

Nitrous oxide



Kate Austin
CNC PPM
Procedural Sedation lead
Comfort Kids Program
2016

What is Nitrous oxide = N₂O ?



Gas

Colourless/ Tasteless/ Odourless
Blunts olfaction - dose dependent
Children report smell - lip smackers



Drug

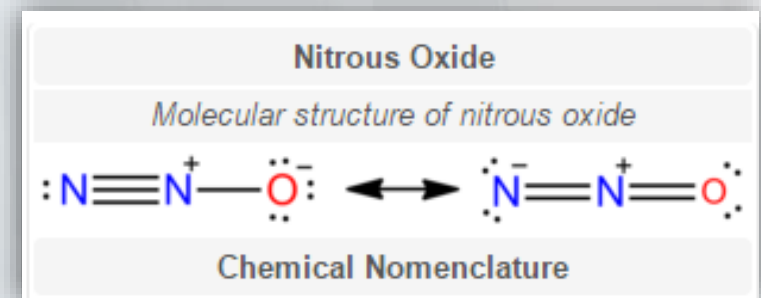
Mechanism of action not fully known

NMDA receptor antagonist

- Short acting anaesthetic agent
- Loss of feeling
- Difficulty moving
- Hallucinogenic
- Euphoria

Opioid agonist

GABAergic effects



Effects of N₂O = 4A's

Anaesthesia

Dissociative, euphoria, drowsiness

Offers ability to sedate in a awake state

Aim conscious sedation – **UMSS ??**

Anxiolytic*

Prepared prior

Reduce anxiety with non- pharm techniques

Analgesic*

Mild to moderately painful or distressing procedures

Amnesic

Mild to moderate

***Consider limitations**



How is N₂O delivered @ RCH ?



Porter MXR 0-70% N₂O

Free flowing open system - continuous

Gas formula route inhaled/ exhaled drug

Low solubility rapid onset & offset 2-5 min

Excreted unchanged scavenge



Delivery ...

Technical Skill, Safety & ART



What's your goal ?

Prep + 4A's

Monitor continuously

Tailor to Pt response

Where to begin ? - target dose

Pt Anxiety ++  greater rate

Pt may feel effect within **1 min**

Increase to 50% to max 70%

Titrate to effect - 10% increments

2-3 min to allow brain concentration to equilibrate !!

Initial higher concentrations are used

Reduced painful part of procedure is completed



How to deliver N₂O

Technical skill (Porter MXR)
Tailor to Pt response
Consider your approach
What's your goal? (Prep+4A's)

Monitor continuously

Where to begin?

Initial target analgesia

Pt may feel effect within 1 min

Increase to 50% to max 70%

Rate = Titrate to effect consider 10% increments

Pt Anxiety ++ Increase at **greater rate**

2-5 min to allow **brain concentration to equilibrate**



N₂O & Diffusion hypoxia ?

N₂O has a low blood: gas solubility coefficient

Rapid diffusion of N₂O out of blood

Pulmonary circulation into alveolar sacs

Occurs in larger volumes



N₂O dilutes the O₂ & CO₂ in the alveoli

Reducing alveolar O₂ tension may produce hypoxia

Reducing alveolar CO₂ may suppress ventilation & hypoxemia

May occur if N₂O intake is suddenly discontinued

End of inhaled sedation patient breathes atmospheric air

Mask off or interruption to flow

Avoiding diffusion hypoxia

100% N₂O can be rapidly lethal

Risk > with Respiratory depression

Perform equipment checks prior

Machine or system failure ?

Delivery units have 2 safety/ lock out mechanisms

Administer 100% O₂ “wash out” N₂O 3-5 min

Mask off >30 sec deliver 100 % O₂

Rescue use Face mask O₂/ B+M

Reservoir bag has mixed gases !



Effectiveness of N₂O



UMSS

Minimal CVS & Respiratory effects as a SINGLE drug

Combined **with opioid or other sedative** risk DEEP sedation

UMSS 3 Risk to Protective reflexes & Spontaneous Ventilation

10% poorly sedated

50-70% mild to moderate sedation

Potential to reach moderate to deep at 70% or + opioid/ sedative

Pain

Rapid but **short acting pain relief** (while drug inhaled)

Wean or Cease N₂O no longer provide **ANALGESIC effect**

Concurrent opioids = Risk assessment

80% experience excellent analgesic

10% some analgesia

10% not effective

Midazolam Pre ?

ANXIOLYSIS

Concurrent sedative = Risk Assessment

Midazolam in conjunction with nitrous oxide

Max 0.3mg/kg PO or not exceeding 10 mg

PO Onset 15 minutes, peaks at 30 min

Half life is 106 +/- 30min

Drug bitter taste, use sweet cordial/ syrup

Metabolised by Liver

Ordering N20 Order Set-IP Procedural Sedation

Chloral Hydrate Dosing 3-12 months (corrected age)

chloral hydrate 500 mg/5 mL solution (Standard dosing)
30 mg/kg, Once, 30 mg/kg initial, 20 mg/kg if required in 20-30 min. Give only if UMSS score < 2.

chloral hydrate 500 mg/5 mL solution (Moderate Dosing)
50 mg/kg, Once

Chloral Hydrate Dosing 1-18 years

Chloral Hydrate 1-18 years

Chloral Hydrate Dosing 3-36 months (OUTPATIENTS - Cardiology and Medical Imaging) [Current Document](#)
[Ctrl+Click to follow link](#)

Recommend < 4 months corrected age: attempt feed & wrap if appropriate for procedure

Chloral Hydrate 3-36 months (OUTPATIENTS - Cardiology and Medical Imaging)

Oral Midazolam

midazolam injection (>4 months pre-nitrous)
0.3 mg/kg, Oral, Once, Tastes bitter and acidic, administer with sweet solution.

midazolam injection (>4 months standard)
0.5 mg/kg, Oral, Once, Tastes bitter and acidic, administer with sweet solution.

Buccal Midazolam

midazolam injection
0.3-0.5 mg/kg, Buccal, Once, Tastes bitter and acidic, administer with sweet solution.

Intranasal Midazolam

midazolam 5 mg/mL solution - pre-nitrous
0.2 mg/kg, Nasal, Once

midazolam 5 mg/mL solution - standard
0.4 mg/kg

Intravenous Midazolam

If patient is >6 months and <12 months, give 1 mL bolus and repeat at intervals of no less than 5 minutes to achieve or maintain anxiolysis.
If patient is >12 months, give 1-2 mL bolus and repeat at intervals of no less than 3 minutes to achieve or maintain anxiolysis.

Intermittent midazolam with flumazenil (for patients <50 kg)

Intermittent midazolam with flumazenil (for patients >=50 kg)

Intranasal Fentanyl

Intranasal Fentanyl (7-10 kg)

Intranasal Fentanyl (> 10 kg)

Naloxone

Nitrous Oxide

nitrous oxide gas
Ward and ambulatory areas: maintain UMSS score <= 2 Critical care areas: maintain UMSS score <= 3

Sucrose

sucrose 33% oral solution
0.5-2 mL, for 3 doses, Give 2 min before procedure. Maximum of 5 mL per procedure.

Local Anaesthetics

lignocaine-prilocaine (EMLA) cream
When required, prior to procedure, Apply 45-60 min before procedure.

amethocaine 4 % gel
When required, prior to procedure, Apply 60-90 min before procedure.

-  Chart Review
- IP Summary
- Results Review
- Work List
-  Flowsheets
- VICTOR
- Fluid Balance
-  MAR
- Notes
- Patient Story
- Education
- Orders
- Chronic Pain P...
- ADT Navigators
- Sedation Docu...
- Pain / Procedu...
- Order Sets**

Order Sets

Order Sets

Search + Add 🔍 Advanced

▼ Favourites

IP Procedural Sedation 📄

Right click on an Order Set to add to favourites.

