Principles of Paediatric Procedural Sedation

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Procedural sedation

Anxiolysis/ Amnesia/ Immobility required for a Procedural ?

- IF **YES** assess risk
- Patient safe to sedate ?
- Non – pharm PPM > Procedural sedation
- Painful or not ? Analgesia & Topical LA cream (consultant preference)

Procedural Sedation requirements

- Documentation
  - Order sets (Selection of agents)
  - Checklists (Record of sedation or Sedation Narrator)
- Consent for conscious sedation
  - Provide parents with a fact sheet
- Risk assessment **PRIOR**
- Continuous line of sight & observation
- Recovery of patient
- Discharge criteria
  - Provide parents with a fact sheet

Conscious sedation UMSS<2

Continuum	Minimal sedation	Moderate sedation	Deep sedation	General Anaesthesia
Goal for procedural sedation	Anxiolysis	Conscious sedation or asleep but rousable	OVERSEDATION	ANAESTHESIA
UMSS	UMSS 1	UMSS 2	UMSS 3	UMSS 4
Behavioural response	Patient does not exhibit fear or anxiety but **responds to verbal commands** Cognitive function may be impaired	Patient **may be sleeping** with **purposeful response to verbal command &/or light tactile stimulation** Loss of orientation to environment and moderate impairment of gross motor function	Patient exhibits depressed consciousness or unconsciousness from which they are not easily rousable, purposeful **response to repeated or painful stimulation only**	**Unable to be aroused, even with painful stimulation**
Airway	Unaffected Protective reflexes (cough and/or gag reflex) maintained	No intervention Protective reflexes (cough and/or gag reflex) maintained	Intervention may be required	Intervention often required
Spontaneous ventilation	Unaffected	Adequate however may have minimal to moderate alteration	Mildly restricted and may be inadequate	Frequently inadequate
Cardiovascular function	Unaffected	Usually maintained	Usually maintained	May be impaired

UMSS	**Response**
0	Awake and alert
1	Minimally sedated: may appear tired/sleepy, responds to verbal conversation +/- sound
2	Moderately sedated: somnolent/sleeping, easily roused with tactile stimulation or verbal command
3	Deep sedation: deep sleep, rousable only with deep or physical stimulation
4	Unrousable

Procedural assessment

- Is this procedure suitable for sedation ?
- What are your primary considerations?
- What resources can help to prepare?

Procedural assessment

Procedural assessment	
Examples of suitable procedures	
Diagnostic Imaging; MRI/CT/Ultrasound/Nuclear medicine scan	
Cardiology ECHO	
Venipuncture, intravenous cannulation, PICC line insertion	
Lumbar puncture	
Insertion of IDC NGT NJT	
Injection of Botox or Joint	
Port access	
Removal of chest drain/wound drain	
Dressing changes/Burns or wound debridement/Abscess management	
Orthopaedic frames pin site care/plaster care	
Nerve conduction test	
EEG electrode application & removal	
Foreign body removal	
Skin biopsy and laser	
Procedural checklist & primary considerations	
Duration	Duration <45 minutes
Non-invasive (not painful to the patient)	Non pharmacological techniques
Painful to patient	Analgesia+/-Topical LA
Distressful to patient (not reduced by non-pharm techniques)	Anxiolysis+/- Amnesia
Diagnostic Imaging (motion control required)	Procedural sedation for immobility
Equipment	Equipment
Staffing	Staffing
Procedural preparation	
Perform invasive painful procedures only when necessary	
Choose the least painful method for the patient and consider topical local anaesthesia	
Plan procedural sedation events and prepare the patient prior	
Prepare required equipment prior and out of sight of the patient	
Use the procedural support plan where available & refer to EPT/Comfort First team	
Use appropriate procedural language Communicating Procedures to families CPG	
Always use non pharmacological techniques Procedural Pain Management CPG	

Clinical assessment

- **What clinical assessment should I do ?**
  - Physical assessment
  - Observations & weight
  - UMSS & Pain score
  - Focused history
  - Relevant pathology

- **Establish your baseline**

Pre-sedation checklist

Pre sedation checklist
Baseline clinical observations Observation and Continuous Monitoring Clinical Guideline (Nursing)
Pulse Oximetry (SpO_2)
Respiratory Rate (RR)
Heart Rate (HR)
Blood Pressure (BP) Indicated for IV sedation agent, concurrent drug therapy which reduces BP and patients with a history of labile or low BP
Temperature (indicated by clinical status)
Level of Consciousness (AVPU scale)
UMSS (if > 1 not suitable for conscious sedation)
Pain score (Pain assessment and measurement Clinical Guideline (Nursing)
Weight (Use lean body weight for dosing in morbidly obese patients)
Corrected Age (Gestational age at birth and current post-conceptual age if applicable
Baseline physical assessment
Airway risk
Upper airway obstruction (e.g. loud snoring, obstructive breathing, stridor or hoarse)
Tracheostomy or upper airway surgery
Abnormal jaw, palate, tongue, neck (e.g. craniofacial abnormalities, obesity, short neck, reduced neck mobility, enlarged tonsils & trisomy 21 patients)
Respiratory risk
Apnoea
Nasal congestion or nasal/oral secretions and/or productive cough
Increased work of breathing (e.g. use of accessory muscles)
Added breath sounds on auscultation (wheeze/crackles)
Baseline general health
Healthy
Unwell- stable
Unwell- unstable (unsuitable for procedural sedation)
Baseline focused history
History of difficult airway
History of issues with analgesia, sedation or anaesthesia (complications/airway problem)
Previous failure to sedate or negative experience
Allergies or adverse reaction to any medication
Current medications (opioid analgesia/medication with a sedative effect)
Behavioural problem (agitation/ hyperactive/combative)
Developmental delay or communication concern
Nausea/Vomiting/Gastro-Oesophageal Reflux
Pathology
Abnormalities (liver most significant)

