



## Animal Anesthetics

### Description

*This standard operating procedure outlines the handling and use of animal anesthetics including: isoflurane, halothane, enflurane and ether. Review this document and supply the information required in order to make it specific to your laboratory. In accordance with this document, laboratories should use appropriate controls and personal protective equipment when handling animal anesthetics.*

### Procedure Location

The use of animal anesthetics must be performed in an area with good ventilation and controls to capture and exhaust waste anesthetic gases.

### Potential Hazards

Anesthetic gas and vapor that leaks during medical or research procedures are considered waste anesthetic gases (WAGs). University faculty, staff and students should be aware of the potential risks of WAGs and be advised to take appropriate precautions to reduce exposures. Workers acutely exposed to excessive amounts of anesthetic gas can experience symptoms of drowsiness, headache, nausea, poor judgment and loss of coordination. Chronic symptoms of over-exposure can include liver, kidney and reproductive effects. Safety precautions include the use of an approved gas scavenging system, or using the agent inside a certified chemical fume hood.

The use of ether is not recommended because it is flammable and a mutagen. Be certain that there are no ignition sources present when handling ether. There are restrictions concerning the use of ether with animals. Contact Environment, Health and Safety (EHS) at (810) 766-6763 concerning the use of ether.

### Engineering Controls

Anesthetics should not be handled on the bench top without special ventilation or a scavenging system. Anesthetic gas filtering cartridges, snorkel exhaust, fume hoods or other scavenging systems must be used. ULAM provides ventilated procedure rooms designed for use of anesthetic gases in many areas. Fume hoods provide the best protection against exposure to anesthetics in the laboratory and are the preferred ventilation control device when handling greater than 100 cc outside of the original container. Always handle large quantities of ethyl ether in a fume hood due to the flammable nature of the material. If your research does not permit the handling of large quantities of ethyl ether in your fume hood, contact EHS to review the adequacy of all special ventilation.

Liquid anesthetics administered with a vaporizer must be scavenged. When used properly, vaporizers equipped with activated charcoal canisters (e.g. F/Air) are effective in removing halogenated waste gases. The F/Air canister containing activated charcoal will absorb waste anesthetics for about 12 hours. Note: F/Air Canisters only absorb halogenated anesthetics (e.g. isoflurane, halothane). Immediately before using any anesthesia machine, the F/Air canister should be removed and weighed to evaluate the remaining absorption capacity. The weight should be recorded and dated on the side of the canister. Immediately following the use of an anesthesia machine, the number of hours the machine was in use should be recorded next to the dated weight information.

Canisters that exceed 12 hours of use or 50 grams of accumulated weight (whichever comes first) must be removed and placed in a sealed plastic bag and disposed of as a hazardous waste through Environment, Health and Safety (EHS) at (810) 766-6763. Thoroughly clean the induction chamber immediately after each use to avoid residual anesthetic waste release into the environment (which can continue to be released for up to three hours). Please refer to the OSEH Guideline entitled [Anesthetic Gas Use](#) for additional information on the safe use of anesthetic gases.

## Work Practice Controls

All anesthetic agents must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.

Always keep the flow rate of anesthetics to the animal as low as possible during the procedure. High flow rates can increase your exposure to the anesthetic. It is also important to move the point of potential gas release as close to the exhaust system as possible to increase capture of the chemical.

Do not permit containers to remain open on the bench top. The odor thresholds for most liquid anesthetics (except for ether) are well above permissible exposure limits. If you smell the anesthetic the control procedures you are using are inadequate and must be re-evaluated.

## Personal Protective Equipment (PPE)

Eye protection in the form of safety glasses must be worn at all times when handling anesthetic agents. Ordinary (street) prescription glasses do not provide adequate protection

Single use nitrile or latex gloves must be worn when handling anesthetic agents as well as lab coats, closed toed shoes and pants. Additional protective clothing should be worn if the possibility of skin contact is likely.

## Transportation and Storage

Ethers form potentially explosive peroxides after exposure to air and light. Since these chemicals are packaged in an air atmosphere, peroxides can form even though the containers have not been opened. Write the date received and date opened on all containers of ether. Opened containers of ether should be discarded within 12 months of opening. Even closed containers of ether must be discarded by the expiration date through EHS at (810) 766-6763.

Halogenated liquid anesthetic agents (i.e. halothane, enflurane, isoflurane) are not flammable but do have limited shelf life. Be certain to date the chemical when it is opened and to check expiration date before use.

Always purchase the smallest quantity required for use. Ether used for anesthetic purposes should be purchased in the smallest quantity available (typically 150 cc, Fisher Scientific E136-150) due to its short (12 month) shelf life after it is opened.

## Waste Disposal

Anesthetic agents are hazardous wastes. Contact Environment, Health and Safety (EHS) at (810) 766-6763 for waste containers, labels, manifests, waste collection and for any questions regarding proper waste disposal. Also refer to UM-Flint Hazardous Waste Management Program and EHS webpage <http://www.umflint.edu/ehs/environment-health-and-safety> for more information.

## Exposures/Unintended Contact



***If the employee is in need of emergency medical attention, call 911 immediately.***



Wash hands and arms with soap and water immediately following any skin contact with anesthetic agents. Flush eyes for 15 minutes following eye contact.

Contact EHS for advice on symptoms of chemical exposure, or assistance in performing an exposure assessment.

