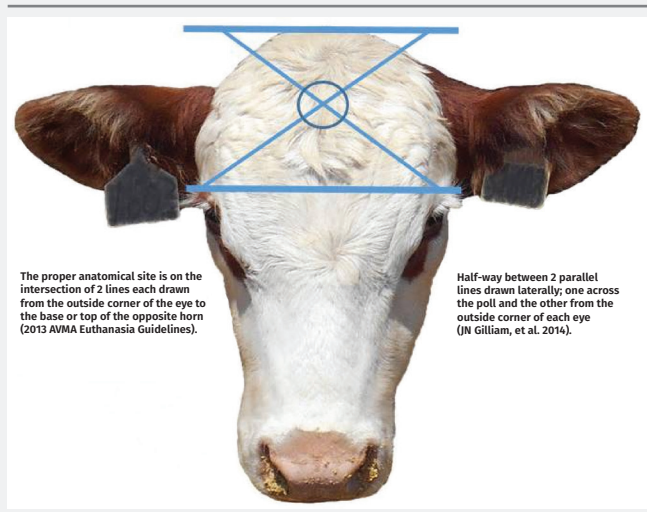


Photo courtesy of Dr. Jan Shearer.

What this means to the practitioner

Building a culture of care on a farm starts with caring for the people. Animal care takers are usually drawn to the profession because they care for animals. While most understand that euthanasia is part of the job, they typically underestimate the effect that it will have on them.⁹ Recognizing that euthanasia is one of the most challenging parts of the job and bringing understanding and empathy to the conversation can go a long way. This include bringing animal care takers into the discussion to develop on-farm euthanasia protocols, providing hands on training to ensure they are at least comfortable with the steps required, and having ongoing conversations with caretakers about their concerns and questions in implementing the process. If possible, it is also good to find responsible farm staff or owners who are not directly involved in animal care taking to perform the euthanasia, to lighten the load. Starting with everyone at the table will help to build a protocol for treatment, culling and euthanasia that matches the farm and the people.

The next step in building effective euthanasia protocols is to start with the decisions which come well before euthanasia, namely treatment and culling decision making. By developing treatment protocols which include the prognosis, likely response to treatment and full extent of time and treatment needed to alleviate suffering the veterinarian can more clearly define the cost-benefit of treatment including the “cost” to the animal. In developing culling protocols with the understanding of the economic ramifications, a veterinarian can emphasis the importance of proactive culling decisions while an animal is fit for transport and a good candidate for slaughter. By providing

clear cut-offs for culling vs. euthanasia, a veterinarian can help the farmer and care takers recognize when culling is not the appropriate decision despite the economic incentive. By providing clear and specific guidance on treatment and culling including specific decision points and endpoints, the practitioner can help farmers and care takers to make better decisions early which avoid difficult euthanasia decisions later.

Focusing now on euthanasia, again the key is to build a clear written protocol which makes it easier for animal caretakers to make the right decisions. Because of the moral challenges of making the decision to euthanize an animal, it is easier for caretakers to make that decision if they have clear directions and understanding of the importance. By taking the time to define measures of quality of life in cattle, providing an understanding of potential welfare of an animal with specific conditions and establishing endpoints for specific diseases, a veterinarian can provide clear guidance to help care takers decide when euthanasia is necessary and to follow through to provide humane euthanasia when needed to alleviate unnecessary pain and suffering.¹³

Once the decision is made, the next step is to define what timely euthanasia means, which is generally recognized as less than 4 hours. It is also important to assign a specifically trained person or people who are responsible for performing euthanasia, preferably those who are trustworthy and responsible, but not directly responsible for the daily care of the animals. By taking the burden of the actual euthanasia off the shoulders of the animal caretakers, it can help to relieve some of the distress.

To ensure that staff who are performing the euthanasia are prepared, it is important to provide clear written protocols of the process including pictures and specific directions. Equally important is providing regular hands-on training, preferably implementing the full process. Since euthanasia is not always schedulable, offering to come out and use the next case as a training case can be a good way to walk through the full process to ensure understanding. It is important to emphasize the importance of proper restraint, attention to process and safety during euthanasia procedures, and to equip those performing the process with a full understanding so they can make appropriate decisions based upon specific situations. Finally, providing an understanding of the importance of confirming death following euthanasia, and training staff on the specifics. Carcass disposal will be dependent upon the method of euthanasia and local requirements. Proper recording of euthanasia can also help to track euthanasia decision-making in the long term. That said, be cautious of self-reported data.

While the act of euthanasia can be difficult, it is important to emphasize the importance of empathy which starts with the staff who are asked to perform this tough task. By taking the time to regularly check in with staff to hear their concerns and appreciating their work, we can help to address some of the psychological stress inherent with the job.

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