

**Institutional Animal Care and Use Committee**  
**THE UNIVERSITY OF MISSISSIPPI MEDICAL CENTER**

**POLICY STATEMENT**

**Scavenging of Waste Anesthetic Gas**

**INTRODUCTION**

The UMMC Institutional Animal Care and Use Committee (IACUC) and the Laboratory Animal Facilities (LAF) have developed this document to provide guidance to help protect personnel who have occupational exposure to waste anesthetic gas.

Inhalant anesthetic gases (e.g., halothane, isoflurane, etc.) are increasingly employed in the research setting for animal anesthesia and euthanasia. Exposure to anesthetic gases can result in toxicity to humans. Some potential effects of exposure to waste (exhaled) anesthetic gases are nausea, dizziness, headaches, fatigue, and irritability. More serious potential sequelae of long-term exposure in those with frequent workplace use of anesthetics may include liver and kidney disease, cancer, sterility, miscarriages, and birth defects in offspring. Although modern agents such as isoflurane pose less of a risk of toxicity than some of the agents used historically, it is still necessary to minimize human exposure when working with anesthetic gases.

Training in proper anesthetic and animal handling techniques and methods for pressure-testing anesthetic machines for leaks are available from the LAF.

Questions or concerns about gas exposure, proper handling and disposal of anesthetic liquids, or other safety components should be directed to UMMC Environmental Health and Safety Department (EHS).

**Proper Scavenging**

Because there will always be anesthetic gases present in the waste air exhaled by the animal, it is absolutely necessary to use anesthetics in a setting that includes some mechanism for removing toxic components from the air stream or venting the exhaled air safely out of the room. This process is called "scavenging" and there are two main options:

**1. Active scavenging**

This is the preferred method, and it involves using low-pressure highflow ventilation to create a suction that captures contaminated air and safely discharges it from the room and the building. The simplest form of active scavenging is to actually deliver the anesthetic to the animal while it is placed within a properly functioning fume hood. Similar functionality can be obtained by working on a downdraft table approved for hazardous gas/vapor use. Many operating rooms are designed to provide active scavenging by including small wall ports that serve as local exhaust connections for the exhaust tubing coming from an anesthetic machine. In a research lab, a similar approach can be taken by running the exhaust hoses from the

anesthesia machine into a fume hood and having them discharge within the hood. Some procedural spaces are equipped with a “snorkel” device (flexible tubing/duct designed to be positioned at/near exhalation point) to collect waste anesthetic gases.

## 2. Passive scavenging

This method is less foolproof than active scavenging, but when done properly it will protect workers from gas exposure. Passive scavenging relies on the positive pressure from the anesthetic gas delivery system and/or the exhalation effort of the animal to drive contaminated exhaled air through a specially designed activated charcoal filter, which will adsorb and remove the anesthetic agent molecules before the air is discharged back into the room. As is the case with any filter cartridge, excessive flow through the filter can result in decreased performance, so gas flows should be set to the lowest rate that will allow adequate ventilation of the animal and proper function of the vaporizer. In addition, the absorptive capacity of the cartridge will eventually be exhausted, which will result in filter failure and the discharge of gases into the room. To prevent this occurrence, manufacturers provide an estimate of the safe loading capacity of the filter expressed in grams. In use, the cartridge must be weighed frequently to assess the degree of loading that has occurred and discarded when the weight increase reaches the threshold provided.

Anesthetic Gas Scavenging techniques currently available and in use at UMMC

LAF Surgical Suites:

- a. Modified Passive: waste anesthetic gases from commercial anesthetic machines are routed via gas flow tubing to adjacent/nearby room exhaust ducts. All air in facilities is 100% fresh (no recirculation), avoiding potential mixing of waste gases with supplied air.
- b. Passive Charcoal Filters: waste anesthetic gases from commercial anesthetic machines are routed via gas flow tubing to activated charcoal-filled canisters. Canisters absorb gases to prevent any unsafe accumulation. Canisters are monitored (weighed and recorded on the canister) regularly to determine when they require replacement.

*Guyton Expansion Procedural Areas*

- a. Active: Procedural spaces within the LAF environment in the Guyton Expansion Project include active gas scavenging systems. Each procedural space has a “snorkel” device (flexible tubing/duct designed to be positioned at/near exhalation point) to collect waste anesthetic gases.

Investigator Laboratories:

- a. Active:
  1. Waste anesthetic gases collected via vacuum flow from bench-top. Tubing connected to vacuum port and positioned at/near exhalation point.
  2. Waste anesthetic gases removed via work within chemical fume hood. Most commonly used with bell jar or drop container.

3. Some laboratories are equipped with a “snorkel” device (flexible tubing/duct designed to be positioned at/near exhalation point) to collect waste anesthetic gases.

b. Passive Charcoal Filters: Waste anesthetic gases from commercial anesthetic machines are routed via gas flow tubing to activated charcoal-filled canisters. Canisters absorb gases to prevent unnecessary accumulation. Canisters are monitored (weighed and recorded on the canister) regularly to determine when they require replacement.

Website for OSHA Anesthetic Gases: Guidelines for Workplace Exposures:

<http://www.osha.gov/dts/osta/anestheticgases/index.html>

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