Orders

Order Sets

▼ IP Procedural Sedation

Please read CPG for guidance on dosing before prescribing.

[Procedural Pain Management CPG](#) | [Procedural Pain Management Policy](#) | [Resuscitation CPG](#) | [Medical Emergency Response Procedure](#) | [Communicating P pain management in infants CPG \(Nursing\)](#) | [Analgesia and Sedation CPG](#)

General, Nursing & Other

> Resus Status

▼ Nursing

- Observations
Continuous starting Today at 12:56 Until Specified
BP Cuff Restrictions: No Restrictions
- Weigh Patient
Routine - Once First occurrence Today at 12:56
- Nursing Communication (Prior to sedation)
Until discontinued starting Today at 12:56 Until Specified
Proceed to sedation narrator to verify risk assessment, exclusion criteria, fasting and consent.

Medications

- ▼ Chloral Hydrate Dosing 0-3 months (corrected age)
 - Chloral Hydrate Dosing 0-3 months (corrected age) Cardiology INPATIENTS only
 - chloral hydrate 500 mg/5 mL solution (Non-cardiology patients - seek consultation)
Once, Discuss with procedural sedation support services
- ▼ Chloral Hydrate Dosing 3-12 months (corrected age)
 - chloral hydrate 500 mg/5 mL solution (Standard dosing)
30 mg/kg, Once, 30 mg/kg initial. 20 mg/kg if required in 20-30 min. Give only if UMSS score < 2.
 - chloral hydrate 500 mg/5 mL solution (Moderate Dosing)
50 mg/kg, Once
- ▼ Chloral Hydrate Dosing 1-18 years
 - Chloral Hydrate 1-18 years

Summary **Orders** Close X

[Manage Orders](#) [Go to Order Sets](#)

Options ▼

Providers

Place new order + New

Per procedure: no cosign required 🔔 Next

Orders from Order Sets

- | | |
|--|--------|
| IP Procedural Sedation | Remove |
| Observations
Continuous starting Today at 12:56 Until Specified
BP Cuff Restrictions: No Restrictions | X |
| Weigh Patient
Routine - Once First occurrence Today at 12:56 | X |
| Nursing Communication (Prior to sedation)
Until discontinued starting Today at 12:56 Until Specified
Proceed to sedation narrator to verify risk assessment, exclusion criteria, fasting and consent. | X |

Remove All Save Work  Sign

Sedation Narrator Checklist for sedationist



Sedation Documentation

Refresh Data Validate

Expand All Collapse All

There are no active alerts

MAR (16)

Edit MAR Note

- Review Blood Orders
- Blood Admin

Transfuse Red Cells (Units): (0 of 2 released)

No currently active released units

Overdue at 16/6 13:00

- ranitidine tablet 75 mg
75 mg : Oral

Infusions

- Plasma-Lyte 148 and glucose 5 % infusion (contains potassium 5 mmol/L)
1,000 mL : Intravenous
Last Action at 16/6 08:30: Stopped
Admin Instructions
- sodium chloride 0.9% IV infusion 1,000 mL
1,000 mL : Intravenous
Last Action at 16/6 12:14: Rate/Dose Verify

PRN

- paracetamol 250 mg/5 mL suspension 600 mg
15 mg/kg : Oral
Last Action at 12/6 03:52: Given
Admin Instructions
- naloxone injection 40 mcg
1 mcg/kg : Intravenous
Admin Instructions
- naloxone injection 80 mcg
2 mcg/kg : Intravenous
Admin Instructions
- naloxone injection 400 mcg
10 mcg/kg : Intravenous
Admin Instructions
- ondansetron disintegrating tablet 4 mg
0.1 mg/kg : Oral
Last Action at 16/6 04:36: Given
Admin Instructions
- metoclopramide injection 8 mg
0.2 mg/kg : Intravenous
Last Action at 16/6 07:54: Given
Admin Instructions

Event Log Patient Summary Orders

The time filed for device data may appear out of chronological order. Please look to the 'Device Time' in the data to see the correct time.

QuickBar

Pulse File

Resp

SpO2

BP

Level of Sedation

0=Awake and alert 1=Minimally sedated 2=Moderately sedated
3=Deep sedation 4=Unroutable

Show Deleted

Time	Event	Details	User
	Sedation Documentation Start		
13:05:56		Date: 16/06/2016	
	Comments:	<input type="text"/>	

Accept Cancel

Expand All Collapse All

Sedation Events

- Sedation Documentation Start
- Sedation Documentation End

Pre-Sedation

- Pre-Sedation Checklist

Intra-Sedation

- Intra-Sedation Checklist
- Observations
- Primary Assessment
- Fluid Balance
- Neurological - Simple
- Pain Assessment
- Quick Update

Find an Event + Add

Post-Sedation

- Post-Sedation Checklist
- Procedural Sedation Summary

IVs

- Airways, Tubes & Drains
- Wounds
- Procedures
- Blood Administration
- General
- Mental Health
- ED Obs

Sedation Narrator views

Event Log- Patient summary-Orders



Sedation Documentation

Refresh Data Validate

Expand All Collapse All

There are no active alerts

MAR (21) MAR

No orders need to be acknowledged

Specimen Collection/Tasks (1)

No orders need to be resulted

Existing LDAs/Wounds (22)

Event Log Patient Summary **Orders**

Orders

Select/Release Sign and Held Orders Select Pended Orders New Order Clear All Orders Next

Routing Dx Association

Order mode: Per procedure: no cosign required Providers Sign Orders

Order Sets

IP Procedural Sedation

Please read CPG for guidance on dosing before prescribing.

Procedural Pain Management CPG | Procedural Pain Management Policy | Resuscitation CPG | Medical Emergency Response Procedure | Communicating Procedures to families CPG | Observation and Continuous Monitoring CPG (Nursing) | Sucrose (oral) for procedural pain management in infants CPG (Nursing) | Analgesia and Sedation CPG

General, Nursing & Other Close

> Resus Status

Nursing

- Observations
Continuous starting Today at 16:50 Until Specified
BP Cuff Restrictions: No Restrictions
- Weigh Patient
Routine - Once First occurrence Today at 16:50
- Nursing Communication (Prior to sedation)
Until discontinued starting Today at 16:50 Until Specified
Proceed to sedation narrator to verify risk assessment, exclusion criteria, fasting and consent.

Medications Close

- Chloral Hydrate Dosing 0-3 months (corrected age)
 - Chloral Hydrate Dosing 0-3 months (corrected age) Cardiology INPATIENTS only
 - chloral hydrate 500 mg/5 mL solution (Non-cardiology patients - seek consultation)
Once, Discuss with procedural sedation support services
- Chloral Hydrate Dosing 3-12 months (corrected age)
 - chloral hydrate 500 mg/5 mL solution (Standard dosing)
30 mg/kg, Once, 30 mg/kg initial, 20 mg/kg if required in 20-30 min. Give only if UMSS score < 2.
 - chloral hydrate 500 mg/5 mL solution (Moderate Dosing)
50 mg/kg, Once
- Chloral Hydrate Dosing 1-18 years
 - Chloral Hydrate 1-18 years
- Chloral Hydrate Dosing 3-36 months (OUTPATIENTS - Cardiology and Medical Imaging)
Recommend < 4 months corrected age: attempt feed & wrap if appropriate for procedure
 - Chloral Hydrate 3-36 months (OUTPATIENTS - Cardiology and Medical Imaging)
- Oral Midazolam
 - midazolam injection (>4 months pre-ritros)

Expand All Collapse All

Sedation Events

- Sedation Documentation Start
- Sedation Documentation End

Pre-Sedation

- Pre-Sedation Checklist

Intra-Sedation

- Intra-Sedation Checklist
- Observations
- Primary Assessment
- Fluid Balance
- Neurological - Simple
- Pain Assessment
- Quick Update