Exclusion criteria

- Absolute contradiction
- Do NOT sedate

Exclusion criteria

Exclusion Criteria Absolute contraindication for procedural sedation
All Agents
Deteriorating child (physiological limits meet MET criteria as per ViCTOR)
Mandatory emergency call indicated or clinical review not completed for rapid review
Nitrous oxide
Age ≤ 2 years of age Risk of airway obstruction
Severe pulmonary hypertension associated with limited exercise tolerance Risk of Hypoxia
Gas filled space 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 Risk of airway obstruction
e.g. Pneumonia or respiratory tract infection with excessive secretions and poor respiratory reserve e.g. Severe asthma (wheeze present)
IV Midazolam & IN Fentanyl
Age ≤ 6 months (corrected age) Risk of airway obstruction/apnoea
e.g. ex premature infant, neonate or any Infant with a significant co-morbidity
Ketamine and Propofol
Administration for procedures restricted to critical care medical staff
Oral sedation
Significant liver disease/liver failure
Significant liver disease/liver failure with Impaired liver function, chloral hydrate must not be used

Risk assessment

- What risk ?
- Relative contraindications
- Consultation – who ?
- Handover using ISBAR
- Establish Safe to sedate ?

Risk assessment

Risk assessment for all agents Relative contraindications for procedural sedation - seek consultation
Age < 4 months (corrected age) oral and intranasal agents Risk of airway obstruction / apnoea
Ex premature infant, neonate or any infant with a significant co-morbidity
Prior Adverse Event (AE) to a sedation or anaesthetic agent Risk of AE
Determine the reaction and the severity
Concurrent opioids or sedative agents Risk of excess sedation
Additional opioid or sedation agents may have synergistic effect producing excess sedation. Sedation may be an effect of medications such as clonidine, anticonvulsants, and antihistamines. The patient's baseline analgesia is not withheld to facilitate the procedural sedation - ASSESS • If the UMSS baseline is 0 the patient is considered low risk for an additional agent • If the UMSS baseline is 1 the patient is considered moderate risk, consider consultation • If the UMSS baseline is 2-4 the patient must not receive an additional agent, seek consultation
Airway or Respiratory conditions Risk of hypoventilation/obstruction /laryngospasm/aspiration
Head, neck or chest pathology (e.g. burns, tumour, trauma, infection or surgery) Reactive airways (e.g. respiratory tract infection, poorly controlled asthma, prematurity) Apnoea (e.g. Obstructive Sleep Apnoea) Significant snoring and drooling Significant work of breathing, tachypnoea or bradypnoea Musculoskeletal and neurological disorders (e.g. weak, restrictive, aspiration, chronic lung disease)
Significant or severe Cardiovascular disease Risk of inadequate reserve/ Decompensation
Poor myocardial function e.g. dilated cardiomyopathy Significant pulmonary hypertension Marked hypovolemia Marked cyanosis or significant limitation of physical activity
Deteriorating child (physiological limits meet Rapid Review **criteria as per** ViCTOR **)**
Clinical review indicated but not completed Modified observation parameters on ViCTOR e.g. acute systemic infection (sepsis)
Abnormal conscious state/risk of raised ICP Risk of excess sedation & increasing ICP
e.g. head injury, meningitis, space occupying lesion

Risk assessment

Significant risk of delayed gastric emptying or vomiting or excess secretion Risk of aspiration
e.g. bowel obstruction, gastro-oesophageal reflux
Significant weight concern Risk - Dosing calculation/ airway obstruction
Obesity Failure to thrive, cachectic
Significant fasting concern
Patient condition or treatment complicated by fasting (e.g. hypoglycaemia)
Liver or Renal disease/ dysfunction Risk - excess sedation
Midazolam: consider dosage reduction in severe renal impairment; use cautiously in hepatic impairment **Chloral Hydrate:** consider reduced dose in mild liver or renal dysfunction. Check Lab results and discuss dosing with treating team. Chloral hydrate must not be used for patients with Liver failure/ Hepatic Encephalopathy
Co-morbidity Risk - Dosing calculation
Assess if co-morbidities will impact procedural sedation plan e.g. adrenal insufficiency, hypothyroidism, hyperthyroidism, diabetes insipidus, endocrinopathies, mitchondrial disease, inborn errors of metabolism
Pregnancy Risk harm to foetus
Consider possibility of pregnancy in girls of child bearing age If pregnant stratify risk and minimize harm
Specific to nitrous oxide
see OHS
e.g. pregnancy, immunosuppression and vitamin B12 deficiency and MTHFR deficiency

Consultation process

Procedural sedation support services			
Service	**Comfort Kids Program**	**Children Pain Management Service**	**In charge anaesthetist**
Staff	CNC	CNC, Pain medicine fellow or Anaesthetist	Anaesthetist
Contact	55776 or pager 7933	pager 5773	52000
Hours	**M-F Business hours**	**Available 24/7**	**Available 24/7**
Consultation	Procedural sedation	Analgesic consultation A/H Procedural sedation	Referral to GA A/H Procedural sedation

Do NOT sedate if unsure seek Consultation

Consult home team ONLY if appropriate

- Cardiology for Pulmonary Hypertension
- Gastroenterology for Liver function
- Not JMRO

