Applies To: **UNM Hospitals**
Responsible Department: Labor and Delivery
Effective Date: 1/15/2019

Nitrous Oxide for Intrapartum Pain Management					**Guideline**
Patient Age Group:	( ) N/A	( ) All Ages	( ) Newborns	( ) Pediatric	(X) Adult

DESCRIPTION/OVERVIEW

Nitrous oxide is a safe and effective analgesic for relieving pain, decreasing anxiety, inducing euphoria and/or reducing the awareness of pain. Nitrous Oxide (in a 50/50 blend with oxygen) by inhalation may be used as analgesia for intrapartum labor pain as well as for other indications (see below). This SOP offers guidance on the use of nitrous oxide 50/50 for minimal sedation and anxiolysis. It does not cover the use of higher concentrations of Nitrous Oxide (>50%), considered moderate sedation and provided by the obstetrical anesthesia service.

REFERENCES

Barbieri R, Camann W, McGovern C. Nitrous oxide for labor pain. OBG management 2014:26(12): 10-12, 14.

Berlit S1, Tuschy B, Brade J, Mayer J, Kehl S, Sütterlin M. Effectiveness of nitrous oxide for postpartum perineal repair: a randomised controlled trial. Eur J Obstet Gynecol Reprod Biol. 2013 Oct; 170(2): 329-32.

Bishop J. Administration of Nitrous oxide in labor: expanding the options for women. Journal of Midwifery and Women's Health 2007; 52 (3): 308-309.

Leeman L, Fontaine P, King V, Klein MC, Ratcliffe S. The nature and management of labor pain: Part ll. Pharmacologic pain relief. Am Fam Physician 2003; 68: 1115-20.

Likis FE, Andrews JA, Collins MR, Lewis, RM, Seroogy JJ, Starr SA, Walden RR, McPheeters ML. Nitrous Oxide for the Management of Labor Pain. Comparative Effectiveness Review No. 67. (Prepared by the Vanderbilt Evidence-based Practice Center under Contract No. 290- 2007-10065-I.) AHRQ Publication No. 12-EHC071-EF. Rockville, MD: Agency for Healthcare Research and Quality. August 2012.

Likis FE, Andrews JC, Collins MR, Lewis RM, Seroogy JJ, Starr SA, Walden RR, McPheeters ML. **Nitrous** oxide for the management of **l**abor pain: a systematic review. Anesth Analg. 2014 Jan; 118(1): 153-67.

Rooks J. Safety and Risks of nitrous oxide labor analgesia: a review. Journal of Midwifery and Women's Health 2011; 56(6): 557-565.

Rosen MA. Nitrous oxide for relief of labor pain: A systematic review. Am J Obstet Gynecol 2002; 186 (Supp 5): S131-59.

Stewart, L.S., & Collins, M. (2012) Nitrous Oxide as Labor Analgesia: Clinical Implications for Nurses. *Nursing for Women's Health,* 2012; 16(5): 398-408. *16(*5)

AREAS OF RESPONSIBILITY

- UNMH OB-GYN and Family Medicine Physicians practicing obstetrics, Certified Nurse Midwives, and Anesthesiologists
- Labor and Delivery RN Staff
- Labor and Delivery Unit/ L&D Operating Room Staff

GUIDELINE STEPS

1. **INDICATIONS**
   - 1.1 Labor pain
   - 1.2 Postpartum laceration repair
   - 1.3 Postpartum IUD placement
   - 1.4 Intracervical balloon catheter placement
   - 1.5 Manual removal of placenta (conscious sedation or regional anesthesia may be preferred.)

2. **EQUIPMENT**
   - 2.1 Self- contained portable nitrous oxide delivery unit (contains scavenging system for exhaled gas dicersion) stored in locked medication room when not in use
   - 2.2 Demand valve. To be stored in locked medication lock box in medication room and key stored in pyxis
   - 2.3 Disposable facemask and tubing
   - 2.4 Nitrous Oxide
     - 2.4.1 Nitrous Oxide is securely attached to delivery unit
     - 2.4.2 Par levels to be maintained by Respiratory. Tanks will be stored badge accessed closed between L&D and NICU.
   - 2.5 Oxygen source
   - 2.6 Vacuum system (set at 45 liters per minute)