Find an Event Add

Post-Sedation

- Post-Sedation Checklist
- Procedural Sedation Summary

IVs

Airways, Tubes & Drains

Wounds

Procedures

Blood Administration

General

Mental Health

ED Obs

KATE A.
Future/Standing Orders

Sedation Documentation START Open & Accept



The screenshot displays the Sedation Documentation START software interface. On the left is a navigation sidebar with options like Chart Review, IP Summary, Results Review, Work List, Flowsheets, ViCTOR, Fluid Balance, MAR, Notes, Patient Story, Education, Orders, Chronic Pain P..., ADT Navigators, Sedation Docu..., and Pain / Procedu... The main area is titled 'Sedation Documentation' and includes a 'MAR (16)' section with a list of medications and their administration details. A yellow banner at the top of the main area reads: 'The time filed for device data may appear out of chronological order. Please look to the 'Device Time' in the data to see the correct time.' Below this is a 'QuickBar' with fields for Pulse, Resp, SpO2, BP, and Level of Sedation. The 'Level of Sedation' is currently set to '0=Awake and alert'. A 'Sedation Documentation Start' event form is open, showing the time '13:05:56' and date '16/06/2016'. The form has 'Accept' and 'Cancel' buttons. On the right side, there is a 'Sedation Events' sidebar with a list of events including 'Sedation Documentation Start', 'Pre-Sedation Checklist', 'Intra-Sedation Checklist', 'Observations', 'Primary Assessment', 'Fluid Balance', 'Neurological - Simple', 'Pain Assessment', 'Quick Update', 'Post-Sedation Checklist', 'Procedural Sedation Summary', 'IVs', 'Airways, Tubes & Drains', 'Wounds', 'Procedures', 'Blood Administration', 'General', 'Mental Health', and 'ED Obs'.

Sedation Narrator

Pre-sedation checklist



Sedation Documentation

Refresh Data Validate

Expand All Collapse All

Alerts (4)

- Active
- Pre-Sedation Checklist Incomplete 0h 00m
- Intra-Sedation Checklist Incomplete 0h 00m
- Post-Sedation Checklist Incomplete 0h 00m
- Procedural Sedation Summary Incomplete 0h 00m

MAR

Acknowledge Orders (2)

New Orders Acknowledge All

- Speech Pathology Inpatient Referral
- Dietetics Inpatient Referral

Specimen Collection/Tasks (1)

Complete Nerve Conduction / Electromyography

Nerve Conduction / Electromyography 15/06 17:46

No orders need to be resulted

Existing LDAs/Wounds (1)

Peripheral IV (Paed) 15/06/16 Left Antecubital

Event Log Patient Summary Orders

The time filed for device data may appear out of chronological order. Please look to the 'Device Time' in the data to see the correct time.

QuickBar

Pulse

Resp

SpO2

BP

Level of Sedation

0=Awake and alert 1=Minimally sedated 2=Moderately sedated

3=Deep sedation 4=Unrousable

Show: Deleted Status Changes

Pre-Sedation Checklist

Time taken: 12:53:44 16/06/2016 Show: Row Info Last Filed All Choices

Values By Create Note

Sedation Exclusion Criteria

Deteriorating Child (Physiological Limits Outside MET Criteria as per VICTOR) Yes No

Mandatory emergency call indicated or clinical review not completed for rapid review.

Nitrous Oxide

Age Less Than 2 Years of Age Yes N/A

Risk of airway obstruction.

Severe Pulmonary Hypertension Associated with Limited Exercise Tolerance Yes N/A

Risk of Hypoxia.

Gas Filled Space Yes N/A

Risk of expansion of gas filled space.

e.g. Pneumothorax, lung cyst, obstructive pulmonary disease, bowel obstruction, recent craniotomy with pneumocephalus resulting in trapped gas, significant middle ear disease or surgery resulting in trapped gas and decompression sickness.

Respiratory Illness or Infection Yes No

Risk of airway obstruction.

e.g. Pneumonia or respiratory tract infection with excessive secretions and poor

Expand All Collapse All

Sedation Events

- Sedation Documentation Start
- Sedation Documentation End

Pre-Sedation

- Pre-Sedation Checklist

Intra-Sedation

- Intra-Sedation Checklist
- Observations
- Primary Assessment
- Fluid Balance
- Neurological - Simple
- Pain Assessment
- Quick Update

Post-Sedation

- Post-Sedation Checklist
- Procedural Sedation Summary

IVs

Airways, Tubes & Drains

Wounds

Procedures

Blood Administration

General

Mental Health

ED Obs

Sedation Narrator

Pre-sedation checklist



Procedural assessment

Exclusion criteria

Risk assessment

Consultation

Consent

Fasting

Staffing

Equipment

Preparation of Child

Melbourne
Children's

Excellence in
clinical care,
research and
education



Murdoch
Children's
Research
Institute



Exclusion criteria – N20



Age <2 @ RCH

N20 will diffuse into the gas filled spaces, leading to increased volume and pressure within that space, which may cause the underlying condition to exacerbate

Pneumothorax

Lung cyst

Obstructive pulmonary disease - asthma

Bowel obstruction

Middle ear disease or surgery

Decompression sickness

Pneumocephalus

Severe Pulmonary HT - Increases Pulmonary Vascular Pressure

Poor Respiratory reserve, illness or infection Pneumonia/ Cold-URTI-

Flu – secretions++ /asthma – medical assessment,

Airway OSA/ Underlying airway problem

Child focused Prep & Planning

Preparation

Set the scene for success
EPT Medical play/ education
Props/ Choice/ Control/ Roles

Not for every child

Assess & use early
N20 is not a rescue
Mask compliance

Memory reframing

Amnesic
Forget part or all
Build on confidence/ coping

Procedural Support Plan ?



Procedural Support Plan



Chart Review

IP Summary

Results Review

Work List

Flowsheets

VICTOR

Fluid Balance

MAR

Notes

Patient Story

Education

Orders

Chronic Pain P...

ADT Navigators

Sedation Docu...

Pain / Procedu...

Customise

More

PAIN / PROCEDURAL SUPPORT PLAN

Created

General

Procedures

Deactivation

Report

BestPractice

Pain / Procedural Support Plan - Created/Updated

No data filed

Pain / Procedural Support Plan - General

No data filed

Pain / Procedural Support Plan - Specific Procedure

Pain / Procedural Support Plan - Injection/Cannula/Isulf...