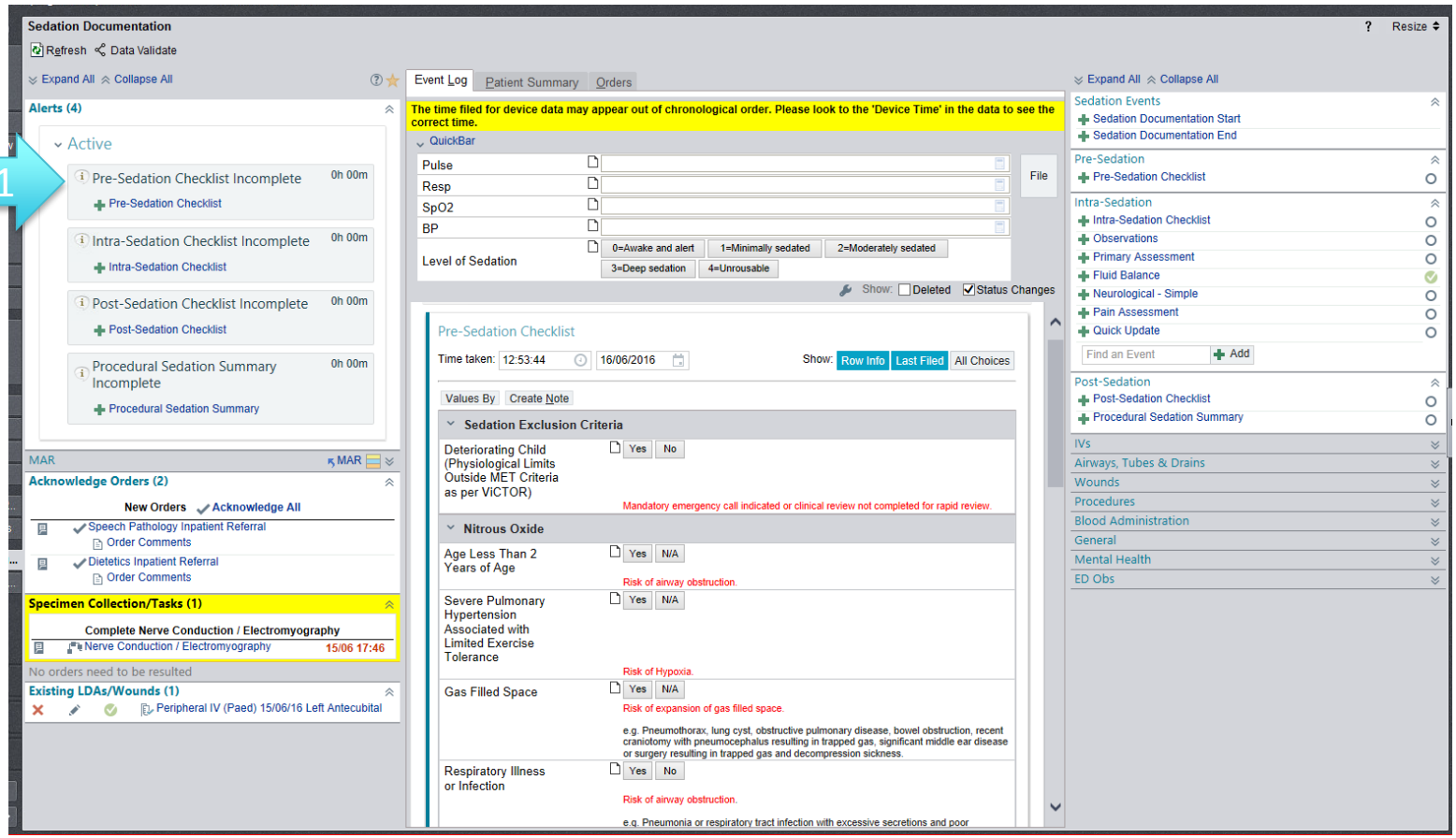
Plan -Fasting/ Staffing/ Equipment

Minimum fasting time	
Time	2 hours solids/milk/formula 2 hours breast milk 1 hour clear fluids

Minimum staff requirement		
Agent	Oral, Buccal or Intranasal	Inhaled or IV
Staff	Two staff members Sedationist **Competent** Proceduralist	Two staff members Sedationist **Accredited** Proceduralist

Equipment checklist	Resuscitation checklist
Oxygen outlet	Resuscitation trolley located in the clinical area
Face mask and tubing	Identify location of emergency alarm
Pulse oximetry	Identify location of reversal agent
Suction unit, Yankauer & Y-suction catheters	Identify appropriate size airway
Blood pressure cuff	Identify appropriate size air cushion mask
Bed or trolley	Identify appropriate size self-inflating bag

Sedation Narrator - Pre-Sedation



Checklists

Mandatory to complete Pre-Sedation Checklist PRIOR

Exclusion Criteria, Risk Assessment, Consultation

Fasting, Staffing, Equipment, Consent & Preparation of Child

Chloral hydrate

Oral **Chloral hydrate**

Sedative and Hypnotic No analgesic effect
Chloral hydrate has an **unpleasant taste.** Administer in a **sweet solution**
If opioid or sedation agent administered within 2 hours, assess UMSS & undertake consultation

Indications

Chloral hydrate is more effective in < 2 years or 15kg
The desired effect is to reduce movement of the patient during a procedure
Chloral hydrate is most successful if used for painless procedures (e.g. ECHO, CT & MRI)

Contraindications

UMSS > 1 undertake consultation
Significant liver disease/failure with Impaired liver function, chloral hydrate must not be used consultation
Any adverse effect as listed below

Adverse effects

Excessive sedation (UMSS score > 2)
Respiratory depression, airway obstruction
Nausea, vomiting, gastric irritation
Hyperactivity occurs in 1-2% of patients
Hangover, disorientation, delirium, ataxia, headaches, nightmares and hallucinations

Onset of action	**Duration of effect**
Within 20- 30 minutes	60-120 minutes
Give 45-60 minutes prior to procedure	Effects can last 4-8 hours