Report all work related accidents, injuries, illnesses or exposures to WorkConnections within 24 hours by completing and submitting the [Illness and Injury Report Form](#). Follow the directions on the WorkConnections website [Forms Instructions](#) to obtain proper medical treatment and follow-up.

If you were involved in or observed an incident or near miss, please complete the [EHS Laboratory Incident and Near-Miss Report Form](#). This will be valuable in improving laboratory safety on UM-Flint campus.

**TREATMENT FACILITIES:**

<b><u>MAJOR INJURIES</u></b>	<b><u>MINOR INJURIES –During Business Hours</u></b>	<b><u>MINOR INJURIES –After Business Hours</u></b>
<p><b>Genesys Hospital</b> One Genesys Parkway Grand Blanc, MI 48439 (810) 606-5710</p> <p><b>Hurley Medical Center</b> One Hurley Plaza Flint, MI 48503 (810) 262-9000</p> <p><b>McLaren Hospital Flint</b> 401 South Ballenger Hwy Flint, MI 48532 (810) 342-2000</p>	<p><b>Genesys Occupational Health Network</b> 1460 Center Rd. Burton, MI 48509 (810) 715-4620 Mon. to Fri. 7:30 am to 10 pm Sat. &amp; Sun. Noon to 8 pm</p> <p><b>McLaren Flint-Burton OCC Center</b> 1459 S. Center Rd. Burton, MI 48509 (810) 496-0900 Mon. - Fri. 8 am to 8 pm Sat &amp; Sun 10 am to 2 pm</p>	<p><b>Downtown Flint</b> 420 S. Saginaw St. Flint, MI 48502 (810) 762-1550</p> <p><b>Genesys East</b> 1096 S. Belsay Rd, Suite F Burton, MI 48509 (810) 743-3351</p> <p><b>Genesys North</b> 4154 W. Vienna Rd Clio, MI 48420 (810) 686-7397</p> <p><b>Genesys South</b> 8447 N. Holly Rd Grand Blanc, MI 48439 (810) 603-0856 Mon. - Fri. 6 to 10pm / Sat. &amp; Sun. 1-10pm</p>

Click [here](#) for more information on the UM – Flint Emergency Preparedness and Response Plan.

**Spill Procedure**

Ether is extremely flammable. If ether is spilled immediately assess and deactivate potential ignition sources. Be prepared for a potential fire and ensure your safety and others first.

Anticipate spills by having the appropriate clean up equipment on hand. Spill materials for anesthetic agents are designed to control the liquid portion of the spill and minimize the production of vapors. Never use paper towels on large spills of anesthetic agents because it exacerbates vapor production.

- When a spill occurs, ***personal safety should always come first.***
- Alert and clear everyone in the immediate area where the spill occurred.

A **minor (small) chemical spill** is one of a known chemical that the laboratory staff is capable of handling safely without the assistance of safety and emergency personnel, i.e., less than 1 liter. A **major/large chemical spill** requires active assistance from emergency personnel.

## Additional Spill Response Steps:

### MINOR CHEMICAL SPILL

- Alert people in immediate area of spill.
- If spilled material is flammable, turn off ignition and heat sources. Don't light Bunsen burners or turn on other switches.
- Open outside windows, if possible.
- Wear protective equipment, including safety goggles, gloves and long-sleeve lab coat.
- Avoid breathing vapors from spill.
- Confine spill to as small an area as possible.
- **Do not wash spill down the drain.**
- Use appropriate spill kits/sorbents to absorb spill. Collect contaminated materials and residues and place in container. Contact EHS at (810) 766-6763 for proper disposal.
- Clean spill area with water.

### MAJOR CHEMICAL SPILL

- Attend to injured or contaminated persons and remove them from exposure.
- Alert people in the laboratory to evacuate.
- If spilled material is flammable, turn off ignition and heat sources. Don't light Bunsen burners or turn on other switches.
- **Call UM-Flint DPS at 911 from any university telephone or (810) 762-3333 from any cell phone or non-university telephone immediately for assistance.**
- Close doors to affected area.
- Post warnings to keep people from entering the area.
- Have person available that has knowledge of incident and laboratory to assist emergency personnel.

### Additional Spill Links:

- [www.oseh.umich.edu/pdf/chemspil.pdf](http://www.oseh.umich.edu/pdf/chemspil.pdf)
- <http://www.oseh.umich.edu/emer-chemical.shtml>.

Report all emergencies, suspicious activity, injuries, spills, and fires to the UM-Flint Department of Public Safety (DPS) at 911 from any university telephone or (810) 762-3333 from cell phone or non-university telephone. Register with the [University of Michigan-Flint Emergency Alert System](#) via Wolverine Access. Also, preprogram the UM-Flint DPS telephone number (810) 762-3333 into your cell phone for quick, easy use.

### Training of Personnel

All personnel are required to complete Laboratory Safety Training. Documentation of the training is required. This training can be accomplished by completing the **Comprehensive Laboratory Safety** session (BLS009 or equivalent) via [MyLINC](#), or UM-Flint EHS on-line training or other equivalent approved by EHS. Furthermore, all personnel shall read and fully adhere to this SOP when handling animal anesthetics.

**Certification**

I have read and understand the above SOP. I agree to contact my Supervisor or Lab Manager if I plan to modify this procedure.

Name	Signature	UM ID #	Date

**Prior Approval required – Is this procedure hazardous enough to warrant prior approval from the Principal Investigator?**       YES       NO

**Principal Investigator** \_\_\_\_\_

**Revision Date** \_\_\_\_\_