No data filed

Pain / Procedural Support Plan - Blood Tests

No data filed

Pain / Procedural Support Plan - Nasogastric Insertion

No data filed

Pain / Procedural Support Plan - Dressing Change

No data filed

Pain / Procedural Support Plan - Port Access

No data filed

Pain / Procedural Support Plan - GA Induction

No data filed

Pain / Procedural Support Plan - Diagnostic Imaging

No data filed

Pain / Procedural Support Plan - Other Procedure

No data filed

Pain / Procedural Support Plan - Deactivated

No data filed

Pain / Procedural Support Plan Report

The Royal Children's Hospital Melbourne

Procedural Support Check list

Procedure Type	<input type="checkbox"/> Intramuscular injection <input type="checkbox"/> Subcutaneous injection <input type="checkbox"/> Venipuncture <input type="checkbox"/> IV cannula insertion <input type="checkbox"/> Finger prick <input type="checkbox"/> Heel prick <input type="checkbox"/> Port access <input type="checkbox"/> Dressing change <input type="checkbox"/> NG Tube insertion <input type="checkbox"/> NG dressing change <input type="checkbox"/> GA Induction <input type="checkbox"/> Diagnostic Imaging _____ <input type="checkbox"/> Other _____
Developmental Considerations	<input type="checkbox"/> Developmental delay _____ <input type="checkbox"/> Special needs _____ <input type="checkbox"/> Sensory needs _____ If yes to any developmental considerations, consider consultation with Educational Play Therapy or Comfort Kids CNC
Communication	Who is to communicate the procedure: <input type="checkbox"/> Have my parent tell me I need a procedure <input type="checkbox"/> I don't mind who tells me I need a procedure How the procedure should be explained <input type="checkbox"/> Show me the procedure on a teddy/doll <input type="checkbox"/> Use pictures to show me the procedure <input type="checkbox"/> Visual schedule <input type="checkbox"/> Other _____ What procedural information is required: <input type="checkbox"/> Tell me close to the procedure time <input type="checkbox"/> Tell me in advance <input type="checkbox"/> Provide me with minimal procedural detail <input type="checkbox"/> Provide me with detailed information about the procedure <input type="checkbox"/> Outline the steps of the procedure as it's happening <input type="checkbox"/> During the procedure ensure there is minimal procedural talk <input type="checkbox"/> Do not explain the procedure to me at all
Environment & Preparation	<input type="checkbox"/> Set up the equipment before I enter the room <input type="checkbox"/> Use treatment room <input type="checkbox"/> One person talking at a time <input type="checkbox"/> Dim lights if possible <input type="checkbox"/> Caregiver present <input type="checkbox"/> Caregiver not required <input type="checkbox"/> Mask preparation required (specify) <input type="checkbox"/> Other (specify)
Pain Management	Topical anaesthesia

Sedation Narrator Intra & Post-Sedation Checklists



Refresh Data Validate
Expand All Collapse All

Alerts (3)

Active

- Intra-Sedation Checklist Incomplete 0h 07m
+ Intra-Sedation Checklist
- Post-Sedation Checklist Incomplete 0h 07m
+ Post-Sedation Checklist
- Procedural Sedation Summary Incomplete 0h 07m
+ Procedural Sedation Summary

Event Log Patient Summary Orders

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QuickBar

Pulse

Resp

SpO2

BP

Level of Sedation
 0=Awake and alert 1=Minimally sedated 2=Moderately sedated
 3=Deep sedation 4=Unrousable

Show: Deleted Status Changes Orders Flowsheets/Assessments

Time	Event	Details	User
12:56	Pre-Sedation Checklist	Sedation Exclusion Criteria - Deteriorating Child (Physiological Limits Outside MET Criteria as per VICTOR): No Nitrous Oxide - Age Less Than 2 Years of Age: N/A Severe Pulmonary Hypertension Associated with Limited Exercise Tolerance: N/A Gas Filled Space: N/A Respiratory Illness or Infection: No (?myasthenia gravis) Sedation Risk Assessment - Patients Already Receiving Concurrent Opioids or Sedative Agents?: N/A Prior Adverse Event and/or Allergic Reaction to a Sedation Agent: N/A Acute Illness - Respiratory: N/A Acute Illness - Surgery: N/A Pregnancy: N/A Significant Cardiovascular Disease: N/A Significant Respiratory Disease: N/A Significant Renal Disease: N/A Acute Systemic Infection: N/A Abnormal Conscious State / Risk of Raised ICP: N/A Significant Risk of Delayed Gastric Emptying or Vomiting or Secretion: N/A NITROUS ONLY: Patient with Sickle Cell Disease / Immunosuppression: N/A Pre-Sedation Checklist - Patient ID: Yes Falls Assessment Completed: Yes Fasted from (Date): 16/06/16 Fasted from (Hours): 12:30 Adequate Staffing Available: Accredited Risk Assessment Completed: Yes Informed Consent Obtained for the Sedation Agent Including Indications and Side Effects: Yes Inform Staff, Parents and Carer of the Possible Risk of Nitrous Oxide in Pregnancy: N/A Pain Relief Administered: N/A Topical / Local Anaesthetic Administered: N/A Non-Pharmacological Options Discussed with Family: Yes Current General Health: Healthy Emergency Equipment Checked and Functional: Yes Nitrous Oxide Unit Checked: Yes	KD
12:55	Pre-Sedation Checklist	Sedation Exclusion Criteria - Deteriorating Child (Physiological Limits Outside MET Criteria as per VICTOR): No Nitrous Oxide - Age Less Than 2 Years of Age: N/A Severe Pulmonary Hypertension Associated with Limited Exercise Tolerance: N/A Gas Filled Space: N/A Respiratory Illness or Infection: No (?myasthenia gravis)	KD
12:55	Sedation Documentation Start		KD

Expand All Collapse All

Sedation Events

- + Sedation Documentation Start
- + Sedation Documentation End

Pre-Sedation

- + Pre-Sedation Checklist

Intra-Sedation

- + Intra-Sedation Checklist
- + Observations
- + Primary Assessment
- + Fluid Balance
- + Neurological - Simple
- + Pain Assessment
- + Quick Update

Post-Sedation

- + Post-Sedation Checklist
- + Procedural Sedation Summary

IVs

- Airways, Tubes & Drains
- Wounds
- Procedures
- Blood Administration
- General
- Mental Health
- ED Obs

MAR

No orders need to be acknowledged

Specimen Collection/Tasks (2)

- Complete Nerve Conduction / Electromyography
Nerve Conduction / Electromyography 15/06 17:46
- Collect Venous Blood Gas and print requisition
Venous Blood Gas 16/06 12:55

No orders need to be resulted

Existing LDAs/Wounds (1)

- Peripheral IV (Paed) 15/06/16 Left Antecubital

Customise More

Safety



Ready to Rescue

Continuous monitoring & observation

Airway skills maintain patency

Bag & Mask ability to ventilate

Know your Emergency equipment !

OHS

Brief & periodic exposure to nitrous oxide is safe

There is no conclusive evidence for reproductive, genetic, haematological or neurological toxicity from nitrous oxide exposure.

While bone marrow suppression, liver, CNS, and testicular dysfunction, decreased fertility and increased spontaneous foetal loss, and peripheral neuropathy may occur with repeated and chronic exposure, no adverse effects have been found when scavenging is used

Scavenging system & mask seal !

Melbourne
Children's
Excellence in
clinical care,
research and
education



Murdoch
Childrens
Research
Institute



Safety



Pregnancy - avoid

low risk 1st trimester
extremely low 2nd and 3rd trimester

Repeated & chronic exposure may inactivate B12

3 times a week

B12 and folate metabolism – levels checked & supplement

Patients who are at greater risk include those with:

Pre-existing B12 deficiency

Folate deficiency

Immunosuppression

Methylene tetrahydrofolate reductase (MTHFR) deficiency

Concurrent underlying critical/serious illness (severe sepsis or extensive tissue damage)

Patient experience of N₂O

Light headedness

Floating

Euphoria

Analgesic effect

Telescoping of time

Feeling of warmth over body

Tingling sensations in the peripheries

Altered auditory +/- olfactory experience



Prepare patient experience of N₂O



Children are naive to sedation/ euphoria may be frightened

Check in & **maintain verbal contact** (UMSS 1<2)

Established roles EPT-Child-Sedationist-Proceduralist

Engage patient in coping strategies

Calm/ One Voice

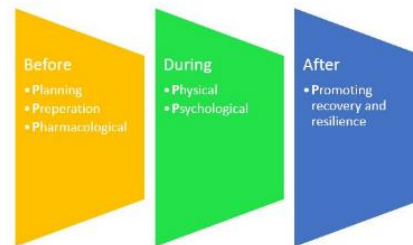
Procedural pain assessment and management

Introduction to the key principles of procedural pain management

There are 6 essential elements of procedural pain management that have been demonstrated to reduce pain and distress associated with medical procedures:

1. Planning
2. Preparation
3. Pharmacological
4. Physical
5. Psychological
6. Promoting recovery and resilience

Optimal procedural pain management maintains the comfort of the child during the 3 distinct phases of a medical procedure: (1) before, (2) during and (3) after the medical procedure. The essential elements can be applied to the continuum of the medical procedure with each stage requiring differing priorities to ensure the ongoing comfort of the child. Adherence to these key principles at each stage of the medical procedure will enhance the success of a procedural pain management plan.