Dose

Chloral hydrate is more effective in < 2 years or 15kg
Consider reduced dose in mild hepatic or renal failure (contraindicated in significant liver disease as above)
If recommended dosing proves ineffective refer to Failure to sedate

Standard Oral dosing *Single or divided dosing is based on assessment of patient & procedure

0-3 months (corrected age)	**3-12 months** (corrected age)	**1-18 years**
Seek consultation	**50mg/kg** (single or divided dose*)	**50-75mg/kg** (single or divided dose*)
Cardiology inpatients ONLY (for removal of wires & drains) Recommend **30mg/kg initial** 20mg/kg if required in 20-30min +/- analgesia per CPMS Seek consultation if UMSS ≥ 2 and/ or patient receiving concurrent sedative or opioid (e.g. Clonidine or morphine)	Recommend **30mg/kg initial** 20mg/kg if required in 20-30min	Recommend **50mg/kg initial** 25-50 mg/kg if required in 20-30 min Maximum dose of 100mg/kg can be used (not exceeding 2g) Risk deep sedation

Oral dosing for Medical Imaging Department & Cardiology outpatients ONLY
Recommend < 4 months attempt feed & wrap if appropriate for the procedure

Infants > 3 months (Corrected age)	**Competency and recommendations** (Medical Imaging Department (MID)
> 3 months Recommend 50-70mg/kg** (single or divided dose) Dosing is based on assessment of patient and procedure	MID requires completion of a mandatory chloral hydrate competency MID recommendations for procedural assessment : • MRI 50-70mg/kg** • CT 50mg/kg • Nuclear Medicine 50mg/kg

Monitoring

HR,RR, SpO_2, UMMS monitored continuously

Midazolam

Midazolam Overview

Indications

Anxiolytic/Sedative/Amnesic/ Antiepileptic No analgesic effect

Contraindications

UMSS > 1 undertake consultation
Any adverse effect as listed below

Adverse effects

Excessive sedation (UMSS score > 2)
Respiratory depression/apnoea
Airway obstruction
Hypotension, especially in patients with impaired cardiovascular stability
Delirium/paradoxical agitation
Impaired coordination/balance (falls risk)

Practice Points

Consider dosage reduction in severe renal impairment; use cautiously in hepatic impairment consultation
Midazolam injection solution (5 mg/mL ampoules) is used for oral, intranasal and IV administration
Midazolam tastes bitter and acidic. Administer in a sweet solution
Oral administration efficacy may be variable (influenced by first-pass metabolism & duration of fasting)
Intranasal midazolam is used less often as it causes nasal irritation and a burning sensation
Midazolam may cause hiccups

Reversal Agent	Flumazenil

Indication Benzodiazepine induced over-sedation
Flumazenil dose 5mcg/kg IV every 60 seconds to maximum total of 40mcg/kg
Considerations Re-sedation may occur. May increase the risk of seizures in predisposed patients
Location Resuscitation trolley in ward and ambulatory areas + MET team

Oral & Buccal **Midazolam**

Anxiolytic/Sedative/Amnesic No analgesic effect
Tastes bitter and acidic. Administer with sweet solution
If opioid or sedation agent administered within 2 hours assess UMSS & undertake consultation

Onset of action	**Duration of effect**
Maximum effect within 15-20 minutes Give 15 minutes before procedure	Up to 2 hours Absorption is rapid but erratic

Oral midazolam dose Use 5mg/mL midazolam for injection

>4 month (corrected age) **0.3- 0.5mg/kg** per dose to maximum of 20mg
If administering prior to N_20 use 0.3mg/kg dose
Oral administration efficacy may be variable (influenced by first-pass metabolism & duration of fasting)
If recommended dosing proves ineffective refer to Failure to sedate

Buccal midazolam dose Use 5mg/mL midazolam for injection

>4month (corrected age) **0.3 - 0.5mg/kg** per dose to maximum of 10mg
If administering prior to N20 use 0.3mg/kg dose
If recommended dosing proves ineffective refer to Failure to sedate
The principle is to have the drug absorbed by the buccal route-only
Ideally the dose is divided (given bilaterally)
Patient compliance will determine bilateral or unilateral buccal delivery
Administer dose buccally via the space between cheek and gum

Monitoring

HR, RR, SpO_2, and UMMS score

Midazolam

Intranasal **Midazolam**

Anxiolytic/Sedative/Amnesic No analgesic effect

Not preferred route due to nasal irritation and burning

If opioid or sedation agent administered within 2 hours, assess UMSS & undertake consultation

Onset of action	**Duration of effect**
Maximum effect within 10 minutes (Absorption is rapid) Give 15-20 minutes before procedure	Up to 2 hours

Intranasal midazolam dose Use 5mg/mL midazolam for injection

>4 month (corrected age) **0.2- 0.4 mg/kg** up to maximum 10mg (Repeat in 5–15 minutes if required)

Delivery

This route must ONLY be used if rapid effect required, as the burning sensation increases distress

Use a Mucosal Atomization Device (MAD) to administer

Delivery via Mucosal Atomiser Device (MAD300)

Draw up appropriate dose for weight (see above) plus 0.1ml extra to the first dose (to account for the dead space in the device)

Attach Mucosal Atomiser Device (MAD300) on to the end of the syringe

Sit the child at approximately 45 degrees or with head to one side

The MAD is directed at 45 degrees to spray the turbinates, rather than along the nasal floor

If directed horizontally the dose runs into pharynx & is swallowed (reducing bioavailability and efficacy)

Insert the device loosely into the nostril and press the plunger quickly

Dose are to be divided between nostrils

Note: Do NOT draw up 0.1ml extra for second dose when re-using the delivery device (MAD)

