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BOARD OF NURSING





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OPINION: Use of Nitrous Oxide APPROVED DATE: May 15, 2025 REVIEWED DATE: April 15, 2025 REVISED DATE: April 15, 2025

Within the Scope of Practice/Role of X_APRN X_RN __LPN __CNA

ADVISORY OPINION

The Alaska State Board of Nursing (AKBON) receives frequent questions regarding the administration of Nitrous Oxide. The purpose of this opinion is to provide guidance for APRNs & registered nurses working in various settings with adult and pediatric populations administering a 50:50 O2/N2O concentration for various procedures.

*This opinion does not apply to CRNAs who are able to give higher concentrations of nitrous oxide per their education and training.

Background/Analysis-Nitrous Oxide (N2O)

Classification Inhalation Anesthetic

Indications

Appropriate for cases which do not need a complete anesthetic (Example: Dental Anesthesia, labor analgesia)

Dose

For non-anesthesia personnel max 50:50 Oxygen/Nitrous mix

Onset and Duration

Onset: 1-5 minutes Duration: 5-10 minutes after end of continuous administration

Adverse Effects

Confusion, seizures, hypoxemia, bone marrow depression (typically caused by decreased oxygen from improper administration. Inspired oxygen concentrations of at least 50% should be given.

Precautions and Contraindications

- Nitrous oxide is not flammable, but will support combustion
- Nitrous oxide diffuses into air-filled cavities 34 times faster than nitrogen can diffuse out, potentially leading to dangerous pressure buildup in enclosed spaces such as the middle ear, obstructed bowel, pneumothorax, pneumocephalus (could result in increased intracranial pressure, or air embolism. Caution should be taken in patients at risk for these conditions.
- Patients should be cautioned not to drive, operate other machinery or make any other major decisions until the effects of nitrous oxide have completely disappeared.
- This list is not exhaustive and those administering nitrous oxide should understand the risks and complications of nitrous oxide.

RN Administration

Rationale

The intention of nitrous oxide administration for the RN is minimal sedation. Minimal sedation is a drug-induced state during which patients respond normally to verbal commands. It is within the scope of practice of a Registered Nurse (RN) to administer nitrous oxide for the purpose of minimal sedation (analgesia or anxiolytic use in adults and children over the age of one. Nitrous oxide will not be used to moderate or deep sedation.

General Requirements - Adults

- 1. Licensed Independent provider (LIP) must be readily available in the facility.
- 2. Candidates for nitrous oxide administration must be evaluated by the responsible LIP and assessed for appropriateness before initiation of therapy.
- 3. Written policies, procedures, and protocols are maintained by the facility and have been approved by the facility prior to implementation.
- 4. Policies, procedures and order sets will include the following
 - a. The use of nitrous for minimal sedation
 - b. Describe the role of the RN during nitrous administration
 - c. Specify frequency of assessment
 - d. Ensure a qualified LIP is available
 - e. Specify emergency equipment and medications to be immediately available including all emergency equipment and medication required to regain and/or maintain the patient's cardiovascular stability.

- 5. The facility must provide an instructional program that includes nitrous oxide administration/airway management with a minimum of six hours of instruction including theory and didactic management of nitrous oxide administration.
- 6. Only RNs who have satisfactorily completed the instructional program and have documented initial and ongoing clinical competency on file with the employer may administer nitrous oxide.
- 7. Current BLS and ACLS on file with the facility
- 8. Continuous pulse oximetry will be monitored during nitrous oxide administration
- 9. The RN responsible for nitrous oxide administration shall not leave the patient or be engaged in any other tasks besides monitoring the patient.
- 10. The RN has the right and responsibility to refuse to administer any medication that may induce procedural sedation when in their professional judgement a state of moderate or deep sedation may be produced or place the patient at risk for complications.
- 11. The dosage parameters are established through patient specific written/electronic order signed by the LIP
- 12. The RN may administer and/or discontinue to nitrous oxide as ordered by the LIP.

