GUIDELINE	
Nitrous Oxide Sedation	
Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

This document should be read in conjunction with this DISCLAIMER
http://kidshealthwa.com/about/disclaimer/

Nitrous Oxide Sedation

Pre-Procedure

- Nitrous oxide is a gas used to provide both amnesia and analgesia during a painful procedure
- It has quick onset (1-2 mins) and rapid offset (5 mins) making it an ideal agent for use in short procedures in the Emergency Department
- The continuous flow circuit should only be considered for use in patients where the patient demand-driven system is unlikely to result in a successful procedure due to patient factors (e.g. immaturity) or due to the nature of the procedure required.

General

- **Demand or Trigger Nitrous Oxide:**
  - A **Trigger Flow System** via a mixer which delivers up to 75:25 nitrous oxide to oxygen (patients should not be given more than 70:30 at PMH ED. 50:50 is usually sufficient for most procedures).
  - This is administered via a face mask or a mouthpiece to children aged 2 and over
- **Continuous Nitrous Oxide:**
  - A portable system is able to deliver a continuous, adjustable percentage of nitrous oxide (up to 70:30) to the patient regardless of compliance or tidal volume.
  - The patient will receive ongoing flow as long as a good seal is in place with a mask
  - The continuous flow system should only be considered for patients who are not able to trigger the wall mounted patient driven system
  - Care must be taken in ensuring senior medical staff are available throughout the procedure due to the higher risk of side effects such as over sedation and vomiting

Indications

- Wound management – including cleaning, suturing, gluing, local anaesthetic injection and dressing
- Removal of foreign bodies
- IV insertion
- Reduction of fractures and/or dislocations
- Catheterisation
- Minor fracture manipulation

Contraindications

- Head injuries with LOC or altered conscious state
- Chest injuries or suspicion of pneumothorax
- Trapped gas scenarios (eg bowel obstruction, marked abdominal distension, decompression sickness, sinusitis, maxillo-facial injuries)
- Acute respiratory conditions (eg current asthma, pulmonary oedema, burns to airway, airway obstruction)
- Altered conscious state (eg drug intoxication/overdose)
- Cardiac disease

Preparation

Staff

- **Demand Administration:**
  - Minimum of 2 staff – either 2 doctors **or** 1 doctor plus 1 nurse
  - Nursing staff responsible for monitoring the patient must be airway competent
  - Nursing and medical staff must have completed the procedural sedation training module and have been orientated and deemed competent by senior staff prior to assisting with nitrous oxide sedation

- **Continuous Flow:**
  - Minimum of 2 staff – either 2 doctors **or** 1 doctor plus 1 nurse
  - Nursing staff responsible for monitoring the patient must have been orientated to Ketamine Sedation
  - The staff member responsible for monitoring the patient must meet the requirements listed above and their sole responsibility is administration of the nitrous oxide, observing the patient and documenting their response
  - The Duty ED Consultant needs to be aware that a procedure using continuous nitrous oxide will be undertaken

Note: Staff or family who are pregnant or may be pregnant should not be exposed to nitrous oxide. Pregnant parents or carers should also be advised of the risk.

Equipment

- High flow oxygen and suction must be checked and available prior to commencing the procedure
- The resuscitation trolley should be checked and present
- Trigger flow system via a mixer and mask/mouth piece circuit
- Continuous nitrous system with disposable circuit and appropriate size mask

Monitoring

- Fasting – Preferably 2 hours prior but may be shortened depending on urgency of procedure
- Conscious level, respiratory effort, colour, oxygen saturations monitored continuously, +/- cardiac monitor
- **For Continuous Nitrous Administration** – Document observations 5 minutely during procedure and for 10 minutes post procedure on the procedural sedation chart
- **For Demand Nitrous Administration** – Document observations 15 minutely during procedure and for 10 minutes post procedure on the procedural sedation chart
- N_2O indicated on sedation chart with **continuous flow clearly or demand documented as the proposed sedation**