Intranasal Fentanyl CPG

Intranasal Midazolam fact sheet

Monitoring

HR, RR, SpO_2, and UMMS score

IV Midazolam

Intravenous **Midazolam**		
Anxiolytic/Sedative/Amnesic No analgesic effect **IV Midazolam may only be administered by an accredited staff member** If opioid or sedation agent administered within 2 hours, assess UMSS & undertake consultation		
Onset of action	**Duration of effect**	
1-5 minutes Peak effect 3-5 minutes **Give 5-10 minutes before a procedure** Incremental boluses to achieve 'anxiolytic effect'	Effect may last 30-60 minutes	
IV Midazolam Dose		
> 6 months < 12 months (corrected age)	**≥ 12 months or ≤ 50kg**	**> 50kg**
0.1mg/kg of midazolam dilute to 10mLs of 0.9% normal saline	0.1mg/kg of midazolam dilute to 10mLs of 0.9% normal saline	5mg of midazolam dilute to 10mLs of 0.9% normal saline
Bolus: Give 1mL and repeat bolus at intervals of no less than 5 minutes to achieve or maintain anxiolysis	Bolus: Give 1–2mLs and repeat bolus at intervals of no less than 3 minutes to achieve or maintain anxiolysis	Bolus: Give 1–2mLs and repeat bolus at intervals of no less than 3 minutes to achieve or maintain anxiolysis
Do not exceed total dose of 0.15mg/kg in 15mLs of 0.9% normal saline	Do not exceed total dose of 0.15mg/kg in 15mLs of 0.9% normal saline	Do not exceed total dose of 7.5mg in 15mLs of 0.9% normal saline
Delivery		
Rapid administration of IV midazolam increases the risk of cardiorespiratory depression When used for sedation/anxiolysis/amnesia for a procedure, dosage must be individualized and titrated Midazolam should always be titrated slowly dose over at least 2 minutes and allow the additional time as per the intervals above to fully evaluate effect Individual response will vary with age, physical status and concomitant medications		
Monitoring		
HR, RR, SpO_2, and UMMS score monitored continuously Blood pressure monitored minimum 5 minutely		

IN Fentanyl

Intranasal **Fentanyl**

Delivery via Mucosal Atomiser Device (MAD300) per the Intranasal Fentanyl CPG

Draw up appropriate dose for weight (see above table) plus 0.1ml extra to the first dose (to account for the dead space in the device)
Attach Mucosal Atomiser Device (MAD300) on to the end of the syringe
Sit the child at approximately 45 degrees or with head to one side
The MAD is directed at 45 degrees to spray the turbinates, rather than along the nasal floor
If directed horizontally the dose runs into pharynx & is swallowed (reducing bioavailability and efficacy)
Insert the device loosely into the nostril and press the plunger quickly
Dose are to be divided between nostrils
Note: Do NOT draw up 0.1ml extra for second dose when re-using the delivery device (MAD)

Intranasal Fentanyl CPG
Intranasal Midazolam fact sheet

Adverse effects

Respiratory depression
Hypotension
Nausea and vomiting- increase risk of vomiting when combined with N_20
Chest wall rigidity (only reported with large IV doses)
Pruritus

Monitoring

HR, RR, SpO_2, UMMS monitored continuously

Reversal agent Naloxone

Naloxone bolus 0.1mg/kg IM or IV, maximum 2mg

Intranasal **Fentanyl**

Analgesic opioid

If opioid or sedation agent administered within 2 hours, assess UMSS & undertake consultation

Indications	**Contraindications**
Age > 6 months (corrected age) Minor painful procedures of short duration Limited IV access Potent & rapid onset of analgesia required Single procedural analgesic agent Adjunct to N_20 (undertake risk assessment)	< 6months (corrected age) UMSS ≥2 Bilateral occluded nasal passage Epistaxis
Onset of action	**Duration of effect**
Rapid onset of effect (2-5 minutes)	30-60 minutes
Initial Dose	**Second dose** (if UMSS <2 may administer after 10 minutes)
1.5 micrograms/kg	0.75 - 1.5 micrograms/kg

Dosing schedule per the Intranasal Fentanyl CPG with the addition of >6months (7kg) infant dosing

- Use 100micrograms/2ml strength fentanyl solution for intravenous use
- Volumes have been rounded to the nearest 0.05mL

Weight estimate(kg)	Initial dose (1.5micrograms/kg)	Volume Initial dose (mL)	Top-up dose (0.75 - 1.5 micrograms/kg)	Volume Top up dose (mL)
7	10 mcg	0.2 mL	5mcg (limited)	0.1mL
10	15 mcg	0.3 mL	7.5 - 15 mcg	0.15 - 0.3 mL
12	18 mcg	0.35 mL	9 - 18 mcg	0.2 - 0.35 mL
14	20 mcg	0.4 mL	10 - 20 mcg	0.2 - 0.4 mL
16	24 mcg	0.5 mL	12 - 24 mcg	0.25 - 0.5 mL
18	27 mcg	0.55 mL	13.5 - 27 mcg	0.25 - 0.55 mL
20 - 24	30 mcg	0.6 mL	15 - 30 mcg	0.3 - 0.6 mL
25 - 29	37.5 mcg	0.75 mL	18.75 - 37.5 mcg	0.35 - 0.75 mL
30 - 34	45 mcg	0.9 mL	22.5 – 45 mcg	0.45 - 0.9 mL
35 - 39	52.5 mcg	1.05 mL	26.5 - 52.5 mcg	0.5 - 1.05 mL
40 - 44	60 mcg	1.2 mL	30 - 60 mcg	0.6 - 1.2 mL
45 - 49	67.5 mcg	1.35 mL	33.7- 67.5 mcg	0.65 - 1.35 mL
> 50	75 mcg	1.5 mL	37.5 - 75 mcg	0.75 - 1.5 mL