For more information on each phase of procedural pain management, please click the hyperlinks.

http://webedit.rch.org.au/rchcpg/hospital_clinical_guideline_index/Procedural_Pain_Management/

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Patient response

Glassy eyes

Pupils dilate

Body relaxing

Flushing of face

Peripheral vasodilation

Line of sight

Continuous monitoring

Titrate N2O

UMSS 2 !

Document RR HR SAO2 UMSS



Excess sedation

Distant sounds become more acute

Visual disturbances - Nightmares or Room spinning

Lacrimation (eyes water) or crying

Laughing excessively

Nausea & Vomiting

Dizziness

Sweating

Drooling

RR & HR

Stop procedure

Titrate N2O down

Assess



Vomiting



Vomiting occurs in 6- 10% receiving 50%

Increase up to 25-27% with **opioid**

Prophylaxis ? Evidence unclear (FON study)

Timing & Titration = Longer/ Higher = N&V

Procedural assessment < 45min & no delays

Intra-sedation/ procedure

Stop procedure

Deliver O2

Assess

Titrate v ON/OFF approach

Risk over sedation UMSS >2



Continuum of Sedation

Anxiolysis to Conscious sedation **UMSS 1<2**

UMSS 3 or **Deep Sedation** is outside RN scope of practice

Respiratory Depression

Loss of Consciousness

Loss of Airway Patency +/- Aspiration

Stop ! Deliver O2

Rapid Recovery/ Rest, Reassess & Seek consultation

If in doubt or Patient meets MET criteria **call MET**

BLS - Secure airway & Ventilate with Bag + Mask 100% O2

Summary of Sedation & Sedation Documentation End



Sedation Documentation

Refresh Data Validate

Expand All Collapse All

Alerts (3)

- Active
- Intra-Sedation Checklist Incomplete 0h 07m
- Post-Sedation Checklist Incomplete 0h 07m
- Procedural Sedation Summary Incomplete 0h 07m

MAR

No orders need to be acknowledged

Specimen Collection/Tasks (2)

- Complete Nerve Conduction / Electromyography 15/06 17:46
- Collect Venous Blood Gas and print requisition 16/06 12:55

No orders need to be resulted

Existing LDAs/Wounds (1)

- Peripherial IV (Paed) 15/06/16 Left Antecubital

Event Log Patient Summary Orders

The time filed for device data may appear out of chronological order. Please look to the 'Device Time' in the data to see the correct time.

QuickBar

Pulse [] [] [] [] File

Resp [] [] [] []

SpO2 [] [] [] []

BP [] [] [] []

Level of Sedation

0=Awake and alert 1=Minimally sedated 2=Moderately sedated

3=Deep sedation 4=Unrousable

Show: Deleted Status Changes Orders Flow sheets/Assessments

Time	Event	Details	User
12:56	Pre-Sedation Checklist	Sedation Exclusion Criteria - Deteriorating Child (Physiological Limits Outside MET Criteria as per VICTOR): No Nitrous Oxide - Age Less Than 2 Years of Age; N/A Severe Pulmonary Hypertension Associated with Limited Exercise Tolerance; N/A Gas Filled Space; N/A Respiratory Illness or Infection; No (?myasthenia gravis) Sedation Risk Assessment - Patients Already Receiving Concurrent Opioids or Sedative Agents?: N/A Prior Adverse Event and/or Allergic Reaction to a Sedation Agent; N/A Acute Illness - Respiratory; N/A Acute Illness - Surgery; N/A Pregnancy; N/A Significant Cardiovascular Disease; N/A Significant Respiratory Disease; N/A Significant Renal Disease; N/A Acute Systemic Infection; N/A Abnormal Conscious State / Risk of Raised ICP; N/A Significant Risk of Delayed Gastric Emptying or Vomiting or Secretion; N/A NITROUS ONLY; Patient with Sickle Cell Disease / Immunosuppression; N/A Pre-Sedation Checklist - Patient ID: Yes Falls Assessment Completed; Yes Fasted from (Date): 16/06/16 Fasted from (Hours): 12:30 Adequate Staffing Available; Accredited Risk Assessment Completed; Yes Informed Consent Obtained from the Sedation Agent Including Indications and Side Effects; Yes Inform Staff, Parents and Carer of the Possible Risk of Nitrous Oxide in Pregnancy; N/A Pain Relief Administered; N/A Topical / Local Anaesthetic Administered; N/A Non-Pharmacological Options Discussed with Family; Yes Current General Health: Healthy Emergency Equipment Checked and Functional; Yes Nitrous Oxide Unit Checked; Yes	KD
12:55	Pre-Sedation Checklist	Sedation Exclusion Criteria - Deteriorating Child (Physiological Limits Outside MET Criteria as per VICTOR): No Nitrous Oxide - Age Less Than 2 Years of Age; N/A Severe Pulmonary Hypertension Associated with Limited Exercise Tolerance; N/A Gas Filled Space; N/A Respiratory Illness or Infection; No (?myasthenia gravis)	KD
12:55	Sedation Documentation Start		KD

Sedation Events

- Sedation Documentation Start
- Sedation Documentation End

Pre-Sedation

- Pre-Sedation Checklist

Intra-Sedation

- Intra-Sedation Checklist
- Observations
- Primary Assessment
- Fluid Balance
- Neurological - Simple
- Pain Assessment
- Quick Update

Post-Sedation

- Post-Sedation Checklist
- Procedural Sedation Summary

IVs

- Airways, Tubes & Drains
- Wounds
- Procedures
- Blood Administration
- General
- Mental Health
- ED Obs

Sedation event in IP Summary

Sedation Timeline



IP Summary

Time Range:

Report: Sedation Timeline

Sedation Timeline

Sedation Sign-off: Today 15:06 to 16:03

Time	Event		User
16:03:14	Sedation Documentation End	Intranasal Fentanyl not required Burns dressing+bath successful with EPT support IPAD oxycodone 3.6mg and clonidine 20mcg + top up 15mcg (delay start due to not fasted for procedural sedation)	Kate Austin, Registered Nurse
16:03:13	Sedation Quickbar	Sedation Quickbar - Level of Sedation: (sitting out of bed watching TV)	Kate Austin, Registered Nurse
16:02:54	Sedation Quickbar	Sedation Quickbar - Level of Sedation: Awake and alert	Kate Austin, Registered Nurse
15:57:16	Summary of Procedural Sedation	Procedural Sedation Summary - Procedure: Wound management ; Procedure Attempts: 1 ; Procedure Outcome: Successful ; Consultation for this Event: Comfort Kids Program (p7933); CPMS (p5773) ; Comfort Kids Program Advice: in fentanyl available use procedural sedation order set ; CPMS Advice: clonidine dose range increase ; Analgesic: Yes ; Adjuncts: No ; Side Effects / Adverse Events: No ; Non Pharmacological Techniques Used: Yes Pharmacological Summary - Deepest Level of Sedation: 1 ; Anxiolytic Response to Sedation Agent: Calm, cooperative ; Analgesic (Oral): Oxycodone; Clonidine ; Oxycodone (mg): 3.6 ; Clonidine Oral (mcg): 35 ; Analgesic Response: Excellent Non Pharmacological Techniques Used? - Preparation: Educational Play Therapist present ; Coping Techniques Used: Distraction / alternative focus; Positive self-talk; Non-medical talk ; Distraction Techniques Used: Utilised an iPad; Singing ; Procedural Support Teams Involved: Educational Play Therapy ; Procedural Support Team Member Name(s): Olivia Iarkins	Kate Austin, Registered Nurse
15:56:44	Post-Sedation Checklist	Post Sedation Checklist - Line of Sight Provided and Observation and Sedation Score Documented 5-Minutely: Yes ; Nitrous Oxide: 100% Oxygen Given for 3-5 Minutes at the End of the Procedure: N/A ; Nitrous Oxide: Patient Oxygen Saturation Re-Assessed in Baseline FIO2 (eg Room Air): N/A ; Patient Returned to Baseline Sedation Score (UMSS) and Observations: Yes ; If Falls Score 3 or Greater, Complete a High Risk Management Plan: N/A	Kate Austin, Registered Nurse
15:38:20	Other Flowsheet Documentation	Other flowsheet entries - Height: (55cm seated – hip to top of head) ; Weight: 19.3 kg ; Weight Method: Bare	Kathy Bicknell, Registered Nurse
15:38:20	Sedation Quickbar	Sedation Quickbar - Level of Sedation: (watching ipad)	Kate Austin, Registered Nurse
15:37:16	Other Flowsheet Documentation	Other flowsheet entries - Restart Observations Timer: Yes	Kate Austin, Registered Nurse
15:37:16	Sedation Quickbar	Sedation Quickbar - Pulse: 86 ; Resp: 22 ; SpO2: 100 % ; Level of Sedation: Minimally sedated	Kate Austin, Registered Nurse
15:36:20	Sedation Quickbar	Sedation Quickbar - Level of Sedation: Awake and alert	Alison Kendrick, Registered Nurse
15:17:15	Other Flowsheet Documentation	Other flowsheet entries - Restart Observations Timer: Yes	Kate Austin, Registered Nurse
15:17:15	Sedation Quickbar	Sedation Quickbar - Pulse: 90 ; Resp: 24 ; SpO2: 99 % ; Level of Sedation: Awake and alert	Kate Austin, Registered Nurse
15:10:37	Intra-Sedation Checklist	Intra Sedation - Time Out or Positive Patient Identification: Yes ; Continuous Pulse Oximetry Provided: Yes	Lisa Brennan, Registered Nurse
15:06:19	Pre Sedation Checklists	Sedation Exclusion Criteria - Deteriorating Child (Physiological Limits Outside MET Criteria as per VICTOR): No Nitrous Oxide - Age Less Than 2 Years of Age: N/A ; Severe Pulmonary Hypertension Associated with Limited Exercise Tolerance: N/A ; Gas Filled Space: N/A ; Respiratory Illness or Infection: No IV Sedation - Midazolam Only - Age Less Than 6 Months (Corrected Age): N/A ; Ketamine or Propofol: N/A Oral Sedation - Significant Liver Disease / Liver Failure : N/A Sedation Risk Assessment - Patients Already Receiving Concurrent Opioids or Sedative Agents?: ! Yes (oxycodone and clonidine UMSS 0) ; Prior Adverse Event and/or Allergic Reaction to a Sedation Agent: N/A ; Acute Illness - Respiratory: N/A ; Acute Illness - Surgery: N/A ; Pregnancy: N/A ; Significant Cardiovascular Disease: N/A ; Significant Respiratory Disease: N/A ; Significant Renal Disease: N/A ; Acute Systemic Infection: N/A ; Abnormal Conscious State / Risk of Raised ICP: N/A ; Significant Risk of Delayed Gastric Emptying or Vomiting or Secretion: N/A ; NITROUS ONLY: Patient with Sickle Cell Disease / Immunosuppression: N/A Pre-Sedation Checklist - Patient ID: Yes ; Falls Assessment Completed: Yes ; Fasted from (Date): 05/07/16 ; Fasted from (Hours): 13:15 ; Adequate Staffing Available: Competent ; Risk Assessment Completed: Yes ; Informed Consent Obtained for the Sedation Agent Including Indications and Side Effects: Yes ; Inform Staff, Parents and Carer of the Possible Risk of Nitrous Oxide in Pregnancy: Yes ; Pain Relief Administered: Yes ; Topical / Local Anaesthetic Administered: N/A ; Non-Pharmacological Options Discussed with Family: Yes ; Current General Health: Healthy ; Emergency Equipment Checked and Functional: Yes ; Nitrous Oxide Unit Checked: N/A	Lisa Brennan, Registered Nurse
15:06:11	Sedation Documentation Start		Lisa Brennan, Registered Nurse

Sedation Sign-off: 04/07 13:34 to 21:29

Time	Event	User

KATE A. Future/Standing Orders

Accreditation - CKP website



For health professionals

The information on this page provides education and resources to health care professionals, please provide feedback to kate.austin@rch.org.au

Quick links

Non Pharmacology

- [Procedural Pain Management Guidelines](#)
- [Procedural Pain Management Education modules PICS eviQ link](#)
- [Sucrose Fact Sheet- Be sweet to me baby](#)
- [Procedural Support Checklist](#)

Pharmacology

- [Procedural Sedation 2016 Procedure link](#) (intranet only PDF at present 15/02/2016)
- [Procedural Sedation learning guide for health care professionals](#)
- [Orientation Package for nitrous oxide- how to guide](#)
- [Procedural Sedation Nitrous Oxide competency - theory](#)
- [Procedural Sedation Nitrous Oxide competency - skill](#)
- [Comfort Kids Intravenous Midazolam for procedures poster](#)
- [Procedural Sedation Intravenous Midazolam competency- theory](#)
- [Procedural Sedation Intravenous Midazolam competency- skill](#)

Nitrous Oxide accreditation

Registered Nurses may be accredited to administer nitrous oxide at RCH by a Procedural Sedation Lead, an accredited RCH CNE/ CSN or by a designated staff member from the Department of Anaesthesia and Management

- To become accredited staff must complete a minimum of three supervised sedation events, independently administering nitrous oxide
- The competency criterion for the Procedural Sedation nitrous oxide competency (skills and theory) completed and entered into Trendcare
- Dentists are credentialed by the Royal College of Dental Surgeons and RCH Emergency Department an internal sedation accreditation program
- Designated staff members from the Department of Anaesthesia and Pain Management, are the only RCH who can accredited Medical staff & APN's in ward and ambulatory areas.

Nitrous Oxide accreditation process

ONLY for Registered Nurses at RCH

1. Basic Life Support is required to become nitrous oxide accredited
2. Discuss with the unit Manager and or Educator if accreditation is appropriate
3. Complete pre-reading [Procedural Sedation learning guide for health care professionals](#) [Procedural Sedation Guideline](#) using the nitrous oxide competency - theory component as a guide
4. Complete the [Procedural Sedation Nitrous Oxide competency - theory](#) with an accredited PSL, CNE or CSN, keep this record and enter the theory competency into Trendcare
5. Orientate self to the equipment & disposable circuit, using the [Orientation Package for nitrous oxide guide](#)
6. Orientate self to the required documentation including; the Record of Sedation, Prescription and V observation chart
7. Independently complete a supervised sedation event with an an accredited PSL, CNE or CSN
8. Complete the [Procedural Sedation Nitrous Oxide competency - skill](#). post sedation event, with an accredited PSL, CNE or CSN and document the sedation event
9. Repeat steps 7 & 8 until you have independently administered nitrous oxide a minimum of three times
10. Provide evidence of meeting all of the competency requirements to the Manager and or Educator, enter the skills competency into Trendcare and email kate.austin@rch.org.au
11. Administer nitrous oxide independently

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Accreditation- Theory



Procedural Sedation Nitrous Oxide competency – theory

ALERT: This competency should precede the procedural sedation nitrous oxide competency – skill component. Completion of this competency in isolation does not indicate the nurse's competency to administer nitrous oxide