Procedure

Positioning and technique

Demand Administration
Using a Mask or Mouth Piece ◦ Using the standard nitrous circuit with an appropriately sized mask or mouth piece, attach the inspiratory tube to the nitrous outlet on the front of the machine and the expiratory or scavenge side to the scavenger outlet ◦ Turn on nitrous device ◦ Turn the scavenger on at the wall ◦ Set nitrous to desired flow (commence at 50:50 – may increase to 70:30 if required) ◦ Nitrous oxide is delivered if audible “rattle” is heard
Continuous Administration
Using a mask ◦ Using the standard nitrous circuit with an appropriately sized mask, attach the inspiratory tube to the nitrous outlet on the front of the machine and the expiratory or scavenge side to the scavenger outlet on the right hand side of the machine ◦ Turn the scavenger on at the wall ◦ **Patients must use a mask with this circuit, not a mouth piece to ensure all gas is scavenged**
Commencing Continuous Procedure:

- Attach continuous pulse oximetry and record baseline observations
- Make note and document the child's weight, fasting status, allergies
- Document verbal or signed consent
- Dial up gas flow to desired level
- Allow the child to breathe on **100%** oxygen ensuring a good seal with either mask or nose piece
- The green bag should fill but not be overly distended and with each breath it should partially deflate
- If the bag is not filling, or is completely deflating with each breath, **consider increasing the oxygen flow rate, and/or decreasing the suction**. **Note:** Rise and fall of bag with each breath may be subtle as small children have small tidal volumes
- Slowly increase the flow of nitrous using the white dial on the left to a **maximum of 70%**
- The percentage of nitrous is displayed on the black dial attached to this and should be documented throughout the procedure
- The flow rate displayed in the flow meter is automatically adjusted dependent on oxygen flow and nitrous percent and does not need to be recorded
- Nitrous flow should be adjusted throughout the procedure to achieve the desired effect
- **If a good seal is not achieved with either the mask or nose piece, the child will not receive all the nitrous, nor will this be scavenged effectively**
- If over sedation occurs, push the white O2 flush button located on the right to purge the circuit
- Once the procedure is complete, allow the child to breathe 100% oxygen for 2-3 minutes
- Continue monitoring the child until 10 minutes post procedure

Parents present:
• Verbal consent should be obtained from the patients parent or carer and documented after a clear explanation of the procedure and the nitrous oxide including the patient and parents role

Important points:
• Nitrous oxide is odourless
• Child will not be fully asleep
• Explain possible adverse reactions, in particular risk of vomiting
• Pain should be less or absent
• Memory of the procedure is suppressed

Post-Procedure

Complications

- There is an **increased risk** of complications when using a concentration greater than 50:50
- **Following administration of greater than 50:50 nitrous oxide to oxygen, 100% oxygen is essential to prevent diffusion hypoxia**
- Drowsiness and over sedation
- Pallor with Nausea/vomiting (up to 10% with 70:30 nitrous oxide to oxygen)
- Excitement/ hallucinations/confusion
- Light headedness /headache
- Shortness of breath
- Tingling of fingers/toes
- Disorders of taste/smell

Aftercare

- Turn off any gas flow

- Discard the whole circuit if the mask/mouth piece has been used
- The patient may be discharged once child returned to pre-procedure mental status

More

Tags

amnesia, analgesia, bain, catheterisation, circuit, dressings, entonox, fb, foreign body, fracture, gas, irrigation, lacerations, n20, nitrous, nitrous oxide, nitrous oxide sedation, pain, painful, procedures, reduction, scavenger, sedation, suction, suture, sutures, suturing, tubing, wounds

References

• Continuing Education in Anaesthesia, Critical Care & Pain | Volume 5 Number 5 2005

This document can be made available in alternative formats on request for a person with a disability.

File Path:			
Document Owner:	Dr Meredith Borland HoD, PMH Emergency Department		
Reviewer / Team:	Kids Health WA Guidelines Team		
Date First Issued:	4 September, 2014	Version:	
Last Reviewed:	6 December, 2017	Review Date:	6 December, 2020
Approved by:	Dr Meredith Borland	Date:	6 December, 2017
Endorsed by:	Medical Advisory Committee	Date:	6 December, 2017
Standards Applicable:	NSQHS Standards: 		
Printed or personally saved electronic copies of this document are considered uncontrolled			