



Cornell University
Cornell Center for Animal Resources and Education

CARE307.01 Euthanasia of Non-Rodent Mammals

The intent of this standard operating procedure (SOP) is to describe non-rodent mammalian euthanasia. This SOP is intended for all staff and investigators who euthanize non-rodent mammals. This procedure is approved by the Cornell Institutional Animal Care and Use Committee (IACUC) and the Cornell Center for Animal Resources and Education (CARE). Any exemption must be approved by the IACUC prior to its application.

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1. Introduction

Euthanasia of animals must be performed in a humane manner by trained personnel. Additionally, physical methods of euthanasia require properly functioning equipment. This SOP details methods of assuring humane euthanasia of non-rodent mammals. Methods not found in this SOP must be approved by the IACUC prior to implementation.

2. Materials

A. Chemical methods include one or more of the following materials:

- barbiturate with needles and syringe;
- inhalant anesthetic agent and delivery device or container.

B. Physical methods include one or more of the following:

- captive bolt;
- method of exsanguination.

3. Procedures

A. Acceptable Methods by Species per AVMA Euthanasia Guidelines, June 2007.

- i) Rabbit
 - (1) Barbiturate overdose
 - (2) Overdose of inhalant anesthetic

- (3) Exsanguination under general anesthesia
- ii) Cat and Dog
 - (1) Barbiturate overdose
 - (2) Overdose of inhalant anesthetic
 - (3) Exsanguination under general anesthesia
- iii) Sheep, Pig, Goat, Cattle, and Equine
 - (1) Barbiturate overdose
 - (2) Exsanguination under general anesthesia
 - (3) Physical methods

B. Method Specifics

Note: verify the animal is dead before disposing of the carcass by observing lack of respiratory movement for at least 3 minutes and confirming lack of functional cardiac activity (e.g. auscultation, palpation, or direct visual observation).

- i) Barbiturate Overdose
 - (1) If necessary, tranquilize animals in pain or agitated prior to barbiturate overdose.
 - (2) Pentobarbital sodium is the main agent of injectable euthanasia solutions. Refer to the label of your euthanasia solution for specific concentrations. The recommendations following are generalizations.
 - (3) Dogs and cats inject 120 mg/kg IV
 - (4) Large animals inject 10–15 mL per 100 lbs. of body weight IV
- ii) Inhalant Anesthetic Overdose
 - (1) The following gases can be used: halothane, isoflurane, methoxyflurane, other halogenated inhalants
 - (2) Expose the animal to a high gas concentration using an anesthetic vaporizer.
 - (3) Vapors are inhaled until respiration ceases and death ensues.
 - (4) If the animal is not dead (or for additional security), follow inhalant anesthesia overdose by another method of euthanasia.
- iii) Exsanguination
 - (1) Deeply anesthetize the animal.
 - (2) Verify that withdrawal reflex is absent by pinching the toes with hemostats of non-hooved animals and pinching leg tendon of a hooved animal.
 - (3) Withdraw the maximum volume of blood.
 - (4) If the animal is not dead (or for additional security), follow exsanguination by another method of euthanasia.

C. Physical Methods

Note: use these techniques only when scientifically justified by the user and approved by the IACUC.

- Whenever possible, apply prior anesthesia or sedation.

- If anesthesia is contraindicated, ensure these methods are applied only by a demonstrated skilled and experienced person.
- i) Penetrating captive bolt gun
- (1) Ensure proper operation by following maintenance and cleaning of the penetrating captive bolt gun, as described by the manufacturer.
 - (2) Captive bolts are powered by gun powder; thus select appropriate cartridge strength for the size of the animal, and manufacturers' recommendations.
 - (3) Do not use captive bolt on adult pigs or mature bulls due to the density of the skull.
 - (4) The optimal site for penetration of the skull differs depending on the species. Follow suggested recommendations per species.
 - (5) Place the captive bolt gun firmly against the skull and fire the trigger mechanism.

4. Safety

- Observe CARE SOP 707 for animal related injuries.
- Observe CARE SOP 715 for personal protective equipment.
- Observe CARE SOP 711 for disposal of medical sharps.
- Observe CARE SOP 712 for proper handling of waste anesthetic gases.
- Refer to CARE Zoonosis Web page
- Refer to Allergens Web Page

5. References

- AVMA Guidelines on Euthanasia, June 2007:
http://www.avma.org/issues/animal_welfare/euthanasia.pdf
- CARE SOP 707 Animal Related Injury
<http://www.research.cornell.edu/CARE/documents/SOPs/CARE707.pdf>
- CARE SOP 715 Personal Protective Equipment
<http://www.research.cornell.edu/CARE/documents/SOPs/CARE715.pdf>
- CARE SOP 711 Sharps Precautions
<http://www.research.cornell.edu/CARE/documents/SOPs/CARE711.pdf>
- CARE SOP 712 Waste Anesthetic Gas Scavenging Systems
<http://www.research.cornell.edu/CARE/documents/SOPs/CARE712.pdf>
- CARE Zoonosis Web page <http://www.research.cornell.edu/care/zoonoses.html>
- Allergens web page
<http://www.research.cornell.edu/Care/documents/OHS/AllergyPreventionFactSheet.pdf>