Competency statement: The nurse has the requisite knowledge to assess and prepare a child and family for nitrous oxide sedation and to safely and effectively administer nitrous oxide throughout the sedation period
RCH references related to this competency: RCH Website - Comfort Kids - For Health Professionals – nitrous oxide Accreditation Process RCH CPG Sedation-Procedural Sedation-Ward & Ambulatory areas and RCH CPG Procedural Pain Management, RCH Record of Sedation for procedure MR755/A

COMPETENCY ELEMENTS

- K**
1. Locate and read
 - a. CPG Sedation-Procedural Sedation-Ward & Ambulatory areas
 - b. CPG Procedural Pain Management
 - c. Procedural Sedation learning guide for healthcare professionals
 - d. Orientation package for nitrous oxide
 - e. Record of sedation for procedure MR755/A
 2. Discuss the role and responsibility of the "Sedationist"
 3. Describe the pharmacological effects of nitrous oxide
 4. Outline the fasting guidelines for nitrous oxide and the consent process
 5. State the three RCH services available to provide procedural sedation advice/consultation and when this is required
 6. Describe how to prepare a child/family for a nitrous oxide sedation event
 7. State any specific variation to nitrous oxide delivery or documentation that applies to your area (DMU, PICU)
 8. Describe what considerations should be taken when administering nitrous oxide with another primary sedation agent or an opioid medication
 9. State the appropriate gas flow rate (L/min) and reservoir bag size (L) for a child and adolescent
 10. State what is required and the rationale for:
 - a. Risk assessment
 - b. Exclusion criteria
 - c. Monitoring - Baseline and ongoing observation of vital signs
 - d. Continual assessment of UMSS and maintaining verbal contact
 - e. Line of sight clinical observation and appropriate staffing
 - f. Maintaining a quiet environment
 - g. Falls prevention
 - h. Time out and positive identification
 - i. Emergency equipment
 - j. Occupational Health and Safety
 - k. nitrous oxide storage
 - l. Post sedation discharge criteria
 - m. Documentation and reporting of adverse events
 11. State the action required for:
 - a. Equipment faults
 - b. Loss of nitrous oxide or oxygen gas flow
 - c. Failure to sedate or adequate analgesic effect
 12. Describe the management and possible prevention of:
 - a. Patient who is combative – including loss of facemask seal
 - b. Patient who complains of nausea or vomits
 - c. Patient who desaturates, is apnoeic or respiratory depressed
 - d. Patient who is distress from double vision or hallucinations
 - e. Patient who is excessive drooling or excessively sweating
 - f. Patient who progresses to an unintended deeper level of sedation
 - g. Patient who is coughing or develops respiratory distress - include airway obstruction and laryngospasm
 - h. Patient who has impaired coordination / balance

Royal Children's Hospital, Melbourne



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PROCEDURAL SEDATION LEARNING GUIDE FOR HEALTH CARE PROFESSIONALS

1. PROCEDURAL SEDATION
2. BENZODIAZEPINE MODULE
3. NITROUS OXIDE MODULE
4. REFERENCES

This edition created by Procedural Pain Program - Comfort Kids.
 March 2006 / Revised September 2008.

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1

Policies and Procedures

RCH > Policy > Procedural sedation – ward and ambulatory areas – at RCH

Intranet On

In this section

Policies and procedures

Development guide

Contact us

Procedural sedation – ward and ambulatory areas – at RCH

The attached procedure was approved by the RCH Policies & Procedures Committee in December 2015.

An on-line version including web-links is currently being prepared.

Meantime RCH Staff are invited to download and/or print a .pdf of the procedure by clicking [here](#)

Document Type:	Procedure
Exec Sponsor:	Executive Director, Nursing Services & Allied Health
Policy Category:	policy
Author Title:	Clinical Nurse Consultant Comfort Kids Program (Procedural Pain Management) Department of Anaesthesia and Pain Management
Authoriser:	RCH Policies & Procedures Committee
Date Authorised:	14 Dec 2015
Next Review Date:	13 Dec 2017
Revision:	1
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Accreditation- Skill

Procedural Sedation Nitrous Oxide competency – skill

ALERT: This competency should follow the procedural sedation nitrous oxide competency – theory component. Nurses must attain the competency elements **INDEPENDENTLY** in order to be considered competent

Competency statement: The nurse assesses and prepares a child and family for a procedure and safely and effectively administers nitrous oxide throughout the sedation period

RCH references related to this competency: RCH Website – Comfort Kids – For Health Professionals – Nitrous oxide Accreditation Process RCH CPG Sedation-Procedural Sedation-Ward & Ambulatory areas and RCH CPG Procedural Pain Management, RCH Record of Sedation for procedure MR755/A

COMPETENCY ELEMENTS

K	<ol style="list-style-type: none"> 1. State when the sedation period starts and ends 2. State how to assess and maintain a patent airway for your patient 3. State the function of the nitrous oxide delivery unit, include all components 4. State the two built in safety features on the nitrous oxide delivery unit, include the rationale 5. Identify the appropriate time and support personnel to delivery nitrous oxide
S	<ol style="list-style-type: none"> 6. Complete the "Prior to the sedation" section of the Record of sedation for procedure (MR755/A) to: <ol style="list-style-type: none"> a. Identify risk and to meet the criteria for nitrous oxide administration b. Obtain informed verbal consent and provide information (fact sheet) c. Obtain an order for nitrous oxide+/-additional analgesic+/- Topical LA 7. Demonstrate patient assessment, including correct sizing of the facemask 8. Demonstrate preparation of the child and parent, prior to the sedation event 9. Demonstrate the safety checks for the nitrous oxide delivery unit and assemble the disposable components of the unit, prior to the sedation event 10. Demonstrate preparation of treatment area and emergency equipment as per the Record of sedation for procedure MR755/A, prior to the sedation event 11. Demonstrate how to turn on the scavenging system for the nitrous oxide gas and ensure compliance with Occupation Health and Safety standards 12. Demonstrate Time out or Positive Patient Identification 13. Demonstrate leadership as the "Sedationist": <ol style="list-style-type: none"> a. Clarify the roles of staff and family, prior to the sedation event b. State when the child is ready for the procedure to begin c. Direct staff and family, maintaining one leader and a calm environment 14. Demonstrate non pharmacological strategies, as part of the sedation event 15. Maintain line of sight and verbal contact throughout the sedation period 16. Demonstrate continuous monitoring of vital signs and UMSS, documenting as per the Record of sedation for procedure MR755/A 17. Deliver nitrous oxide making adjustment to: <ol style="list-style-type: none"> a. the concentration of nitrous oxide based on anxiety, pain and sedation requirements b. the gas flows based on the patients age (child or adolescent), breathing pattern and volume of gas in the reservoir bag c. the facemask in order to maintain a seal over the nose and mouth 18. Demonstrate safe and timely management of side effects or adverse events 19. Monitor administration time and communicates timing with the Proceduralist 20. Demonstrate delivery of oxygen post procedure for 3-5 minutes 21. Perform the "end of sedation period" assessment, include level of alertness and return to baseline vital signs 22. Demonstrate "recovery" positioning and handover of patient when indicated 23. Complete all documentation for the sedation event per the Record of sedation for procedure (MR755/A) and medication chart (MR690A) 24. Demonstrate debrief of child and parent, include positive reinforcement 25. Discuss post sedation care with family and child, include falls prevention 26. Discuss travel arrangements and supervision (for outpatients)

Orientation package for nitrous oxide



Department Anaesthesia and Pain Management, Comfort Kids Program.

Author: Lisa Takacs

Date: September 2011

Acknowledgements: Parker/Porter; Porter Nitrous Oxide Sedation Systems Manual.

