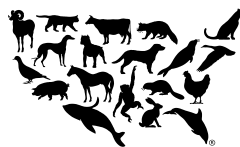


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# EUTHANASIA REFERENCE MANUAL

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The Humane Society of the United States



**THE HUMANE SOCIETY  
OF THE UNITED STATES**

***hsVma***

**HUMANE SOCIETY  
VETERINARY MEDICAL  
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Last but not least, The HSUS wishes to acknowledge and thank the many animal shelter and rescue staff and volunteers who are working tirelessly to save lives and make euthanasia of healthy and treatable animals a tragedy of the past.

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All illustrations by Les Sealing unless otherwise noted.



# Foreword

Since the first edition of this manual was published, in 2002, not much has changed in terms of “how” euthanasia is performed; the debate over “why,” on the other hand, has become more contentious than ever. Over the last few decades, euthanasia numbers have declined sharply—from over 23 million cats and dogs euthanized in 1970 to fewer than 4 million in 2010, even as pet ownership rose steadily over that period. As we come ever closer to achieving zero euthanasia, the challenges become greater, and the debate over which animals must be euthanized and which can be saved seemingly grows more intense. Euthanasia technicians should welcome this debate—as a profession, we should be clear, transparent, and honest about our decisions and agree that euthanasia should ultimately be reserved only for animals that are suffering or are too aggressive to safely place in homes.

Regardless, we must ensure that when euthanasia is performed it is as humane as possible. Direct injection of sodium pentobarbital (referred to as euthanasia by injection, or EBI) remains the most humane method available. We are encouraged to report that more organizations than ever before have adopted EBI, as opposed to using far less appropriate alternatives like gas chambers. It is our hope that by the time the next edition of this manual is published we will have reached the point where every shelter practices only the most humane methods of euthanasia available.

No one wants to perform euthanasia, but the people who take on this emotional and unwelcome task owe it to the animals to do it well. We hope this manual will serve as the definitive basic education tool for understanding the methods of humanely ending an animal’s life; however, it cannot provide answers to the topic’s moral questions. Euthanasia technicians should use this manual to refine their skills, but they must also develop programs and initiatives intended to bring an end to the need for euthanasia of healthy and treatable animals.

## CHAPTER 1

# Understanding Euthanasia

## What Is Euthanasia?

Euthanasia involves more than ending an animal's life. It is a process that combines compassion and scientific consideration while providing each animal with a death that is free of pain and stress. Along with the technical skills required, there must be compassion and a sense of solemnity, reverence, and respect for the animals.

Humane euthanasia of an animal requires five basic elements:

1. Compassion.
2. Knowledge.
3. Technical skills developed through training and experience.
4. Appropriate application of the most state-of-the-art drugs, equipment, and techniques available.
5. Wisdom to know when euthanasia should, and should not, be performed.

This manual will bring these five attributes into focus so that those entrusted with the care of sheltered animals have the knowledge, skill, equipment, and insight to serve their needs, even if this means ending their suffering through euthanasia.

## Euthanasia, Past and Present

Euthanasia, simply defined, is the act of inducing a painless death. The word itself comes from the ancient Greek "euthanatos"—*eu* meaning easy, and *thanatos* meaning death. Providing a "good death" for shelter animals whose lives must be ended should without a doubt be uppermost in the minds of those

entrusted with the task. In the 19th and early 20th centuries, long before pain-free methods of ending life were available and when the primary reason for destroying dogs and cats was not overpopulation but the control of rabies, such a goal was virtually unattainable. As the threat of rabies and other diseases diminished, the population of domestic pets skyrocketed, and with this increase in numbers came various methods for eliminating homeless animals; sadly, humane considerations were often secondary.

Over the years, many techniques were tried in search of "better" methods. Tragically, drowning was one of the earliest methods used; in many cities at the turn of the 20th century, animals were loaded into huge cages and lifted by cranes into a river or bay. Electrocutation was popular in the 1920s, with animals placed in cages with zinc floors wearing conductive collars. With the advent of the gasoline engine, the use of carbon monoxide "gas chambers" became commonplace. This method was later refined by replacing the raw, hot exhaust of an engine with commercially prepared gas from tanks. The decompression chamber was considered an improvement over previous methods when it was initially developed; however, persistent mechanical problems and questions about its humaneness quickly prompted bans in most areas, and the method is completely eliminated today.

Since 1963, the American Veterinary Medical Association (or AVMA) has reviewed euthanasia methods by regularly gathering a panel of experts to evaluate the latest studies and information about the various methods available. The report, updated most recently

in 2013 (at the time of this manual's publication), contains a list of recommendations intended for veterinarians (and by extension, trained euthanasia technicians) to follow in providing euthanasia for a variety of species. The AVMA report is the most extensive study of euthanasia methods currently available. The association's panel evaluates each method based on 14 criteria:

1. ability to induce loss of consciousness and death with a minimum of pain and distress;
2. time required to induce loss of consciousness;
3. reliability;
4. safety of personnel;
5. irreversibility;
6. compatibility with intended animal use and purpose;
7. documented emotional effect on observers or operators;
8. compatibility with subsequent evaluation, examination, or use of tissue;
9. drug availability and human abuse potential;
10. compatibility with species, age, and health status;
11. ability to maintain equipment in proper working order;
12. safety for predators or scavengers should the animal's remains be consumed;
13. legal requirements; and
14. environmental impacts of the method or disposition of the animal's remains.

Since 1986, the AVMA has consistently concluded that "the intravenous injection of barbituric acid derivatives [i.e., sodium pentobarbital] is the preferred method for euthanasia of dogs, cats, other small animals, and horses." When administered properly, sodium pentobarbital is capable of causing death quickly and

painlessly (criteria 1 and 2) and may be used consistently and reliably with many species (criteria 3, 5, 6, and 10).

Nevertheless, even sodium pentobarbital does not meet all 14 criteria. For example, it is a federally controlled substance with high abuse potential, which puts it at odds with No. 9. Moreover, it has several characteristics that may be considered both advantages and disadvantages. Its use requires close contact with each animal, which can provide beneficial comfort and the reduction of stress to the animal (No. 6), but as with all euthanasia methods, this takes a toll on the humans involved (although technicians performing euthanasia by injection are generally heartened by their ability to gently hold the animals, reporting less stress than those who use more removed methods like the gas chamber). Effective use of sodium pentobarbital also typically requires the participation of at least two trained staff members, to provide a higher degree of safety and support for the personnel involved (No. 4); some view this as a disadvantage because dedicating multiple staff members to the procedure requires more time than methods that can be performed by one person, but a properly trained team can actually be more efficient than a single technician.

While sodium pentobarbital may not be the perfect means of euthanasia, it comes closest of any available methods. All of its disadvantages weigh against the people who administer it, and all of its advantages weigh in favor of the animals. Therefore, its deficiencies, while certainly legitimate, do not outweigh its advantages, and should not be used as an argument in favor of less acceptable alternatives.

We hope that in the future, an even more sophisticated technique will be developed—one that meets all 14 of the AVMA's criteria. In the meantime, it is our responsibility to use the best method we have, and to use it with skill, compassion, and consistency.

## Important Definitions

Before discussing euthanasia techniques it is vital to establish a common understanding of the language of euthanasia. It is not unusual to hear people use terms like sedation, tranquilization, and anesthesia interchangeably. However, in order to achieve the most humane death possible for each animal by selecting the proper drugs it is imperative to understand their differences:

**Consciousness:** When conscious, an animal has the ability to deliberately and intentionally respond to environmental stimuli.

**Unconsciousness:** When rendered unconscious, the animal lacks awareness and the capacity for sensory perception, appearing to be in a deep sleep.

**Tranquilization:** When tranquilized, the animal usually is calm and relaxed, and he may even fall asleep. The animal may still feel pain, however, and a tranquilizer may not offer enough of a calming effect to safely handle a fractious animal. Tranquilized animals may also suffer seizures, and can be more unpredictable.

**Sedation:** When sedated, the animal falls into a sleep-like state and becomes uncoordinated, with relaxed and unresponsive muscles. There is often a decreased ability to feel pain, but pain sensations are still possible. Sedated animals may appear to be sleeping but may quickly

become aroused when stimulated by light or sound and cause harm to themselves and the humans around them.

**Immobilization:** When immobilized, the animal is essentially paralyzed and unable to move. However, while the animal appears to be unresponsive to sight and sound, he may still feel deep pain and may actually be experiencing fear and panic as he remains aware of his surroundings. For this reason, immobilizing agents are never appropriate for use in euthanasia.

**Analgesia:** Drugs that have an analgesic effect are intended to diminish an animal's ability to perceive pain, although not all drugs can extinguish pain completely. Moreover, just because a drug has an analgesic effect does not mean that it causes unconsciousness in the animal. Therefore, the ideal pre-euthanasia drug is both an analgesic and an anesthetic.

**Anesthetic:** When an anesthetic agent has been administered, the animal is ideally rendered unconscious, has a total loss of ability to feel pain (analgesia), and is immobilized, yet her vital functions (breathing and heart-beat) are retained. For this reason, the ideal pre-euthanasia drugs are anesthetics that, when used at proper dosages, achieve all of these ideals.

## CHAPTER 2

# Sodium Pentobarbital

Sodium pentobarbital belongs to a large family of drugs known as barbiturates. First used clinically about the turn of the 20th century as medical hypnotics, barbiturates like sodium pentobarbital served as the basis for many types of anesthetic agents now used for human and veterinary surgery. When used as surgical anesthesia, a barbiturate is dosed to safely cause short-term unconsciousness and loss of pain for the required duration. When used for euthanasia, barbiturates in general, and sodium pentobarbital in particular, are used at doses higher than would be used in surgery in order to quickly and completely depress the animal's central nervous system, resulting in death.

## How Sodium Pentobarbital Works

Sodium pentobarbital is an effective euthanasia agent because of its effect on brain function. When introduced into the bloodstream, sodium pentobarbital moves rapidly to the heart and then into the brain, where it quickly and painlessly depresses all vital life functions. A lethal intravenous dose of sodium pentobarbital causes a mammal to lose consciousness within seconds, and results in clinical death within just minutes.

To understand how the drug works, why it is considered to be the most humane method of euthanasia for virtually all animals, and how to recognize and correct potential problems after the drug has been administered, one must understand the stages of anesthesia that each animal undergoes once the drug has been administered. Each stage is identified by physiological changes within the animal's body. While sodium pentobarbital typically works so quickly

Sodium pentobarbital is commercially available in two variations, either alone or in combination with a drug called phenytoin sodium (an anticonvulsant drug that is intended to decrease abnormal electrical activity in the brain). Sodium pentobarbital alone (either in liquid form or in a powder that must be reconstituted with water) is available under trade names like Fatal-Plus, Euthanasia-6, Pentasol, and Succumb, and can be used for virtually all species of animals. However, because of its higher concentration of barbiturate (with its associated mood-altering properties) it has a high risk of addiction and fatal overdoses in humans; therefore, in this form sodium pentobarbital is strictly regulated by federal and state laws (see Chapter 10). When combined with phenytoin sodium, however (under trade names like Euthasol, Beuthansia, and Euthanasia III), the drug loses its properties as an addictive substance (the phenytoin sodium actually serves to hasten cardiac arrest, making the drug unsuitable for achieving a safe "high") and is therefore not subject to the same stringent acquisition controls. However, these combined formulations are approved for use only in dogs, and their routes of administration are restricted (these formulations may not be injected into the abdominal cavity, for example). Efforts are under way to produce formulations that combine sodium pentobarbital with lidocaine, though none is commercially available yet. **IMPORTANT NOTE:** Formulas that combine sodium pentobarbital with any other agent besides phenytoin sodium or lidocaine are not acceptable for use in euthanasia.



*Typical euthanasia drugs*

and effectively that it can be difficult to discern when the animal is moving from one stage to another, it is nevertheless crucial for euthanasia technicians to understand the process in order to appreciate how the drug so successfully provides a humane death.

**Stage I: Voluntary Excitement.** As the sodium pentobarbital is injected, the drug makes its way from the injection site to the heart, and is then pumped to the outermost layer of the brain called the cerebral cortex. As the animal begins to lose consciousness and coordination, he or she may become increasingly sensitive to noise, touch, and other stimuli. Gentle, safe restraint and a quiet environment are essential to minimize excitement during this phase. As the drug passes through the cerebral cortex, the animal quickly begins to lose the ability to feel pain (although he or she can still feel “deep” pain) and loses voluntary motor skills. **IMPORTANT NOTE:** Euthanasia technicians should be aware that when sodium pentobarbital moves through the brain it also shuts down the animal’s normal inhibitory centers, which typically keep the animal from biting; when this happens, the disorientation the animal is experiencing can cause even the gentlest soul

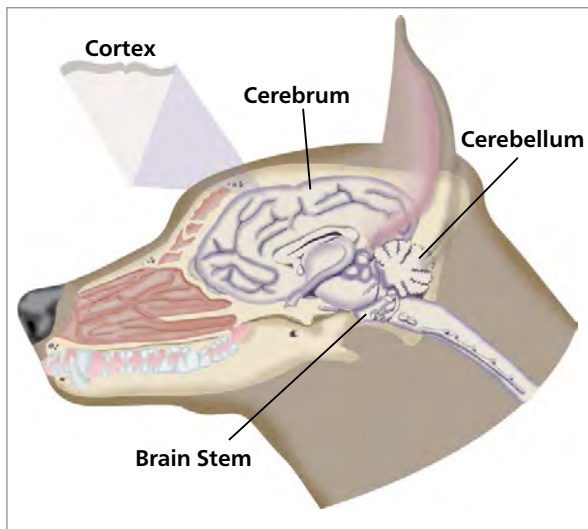
to react. Luckily, sodium pentobarbital works so quickly that euthanasia technicians are rarely hurt, but it is important to be aware of the possibility and keep the animal safely restrained until complete loss of consciousness occurs.

**Stage II: Involuntary Excitement.** Next, the drug moves through the cerebral cortex into the cerebrum, the area of the brain responsible for higher-order functioning, like senses, memory, personality, and emotions. The imbalance resulting from the presence of the drug in this region frequently causes uncontrolled motor activity like paddling of the legs and vocalizations; although this may be disconcerting to see, the animal is completely unconscious and not suffering.

**Stage III: Surgical Anesthesia.** Once the drug has made its way through the cerebrum it enters the cerebellum, the area of the brain that governs balance and gross motor activity. At this point the animal can feel no pain at all and does not respond to visual or auditory stimuli, and reflexes (including eye blink and toe-pinch) begin to disappear. Now the animal is considered to be in a state of surgical anesthesia and could be safely and painlessly operated on (provided vital signs—heartbeat and respiration—are maintained). If sodium pentobarbital has been injected into a

### How fast does sodium pentobarbital work?

Typically, within five seconds after injection into a vein the animal is unconscious, within 20 seconds the animal stops breathing, within 40 seconds the animal is considered “medically dead” (meaning the heart has ceased circulating blood), and within two minutes the animal is “clinically dead” (meaning all voluntary and involuntary functions have ceased, although muscle twitching may continue for several minutes).



*The anatomy of the brain*

vein, the animal generally reaches this stage as soon as four to five seconds after injection.

**Stage IV: Medullary Paralysis.** When performing surgery on an animal in Stage III anesthesia, specialists ensure that the drugs administered do not compromise the core functions of the deepest part of the brain, in the brain stem (*medulla oblongata*). The brain stem is responsible for the body's most basic needs for survival, namely breathing, heartbeat, and blood pressure. With euthanasia, however, the goal is to have the drug reach the animal's brain stem and depress these core functions as quickly as possible. Sodium pentobarbital achieves this goal, stopping the animal from breathing in oxygen and circulating blood usually within just 40 seconds after injection directly into a vein. When these core functions cease, the animal dies.

It is important to understand that even after the core functions have ended and death has occurred, the body may appear to the untrained eye to be showing signs of life—for example, the animal's heart may fibrillate, or the animal may audibly appear to gasp (called agonal breathing). These are not conscious, voluntary responses by the body or indications that the animal is "fighting for life." For example, heart fibrillations are little more than muscle spasms; they do not indicate that the heart is effectively circulating

blood. Similarly, agonal breathing is simply the body's reflexive attempt to address its shortage of oxygen; the animal is not actually breathing, or trying to breathe, in a manner that would sustain life. Knowing the difference between actual life signs and involuntary death responses is a critical part of performing euthanasia.

**IMPORTANT NOTE:** It is not enough to simply inject an animal with a lethal dose of sodium pentobarbital and assume that he or she has been euthanized. Euthanasia is not complete until death has been verified (see Chapter 4).

### "Lethal dose" vs. "label dose"

A lethal dose of sodium pentobarbital is the amount of drug sufficient to move the animal through all four stages of anesthesia and stop the core functions of life (respiration and circulation). Because sodium pentobarbital is intended to serve as a euthanasia agent, the actual amount of drug administered when following the dosage on the label (the "label dose") is much higher than the amount necessary to achieve death (the "lethal dose")—30% to 50% higher. This "extra" drug is intended to serve as a cushion to ensure that if the proper amount of drug is administered in the proper manner, the animal will in fact die humanely. **IMPORTANT NOTE:** This does not eliminate the need to affirmatively verify death, as a variety of factors can influence how much drug the body actually absorbs.

If sodium pentobarbital has been injected directly into a vein, the animal typically passes through all four stages of anesthesia in a matter of seconds; if the drug has instead been injected into the abdominal cavity, the process will take longer simply because the drug must first be absorbed into the bloodstream in order to then be carried from the heart to the

## Supply List

Before picking up a needle for injection, a euthanasia technician should ensure that all of the supplies necessary to perform euthanasia and manage any complications are at the ready, including:

- Electric clippers
- Tourniquet/hemostat
- Needles of various sizes
- Syringes of various sizes
- Towels/blankets
- Muzzle, net, press gate, or other appropriate humane restraint devices
- A “backup” syringe with sufficient amount of pre-euthanasia anesthetic to render the animal unconscious

brain. Regardless of method, a well-trained, experienced euthanasia technician can recognize when an animal is not following the typical timeline for the stages of anesthesia, and make necessary corrections to the process.

## Administering Sodium Pentobarbital

Sodium pentobarbital may be administered to an animal in several ways: IV (intravenous, injection of drug directly into a vein), IP (intra-peritoneal, injection of the drug into the abdominal cavity), IC (intracardiac, injection of the drug directly into the heart), or PO (*per os*, oral administration of the drug). Each method has advantages and disadvantages. A qualified euthanasia technician should be comfortable

A well-trained euthanasia technician must determine the most appropriate method, based on the animal’s species, age, medical condition, and temperament.

with each, and should select the method that will provide the most humane euthanasia for the animal under the circumstances.

## Intravenous (IV) Injection

*(Injection of Sodium Pentobarbital Directly into a Vein)*

With this method, sodium pentobarbital is directly injected into the animal’s vein, where the drug is carried by the circulatory system to the heart and then on to the brain. Once the proper quantity is injected, loss of consciousness is nearly instantaneous, and death quickly

## Intravenous (IV)

*(injection of drug directly into a vein)*

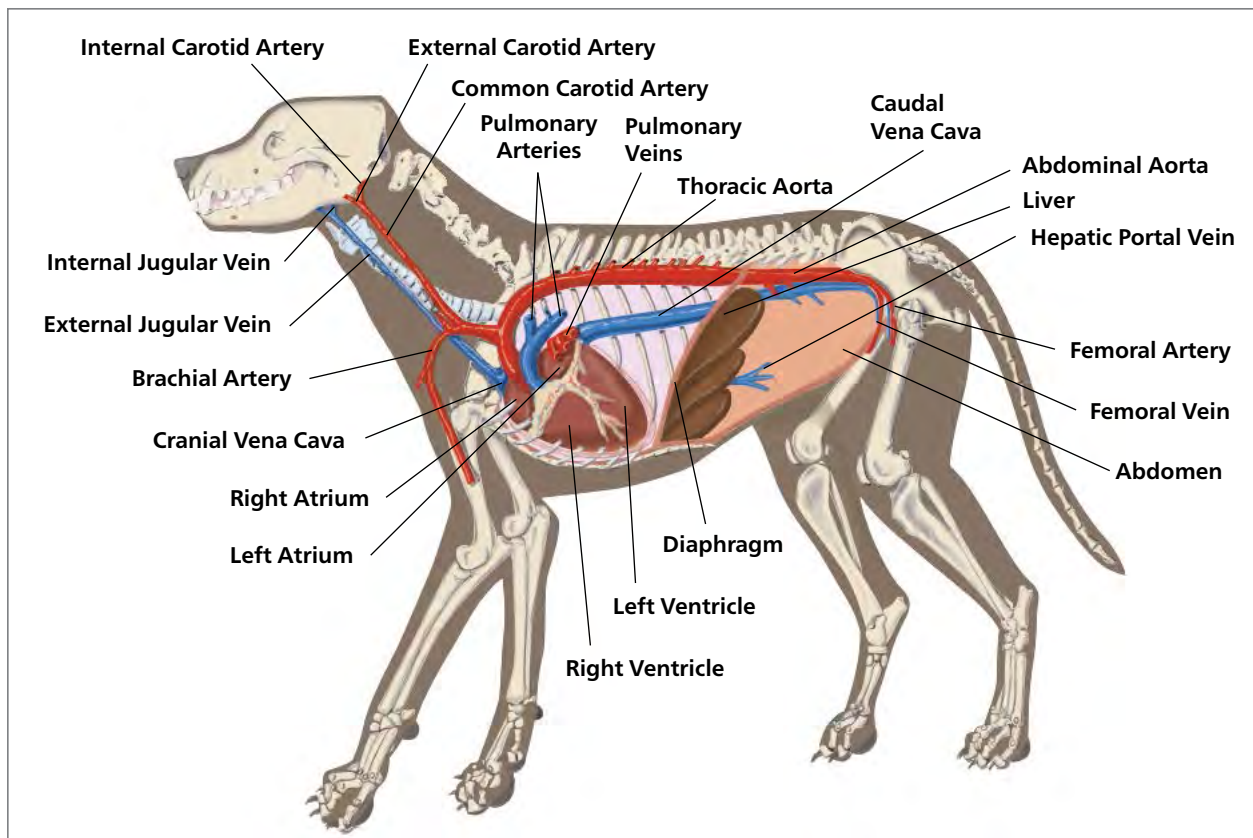
### Primary Advantages

- Can be used on virtually any animal, regardless of age or species.
- Can be used on conscious or unconscious animals.
- Appropriate veins are typically readily accessible.
- Causes minimal distress or pain when proper technique is used.
- Results in rapid death, as the drug is introduced directly into the circulatory system.
- Allows technicians to hold and comfort the animal.

### Primary Disadvantages

- The close contact required for direct injection into conscious animals can cause undue stress for some animals or can put technicians at undue risk of injury if the animal is fractious.
- The animal’s medical condition can make locating and injecting into veins a challenge.
- It generally cannot be used on very tiny animals whose veins are too small for injection.





*Circulatory system of a dog*

follows. Because there are no nerve endings inside veins, the only pain an animal feels in connection with IV injection is the initial prick of the needle piercing the skin. With education, training, and practice, a euthanasia technician can become extremely proficient at minimizing this needle sting and can “hit” (locate and enter) the vein on the first try virtually every time, creating a very humane and nearly painless experience.

IV injection is the most flexible type of injection in that it can be used on virtually any animal, with few restrictions for age or health. It also has the unique advantage of being appropriate for use on conscious dogs, because it is virtually

painless and because it does not require handling that most dogs find uncomfortable or invasive. Well-socialized dogs can be gently restrained while a euthanasia technician injects the drug directly into a leg vein (for this reason, IV injection into a conscious animal is often referred to as “direct injection”); using this direct injection method, the dog receives the benefit of close, comforting human contact in the last moments and avoids the pain that accompanies the injection of most pre-euthanasia drugs (see Chapter 3). For this reason, the preferred method for humanely euthanizing well-socialized dogs is direct IV injection of sodium pentobarbital without administration of any pre-euthanasia drug.

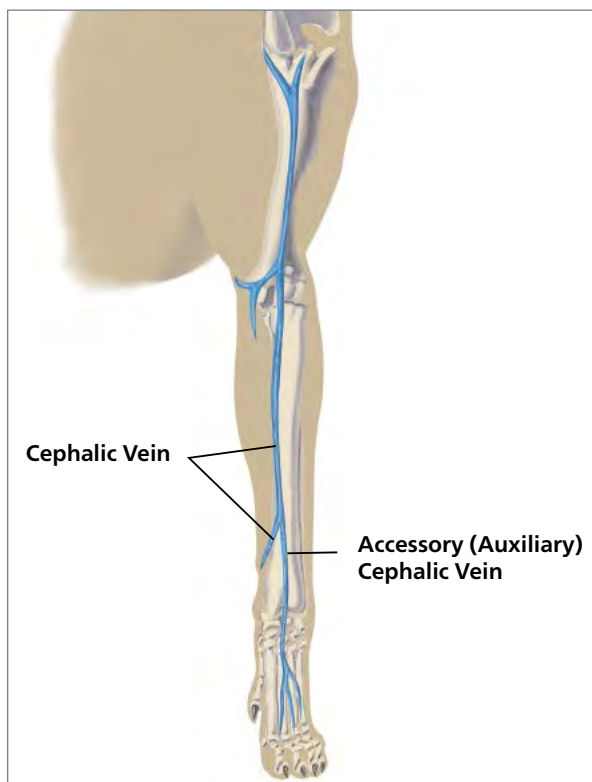
Cats tend to resist even the gentle restraint associated with IV injection, so IP (intraperitoneal) injection is often preferred over IV for conscious, well-socialized cats.

### Selecting Veins for IV Injection

IV injection can be performed on any of several veins throughout an animal’s body. When selecting a vein, a euthanasia technician should take into account factors like species, size, and

whether the animal will be conscious or unconscious when the injection is given. Another important consideration is the technician's personal preference and comfort level—some people are simply more adept at “hitting” veins (successfully administering IV injection) in an animal's front legs than back legs, or vice versa. Any vein can be acceptable provided accessing it does not place any undue stress on the animal (assuming the animal is conscious). Whichever veins are preferred, however, euthanasia technicians must be able to locate and inject into any of them, because the animal's front or rear leg veins may be unavailable because of illness or injury, and because even the most skilled technicians can “blow” veins (see discussion on Injection, below), requiring them to move from one leg to another to achieve successful injection.

Four pairs of veins can be used for IV euthanasia injections in mammals (the trained euthanasia technician must determine which is most appropriate):

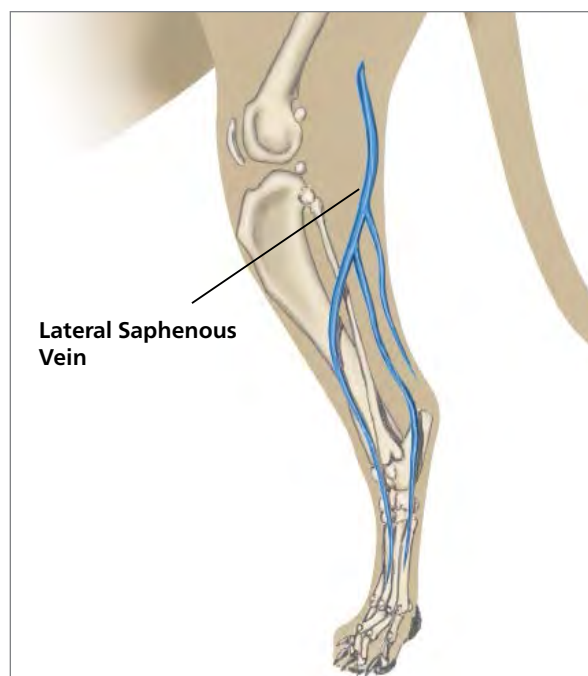


*Cephalic vein of a dog*

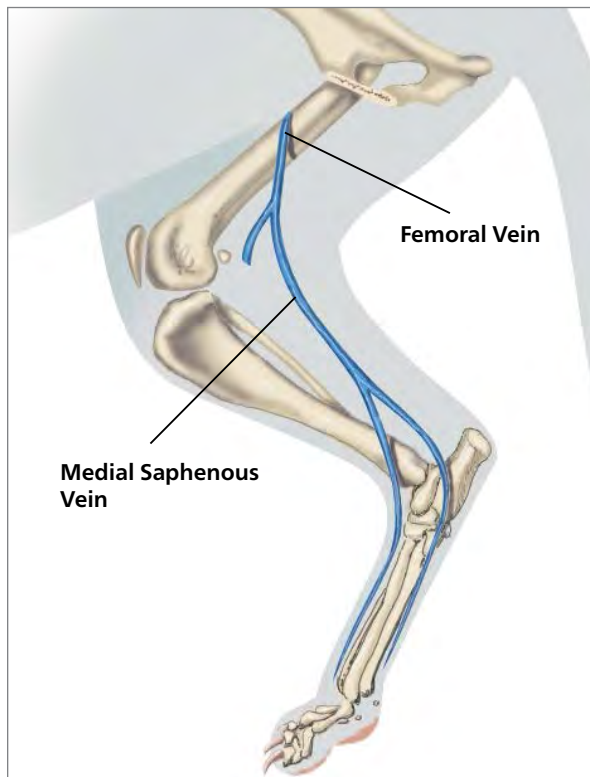
Throughout this manual, the term “handler” will be used to refer to the person holding the animal for euthanasia and the term “technician” will be used to refer to the person performing the injections.

The **cephalic veins** run prominently down the front of each foreleg of an animal. They are a preferred route for direct injection of conscious, socialized, friendly dogs because the handler can easily extend the foreleg while providing gentle, humane restraint. The cephalic veins also are held tightly in place and tend not to “roll,” or move sideways within the leg, quite as easily as other veins can. Many technicians prefer them for these reasons.

The **lateral saphenous veins** run down the outside of the animal's rear legs and then cross diagonally across the leg just above the hock. The lateral saphenous veins of adult dogs tend to be fairly large and easy to find, making them a preferred choice for many technicians, provided they choose their injection location appropriately. Lateral saphenous veins must



*Lateral saphenous vein of a dog*

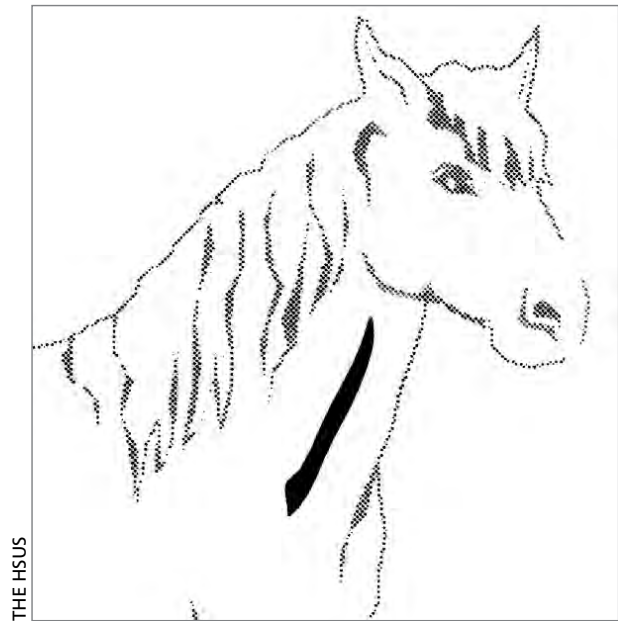


*View of the medial saphenous vein of a cat*

be injected away from the hock joint or they can roll, and they do not run directly from top to bottom of the leg as the cephalic veins do. The lateral saphenous vein can be used for direct injection of conscious dogs, as long as the animal is not unduly stressed by the gentle restraint of its rear leg. Cats, puppies, and kittens, however, tend to have small lateral saphenous veins, making these veins a less attractive choice.

