



## **Nitrous Oxide Use Policy**

Revision Date: March 2014

### **Applicability**

Environmental Health and Radiation Safety has prepared this policy for the information and guidance for those who work with or may be exposed to nitrous oxide. It applies to employees, students, and faculty in all operations. This policy is not applicable to patients during clinical use. OHSU Departments may adapt the policy elements to their specific operations. Departments are individually responsible for ensuring the health and safety of their staff. OHSU is obligated to inform and protect students from harm that may be present in their academic environment. Likewise, the schools within the University are urged to adopt appropriate policy elements herein to ensure the health and safety of their students. Departments may contact the Office of Environmental Health & Radiation Safety (EHRS) to confirm compliance with all applicable guidelines.

### **Scope and Purpose**

The purpose of the nitrous oxide policy is to establish procedures and guidelines to protect the health and safety of those who may be occupationally exposed to nitrous oxide. This will minimize exposure to concentrations of nitrous oxide which exceed recommended exposure limits set forth by the National Institute of Occupational Safety and Health (NIOSH).

### **Implementation**

Departments are individually responsible for adhering to the provisions of this policy. Environmental Health & Radiation Safety (EHRS) may be contacted for guidance and technical assistance.

## Requirements

- **Control Measures**

The following control/precautionary measures have been documented to reduce the breathing zone concentrations of nitrous oxide and may be implemented in the case of exposures exceeding 25 ppm:

- Limit/modify the use of nitrous oxide. Minor modifications in an anesthetist's work practices can substantially reduce anesthetic exposure
- Use a scavenging system.
- Use an adjustable, well-fitting nose mask.
- Minimize speech by the patient during dental procedures, and use a rubber dam.
- Initiate regular preventative maintenance procedures for anesthetic equipment.
- Perform periodic leak testing of equipment.
- Provide continuing education to personnel.

- **Exposure and Leak Monitoring**

Waste anesthetic gases, although not yet covered by federal regulations, have long been recognized as health hazards to operating room and dental personnel. Many different materials are used along with nitrous oxide to anesthetize patients but, for ease of monitoring, the nitrous oxide component of anesthetic gas mixtures is generally regarded as an indicator of exposure. For a normative mixture of waste anesthetic gases, if the concentration of nitrous oxide is less than a 25 ppm time-weighted average (TWA), it is assumed that the levels of other gases are acceptable. Nitrous oxide enters the body by inhalation and is readily absorbed through the lungs and transported throughout the body. Short-term or acute exposure to nitrous oxide may cause headaches, nausea, fatigue and irritability. Long-term or chronic exposure is suspected of causing serious health problems including increased incidence of spontaneous abortions, congenital abnormalities and liver, kidney and nerve disorders.

Leak test surveys will be conducted in all nitrous oxide use areas within the Hospitals & Clinics and the School of Dentistry upon request by unit or department. The results of the survey will be submitted to the appropriate authority for correction as needed. Correction and re-testing will be done within 30 days of the initial survey.

- **Maintenance**

Periodic maintenance of all anesthetic gas-delivery equipment is essential to verify proper gas delivery and to remedy leaks. Maintenance is the responsibility of the department. Maintenance must be coordinated with the appropriate service providers.

### **Precautions for Pregnancy and Conception**

Personnel who are pregnant or are expecting to become pregnant should not work in areas where nitrous oxide is used unless exposure monitoring has shown that nitrous levels do not exceed a TWA of 25 ppm. Chronic exposure to nitrous oxide in excess of 50 ppm has been shown to increase the probability of spontaneous abortion and decrease the probability of conception. However, brief excursions above 50 ppm have not been demonstrated to adversely affect women's health. Situations may be evaluated on a case-by-case basis by EHRS.

**History:** Replaces revision of July 7, 2004, February 2008, March 2011

### **References:**

ACGIH [2001]. Documentation of the Threshold Limit Values and Biological Exposure Indices. 7th ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

Donaldson D, Meechan J.G., The Hazards of Chronic Exposure to Nitrous Oxide: an update. British Dental Journal 1995; 178: 95-100.

NIOSH [1999]. Control of Nitrous Oxide in Dental Operatories. Applied Occupational and Environmental Hygiene 1999; 14: 218-220.

NIOSH [1994]. Controlling Exposure to Nitrous Oxide During Anesthetic Administration. Cincinnati, OH: U.S. Department of Health and Human

Services, Public Health Service, Centers of Disease Control, National Institute of Occupational Safety and Health, DHHS (NIOSH) Publication No. 94-100.

**Related policies, procedures and forms:** none

**Responsible Department:** Environmental Health and Radiation Safety