**Name: Nitrous Oxide in the Intrapartum/Immediate Post-partum Period**

**PURPOSE:**

To provide patient administered inhalation nitrous oxide as an analgesia option for women in labor, as well as for therapeutic use in the immediate post-partum period.

**POLICY STATEMENT:**

Nitrous oxide has been found to be an effective analgesic by relieving pain, decreasing anxiety, inducing euphoria and/or reducing the awareness of the pain. Nitrous oxide inhalation (in a 50-50 blend of nitrous oxide and oxygen) is a form of labor analgesia that provides a reasonable alternative to narcotic analgesia or epidural anesthesia, or may be used as a first line of analgesia prior to receiving an epidural. Many characteristics of the 50-50 blend of nitrous oxide with oxygen make it well suited for laboring women (easily administered, awake and alert with complete motor and sensory function, does not inhibit maternal laryngeal reflex).

**RESPONSIBLE PERSONS:** Obstetric physicians, Certified Nurse-Midwives, and RN staff

**EQUIPMENT**:

1. Nitrous oxide delivery system-set up and administered by manufacturer’s guideline (50/50 concentration with oxygen). Nitrous administration equipment and tank will be stored in a locked room/cabinet when not in use.
2. Nitrous oxide
3. Oxygen source
4. Disposable face mask and tubing

**INDICATIONS:**

1. Women in labor.
2. Women undergoing perineal repair where local anesthesia may not meet the patient’s analgesic needs.
3. Women who require immediate postpartum procedures requiring analgesia such as: manual removal of the placenta, uterine exploration, dilation and curettage of the uterine cavity, extensive perineal repair.
4. Women who are very anxious with IV initiation or epidural placement.
5. Women who have a fetal heart rate tracing deemed acceptable by the obstetric provider.

**PRECAUTIONS/CONTRAINDICATONS:**

1. Women who cannot physically hold their own mask.
2. Women who have impairment of consciousness or who are intoxicated with either drugs or alcohol.
3. Women who have received intravenous opioids within the last 1 hours or intramuscular (IM) within the last 4 hours.
4. Women with known vitamin B12 deficiency (pernicious anemia, atrophic gastritis, history of gastric bypass or similar surgery, Crohn’s disease, celiac disease, grave’s disease, lupus erythematosus, or history of alcohol abuse).
   1. If a woman’s B12 level is adequate from replacement therapy, nitrous oxide is acceptable.
5. Women with impaired oxygenation defined as oxygen saturation consistently less than 95% on room air.
6. Women who are hemodynamically unstable defined as a systolic blood pressure consistently less than 90.

**PROCEDURE:**

1. **Pre-treatment evaluation**:
   1. Assessment of patient (history and physical of mother and fetus) to determine if nitrous oxide is appropriate choice of analgesia and if contraindications are present. This includes maternal vital signs with oxygen saturation along with fetal heart rate (FHR) evaluation by the physician.
2. **Patient agreement**: Patient will review and sign patient agreement form prior to initiating administration. (see Appendix A)
3. **Set-up**: RN will ensure equipment is properly connected and operating
4. **Patient Preparation** 
   1. The patient is to be educated on the possible side effects of nitrous oxide: nausea, vomiting, dizziness, fatigue.
   2. The patient will not ambulate without assistance once nitrous oxide has been initiated.
   3. Instruct the patient on self-administration: placement of mask to create seal; timing of breathing for maximum analgesic effect; only the patient is allowed to hold the mask.
5. **Administration**:
   1. Patient holds mask over nose and mouth creating a sufficient seal to activate a second- stage regulator to open flow of nitrous oxide at 50% in nitrous concentration and 50% oxygen.
   2. Patient is to be monitored/assessed at the bedside for the first 15 minutes of administration by the primary nurse caring for the patient, then routine monitoring/assessment is implemented.
      1. The attending physician or midwife will be readily available during the time nitrous oxide is being administered.
      2. The primary nurse will notify the attending physician or midwife of any adverse effects or changes in the FHR.
   3. With initiation of nitrous oxide orders and administration, additional opioids are to be ordered and given only under the direct supervision of an anesthesiologist.
   4. Patients may receive a dose of IV narcotics 15 minutes after discontinuation of nitrous oxide.
6. **Termination of Treatment**: Use of nitrous oxide is discontinued when the patient desires or when the need for analgesia is no longer present.
7. **Exposure**:
   1. Equipment will function with an appropriate scavenging system per manufacturer’s and hospital guidelines.
   2. Annually, dosimeters will be worn by 1 nurses assisting patients administering nitrous oxide and 1 nurse not assisting patients administering nitrous oxide for 2 12-hour shifts.

**DOCUMENTATION**

In the Electronic Health Record document:

1. Informed consent obtained from patient.
2. Documentation Flow Sheet-date, time, and concentration of nitrous oxide given. Time administration initiated and time when discontinued.
3. Any side effects experienced and patient’s response to nitrous oxide.
4. Any noted changes in fetal heart rate and interventions implemented.
5. Patient/family teaching on patient education record.

**REFERENCES:**

Bishop, JT.(2007). Administration of nitrous oxide in labor: Expanding the options for women. Journal of Midwifery & Women’s Health, 53(3): 308-309.

Likis FR, Andrews, JC, Collins MR, Lewis RM, Seroogy JJ, Starr SA, McPheeters ML. (2014). Nitrous oxide for the management of labor pain: A systematic review. Society of Obstetric Anesthesia and Perinatology, 118: 153-167

Stewart, LS, Collins, M. (2012). Nitrous oxide as labor analgesia. Nursing for Women’s Health, 16(5):398-409.

Rooks, J.P. (2011) Safety and Risks of Nitrous Oxide Labor Analgesia: A Review. Journal of Midwifery & Women’s Health, 56(6):557-565

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Rooks, J. CNM, MPH, MS. Collins, M. Phd, CNM, No Laughing Matter; Nitrous oxide is making its way into births in the US. Power Point Presentation. AWHONN National Convention, Nashville TN. June, 2013.

Appendix A: Patient Agreement

**Patient Agreement for the**

**Administration of Nitrous Oxide during Labor**

I understand the risks and benefits of breathing nitrous oxide for labor and I wish to use this form of patient controlled analgesia (pain management) at this time. I understand that this form of pain management may not remove all sensation of discomfort.

I understand that some of the potential side effects of nitrous oxide include: dizziness, nausea, light-headedness, unsteadiness, dysphoria (feeling bad). If I wish to stop using nitrous oxide at any time during labor, I may voluntarily discontinue use immediately. I will then inform my nursing care provider of this decision and may select another form of pain management, if desired.

I understand that using nitrous oxide may make me feel unsteady for brief periods of time. If I need or want to get out of bed while using nitrous oxide, I will do so only with assistance from a support person or nursing staff.

I understand that nitrous oxide may cause dizziness and that if I am using the labor tub I will do so only with assistance.

I agree to hold the mask on my own and will not allow others hold the mask to my face or utilize any other form of external support (pillows, straps, etc) to maintain the mask to my face.

I will not allow anyone other than me to use the mask and understand that anyone observed attempting to or utilizing the mask will be asked to leave the room. Nitrous oxide will no longer be available for my use.

I understand there could be theoretical risks to nitrous oxide, as well as most other pain-relieving medications, used during pregnancy. Some animal studies have shown effects on animal babies and it is not known, if in the future, there may be proven some negative effect on humans. I understand that nitrous oxide has been used throughout the world for labor pain control for many decades and is considered safe.

I understand and agree to the above and wish to use nitrous oxide for my labor pain at this time.

Patient Date/Time

Witness Date/Time