MASSACHUSETTS GENERAL HOSPITAL

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# EH&S Fact Sheet and Checklist — USDA Covered Non-Rodent

## Waste Anesthetic Gas (WAG)

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| *What is waste anesthetic gas (WAG)?* | WAG most often refers to occupational exposure to anesthetic gas (e.g., **isoflurane**, desflurane, and sevoflurane) during a medical or surgical procedure. |
| *What contributes to WAG exposure?* | Leakage from tubing, seals, and gaskets; poor work practices/lack of training; poor ventilation; and ineffective gas-scavenging systems. |

## Health Effects of WAG Exposure

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| *What are the health effects of being exposed to WAGs?* | **Acute effects** — dizziness, lightheadedness, nausea, fatigue, headache, irritability, depression.<br>**Chronic effects** — liver and kidney disease, birth defects, miscarriages — Visit the MGH Occupational Health website or NIOSH for more information. |
| *What are the Exposure Limits?* | NIOSH has a non-regulatory recommended exposure limit (REL) for halogenated agents (e.g., **isoflurane**) of 2 ppm as a ceiling limit (over a sampling period not to exceed one hour) during anesthetic administration. OSHA has not established a regulatory permissible exposure limit (PEL) for anesthetic gases; therefore, 2ppm is used as the exposure threshold. |

## Exposure Risks

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| *What activities have been found to have an increased risk of exposure to WAGs?* | • Not ensuring a tight seal around the face mask or not using a properly sized endotracheal tube.<br>• Imaging anesthetized animals without appropriate scavenging.<br>• Improper scavenging<br>• Prolonged surgeries or procedures with passive scavenging and/or inadequate ventilation. |
| *Is exposure monitoring available?* | Upon request, EHS will evaluate staff exposures by monitoring laboratory workers while they perform work with WAGs. |

## Personal Protective Equipment (PPE)

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| *What are the minimum PPE requirements while filling the vaporizer* | • Nitrile gloves<br>• Lab coat<br>• Eye protection (safety glasses, goggles or a face-shield)<br>**NOTE:** Species-specific and biosafety level PPE requirements must be followed |

## Scavenging Requirements

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| *Do you need to scavenge/capture WAGs?* | • It is highly recommended that WAGs are scavenged through active means. Active scavenging involves an active airflow system that draws WAG away from the researcher into an in-house vacuum exhaust line or chemical fume hood.<br>**NOTE**: If scavenging systems are not properly used or maintained, gases may escape into the work area resulting in overexposures. |
| *What are the most effective means for scavenging WAGs?* | • Downdraft surgery table<br>• Commercially available active scavenging system*<br>• Vapor capture snorkel<br>• Placement of the entire gas mixing and delivery system within a ducted fume hood |

*Contact EH&S (617-726-2425) for guidance

## Anesthetic Equipment Maintenance

- Anesthesia machines and vaporizers must be maintained and certified annually, unless otherwise specified by the manufacturer.
- If working with a face mask inspect and replace as necessary. Ensure that there are no leaks in the endotracheal tube cuff.
- Establish written procedures for daily and routine inspection/maintenance of anesthesia and scavenging systems.

## Checklist for Working with Anesthetic Gas

- ☐ Ensure personnel receive training on equipment use. Managers should document the training.
- ☐ Review and understand the manufacturer's instructions for operating the equipment.
- ☐ Use a certified local exhaust ventilation system as the preferred means to remove WAGs.
- ☐ Verify equipment is currently certified and in working condition.
- ☐ Ensure connections are properly secured.
- ☐ Check equipment for leaks by pressure testing before each use. If a leak is suspected contact EH&S (6-2425). If you are using a CCM-owned anesthesia machine, also contact Veterinary Services or the on-call vet (617-721-9332)
- ☐ Verify preventative maintenance has been performed annually or more frequently per the manufacturer.
- ☐ Fill vaporizer with the specific anesthetic for which it is certified either in a fume hood or using an anti-spill bottle adaptor. Use chemical-resistant gloves, lab coat, and eye protection.
- ☐ Keep laboratory doors closed when anesthetic gas is in use.
- ☐ Avoid high concentrations of isoflurane (>4%) for induction and/or for prolonged periods. Turn off vaporizer when animals are not receiving anesthetic.
- ☐ Minimize leakage by selecting the best-fitting size of commercially available face mask or endotracheal tube.
- ☐ Keep worker's breathing zone as far as possible from animal's face.

## Spills and Waste

- **Spills** — Do not attempt to clean up isoflurane spills. Evacuate personnel and allow anesthetic to evaporate. Call EH&S (617-726-2425) for guidance.
- **Waste** — Dispose of charcoal canisters into the regular trash. Empty bottles may be triple-rinsed, labels removed, and disposed of as non-hazardous glass waste.