Exposure Awareness

**Symptoms of Exposure:**
Headaches, irritability, nausea, fatigue, motor skill, perceptual, cognitive impairment

**Act quickly if an exposure occurs:**
- Seek medical attention immediately at an emergency room.
- Call Campus Police
  **Cell:** (858) 534-4357
  **Land line:** 9-1-1
- Request an ambulance if transportation is necessary.
- Call the Poison Control System, (800) 222-1222, if you need additional information.
- You may request medical evaluation from the **EH&S Occupational Health Nurse**, (858) 534-8225

**Common Causes of Exposure:**
- Benchtop delivery of inhalant anesthetic without adequate scavenging.
- Poorly fitted face masks.
- Use of uncuffed ET tubes or improper inflation of cuffs on ET tubes.
- Turning on flow meters or inhalants before attaching the breathing system to the subject.
- Disconnecting subjects from the anesthesia machine before waste anesthetic gases have been adequately scavenged.
- Leaks in the anesthetic delivery system.

**Equipment and System Maintenance**
- Check anesthesia machines, breathing systems, and scavenging systems for leaks before each use.
- Have equipment and systems regularly serviced and maintained to ensure reliable performance.

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**Safe Use of Anesthetic Gas in Research**

**Environment, Health and Safety**

**Chemical Safety Officer:**
Doug Harvey
**Phone:** (858) 822-1579
**Email:** ehschem@ucsd.edu
**Website:** http://www-ehs.ucsd.edu/

**Animal Care Program Senior Veterinarian:**
Jennifer Fujimoto
**Phone:** (858) 534-8612
**Email:** jfujimoto@ucsd.edu

This guide is only intended as a summary of the requirements to work with anesthetic gases. Please consult the EH&S web site for more complete information.
Training and Hazard Evaluation:
- The PI or a knowledgeable designee must provide appropriate safety training.
- Evaluate the possible hazards of materials before beginning work.
- Consult Safety Resources before beginning work (e.g., MSDSs).
- Consult with one or both of the UCSD staff below about questions or concerns related to work with anesthetic gases:
  1. Jennifer Fujimoto
  2. Doug Harvey

Emergency Preparedness:
- Never work alone.
- Clean up small, incidental spills promptly.
- Review your MSDS.
- Know the location and how to operate safety equipment, including:
  - Emergency Guide
  - Emergency Eyewash and Shower
  - First aid kit
  - Fire Extinguisher & fire alarm pull station

Identifying Anesthetic Gases:
Anesthetic gases commonly used at UCSD include:
- Halogenated
  - Isoflurane is the predominant halogenated ether in use at UCSD

Purchasing and Storage:
Label all containers as follows:
- Name of the material
- Concentration
- Warnings
- Date, when appropriate
- Preparer’s initials, when appropriate

Buy the least amount of product the work requires. Do not buy in large quantities to "save money."

Preparation

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Hazard Control

Engineering controls involving active scavenging strategies (using negative pressure to manage unwanted material) are vital for working safely with anesthetic gases. As part of this strategy, Environment, Health & Safety (EH&S) uses a 2 ppm ceiling limit to determine whether or not your control strategy is adequate.

Active Scavenging Models: Minimize or eliminate the possibility of workplace exposure by using 1 of the 3 active scavenging models listed below (in descending order of priority). Model 1 is always preferred over all other methods of scavenging.

Model 1 (preferred) – Handle inhalants and subsequent waste products using a hard-ducted device that allows rapid elimination of waste gases from the workplace:
- Certified chemical fume hood
- Certified hard-ducted biosafety cabinet
- Ducted downdraft table
- Other local exhaust device (e.g., snorkel, etc)

Model 2 – Handle inhalants and subsequent waste products in a ductless device that allows rapid elimination of waste gases from the workplace:
- Chemical fume hood
- Downdraft table
- Other local exhaust device (e.g., snorkel, etc)

Model 3 – Handle inhalants and subsequent waste products using house vacuum that allows rapid elimination of waste gases from the workplace:
- Line and mini snorkel
- Downdraft tables
- Other effective means
  These types of set ups can work well, but not always. Use them only if other more reliable techniques are not available. Model 1 is preferred whenever possible.

Additional Required Controls:
- Work in a well-ventilated room
- Wear this personal protection equipment:
  - Lab coat
  - Safety glasses
  - Disposable surgical gloves
  - Closed-toed shoes
- Use the least hazardous product and delivery system available for the task.
- Keep container sizes and quantities as small as possible in the work area.
- Store and transport stock bottles in a secondary container.
- Avoid techniques that make scavenging difficult or impossible (ex: open drop etc)

For additional controls see the EH&S Blink web site.