The **medial saphenous veins** (aka femoral veins) run straight down the center of the inside of the animal's rear legs. They can be a good choice for unconscious cats, whose lateral saphenous veins may be too small to easily inject into.

The **jugular veins** run down each side of the neck of most mammals. Restraining a cat or a dog safely for jugular injection can be difficult, causing undue stress on both the animal and the handler. Moreover, the jugular vein in an animal as small as a dog or cat is very close to the trachea and carotid arteries, increasing



*Location of the jugular veins in a horse*

the likelihood of improper injection. For these reasons, injection into the jugular vein of a dog, cat, or other small mammal should be avoided. For large animals like horses, however, the jugular veins are readily accessible and clearly evident, making injection fairly easy. Moreover, in these large animals it is often impractical or dangerous to try to inject veins in the leg, making jugular injection the safest option for the technician.

### Administering IV Injections

**NOTE:** The following describes the correct procedure for injecting into a cephalic vein, but this basic technique is also generally applicable to injections into other veins as well; specific information pertinent to injecting into the saphenous and jugular veins follows.

#### **Readying the Syringe and Needle**

Regardless of the method used to inject sodium pentobarbital, selection of the appropriate syringe and needle is the first step to ensuring success. The volume of drug required will dictate the size of the syringe. For the most part, the larger the syringe the more unwieldy it is; therefore, technicians should always select

While needles must never be reused, syringes can be. It is critical, however, not to use the same syringe to inject first one drug and then another (for example, do not use a syringe for administering first a pre-euthanasia drug and then sodium pentobarbital), since any leftover drug remaining in the syringe can crystallize and cause obstruction. Moreover, blood left in the syringe can interfere with the technician's ability to see the flash of blood that shows the needle is properly in the vein. For these reasons, it is recommended that new syringes be used at least during every new euthanasia session, and that separate syringes be used for each separate drug administered.

the smallest syringe capable of handling the necessary dose of drug (see Chapter 6 for more information on syringes).

By contrast, the needle will depend primarily on the size of the animal. Needles are available in several lengths and sizes, called gauges, according to the bore diameter of the needle. It may



*Readying for injection into the cephalic vein*

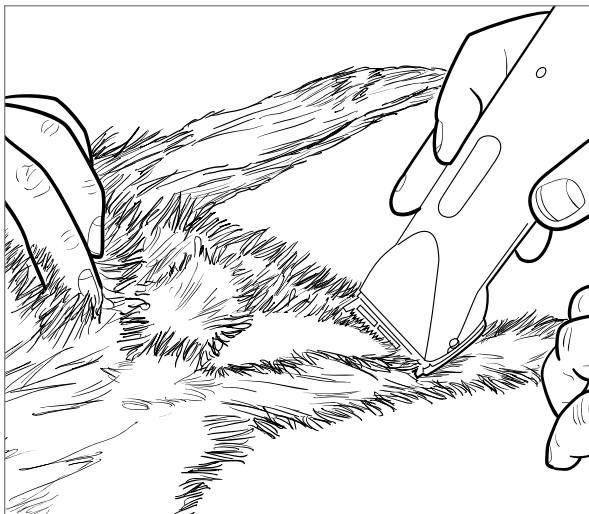
appear counterintuitive, but the smaller the diameter of the needle, the larger the gauge size—for example, a 25-gauge needle is smaller than a 22-gauge needle, which is smaller than an 18-gauge needle. Choosing a smaller needle generally produces less discomfort for the animal on injection; however, if a large volume of drug is required, a smaller needle may not be able to deliver the necessary volume of drug at an appropriate pace, or may fail completely and pop off the end of the syringe. Selecting the proper needle may seem to be a fairly minor consideration, but it is a vital part of a good euthanasia technician's toolkit for making euthanasia as humane as possible.

The seals of sodium pentobarbital bottles are quite durable and will dull any needle pushed through them. For that reason, needles that have been pushed through a sodium pentobarbital bottle top should never be used to pierce the skin of an animal, since a dull needle means increased pain. Most technicians insert a single needle (usually mid-to-large gauge) into the sodium pentobarbital bottle at the start of each euthanasia session, and use that same needle to draw all drug into the syringes. It is not necessary to use a new syringes. It is not necessary to use a new needle for every draw of drug.

Once the proper needle and syringe have been selected, the technician should insert a spare needle into the bottle and draw up the appropriate amount of sodium pentobarbital into the syringe, then attach the needle. Once that task is completed, both the euthanasia technician and the handler should verify one last time that they have the right animal before them, that the appropriate paperwork authorizing euthanasia is in order, and that the animal has been scanned once more for a microchip or other identification. Once all proper verifications have been made, injection can proceed.

### Locating the Proper Injection Site

Assuming the euthanasia technician has decided to inject sodium pentobarbital into the cephalic vein (regardless of whether the animal is conscious or not), the handler should gently extend the animal's foreleg (see Chapter 8 for information on humane restraint) so that the front of the leg can be shaved. Shaving is not an absolute necessity, but it gives the technician a clearer view of the vein and increases the odds the injection will succeed on the first attempt. The technician should use clean and well-lubricated electric clippers (size 40 blades are recommended) to shave a sufficient area over the front of the animal's leg to allow access to the vein, clipping opposite the direction of hair growth (from paw to shoulder) to produce the closest shave. Care should also be taken to avoid "clipper burn," abrasion of the skin caused by excessive heat from the friction of the clipper blades or poor blade positioning; holding the clipper at the proper angle (typically flush against the skin), applying only light, consistent pressure, and ensuring proper lubrication of the blade will avoid this. Some technicians prefer not to shave, since the use of noisy clippers may add to an animal's stress; however, a higher degree of skill is necessary to locate the vein without first shaving the area. As an alternative, curved scissors may



*The proper angle for gentle shaving of the injection site*

Some euthanasia technicians mistakenly believe that alcohol must be sprayed on the injection site to "raise" the animal's vein, making it easier to inject. However, in many cases the alcohol only dampens the hair, giving the illusion that the vein is raised. Moreover, the alcohol can cause a burning sensation and can make the needle puncture more painful for the animal, particularly if the leg has been shaved. Technicians should therefore never apply alcohol to the shaved legs of conscious animals before injection (for technicians reliant on spraying alcohol, water can be used as an effective alternative).

be used to eliminate excess fur, although care must be taken as the skin may "tent up" and be accidentally cut.

The technician may sprinkle water on the area to help make the vein more visible—not only does the presence of water flatten the hairs on the leg, the evaporation process helps to tighten the skin surface making the vein appear more prominent. Alcohol should not be used on a conscious animal if the fur has been shaved, since it causes an uncomfortable stinging sensation.

In some animals, once the hair has been removed, the vein will be easily visible as a long, bluish line running down the front of the leg. However, in most cases, an additional step, known as "holding off the vein," must be taken to make the vein accessible for injection. Veins carry blood to the heart; in the case of the cephalic veins, blood is being pumped continuously up the leg from the paw toward the shoulder. When the flow of blood is constricted, the blood below the point of constriction backs up, increasing the pressure in the vein; this increase in blood pressure causes the vein to enlarge, making it much easier to see and feel (imagine a cheap garden hose—if the hose develops a kink that prevents



*Inserting needle into the cephalic vein*

water from continuing to move through, the pressure will cause the hose to appear to expand just below the point of the kink). This effect (referred to as “raising the vein”) can be achieved either by having the handler “hold off” the vein manually or by applying a tourniquet or other mechanical means of blocking off the vein.

To hold off the cephalic vein, the handler grasps the leg from behind, “cupping” the animal’s elbow in his or her palm, then wraps her thumb over the vein and applies firm, consistent pressure. This approach gives the handler a controlling grasp that not only obstructs the blood flow of the cephalic vein, causing it to swell so that it can be injected into more easily, but also helps to gently prevent the dog from retracting his or her leg away from the injection. The handler may roll her thumb and hand (along with the skin and vein it holds) slightly outward so that the vein is positioned directly on top of the leg bone, creating the ideal position for injection.

If the handler requires both hands to gently restrain the animal or is otherwise unable to adequately hold off the vein, a commercially purchased tourniquet system may be used

to achieve the same result. A Nye tourniquet consists of strong rubber cord that is placed around the animal’s leg and then is clamped with an attached friction grip; alternatively, a hemostat can be used to clamp an elastic tube or band wrapped around the animal’s leg. The tourniquet or hemostat should be placed just above the elbow and tightened firmly enough to cause the vein to rise for easy visibility. A tourniquet or hemostat can at times provide better constriction of a vein than simply a handler’s thumb; however, it can be difficult for the technician to unclamp a mechanical device once the needle has been inserted, so most technicians prefer to rely on their partner for manual hold-off.

## IV—Intravenous

*(injection of sodium pentobarbital into a vein)*

**Species recommended:** dogs, calm and friendly cats

**Dose:** 39 mg/pound (usually 1 ml/10 pounds)

**Circulatory compromised:** 78 mg/pound (2 ml/10 pounds)

**Injection speed:** rapid (1-2 ml/second) and consistent with good technique

**Dog veins:** cephalic, lateral saphenous

**Cat veins:** cephalic, medial saphenous (femoral)

**Syringe retracts:** small volume (flash) of blood

**Time to loss of consciousness:** ~5 seconds

**Time to deep anesthesia:** ~10 seconds

**Time to cessation of respiration:** ~20 seconds

**Time to cessation of heartbeat (death):** ~40 seconds

**Time to cardiac standstill (no fibrillation):** ~2–5 minutes

If the euthanasia technician is still having trouble viewing the vein after applying sufficient pressure to raise the vein, he or she can “pump” the leg by holding the upper part of the leg and moving the foot up and down several times. This is somewhat like shaking a dog’s paw, except that only the foot and carpus (the dog’s “wrist,” or leg just above the foot) are moved. Pumping the leg increases the return of blood from the foot toward the heart and helps to further increase the size and appearance of the restricted vein. Rolling the leg slightly to one side or the other can sometimes change the visual angle enough to help the technician identify the vein. Finally, tapping the surface of the forelimb with the index finger can also help confirm the presence of the vein, which should have a more “springy” feeling than adjacent tissues.

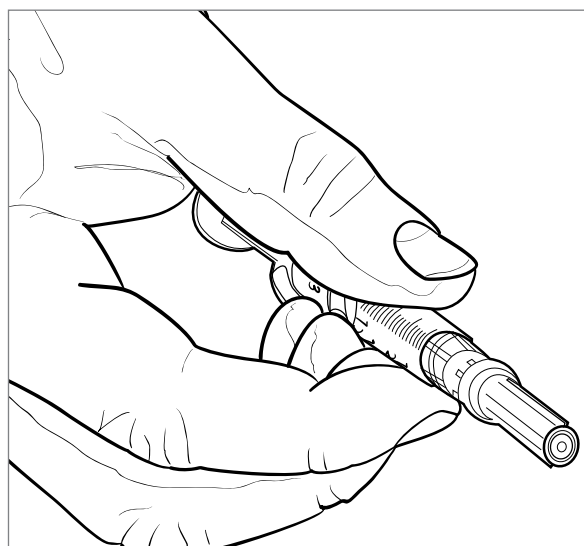
Once the vein has been located and raised for injection, the handler should continue to hold off the leg (or leave the tourniquet in place) until the euthanasia technician indicates that the needle has been successfully inserted into the vein and the injection of sodium pentobarbital is ready to proceed.

**IMPORTANT NOTE:** The euthanasia technician must be able to see the vein, feel it, or both, before inserting the needle into the animal’s limb. It is not acceptable practice to “fish around” for the vein (puncturing the skin then moving the needle around in a blind attempt to locate the vein), even if the technician is very experienced and knows where the vein is most likely to be located. While veins are generally in the same place on every animal, slight anatomical variations must be accounted for (for example, some animals have veins that run perfectly vertical in the center of the foreleg, while others have veins that sit slightly off-center, that bend slightly to one side or the other, or that sit more or less deeply under the skin). The technician should try to pierce the skin with the needle only if he or she is confident that the vein has been located and that there is a reasonable expectation of piercing the vein on the

first try. If the technician has followed all of the steps above to locate the vein without success, he or she should either move on to another leg vein for IV injection, switch to IP injection if appropriate for the species and size of the animal, or administer pre-euthanasia drugs to render the animal unconscious so that sodium pentobarbital can be administered IC.

### ***Injection***

The proper technique for injecting sodium pentobarbital into a vein is not the same as for administering vaccinations or other injections. The way the needle is directed, the angle at which it enters the skin, even the way the syringe is physically picked up and held are different for administration of an IV injection, and euthanasia technicians must know these differences and be comfortable with them. When administering a vaccination, the technician typically holds the syringe between the index and middle finger and places the thumb on the plunger, so the hand effectively surrounds the syringe. The orientation of the bevel (the hole from which the liquid leaves the needle) isn’t critically important when administering a vaccination, nor is the exact angle of the injection. When administering IV injections, however, care must be taken to ensure that the needle’s



*Proper technique for picking up and holding a syringe for IV injection*

bevel is pointed up (so the sharpest point is the first to touch and enter the skin, ensuring a clean puncture), and that the needle angle is shallow enough to allow it to fully enter the vein without piercing the far side. To achieve this, the technician should pick up the syringe as though it were glued to a table surface. Ideal finger placement is for the thumb to sit on one side of the syringe and for the first and second fingertips to sit on the other side, on the barrel away from the needle end of the syringe (so there is room for the technician's other hand to properly stabilize the needle, as discussed below), with no part of the hand lying underneath the syringe. This not only ensures that the syringe can have fairly close contact with the skin of the animal, but it also allows the technician to control the needle angle most effectively.

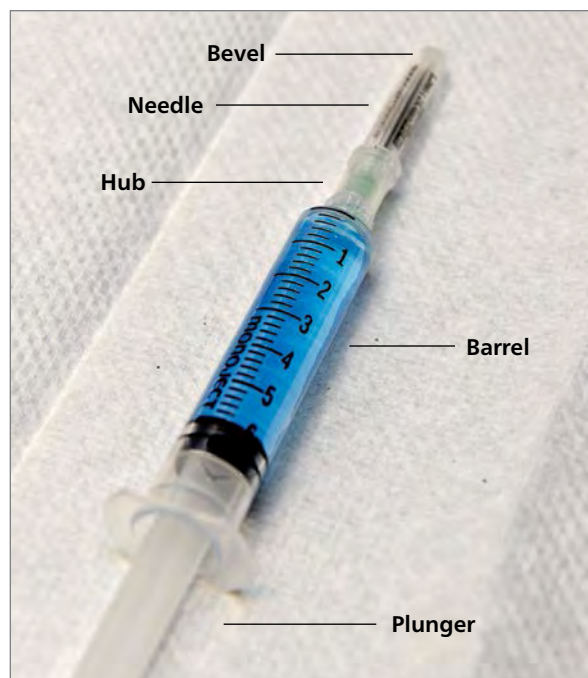
Remember, even if your shelter already has a policy in place to scan each stray animal upon arrival for a possible microchip or other identification (this should be standard practice, and is legally required in some states), each animal should be scanned one final time before being euthanized. Animals too fractious or fearful to be adequately scanned while conscious can be scanned while under the influence of pre-euthanasia drugs; if an identification is found, the animal can be allowed to awaken with no irreversible effects.

The hand not holding the syringe should stabilize both the leg of the animal and the vein itself. Ideally, the technician should wrap his or her hand under the animal's leg and cradle the vein between the thumb and fingers; this technique has the added benefit of creating a kind of channel to help guide the needle into the proper location in the center of the vein. Alternatively, the technician can wrap his or her fingers around the back of the animal's leg and

lay the thumb flat along the vein from thumb-nail to palm, applying gentle steady pressure so that the vein does not roll away from the needle.

Once the handler has a firm but gentle grasp on the animal, the vein has been definitively located and stabilized, and the euthanasia technician has the syringe at the ready (beveled edge facing up), injection can begin. The first injection attempt should be made into the vein in the center of the shaved area (typically just above the carpus, or wrist joint). The skin of most dogs and cats is thin enough that it takes only a small amount of pressure to make the initial puncture; the technician will feel brief resistance, then a smooth insertion under the skin, although age, gender, and the medical condition of the animal can make the skin a bit more difficult to pierce.

One of the most difficult aspects of successful IV injection is developing an appreciation for not just the proper location for insertion but the angle at which the needle should be inserted. IV injection requires that the needle puncture the skin and fully enter the vein so that the drug can be injected directly into the bloodstream and



*A syringe holding 6 ccs of euthanasia solution*



Because there are nerve endings in the skin, animals may react to the initial needle puncture. Ensuring that the needle is new and that the animal is securely but gently restrained can help minimize the impacts of such a reaction. If the animal reacts slightly, an experienced technician can continue the process by remaining calm and moving quickly through the next steps; in most cases the animal will mirror the technician's calm demeanor and settle back down. If the animal does not calm down, however, and it becomes unsafe to proceed, the procedure should be halted, the needle removed, and the injection site should be covered with light pressure to stop the leakage of blood. In such cases it will be appropriate to use a pre-euthanasia drug to minimize further distress.

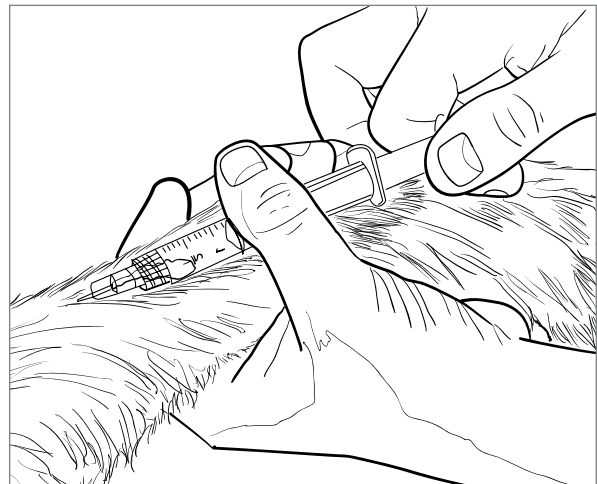
carried swiftly to the heart (commonly referred to as "hitting the vein"). If the initial approach is at too shallow an angle, the needle may puncture the skin but may not enter the vein, or the needle may bounce off the top of the vein and roll the vein away; in either case, if injection is attempted, the drug will simply pool between the skin and the vein. Alternatively, if the approach is at too steep an angle, the needle is likely to pass through the vein and out the other side (given that most veins are just a few millimeters wide), again causing any drug injected to miss the bloodstream. Generally, entering the skin at a 30-degree angle is likely to produce the greatest success; however, because all animals are individuals there is no guaranteed perfect angle, and the best way for a technician to maximize success is through practice and experience.

It can be difficult for the inexperienced technician to know when the needle has entered the vein. Although not always present, there is frequently a "flash" of bright red blood that appears in the hub of the needle (the plastic part of the needle that attaches to the syringe) when the vein is pierced. This may be accompanied

by a very slight popping feeling as the needle pierces the vein wall and enters the bloodstream, after which it should meet little resistance unless it is inserted so far that it pierces the other side. Feeling the vein is one of the most difficult skills for the new euthanasia technician, but with patience and practice it can be readily mastered.

Once the vein has been entered, the technician must continue to insert the needle until a sufficient portion of its length is inside the vein. If only the tip or a very small portion of the needle is inserted, the needle is likely to be knocked out of the vein once pressure is applied to the plunger to inject the drug. However, care must be taken to ensure that the needle is not thrust so far in that it pierces the vein's far wall. Again, practice and experience are the best teachers.

Because proper placement of the needle inside the vein is so critical, once it has been achieved the technician must secure the syringe in place before any drug is injected. This is important not just because the pressure of injection could cause the needle to move, but also because the animal may at any point jerk his or her leg away, altering placement of the needle. If the syringe is clamped securely to the leg, however, the technician can usually continue the injection even though the leg is moving or wait a few seconds until movement has stopped and then continue.



*After insertion, the technician should use his thumb to secure the needle*

Typically, the technician secures the syringe by taking the thumb that was formerly supporting the vein for initial injection and clamping it down over the syringe, securing it firmly between the thumb and the animal's leg. Thumb placement is important—it must be back far enough to secure the body of the syringe, rather than the needle, and it must not block the technician's view of the hub (it is necessary for the technician to look for blood in the hub when the needle is aspirated). Alternatively, the technician may secure the syringe by clamping it between the thumb and fingers of the hand holding the leg. At first these movements may seem awkward, because they mean loosening the grip on the animal's leg momentarily and finding just the right spot to hold the syringe securely in place. With practice, however, it becomes a quick, smooth motion that secures the syringe firmly without any shift in needle location.

Injecting into veins is a skill that requires experience to master; fortunately, new euthanasia technicians have ways to practice without inflicting suffering on an animal. Inexperienced technicians can use an orange to simulate the feeling of pushing a needle through skin. Alternatively, they can practice on animals that have already been euthanized. While this may sound inappropriate, it is better that technicians develop their skills using animals that can no longer feel pain than live animals. While being technically proficient at euthanasia is a skill no one expects or desires to have to master, if euthanasia must be performed it is best done by someone who is as skilled as possible.

### ***Verifying that the Needle Is in the Vein (Aspirating Blood)***

Once the syringe has been secured to the leg, the technician must confirm that the needle is properly in the vein. To do this, he or she

attempts to aspirate (draw back) blood into the syringe. When the plunger of a syringe is pulled back, it sucks in whatever material the needle is exposed to—if the needle is immersed in water, for example, pulling back the plunger (aspirating) will draw water into the syringe. Likewise, if the needle is immersed in blood, as it should be if it is properly inserted into a vein, pulling back on the plunger will draw blood into the syringe. This is the most definitive sign that the needle is properly placed for injection of sodium pentobarbital. If pulling back on the plunger produces either no blood at all or just a slight flash of blood, the needle is not actually in the vein and it must be repositioned before any drug is injected. **IMPORTANT NOTE:** When aspirating, pull back on the plunger gently; pulling back too aggressively can draw the wall of the vein into the needle tip ("collapsing" the vein), blocking the needle.

To reposition the needle, it is often not necessary to remove it fully from underneath the skin. In fact, it is preferable to simply reposition the needle under the skin to avoid causing the animal pain by reinjection. The technician should use his or her senses to determine whether the needle is sitting above, below, to the right, or to the left of the vein and adjust position accordingly. Once the needle has been repositioned, it should once again be secured and aspiration attempted. It may be necessary to move the needle several times before successful aspiration of blood confirms that it has been properly placed; this happens to even the best and most experienced technicians. The important thing is not to become frustrated or

It is a commonly held misconception that second injections must always be performed above the initial injection site; in actuality, the structure of veins is such that they will effectively carry blood to the heart even if they encounter a puncture.

upset, since humans' moods can easily be read by the animal—simply take a breath, regroup, and try again.

**IMPORTANT NOTE:** If it appears from all indications that the needle is actually in the vein but nevertheless no blood can be aspirated, the needle may be clogged. Dirt from the animal's skin, skin tissue, blood from a previous insertion attempt, or a hair particle may be caught in the shaft, blocking delivery of the drug. The only way to confirm this is to withdraw the needle, aim it away from any animals or people, and gently attempt to push a small amount of solution out of the syringe. If nothing comes out, the needle is clogged and should be discarded. Use a new needle to attempt another injection.

If it is necessary to remove the needle from the leg, remove the pressure being used to raise the vein (loosen the tourniquet or release the hold on the vein) and apply gentle pressure to the puncture site to try to avoid the formation of a hematoma or swelling created by blood leaking from the pierced vein.

The second injection attempt should be made either slightly above or slightly below the initial puncture site. If the animal begins to resist, let him or her relax for a moment by loosening (but not releasing) the restraint.

**IMPORTANT NOTE:** Every time you pierce the skin the needle becomes dull, and can cause the animal pain. If the animal is conscious and you have missed the vein, at a minimum you should replace the needle; a better practice is to simply abandon the attempt to use direct injection and opt instead to anesthetize the animal before attempting further injection.

If the animal is unconscious and the vein continues to be missed, the technician can simply move on to another leg. If the technician is still not having success in hitting the vein, consider passing the syringe to another trained technician. Every euthanasia technician has experienced being seemingly completely

unable to hit a vein, only to have her partner hit the vein on the first try; while understandably frustrating, it is important to shake this off and move on with the work, since everyone has a bad day from time to time. One final tip on hitting veins: Those just learning the art of intravenous injection tend to be very cautious, and rightly so. Their tendency is to hesitate and advance the needle very slowly; however, a slow-moving needle is more apt to push the vein off to one side, rather than pierce it, and piercing the skin slowly is more painful than moving through the skin deftly. Practice will help the inexperienced technician become more confident and slide the needle into the vein with a deliberate, yet gentle motion.

### ***Injecting the Drug***

Once blood is clearly aspirated into the syringe, allowing the euthanasia technician to confirm that the needle is properly located in the vein, the sodium pentobarbital can be injected. The technician should signal the handler to remove the pressure from the vein (or release the tourniquet) so that full blood flow to the heart is restored; if injection is attempted before pressure is released, the leg will begin to swell as a result of the backup.



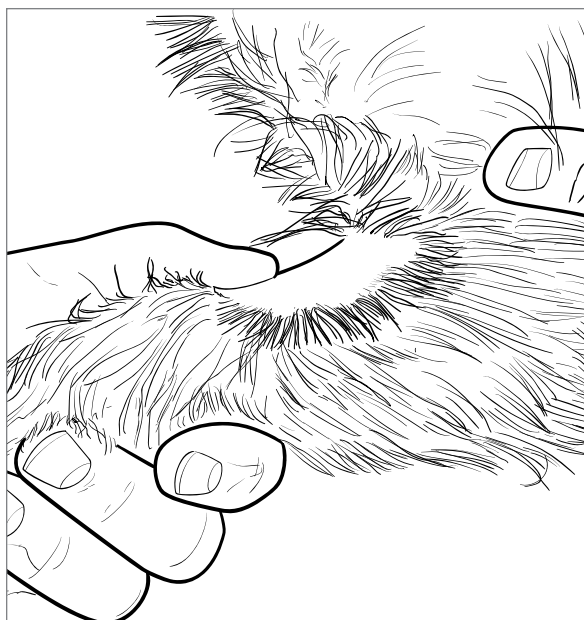
*Injection into the cephalic vein of an unconscious dog*

When administering vaccinations or injecting pre-euthanasia drugs, best practice is to inject the drug slowly, so as to limit stinging; by contrast, sodium pentobarbital should generally be administered quickly, so that the maximum amount of drug possible is carried to the heart and then the brain at one time (this effect of getting a large quantity of drug to reach the target at one time is called a bolus effect). Injecting the drug too slowly may cause the animal to move slowly between Stages I and IV and have adverse reactions (howling, uncoordinated movement, anxiousness, etc.) before losing consciousness. **IMPORTANT NOTE:** Drugs that combine sodium pentobarbital with phenytoin sodium should be administered slowly, since the presence of phenytoin sodium is sufficient to avoid the need for bolus administration.

Nevertheless, whenever injecting drugs, make certain that the pressure on the syringe is not so great that the needle either moves out of the vein or pops off the end of the syringe. When the injection is performed correctly, the animal should begin to lose consciousness and collapse three to five seconds after the first milliliter of sodium pentobarbital is introduced into the vein; the technician should continue to inject the sodium pentobarbital until the syringe is empty, and the handler should continue to gently restrain the animal until he or she has fully lost consciousness. If the injection is successful there will be no visible change to the leg during or after injection; if, however, a bulge appears, the vein wall has been compromised, drug is escaping and injection should cease immediately (this is commonly referred to as having “blown” the vein).

### **Removing the Needle**

If the animal was conscious when direct IV injection was performed, he or she will typically lose consciousness and begin to collapse before the injection is completed. The handler should take care to gently lower the animal to the table or floor once he is unable to stand on his own, ensuring that the syringe remains in



*Light pressure on the puncture after injection will prevent bleeding*

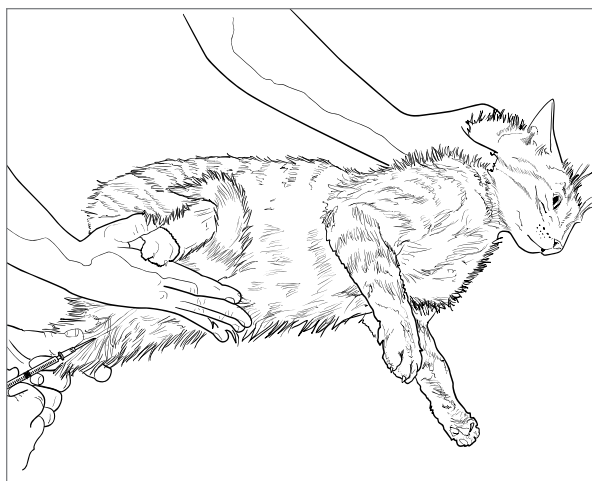
place until fully withdrawn by the technician, in addition to showing respect for the animal. When the animal is completely unconscious and his body is resting fully on the table or floor, the technician may remove the needle from the vein by withdrawing it slowly; slight pressure should be placed on the injection site to prevent blood from seeping from the puncture. **IMPORTANT NOTE:** Verifying death (see Chapter 4) is a required next step. The euthanasia process is never finished until death has been verified.

### **Special Considerations for Injecting into the Saphenous Vein**

The procedure for injecting into the saphenous vein is generally the same as that for the cephalic vein, except for how the vein is held off and how the needle is inserted.

#### **Holding Off the Saphenous Vein**

To hold off the lateral saphenous vein, the handler usually places his hand around the leg just above the stifle (knee), so that the thumb is on the back side of the leg and the fingers on the front surface of the leg. The vein is then held off by gently but firmly squeezing the leg



*Holding a cat for injection into the medial saphenous vein*

and the vein between the thumb and fingers; when properly performed, this pressure will cause the leg to extend. The primary goal is to get sufficient pressure over the saphenous vein as it runs down the rear leg to both raise it and stabilize it for injection. For the medial saphenous vein, the handler may either hold off in a similar fashion, only the leg is reversed, or may apply pressure with the outer edge of the palm, usually while holding the animal's leg or tail. **IMPORTANT NOTE:** The closer the technician gets to the animal's joint the higher the likelihood that the vein will roll; injecting higher up and away from the joint proves much easier. A commercial tourniquet, however, does not hold its position well when used above the joint, so a partner able to manually hold off the saphenous vein is necessary.

