

**Subject:** Volatile Gas Anesthesia/Euthanasia

**Source:** Institutional Animal Care and Use Committee (IACUC)

**Effective Date:** 12/11/2023

**Replaces:** 06/08/2020

**Applies to:** Personnel involved in research or teaching studies involving animals

**Reference:** Animal Welfare Act; PHS Policy on Humane Care & Use of Laboratory Animals; Guide for the Care & Use of Laboratory Animals; AVMA Guidelines on Euthanasia

  
12/11/2023

### **Introduction**

The Institutional Animal Care and Use Committee (IACUC) maintains oversight review for federally mandated rules and regulations with regard to animal research, ethics, misconduct and biomedical research for the University of Colorado Denver | Anschutz Medical Campus (CU Denver | Anschutz)

### **Policy Statement**

This policy is intended to provide information on appropriate procedures for use of volatile gas (halothane, methoxyflurane, isoflurane, sevoflurane, desflurane and enflurane) for anesthesia and euthanasia and to establish procedures to be followed.

Operator exposure to anesthetic gas is a potential occupational hazard if used without adequate scavenging. Exposure to high concentrations of waste anesthetic gases—even for a short time—may cause the following health effects: Headache, Irritability, Fatigue, Nausea, Drowsiness, Difficulties with judgment and coordination; Liver and kidney disease.<sup>1</sup> Additional information and guidance for occupational exposures and safety measures is available from the Department of Environmental Health and Safety, Industrial Hygiene / Occupational Safety Office, 303-724-0242/0345.

- The use of variable by-pass precision vaporizers for accurate delivery of volatile anesthetics, with gases that are adequately scavenged, is strongly recommended by the IACUC:
  - Anesthetic gases may be delivered via a properly placed endotracheal tube or laryngeal cuff.
  - Anesthetic gases may be delivered via an appropriately sized nose-cone device.
  - The institution requires that each anesthesia machine be checked for air-tightness and each vaporizer be checked for proper calibration and air-tightness at intervals not exceeding 12 months by qualified service personnel. This date should be notated on the 'Veterinary Anesthesia Machine Verification/Certification' and 'Vaporizer Concentration Verification' stickers on the machine.
  - Vaporizers should be fully serviced (detailed maintenance, cleaning, and replacement of parts) according to the manufacturer's and service provider's recommendations, which are generally every 3 years. This date should be notated on the 'Vaporizer Service and Calibration' sticker on the machine.
- The Drop technique (placing an anesthetic soaked gauze or cotton ball in sealed vessel with the animal) is a recognized method of delivering anesthetic gases for certain applications:
  - The technique should be performed in a vented fume hood and in a closed container that is of sufficient transparency to observe the animal closely enough determine the depth of anesthesia.
  - A rigid physical barrier between the animal and the liquid volatile anesthetic is required so that animal is unable to directly contact the anesthetic in the liquid form.
  - The container should be composed of materials that are easily cleanable and able to withstand contact with disinfectants in order to remove anesthetic residue and sanitize between animals.
- When using volatile anesthetic overdose as a method of euthanasia, a secondary follow up method to confirm death, such as cervical dislocation, decapitation or bilateral thoracotomy, is required.
- Any deviation from the policy concerning use of volatile gas for anesthesia and euthanasia will be considered and reviewed by the IACUC on a case by case basis.

Per regulatory requirements, failure to comply with this policy may result in notification of your funding agency (e.g. NIH) and regulatory agencies (e.g. USDA) that your research has violated federal and/or local policies regarding the

<sup>1</sup> CDC NIOSH Publication on Waste Anesthetic Gases, <http://www.cdc.gov/niosh/docs/2007-151/pdfs/2007-151.pdf>,

humane use of animals. This notification may affect continuous funding of your animal-related research. Further, depending on the violation, you may be required to take additional training and/or your privilege to conduct animal research at CU Denver | Anschutz might be temporarily suspended or even completely revoked.