Nitrous oxide

Practice Points

- **Vomiting occurs in 6-10% receiving 50% N_2O.** This **increases** up to 25% with **co-administration** of an **opioid.** Vomiting may also increase with higher concentration and longer administration time. If patient has a history of nausea & vomiting, consider anti-emetic prior & slower titration of N_2O.
- If the patient is extremely anxious (despite non-pharmacological techniques and preparation), consider commencing N_2O at 50%, increase at a greater rate. Once the patient is calm, titrate and maintain UMSS ≤ 2.
- **50-70% patients achieve mild to moderate sedation with N_2O as a single agent**. A few patients may reach moderate to deep sedation at 70%. Close monitoring of UMSS is essential throughout.
- 10% of children may be poorly sedated & for 10% analgesia is not effective or may have psychological resistance Failure to sedate)
- Diffusion Hypoxia may occur when the N_2O/O_2 mix is suddenly stopped. When nitrous oxide is discontinued, nitrous oxide diffuses out of the blood into the alveoli in large volumes. If the patient is allowed to breathe air at this time, the combination of nitrous oxide and nitrogen in the alveoli reduces the alveolar PO_2. This causes diffusion hypoxia and is avoided by administering 100% oxygen for 3-5 minutes post procedure. If the patient's mask is off for more than 30 seconds or after discontinuing nitrous oxide, 100% oxygen must be administered.

Inhaled **Nitrous Oxide** N_2O

Conscious sedation/Anxiolytic/Amnesic/Analgesic

Nitrous oxide may only be administered by an accredited staff member

If opioid or sedation agent administered within 2 hours, assess UMSS & undertake consultation

Onset of action	**Duration of effect**
Onset 30-60 seconds **Peak 2-5 minutes** Patient must breathe an effective concentration before commencing the procedure	Offset 2-5 minutes 100% Oxygen is to be given on ceasing N_2O for 5 minutes to avoid diffusion hypoxia **Psychometric recovery in 20 minutes** (falls risk prior)

Exclusion criteria

Age ≤ 2 years of age - Risk of airway obstruction

Severe pulmonary hypertension associated with limited exercise tolerance - Risk of exacerbation

Gas filled space - Risk of expansion - 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 - Risk of airway obstruction e.g. Pneumonia or respiratory tract infection with excessive secretions and poor respiratory reserve. Severe asthma (wheeze present)

Additional criteria PICU & DMU

Nitrous Oxide in PICU

Day Medical Unit Procedural Sedation with inhaled Nitrous Oxide

Dose

Nitrous oxide (N_2O) 30-70%. The dose is titrated to the desired effect, maintaining a UMSS ≤ 2

- N_2O must always be blended with Oxygen (30-90 %) via the designated delivery system at RCH
- The maximum percentage of N_2O which can be delivered is 70%, with a minimum O_2 30%
- Additional opioid or sedation agents may have synergistic effect producing excess sedation.

Assess before commencing N_2O:

- If UMSS ≤ 1 N_2O must be titrated to maintain UMSS ≤ 2
- If UMSS is ≥ 2 do not administer N_2O seek consultation

Use of Midazolam / Opioids with N_2O

If the patient is extremely anxious (despite non-pharmacological techniques and preparation), consider a rapid titration approach or midazolam (oral or buccal- see table for dosing) prior.

If the patient is considered to require additional analgesia, consider timing the procedure with the patient's baseline analgesia or consider intranasal fentanyl.

Delivery

Nitrous oxide is delivered via the Porter MXR Nitrous Oxide delivery system

Check nitrous oxide equipment and fail safe mechanisms prior

Gas scavenging must be set up and on

Maximum 45 minutes for procedural sedation Risk (side effects) > Benefit (see practice points)

Side effects	**Adverse effects**
Dizziness	Expansion of closed gas-filled space
Lightheaded	Respiratory depression/apnoea
Headache	Loss of airway reflexes (pulmonary aspiration risk)
Euphoria	Diffusion hypoxia (see practice points)
Memory loss	Laryngospasm
Mild Nausea	Excessive sedation (UMSS > 2)
Vomiting	Hallucination- Scary or Nightmare
Auditory – amplification of noise	Loss of consciousness
Visual disturbance	Folate metabolism and vitamin B12 suppression

Monitoring

HR, RR, SpO_2, and UMMS score monitored continuously

Effects of N_20 = 4A's

Anaesthesia

Dissociative, euphoria, drowsiness

Offers ability to sedate - awake state

Conscious sedation UMSS 2

Anxiolytic*

Prepared PRIOR

Reduce anxiety with non- pharm techniques

Analgesic*

Mild to moderately painful or distressing procedures

Amnesic

Mild to moderate

***Consider limitations**

Effectiveness of N_20

Minimal CVS & Respiratory effects as a SINGLE drug

Sedation

Potential to reach moderate to DEEP sedation (UMSS 3) at 70%

Combined with opioid or other sedative increase risk DEEP sedation

Risk to protective reflexes & spontaneous ventilation

- 50-70% patients mild to moderate sedation
- 10% patients poorly sedated

Pain

Rapid but short acting pain relief (while drug inhaled)

Wean or cease no longer provide ANALGESIC effect

Concurrent opioids = Risk

- 80% experience excellent analgesic
- 10% some analgesia
- 10% not effective

Midazolam Pre N_2O ?

Anxiolysis

Concurrent sedative = Risk

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

How to deliver N_20 ?