### ***Injecting the Drug***

Because the saphenous vein is much freer to move under the skin than the cephalic vein, the needle must be inserted with a quick puncture, threading into the vein quickly and stabilizing its movement. If the technician tries to place the needle over the vein and slowly insert it, particularly if the injection site is too close to the joint, the saphenous vein will roll out from under the needle and off to the side. When injecting into the saphenous vein it is important for the handler and technician to communicate effectively, since the

more pressure that is applied to stabilize the vein, the more difficult it can be for the technician to feel.

Once the needle is in the vein, the same procedure should be carried out as for injection into the cephalic vein. The syringe must be secured in place and aspirated, the pressure on the vein released, and the drug injected. **NOTE:** Securing the syringe to the leg may be slightly more awkward than with the cephalic vein, as the syringe and rear leg will not be aligned in exactly the same direction.

## **Special Considerations for Injecting into the Jugular Vein**

As noted above, while it is technically possible to use the jugular vein for euthanasia of cats and dogs, it is not recommended. However, for livestock, equines, and other large mammals, the jugular veins are typically preferred because they are large and readily accessible, they are capable of handling the large volumes of sodium pentobarbital necessary, and because trying to inject into the leg of a conscious equine or other large animal poses grave safety risks for the technician and handlers. **IMPORTANT NOTE:** Large animals can be dangerous and pose special risks even after injection, so even technicians with extensive experience with small animals should defer to the expertise of a large-animal veterinarian. (See Chapter 12 for more information on euthanasia of large animals.)

### ***Holding Off the Jugular Vein***

To hold off the jugular vein, one or more fingers should be pressed against the vein below the injection site in the jugular furrow (blood in the jugular vein runs down the neck toward the animal's heart). Since a tourniquet or other mechanical means cannot be used to hold off the jugular vein, the technician must become proficient at holding off the vein herself, placing the fingertips flat across the vein to provide the maximum area of pressure.

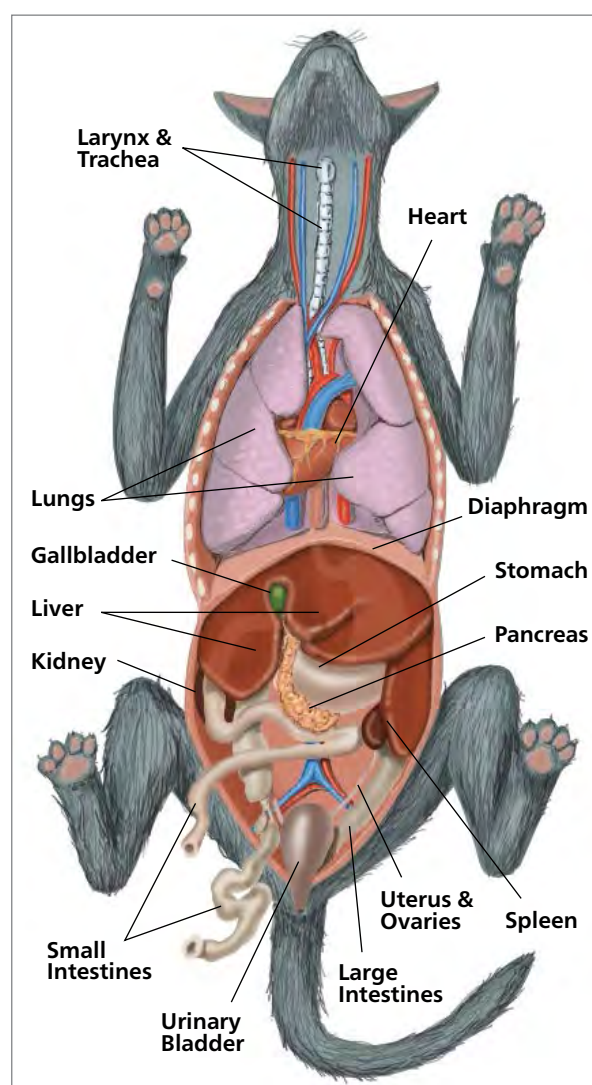
## Problems with IV Injection (Commonly Referred to as 'Blowing the Vein')

Proper IV injection involves inserting the needle inside the vein and ensuring that 100 percent of the drug injected enters the bloodstream and flows to the heart. If the needle pierces the vein wall (either because the initial needle insertion was imprecise or because movement by the animal or technician pushed the needle out of the vein) or misses the vein entirely, and drug ends up injected outside the normal flow of blood, the drug will pool under the skin and make the area swell up (this is clinically referred to as "extravascular injection", injection of drug outside the vein). This is what euthanasia technicians commonly refer to as "blowing the vein," and it can happen to even the most skilled technicians. When it occurs, the technician should not panic but should take steps to correct the problem and ensure that the euthanasia process continues as quickly and humanely as possible.

Technically speaking, if sodium pentobarbital is injected outside the vein, the animal will experience pain because the pH level of the drug is higher than that of blood, and because the tissue surrounding the veins is rich in nerve endings (unlike the walls of the veins themselves). In practice, however, unless the vein was missed entirely, it most often happens that some of the sodium pentobarbital does reach the brain and quickly renders the animal insensitive to pain, allowing the technician time to regroup and reinject the drug properly. Nevertheless, the possibility of causing pain to an animal through improper injection exists, and technicians must recognize that an animal in pain can pose a significant danger to himself or herself and to humans; this should serve as a sobering reminder that: a) technicians must never inject blindly, without some indication that the needle is actually in the vein; b) technicians must be careful to secure the syringe and not allow the needle to move once it is properly inside the vein; and c) handlers must ensure each animal is

adequately and humanely restrained throughout the entire injection process.

If the technician believes that the vein has been blown (as evidenced by swelling indicating that the drug is outside the vein or by a pain reaction from the animal), he or she should stop injecting immediately, withdraw the needle, and apply pressure to the injection site to stop the flow of blood—there is no point in continuing to inject additional drug, since it will not be properly carried by the bloodstream to the heart. If the animal is still calm and tractable, or if the animal is unconscious, the technician can simply attempt a second injection. However, if the animal is either reacting in pain or becomes caught in the excitement phase of anesthesia,



*View of a cat's internal organs, as seen from above*

it is neither safe nor practical to continue trying to administer sodium pentobarbital by IV injection—the animal will not be sufficiently manageable to safely administer the drug. In such cases, a pre-euthanasia drug should quickly be administered into the large muscle mass of the leg or back so that the animal is rendered unconscious as quickly as possible and humane injection of sodium pentobarbital can proceed.

### IV Dosage of Sodium Pentobarbital

For IV injections of dogs and cats, regardless of the vein used, the standard dosage of sodium pentobarbital in commercial formulations like Fatal-Plus and Pentasol is 1 milliliter for every 10 pounds of body weight. **IMPORTANT NOTE:** The commercial formulation of sodium pentobarbital known as Sleepaway requires different dosing, so refer to the product label for details. For the purposes of this manual, sodium pentobarbital dosage information will refer to other commercial formulations like Fatal-Plus. That means for IV injection, a cat weighing 10 pounds should receive 1 milliliter of sodium pentobarbital, and a 100-pound dog should receive 10 milliliters. A simple method to calculate the appropriate IV dosage of sodium pentobarbital is to divide the animal's body weight (in pounds) by 10, which equals the volume of drug in milliliters to be administered. Technicians can help minimize the chances of record-keeping errors by rounding up (never down!) to the nearest milliliter; entering fractions into a euthanasia logbook (see Chapter 10 for information on record-keeping requirements for drugs like sodium pentobarbital) is an invitation for mathematical errors. Remember, when using the label dose, the technician is administering more than the lethal dose; rounding up and administering slightly more drug than technically needed is perfectly acceptable (it is never acceptable to use less than the label dose). Therefore, for an 18-pound animal, even though the accurate label dose is 1.8 milliliters, administration of 2 milliliters is appropriate.

In the past, technicians were advised to engage in a practice called “dosing for effect,” adding an extra one to two milliliters of drug to compensate for circumstances like pregnancy, heavy musculature, and others. Current practice is to “dose for effect” only those animals suffering from circulatory problems (as evidenced by severe dehydration, external bleeding or pale gums), giving them twice the normal dosage of drug recommended. Extra drug may also be administered to an animal whose owner is present, not because it is technically required but to ensure that death is achieved as quickly as possible.

### Intraperitoneal (IP) Injection

*(Injection of Sodium Pentobarbital into the Abdominal Cavity)*

Intraperitoneal (IP) injection involves the injection of sodium pentobarbital directly into the animal's abdominal cavity, the space in the abdomen surrounding most of the internal organs. While at first glance this method might appear to be painful, and therefore inappropriate for euthanasia, when performed properly it is completely painless for the animal and can be more humane than even IV injection in some circumstances. With IP injection, the needle is inserted into the narrow band of connective tissue that runs vertically along the center of the abdomen called the *linea alba* (imagine the center line of the “six pack” on a person with well defined abdominal muscles); because there are no nerve endings or blood vessels along this line, there is no pain or sensitivity upon insertion of the needle or during injection. IP is the most humane option for euthanasia of conscious cats because it requires even less restraint than IV injection; cats tend to resist extending a forelimb for IV injection, but they are often very amenable to the gentle lifting or cuddling

## Intraperitoneal (IP)

*(injection of drug into the abdominal or peritoneal cavity, the gap between organs and the abdominal wall)*

### Primary Advantages

- Can be used with the very youngest or smallest of mammals, where finding a vein is difficult.
- Often preferred for use on conscious, well-socialized adult cats because it does not require invasive handling.
- Restraint of the animal for IP injection does not put the euthanasia technician in close proximity to the animal's teeth or claws as restraint for IV injection.
- Virtually pain-free for the animal when performed correctly.

### Primary Disadvantages

- Improper injection can result in drugs introduced into fat or organs, making absorption less effective and potentially causing pain to the animal.
- Takes a longer time before unconsciousness and death, because the drug must first be absorbed into the bloodstream before being carried to the heart and brain.
- The animal must be held in a safe, quiet, secure area after drug administration until it fully loses consciousness.
- Requires a much larger volume of sodium pentobarbital than other methods (three times more drug).
- Can be perceived as painful by those who misunderstand the technique (an untrained individual may not understand that there are no nerve endings along the linea alba, for example, and may inaccurately assume that IP involves a painful injection into the animal's stomach).
- Should not be used on adult dogs because of an increased chance that they will experience a prolonged excitement phase.

motion associated with IP injection. IP is also a good option for kittens, puppies, birds, reptiles, small mammals, and small wildlife, whose veins are difficult to locate. IP is not, however, a good option for late-term pregnant animals, or for adult dogs and puppies over five weeks of age because they are more likely to experience a panic/excitement response, and because IP requires the injection of three times the quantity of drug that IV does.

When sodium pentobarbital is injected into the abdominal cavity, it begins to disperse over the large surface area of the intestines and internal organs. After several minutes, the drug starts being absorbed into the bloodstream and slowly travels to the brain. This process of absorption makes IP a slower process than IV, where the drug is injected directly into the bloodstream. The time period between injection and death is typically less than 10 minutes, and it is vital that during this time the animal be placed in a dark, quiet, confined area (like a carrier covered with a thick towel or blanket) while the drug takes effect.

While the slower time to take effect and triple dosages can be considered disadvantages of IP administration, they must be weighed against the stress that would be caused to the animal if he or she were restrained for an IV injection and the inherent difficulties trying to insert a needle into very tiny veins. For

## Units of Measure

**cc** = cubic centimeter (measure of volume/space)

**ml** = milliliter; one 1000th of a liter (measure of liquid volume)

**mg** = milligram; one 1000th of a gram (measure of weight/mass)

*1 cc is generally equivalent to 1 ml*



well-socialized cats, kittens, and other small mammals, IP can in many cases be the more humane and effective method of administering sodium pentobarbital.

### Administering IP Injection

To administer an IP injection, the animal must be gently lifted so that its abdomen is accessible to the euthanasia technician. This can be achieved with a well-socialized adult cat, for example, by simply gathering the cat's front legs and lifting them slightly off the exam table; the drug can then be injected without the cat even realizing the procedure is happening.

Once the belly is accessible, injection should be made into the animal's ventral midline. The ventral midline injection site is midway down the abdomen, just below the umbilicus (belly button). The xiphoid, a cartilaginous protrusion at the base of the sternum (the breast bone), makes for a good landmark in locating this injection site. Look for the xiphoid, and draw an imaginary vertical line down the animal's abdomen from that point (remember, there are no nerve endings or blood vessels along this imaginary vertical line, called the *linea alba*). Next, look for the animal's hip joints, and draw an imaginary horizontal line between them. The intersection of the imaginary horizontal and vertical lines will indicate the point on the animal's midline just below the belly button where

It is sometimes recommended that IP administration be achieved by grasping the animal's front and rear legs and stretching the body to expose the abdomen. Stretching, however, is not only uncomfortable for most animals, but it can also result in increased pain sensation, as the stretched skin can be more sensitive to pain. If IP cannot be achieved by simply gently lifting the forelimbs of the animal, an alternate method of administration should be considered.



*Proper hold and injection site for IP injection of a cat*

it is safe to insert the needle for an IP injection. When the euthanasia technician successfully injects into the ventral midline the drug will be properly injected to the peritoneal cavity, and the injection will be completely painless.

While injecting into the midline does not require quite as much precision as injecting into a vein, it is still critical to properly locate the injection site. Injection into the left side of the abdomen should be avoided because of the possibility of injecting into the spleen, which could delay absorption of the drug. The lower part of the abdomen should be avoided because if the drugs are injected into the bladder they may simply be excreted through the urine before being absorbed. Injection into the liver (technically intrahepatic injection) should be avoided as well, as there remain questions about the liver's sensitivity to pain. Finally, and perhaps most important, injection into any other area of the abdomen aside from the ventral midline will be painful for the animal, and must be avoided.

It is not necessary to shave the abdominal area before IP injection; simply insert the needle straight into the ventral midline of the abdomen

Because of the indirect absorption of the drug when IP is used, animals may receive enough drug to enter the involuntary excitement phase of anesthesia but not enough to move toward complete unconsciousness and death. Handling of animals in this state should be avoided.

at a 90-degree angle to the body (as opposed to the much shallower angle used when injecting into a vein). The smallest gauge needle available is recommended; typically a 22-, 23-, or 25-gauge, three-quarter-inch to one-inch needle is used. Upon aspirating (pulling back) the syringe's plunger, a vacuum with no blood or other bodily fluid entering the syringe should be observed, indicating that the needle has been successfully inserted into the abdominal cavity; if there is fluid or other material in the syringe the needle should be withdrawn and repositioned, because it may be mistakenly located in the spleen, bladder, or other organ. If the needle appears to be located properly, meaning no blood, urine, or other bodily fluid appears, inject the drug at the steady rate of 1 milliliter per second. **IMPORTANT NOTE:** While the peritoneal cavity is normally empty, creating a vacuum on aspiration, there are situations in which the needle is properly in the cavity but fluids are nevertheless aspirated. Blood may be present as a result of internal injuries, or feline infectious peritonitis or other diseases could cause pus to exist there. An experienced euthanasia technician will be able to tell whether fluids aspirated into the syringe indicate that the needle has been improperly inserted or fluids have invaded the cavity; if in doubt, they should either reposition the needle and try again, or opt for an alternate method of administering sodium pentobarbital.

Because IP does not induce immediate unconsciousness, all animals given an IP injection should be immediately placed in a cage or kennel with soft bedding where they can remain

## IP—Intraperitoneal

*(injection of sodium pentobarbital into the abdominal cavity—needle passes through the skin, muscle wall and peritoneum)*

**Species recommended:** conscious calm and friendly cats, conscious puppies under 5 weeks, conscious or unconscious small rodents

**Dose:** 117 mg/pound (usually 3 ml/10 pounds)

**Circulatory compromised:** not usually recommended

**Injection speed:** slow (0.5–1 ml /second) and consistent with good technique

**Needle insertion point:** ventral, midline, ~2" below (caudal to) umbilicus

**Needle angle/depth:** right angle to the skin/~3/4 inch

**Syringe retracts:** suction (no fluid, no air)

**Time to loss of consciousness:** ~2 minutes

**Time to deep anesthesia:** 3–4 minutes

**Time to cessation of respiration:** ~6 minutes

**Time to cessation of heartbeat (death):** ~8 minutes

**Time to cardiac standstill (no fibrillation):** ~10 minutes

undisturbed until they have lost consciousness. The cage or kennel should be covered with a towel or blanket, or the lights in the room should be dimmed, and any noise minimized to avoid any undue stimulation of the animal as the drug takes effect. Although most animals should be placed alone in a cage or kennel after IP injection, littermates can be placed together to provide them more comfort and security. **IMPORTANT NOTE:** If a mother and litter are to be euthanized, the mother should be euthanized before the litter to help reduce her stress to the greatest extent possible.

The most common impediment to IP administration is fat—if sodium pentobarbital is inadvertently injected into fat, the drug will not readily move through the circulatory system to the brain. Therefore, an obese animal should not be considered a candidate for IP injection.

As an animal passes through the early stages of anesthesia after IP injection, several signs may be noted. One of the first is a characteristic tongue-licking, typically seen about two minutes after IP injection. Thereafter, the animal typically loses coordination and may fall over or begin to flail—the animal is not experiencing pain at this point, but is still capable of reflexively biting if startled, making this a potentially dangerous time for a euthanasia technician or handler. Minimizing environmental stimuli, like noise and light, is especially important during this stage. If the animal has not begun to show signs of moving through the stages of anesthesia toward unconsciousness and death within 10 minutes after IP injection, it is possible that the drug was mistakenly injected into (and subsequently expelled from) the bladder, or that its absorption has been otherwise impeded, usually by absorption into fat. The animal should be injected again with additional drugs, either by IP or IV injection. Even after the animal appears to be unconscious (lying still, no blink or toe reflexes), it may take 10 to 15 minutes more for clinical death to occur. **IMPORTANT NOTE:** Never assume that an unconscious animal is dead! Always take proactive steps to verify death (see Chapter 4).

### IP Dosage of Sodium Pentobarbital

The standard dosage for IP injections (in commercial formulations like Fatal-Plus and Pentasol) is 3 milliliters for every 10 pounds of body weight, or triple the dosage used for an IV injection (the larger dose is required

because the drug must be absorbed into the bloodstream before beginning its trip to the brain). A minimum dosage of 1 milliliter of sodium pentobarbital should be used on any animal under 3 pounds (except neonates and very small animals like young mice, etc., whose bodies may not be large enough to absorb a full milliliter of drug.)

## Intracardiac (IC) Injection

*(Injection of Sodium Pentobarbital Directly into the Heart)*

An intracardiac (IC) injection involves the injection of sodium pentobarbital directly into the heart, where it is quickly transported to the brain. Injection into a conscious animal's heart is excruciatingly painful, even if the technician is able to locate the heart chamber on the first attempt. **For this reason, IC injection must never be administered to an animal unless**

## Intracardiac (IC)

*(injection of drug directly into a chamber of the heart)*

### Primary Advantages

- Ensures the fastest delivery of drugs of any method (because the drug has a direct route from the heart to the brain).

### Primary Disadvantages

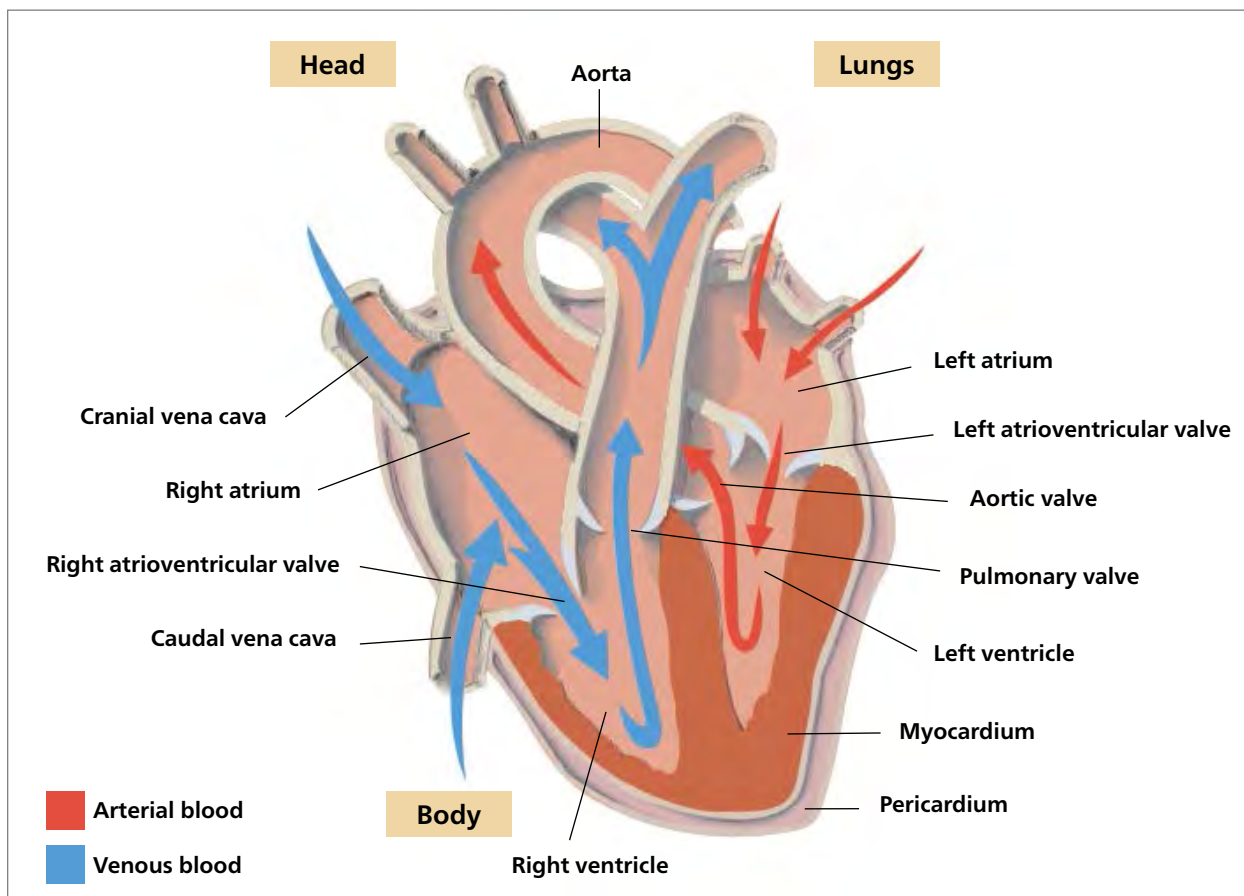
- Tremendously painful for conscious animals, so it must never be used unless the technician has confirmed that the animal is fully unconscious.
- Aesthetically unpleasant to observe (therefore not appropriate for cases where the owner or a member of the public is present, even if the animal is unconscious), and often misunderstood by members of the public.

the euthanasia technician has confirmed that the animal is fully unconscious. Many states and municipalities have laws dictating that animals must be fully unconscious before an IC injection. Assuming that the technician has ensured that the animal is unconscious, though, IC can be the most efficient method of administering sodium pentobarbital, particularly if: a) the animal's veins have been compromised because of illness or injury; b) the animal's circulatory system is too compromised to transport the drug from a vein to the brain; or c) sodium pentobarbital has already been administered to the animal through IV or IP injection but has not effectively resulted in death.

### Administering IC Injection

First and foremost, the technician must always verify that the animal is fully unconscious before attempting IC injection (this could be

because of illness or injury, or it can be induced via a pre-euthanasia drug). An animal can be considered fully unconscious if she has neither a palpebral (blink) reflex nor a toe-pinch reflex. To check for a blink reflex, the technician should gently touch the inside corner of the eyelid—if the animal does not reflexively blink, she can safely be concluded to be unconscious. To check for a toe-pinch reflex, which assesses whether the animal is still able to withdraw from deep pain, the technician should pinch firmly on the soft skin (or webbing) between the toes of a rear leg; if the animal does not respond by reflexively pulling her leg back and away from the pain, it is unconscious, and IC injection can be administered. If the animal still has either a blink or a toe-pinch reflex, either give the animal more time for the drugs to take effect or administer additional pre-euthanasia drugs.



*Anatomy of the heart*

There are few technical aspects of euthanasia that generate more intense debate than IC injection. Stories of conscious animals being injected IC horrify the public, and rightly so. However, when properly administered on an unconscious animal, IC can be a very effective means of achieving a quick, painless death. Shelters can navigate this potential publicity minefield by assuring the public that their staff is properly trained, their policies reflect the highest standards of humane care, that “heart sticks” are never performed on conscious animals under any circumstances, and that checks and balances are in place to ensure that humane protocols are always followed.

Once the animal is confirmed to be unconscious, IC injection can proceed; however, locating the chambers of the heart for proper IC injection is not always easy, even for an experienced euthanasia technician. On most unconscious animals that are still breathing and circulating blood, the heartbeat can be felt on the skin surface using the fingers, or heard with a stethoscope. Injection should be made at the point where the heart is heard or felt most prominently, although the exact position will vary according to the animal’s species, age, size, and weight. If the heart cannot be easily heard or felt, a good reference point for the correct injection site is the point where the animal’s elbow aligns with the body: while the animal is lying on his or her side, bend the front leg back slightly toward the rib cage so that the shoulder is at a 45-degree angle; the proper injection site should be directly behind the animal’s elbow. Alternatively, the euthanasia technician can count the animal’s ribs and inject into the lower side in the third, fourth, or fifth, “intercostal” spaces (the spaces between the ribs). The best technique for identifying the proper location is to practice on a live dog—as the dog is lying



*Checking for absence of blink reflex*

down, count back the spaces between the ribs beginning at his front leg—you will feel a strong heartbeat in the area of the third, fourth, and fifth spaces.

Because the heart is much farther below the skin surface than a vein, it is typically necessary to use a much longer needle for IC injection than is used for IV or IP injections. A needle as long as two inches may be required for obese or deep-chested animals (the technician need not worry about pain a large-bore needle may cause because the animal is confirmed unconscious and unable to feel pain). **NOTE:** Clipping or shaving is not necessary for IC injections because nothing on the skin indicates the heart’s location.

When performing an IC injection, the needle should be inserted straight into the chest cavity at a 90-degree angle, as opposed to the much shallower angle required for IV injection, and the technician should ensure that the needle is inserted between ribs (if the needle hits a rib the technician will feel resistance, and should reposition). The technician should then aspirate (pull back on the

plunger) to ensure that the needle is in one of the chambers of the heart, rather than in the muscle of the heart or elsewhere. If the needle has been properly inserted into a chamber of the heart, a rapid, strong flow of blood will be observed when the plunger is pulled back, and the syringe will rapidly fill with blood. If blood is not easily aspirated, or if only a quick flash of bright red blood is observed, the needle may be in the heart muscle, or may have missed the heart entirely; the needle should be redirected until a strong flow of blood is easily aspirated, indicating it is correctly located in a heart chamber. **IMPORTANT NOTE:** Injection into the heart muscle, rather than a chamber, is not considered to be proper IC injection; that is actually intramuscular (IM) injection, which is not considered to be an acceptable route of administration of sodium pentobarbital. Therefore, just watching for movement of the needle is not sufficient, since injection into the heart muscle will cause the needle



*The proper location for intracardiac injection or heart stick*

to move; the technician must observe the strong, rapid flow of blood into the needle.

Once the technician has verified proper insertion, the sodium pentobarbital can be injected. After an IC injection is completed, the needle should be left in place until the heart has been observed to stop beating to facilitate verification of death (see Chapter 4). It generally takes seconds for death to occur (similar to the time frame for an IV injection).

### IC Dosage of Sodium Pentobarbital

The correct dosage for IC injections is the same as for IV injections, 1 milliliter for every 10 pounds of body weight (in commercial formulations like Fatal-Plus and Pentasol).

### Other Injection Routes— Not Acceptable

Aside from IV, IP, and IC, no other injection method for sodium pentobarbital is acceptable (this includes intramuscular, subcutaneous, intrathoracic, intrapulmonary, intrahepatic, intrarenal, intrasplenic, intrathecal, or any other nonvascular injection site).

### IC—Intracardiac

*(injection of sodium pentobarbital into one of the four heart chambers)*

Unconscious animals only

**Species recommended:** all

**Dose:** 39 mg/pound (usually 1 ml/10 pounds)

**Circulatory compromised:** 39 mg/pound (usually 1 ml/10 pounds)

**Needle insertion point:** right or left side, 4th intercostal space, or sternally in cats

**Syringe retracts:** large volume (fill) of blood

**Injection speed:** slow (0.5–1 ml/second) and consistent with good technique

**Time to cessation of heartbeat (death):** 5–10 seconds

**Time to cardiac standstill (no fibrillation):** ~2–5 minutes

## Oral Administration of Sodium Pentobarbital (PO)

Where permitted by law, oral administration of sodium pentobarbital can be particularly useful for very difficult or fractious animals. For example, if a dog is especially aggressive and willing to charge the front of its kennel, it can be much easier and safer to simply squirt sodium pentobarbital directly into his or her mouth or put the drug into some wet food and allow the animal to eat it rather than try to put the dog on a control pole and attempt injection. However, it can be difficult to get an animal to ingest sodium pentobarbital because of its bitter taste, and squirting the drug into a moving target like a snarling animal's mouth can be tricky. Most often, the animal ingests only a small quantity of drug—it is rare that an animal will ingest enough to achieve euthanasia. However, the goal of oral administration of sodium pentobarbital is usually not to fully complete the euthanasia process but to simply get the animal to ingest enough drug to render him fully unconscious for direct injection of additional sodium pentobarbital, or at least manageable enough to be put in a net or on a control pole for safe injection of a pre-euthanasia drug. In such cases, injection of additional sodium pentobarbital should follow once the animal has lost consciousness, in order to ensure that a sufficient dose to achieve euthanasia is received.

Oral administration of sodium pentobarbital is limited because:

- It is expressly prohibited in certain states
- The drug has a bitter taste, so many animals (cats in particular) will not ingest it
- It has a high dosage requirement (3 times greater than the IV dose)

### Oral Administration

*(PO, per os, Latin for "by mouth")*

*(squirting drug directly into animal's mouth or mixing it into food)*

#### Primary Advantages

- Useful for aggressive, fractious animals that are unsafe to handle.

#### Primary Disadvantages

- Expressly prohibited in certain states.
- The drug has a bitter taste, making it difficult to get a sufficient amount of the drug ingested to achieve death (therefore it will most likely have to be followed up with IV or IC injection).
- Should be limited to rare cases of extremely fractious animals that cannot be safely and humanely handled by any other means.

