

IACUC Policy #:	530
Policy Title:	<i>Anesthetic Waste Gas</i>
Date Approved:	December 19, 2018
Date Reviewed:	August 19, 2020

Purpose:

The *Guide to the Care and Use of Laboratory Animals (The Guide)*¹ states that personnel exposure to anesthetic waste gases should be limited. Isoflurane and sevoflurane gas anesthetics used in animal surgery can pose an inhalation exposure risk to workers. These compounds are clear, colorless, odorless liquids at standard temperature and pressure, and are highly volatile. They have poor exposure warning properties, since odor thresholds can be greater than recommended exposure limits. The Occupational Safety and Health Administration (OSHA) has not established a permissible exposure limit for isoflurane; the National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit of 2 ppm^{2,3}. As recommended in the Guide exposure to anesthetic waste gases should be limited. The purpose of this policy is to inform personnel of work practices to limit exposure to waste anesthetic gases.

I. Policy

- A. Good laboratory practices including engineering and administrative controls must be employed to reduce the risk of anesthetic waste gas exposure, including complete scavenging of waste gases, to reduce risk of unintended exposure.
- B. The Attending Veterinarian must be consulted on proper anesthetic equipment setup prior to initiating new surgical procedures.

II. Procedures

- A. Engineering controls:
 - 1. Anesthesia vaporizers must be inspected and serviced regularly to ensure proper function.
 - a. Routine inspection prior to use includes visual inspection of hoses and connections; testing the breathing circuit for leaks, and verifying that it can maintain positive pressure; weighing the charcoal scavenging device and recording the weight, according to the manufacturer’s directions.
 - 2. Ideally, surgery utilizing anesthetic gases should be conducted in a downdraft surgical table. Alternatively, a local ventilation device such as a snorkel may be used. Without a downdraft table or a snorkel, anesthetic gases must be used in a well-ventilated laboratory space with no air recirculation, and must use a charcoal scavenging canister at ALL points that anesthetic gases may escape, include nosecone areas.
 - 3. Scavenger canisters with exhaust ports located on the top alleviate backpressure and result in better capture of waste gases. Scavenger canisters with ports on the bottom

must be raised, so that the vents are not blocked. Both types of canisters must be used in the position recommended by the manufacturer.

B. Administrative controls:

1. Anesthesia procedures conducted in dedicated surgical areas (not in the field) must include the use of nosecones and proper venting of induction chambers.
 - a. Before removing an animal that has reached the proper plane of anesthesia from the induction chamber, the induction chamber must be flushed with oxygen only for more than five seconds. Do not open the chamber until it has been flushed.
 - b. Once the induction chamber has been flushed, the animal may be removed and a placed in a nosecone to maintain anesthesia during surgery. All waste gases must pass through the charcoal scavenging canister.
2. In case of unintentional release (spill), evacuate the area immediately, close the door, and call the Center for Environmental Health and Safety (CEHS) at 618-453-7180.

III. References

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- ¹ National Research Council. 2010. Guide for the Care and Use of Laboratory Animals. Washington, DC: The National Academies Press. [Guide for the Care and Use of Laboratory Animals | The National Academies Press](#)
 - ² Anesthetic Gases: Guidelines for Workplace Exposure, OSHA, May 18, 2000
 - ³ Criteria for a Recommended Standard: Occupational Exposure to Waste Anesthetic Gases and Vapors. DHHS (NIOSH) Publication No 77-140, 1977