Technical skill (Porter MXR)
Tailor to Pt response

Consider your approach
What's your goal ? (Prep+4A's)
Monitor continuously

Initial target anxiolysis
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

Initial higher concentrations are used
Reduce once painful part of procedure is completed

N_20 & Diffusion hypoxia ?

N_20 has a low blood: gas solubility coefficient

- Rapid diffusion of N_20 out of blood
- Pulmonary circulation into alveolar sacs
- Occurs in larger volumes

N_20 dilutes the O2 & C02 in the alveoli

- Reducing alveolar O2 tension may produce hypoxia
- Reducing alveolar C02 may suppress ventilation & hypoxemia

May occur If N_20 intake is suddenly discontinued

- End of inhaled sedation patient breathes atmospheric air
- Mask off or interruption to flow

Avoiding diffusion hypoxia

100% N_20 can be rapidly lethal

Risk > with Respiratory depression

Perform equipment checks prior

- Machine or system failure ?
- Delivery units must have safety lock out mechanisms

<u>Reservoir bag has mixed gases !</u>

Administer 100% 0_2 "wash out" N_20 3-5 min

Mask off >30 sec deliver 100 % 0_2

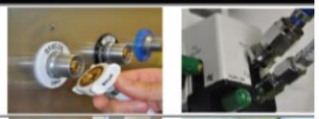
Rescue using Bag + Mask to deliver 100% 0_2

N_2O Equipment checklist

Checklist Porter MXR & Equipment

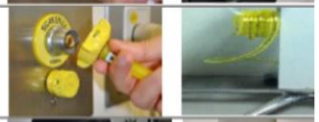
CHECK CONNECTIONS GAS HOSES *BLUE (N20) WHITE (OXYGEN)*

- SECURED AT THE BACK OF THE MXR UNIT
- SECURED AT THE WALL OUTLET
- PIN WHEEL TO CORRESPONDING OUTLET
- WHITE O_2 TO O_2 BLUE N_2O TO N_2O



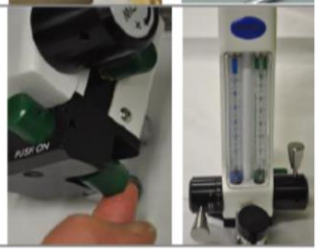
CHECK SCAVENGING SYSTEM *YELLOW*

- 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

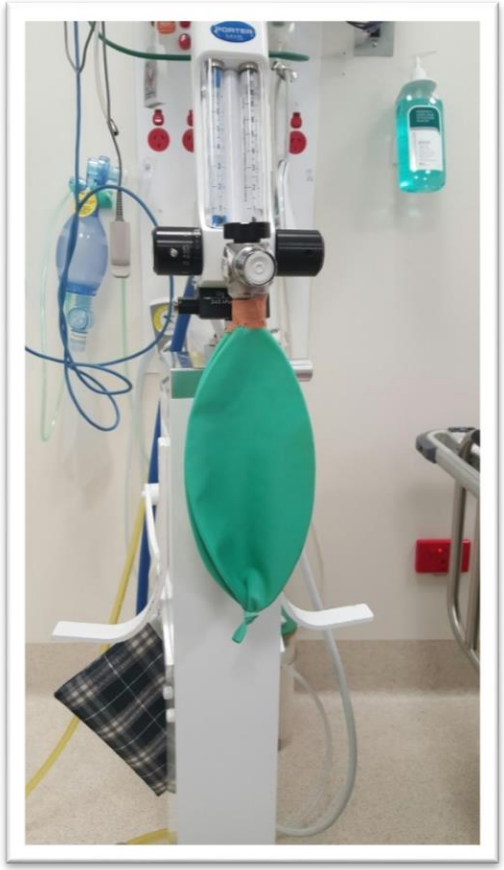
- TURN CONCENTRATION CONTROL KNOB TO 50% N_2O
- THERE SHOULD BE NO FLOW OF N_2O DUE NO O_2
- TURN THE FLOW CONTROL KNOB TO 3-4 L/MIN O_2
- THE N_2O SHOULD FLOW PORTIONALLY TO THE O_2 THE FLOW METRE BALLS SHOULD AT SAME HEIGHT
- INTERRUPT THE OXYGEN SUPPLY BY LOOSENING THE OXYGEN PIN WHEEL AT THE WALL 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)
- **N_2O FLOW STOPS COMPLETELY WITH NO O_2 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 RESERVIOR BAGS
- DO NOT TIE OR MODIFY RESERVIOR 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