## CHAPTER 3

# Pre-Euthanasia Drugs

Ideally, every animal scheduled for euthanasia could be gently restrained for direct IV or IP injection of sodium pentobarbital. However, in reality not every animal can be safely handled with gentle physical restraint, and in some cases animals are so unsocialized or fearful that attempts at physical handling would sharply increase their level of stress. For those animals, pre-euthanasia drugs should be administered to render them unconscious before the lethal injection of sodium pentobarbital. Availability of the proper pre-euthanasia drugs and proper training regarding their use are therefore integral to the success of any euthanasia protocol.

**Should all animals be anesthetized before euthanasia?** Not necessarily. The notion that administration of pre-euthanasia drugs is more humane than direct injection for every animal in every circumstance is incorrect. For many well-socialized animals, direct injection of sodium pentobarbital is perfectly humane because it can be achieved virtually painlessly.

## Advantages

The primary advantage of pre-euthanasia drugs is that their use allows the euthanasia technician to render the animal unconscious without requiring the same level of human contact necessary for direct administration of sodium pentobarbital. A fractious or fearful animal may be physically restrained for intramuscular (IM) injection of a pre-euthanasia drug with a control pole, squeeze cage, restraint gate, feral

cat box, or other remote device, injected safely, then released to a quiet, low-stress environment while the drug takes effect. This release period allows the animal to relax, with the sense that the human interaction is over; the next time the animal is touched by human hands, he will be unconscious. Alternatively, some pre-euthanasia drugs can be administered without any contact or handling at all (including anesthetic inhalants, or oral administration of certain drugs). Once the animal has lost consciousness, the technician can safely handle the animal for injection of sodium pentobarbital without causing undue stress or discomfort.

## Disadvantages

Pre-euthanasia drugs do have significant disadvantages that should prevent shelters from making their use mandatory for every animal. Most significant, injection of pre-euthanasia drugs is painful for animals, even when done properly. The low pH of the drug and the volume of the solution forced into densely packed muscle tissue during an IM injection causes a stinging sensation for every animal; when the drug is improperly injected outside muscle tissue, or when the animal is so emaciated that there is barely any muscle tissue available for injection, administration of pre-euthanasia drugs can cause considerable pain. Moreover, all pre-euthanasia drugs have potential side effects, and two animals of the same breed and size may react very differently to the same type and dosage of drug, making administration somewhat complicated. In fact, if the wrong drug is selected, or if the animal has an unanticipated reaction to the drug, the animal can actually become more dangerous. This is especially concerning since



routine use of pre-euthanasia drugs may give staff a false sense of security when working around fractious or aggressive animals, or they may begin to rely on the use of drugs as a substitute for safe and compassionate handling of every animal.

Finally, many pre-euthanasia drugs are very expensive, and some are controlled substances that must be handled and secured just as strictly as sodium pentobarbital to ensure compliance with state and federal laws. Many pre-euthanasia drugs are restricted by state law to use by or on the order of a licensed veterinarian. Shelters without a veterinarian on staff should work closely with a local veterinarian to create guidelines and procedures for the use of drugs, and must be careful to honor their relationship with that veterinarian by strictly complying with those guidelines and procedures.

As a rule, all aspects of euthanasia should be performed out of sight and hearing of other animals (as well as members of the public and volunteers); even the administration of pre-euthanasia anesthetics is optimally performed in a separate euthanasia room. However, in some cases putting an animal in a net or on a catchpole and forcing him or her into the euthanasia room for injection of a pre-euthanasia drug may put employee safety at risk and may cause undue distress, not just for that animal but for all of the other animals who see and hear the struggle. In those cases, discretion may dictate that the animal be anesthetized inside a kennel, then transported to the euthanasia room after loss of consciousness. Care must be taken, however, to limit the exposure of other animals to any portion of the euthanasia process to the greatest extent possible (for example, blankets and towels can be effective ways to block animals' views, etc.).

## Policy

For the reasons noted above, blanket policies requiring all animals to be given pre-euthanasia drugs are not always in the best interest of the animals or the organization, and should be carefully reconsidered. When appropriate, it is often best practice to hold and comfort an animal for direct IV or IP injection of sodium pentobarbital rather than injecting a pre-euthanasia anesthetic, but neglecting or refusing to use pre-euthanasia drugs when direct injection would cause the animal undue stress is equally ill-advised. A technician should not hesitate to use a pre-euthanasia drug when there is a clear need; no animal should ever be forced or excessively restrained for direct injection of sodium pentobarbital, for not only is that inhumane for the animal, it puts staff at unreasonable risk of serious injury. A good euthanasia technician must have a variety of options at his or her disposal and must be able to adapt to changing circumstances, and it is sound policy to allow technicians the discretion to choose the drugs and techniques most appropriate for each individual animal based on thorough training and the advice and guidance of consulting veterinarians.

### **Vaccines are administered under the skin (SQ), pre-euthanasia drugs into muscle (IM) (typically), and sodium pentobarbital into veins (IV)—but why?**

The appropriate routes of administration for each drug are clearly marked on the label, and are based on factors like how quickly the drug needs to be circulated for maximum effect (for example, vaccines should be absorbed more slowly than other types of drugs, so they are administered SQ). Administration of any drug in a manner not prescribed by the manufacturer's label is unlawful in the United States.



*PreMix bottle, labeled*

## Types of Pre-Euthanasia Drugs

Just as important as the decision whether or not to use a pre-euthanasia drug is the selection of the most appropriate drug. The best pre-euthanasia drugs are anesthetics, drugs that quickly render the animal unconscious with a total loss of ability to feel pain and that have minimal side effects. Although no drug is perfect, for dogs and cats, Telazol or a combination of the drugs xylazine and ketamine (commonly referred to as “PreMix”) are currently the preferred drugs for pre-euthanasia (there may be newer drugs that can be considered acceptable for pre-euthanasia in the near future; their use must be evaluated by a veterinarian to ensure that they are as humane and effective as Telazol and PreMix).

### Best Pre-Euthanasia Drug Option A: PreMix

*(Xylazine/Ketamine Combination)*

When the drugs xylazine and ketamine are used in combination at appropriate dosages (this is commonly referred to in the United States as “PreMix”), the animal is put into a

deep plane of anesthesia—unconscious, unable to move, and unresponsive to even deep pain stimuli. The animal has no blink reflex or toe-pinch reflex, but still retains good circulation and blood pressure (meaning sodium pentobarbital can be administered intravenously safely and effectively).

While PreMix is in most cases a very good choice for pre-euthanasia anesthesia, euthanasia technicians must be aware of its potential drawbacks. The animal does experience a stinging sensation when any drug is administered intramuscularly, so care must be taken to inject properly. Injecting slowly into a large muscle mass (the back muscle is ideal, since it ensures smooth absorption of the drug; also acceptable is the large muscle of the back leg) is the best way to alleviate pain to the extent possible. PreMix does have the potential to induce seizures or vomiting, so the animal must be closely monitored after administration. Finally, there are administrative complications with using PreMix—ketamine is federally controlled, so the resulting combination of the two drugs must be treated as a controlled substance (see Chapter 10). Moreover, in some states the mixing of two such drugs is considered to be “compounding,” and as such may violate applicable state board of pharmacy regulations.

To make PreMix, first ensure that xylazine and ketamine are added together at a ratio of one part xylazine to five parts ketamine (for example, add 2 milliliters of large-animal xylazine (1 milligram per pound, 100 milligrams per milliliter) to a standard 10-milliliter vial of ketamine (5 milligrams per pound), creating a 12-milliliter bottle of PreMix that can be dosed for individual animals as needed). **IMPORTANT NOTE:** Ensure that a new label is placed onto the vial of mixed drugs that specifies the names of the drugs mixed, the amounts of each drug, the date mixed, and the initials of the individual who prepared the mixture.

The proper dosage for administration of most formulations of PreMix as a pre-euthanasia anesthetic is 0.5 milliliter for every 10 pounds the animal weighs, given intramuscularly. An animal that has been administered PreMix will generally feel the full effects of the drugs within three to five minutes, and will remain anesthetized for 30 to 40 minutes before regaining consciousness.

Pre-euthanasia drugs should not be “dosed for effect”—the specified amount should be given by weight regardless of whether the animal is pregnant, elderly, heavily muscled, etc.

Remember, because ketamine is a Schedule III controlled substance, be sure to record and track the use of this combination product in detail in the controlled substance logbook, as required by law.

## Best Pre-Euthanasia Drug Option B: Telazol

*(Tiletamine/Zolazepam Combination)*

Like PreMix, Telazol also provides deep anesthesia in which the animal quickly becomes unconscious, immobile and unable to feel pain, allowing for all routes of injection of sodium pentobarbital. It is particularly recommended as a pre-euthanasia drug because it stings less than PreMix does on injection and is less likely to induce seizures.

Telazol is the trade name for a drug combination of tiletamine and zolazepam, and is used as an anesthetic in veterinary practice for minor surgical procedures because it provides rapid unconsciousness, analgesia and good muscle relaxation. The drug begins to take effect within 10 minutes of IM administration and lasts for approximately 30 minutes before



*Telazol*

the animal starts to wake up. These properties also make Telazol a good choice for chemical capture of animals in the field.

Although Telazol is an excellent choice as a pre-euthanasia drug it can be fairly expensive, and it has a short shelf life once it has been reconstituted (meaning sterile water has been added); it must also be refrigerated to maintain potency for more than a few days. These are two important considerations that a shelter should weigh before selecting Telazol as the only pre-euthanasia drug kept available for dogs and cats; many shelters elect to use PreMix for dogs and reserve Telazol for cats, because the lower doses required for cats alone make it much more cost-effective.

Telazol typically comes in powder form in small 5-milliliter bottles and must be reconstituted with 5 milliliters of sterile water. Draw 5 milliliters of sterile water into a syringe and inject it directly into the bottle of powdered Telazol, then roll or gently shake the bottle to ensure thorough mixing. It is important to label each bottle of Telazol with the date it was reconstituted to ensure that its expiration date is apparent. The reconstituted solution remains effective for only four days when stored at room

temperature; it can last up to 14 days when refrigerated. **IMPORTANT NOTE:** Refrigeration may not be an option without a means to securely store the drug (see Chapter 10).

In most settings, Telazol, like PreMix, should be administered by IM injection into the back muscle (epaxial) or rear thigh muscle (bicep femoris) of the animal (in certain cases subcutaneous administration can be performed, but for use in companion animals IM injection is preferred). While the injection does sting, it is not quite as painful as injection of other drugs. The label dose of Telazol is 0.3 to 0.45 milliliters for every 10 pounds of animal, given intramuscularly; however, best practice is to use .5 milliliters per 10 pounds to achieve full analgesic effect.

### Dosage Chart for Telazol® and PreMix

Animal's Weight (pounds)	Milliliters (ml)
5	.25
10	.5
15	.75
20	1
25	1.25
30	1.5
35	1.75
40	2
45	2.25
50	2.5
55	2.75
60	3
65	3.25
70	3.5
75	3.75
80	4
85	4.25
90	4.5
95	4.75
100 (and up)	5

Increasing the dosage of a pre-euthanasia drug generally does not speed up the drug's effects, it only extends the length of time that the animal feels the influence of the drug.

Telazol is a Schedule III controlled substance and must be strictly handled and secured to comply with federal, state, and local laws.

### Other Pre-Euthanasia Drugs: Conditionally Acceptable, but Not Preferred

A variety of other drugs can be used for pre-euthanasia when direct injection of sodium pentobarbital is not feasible, but because of their side effects or their lack of analgesic properties (they fail to provide sufficient pain relief or full unconsciousness), or both, they are not as preferred as either Telazol or PreMix.

#### Acepromazine/ACE (PromAce)

Acepromazine ("ACE") is a mild tranquilizing agent that depresses the central nervous system. It is typically used to prevent vomiting during surgery, in conjunction with other drugs. An animal experiencing the effects of ACE may have some difficulty maintaining balance, but will usually remain on his or her feet, appearing conscious but subdued, moving in slow motion. The animal remains somewhat aware of what is taking place around him or her, and may react suddenly to loud noises or quick movements.

Because ACE is a tranquilizer, rather than an anesthetic, it is not recommended for use as a pre-euthanasia drug by itself. Not only can it induce seizures, in some cases it can make the animal more excited, unpredictable, and dangerous because it may act as a stimulant rather than a tranquilizer, and may reduce an animal's natural bite inhibition (so an animal

who typically would not bite may do so while under the influence of the drug). An animal that is highly stimulated but unable to inhibit its behavior can prove very dangerous indeed, and is capable of causing serious injury. Therefore, ACE should never be used alone; it should be used only in conjunction with a drug with true anesthetic properties. Moreover, ACE has been shown to have negative effects when given before injections of sodium pentobarbital combined with the drug phenytoin (in the drug Euthasol, for example) because it diminishes the drug's effectiveness at slowing the heart.

ACE can be administered via subcutaneous (SQ) or IM injection, and takes 10 to 20 minutes for full effect. ACE is also available in tablet form (in doses of 5, 10, or 25 milligrams), so that the drug can be mixed in a treat ball or with canned food for oral administration. When administered orally it can take 30 to 40 minutes for full effect.

**The general dosages for ACE (10 milligrams/ milliliters, small animal product) are:**

Subcutaneous or IM injection: 0.1 milliliter per 10 pounds of body weight (3 milligrams maximum total dose for dogs, 1 milligram maximum for cats); oral administration of ACE pills: 1 milligram per pound of body weight.

## Xylazine

Xylazine (commercially available under the names Rompun and AnaSed, among others) is a non-narcotic sedative, analgesic, and muscle relaxant; it is not a true anesthetic because it does not render the animal unconscious. It does, however, act as a central nervous system depressant, rendering most dogs and cats somewhat immobile and producing a moderate level of short-term analgesia (pain relief), typically for about 30 minutes. The result is an animal that is heavily sedated and thus easily controllable for giving an IV injection (although good restraint technique should always continue to be practiced even when an

animal appears heavily sedated). Xylazine is available in two concentrations: large animal (100 milligrams per milliliter) and small animal (20 milligrams per milliliter). Most shelters use the large animal formulation for dogs and cats because it is more cost-effective. Another benefit of xylazine is that, unlike other pre-euthanasia drugs, it is not a controlled substance subject to stringent federal and state storage and tracking requirements. Nevertheless, it is good standard practice to record the purchase and use of xylazine as with any controlled drug.

Despite these advantages, xylazine is not recommended for use as a pre-euthanasia drug by itself because: a) it commonly causes vomiting, particularly in cats and in any animal that has recently eaten; b) though sedated, the animal remains conscious, and may react violently to sudden noises and movements; c) it may dangerously reduce the animal's natural bite inhibition, making it potentially even more dangerous to handle; and d) it lowers the animal's blood pressure to the point that it can be difficult to inject the sodium pentobarbital for euthanasia. For these reasons, xylazine is recommended for use only when combined with another drug (like ketamine to create PreMix, above), that tempers these negative effects.

Using xylazine alone is particularly dangerous when working with horses, because it tends to make them more likely to kick.

## Ketamine

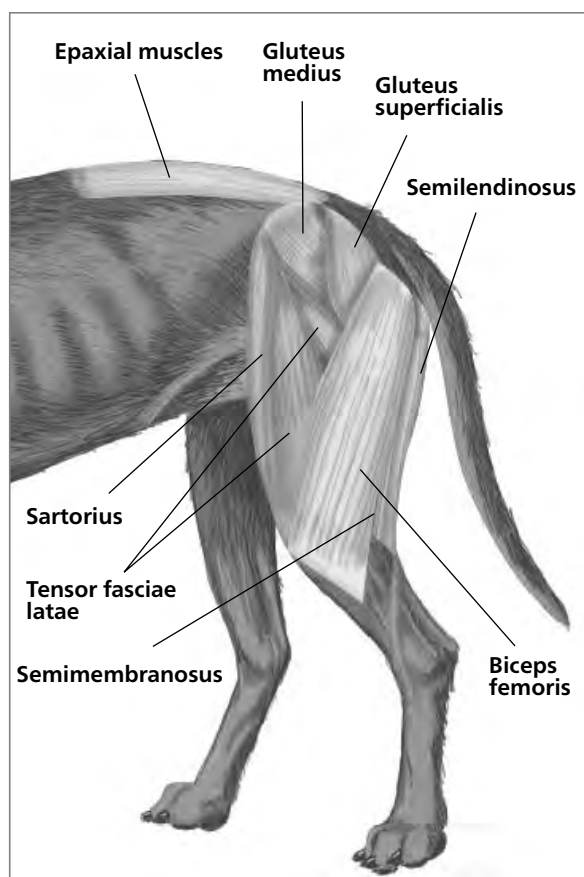
Ketamine (available commercially as Ketaset, Ketaject, and others) is an anesthetic agent that renders an animal completely immobile. However, when used alone it can cause the muscles to become rigid, causing the body to

stiffen. It also stings so much upon injection that it creates a fairly pronounced reaction in most animals. Moreover, in large doses it can produce convulsions and seizures. For these reasons, ketamine is recommended for use only when combined with another drug (like xylazine to create PreMix, above), that tempers these negative effects.

Shelters using ketamine either alone or in combination should also be aware that it has a strong potential for abuse by humans because of its profound dissociative effects. Ketamine is a Schedule III controlled substance and must be handled and secured strictly according to federal, state, and local laws, similar to sodium pentobarbital. Shelters are advised to take additional measures as needed to prevent against theft and abuse.

## Administration of Pre-Euthanasia Drugs

Most pre-euthanasia drugs are injected directly into the animal's muscle tissue (intramuscular, or IM, injection), typically using a small-gauge needle to help reduce the sting and ensure that the drug is injected into muscle, not bone. The most common location for this type of injection is in the lumbar muscle along the spine (epaxial) or the large muscle of the rear thigh (biceps femoris). Each of the pre-euthanasia drugs discussed above produces a distinct stinging sensation on administration, which is likely to cause even the most cooperative animal to react. Just as is the case with direct injection of sodium pentobarbital, each animal should be gently but securely restrained before an IM injection. However, unlike direct injection of sodium pentobarbital where a bolus effect is preferred (injection of a large quantity of drug at one time), when injecting pre-euthanasia drugs it is important to inject slowly in order to minimize the pain caused by the drug entering the muscle tissue; an experienced euthanasia technician will look



*Muscle masses in rear leg of dog, appropriate for IM injection of pre-euthanasia drugs*

to balance the need to inject slowly, to minimize the animal's pain, with the desire to finish the process quickly so as to lessen the stress induced by handling the animal. **IMPORTANT NOTE:** Pre-euthanasia drugs are typically administered to animals that are fractious or feral, making accurate placement of an injection difficult. Nevertheless, it is unacceptable to simply inject an animal randomly in any accessible location—euthanasia technicians must ensure that IM injections are made *only* into muscle tissue. Tools like restraint gates should be used to ensure that the animal is sufficiently immobilized to allow for accurate injection (see Chapter 8 on humane animal handling).

Standard syringes (for example, 1cc or 3cc) and small-gauge needles are typically used to administer pre-euthanasia drugs, depending on the volume needed. The injection should

be delivered at a 90-degree angle to the skin, directly into the largest accessible muscle mass (typically the thigh of the rear leg). The technician holds the syringe with one hand, with thumb ready to push the plunger and gently but firmly grasps the leg to be injected with the other hand to help steady the animal. He then inserts the needle and injects the full amount of the drug as slowly as the animal will permit.

In some cases it may be excessively difficult or dangerous to use a traditional syringe. Each shelter should have at least one alternative injection device, such as a Safety Stick™, if available. A Safety Stick is a fairly inexpensive piece of equipment that may be used to safely and humanely administer a pre-euthanasia injection to a wild or fractious animal. The syringe, at the end of a 3- to 5-foot pole, is filled with the drug just as it would be for a normal injection. The stick simply serves as an extension of the technician's arm, allowing him to administer the drugs from the plunger on the end of the stick while maintaining a safe distance from the animal. A short but stout needle is inserted into the muscle of the animal's hindquarters, and the plunger on the end of the Safety Stick is pushed gently to inject the drug. The animal is immediately released afterward into a secure, dark, quiet area while the drug begins to take effect.

When using a Safety Stick™ or a pole syringe, it can be difficult to judge how much pressure is required to firmly insert the needle without causing undue pain. Practice injecting on a ripe banana—the goal should be to cleanly pierce the peel without bruising or squishing the banana.

Some agencies still use traditional pole syringes, in which there is no plunger to be depressed by the technician, rather the jabbing motion itself is used to push the drug through the syringe



*Use of a Plexiglass® Shield to secure a cat for injection*

(akin to a harpoon). A technician operating a traditional pole syringe has much less control over the injection process than that available when using a Safety Stick, and is more likely to induce pain to the animal, so Safety Sticks are preferable. If only a traditional pole syringe is available, a technician can enhance the level of control over injection by looping the ring of a traditional flat leash over the needle and using a slow but steady pulling motion to regulate the rate of drug injection (as an alternative, a rubber stopper, like those used to block the end of a test tube, can be applied over the needle to provide a base of resistance and limit how much needle can pierce the animal's skin, but the very act of applying the stopper will dull the needle). **IMPORTANT NOTE:** As stated above, an IM injection must be delivered into muscle—it is not permissible to simply inject into any accessible skin of the animal. Trying to accurately inject an animal with a Safety Stick pole syringe while he or she is loose in a cage is nearly impossible; therefore, animals that will be injected via Safety Stick or pole syringe should first be confined to a smaller space using a press gate, squeeze cage, or other device so that injection can be performed accurately. It is never appropriate to simply stab at an unsecured animal and possibly inject into a non-muscle area.

Injecting fractious animals can be intimidating even for experienced technicians. Bending or stooping to inject an animal in the muscle of the leg places the technician in a very vulnerable position even under the best of circumstances, but grabbing the leg of a large, snarling dog held in place only by a restraint gate or the slim cable of a control pole takes a great deal of courage. In such cases, trust between the handler and technician is paramount. The technician must trust that the handler has a secure hold on the animal and will not permit him or her to be bitten; likewise, the handler must trust that the technician will inject quickly, calmly, and effectively, and will not escalate the situation by panicking. This trust is only built up over time, and euthanasia teams should have the freedom to discuss their fears and concerns, practice handling animals together, and build a solid working relationship before they are called on to tackle dangerous animals.

As the animal begins to feel the effects of the drug, he or she will typically start to lick the lips, as though experiencing an unpleasant taste in the mouth, lose the ability to focus vision (the eyes will often dart from one side to the other, as though the animal is watching a tennis match), and then lose coordination and begin to drop to the floor. Although the animal is not experiencing any pain during this time, the handler should take care to ensure that he does not stumble into equipment or otherwise injure him or herself and that he drops gently to the floor. The technician should also monitor for any seizures or vomiting (in which case it is critical to ensure that the animal does not choke on its own vomit before sodium pentobarbital can be humanely administered). **IMPORTANT NOTE:** Just as with sodium pentobarbital, while the animal is experiencing the effects of a pre-euthanasia drug he or she can enter

an excitement phase and lose normal bite inhibition—handlers must ensure that they and other staff members remain safe until the animal has fully lost consciousness.

## Inhalant Anesthetics (Halothane, Isoflurane)

When euthanizing very small rodents or birds, injection can be extremely challenging. In such cases, liquid inhalant anesthetics like halothane or isoflurane can be used to induce rapid unconsciousness and death. Inhalants work on the principle of displacing oxygen with an alternate gas; because the body's organs require oxygen to function, when another gas is inhaled, the body begins to shut down, and death is inevitable. Whether or not this death is considered to be humane depends on what happens between the time that the animal first inhales the gas and the time consciousness is lost. If the process is almost immediate and completely pain-free, death can be considered humane; however, if the animal experiences any physical or psychological distress or suffers in any way before losing consciousness, the death is inhumane. Many variables affect whether a death by inhalant is humane, including the physical effects of the inhalant itself, the method of delivery, and even the animal's reaction to the inhalant.

According to the AVMA, halothane is considered the most effective and humane inhalant anesthetic. Other inhalant anesthetics like isoflurane are less desirable because their pungent odor may cause the animal to initially hold his or her breath, delaying the onset of unconsciousness. However, in the shelter setting, halothane can be difficult to acquire, so isoflurane is most commonly used. Chloroform and ether are not acceptable inhalants for use in euthanasia in part because of the risk of bodily harm they pose to humans (they are a possible carcinogen and can cause liver damage).



Technically speaking, inhalant anesthetics can be used either as direct euthanasia agents or as pre-euthanasia drugs. However, it is advisable that an appropriate dose of sodium pentobarbital be injected into animals that have been rendered unconscious with the use of an inhalant anesthetic in order to ensure that death is achieved as rapidly as possible.

**IMPORTANT NOTE:** Liquid inhalant anesthetics must never be allowed to directly contact animals because they can cause irritation;

rather, the liquid should be poured onto cotton balls, gauze, or other absorbent materials and placed with the animal in an airtight container, so that the animal is exposed only to the vapors produced, rather than the liquid itself. Inhalant agents are generally not federally regulated controlled substances; nevertheless, it is good practice to control their storage and use in the same manner as other euthanasia drugs. Leftover absorbent materials must be safely disposed of so that there is no unnecessary human exposure to the inhalant.

## CHAPTER 4

# Verification of Death— The Most Critical Step in the Euthanasia Process

The euthanasia process is not complete until death has been verified. Dramatic stories about euthanized animals “waking up” after euthanasia are not modern-day miracles, but examples of grievous failures in the euthanasia process—the animal was not administered an amount of drug sufficient to depress essential brain functions, and so never moved from Stage III, surgical anesthesia, into Stage IV, medullary paralysis; in effect, the animal was never actually euthanized at all. If the technician had properly tried to verify death he would have discovered that the animal’s basic life functions had not been completely suppressed, and would have recognized that administration of additional sodium pentobarbital was necessary to achieve euthanasia.

Unless proper verification steps are taken, it is surprisingly easy to mistake an animal for dead. Sodium pentobarbital is a potent drug

that puts animals into a deep anesthetic plane that can fool even longtime technicians. The animal can appear lifeless, without any evidence of breathing or heartbeat, yet still retain minimal life-sustaining functions. The animal may survive in this state until the drug wears off, sometimes many hours later, and then will appear to “revive.” Because episodes like this are possible, it is essential to develop a protocol for the verification of death and ensure that it is followed for every animal, without exception.

It is not an exaggeration to say that the implications of failing to verify death are monumental. The trauma for the animal who “wakes up” in a landfill, freezer, or worse, is unimaginable, and the guilt experienced by the euthanasia technician responsible can be overwhelming. Moreover, media reporting of such an incident can do lasting damage to the reputation of a shelter, and the loss of the public’s trust can be permanent. For all these reasons, verification of death can be viewed as the most crucial aspect of the euthanasia process, and the euthanasia technician must take responsibility for checking each animal and ensuring that death has in fact occurred. If there is any doubt, the animal should be injected again with sodium pentobarbital and rechecked until death is definitively confirmed. Only at that point should proper disposal of the animal’s body be made, in compliance with policy and with state and local laws.

## Steps for Verifying Death

**First:** Ensure that the animal has neither a blink reflex nor a toe pinch reflex.

**Second:** Use a stethoscope to verify that respiration has stopped.

**Third:** Perform a cardiac stick or verify the onset of rigor mortis.

## Verifying Death

When an animal “wakes up” from euthanasia it is typically because the technician has misinterpreted two signs, the appearance of lifelessness and lack of breathing, as proof of death. It is critical for euthanasia technicians to understand why these two signs can be deceptive, and why affirmative steps must be taken to definitively declare an animal dead.

As we know from the discussion of the stages of anesthesia above, sodium pentobarbital puts animals into such a deep plane of surgical anesthesia that they appear to the naked eye to be completely lifeless. They are so completely unresponsive to any stimuli that they have lost both their palpebral (blink) and toe-pinch reflexes. Nevertheless, they may still be only in Stage III, surgical anesthesia, and their vital functions have not been completely depressed. Therefore, an appearance of lifelessness and lack of reflexes alone are not sufficient to conclude that an animal has died.

If the animal does not appear to be breathing regularly but instead appears to be occasionally gasping, the animal is exhibiting what is referred to as “agonal breathing.” These are not actual attempts by the animal to breathe, because the animal is not actually gasping in an effort to bring air into his or her lungs; rather it is a reflex reaction to the lack of oxygen, and is a normal part of the dying process.

Similarly, the apparent lack of breathing alone cannot be definitively relied upon. While an animal cannot survive without breathing oxygen, an animal in Stage III anesthesia may take breaths that are so shallow and infrequent that they can be missed by mere observation. A stethoscope must be used to ensure that there is in fact no heartbeat. It is important to note,



*A stethoscope is one means of verifying death*

however, that untrained ears, particularly when using an inexpensive stethoscope, may miss a very faint, weak heartbeat—even on a fully conscious, 100-pound, overweight dog that is standing up with his tail wagging! Imagine, then, how difficult it can be to determine the absence of heartbeat in a surgically unconscious animal. For this reason, euthanasia technicians must receive proper training in using a stethoscope, and must have high-quality, reliable equipment.

To be 100 percent accurate in determining death, technicians should consider supplementing the use of a stethoscope with one of two additional methods: a) waiting several hours for rigor mortis to set in; or b) using a method called cardiac stick (or heart stick) to determine that the animal’s heart has ceased beating. While either method is acceptable, the presence of rigor mortis is the only indisputable proof of death; however, in the shelter environment, where time is often of the essence, cardiac stick is most commonly used, and when performed correctly is equally as accurate. **IMPORTANT NOTE:** In some states an animal may not be left unattended until death has been verified; ensure that you are familiar with the laws applicable in your state before you leave the animal while awaiting rigor mortis.

## Performing a Cardiac Stick ('Heart Stick')

A cardiac stick involves the insertion of a needle and syringe directly into the heart of the fully unconscious animal (**IMPORTANT NOTE:** A needle must never be inserted into the heart of a conscious animal—the euthanasia technician must be certain that the animal has no blink or toe-pinch reflexes before the cardiac stick is performed). Once the needle has pierced the heart muscle, any movement of that muscle will be transferred to the syringe, which will then mimic the heartbeat extremely accurately. Imagine that the animal's heart is the base weight of a metronome, and the syringe is the metronome's pendulum—when the heart muscle moves the base of the metronome, the syringe protruding from the base will swing in response. If the syringe reflects zero movement (assuming it was properly placed in the heart muscle), it can be definitively determined that the heart has ceased beating, and death can be confirmed.

It is important to note that every movement of the syringe does not necessarily mean the animal is actually alive; an experienced euthanasia technician can tell the difference between movement that indicates a true heartbeat, meaning the heart is still circulating blood through the body, and mere fibrillation. If the syringe is moving in a circular fashion, the heart is beating and circulating blood, and the animal is still technically alive; in this case, either the technician should wait a few minutes longer to allow the drug additional time to take effect or administer additional sodium pentobarbital to the animal to facilitate death. If, on the other hand, the needle is moving in a side to side fashion (like a true metronome), the heart muscle is simply fibrillating, twitching or spasming aimlessly, and is not circulating blood. In this case, the animal is technically dead; nevertheless, the euthanasia technician should wait until the fibrillation has ceased and the syringe is still before declaring the animal

dead. (**IMPORTANT NOTE:** Injecting more drug into a heart that is fibrillating does not have any effect, as the heart is no longer capable of pumping that drug to the brain—the technician should just wait as long as necessary for the heart to become still).