Course Of Instruction

- 1. Age specific anatomy and physiology
- 2. Age specific pre-sedation assessment
- 3. Pharmacologic properties of nitrous oxide/oxygen
- 4. Indications/contraindications of nitrous oxide
- 5. Indications/contraindications of nitrous oxide
- 6. Techniques of administration, titration, and termination of nitrous oxide use
- 7. Level of consciousness assessment and physiological response to nitrous oxide
- 8. Airway management
- 9. Emergency situation management and appropriate interventions
- 10. Abuse potential
- 11. Occupational exposure to nitrous
- 12. Legal implications, responsibility, documentation
- 13. Nursing roles and responsibilities

Pediatric Specific Considerations

General Requirements

- 1. Use of failsafe equipment with a scavenger system must be used
- 2. The RN has successfully completed 6 hours training that includes didactic, skills, and competency demonstration. See course requirements.
- 3. The nitrous percent does not exceed 70% and pulse oximetry is continuously monitored.
- 4. Once additional medications are used in concert with nitrous oxide the RN must also meet the additional requirements of sedation under the board of nursing conscious sedation advisory opinion.
- 5. A LIP dedicated specifically to sedation must be at the bedside if any additional medications that may cause sedation, relaxation, or paralytics are used. See advisory on RN administered conscious sedation.
- 6. Patients are assessed by LIP prior to the administration of nitrous oxide.
- 7. The RN is responsible for obtaining verbal consent. The LIP is responsible for providing written orders or an order set. The specific dosage parameters are established by the LIP in

writing prior to RN administration of nitrous oxide. The RN may titrate the nitrous oxide with the parameters determined by written orders.

- 8. There are facility policies and procedures approved in place.
- 9. Dosimetry is available in accordance with the facilities policies and procedures.
- 10. Signage for nitrous oxide use must be in use during administration.
- 11. The RN must hold current BLS and PALS certification on file at the facility.
- 12. An RN is dedicated to nitrous administration and must remain with the patient. RN may not engage in other tasks that could compromise the continuous monitoring of the patient airway and/or level of consciousness.
- 13. The RN has the right and responsibility to refuse to administer any medication that may induce procedural sedation when in the professional judgement of the RN, the medication or combination of medications, the dosages prescribed, or frequency of administration may produce a state of moderate or deep sedation or place the patient at risk for complications.
- 14. Due to occupational exposure risk, RNs may refuse participation.

Self-Administration

Self-Administration of a 50:50 oxygen/nitrous oxide mixture is frequently seen in obstetrics but is not limited to this setting. If educational and other safety requirements are met, nitrous can be administered in a variety of settings and for many case types.

Obstetrics

Recommendations

- 1. The licensed independent practitioner managing the labor and delivery must be readily available and is responsible for:
- 2. Maternal-fetal assessment for suitability for absence of contraindications.
- 3. Patient and family education about the nature of "self-administration" including the safety feature that when a woman has physiologically reached her limit, she will no longer be able to hold the mask to her face, thus self-regulating her intake.

The RN is responsible for:

- 1. Reinforcing patient and family education about the nature of "self-administration"
- 2. Setting up the 50:50 02/N2O delivery system
- 3. Monitoring the 50:50 O2/N20 delivery system for accuracy and safety
- 4. Ongoing patient assessment for response to and effectiveness of O2/N2O self-administered analgesia including continuous pulse oximetry
- 5. Discontinuing the 50:50 O2/N2O delivery system when
 - a. There is evidence of maternal or fetal compromise
 - b. The patient chooses to discontinue
 - c. The patient is non-compliant with self-administration instructions
- 6. In the event the patient is receiving inadequate analgesia with N20 alone, the LIP managing the labor and delivery of the patient pay order the addition of IV opioid pain medications and/or regional anesthesia. When these modalities are used in conjunction with N20, the following criteria must be met:
 - a. LIP managing the labor and delivery of the patient must document physical assessment of the patient's neuro status to include being awake and alert with intact motor and sensory function.
 - b. Continue continuous pulse oximetry monitoring

c. RN will monitor and document patient neurological status with a validated sedation scale.

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