N₂O Equipment checklist

Checklist Porter MXR & Equipment

CHECK CONNECTIONS GAS HOSES **BLUE (N₂O) WHITE (OXYGEN)**

- SECURED AT THE BACK OF THE MXR UNIT
- SECURED AT THE WALL OUTLET
- PIN WHEEL TO CORRESPONDING OUTLET
- WHITE O₂ TO O₂ BLUE N₂O TO N₂O



CHECK SCAVENGING SYSTEM **YELLOW**

- YELLOW PIN WHEEL SECURED AT WALL OUTLET
- YELLOW TUBING SECURED AT BASE OF PORTER MXR
- TURN SCAVENGER DIAL "ON" USING THE YELLOW DIAL
- SUCTION IS HEARD FROM THE SCAVENGER UNIT



CHECK POSITIVE "ON/OFF SWITCH" **WHITE OR GREEN**

- PULL BUTTON TOWARDS THE OPERATOR (FRONT) WHEN IN THIS POSITION THE PORTER MXR WILL NOT OPERATE. PREVENTS GAS ACCIDENTALLY DELIVERED INTO TREATMENT AREA, WHEN NOT IN USE
- TO TEST THIS FAIL-SAFE MECHANISM; POSITION THE FLOW CONTROL KNOB TO ZERO (L/MIN) & POSITION THE CONCENTRATION KNOB TO ZERO %. TURN THE FLOW CONTROL KNOB UP. THE MXR WILL NOT DELIVER GAS WHEN POSITIVE SWITCH IN OFF
- PUSH IN THE "ON/ OFF SWITCH" FOR DELIVERY



CHECK NITROUS OXIDE FAIL-SAFE SYSTEM & FLOW

- TURN CONCENTRATION CONTROL KNOB TO 50% N₂O
- THERE SHOULD BE NO FLOW OF N₂O DUE NO O₂
- TURN THE FLOW CONTROL KNOB TO 3-4 L/MIN O₂
- THE N₂O SHOULD FLOW PORTIONALLY TO THE O₂ THE FLOW METRE BALLS SHOULD AT SAME HEIGHT
- INTERRUPT THE OXYGEN SUPPLY BY LOOSENING THE OXYGEN PIN WHEEL AT THE WALL OUTLET
- THE GAS WILL MAKE A "HISSING" NOISE
- THE NITROUS OXIDE FAIL-SAFE VALVE SHOULD INITIATE & THE NITROUS OXIDE FLOW SHOULD DROP AS THE OXYGEN FLOW DECREASES (L/MIN)
- N₂O FLOW STOPS COMPLETELY WITH NO O₂ FLOW
- RECONNECT OXYGEN PIN WHEEL TO WALL OUTLET
- SET CONCENTRATION CONTROL KNOB TO ZERO
- SET FLOW CHILD 5-6L/MIN ADOLESCENT 6-8L/MIN



CHECK RESERVOIR BAG ATTACHED TO BAG CONNECTION

- THE RESERVOIR BAG MUST BE INTACT
- INFLATE BAG AND INSPECT TO DELIVER 3/4 FULL
- REPLACE BAG IF CRACKED, TORN OR PERFORATED
- DO NOT USE TAPES TO REPAIR RESERVOIR BAGS
- DO NOT TIE OR MODIFY RESERVOIR BAG



CHECK CIRCUIT CONNECTION

- USE DISPOSABLE PATIENT CIRCUIT
- CHECK CIRCUIT INTACT & COMPLETE
- CONNECT BLUE LIMB TO FRONT - FRESH GAS OUTLET
- CONNECT PINK LIMB TO SIDE - SCAVENGER OUTLET



N₂O Equipment Trouble shooting

Troubleshooting Porter MXR

Problem	Possible cause	Action
NO OXYGEN &/ OR NITROUS OXIDE GAS FLOW	POSTIVE "ON/OFF" SWITCH OFF	TURN POSITIVE "ON/OFF SWITCH" TO "ON" POSITION = PUSH IN
	GAS SUPPLY NOT CONNECTED PROPERLY, INTERRUPTION/ LEAK IN THE GAS SUPPLY	CHECK OXYGEN & NITROUS OXIDE CONNECTIONS AT THE WALL PANEL & BACK OF PORTER MXR
NITROUS OXIDE FLOW METRE WORKING BUT NO OXYGEN FLOW OBSERVED IN OXYGEN FLOW METRE	NITROUS OXIDE FAILSAFE MECHANISM MALFUNCTIONING	REMOVE MXR FROM CLINICAL AREAS IMMEDIATELY, REPORT TO CKP* & SEND EQUIPMENT TO RCH BIOMEDICAL ENGINEERING DEPARTMENT
GAS LEAKING FROM THE POSITIVE SWITCH ON/OFF	DAMAGE TO THE "O" RING INSIDE THE ON/OFF SWITCH	REMOVE PORTER MXR FROM CLINICAL AREAS IMMEDIATELY, REPORT TO CKP* & SEND EQUIPMENT TO RCH BIOMEDICAL ENGINEERING DEPARTMENT
GAS LEAKING AROUND THE OXYGEN OR NITROUS OXIDE PIN WHEEL OR HOSE AT THE WALL	DAMAGE TO THE PIN WHEEL THREADS OR THE GAS HOSE	REMOVE PORTER MXR FROM CLINICAL AREAS IMMEDIATELY, REPORT TO CKP* & SEND EQUIPMENT TO RCH BIOMEDICAL ENGINEERING DEPARTMENT
RESERVOIR BAG FAILS TO INFLATE	INADEQUATE GAS FLOW	CHECK ADEQUATE FLOW OF OXYGEN & NITROUS OXIDE TURN FLOW CONTROL KNOB UP (L/MIN)
	PATIENT HYPERVENTILATING	COACH PT TO SLOW BREATHING
	RESERVOIR BAG DAMAGED	REMOVE & REPLACE** DAMAGED RESERVOIR BAG
RESERVOIR BAG OVERINFLATING	PRE-ADMINISTRATION CIRCUIT CONNECTION INCORRECT (REVERSED)	PRE-ADMINISTRATION- CHECK CIRCUIT
	GAS FLOW NEEDS ADJUSTING	REDUCE GAS FLOW - TURN FLOW CONTROL KNOB DOWN & REDUCE NITROUS OXIDE CONCENTRATION
	PATIENT HYPOVENTILATING	ASSESS PATIENT - RESPIRATORY EFFORT & UMSS IF ISSUES DOES NOT RESOLVE, STOP PROCEDURE, GIVE OXYGEN & REMOVE PORTER MXR
HIGH PITCH WHISTLE SOUND	EMERGENCY AIR VALVE INITIATED DUE TO LOSS IN OXYGEN GAS FLOW/ SOURCE	CHECK OXYGEN AND NITROUS OXIDE CONNECTIONS AT THE WALL PANEL & BACK OF PORTER MXR IF ISSUES DOES NOT RESOLVE, STOP PROCEDURE, GIVE OXYGEN & REMOVE PORTER MXR

*Report to Kate Austin ext 55776 p7933 email kate.austin@rch.org.au Karin Plummer ext 55772 p7932

**Replacement bags are available from Comfort Kids Program Level 3 West Zone N Desk 1216/17



B Positive



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Be Positive

RCH > Communications & Marketing > ERC > Be Positive (B+)

In this section

Be Positive (B+)

Be Positive (B+) is your way of finding out more about The Royal Children's Hospital. B+ host Slobtan and her two lovable friends, Jazz and Rocco, are here to help you learn and understand more about hospital, and what happens here. Meet the different people that look after you during your stay, learn about the technology that helps you get better, and discover what makes RCH a great hospital.

You can watch episodes any time on RCH TV, or watch these video clips from the show:

Get ready for hospital | Get to know the people | Get to know RCH

Get ready for hospital

Having an ECG
Dominic has an ECG to see how his heart is working.

Having an ECHO
Maddie takes some special pictures of Dominic's heart using an 'Echo'.

Having Nitrous Oxide – YouTube

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