To perform a cardiac stick, one uses essentially the same technique as for giving an IC injection (see Chapter 2), except that the syringe attached to the needle is empty. Unlike IC injection, however, the needle need not be inserted into a chamber of the heart; any portion of the heart muscle will do. As long as some blood is drawn into the syringe upon aspiration, either a small flash or a large surge, the needle is properly placed in the heart for purposes of a cardiac stick. If the animal is particularly obese or has a broad, barrel chest, switching to a longer needle may be required. Conversely, if the animal is tiny, the technician will want to use the smallest needle available; in fact, it may be necessary to remove the syringe from the needle once the needle has been placed in the heart in order to accurately determine whether the heart is moving, since the syringe may weigh the needle down and prevent the technician from seeing movement. Be aware that once the syringe is removed there may be a discharge of blood through the open hub of the needle.

Even though a cardiac stick is the best method of verifying death aside from rigor mortis, it is not generally used when the euthanasia is being viewed by the animal's owner or by another member of the public. Although the stick is not conducted until after the euthanasia technician has confirmed that the animal is fully unconscious and completely unable to feel pain, to the uninitiated, viewing a needle in the heart may be disturbing. In these situations, extra care must be taken to ensure that the determination of death is 100 percent accurate. In addition to using a stethoscope to verify the absence of a heartbeat, the technician should verify that the gums and mucous membranes of the animal's mouth have turned

bluish or purplish (this is called cyanosis, which indicates the lack of oxygen in those tissues). The technician may also test for a lack of rectal sphincter tone.

If cardiac stick cannot be performed, or as an additional measure of certainty, confirming the onset of rigor mortis can determine death. Rigor mortis is defined as the state of muscle rigidity that occurs in mammals after death—in full rigor, the animal will be rendered completely stiff, essentially frozen into the position in which it died. Signs of rigor mortis can usually be observed within a half-hour of the injection,

but it could take as many as several hours after death, depending on the air temperature and other factors. During this period, the body should be covered with towels, sheets, or tarps whenever possible; showing respect for an animal throughout the complete euthanasia process is essential. **IMPORTANT NOTE:** After about 12 hours the animal will pass out of rigor mortis and lose the telltale full-body stiffness as the body begins to decompose. Therefore, it is important to ensure the proper window of time is factored when using rigor mortis to verify death.

## CHAPTER 5

# Disposal of Animal Bodies

Several factors determine the best method of disposal for animal bodies, including the number of animals handled, state and local ordinances, financial considerations, and local public acceptance of the various methods available.

Placing animal bodies in a landfill is usually the most economical method of disposal, but it is not practical in communities that restrict the use of their landfill facilities. The public is not always receptive to disposal of dogs and cats this way—people do not want to see or smell animal carcasses decomposing in a dumpster outside the shelter while they await pickup, nor do they want to see animal carcasses strewn about within the landfill. Moreover, there are confirmed cases of wildlife and stray dogs and cats dying after ingesting sodium pentobarbital-filled carcasses that have been scavenged from a landfill. Therefore, if a landfill is to be used, the bodies should be bagged or boxed before disposal (which will help minimize the chances of scavenging birds and other animals eating carcasses contaminated with sodium pentobarbital), and they should be frozen or at least cooled until such time as they are removed for transport to the landfill.

Boxing animals before landfill disposal is much preferred to simply tossing bodies into a dumpster or landfill, and it need not be an additional expense—check with your local supermarket about donations of used banana or other grocery boxes.

One alternative to the landfill is to engage the services of a rendering company, which processes animal carcasses into fertilizers and other

products. Rendering companies typically charge considerable fees for pickup service (although costs vary), but they save staff the time and unpleasant task of transporting bodies to a landfill. Shelters must be sensitive, however, to the fact that the public may not look kindly on euthanized companion animals being rendered. Therefore, shelters typically reserve the services of rendering companies for disposal of large animals like horses or livestock.

Composting has been proposed as a new disposal option, particularly for disposal of large animals. However, composting requires careful layering of substrates and regular mechanical aeration, and research is still being conducted into whether composting breaks down drugs like sodium pentobarbital sufficiently to be considered safe.

Perhaps the best option for disposal of animal bodies is cremation, as it is typically less expensive than rendering (although prices can vary) and more palatable for the public than use of a landfill. Some shelters have a crematorium on site and even offer those services to the public for their own pets, helping to offset the cost of maintenance. While convenient, a private crematorium can be prohibitively expensive (the equipment itself can cost tens of thousands of dollars, it uses high volumes of fuel, and it can have prohibitively high maintenance costs) and it can require air pollution discharge permits from local, state, and federal regulatory authorities. As an alternative, many shelters contract with a private crematory company to perform this service on their behalf. Shelters are generally charged by the pound for cremation of animal bodies, and must keep bodies frozen until pickup. Most important, organizations engaging private

crematory services must verify that the company is reputable; stories of animal bodies being dumped en masse in remote areas by companies paid to cremate them do appear, and can hurt a shelter's reputation. A reputable crematory company should provide videotapes or other documentation as evidence that animals sent for cremation are properly cremated, and should welcome on-site visits by shelter representatives.

No matter the disposal method, the animal must be handled humanely and respectfully throughout the euthanasia process, from initial selection as a euthanasia candidate,

through injection and verification of death, and ultimately through disposal of the body. It is unacceptable for any person to treat an animal's body after death with any less care and reverence as would have been given while the animal was alive. A euthanasia technician who disrespects the body of an animal is likely suffering from burnout, or compassion fatigue. Retraining and counseling interventions should be undertaken, and serious consideration should be given to whether that person should be permitted to continue working with animals at all.

**Animals suspected of having rabies** should be handled and managed by trained personnel, in accordance with applicable state laws. Even though there has never been a case of human rabies acquired through the process of collecting and testing specimens, contact with saliva, mucous membranes, salivary glands, spinal cord tissue and/or brain tissue could be hazardous. Technicians handling rabies suspect animals must always wear personal protective equipment (gloves, face/eye shield, gown, etc.) and should have received pre-exposure rabies vaccinations. General guidelines for preparing specimens for rabies testing are:

- Rabies-suspect animals should be humanely euthanized in a manner that preserves the brain.
- For small mammals like bats or rodents, the whole body can typically be submitted to the testing facility. In the case of larger animals like cats and dogs, the head of the animal should be severed at the base of the skull (between the foramen magnum and the atlas) and submitted for testing, so as not to damage the sections of the brain required for testing. Livestock, equines, etc. must be handled by a veterinarian or other individual specially trained to remove the brain stem.
- Axes, hatchets, power saws, etc., should not be used for decapitation, since they not only create a danger of flying bone and tissue, they also create the potential for aerosolizing virus-contaminated fluids. Shears and hacksaws are preferred tools.
- Specimens should be kept refrigerated. Avoid freezing rabies-suspect animals, since the thawing process can delay testing.
- Carefully sanitize or dispose of not only the remainder of the animal's body but any surfaces (including soil) that may have been contaminated with bodily fluids.

## CHAPTER 6

# Euthanasia Tools

## The Euthanasia Area

The ideal euthanasia area is a clean, well-lit, well-ventilated, and readily accessible room away from high-traffic areas and used exclusively for performing euthanasia. Since animals are sensitive to sights, sounds, and smells, the area should be constructed and maintained to minimize these stimuli, which otherwise may cause unnecessary stress. Euthanasia areas and animal storage areas should also ideally be located in areas not accessible to the public or volunteers, both to preserve solemnity of the practice for the technicians and handlers involved and to avoid having the public experience sights and smells that may be misinterpreted. Basic handling equipment, first aid supplies, and a variety of needles, syringes, and other tools should be readily accessible, as should enclosures designed to safely house animals in the process of losing consciousness.

An appropriate environment, along with competent, gentle handling techniques, can go a long way toward keeping animals relaxed and calm. As noted elsewhere in this manual, a relaxed animal can frequently be euthanized without pre-euthanasia drugs, a benefit for everyone involved.

## Layout and Design

It is highly recommended that each shelter reserve a room specifically for conducting euthanasia. It is important to isolate the area from other shelter activities as much as possible to reduce the stress on the animals and to provide the staff with a safe and quiet working area. A well-appointed euthanasia room should

have adequate space for at least two people and an animal to move around freely. Exam tables, cabinets, and other fixtures should be thoughtfully located to make for an efficient and comfortable workspace.

In smaller shelters, it may not be possible to devote a room exclusively to euthanasia. In such cases, the euthanasia area should be a section of the shelter that can be separated from the rest of the building by a partition or curtain. All other types of activities must be curtailed in that space while euthanasia is being performed.

Since animals with all stages of contagious diseases will enter the euthanasia area, it is crucial that no healthy animals pass through it on their way to or from other areas of the shelter. A separate door to the outside is ideal so that injured, sick, or quarantined animals can be brought directly into the room without having to pass through live animal holding areas. Ideally, the separate door should also provide access to a cooler, freezer, or vehicle for the removal of bodies.



*A typical euthanasia room*



A euthanasia room does not have to be a drab and somber place. It is very important to create an environment that is as comfortable as possible for the people who work there. The use of skylights, windows (provided they that do not open onto public areas), and inviting colors on the walls may help foster a more soothing mood. Some shelters have murals, plants, posters, and quiet music in their euthanasia rooms. If there is a telephone in the room, the ringer should be turned off (as should personal cellphones), since ringing and beeping can startle an animal during the euthanasia process. These considerations can help reduce some of the stress on the staff, which translates into less stress for the animals. They can also provide a more appropriate atmosphere for a pet owner who wants to be with his or her animal during the procedure, if the organization permits it.

## Lighting and General Environment

Lighting that is bright enough to provide clear visibility in all areas of the euthanasia room is very important, since shadows or dark areas may obscure the technician's view of a vein and make it difficult for the handler to observe the animal's behavior. Fluorescent lighting usually provides a uniform illumination that is not too bright for most animals' eyes. Two banks of lights, one on either side of the work area where animals are euthanized, provide excellent illumination with minimal shadows.

The room's temperature should be within a reasonable comfort range for humans and animals. Portable heaters and air conditioners are sometimes necessary if the room does not have sufficient environmental controls. Performance is enhanced when animals and people are comfortable.

It is essential to have good ventilation in the area to prevent the accumulation of odors. To minimize the transfer of airborne diseases into other areas of the shelter, the ventilation system for the euthanasia room should not be connected to the rest of the building's heating and air conditioning system. An exhaust fan vented to the outside of the building is recommended if there is no separate air-exchange system built into the heating and air conditioning system.

Like all areas of the shelter, the euthanasia room must be able to withstand frequent cleaning and disinfecting. The floor of a euthanasia room is especially vulnerable to an accumulation of dirt and animal fluids and waste, and must therefore be completely sealed; if possible, a central floor drain should be installed to facilitate drainage. The floor should also have a durable nonslip surface to protect employees from falls when handling animals. All walls, cabinets, and other surfaces should be sealed with an epoxy-based paint or covered with a nonporous material for easy disinfection.

## Recommended Equipment

Euthanizing animals is highly stressful for humans, physically as well as emotionally. Physical strain can be caused by lifting, holding, and restraining animals. A well-equipped work area that allows for flexibility in handling and managing animals is therefore essential.

While euthanasia can be performed exclusively on the floor, having a table or other elevated workspace makes the work much easier, particularly when euthanizing cats and small dogs. Ideally, a commercial-grade grooming or veterinary table will be available in the euthanasia room, as these typically can be raised and lowered to ensure that technicians are working at a comfortable

height (a battery powered mobile scissor lift table is ideal). If a shelter cannot afford a grooming or veterinary table, any wide, solid surface that is of a comfortable working height can be acceptable, provided it has a nonslip, easily disinfected surface (a stainless steel table covered with a rubber mat to provide secure footing for dogs can be a good choice).

In addition to the table, there should be a separate work surface and locking cabinets for holding syringes, needles, and other equipment. Assuming the shelter uses a computerized management system for recording and updating information regarding individual animals, a computer station should ideally be available in the euthanasia room for the technician to verify an animal's status and update records throughout the process. A microchip scanner must be readily available to scan each animal immediately before euthanasia.

There should be one or more kennels, large transport cages, or banks of cages easily accessible in or near the euthanasia area. These are necessary to hold animals while waiting for pre-euthanasia drugs to take effect, or to securely house animals that have been administered an IP injection of sodium pentobarbital.

Few employees can lift a large dog alone without risking back injuries. Veterinary-grade stretchers can be useful in transporting heavy animals when they cannot move on their own. A flatbed cart or commercial bin container on wheels is also useful for removing animals; remember that animal urine is highly corrosive and will cause ordinary metal or painted surfaces to deteriorate quickly, so stainless steel is best. No matter what method of transport is used, each animal body should be removed from the euthanasia room before the next conscious animal is brought in.

Human hospitals operate under very stringent standards regarding the use and reuse of medical equipment; in some cases, these protocols prevent them from using equipment that is actually still in 100 percent working order. While shelters must be careful to weigh the advantages and disadvantages of using "secondhand equipment," it is never a bad idea to check with your local hospital or clinic to see if it has any useful supplies available.

## Syringes

All syringes commonly used for euthanasia are plastic and disposable. Most syringes can be reused, provided that they are adequately cleaned after each session. However, any leftover drug that remains in the syringe can crystallize and cause obstruction when another drug is introduced. Therefore, it is recommended that new syringes be used during every new euthanasia session, and separate syringes must always be used for each separate drug administered.

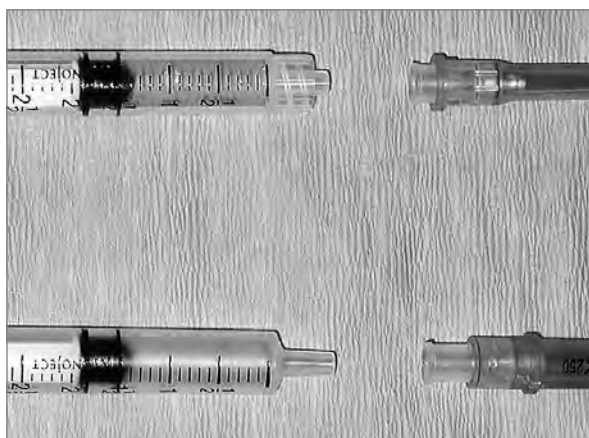
Syringes of 1, 3, 6, and 12 milliliters are most commonly used with dogs and cats, and shelters should keep all four sizes in stock. Larger sizes are available for livestock and other large animals, and smaller sizes can prove helpful for rodents and small birds. For the most part, the larger the syringe, the more expensive it is and the more unwieldy it is to use; therefore, technicians should always select the smallest syringe available to handle the necessary dose of drug.

Syringes are available either with or without a locking "hub" for the needle. The hub is the protrusion at the end of the syringe over which the needle is fastened. A standard syringe has a smooth, or "slip," hub, in which the needle is simply pushed over the hub and

held in place by friction. While this type of syringe is easiest to use, if care is not taken, the needle may pop off as the plunger pushes the drug through the small needle opening, causing the drug to spray into the face and eyes of the technician. This can be avoided by ensuring that the hub is dry before attaching the needle.

A syringe with a hub that allows the needle to be mechanically screwed onto the syringe (known as a “locking hub”) is preferred because it helps prevent the needle from accidentally coming off the syringe, an important safety feature. The locking hub also fixes the placement of the needle on the syringe at a stationary position.

Most smaller syringes have hubs in the center of the syringe (these are known as centric syringes). Larger syringes (more than 6 milliliters) are available with off-center (eccentric) hubs at the edge of the syringe, so the needle is on approximately the same plane as the animal’s leg. This can be a great advantage because it reduces the angle between the syringe and the vein, making a proper injection easier. Unfortunately, off-center hub syringes are not currently available in the locking hub style, so care must be taken when using them to ensure that the needle does not pop off.



*Needles and syringes*

## Needles

As noted earlier in this manual, needles are available in several sizes, called gauges, according to the bore diameter (the size) of the needle. The smaller the diameter of the needle, the larger the gauge size—for example, a 25-gauge needle is smaller than a 22-gauge needle, which is smaller than an 18-gauge needle. Most shelters use 18- to 25-gauge needles for euthanizing companion animals.

Choosing a smaller needle generally produces less pain for the animal on injection. However, smaller needles are more fragile and more likely to bend with animal movement; moreover, the smaller bore means that the drug moves more slowly through the needle, making it impossible to achieve a bolus effect if a large amount of sodium pentobarbital needs to be administered. Also, a small-bore needle on a larger barrel syringe will create more pressure, potentially causing the needle to pop off. Therefore, selecting the right needle for the right animal is crucial. Typically, cats, puppies, and small animals use smaller needles for IV injection, 22-gauge and smaller. Dogs typically do well with 20-gauge needles, depending on the size of the animal (although a very small Chihuahua may do well with a 22-gauge needle). Selecting the proper needle comes with experience, and is part of a good euthanasia technician’s toolkit for making euthanasia as humane as possible for each animal.

In addition to different gauges, needles come in different lengths. A euthanasia technician will select a short needle for small animals like guinea pigs or kittens, but will select a longer needle for larger animals like livestock. Even if livestock are not common in your facility, it is important to have longer needles on hand to facilitate cardiac sticks on deep barreled or obese animals, in order to verify death (see Chapter 4). The common needle

## Recommended Needle Size/Application

### 14 gauge, 1 inch/

sodium pentobarbital draw needle

### 18 gauge, 1 ½ inch/

IC, large dog

### 20 gauge, 1 inch/

IV, dogs 60 pounds and larger,  
IC, small dog

### 22 gauge, 1 inch/

IV, dog less than 60 pounds

### 22 gauge, ¾ inch/

IP, adult cat

### 25 gauge, ⅝ inch/

IV, cats; IP, kittens

## Recommended Syringes Size/Hub Style

1 cc/luer slip or lock

3 cc/luer slip or lock

6 cc/luer slip or lock

12 cc/eccentric luer slip only

lengths for dog and cat euthanasia are ⅝ inch to 1 inch, and 1½ inch needles are useful for IC injection.

At a minimum, a brand-new needle should be used for every animal; best practice calls for a new needle to be used with every injection. Reusing needles dulls the tips, and makes each subsequent injection more painful. Because veins do not have nerve endings, the only pain an animal experiences during a normal IV injection is the penetration of the skin with the needle, so it is critical to avoid the unnecessary pain caused by using a dull needle. Moreover, working with needles does raise the possibility of the injector or handler getting accidentally stuck; using sterile needles helps reduce the risk of

infection afterward. And, as noted above, never inject an animal with a needle that has been dulled by insertion through the seal of a drug bottle.

## Sharps Containers

All shelters should use approved medical waste containers (called sharps containers) for disposal of used needles. Needles must never be discarded with general waste disposal, as they are a potential source of injury and infection. There is also a risk that this dirty needle will fall into the hands of an IV drug user if disposed of improperly. With the growing concern over medical waste, some local jurisdictions have strict regulations about the disposal of needles and even syringes—in many locations they must also be disposed of as medical waste (even if they can be disposed of as general waste, they should be thoroughly washed to ensure that leftover drug does not cause harm). Check with local health authorities to be sure that your shelter meets all applicable standards.

## Tourniquets/Hemostats

While it is recommended that there always be two people involved in the euthanasia of an animal, one handler and one euthanasia technician, there may be times when the handler cannot successfully “hold off” the vein for the technician. In those cases, a Nye tourniquet (a commercially made unit with a metal restricting device) or a combination of rubber tubing and hemostat can be clamped just above the animal’s elbow, constricting the blood flow in the vein and causing it to enlarge. Once the vein has been entered, the technician must be careful to release the pressure before injecting sodium pentobarbital, as it will block the drug from smoothly circulating to the heart. Tourniquets and hemostats can be bought from veterinary and medical supply



*Using a tourniquet to hold off the lateral saphenous vein for injection*

companies; alternatively, shelters can contact local hospitals and veterinary offices for possible donations of used equipment.

## Scale

The animal's weight will dictate proper drug dosage, so having a scale near the euthanasia room is essential. A walk-on scale is preferred for adult dogs and cats, and a baby scale works well for puppies, kittens, small mammals, and small wildlife. When weighing an adult dog or cat on a floor scale, if the dog will not stand long enough to get an accurate weight the handler may need to weigh himself holding the dog, then subtract his weight to obtain the weight of the dog (referred to as tare weight). If an animal is restrained in a trap or carrier, the same technique can be used—just subtract the container's weight.

## Electric Hair Clippers

Electric hair clippers are essential to ensuring that the technician has the best possible view of an animal's leg. Any of the brand-name grooming or hair clippers is acceptable, although a cordless commercial-quality model will provide fewer problems and last much longer than many of the less expensive models on the market. A wide range of blades is available for clippers, but a No. 40 blade is used most typically because of its close cut. Follow the manufacturer's directions for cleaning and lubricating the clippers, because without proper care the clippers will burn out and have to be replaced. A cooling spray (a specially formulated product) should be applied to clipper blades every few minutes of use on the leg of a dog with long or matted hair to prevent overheating, which can cause discomfort or burning; use a toothbrush to remove hair and debris from the blades before applying the spray.

## Other Recommended Supplies

In addition to the items mentioned above, a number of items should be present in every euthanasia room:

- While every shelter should have at least one comprehensive **first aid kit** on the premises, it is advisable to keep an additional kit in the euthanasia room in the event of a bite or a scratch.
- An **eyewash station** approved by the federal Occupational Safety and Health Administration is recommended for accidental exposure to drugs (some states require this). Alternatively, a manual eye-flushing device must be easily accessible.
- A high-quality **stethoscope** is useful for determining lack of heartbeat (technicians must be properly trained in using a stethoscope to verify death).

- All animals should be scanned again for a microchip with a **universal microchip scanner** before euthanasia, as a final opportunity to reunite lost pets with their owners (remember that metal tables, fluorescent lights and computers may interfere with a reader's ability to accurately identify a microchip).
- **Towels or a rubber pad** can be used on the surface of the table or floor, under the animal, to minimize slipping and increase the animal's comfort; towels can also be used to darken cages and carriers for animals that have been given a pre-euthanasia drug.
- **Cleaning and disinfecting supplies**, including paper towels, disinfectant, squeegee, and plastic bags, should be easily accessible.
- **Drug logbook**, calculator, drug dosage charts, paper, writing pads, etc., are necessary for compliance with applicable record-keeping requirements.
- **Computer station or laptop** can provide easy access to the shelter's animal record-keeping system.
- **Animal handling equipment** including nets, control poles, etc. (see Chapter 8) ensure the safety of both animals and humans.
- **Crates, carriers, or caging** for animals that have been administered a pre-euthanasia drug, to allow the animal to pass through the stages of anesthesia in a secure and isolated environment.

## CHAPTER 7

# Euthanasia Policy and Protocols

No matter how frequently or infrequently euthanasia is performed in a facility, no other component of shelter work is as consequential or will be as carefully scrutinized by the public. It is imperative that every sheltering facility have a written euthanasia policy that identifies when euthanasia will be performed, how it will be performed, and by whom. It should also provide guidance as to available drugs and dosages, safety information, restraint policies, carcass disposal policies, and instructions on completing all necessary paperwork and record-keeping to ensure compliance with state and federal regulations. All staff involved in euthanasia must be trained thoroughly on this policy.

## Selection Criteria

A facility's written euthanasia protocol should provide clear guidance as to which animals will be considered candidates for euthanasia, and what the review and approval process for determinations will be. While these guidelines should be clear and consistent, they must still be flexible; rules that mandate that every animal be euthanized after a specific period for time, for example, are arbitrary and do not serve the best interest of the animals in the shelter's care or foster respect from the public.

A shelter's euthanasia protocol should specify that euthanasia determinations are made by an experienced animal care professional in a position of authority, preferably in con-

sultation with other key staff members. To determine whether euthanasia is necessary, shelters should consider such variables as age, health, temperament, physical condition, behavior, and available space, and should aim to objectively consider other questions, including:

- What are the realistic prospects for providing this animal with a good quality of life?
- Is the animal in pain or distress, and is there realistic hope of (and financial resources for) alleviating this pain to allow for a quality life?
- Does keeping this animal present health or safety risks to other animals or people?
- Given the fiscal and practical limitations faced by this organization, does keeping this animal reduce the organization's ability to humanely care for other animals in need?
- Are there realistic options for rehabilitation or management of the animal's behavioral issues?
- Is there foster care available for the animal that will enable the animal to achieve placement?
- Is there a reputable rescue or alternative placement available for the animal?

The answers to these questions will vary greatly depending on the community (and may even vary by facility in one community) based on financial and staffing resources, demand for space within the facility, and other considerations.

Determining whether an animal should be euthanized for behavioral reasons is a complex process. Evaluation of an animal's behavior should begin the minute the animal arrives in the shelter, and should continue throughout the stay, as opposed to being solely dependent on a "pass/fail" temperament test. A history of the animal should be solicited from the owner upon surrender whenever possible, and daily behavioral observations should be noted by staff and volunteers. An objective, formal assessment should complement this more informal information-gathering process, and whenever possible, shelters should use the results gleaned to provide additional training or other behavioral support to help the animal achieve placement.

When euthanasia is necessary, typically one staff member selects the euthanasia candidate and brings the recommendation to one or more senior staff members for written approval. Additional input may be sought from a veterinarian or other qualified professional(s). Some organizations employ committees to make euthanasia decisions, but for most organizations that must make these difficult decisions on a timely basis, a more streamlined procedure is preferable. To avoid any confusion, the chain of command for decision-making should be specified in the policy and strictly followed.

Generally, animals must not be euthanized before the expiration of their legally mandated minimum hold time. If an exception must be made because the animal will endure unnecessary suffering by being held, the reason for the exception should be specified in writing, and, whenever possible, confirmation of the necessity for the decision should be obtained by a licensed veterinarian. **IMPORTANT NOTE:** Some states mandate veterinary approval

before any animal is euthanized within its hold period; check with a lawyer or your state's oversight authority to ensure that your process for euthanasia before the expiration of the legal minimum hold time is lawful in your jurisdiction.

Although it may be tempting, a policy requiring 100 percent agreement from all staff or volunteers, or both, before a euthanasia decision is reached is difficult to implement. Not only does it often result in a stalemate where no actual decision is reached and the animal sits in limbo, it forces everyone to carry the burden of euthanasia-related stress, even those who are not psychologically equipped to handle it. A better practice is to empower individuals to express their thoughts and concerns, but charge a few key staff members, those who can be relied on to make objective decisions in accordance with policy, to make the ultimate decision.

Occasionally, stories surface about a shelter euthanizing the "wrong" animal—either mistaking one animal for another (usually because the animal is in the wrong cage, has the wrong paperwork, or because he or she is similar in appearance to another), or mistakenly euthanizing an animal that has a potential adopter or rescue placement, or worse, an animal that has an owner. To minimize the chances of such mistakes, the protocol should specify steps to verify that the right animal has been approved and brought to the euthanasia area before any drugs are administered. At a minimum, this should involve checking and cross-checking the animal's ID number and description by no less than two separate people, rescanning the animal for a microchip, and verifying one final time that there are no administrative or possible owner/adopter



holds associated with the animal. If there are any doubts, the process should be halted until all necessary confirmations are made.

It is every euthanasia technician's worst nightmare—the wrong animal is euthanized. While human error does occur, the chances of this happening are greatly reduced if appropriate safeguards are followed, including:

- All potential owner contact notes attached to animal's record.
- Double/triple signature, after review of dates and records.
- Both handler and technician verify that it's the right animal.
- Final scan of animal for microchip before administration of drugs.

If the worst does happen, and a mistake is made, acknowledge it, review what went wrong, and put necessary steps in place to ensure that the mistake does not occur again.

## Policy Elements

The agency's written euthanasia policy should ensure that animals are being euthanized in accordance with the highest standards of humane practice, and in conformance with all applicable state and local laws. Technicians should be empowered to select the most appropriate method of euthanasia for each animal.

Partnerships with rescue groups and other facilities can afford lifesaving opportunities for animals that might otherwise be euthanized. However, facilities must make rescue decisions responsibly, taking measures to ensure animals are moving to a better circumstance.

The policy should also remind technicians about the importance of verification of death, and indicate proper methods for disposal of remains.

Some written euthanasia policies are extremely detailed, specifying each step of the process, which drugs are to be used, how drugs are to be administered, specific animal handling methods, and more. Others are broader, outlining general policies and procedures but referring employees to training manuals, etc., for details. A facility's euthanasia policy can be as detailed or general as desired, but at a minimum it should include:

- Selection criteria for euthanasia.
- Procedure for recommendation and approval of euthanasia decisions.
- Verification procedures intended to ensure that the proper animal is euthanized, including assurances that:
  - › the proper signatures and approvals have been obtained.
  - › the animal's minimum hold date has expired or a documented exception to the minimum hold time has been obtained.
  - › the description and identification numbers of the animal ready for euthanasia match the approval paperwork exactly.
  - › the animal has no adoption, possible owner or other hold in place.
  - › the animal has no evidence of ownership (no tattoo, microchip, or lost report).
- Statement regarding who is permitted to perform euthanasia (should reflect applicable training requirements for the jurisdiction).
- Statement regarding who will be permitted to be present in the euthanasia room (for example, will members of the public be permitted to witness euthanasia?).
- Procedures for performing euthanasia.
- Procedures for verification of death.
- Procedures for proper disposal of remains.

- Procedures for drug handling and storage.
- Emergency procedures, staff safety protocols and applicable personal protective equipment required.
- Procedures for record-keeping and administrative compliance (for example, every facility managing controlled substances must keep logs detailing the date of euthanasia, weight and breed of animal, volume of drugs used, and technician's initials, and this log must be updated as each animal is euthanized).

## Volunteers and Euthanasia

Euthanasia decisions can be a source of tension between a shelter and its volunteers. Shelter personnel report feeling that volunteers who inquire about euthanasia decisions are overstepping boundaries, while volunteers feel entitled to basic information about the outcomes of animals for whom they have provided care. Clear communication about expectations and policies is crucial. Volunteers should be made aware of your organization's euthanasia policy from the outset, and they should be provided a clear channel for communicating questions about euthanasia decisions (rather than putting technicians on the spot). By the same token, while volunteers should not necessarily be empowered to influence euthanasia decisions, respect for their feelings or experiences with and knowledge of the animals they are working with should be considered. By creating a culture that is open, honest, and respectful, an organization and its volunteers can form a successful partnership without strife over euthanasia decisions.

While shelters are well-served to be transparent and open about euthanasia decisions, it is important to be aware of the effects those decisions have on staff members. Comments and questions from employees and volunteers alike (such as "You're not going to euthanize that one, are you?" or "What happened to Fluffy?") are certainly understandable, but they can be hurtful to technicians and handlers already carrying a tremendous burden. While employees and volunteers should be given an outlet for their questions and comments (for example in many shelters the shelter manager or volunteer coordinator is responsible for addressing such questions and concerns), they should be encouraged to respect the feelings of the staff members involved and refrain from commenting about euthanasia decisions.

