

**Carolinas Healthcare System  
Children's Emergency Department  
Pediatric Policy & Clinical Practice Guidelines**

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**CARE OF THE INFANT/CHILD RECEIVING NITROUS OXIDE**

Written: 7/08

**I. POLICY**

Nitrous oxide will be administered according to physician order.  
Patients will be monitored at all times with continuous pulse oximetry.

Nitrous oxide use will be considered moderate sedation and fall under the moderate sedation guidelines for monitoring. ETCO<sub>2</sub> monitoring is encouraged.

Nitrous oxide should not be used as a sedation agent in conjunction with other titrated narcotics or sedatives as part of a sedation sequence.

An RN will remain with the patient the entire time Nitrous Oxide is administered and until its effects have cleared (generally 3-5 minutes after brief use).

Known pregnant individuals (including staff) will not administer Nitrous Oxide due to the very unlikely but theoretic risk associated with its use should the scavenger function fail.

**II. SUMMARY**

Nitrous oxide will be available for pain control, anxiolysis, or mild sedation during procedures in the Children's Emergency Department. It has been shown to be 95% effective and very safe when used appropriately in pediatric patients.

**III. NOTE**

Nitrous oxide (N<sub>2</sub>O) is used as a mixture of nitrous oxide gas and oxygen and is administered via face mask. When inhaled, this is absorbed by the body and has a calming and analgesic effect. Normal respiration eliminates nitrous oxide from the body. Nitrous oxide in varying concentrations with oxygen has been successfully used for many years to provide analgesia/anxiolysis and mild sedation for a variety of painful procedures in children.

**IV. PERFORMED BY**

RN, MD

**V. EQUIPMENT**

Nasal Mask appropriate for the child's size

**VI. Nitrous Oxide unit**

Airway equipment  
Cardiorespiratory monitor, pulse oximetry

## **VII. EDUCATION**

Explain procedure to patient/family in developmentally appropriate manner and obtain consent.

## **VIII. Contraindications:**

- Patients who can not self administer
- Any patient with airway compromise
- Any patient in whom an adequate mask seal can not be maintained.
- Any patient with COPD, chest trauma, or CHF
- Any patient requiring careful monitoring of mental status (i.e. head trauma, ETOH, or drug intoxication/psych problems)
- Patients with suspected or actual pneumothorax or bowel obstruction
- Any patient that is pregnant
- Any patient with shock or severe illness of undetermined etiology

## **IX. INTERVENTION**

- Assemble and check equipment.
- Place patient on cardiac monitor and continuous pulse oximeter.
- Explain procedure to patient and then have patient hold the mask firmly on the face during inspiration/expiration.
- Instruct the patient to breathe normally and encourage them to relax.
- Discontinue use if the patient becomes nauseous.
- Once the procedure is completed, turn off the nitrous and allow the patient to breathe oxygen alone for a few minutes to clear the nitrous from his/her system.

## **X. DOCUMENTATION**

- Document patient's vital signs before, during, and after procedure.
- Document delivered concentration of oxygen and nitrous during procedure and length of time on nitrous oxide.
- Document education on Education Teaching Record.
- Place consent in the patients chart.

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## **REFERENCES**

The New England Journal of Medicine. (2000) Volume 342:938-945. Sedation and Analgesia for Procedures in Children.

The University of Chicago Children's Hospital. (2007) 1-7. Pediatric Emergency Department Clinical Guideline: Nitrous Oxide

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## Nitrous Oxide Guide

**Contraindications:** closed spaces like pneumothoraces, bowel obstructions; patients dependent on oxygen; pregnancy (including pregnant providers/parents in the room); airway compromise; inadequate mask seal; decompression sickness; altered mental status

**Indications/Great For:** laceration repairs, lumbar punctures, abscesses, fractures with appropriate block, IV placement, and more

**Adverse Effects (rare):** nausea/vomiting, anxiety

**Onset:** 2-3 minutes. **Duration:** 3-5 minutes.

Consent form at: Sharepoint -> CMC Emergency Department -> CMC Children's ED -> CED Forms -> Sedation -> Nitrous Consent Form

## Tips & Troubleshooting

- If you get a loud noise when you open the gas tanks, double check if the tanks are appropriately hooked up to the machine.
- Get the patient involved early; they can even help select a flavor for the mask (bubble gum – yum!)
- Nurses will generally help you set up the nitrous machine and assemble the mask with the coupler, but if you're trying to expedite things, see below for some hints on mask assembly.
- Titrate slowly. If you overshoot, the patient may get anxious/agitated. Flush with oxygen for a few minutes, then start again with a lower concentration of nitrous.
- Children will need about 4-5L/min flow; adults will need about 6-7L/min. Adjust as necessary to keep the bag inflated but not too much; it should deflate by about 1/3 with each breath.
- If the patient gets really nauseous, try to work through it (usually passes within a few minutes). Otherwise stop.
- Contraindicated in pregnancy because it's teratogenic, but can be used if the patient is in labor.



## Nitrous Oxide Setup

1. Familiarize patient with mask (child life can help).
2. Hook up machine to wall suction (no nitrous for providers). May need to remove default suction adapter first. Bring in portable suction.
3. Turn on suction until arrow is in green area.
4. Turn on oxygen and nitrous; check amount of gas in tank (see below).
5. Power on machine.

6. Adjust flow to inflate green reservoir bag to keep inflated (but not too much).
7. Slowly titrate oxygen down; nitrous will automatically start flowing in (indicated by blue light). Titrate to effect (usually 50 to 30% oxygen) and proceed with procedure.
8. When done, turn off nitrous and give 100% oxygen for
9. ~5 minutes.
10. SAVE the coupler on the mask (it's expensive, you don't want to pay for it)!!!



**4 - ON**  
Counterclockwise to