3. **PRECAUTIONS/CONTRAINDICATIONS**
   - 3.1 Patient unable to hold her own face mask
   - 3.2 Patient overly sedated, intoxicated or neurologically impaired
   - 3.3 Women on oral Methadone or Buprenorphine for opioid dependence are candidates for Nitrous for labor analgesia as long as there is no concern for excess sedation based on vital signs and decreased level of consciousness
   - 3.4 Vitamin B12 deficiency (example: strict vegan, Crohns disease, bariatric surgery)
     - 3.4.1 In women with a B12 deficiency or B12 deficiency risk factors, consider lab confirmation of normal B12 levels prior to use of Nitrous.
   - 3.5 Hemodynamic instability/impaired oxygenation
     - 3.5.1 Only Anesthesiology at their discretion may consider use of Nitrous in this setting
     - 3.5.2 Oxygen saturation <93% on room air is an indication for an anesthesia consultation
   - 3.6 Category III fetal heart monitoring
   - 3.7 Recent history of head trauma within two weeks, increased intraocular pressure, pneumothorax, bowel obstruction, eye surgery, or middle ear surgery requires Anesthesiology consult.

4. **PROCEDURE**
   - 4.1 Patient Preparation
     - 4.1.1 Inform patient of possible side effects of Nitrous (nausea, vomiting, dizziness)

4.1.2 Inform patient regarding optimal methods of inhalation and exhalation to allow maternal control of strength of analgesia and to maximize successful scavenging of exhaled Nitrous.

4.1.3 Review with the patient and any labor support people present that ONLY the patient holds the mask. It will make a "hissing" noise when properly connected.

4.1.4 Inform the patient on self-administration: positioning of mask to ensure good seal, timing of inhalation to allow maximum analgesic effects during contraction.

4.1.4.1. Patient holds mask over mouth and nose, creating a sufficient seal to activate Nitrous and blend. Patient should start inhaling the gas 30 seconds before a contraction begins. The onset of action takes about 30 seconds; full analgesic effects occur in 50 seconds.

4.1.5 The patient must exhale fully into the mask to facilitate scavenging.

4.1.6 The patient may ambulate with assistance while using Nitrous

4.2 Assessment/Set up

4.2.1 Assess patient suitability and absence of contraindications

4.2.2 Document vital signs, O2 saturation, mental status, and fetal heart tones

4.2.3 Order set completed by provider

4.2.4 Nitrous delivery system set up by Registered Nurse

4.2.5 Inspect the Nitrous delivery system and all connections before starting administration (make sure mask, hoses, and clamps are in place before turning on the system).

4.3 Ongoing Patient Monitoring

4.3.1 If fetal or maternal wellbeing is compromised, discontinue Nitrous, notify the provider, and perform intrauterine resuscitation.

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4.3.3 Vital signs: follow routine L&D orders. Nitrous does not change the frequency of vitals.

4.3.4 Fetal Monitoring: Continuous or structured intermittent fetal monitoring is indicated in admission L&D orders. Nitrous for labor analgesia does not require continuous fetal monitoring unless required for another indication.

4.4 Documentation

4.4.1 Nurse documents patient education in CPN

4.4.2 Nurse initiates Nitrous order

4.4.3 Time administration initiated and time discontinued will be documented in CPN and in MAR

4.4.4 Side effects and patient response to Nitrous will be documented

4.4.5 Any noted changes in fetal heart rate and interventions implemented

4.5 Exposure

4.5.1 In the event of an unplanned exposure of Nitrous, refer to the SDS for first aid information, and MSDS Vault, which is available on L&D and on the UNMH Intranet.

4.5.2 A PSI should be used for any safety concerns

4.6 Equipment cleaning and disinfection

4.6.1 The equipment requires regular, between patient cleaning/disinfection with an Oxivir wipe. If the patient is on isolation precautions then Clorox Germicidal wipes will be used.

4.6.2 Once cleaned, the Nitrous blender and tanks will be covered with a clear plastic bag and taken to the med room.

DEFINITIONS

Nitrous Oxide: A colorless, odorless and tasteless gas made for inhalation. Nitrous oxide's rapid onset of action and quick clearance prevents accumulation in maternal or fetal tissues. When nitrous oxide is administered, without opioids or other central nervous system depressants, it is defined as minimal analgesia.

Minimal analgesia: A drug-induced state during which patents respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are not affected. This is NOT anesthesia. Adapted from CMS

SUMMARY OF CHANGES

Only formatting changes were made to the document dated 4/28/15. Revision made 1/15/19.

DOCUMENT APPROVAL & TRACKING

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