## CHAPTER 8

# Animal Handling and Restraint

Whether the euthanasia technician has chosen to start the euthanasia process with a direct injection of sodium pentobarbital or administration of pre-euthanasia drugs, the animal must always be humanely restrained. The handler therefore assumes a crucial responsibility, ensuring that the animal's last interaction with humans is filled with as much kindness, compassion, and gentleness as possible while preserving the safety of everyone in the room. A successful handler must be able to accurately read the animal's body language and behavior, understand how voices and movements both inside and outside the room may affect the animal, and be familiar and comfortable with all the tools available to do the job most humanely and effectively.

As is the case in virtually every animal handling situation, the least restraint is always the best restraint. Friendly, well-socialized animals typically appreciate human contact, and euthanasia can generally be performed by gently holding and comforting the animal while sodium pentobarbital is directly injected into the vein or abdominal cavity. Fractious, fearful, or highly aroused animals, on the other hand, reject human contact, and become more stressed when forced in close proximity to people. Proper euthanasia for these animals requires the least amount of human interaction and handling possible, and is typically best achieved via a pre-euthanasia drug that allows the animal to lose consciousness in a dark, quiet, safe enclosure before a fatal dose of sodium pentobarbital is administered. No magic formula exists for determining the best technique; the decision

must be based on the animal involved, his or her reaction to the situation, and the resources available. The ability to evaluate each element is the handler's greatest asset, and is crucial to providing the animal a "good death" with minimal stress and anxiety.

**NOTE:** All of the following information relates to the restraint of dogs and cats. Because of the wide range of variables, it is not possible to address here all the techniques that should be applied with other species, so handlers must consult experts to ensure that the restraint techniques used are as humane as possible.

## Typical Restraint Techniques—Dogs

### Restraint for Direct Injection

To administer an IV injection to a dog, it is common practice for the handler to stand alongside the dog, facing the same side of the dog, and use the arm closest to the dog's head to cradle its neck in the crook of the elbow (he or she can use that hand to scratch or rub the dog's ear or neck as an extra measure of reassurance). The handler's other arm then reaches over the back of the dog and grasps the far front leg just behind the elbow, extending it for the technician to inject into. Most well-socialized dogs will not object to this type of gentle restraint, but if they do resist, the handler can use the combined strength of their arm and torso (also using the rest of the body or even a wall to serve as a barrier to movement by the animal)

to help to maximize control. Smaller dogs can be held in this manner on top of a steady table, while larger dogs should be allowed to remain on the floor. Held in this manner, dogs administered an IV injection quickly fall unconscious while still in the arms of the handler.

When handling puppies, the handler may simply draw the puppy up close to his or her body, using one arm to support the weight of the body (the puppy's tail facing the handler's elbow, the handler's fingers between the front paws supporting the neck and helping to extend one foreleg) and the other to gently control the puppy's head. Alternatively, the front half of the puppy can be lifted off a table by a hand slid under his or her chest, exposing the abdomen for IP injection. Whichever method is chosen, ensuring that the puppy feels secure is paramount.

## Restraint for Administration of Pre-Euthanasia Drugs

Dogs that cannot be safely restrained with a moderate amount of handling should be injected with a pre-euthanasia drug. For mildly

uncooperative dogs, this can be achieved using the same techniques noted above, except instead of extending the dog's front leg the handler simply uses his or her arm to help immobilize the entire length of the dog, allowing the euthanasia technician to safely hold the animal's rear leg for an intramuscular (IM) injection. One effective technique is for the handler to place his or her arm under the lower abdomen of the dog, thus helping to support the dog and using the arm almost as a barrier against the legs so the dog cannot bend his or her knee. Alternatively, the dog can be placed in a press gate, allowing the technician to safely and quickly reach the dog's hind legs for administration of the IM injection (dogs on control poles can also be gently restrained for injection, but the use of a press gate is preferred). Once the injection has been administered, the dog should be left alone in a quiet, secure environment until he or she has lost consciousness, whereupon sodium pentobarbital can be administered; the handler remaining with the dog should be prepared to gently restrain the dog through all the stages of anesthesia so the dog does not cause self-injury.



*Proper hold of a dog for direct injection into the cephalic vein*



*Proper hold of a puppy for euthanasia*

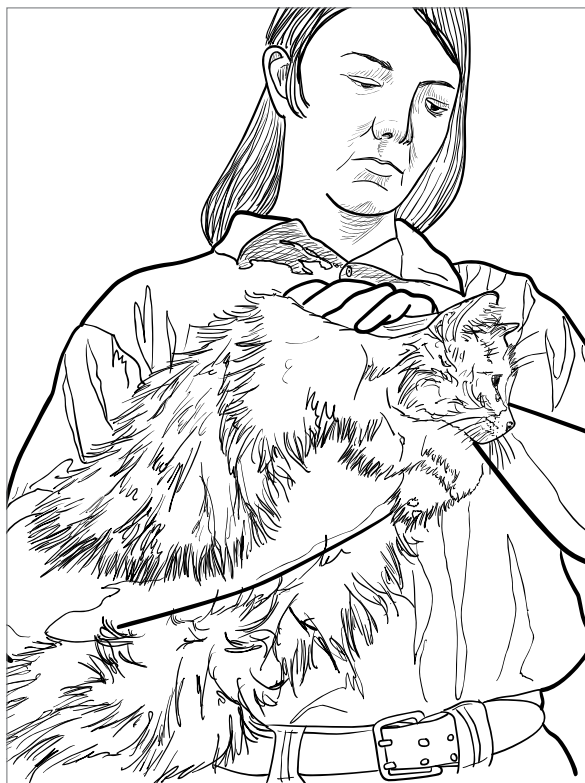
## Typical Restraint Techniques—Cats

### Restraint for Direct Injection

Because intraperitoneal (IP) injection, when performed properly, causes no pain, well-socialized cats can be injected directly with sodium pentobarbital with very minimal restraint. The handler simply places one hand between the cat's two front legs, grasping them gently together, and lifts the front of the cat slightly off the table surface. When restrained in this manner, the forelimbs of the cat need to be lifted only enough to allow the euthanasia technician to determine the proper location for injection, and most cats do not object. Because IP injection takes time for full effect, after the injection the cat should be placed in a quiet, dark cage or carrier until he or she loses consciousness.

**IMPORTANT NOTE:** If the cat struggles and resists gentle handling, IP injection should not proceed; instead, a pre-euthanasia drug should be administered. Also, cats should not be stretched for IP injection because stretching is not only uncomfortable for the animal, it can result in pain upon injection if the skin is taut.

Mother cats move their kittens by firmly grasping the nape (scruff) of their neck, with the rest of the body left to dangle. As cats age, though, they do not appreciate being carried in quite the same fashion! Therefore, for adult cats the term "scruffing" is said to mean gently grasping the loose skin on the back of the cat's neck, without pinching or twisting the skin, while at the same time supporting the cat's weight by cradling the lower body. If the cat cannot be gently handled in such a fashion it should not be considered an appropriate candidate for IP injection.



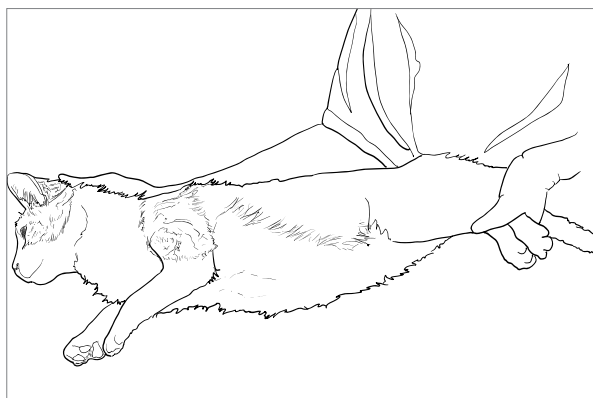
*Using both hands to properly support a cat*

### Restraint for Administration of Pre-Euthanasia Drugs

If a cat cannot be safely handled for direct injection, a pre-euthanasia drug should be administered. If the cat will accept minimal handling, simply open the cage door and gently hold the cat securely in place (either by gently scruffing it, with or without a towel draped over its head to encourage the cat to calm down and to provide an extra measure of security, or by using a clear plastic shield or other device designed to gently hold the cat in place) with the head turned away, then inject the cat with the appropriate pre-euthanasia drug (preferably Telazol) in the large leg muscle. Once the cat has been injected, close the cage door and leave the cat alone or place the cat in another quiet, dark, secure place to limit stimulation while the drug takes effect. Once the cat is unconscious, he or she can be brought to the euthanasia table and given an IV or IC injection of sodium pentobarbital. **IMPORTANT NOTE:** If pre-euthanasia drugs are administered while

the cat is in a cage, be sure to remove water, so that the cat does not drown (it is advisable to remove everything from the cage except the towel or bedding).

For fractious cats, it is best to avoid any direct handling. Using a Safety Stick is the best approach for injecting most unhappy cats—simply use the stick to gently administer a pre-euthanasia drug in the large muscle mass of the leg. Cats that are overtly aggressive when the Safety Stick is introduced into the cage will most likely need to be removed in order to humanely administer the drug (remember, it is unacceptable to administer pre-euthanasia drugs in any location besides a large muscle mass, so a cat that will not hold still for careful placement of the needle should not be injected). The cat should be secured in a net for injection, then returned to a secure, quiet, dark area to allow the drug time to take effect. Another alternative is to use the feral cat box that will hopefully already be in the cat's cage—close the box and carry it to the euthanasia area where IM injection of a pre-euthanasia drug can be performed through the holes in the box (although injecting through the holes in a feral cat box can be challenging). Alternatively, the handler can either transfer the cat to a squeeze cage or restrain the cat with a Plexiglass® shield, net, or “fork” for an IM injection of pre-euthanasia drugs. Again, after the injection the cat should be placed in a dark enclosure to lose consciousness.



*Gentle restraint of a cat for injection*

## General Restraint Techniques

Regardless of method, everyone involved in the euthanasia process should speak in calm, quiet, reassuring tones, and avoid rapid, jerky, or threatening movements. A calm atmosphere can relax a nervous animal sufficiently to avoid needing additional restraint tools, and can keep a docile animal tractable.

Even if an animal appears to be receptive to gentle restraint, a backup plan is crucial in case something goes wrong. Nets, towels, control poles, and other tools should be at the ready in case an animal begins to resist restraint, and pre-euthanasia drugs should be available to administer quickly when direct injection is no longer viable.

When handling rabbits, hamsters, and other small mammals, the same general principles apply—the least amount of restraint is always best. Many mammals aren't comfortable being carried, so keeping them in their familiar enclosures to the greatest extent possible is best. And always be sure to support small mammal bodies fully—never pick up or carry an animal by the ears or tail, and be certain that the entire length of their body is supported.

## Restraint Tools

Although there is no substitute for the knowledge and experience of the handler, humane animal-handling tools are among the most important pieces of equipment at a shelter. Standard equipment that should be accessible at all times includes: leashes, towels, gloves, control poles, bags, nets, ropes, muzzles, barriers, and various types of confinement units. When using restraint tools, the principle that

the least restraint is best always applies—a control pole or press gate should not be a first option when the use of a leash or a towel will do. It is the handler’s responsibility to read the animal and decide which, if any, restraint tool(s) should be applied in order to humanely secure the animal and preserve human safety.

**IMPORTANT NOTE:** If restraint tools are necessary, use pre-euthanasia drugs instead of attempting direct injection.

## Time

The most crucial, yet most frequently overlooked, tool for humane animal handling is time. Animals that appear nervous or fractious can often be humanely handled with just a leash or a towel if they are approached slowly and given sufficient time to acclimate to the handler’s presence. Unfortunately, in shelter settings, the overwhelming amount of work to be done and frequent staffing shortages sometimes force staff to rush, even when working with and around animals. However, it is vital that handlers appreciate that taking their time with an animal can avoid a prolonged battle on a control pole or other device, can keep all the humans safer, and will save time in the long run. It is equally critical that those not involved in the euthanasia process respect this important point, and ensure that employees are not interrupted or rushed.

## Leash

For dogs, a leash is one of the most basic, and crucial, pieces of restraint equipment. Provided the dog has been properly socialized to it, a leash can help position the animal’s head and body, and it ensures that the animal will not bolt away if he or she becomes startled or frightened. Handlers must always take care to ensure that the leash does not choke the dog, as that could cause panic unrelated to the injection process. A flat cloth or nylon leash

can also serve double duty as a temporary muzzle when gently wrapped around the dog’s snout, if no other option is available; however, a leash wrapped around the dog’s snout will not provide as much security as an actual muzzle, and should not be relied on if there is reason to believe the dog may become fractious. **IMPORTANT NOTE:** Leash muzzles can injure the animal if not applied properly (if the leash is twisted or pinches the lips), which can cause the animal to become more difficult to handle. When possible use a commercially made muzzle or fashion one out of soft gauze rather than a leash.

## Towel

For most animals, a towel gently draped over the eyes has a calming effect, which can work to a handler’s advantage in a euthanasia setting. Handlers must not simply assume that a towel will prevent an animal from biting or scratching—take care to properly secure every animal whether or not a towel is used to calm them.

A towel is extremely useful for handling mildly uncooperative cats. Drop a thick towel over the cat in a cage so that the head and body are covered; after allowing him or her to calm down under the towel, the cat and towel together can be safely scooped up and carried from the cage to the euthanasia table. For slightly less cooperative cats, a towel wrapped snugly once or twice around the head, legs, and body will protect the handler from being scratched. This “kitty burrito” acts much like a cat bag to minimize scratching and biting, as the confinement provided by the towel often calms the cat (this technique can also be used on small dogs).

For dogs, a towel can even be used as a makeshift Elizabethan collar, preventing the dog from turning its head to bite, particularly for small breed dogs.

## Gloves

Gloves can often provide protection from bites and scratches, and are an immensely important tool, particularly when handling a fractious cat or small animal. But gloves can provide either thickness and bite protection or dexterity and sensitivity—not both—making any glove less than desirable for extensive use in a euthanasia setting. True animal handling gloves (as opposed to more traditional general work gloves) can offer protection from both crushing and penetrating bites. While general work gloves (typically leather gloves for construction or farm work) can be better than nothing, they do not compare with rugged gloves intended for animal handling work. Some of the best gloves available have two layers, using both dense leather and Kevlar, and may reach all the way to the shoulder. But typically, the more protection the glove affords the more restrictive it is. For that reason, while gloves are useful, many handlers avoid them unless absolutely necessary. Gloves should therefore never be considered a substitute for proper handling technique.

## Muzzle

Muzzles are essential for minimizing bite risk, and should be used whenever there is any doubt as to whether a dog might become fractious. Lightweight, easy-to-clean nylon muzzles, leather muzzles and even metal basket muzzles are available in a wide range of sizes and styles. Be certain that any muzzle is securely applied. Even after application, it is critical to use safe handling techniques in the event that the muzzle somehow slips or is removed by the animal. Once applied, the muzzle should not be removed until the animal has completely lost consciousness, because even after pre-euthanasia drugs have been administered the dog may experience an excitement phase with reduced bite inhibition. A muzzled dog must be closely monitored to ensure that he or she does not vomit with the muzzle on,



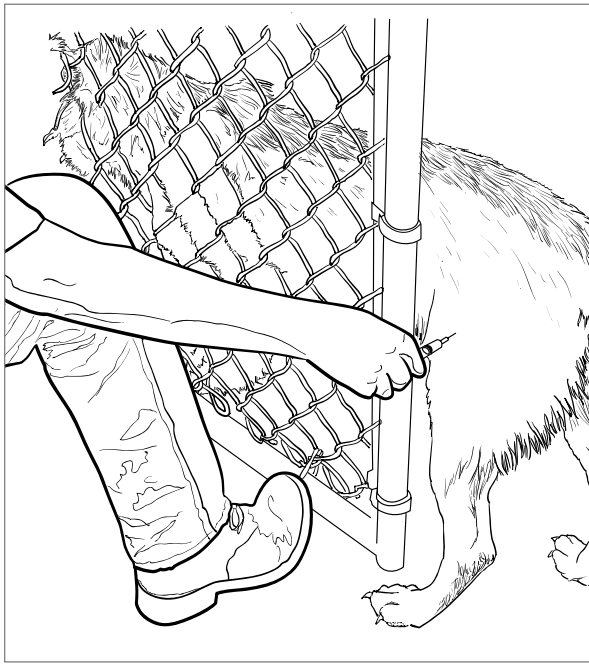
*Application of a muzzle can increase worker safety*

which could cause the dog to choke; if the dog vomits, quickly but cautiously remove the muzzle and allow the dog to expel the vomit. Dogs panting heavily from stress or exertion should be allowed to calm down before a muzzle is placed.

## Press Gate

For dogs who can be safely walked on a leash but may become fractious when IM injection is attempted, a press gate (also commonly referred to as a restraint gate or a squeeze gate) can be a useful alternative to putting the dog on a control pole. The press gate typically looks like a small section of chain-link fencing that has been secured to a wall on one side, leaving the other side free to swing back and forth. With the gate swung open, the dog is walked toward the affixed end of the gate; the loose end of the gate is then gently swung back toward the wall, securing the dog's body between the gate and the wall, allowing the technician to perform an IM injection in the dog's back leg. In most cases, when experienced personnel use the press gate, the process runs smoothly; however, there are occasions where the dog becomes frightened





*A press gate is a useful tool for securing a fractious dog for injection of pre-euthanasia drugs*

or aroused by the confinement of the gate. In such cases, the handler can further secure the dog by running its leash through the front of the gate and holding it near the floor, to maintain an extra measure of control over the front of the dog's body such that he or she can't back out or try to go up and over the gate. For shelters that have no press gate, the effect can be simulated using the door of a traditional dog kennel.

## Control Pole

Probably no device has saved more animal shelter personnel from serious injury than the control pole (also commonly referred to as a catch pole, rabies pole, or come-along). When properly used, the control pole serves, in effect, as an extension of the handler's hand, allowing her to safely secure and guide a dog that could not be safely approached in closer proximity. However, the control pole can easily be used improperly, and can cause serious injury or even death to a dog. Therefore, a control pole should be used only when the dog presents a legitimate risk of serious injury to the handler.

If the dog can be safely walked on a leash, or the dog is small enough that he or she can be secured with a towel, a control pole should not be used. **IMPORTANT NOTE:** Never use a control pole on a cat!

Even the most docile cats that are accustomed to wearing a collar will resist a control pole or other tightening around their neck. Therefore, control poles should never be used on cats.

While control poles can be constructed from simple materials like a pipe and rope, the quality and construction of commercial models are far better than any homemade devices. Several commercially manufactured types of poles exist, and shelters should keep them handy in the dog housing areas and the euthanasia room. Control poles should be checked frequently to ensure that they remain in good working order.

As noted above, a control pole should serve as an extension of the handler's arm, and should simply help to guide the dog's body, not to choke, yank, or drag it. The noose (loop) of the pole should be placed as low on the dog's neck as possible to avoid crushing the larynx. Apply just enough pressure on the noose to ensure that the dog cannot slip out of it—too much pressure may cause the dog to panic, particularly if the dog feels its airway is being cut off (a good test of this is to slightly release the noose on a dog that is struggling on the pole—if the dog relaxes, it is likely that the noose was so tight the dog was feeling suffocated). Once the dog is securely on the pole, use it to guide the animal forward. Never drag a dog on a control pole; if the dog will not move, the handler should position herself behind the dog to encourage him to step forward; the dog should be permitted to move forward at his own pace, rather than being pushed with the

pole. Typically one pole is sufficient to secure a difficult dog; however, for exceptionally large, fractious dogs, a second pole can be applied by a second handler to ensure that the handler is not overpowered. Again, the goal is not to force a dog to comply through use of one or more poles, but simply to prevent injury and help guide the dog in the general direction required.

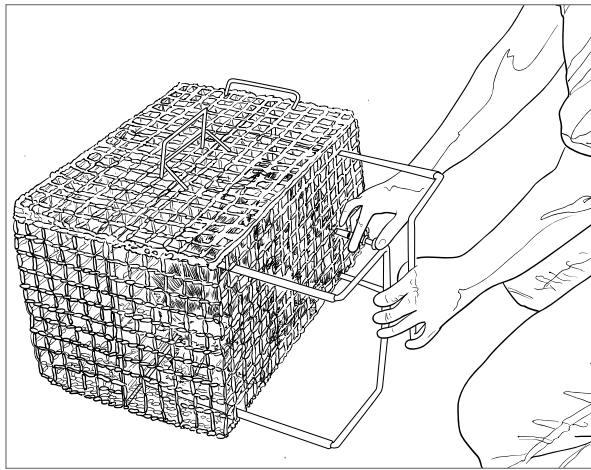
The condition of the control pole can tell a great deal about whether it is being used humanely. If the pole is full of bite marks, the user may be dragging dogs on it, putting the pole in range of the teeth, rather than positioning him or herself behind the dog and guiding it forward. A bent or curved control pole suggests that the user is lifting dogs up with it, which is an inappropriate use of the tool.

To reduce the anxiety of both the animal and the handler, the amount of time a dog spends on the end of a control pole should be limited. To this end, design of a euthanasia area and pre-planning for the handling of aggressive dogs is essential for minimizing both human and animal stress and to provide euthanasia safely. Too often, animal handlers are forced to move an aggressive dog on the end of a control pole across the shelter grounds to the isolated euthanasia area, where by the time they arrive, both dog and handler are stressed and exhausted. Instead, if aggressive dogs arrive at the shelter specifically for euthanasia, they should ideally be driven directly to the euthanasia area for a pre-euthanasia anesthetic injection. Alternatively, they can be placed into a wheeled transport cage that is brought directly to the euthanasia room—upon arrival, the leash or control pole still on the dog can be pulled taut through the cage door to restrain the neck of the dog while a pre-euthanasia injection is given in a hind leg.

While ideally all euthanasia-related procedures should be performed in a designated euthanasia area, for some fractious dogs who become highly aroused on a pole it may be most humane to administer pre-euthanasia drugs while still in the safety of their kennel. Not only is this often less stressful for the dog, it reduces the chances that other dogs in the kennel will become stressed witnessing the dog fight the control pole. To administer pre-euthanasia drugs to a dog in a kennel, first secure the area to ensure that members of the public and volunteers will not unwittingly stumble upon the scene and cause a distraction. Next, properly apply a control pole to the dog and either use the gate of the kennel as a makeshift press gate or gently press the dog's head toward a corner of the kennel, allowing the technician easy access to the dog's hind leg for IM injection. Because kennels are usually such tight quarters, it will be critical that the handler is experienced enough to ensure that the dog remains secure and that the technician is adept enough to administer the pre-euthanasia drug efficiently and quickly. Once the drug has been administered and the technician has safely left the kennel, the dog should be released from the pole and allowed to lose consciousness, at which point he or she can be carried to the euthanasia area on a stretcher or a cart for injection of sodium pentobarbital.

## Squeeze Cage

One of the most practical devices for safely restraining cats (and even wild animals like raccoons, etc.) is a squeeze cage. A squeeze cage is simply a regular cage or trap with an extra movable wall inside; this wall can be pushed or pulled toward the animal until he or she is unable to move, helping to ensure safe and humane injection of a pre-euthanasia drug. Ideally, each shelter should have at least one commercially manufactured squeeze cage for use on fractious cats or wildlife. Alternatively, a makeshift squeeze cage can be made by using a commercial or homemade "fork" inserted



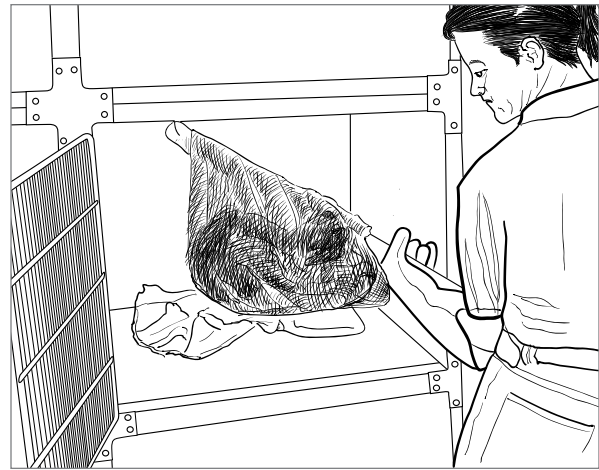
*A squeeze cage immobilizes a cat for injection of pre-euthanasia drugs*

through a wire carrier or trap. The fork fits through the top or side holes of the container and creates a false “wall” that restricts the animal to the end of the carrier. A pair of forks can be used to “walk” the animal into a pressed position within the cage. The animal can then easily be given an injection, the fork can be removed, and the carrier can be covered to allow the animal to go under the effect of the drug administered.

Simple clear plastic hand-held barriers can also provide an effective variation on the squeeze cage concept. The barrier is inserted into a regular cage and is used to guide an animal into a corner, at which point the animal can be injected through holes in the barrier. When using a plastic-glass barrier it is critical that it be properly sized so that the cat cannot escape over or around it, causing more stress and possible injury for both the cat and the technician.

## Feral Cat Box

Another alternative for humane IM injection of fractious cats is the use of a commercially manufactured or homemade feral cat box. This is a small box with small holes on the sides that can be used for transporting a cat and for IM injection of pre-euthanasia drugs. A feral cat box is ideal for use because it can be placed inside the



*A net is a useful tool for securing a fractious cat for injection of pre-euthanasia drugs*

cage of the cat, offering a safe, stress-free place for hiding. When the cat is to be euthanized, simply securely shut the openings of the box and carry it to the euthanasia room.

## Cat Bags/Nets

Cat bags and nets can be very effective for handling fractious cats. Handlers must be careful to not just catch the cat in the net, but also to roll the net sufficiently to ensure that the cat is rendered completely immobile, allowing for safe and accurate IM injection of pre-euthanasia drugs. After the injection, the cat should be returned to a cage or carrier while the drug takes effect. While fishing nets can be used to secure cats, they are typically not intended to withstand sharp cat claws and they may contain openings large enough for cats to strike out with their legs; only nets made specifically for containment of cats should be used in a shelter.

## Cat Graspers/Tongs

Cat graspers/tongs are designed to grasp and hold a cat securely (the tongs will not tighten so completely as to injure the animal). They are very useful for securing and removing cats from tight spaces where a net cannot be used. They should not, however, be used for restraining a cat for euthanasia.

## CHAPTER 9

# Employee Health and Safety

**NOTE: Nothing in this chapter should be regarded as medical advice. Always consult a physician for evaluation or treatment of any injury.**

While participating in euthanasia does pose inherent risks, as is the case with virtually any activity involving animals, proper training and education are vital to help avoid injuries. It is incumbent on facility managers to provide the tools, training, and other resources that staff and volunteers need to minimize risks to the greatest extent possible.

The tips meant to increase staff safety during the euthanasia process apply equally well regardless of the shelter work being performed—working in pairs, for example, not only helps reduce the chance of problems (a second pair of eyes is always useful for

Of course, preventing problems before they occur is always best—you can reduce chances of workplace injuries by:

- Having clear policies in place.
- Ensuring that the staff is properly trained.
- Ensuring that workers have the time needed to do their jobs thoroughly and carefully.
- Promoting good communication and discussion of problems and opportunities for improvement.
- Ensuring that employees have all equipment they need, in good working order.
- Promoting teamwork and a positive, supportive working environment.

spotting trouble before it happens), it also ensures that someone is there to restrain the animal and summon help, should a crisis arise. Having proper, well-kept tools like nets and control poles is vital to ensuring that response to incidents is immediate, effective, and humane. First aid kits and other safety supplies should be accessible and restocked as necessary. And last but not least, acknowledging incidents, discussing how they can be avoided, and adopting changes based on lessons learned is of utmost importance—if staff cannot discuss problems because they fear they will be rebuked or disciplined, opportunities for prevention of future incidents are lost.

## Bites/Scratches

Even though most injuries, including bites and scratches, can be avoided through skilled handling, incidents can still occur. If a technician or handler is injured, follow these procedures:

- Ensure that the animal is immediately secured and unable to inflict additional injury.
- Treat the injury as appropriate.
- Report the injury to both shelter management and public health officials.
- Ensure that the animal is properly evaluated for rabies.
- Debrief about what happened, and how the incident could have been avoided.
- Correct any deficiencies in policies and procedures.

Staff members may also suffer back strain or other injuries from lifting or restraining

animals. Employees should be trained on proper lifting techniques, and should have equipment like stretchers available to ease physical burdens.

## Needle Sticks

In addition to sustaining possible injuries from animal handling, euthanasia technicians can be injured by accidental needle sticks. If an animal becomes excited and bumps the hand holding the needle during injection, or if the technician becomes careless or distracted while holding an uncapped needle, it is possible that a needle will cause a puncture injury (called a needle stick). If an accidental needle stick occurs, run the wound under water immediately to help flush out any bacteria that may be pushed into the wound, and cover it, then promptly seek medical attention.

The primary danger from a needle stick arises from the puncture itself—the risk of danger from drugs being injected is actually quite low. This is not because the drugs are any less lethal to humans than they are to animals, but because the quantities necessary to affect a person are unlikely to be injected accidentally (for an average-size person, quite a large amount—greater than a few milliliters—must be injected to achieve a lethal dose). Typically when an accidental puncture occurs, only a minute amount of drug is injected before the technician reflexively reacts to the pain of the puncture and removes the needle. Such incidents usually cause nothing more serious than some pain or tingling at the injection site. Nevertheless, always seek immediate medical attention whenever accidental injection of even small amounts of drug occurs, since the possibility of an allergic or other reaction exists.

The risk of needle injuries can be greatly reduced by leaving the needle capped until just before the injection, and by not using risky shortcuts like pulling the cap off a needle with the teeth, or worse, trying to reinsert a needle into a cap held between the teeth. Using a clean needle each time will help reduce the risk of infection if a needle stick does occur. But perhaps most important to avoiding accidental needle stick injuries is clear, effective communication between technician and handler to identify and prevent potentially risky situations.

## Eye Injuries

Sodium pentobarbital and pre-euthanasia drugs can cause significant injury if they are sprayed into a person's eyes. This most typically occurs when the needle pops off the syringe during injection, either because the needle was not properly secured or because the needle became clogged and could not withstand the pressure applied during injection. When any drug comes into contact with an eye, the situation should be considered a medical emergency. The eye immediately should be flushed voluminously with water (which is why it is advisable to have an emergency eyewash station in the euthanasia room). Contact lenses should be removed immediately, and first aid procedures for this type of injury should be started at once.

The use of locking syringes, the selection of appropriately sized needles, and the steady administration of pressure can help prevent needles from accidentally popping off, and using clean needles every time can help avoid blockage. Nevertheless, the only way to definitively avoid any risk of accidental eye injury is by requiring staff to wear protective eyewear.



