

# The National Institute for Occupational Safety and Health (NIOSH)

## NIOSH Warns: Nitrous Oxide Continues to Threaten Health Care Workers

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The National Institute for Occupational Safety and Health (NIOSH) has issued a warning to the hundreds of thousands of medical, dental, and veterinary professionals who work with nitrous oxide (N<sub>2</sub>O). The Institute warns that even with preventive measures such as scavenging systems in place these workers may be at risk for serious health effects due to their exposure.

N<sub>2</sub>O, commonly called laughing gas, is an anesthetic agent used in operating rooms. Workers are exposed to N<sub>2</sub>O while administering the anesthetic gas to patients. To protect workers from the health risks associated with N<sub>2</sub>O, operating rooms are often equipped with scavenging systems that vent unused and exhaled gas away from the work area. Recent research shows that these systems can significantly reduce the risk of impaired fertility among female dental assistants exposed to N<sub>2</sub>O.

However, a recent NIOSH Alert reports that even with scavenging systems in place, Institute researchers measured N<sub>2</sub>O exposures as high as 12 times the NIOSH recommended limit in hospital operating rooms and more than 40 times the NIOSH recommended limit in dental operating rooms. The report clearly demonstrates that simply using a system is not sufficient—it must be continuously monitored and maintained to effectively reduce exposure to N<sub>2</sub>O.

“These devices may have created a false sense of security in health care workers. Employers must ensure that these systems provide the expected level of protection,” said NIOSH Director Dr. Linda Rosenstock. “Health care workers should not have to risk their health to improve the health of others,” she stressed.

Several human studies have shown that occupational exposure to N<sub>2</sub>O may cause reduced fertility, spontaneous abortions, and neurologic, renal, and liver disease as well as documented decreases in mental performance, audiovisual ability, and manual dexterity. Moreover, animal studies have shown that exposure to N<sub>2</sub>O during gestation can produce adverse health effects in offspring.

The NIOSH Alert, Request for Assistance in Controlling Exposures to Nitrous Oxide During Anesthetic Administration, warns workers of the hazards of N<sub>2</sub>O exposure and provides prevention measures. A summary of the guidelines for controlling exposure to N<sub>2</sub>O is provided on the following page. Although properly operating scavenging systems have been shown to reduce N<sub>2</sub>O concentrations by more than 70%, simply having a scavenging system in place is not enough. Workers and employers must ensure that systems and equipment are properly operated, inspected, and maintained. NIOSH urgently requests your assistance in informing all workers of the hazards they face if exposed to N<sub>2</sub>O at their workplace.

### STEPS FOR PREVENTION

Workers and employers should take the following steps to reduce N<sub>2</sub>O exposure in the workplace:

Monitor anesthetic equipment when installed and every 3 months thereafter:

- Leak test equipment
- Monitor air in the worker’s personal breathing zone

- Monitor the environment (room air)
- Prevent leakage from the anesthetic delivery system through proper maintenance and inspection of equipment. Eliminate or replace the following:
  - Loose-fitting connections
  - Loosely assembled or deformed slip joints and threaded connections
  - Defective or worn seals, gaskets, breathing bags, and hoses
- Control waste N<sub>2</sub>O with a well-designed scavenging system that includes the following:
  - Securely fitting masks
  - Sufficient flow rates (i.e., 45 liters per minute) for the exhaust system
  - Properly vented vacuum pumps
- Make sure that the room ventilation effectively removes waste N<sub>2</sub>O. If concentrations of N<sub>2</sub>O are above 25 ppm, take the following steps:
  - Increase the airflow into the room
  - Use supplemental local ventilation to capture N<sub>2</sub>O at the source
- Institute an education program that describes N<sub>2</sub>O hazards and defines prevention measures.
- For more information on protecting yourself or your employees from N<sub>2</sub>O exposure consult the NIOSH Alert: Request for Assistance in Controlling Exposures to Nitrous Oxide During Anesthetic Administration [DHHS (NIOSH) 94-100].
- To request a copy of the Alert or to receive information on other occupation safety and health concerns, call: 1-800-35-NIOSH