

ANESTHETIC GASES

Gas anesthetic agents are used commonly in veterinary practices and can be safe for both for our patients and ourselves. Excessive chronic exposure, however, can lead to detrimental health effects. Short-term exposure can lead to nausea, fatigue, drowsiness, pruritus (itching), headache, irritability, lack of coordination, and mental impairment. These are similar to the effects felt by anesthetized patients.

The possible effects of chronic exposure to waste anesthetic gases include liver disease, kidney disease, immune suppression, bone marrow suppression, birth defects, cancer, neurological disturbances, and spontaneous abortion. Abortions and birth defects associated with excessive exposure have been seen in both female employees and in the wives of exposed male employees.

Adequate ventilation, especially when used in conjunction with an effective scavenging system, can prevent excessive exposure and its associated problems. Effective scavenging systems include absorbent charcoal canisters, passive exhaust systems, and active scavenging units. All three types have been shown to be effective if used properly. *Note: Charcoal canisters will not absorb nitrous oxide.*

Protect Your Health

- Avoid exposure to waste anesthetic gases whenever possible. Stay out of the room where gas anesthesia is administered unless you need to be there.
- Anesthetic gas monitoring badges should be worn by all personnel participating in surgery involving gas anesthesia. Badges should be submitted for dosimetry in accordance with manufacturer recommendations.
- Report any odors indicating a possible leak in the anesthetic circuit. Unfortunately, you may not be able to detect all leaks by odor alone.
- Review the Safety Data Sheet (SDS) for the anesthetic agents used in your practice.
- Make sure the ventilation in the room adequate.

For Veterinary Anesthetists

- Make sure all hoses, scavenging equipment, and absorbers are properly connected; check for leaks at the beginning of each procedure.
- Minimize oxygen flow rate.
- Use properly-fitted endotracheal tubes with the cuff inflated, or close-fitting masks: loose-fitting tubes and masks can be a source of exposure, especially for those working close to the patient's head.
- Minimize the use of induction chambers. If they are used, place the animal in the smallest space that is safe, flush the chamber with oxygen for a few minutes before removing the animal and replace the lid as soon as possible.
- Turn on the vaporizer only after the animal is intubated.
- Avoid non-essential disconnection of the breathing system during anesthesia.
- Consider installing a stopcock valve to minimize exposure if the system is disconnected from the endotracheal tube while the animal is under anesthesia.
- After turning off the vaporizer, continue to administer oxygen for a few minutes before disconnecting the patient. This helps to flush anesthetic gas out of the patient's lungs and into the scavenging system.
- Make sure vaporizers and compressed gas tanks are turned off after each use.
- Use non-spill safety adapters when filling vaporizers.
- Avoid unnecessary exposure to anesthetic gases exhaled by patients during recovery.
- Be sure your scavenging system is properly connected and functioning normally. Ask your supervisor or safety coordinator for instructions on your particular system.

Anesthetic Equipment Maintenance

- Inspect the entire anesthetic gas circuit periodically.
- Check soda-lime canisters carefully. After each refilling, make sure all gaskets are in place and all fittings are properly sealed.
- Leak-test the anesthetic circuit before each use.
- Replace charcoal canisters at the intervals specified by the manufacturer. Shaking the charcoal periodically helps maintain maximum efficacy. *Remember, charcoal does not absorb nitrous oxide.*
- Notify your supervisor if there are any problems with the anesthetic machine or vaporizer. Do not use the machine until it is functioning properly.

ANESTHETIC GASES SAFETY QUESTIONS

What is the practice system of monitoring for anesthesia gas?

Are all employees trained to understand the times during the anesthetic procedure when exposure to anesthetic gas is most likely to occur?

Are employees familiar with measures they can take to minimize exposure to anesthetic gases throughout all phases of an anesthetic procedure?

Do employees know how to check anesthesia machines for leaks?

Does staff know who to go to with issues or questions regarding anesthesia machines, procedures, etc?

ADDITIONAL TRAINING RESOURCES

California law on airborne contaminants: <https://www.dir.ca.gov/title8/5155.html>

The American College of Veterinary Anesthesia and Analgesia has recommendations for "Control of Waste Anesthetic Gases in the Workplace": http://www.acvaa.org/docs/2013_ACVAA_Waste_Anesthetic_Gas_Recommendations.pdf

OSHA Guidelines for Anesthetic Gas Safety: <https://www.osha.gov/dts/osta/anestheticgases/#F4>

California Department of Public Health Waste Anesthetic Gas Safety:
<https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/IsofluraneGas.pdf>