*For worker safety, a euthanasia room should ideally contain an eye wash station*

## General Hazards

Most environmental injuries are the result of inadequate safety measures, vague procedures, or human error. Accidents that result from the first two causes may be reduced by providing proper training, solid procedures, and a good selection of high-quality restraint equipment; human error, unfortunately, is impossible to completely eliminate. Because of the nature of the work, the euthanasia area is the site of many potential work hazards, like slippery fluids or hair clippings on the floor, cage doors left open, and the like. A good way to minimize injuries from these sources is to provide staff with adequate time to accomplish their tasks effectively and thoroughly.

## Compassion Fatigue/ Euthanasia-Related Stress

Animal shelter workers and volunteers must contend with a unique paradox in their lives. They enter the field of sheltering because of their love for animals and their desire to care for those that find themselves victims of homelessness, or worse. Yet the work of caring for animal victims exposes them to a phenomenon called “compassion fatigue,” a form of secondary post-traumatic stress disorder in which caretakers begin to internalize and suffer the effects of the trauma experienced by the victims they care for. And while most sufferers of traumatic stress experience a trauma and are able to move through the stages of grief to eventually heal, for caretakers the grief process begins anew with every new animal victim that comes through the door—there is never any final resolution or psychological healing.

To complicate matters further, euthanasia technicians must suffer the additional psychological burden of being the only caretakers who often are called upon to end the lives of the very victims for whom they have provided care. This dilemma has been referred to as “caring-killing paradox,” and it dramatically affects the lives of every euthanasia technician.

Those suffering from compassion fatigue and euthanasia-related stress describe symptoms that can include: disruption of daily activities, lack of concentration, sleep problems, feelings of inadequacy and lack of self-worth, family conflict, substance abuse, depression, burnout, and negative job satisfaction. The stresses of the job are typically manifested in one of two ways—internalizing (exhibiting self-destructive behaviors like smoking or

drinking, avoiding social situations, or otherwise ceasing activities that once provided pleasure and personal satisfaction) or externalizing (sudden outbursts of anger, open hostility toward others, etc.). While both are normal, neither is productive. Instead, employees must be supported in finding ways of managing their grief without harming themselves or others.

Every shelter must acknowledge that compassion fatigue and euthanasia-related stress are real, and must support their employees' and volunteers' psychological needs. Both employees and volunteers must be made aware of the signs and symptoms so that they can better understand and actively support one another and help build coping skills. Many organizations have taken steps to provide support for staff and volunteers, with internal support groups or professional counselors to help build coping skills, and still

others use agency-provided employee-assistance programs. Organizations can also take internal policy measures intended to combat compassion fatigue and euthanasia-related stress, including rotating euthanasia responsibilities among a number of staff members, allowing technicians to transfer the task to another technician if a day is going particularly badly, allowing technicians to participate in all of the positive aspects of shelter work (like reuniting animals with their owners and facilitating adoptions, instead of only performing euthanasia). It is also critical that shelter leadership create a culture that views euthanasia decisions as an operational necessity of the organization as a whole, rather than as decisions made by a few individuals; a culture that allows just a few individuals to bear full responsibility is likely to generate high amounts of staff dissatisfaction, burnout, and turnover.

## CHAPTER 10

# Federal Requirements for Controlled Substances

Any agency using sodium pentobarbital or other controlled substances must adhere to the strictures of the Controlled Substance Act (part of the Comprehensive Drug Abuse Prevention and Control Act), passed in 1970 and enforced by the U.S. Drug Enforcement Administration (DEA). This law classifies drugs into five major categories (called Schedules) according to their abuse potential, and strictly regulates their manufacture, distribution, and handling according to their potential risks and medical benefits.

Under federal law, animal shelters are not expressly permitted to obtain or use controlled drugs like sodium pentobarbital (a Schedule II controlled substance). Most shelters obtain euthanasia drugs in one of three ways:

1. They may hire a staff veterinarian who can obtain drugs pursuant to their professional license. This is the most ideal circumstance, but unfortunately many agencies do not have veterinarians on staff.
2. They may team with an off-site veterinarian willing to provide drugs to the agency; in such cases, the veterinarian assumes all responsibility for ordering and obtaining the drugs, administering their use, ensuring their security, overseeing inventory, and reporting any losses or theft to the DEA. This collaboration works well for many organizations, although in some more remote areas there is no local veterinarian willing or able to oversee the shelter's use of euthanasia drugs.

3. They may take advantage of a state law that enables direct licensing of shelters, allowing them to obtain and use drugs without the direct oversight of a veterinarian. Assuming that the shelter's euthanasia technicians have been properly trained, this is the best option for shelters without a staff veterinarian, (although it is highly recommended that the agency still maintain a close working relationship with at least one expert in shelter medicine to assist in developing and overseeing euthanasia practices).

## Controlled Drug Schedules

**Schedule I:** drugs that have a high potential for abuse and no currently acceptable medical use.

**Schedule II:** drugs that have a high potential for abuse but have a currently acceptable medical use (sodium pentobarbital).

**Schedule III:** drugs that have less potential for abuse and have a currently acceptable medical use (Telazol, ketamine, sodium pentobarbital mixes).

**Schedule IV:** drugs that have a low potential for abuse and have a currently acceptable medical use.

**Schedule V:** drugs that have the lowest potential for abuse and have a currently acceptable medical use.

For the full list of controlled substances and their classifications please refer to: [www.dea diversion.usdoj.gov/schedules/orangebook/c\\_cs\\_alpha.pdf](http://www.dea diversion.usdoj.gov/schedules/orangebook/c_cs_alpha.pdf)



All shelters that use euthanasia drugs must meet federal requirements for the storage, record-keeping, inventory, and disposal of controlled substances, as well as any applicable state laws and regulations, which may be even more stringent than the federal requirements. For specific information about your state's laws, contact the appropriate regulatory agency, like the state board of pharmacy, board of veterinary medicine, or state animal control or humane association. Bear in mind that when more than one legal requirement applies (for instance, if there are both federal and state requirements relating to drug storage), the agency must meet or exceed whichever version is more strict.

### Know Your Laws

- What are the minimum hold times animals must be held before adoption, transfer, or euthanasia? Are there any exceptions?
- Does your jurisdiction permit you to apply to obtain, possess, and use euthanasia drugs directly or only with veterinary authority and oversight?
- What are the training and certification requirements for performing euthanasia?
- What drugs are permitted? (For example, some states prohibit the use of sodium pentobarbital in powder form; other states dictate which pre-euthanasia drugs may or may not be used.)
- What administration methods are permitted? (For example, some states prohibit oral administration of sodium pentobarbital.)
- Are there other laws that may affect how euthanasia is performed? (For example, in some states mixing of ketamine and xylazine is prohibited as a violation of pharmacy compounding laws.)

## Storage

Federal law specifies that all controlled substances be stored in a “substantially constructed,” securely locked cabinet. The law does not define exactly what constitutes “substantially constructed,” so organizations must look to the intent of the provision for guidance—since the intent of the requirement is to deter theft or misuse of drugs, they should be stored in a cabinet that is either permanently constructed or attached to a building structure to prevent physical removal. The following are suggestions to ensure safe and lawful storage of drugs; agencies should check with their local DEA office for more specific recommendations.

- Store the central supply of controlled substances (the unopened, sealed bottles) in a floor safe (cemented into the floor), a safe securely bolted to the floor, or a safe weighing more than 750 pounds. Store the daily supply (opened bottles) of controlled substances in a double-locked steel cabinet bolted to the wall.



*A wall-mounted drug safe for storing controlled substances*

- Because hydrated (mixed) Telazol should be kept refrigerated, a lock box should be mounted in the refrigerator itself.
- If state regulations allow controlled substances to be carried in a vehicle, such supplies should be kept in a locked box that is securely fixed to the inside of the vehicle.
- Access to the drug supply should be limited to supervisors, veterinarians, and properly trained and certified euthanasia technicians.
- For high-volume shelters with a large supply of controlled substances kept on hand, a security alarm or surveillance system should be installed as additional protection.
- A master drug inventory log recording every time the supply safe is opened should be maintained to ensure that the inventory remains accurate (this log should be separate and distinct from the euthanasia log used to record each euthanasia performed, but the individual bottle numbers, etc., should be capable of being cross-matched). A witness should be present and the drugs counted every time a staff member opens the safe, and the log should be updated with each new shipment received or bottle removed for use in the shelter. The log should include:
  - a) The drug's shipment lot number and manufacturer/distributor name.
  - b) The drug type and name.
  - c) The in-house assigned bottle numbers (used to match specific bottles with specific animals on the euthanasia log).
  - d) The drug's strength, volume, and expiration date.
  - e) The date and amount of drug (number bottles in consecutive order) received.
  - f) The date and amount of drug (number bottles in consecutive order) removed.

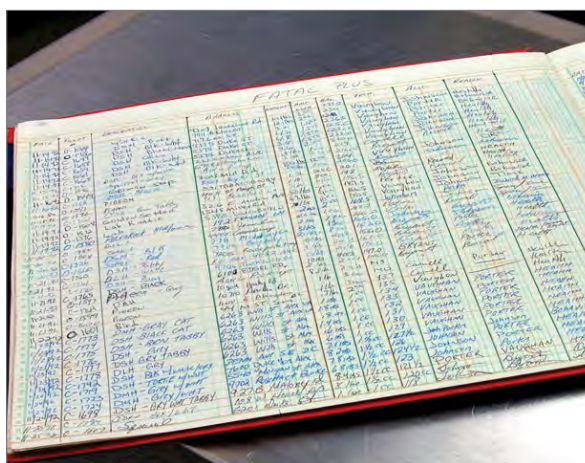
When more than one controlled substance is used at a facility, each controlled substance must have its own section within the logbook.

It is good practice to track each drug used in the euthanasia process, even those that are not considered to be controlled substances (like xylazine).

## Record-Keeping Requirements

A detailed log recording the exact use of controlled substances for euthanizing individual animals is also required to be maintained by shelters. These records should be kept in a bound logbook with numbered pages rather than in anything with detachable pages, like a loose-leaf binder. The following information must be included in the euthanasia log:

- The type of drug(s) used.
- The in-house number assigned to the bottle(s) from which the drugs were drawn.
- The name of the person administering the drug.
- The description (species, breed) of each animal euthanized.
- Each animal's identification number.
- The weight of the animal euthanized.
- The amount of each drug used.
- The total amount of the drug remaining in each drug bottle after use (this record should demonstrate that 100 percent of the drug from each bottle was used).



Sample page from a euthanasia logbook

## Inventory Records

Federal law requires that a full, detailed inventory of all controlled substances be performed at least every two years (individual states may impose more stringent requirements). However, it is recommended that shelters inventory their controlled substances much more frequently, ideally as often as monthly. This constant close monitoring helps keep the inventory process simple, and it helps to promptly account for any discrepancies between the records and the shelter supply of controlled substances.

Shelters must maintain inventory and other records for controlled substances on site for a minimum of two years, and these must be kept separately from ordinary business records. All records, including those kept on computer files, must be easily readable and retrievable for DEA inspection on demand.

Penalties for failing to comply with state and federal drug laws can range from minor fines to possible criminal charges, depending on the nature of the infraction.

## Reporting Theft/Loss

Federal law requires that the loss or theft of any controlled substance be reported to a DEA field office immediately. Disposal of outdated or unwanted controlled substances must follow strict DEA requirements.

## Training of Euthanasia Technicians

There are no specific federal regulations regarding the training of shelter personnel using controlled substances; however most states have specific training and certification requirements in place. For specifics about certification requirements for your state contact the appropriate regulatory agency, like the state board of pharmacy or board of veterinary medicine, or state animal control or humane association.

## CHAPTER 11

# Unacceptable Methods of Euthanasia

The following methods of killing animals are not considered to be humane euthanasia, and should never be permitted in a shelter setting:

**If you have been ordered to perform an inhumane practice, do not comply, and do not remain silent!** Alert an official with regulatory power over the facility (like a veterinary board, the Department of Agriculture, etc.), national animal advocacy organizations like The Humane Society of the United States, and if necessary alert your local media. Every individual euthanasia technician is responsible for not just understanding and using humane euthanasia practices, but for stopping inhumane practices from being performed by others.

- Injection of neuromuscular blocking agents (succinylcholine chloride, T-61, strychnine, curare, etc.) which when administered to a conscious animal (or human), induce muscle paralysis and respiratory distress without loss of consciousness. In effect, with these drugs the animal is rendered completely unable to move, to breathe, even to blink, even though the animal is fully awake and aware, and able to experience pain, fear, and panic; this can go on for several minutes until the animal eventually succumbs to respiratory paralysis.

- Carbon monoxide (CO) (gas chamber).
- Electrocutation.
- Drowning.
- Cervical dislocation.
- Carbon dioxide (CO<sub>2</sub>).
- Decompression.
- Pithing.
- Decapitation.
- Exsanguination.
- Ether.
- Air embolism.
- Nitrogen flushing.
- Injection of acetone or any other solvent.
- Injection of Roccal-D or any other disinfectant.
- Injection of sedatives like chloral hydrate.
- Injection of any agent other than sodium pentobarbital, xylazine, ketamine, ACE, Telazol, or other approved drug (including caffeine, nicotine, magnesium sulfate/ epsom salts, potassium chloride, chloral hydrate, etc.).
- Any combination of sodium pentobarbital with a neuromuscular blocking agent.
- Any combination of the above.

**IMPORTANT NOTE:** Gunshot should never be used in the shelter environment; there should always be a more humane alternative available.

## CHAPTER 12

# Euthanasia of Other Animals

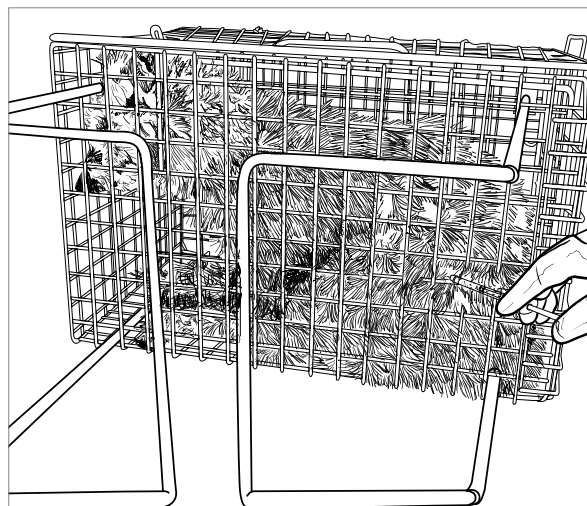
Many organizations care for animals other than dogs and cats, and at times these animals must be euthanized. Ensuring that this process is as humane as possible for each animal, regardless of species, is just as critical as it is for dogs and cats. **NOTE:** These species-specific guidelines are intended to complement the basic euthanasia information provided above; they are not intended to serve as a substitute for thorough knowledge of, experience with, and training regarding the behavior and physical characteristics of each species. Euthanasia technicians should not try to handle species with which they are not familiar and comfortable.

## Small Mammals

All small mammals have sharp teeth and may bite when startled or in pain; they are also capable of moving very quickly, and can injure themselves or even become lost in the shelter if not handled properly. Care must be taken to ensure that each individual is handled and euthanized humanely. Whenever handling small animals for euthanasia, the technician should try to make them feel as physically secure and comfortable as possible—use towels to securely wrap rabbits, for example, and “scoop” smaller animals like mice in the palm of the hand. Never grab small animals by the tail or the ears, and ensure that their bodies are fully supported at all times. Gloves can be useful to help avoid bites that break the skin, but they are not a substitute for calm, careful handling.

## Rabbits

Although rabbits should be euthanized with sodium pentobarbital in the same manner described earlier for cats and dogs, because



*A squeeze cage is useful for securing wildlife for injection of pre-euthanasia drugs*

of their high metabolism they require fully twice the amount of drugs. For IV injection, therefore, at least 2 milliliters of sodium pentobarbital should be used per 10 pounds of animal, and for IP injection 6 milliliters is the minimum recommended. Both PreMix and Telazol are acceptable pre-euthanasia drugs for rabbits. Rabbits should never be euthanized using a gas chamber or another inhalant agent.

## Small Rodents (Mice, Rats, Hamsters, Gerbils, etc.)

Because it is nearly impossible to inject into the veins of most small rodents like mice, rats, gerbils, and hamsters, the most effective mode of administering euthanasia drugs is by IP injection. Gently grasp the animal’s back and neck from the top—for some small animals the technician can gently “scruff” the nape of the neck while holding the animal in the palm—and inject into the midline. If the animal cannot

be gently and securely handled, or if handling would cause the animal undue stress, the technician should either administer a pre-euthanasia anesthetic (Telazol or PreMix) or use an inhalant anesthetic like halothane to render the animal unconscious before injecting the drug IP.

## Guinea Pigs

Guinea pigs should be euthanized with sodium pentobarbital in the same manner described previously for cats and dogs, typically using IP injection because of their tiny veins. Both PreMix and Telazol are acceptable pre-euthanasia drugs (guinea pigs can actually pass out from fear or stress, so administration of pre-euthanasia drugs may be advisable). Guinea pigs should never be euthanized using a gas chamber or other inhalant agent.

## Ferrets

Like cats, ferrets react quickly in their attempts at escape from unfamiliar handling, and caution should be used when handling even tame ferrets. Ferrets can be restrained for euthanasia either by wrapping them securely in a towel or by scruffing the body for IP injection, similar to a cat. If the ferret can be handled, direct IP administration of sodium pentobarbital is the most effective means of euthanasia. If not, either PreMix or Telazol are acceptable pre-euthanasia anesthetics.

## Birds

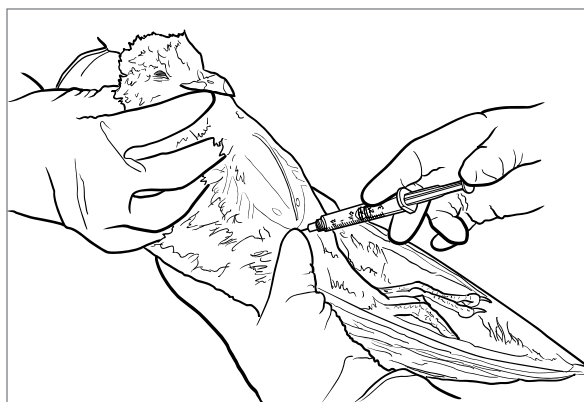
Birds are generally more susceptible to stress than any other group of animals, and even small birds like parakeets, canaries, or other songbirds can deliver painful bites. Regardless of the bird's type or size, be careful to ensure that stress levels are reduced as much as possible both for the animal's comfort and human safety.

Small birds can generally be handled using a soft washcloth or towel; gently cover the

bird, then grasp gently from behind, placing the bird's head between the first and second fingers and cupping the bird's body in the palm of the hand. Chickens and other larger birds can be restrained using larger towels to wrap and restrain the head and wings. Gloves and eye goggles are highly recommended when working with any of the larger bird species, like fish-eating birds or raptors, as both their sharp beaks and their talons may inflict serious injury, and it is very common for a bird in distress to stab out at a person's eyes.

Extra caution must be taken when handling birds used for fighting, as they may have sharpened spurs or razor attachments that could easily injure or even kill a person.

Small birds can be anesthetized before euthanasia using an inhalant anesthetic like halothane; larger birds should be administered an injection of PreMix or Telazol into the muscle mass overlying the breastbone or at the back of the thigh. Once the bird is unconscious, injection of sodium pentobarbital can proceed. Even though birds do not have a true peritoneal cavity like mammals, sodium pentobarbital can be injected into the body cavity directly below the keel, or breastbone, perpendicular to the body. Alternatively, IV injection can be performed directly into the veins



*Proper site for injection of bird*

running along the wings. For technicians experienced with feeding birds, oral administration of sodium pentobarbital may be yet another option (assuming oral administration is permitted by law); using a curved dosing needle the drug can be simply squirted into the bird's mouth, but care must be taken to ensure that the drug is not accidentally introduced into the trachea where it will cause suffocation.

Very large birds like raptors and ratites (ostriches and emus) are dangerous, and euthanasia should not be attempted without skilled assistance.

## Reptiles

Reptiles have physiological differences that pose specific challenges for euthanasia. Reptiles in general have a much slower metabolic rate than either mammals or birds, requiring a longer time for euthanasia drugs to take effect. Moreover, many of these animals can appear to be lifeless while just lying dormant, making verification of death extremely difficult. For these reasons, it is particularly important that technicians not attempt euthanasia of reptiles unless they have considerable experience with the species in question.

Technically speaking, most reptiles' breathing and heart rates can be monitored in much the same way as one would monitor a mammal or bird. Respirations can be seen as the chest and abdomen move in and out, and the heart may be seen beating if the animal (particularly lizards and snakes) is examined from the bottom. However, all reptiles can survive with an extremely low heart rate and respiratory rate, especially if the body is chilled. Mistakes can be made, therefore, if the technician relies on visual observation alone to make a conclusion about death. Moreover, while heart sticks are technically possible, they can be very difficult to perform on reptiles, particularly when the animal has a plastron (shell) that blocks access to the heart. For these animals, best practice

is to leave the body at room temperature overnight (whenever relying on rigor mortis to verify death it is best to cover the animal with a towel). Within 12 hours, the eyes should be dull and sunken, and the limbs, head, and neck should be limp (or extremely stiff, if the cycle of rigor mortis is incomplete); if this isn't the case, the animal may not actually be dead, and additional sodium pentobarbital should be administered.

All reptiles can be euthanized using a two-step process: 1) administer PreMix or Telazol at a dosage of four times that recommended for dogs and cats (2 milliliters for every 10 pounds, instead of 0.5 milliliters per 10 pounds), then return them to their enclosure until they become limp; 2) administer sodium pentobarbital either through IC, IV or the abdominal cavity.

Be sure to always wear gloves when handling reptiles and wash hands thoroughly after, as they can be carriers of salmonella and other pathogens.

## Snakes

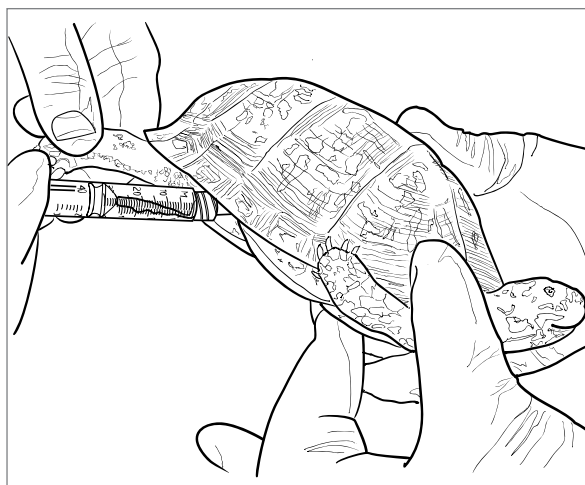
Although most snakes are harmless, any snake that cannot readily be identified should be regarded as potentially dangerous. Some snakes can injure or kill people with their venom or constricting ability, so only an expert and experienced handler should handle large or poisonous snakes. A plastic or heavy-wire screen barrier may be used to approach and capture nonpoisonous snakes, and specifically designed snake-handling tools (hooks and gloves) should be used to increase handler safety. Appropriate restraint involves control of the head (grasp immediately behind head) plus adequate support of the body (as a general rule there should be one handler for every five feet of snake).

Snakes can be euthanized either by direct injection or with the use of a pre-euthanasia anesthetic. If using Telazol or PreMix as a pre-euthanasia anesthetic, inject into the muscle along the backbone. Once the snake is unconscious, an IC injection of sodium pentobarbital may be given; the heart of a snake can be located by visually observing the heartbeat in between the first and second thirds of the underside of the body. Alternatively, IV injection into the ventral (tail) vein is an option. Direct injection into the coelomic cavity (body cavity space similar to IP cavity) can also be performed. Whenever injecting snakes be sure to use a small gauge needle and inject under the animal's scales, do not try to push the needle through the scales.

## Turtles, Tortoises, and Terrapins

All turtles, tortoises, and terrapins (all collectively referred to in this section as turtles) can bite and strike with surprising speed, and some species, like snapping turtles, are dangerous and can inflict serious injury. Turtles can also be difficult to restrain because of their strength and protective shell.

To inject a turtle it is necessary for the head and limbs to be extended. This can pose quite a challenge, particularly because some species can actually draw their head and legs fully into their shells and then close the hinged shells completely over these appendages. Trying to force a limb out of a shell will only increase the animal's stress level, and may result in a painful bite. Better practice is to simply place the animal on flat surface until the head and tail reemerge, then quickly grasp a limb before it can be retracted again; most hard-shell species cannot hinge their shells closed if a limb is extended. To safely work with a front leg, use a towel or other soft cloth to gently press the turtle's head to the side and hold it safely out of biting range;



*A pre-euthanasia anesthetic can be injected into the rear leg of a turtle*

for larger species, the head can be restrained by gently placing an object like a coffee can or a toilet plunger over their heads and pressing it in toward the shell.

## Crocodylians (Alligators and Crocodiles)

The jaws, feet, and tail of crocodylians are extremely dangerous. Only experienced handlers should try to restrain a crocodylian that has not been chemically restrained, so professional expertise from qualified zoo or wildlife personnel will be needed. If PreMix or Telazol is to be used for pre-euthanasia anesthesia it should be administered via a pole syringe into the muscle mass at the base of the tail or top of the rear leg. Once the animal is unconscious, an IV injection into the jugular or ventral (bottom) tail vein is preferred. **NOTE:** If the animal is over four feet long, and must be euthanized outside the shelter environment, safety may dictate euthanasia by gunshot rather than by injection.

## Lizards

Larger lizards are potentially dangerous because of their sharp claws and teeth and strong tails. In addition, a few species are venomous. It is prudent to always wear



gloves when handling lizards. Appropriate restraint involves control of the head (grasp the neck area above the shoulders and behind the jaw) and the tail (grasp the base of the tail, right next to the body, for most effective control).

Pre-euthanasia anesthetic is preferred to minimize the stress of handling and to increase the safety of the handler. Following unconsciousness, an IV injection into the jugular or ventral (bottom) tail vein may be given. An IC injection may be made directly into the heart only if the animal is unconscious. The heart can be accessed from the underside of the lizard's body and is found between the front and middle thirds of the body. The heart may be located by visualizing its beating, with a stethoscope, or by feeling the pulse with a finger or the palm of the hand.

## Fish

To euthanize fish in the shelter setting, it is most practical to dissolve 6 milliliters of sodium pentobarbital into a quart of water and introduce the fish to be euthanized; death will occur quickly, although verification of death in fish can be challenging (awaiting rigor mortis is recommended). Alternatively, a commercial fish anesthetic like tricaine methanesulfonate (commercially sold as FinQuel) can be used, at overdose levels.

The notion that fish, reptiles, and amphibians can be euthanized simply by placing them in a freezer is false. The AVMA's *Guidelines on Euthanasia* state:

*Immobilization of reptiles by cooling is considered inappropriate and inhumane even if combined with other physical or chemical methods of euthanasia. Formation of ice crystals on the skin and in tissues of an animal may cause pain and distress.*

## Amphibians

Amphibians (toads, frogs) can be difficult to handle because of the slippery protective mucous layer coating their skin. Many amphibians also have skin glands, generally toward the back and to the side of the head, which exude a toxic substance under stress. Latex gloves are recommended for any staff handling amphibians. The advantage of amphibian skin, however, is that it is actually very absorbent, so euthanasia can be achieved by simply allowing the animal to absorb sodium pentobarbital placed directly on its body (3 milliliters for every 10 pounds).

Alternatively, euthanasia can be achieved by injecting ketamine directly into the thigh muscle. The animal should be kept in a warm, dark, quiet place while waiting for the drug to take effect, then administered an IP injection of sodium pentobarbital through the ventral midline.

## Large Domestic Mammals

Large mammals (horses, cows, etc.) have the potential to inflict grave injury if they are improperly handled. Most people know that horses, for example, can both bite and kick, but euthanasia technicians must also be aware that certain drugs can increase the chances that the animal will react violently. Moreover, large animals injected with euthanasia drugs can drop to the ground quickly, and anyone caught in the path of a falling half-ton animal is liable to be seriously injured. For these reasons, unless the euthanasia technician and handlers are experienced both in handling large animals and euthanizing them, they should defer to the expertise of a large animal veterinarian.

## Equines (Horses, Donkeys, Mules)

Equines can be euthanized by direct injection of sodium pentobarbital into the jugular vein. However, because of the large quantities of drug required to achieve euthanasia (technically speaking a 1,000-pound horse requires 100 milliliters of sodium pentobarbital, although the manufacturer indicates that there is a “dose ceiling” of about 60 milliliters, after which little further effect is really achieved), the animal is likely to fall to the ground well before the full dosage of drug is administered, creating a situation that is potentially dangerous for the technician and handlers. A safer practice is to administer pre-euthanasia drugs to the animal; the drugs will take several minutes to achieve full effect and cause the animal to fall to the ground, increasing the odds that all of the people involved will be safely out of the way.

When handling an equine for euthanasia it is important to remember that the head of an equine is very heavy, and can cause serious injury when the animal falls; it is vital that at least one handler holds a lead rope on the animal’s halter, and that he is prepared to help guide the animal’s head to the ground when it falls, rather than just allowing the head to move unsecured. A common approach is to turn the head toward the animal’s left (or “near”) side (the one from which the handler traditionally mounts or leads the horse) and help push the horse down and back, away from the handler, as the horse starts to drop.

Administered alone, xylazine can actually increase an equine’s propensity to kick; however, when combined with another drug like acepromazine or ketamine it can be a very effective pre-euthanasia anesthetic for equines.

## Ruminants (Cows, Goats, Sheep)

Cows and other split-hooved ruminants like goats and sheep are very sensitive to xylazine, making it the preference for pre-euthanasia anesthesia. Alternatively, if the animal is securely restrained in a chute or if it is small enough to be held (and the confinement will not increase the animal’s stress) direct injection of sodium pentobarbital into the jugular vein can be performed.

## Pigs

Pre-euthanasia anesthetic is needed for most pigs since they are difficult to restrain and their veins are very deep and difficult to find. Pigs are particularly sensitive to Telazol, so that is the best option to render the animal unconscious before administration of sodium pentobarbital. If a technician is experienced, he or she may be able to administer an IV dose (1 milliliter for every 10 pounds of body weight) of sodium pentobarbital into the large vein that is clearly visible in a pig’s ear.

## Wildlife

Unlike the majority of domesticated animals, wild animals are easily stressed and threatened by contact with humans, whether that contact is direct or indirect; just the presence of people nearby causes tremendous stress. This fact not only makes it virtually impossible to achieve

The perceived elevated threat posed by handling wild animals is often used to justify the use of less humane euthanasia methods like gas chambers. However, if technicians are well trained in safe handling techniques there is no reason that traditional EBI cannot be used for all wildlife species.

a humane death for such animals, it elevates concerns about employee safety. However, this is not an excuse to practice less-than-humane methods; instead, technicians must work that much harder to make the process as safe and stress-free as possible.

In the shelter setting, the environment in which wildlife is held before euthanasia is of critical importance. The goal should be to provide as stress-free a setting for the animal as possible. To facilitate this, consider the following recommendations:

- Isolate as much as possible from the sights and sounds of domestic animals.
- Choose a location away from high-traffic areas.
- Restrict staff access to holding areas or places where wild animals might be held.
- If possible, dim the lights in the area.
- Maintain as quiet a setting as possible.
- Restrict the animal's ability to see what is going on around him or her by covering his or her container with towels or blankets.
- Perform the euthanasia as quickly as possible.

Contrary to popular belief, North American porcupines are not able to project their quills. They, however, can flip their tails and slap the quills into anything the tail touches.

The principles of euthanasia of wild mammals are the same as for cats and dogs, as described previously. However, administration of pre-euthanasia drugs resulting in unconsciousness should be considered mandatory to alleviate the animal's stress as quickly as possible. Oral administration of sodium pentobarbital is an

option if the animal is already in a trap or cage, and if his or her stress level can be reduced sufficiently that he or she will eat; mix the drug in canned dog or cat food, carefully place it within the animal's reach, and leave the vicinity until the animal has lost consciousness. If the animal is too stressed or injured to eat, direct IM injection of pre-euthanasia drugs will be required. To restrain the animal for administration of pre-euthanasia drugs, ensure that he or she is safely confined in a cage, carrier, or trap, and use a trap fork, heavy blanket, or other method to safely press the animal into position for IM injection into a muscle mass. Control poles should not be used on wild animals unless the loop of the pole is placed around one of the animal's front legs and the neck to prevent strangulation.

Skunks are capable of projecting spray up to 13 feet. Cover their cage/trap with a towel and move as slowly as possible to limit their stress and reduce their chances of spraying.

## Bats

Bats in particular should be considered potentially dangerous because they bite readily and are a primary carrier of rabies. If possible, avoid direct handling of bats by using nets and other restraint devices. If the bat must be handled, wear leather gloves and use a thick cloth or towel to restrain the wings and legs.

A technician can use an inhalant anesthetic like halothane to render the animal unconscious, followed by an IC dose of sodium pentobarbital. Alternatively, the technician can immobilize the bat in a net, grasp the bat gently but firmly with gloved hands, and administer an IP injection with a very small-gauge needle.

## Deer, Elk, and Other Large Hooved Animals

Extreme caution must be exercised when handling large hooved animals, since most adult deer, elk, moose, and the like are capable of breaking a human's leg or inflicting other grave injury with a single kick. Antlers can also be used effectively as weapons. Males will be particularly excitable and likely to behave aggressively during the fall breeding season. Administration of a pre-euthanasia drug like PreMix will be required for such animals, followed by injection of sodium pentobarbital. Alternatively, outside the shelter environment the animal may have to be humanely euthanized by gunshot if drugs cannot be safely administered.

## Bears, Coyotes, Mountain Lions, Primates, and Other Large Mammals

Even if large carnivores are not native to your community, there is the potential that a captive animal (being housed in a small zoo or by a private owner) may escape and be injured by a passing car or otherwise require euthanasia. Contact your local state or federal wildlife authority to assess which animals are likely to be housed in your area (based on local permits issued, etc.) and to develop a plan for handling potential incidents.

While a good recommendation for all animal care workers, pre-exposure rabies vaccinations should be a requirement for anyone who may come into contact with rabies-vector species, including euthanasia technicians.

## CHAPTER 13

# Field Euthanasia

In most cases, animals picked up by an officer or humane agent are transported to a shelter facility or veterinary office. However, some situations may make transport impossible and require that euthanasia be performed on site (this is commonly referred to as “field euthanasia”). This most often occurs when the animal is so gravely ill or injured that he or she is likely to suffer a painful death during transport, the ill or injured animal is so large that he or she cannot be reasonably transported even to a nearby facility, or there are other extenuating circumstances that make transport of individual animals unreasonable (for example, when a truck full of livestock is involved in a traffic accident and dozens of mortally wounded animals are spread out along the roadway). Regardless of the circumstances, it is critical that every animal receives a humane death.

Special care must be taken when field euthanasia of ill or injured domestic animals is required, particularly when they are wearing a collar with identification tags. The facility’s field euthanasia policy must be expressly clear about any and all procedures required, including documentation to be provided, approvals that must be obtained, witness statements that must be taken, etc., to avoid potential liability.

Just as is the case with in-shelter euthanasia, field euthanasia must follow policies and procedures established by each organization. Field euthanasia policies should include, but not be limited to, guidance regarding:

- What approvals will be necessary to authorize field euthanasia. (Will a veterinary recommendation be required for all animals or only for companion animals like cats and dogs?)
  - What state and local laws apply to emergency euthanasia situations.
  - Whether euthanasia drugs are permitted to be taken out of the shelter facility, and if so how they will be stored and managed.
  - What types of firearms will be permitted for field euthanasia, and how they will be used.
  - What methods of euthanasia will be permitted.
  - What steps must be taken to minimize agency liability.
  - What notifications, if any, of local law enforcement must be made (particularly if firearms are to be discharged).
  - How should the presence of members of the public affect euthanasia decisions and methods.
- Assuming all policy issues have been addressed and field euthanasia will proceed, the officer must determine the appropriate method of euthanasia. A number of factors must be considered, including the type of animal(s) involved, the condition of the animal(s), the potential risks involved to the officer and to public safety, and the public perception of the method selected. To complicate matters, these situations invariably occur under difficult conditions—in dark of night, bad weather, and sometimes even in dangerous locations. Nevertheless, ensuring the most humane euthanasia possible for the animal(s) must always be of paramount importance.
- Typically, in a field situation an officer must choose between euthanasia with sodium pentobarbital and gunshot (gunshot is appropriate

only in field situations, and should never be used in a shelter environment). Technically speaking, either method is potentially available for any animal; however, EBI is often preferred for smaller animals where the officer can safely approach the animal, and gunshot is typically preferred for larger animals and situations where direct handling is not possible.

Stories abound of law enforcement professionals shooting dogs because they believe their safety is at risk. A well-run animal control agency must ensure that local law enforcement can trust them to manage situations involving animals with non-lethal means.

## Confinement for Field Euthanasia

Regardless of the euthanasia method, the animal must first be sufficiently controlled. Obviously, injection of euthanasia drugs requires direct handling; however, even gunshot requires precise targeting to ensure instantaneous death. In many cases, the animal will already be recumbent or have its movement restricted. If not, the animal will need to be humanely confined and restrained in order to carry out safe and effective euthanasia. The officer must therefore have a variety of humane confinement methods available, including blankets, nets, traps, ropes, halters, and even chemical immobilization methods like injection poles and darts.

It is always best to try to steer the animal into a pen or enclosure that allows him to remain on his feet but prevents significant movement. For smaller animals, cages and carriers are typically used; for larger animals, boards, fencing, and gates may be used to create a makeshift enclosure.

If confinement is not an option, the officer will have to use a rope noose or plastic-coated cable

wire to contain the animal; horses, cattle, sheep, and other livestock can have makeshift halters placed over their neck and head to control their forward and backward motion; for pigs, place the noose over their upper jaw, behind their canine teeth. Remember, animals are generally much more powerful than humans, and animals in pain and fear can be especially dangerous. Wild animals like deer pose extra challenges in that even the smallest can inflict grave injury. Officers must take extreme precautions to keep themselves and the public safe when trying to confine or restrain any animal, and should never attempt to do so without the help of a trained assistant.

## Field Euthanasia by Injection of Sodium Pentobarbital

Assuming the animal has been safely secured, the ideal means of euthanasia even in field settings is injection of sodium pentobarbital after administration of a pre-euthanasia drug, as described in this manual. Any officer performing field injection must take extra precautions to ensure that the animal is properly and safely handled, as the additional stress of the uncontrolled field environment combined with whatever trauma the animal has suffered will cause many animals to react violently.

Some state laws prohibit euthanasia drugs from being carried in vehicles or require direct

Bear in mind that the conditions in which the animal is found can influence which method of euthanasia is most appropriate; for example, it can be exceedingly difficult to inject into the veins of an animal that has been exposed to extreme cold. Technicians in the field must therefore be well-versed in all of the humane options potentially available.

supervision of such drugs by a licensed veterinarian when off shelter property. Officers should check with their state officials to find out the legal requirements for their jurisdictions. If drugs can be carried, maintaining the same security for controlled substances in the vehicle as in the shelter is crucial. Bolting a combination or keyed metal lock box to the floor of the vehicle behind or under the seat, out of sight, provides security for carrying a small amount of controlled substances. Procedures generally recommended are to maintain the supply of controlled drugs in a safe at the shelter, check out the necessary drugs at the beginning of the shift, and then log and return the drugs at the end of the shift. No controlled substances should ever be left in an unattended vehicle overnight.

## Field Euthanasia by Gunshot

While euthanasia by injection is preferred, it sometimes is simply not an option (for example, if an animal is so large and fractious that trying chemical capture is impossible). In such limited cases, a properly trained officer may elect to dispatch the animal by gunshot, provided he or she is: a) trained and certified in the use of the weapon; b) certain that the discharge of the firearm will pose no threat to the public; and c) confident in hitting the exact spot necessary to ensure that the animal dies instantaneously without enduring further suffering.

### Types of Firearms

#### Rifles

Because rifles can drive a bullet at a greater velocity than other weapons, significantly increasing the risk of ricochet and injury to onlookers, their use for field euthanasia is not recommended. A rifle should be used only as a last resort in cases where an injured animal cannot be approached, but where

an expert marksman can nevertheless target the exact spot necessary for a humane death.

#### Handguns

General-purpose handguns can be used to kill animals humanely, provided: a) the muzzle of the gun must never be placed in direct contact with the animal's head—instead, the officer should shoot from a distance of approximately two inches and aim down the length of the neck into the main bulk of the body; and b) the officer must use round-nose lead bullets to facilitate proper penetration—the use of target-shooting ammunition is unacceptable.

#### Shotguns

Used properly, shotguns are the best choice for field euthanasia by gunshot because they are much safer than handguns or rifles and are equally effective. For all species, a 12-, 16-, or 20-bore shotgun may be used with number 4, 5, or 6 birdshot. A 28-bore or a .410 can be used if nothing larger is available, but should not be used on mature bulls or large pigs. As with handguns, the muzzle should never

No officer should attempt field euthanasia without all appropriate certifications and training. Field euthanasia tests the skills of the most experienced officers, and should not be attempted unless the officer is confident that it will be achieved safely and humanely. If in doubt, the officer should call in a professional better able to manage the situation, be it a more experienced officer, a veterinarian, or even a law enforcement officer with more experience handling such high stress circumstances. Calling in "backup" is not a sign of weakness or failure—it is recognition that such situations must be handled with the utmost care and professionalism.

be placed in direct contact with the animal's head; instead, the muzzle should be held 2 to 10 inches from the animal's forehead, aiming down the line of the neck into the main bulk of the body.

Ordinary-sized birdshot is capable of inflicting significant injuries when it initially strikes the skull as one compact mass, giving it considerable initial penetrating power. Once inside the skull, the pellets will separate and disperse within the brain cavity, effectively destroying the brain and killing the animal. As such, a shotgun is a much safer and usually more readily available firearm than is a weapon using a single bullet.

**IMPORTANT NOTE:** Particularly when using a free-bullet weapon, it is important that a suitable backstop be found to block the bullet if it exits the body or if the target is missed. Suitable backstops include manure heaps, hay or straw stacks, and earthen banks. There should be no "dead ground" (hidden dips) between the target and the backstop from which people, vehicles, or other animals could suddenly appear. If no backstop is available, the area behind the target must be clear of roads and dwellings for a distance of approximately 3,000 yards. (A bullet from a .32-caliber handgun can ricochet and travel in excess of 2,000 yards.) In such a circumstance, everyone nearby must stand behind the officer, who should aim the shot down the spine and into the body of the animal.

Officers should assume that any ill animal they encounter may have been exposed to rabies, and should handle them with extreme caution. They should also be mindful that because rabies testing requires the dissection of the brain, if the animal must be submitted for rabies testing it should not be euthanized by gunshot.

In order to be considered humane euthanasia, a gunshot must cause death instantaneously. To do this, the bullet must destroy the brain stem, the portion of the brain that controls vital functions like breathing, achieving loss of pain and loss of consciousness at the same moment it causes loss of life. Hitting the brain stem requires precise positioning of the bullet, and this position varies by species; therefore, officers must be thoroughly trained on the precise location required to effect humane euthanasia by gunshot for each type of animal they may encounter in the field. **IMPORTANT NOTE:** All firearms must be discharged at close range into the brain. The muzzle of the firearm, however, should never come in contact with the animal's head; such placement could result in a burst gun barrel and severe injury to the officer.

When an animal is properly shot, it will collapse immediately and stop breathing, and all vocalizations will cease. It will also exhibit physical reactions that may be disconcerting to the untrained observer: the animal will bleed profusely from the entry wound, mouth, or

Any officer that carries firearms as a possible means of euthanasia must strictly observe all general firearms safety rules, including:

- All firearms must be handled as if they were loaded at all times.
- Officers must never engage in behavior that may result in an accidental discharge while holding a firearm, such as climbing fences, etc.
- Firearms must never be carried in a pocket or waistband; a pistol case or gun holster with a safety flap or strap must always be used.
- No firearm, loaded or unloaded, should ever be pointed at anything not intended as a target.
- A loaded firearm should never be left unattended or carried in a vehicle.



nose (a thick plastic bag can be used to prevent blood from pooling); there may be exaggerated contraction of the muscles; the eyes will assume a fixed, glazed expression; the body may start to twitch and in some cases convulse quite violently (particularly in the case of pigs) for a minute or longer. While disturbing to see, these are all to be expected even if the animal has been successfully euthanized by gunshot. To confirm that the animal is in fact dead, the officer should verify the lack of rhythmic breathing and lack of blink reflex; if in doubt, the animal should be promptly shot a second time.

## Correct Shot Location by Species

### Cattle

A cow's brain is situated high in the head. The ideal point of penetration is in the middle of the forehead, at the crossing point of two imaginary lines drawn from the middle of each eye to the base of the opposite horn. This should put the target about two inches above a line drawn across the forehead at the back of the eyes. The shot should enter at a right angle (90 degrees) to the skull. For a calf, the upper portion of the brain is not yet developed, so the firearm should be aimed at a point slightly lower than that in the adult animal, and it should be tilted back to obtain the correct angle for the shot to destroy the brain stem.

**IMPORTANT NOTE:** While the target location remains the same, mature bulls may have a hard, thick frontal bone, often covered in dense, matted hair, which can be difficult to penetrate with a small-caliber weapon; for these animals a shotgun is a better option.

### Deer

A deer's brain is situated high in the head. When determining the ideal aiming point, know that the antlers are not comparable to the horns on cattle. Instead, the ideal aiming point is in the middle of the forehead, at the crossing point of two imaginary lines drawn

from the middle of each eye to the top of the opposite ear. In stags, this spot is found between the antlers. The angle of the shot should be through the brain stem, as in cattle.

### Horses and Other Equines

A horse's brain is situated high in the head. The shot should be aimed in the middle of the forehead, but slightly higher than the aiming point in cattle. Two imaginary lines should be drawn from the middle of each eye to the base of the opposite ear; the aiming point should be approximately three-quarters of an inch above the point where they cross. The muzzle of the firearm should be tilted slightly upward or downward so that the shot is directed through the cerebral cortex toward the brain stem. If a horse is holding his or her head in a lower than normal position, care should be taken to adjust the angle of the shot.

### Sheep and Goats

For sheep and goats, the aiming point is in the midline, just above the eyes, with the shot directed down the line of the spine and into the bulk of the body. This can be difficult to achieve. A slight error in the angle of the shot or small movement by the animal can result in a free bullet exiting the animal's throat or neck. To prevent this, the animal's head must be in the normal position before shooting.

Heavily horned sheep and goats can present a problem. The mass of horn can leave little or no target area. A shot between the eyes is too low and should never be used. Such animals can be shot from behind the poll (the top of the head), but it can be dangerous to do so with a free-bullet weapon and the animal must always be on soft ground. Whenever possible, a shotgun is recommended for this type of shot.

### Pigs

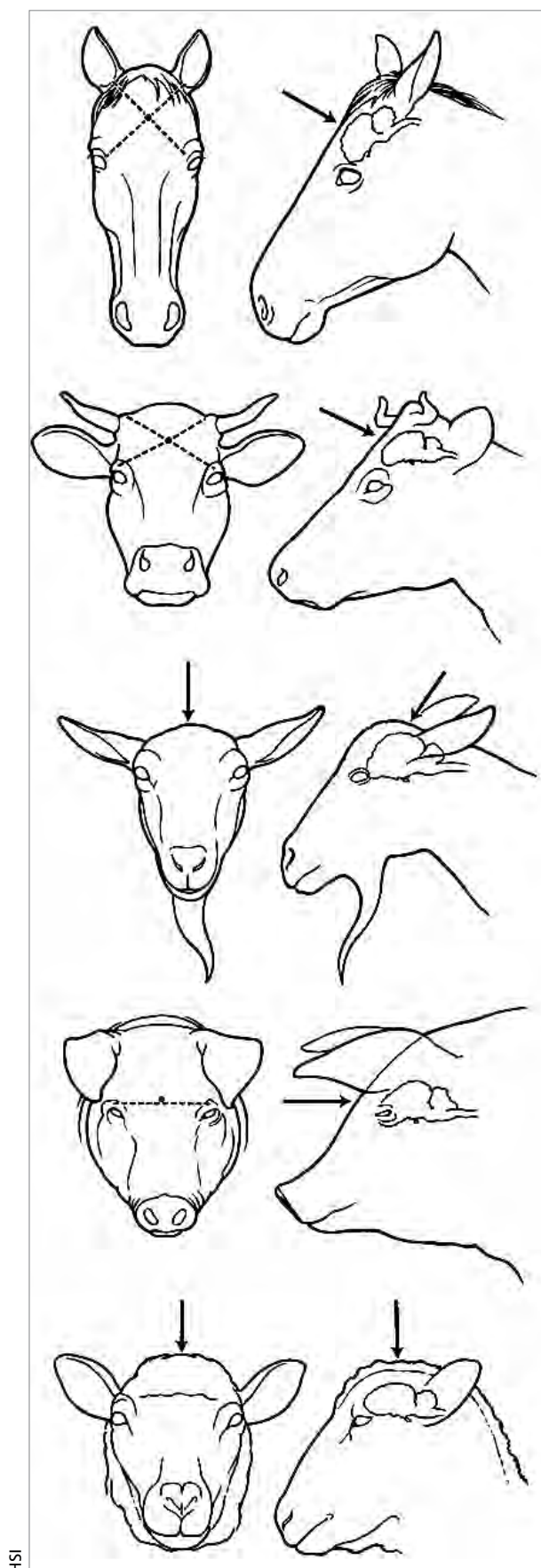
Pigs are among the most difficult animals to shoot. The target area is very small, and some pigs are "dish-faced" because of age or breed

characteristics. The brain lies quite deep in the head with a mass of sinuses between the frontal bone and brain cavity. The ideal site for shooting pigs is one finger's width above eye level, on the midline of the forehead, aiming toward the tail.

Older pigs and exotic breeds, like the Vietnamese pot-bellied pig, often have a deep, bony mass on the forehead, which can cause problems when using a free-bullet weapon. The bullet can become lodged in the sinuses and fail to penetrate the brain. Some older pigs, especially boars, have a ridge running down the center of the forehead. In such cases the muzzle of the gun should be placed slightly to one side of the ridge aiming into the center of the head. Because of the problems that might occur with adult and exotic-breed pigs, a shotgun should be used if possible. The shooting position is the same with a shotgun. The animal can also be shot from behind the ear aiming toward the middle of the head.

## Disposal

After the euthanasia, arrangements must be made to have the animal's body removed from the scene. Small animals can be transported to the shelter for routine disposal. Larger bodies, however, may need special accommodations, like a rendering company. **IMPORTANT NOTE:** If a large animal like a horse is euthanized in a confined space, like a stall or pen, the body should be removed from the enclosure as soon as possible, since the onset of rigor mortis will make it very difficult to move later. If a body is to be buried, it must be at least 250 yards from any well, borehole, or spring that supplies water for human consumption, and at least 30 yards away from any other spring or watercourse. Some jurisdictions prevent the burial of animal carcasses, so ensure that the means of disposal selected is lawful.



HSI

*Angles and points of entry for correct shot locations for horses, cattle, goats, pigs and sheep*

## CHAPTER 14

# Mass Euthanasia

While a written policy will ideally lay out proper procedures for virtually every euthanasia that must be performed in the shelter, there may be cases where it is necessary to euthanize large numbers of animals off-site, either because of their physical condition (for example, several equines in such poor condition that they cannot be humanely transported) or because of the sheer number of animals involved (for example, large-scale hoarding cases). In such cases, it is still critical to ensure that every animal is treated humanely.

Typically, in cases where immediate euthanasia off shelter property is necessary to end extreme suffering, the lead veterinarian on the scene, in consultation with the shelter official in charge, will determine which animals must be euthanized and what manner of euthanasia is most appropriate. Depending on the type and numbers of animals involved, euthanasia by injection may not be practical or safe; nevertheless, the number of animals involved or complexity of the situation should not excuse inhumane practices. **IMPORTANT NOTE:** Even in cases of extreme suffering, minimum hold periods and other legalities may still apply; it is vital to ensure that all applicable legal mandates are followed, particularly if the animals are being seized as evidence of cruelty or another crime.

Removing euthanasia drugs from the shelter facility may be subject to regulation—be certain to obtain all necessary legal authorizations before taking drugs off site. Typically the veterinarian on scene will be responsible for providing and overseeing the use of all drugs, and must ensure that proper record-keeping requirements are met.

If carcass disposal will be managed through the shelter's normal crematory or landfill service, it may be necessary to call for an extra pickup. If disposal must be managed through a rendering company or other service, arrangements should be made as quickly as possible. In no case should carcasses simply be left behind.

Depending on the nature of a mass euthanasia event and the number and type of animals involved, psychological debriefing of staff may be prudent. Shelter management should arrange for such debriefing within one to three days, and should determine whether staff attendance will be mandatory. Even without a formal debriefing, any staff member involved in a mass euthanasia event should be allowed to request psychological assistance at any time, and arrangements to fulfill such requests should be made promptly.

Supplies needed for off-site mass euthanasia typically include:

- Syringes appropriate for species.
- Needles.
- Appropriate drugs.
- Stethoscope.
- Towels.
- Sharps containers.
- Humane handling equipment.
- Clippers.
- Tourniquets/hemostats.
- Plastic garbage bags.
- Log sheets.

# Glossary

**Analgesia:** Drugs that have an analgesic effect are intended to diminish an animal's ability to perceive pain, although not all drugs have the ability to extinguish pain completely. An analgesic effect does not mean that a drug will cause unconsciousness in an animal.

**Anesthetic:** When an anesthetic agent has been administered at proper dosages, the animal is ideally rendered unconscious, has a total loss of ability to feel pain (analgesia), and is immobilized, yet her vital functions (breathing and heartbeat) are retained. For this reason, the ideal pre-euthanasia drugs are anesthetics.

**Aspiration of Blood:** A means of verifying that a needle is properly in the vein, by which the technician pulls back on the plunger and ensures that there is a flow of blood into the syringe.

**Blink (Palpebral) Reflex:** A method used to confirm lack of consciousness, by which the technician gently touches the inside corner of the animal's eye; if no automatic blink reflex occurs, the animal can be presumed to be unconscious.

**Cephalic Veins:** Veins running prominently down the front leg of most animals.

**Consciousness:** When conscious, an animal has the ability to deliberately and intentionally respond to environmental stimuli.

**Euthanasia:** From the ancient Greek—*eu* + *thanatos*, meaning "good death".

**Handler:** The person holding the animal for euthanasia.

**Heart stick:** Placing a needle into the heart muscle to verify death (acceptable only when the animal is unconscious).

**Hitting the Vein:** Successfully inserting a needle into the vein to accept injection of drugs.

**Holding Off the Vein:** Using one's hands or a mechanical device (such as a tourniquet) to restrict the flow of blood from the vein to the heart, making the vein easier to find for purposes of injection.

**IC:** Intracardiac—injection of drug into the heart (acceptable only when the animal is unconscious).

**IM:** Intramuscular—injection into the muscle (not a permissible route of administration for sodium pentobarbital).

**Immobilization:** When immobilized, the animal is essentially paralyzed and unable to move, but he may still be aware of his surroundings, may still feel pain, and may actually be experiencing fear and panic. For this reason, immobilizing agents are never appropriate for use in euthanasia.

**IP:** Intraperitoneal—injection of drug into the abdominal [peritoneal] cavity, the gap between the organs and the abdominal wall.

**IV:** Intravenous—injection of drug directly in a vein.

**Jugular Vein:** Veins running down each side of the neck (not appropriate for euthanasia of dogs and cats).

**Label Dose:** The actual required dosage of sodium pentobarbital that should be administered for euthanasia, per label instructions. The label dose is higher than the lethal dose, so it provides a safety cushion to ensure that if the proper amount of drug is administered in the proper manner, the animal will in fact die humanely.

**Lateral Saphenous Veins:** Veins running down the outside rear leg of the animal, crossing diagonally across the leg just above the hock.

**Lethal Dose:** The minimum amount of drug sufficient to move the animal through all four stages of anesthesia and stop the core functions of life (respiration and circulation). Technicians should administer the label dose of sodium pentobarbital, not the lethal dose, to ensure that sufficient quantities of drug are administered.

**Medial Saphenous Veins (aka femoral veins):** Veins running down the center of the inside of the animal's rear legs.

**PO:** "Per Os" meaning "by mouth", oral administration of drug by squirting directly into the mouth or mixing into food.

**Raising the Vein:** Making the vein easier to spot for injection through pumping the foot, applying water, etc.

**Sedation:** When sedated, an animal falls into a sleep-like state and becomes uncoordinated, with relaxed and unresponsive muscles. There is often a decreased ability to feel pain, but pain sensations are still possible. Sedated animals may appear to be sleeping but may quickly become aroused when stimulated by light or sound, and could cause harm to themselves and the humans around them.

**SQ:** Subcutaneous—injection under the skin (not a permissible route of administration for sodium pentobarbital).

**Technician:** The person administering euthanasia drugs.

**Toe Pinch Reflex:** A method to confirm lack of consciousness. The technician firmly pinches the webbing between the toes of the animal; if there is no reflexive pull of the leg away from the pain, the animal can be presumed to be unconscious.

**Tranquilization:** When tranquilized, the animal usually is calm, relaxed, and may even fall asleep. The animal may still feel pain, however, and a tranquilizer may not offer enough of a calming effect to safely handle a fractious animal. Tranquilized animals may also suffer seizures, and can be more unpredictable.

**Unconsciousness:** When rendered unconscious, the animal lacks awareness and the capacity for sensory perception, appearing to be in a deep sleep.

**Units of Measure:**

cc = cubic centimeter (measure of volume/space)

ml = milliliter; one 1000th of a liter (measure of liquid volume)

mg = milligram; one 1000th of a gram (measure of weight/mass)

*1 cc is generally equivalent to 1 ml*



## Dosage Chart for Telazol® and PreMix (ketamine/xylazine combination)

<b>Animal's Weight (pounds)</b>	<b>Milliliters (ml)</b>
5	.25
10	0.5
15	.75
20	1
25	1.25
30	1.5
35	1.75
40	2
45	2.25
50	2.5
55	2.75
60	3
65	3.25
70	3.5
75	3.75
80	4
85	4.25
90	4.5
95	4.75
100 (and up)	5

*(.5 ml/10 pounds)*

# Injection Methods—Quick Reference

## IV—Intravenous *(Injection of sodium pentobarbital into a vein)*

- **Species recommended:** dogs, calm and friendly cats
- **Dose:** 39 mg/pound (usually 1 ml/10 pounds)
- **Circulatory compromised:** 78 mg/pound (2 ml/10 pounds)
- **Injection speed:** rapid (1–2 ml/second) and consistent with good technique
- **Dog veins:** cephalic, lateral saphenous
- **Cat veins:** cephalic, medial saphenous (femoral)
- **Syringe retracts:** small volume (flash) of blood
- **Time to loss of consciousness:** ~5 seconds
- **Time to deep anesthesia:** ~10 seconds
- **Time to cessation of respiration:** ~20 seconds
- **Time to cessation of heartbeat (death):** ~40 seconds
- **Time to cardiac standstill (no fibrillation):** ~2–5 minutes

## IC—Intracardiac *(Injection of sodium pentobarbital into one of the four heart chambers)*

- Unconscious animals only
- **Species recommended:** all
- **Dose:** 39 mg/pound (usually 1 ml/10 pounds)
- **Circulatory compromised:** 39 mg/pound (usually 1 ml/10 pounds)
- **Needle insertion point:** right or left side, 4th intercostal space, or sternally in cats
- **Syringe retracts:** large volume (fill) of blood
- **Injection speed:** slow (0.5–1 ml/second) and consistent with good technique
- **Time to cessation of heartbeat (death):** 5–10 seconds
- **Time to cardiac standstill (no fibrillation):** ~2–5 minutes

## IP—Intraperitoneal *(Injection of sodium pentobarbital into the abdominal cavity—needle passes through the skin, muscle wall and peritoneum)*

- **Species recommended:** conscious calm and friendly cats, conscious puppies under 5 weeks, conscious or unconscious small rodents
- **Dose:** 117 mg/pound (usually 3 ml/10 pounds)
- **Circulatory compromised:** not usually recommended
- **Injection speed:** slow (0.5–1 ml /second) and consistent with good technique
- **Needle insertion point:** ventral, midline, ~2" below (caudal to) umbilicus
- **Needle angle/depth:** right angle to the skin/~3/4 inch
- **Syringe retracts:** suction (no fluid, no air)
- **Time to loss of consciousness:** ~2 minutes
- **Time to deep anesthesia:** 3–4 minutes
- **Time to cessation of respiration:** ~6 minutes
- **Time to cessation of heartbeat (death):** ~8 minutes
- **Time to cardiac standstill (no fibrillation):** ~10 minutes

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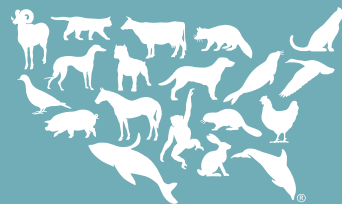
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Thanks to many decades of hard work, euthanasia in animal shelters has dramatically declined, as our field moves ever closer to eliminating overpopulation and finding homes for all of the animals in our care. When the difficult decision is made to euthanize an animal to alleviate suffering, it is our responsibility to ensure that euthanasia is performed as expertly and humanely as possible. Anything less is simply unacceptable.

This manual, published by The Humane Society of the United States, the nation's leading animal welfare organization, is intended to serve as the definitive reference tool for understanding the methods and techniques of humane euthanasia. It is our hope that when there are no lifesaving alternatives available, technicians will use this tool to provide as humane an ending as possible for the animals entrusted to their care.



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