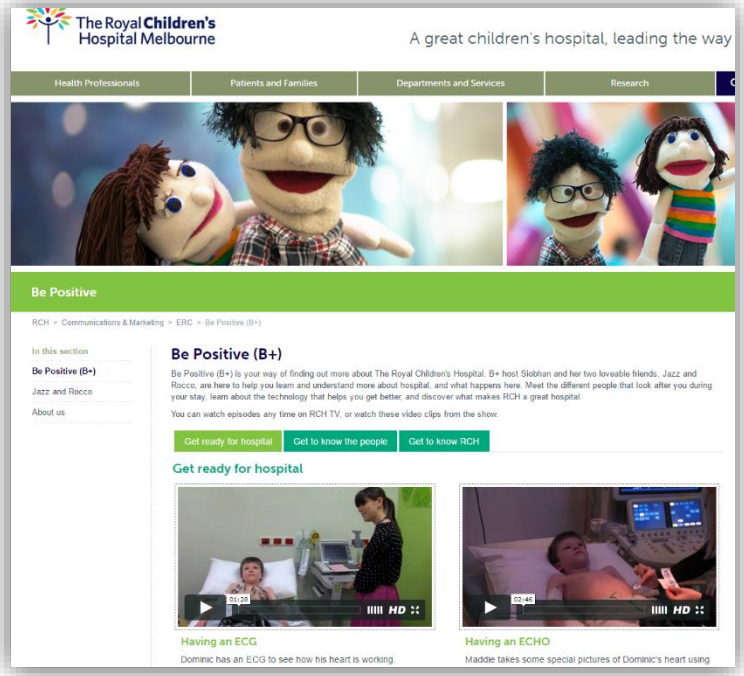


N_2O Equipment Trouble shooting

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



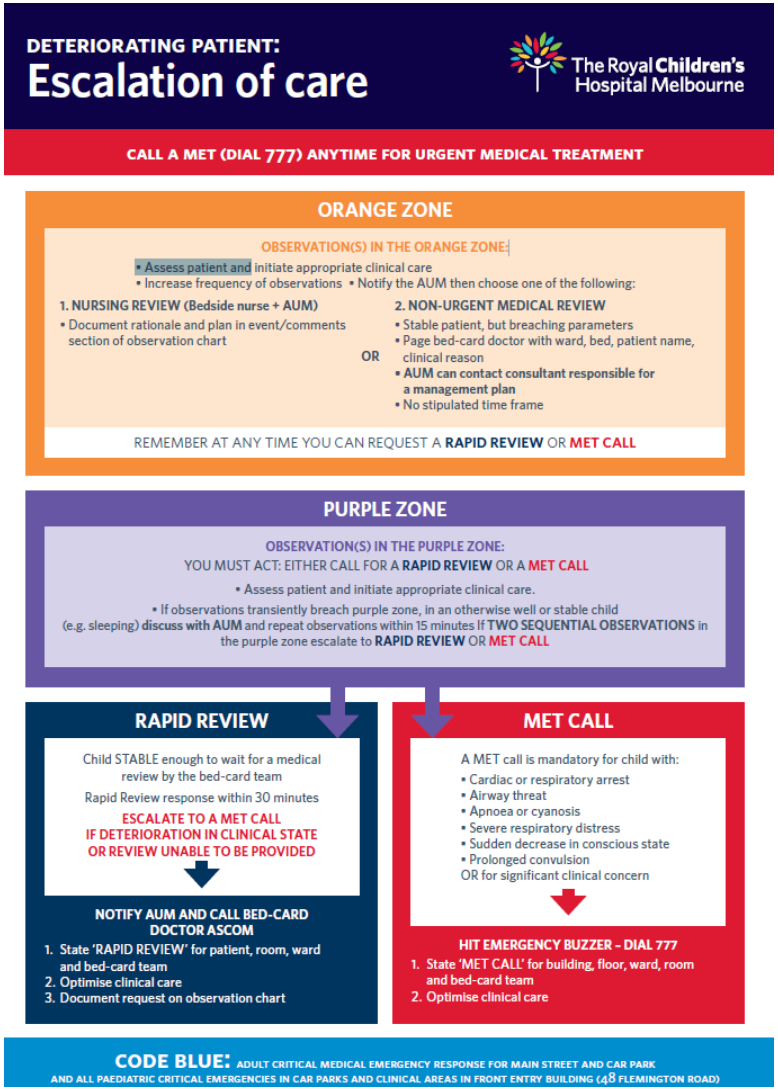
[Having nitrous oxide – YouTube]

Failure to sedate

Failure to sedate – factors			
Patient	**Drug**	**Procedural**	**Staff**
Overstimulation	Adverse effect	Lack of preparation	Sedationist
Environment noise Procedural talk Bright lighting Unsuitable audio/visual Staff interruption Excess staff Movement of patient Lack of leader/one voice Lack of calm preparation Time of day	**N_20** Poorly sedated 10% No analgesia 10% Vomiting 6-10% **Midazolam** Paradoxical agitation Delirium **Chloral hydrate** Hyperactivity1-2%	Preparation of equipment in front of patients increases anxiety Lack of procedural preparation results in delays and prolonged procedures	Technique, knowledge and skill proficiency is required to avoid ineffective titration of N_20 or IV midazolam Sedationist must plan commencement of procedure in relation to sedation onset and peak.
Failed administration	Timing	Procedural pain	Inadequate staffing
Refusal Spit out Vomit	Too early/too late	Procedure painful or distressing. Inadequate analgesia or local anaesthesia	Adequate staffing is required for delivery of sedation and to perform the procedure
Fear of procedure	Dosing	Length of procedure	Proceduralist
Developmental stage Non acceptance of mask Past negative experience Parental separation Lack of patient preparation	Peak sedation ineffective due to inadequate dose	Duration of procedure exceeds sedation period. Restlessness due to prolonged procedure	Technique and skill proficiency is required to avoid an extended procedure
Support plan			
Rest Recover Reassess			
Additional sedation agent consultation			
Outpatient reschedule consultation			
Referral for GA consultation			
Seek consultation using the ISBAR communication tool			

Excess sedation

- Risk of over sedation
  - Assessment
  - Consultation
- Synergist effects
  - Opioids/ Clonidine
  - Anti-histamines
  - Anticonvulsants
  - Benzodiazepines
- Baseline
  - UMSS & Observations
- Maintain
  - Line of sight



Escalation of care

Sedationist

- Pre-sedation = Checklist
  Equipment = Rescue
- Leadership = Roles
- BLS = Accredited

Ready 2 Rescue

- Respiratory depression
- Loss of consciousness
- Pulmonary aspiration
- Loss of airway
- Laryngospasm

Transport or Discharge

Transport of the sedated patient
The patient is accompanied by an accredited or competent clinician
The patient is placed in the recovery ” lateral” position
Continuous monitoring of SpO_2 and HR
Observation of respiratory effort and airway patency
UMSS ≤ 2 Minimum requirement for patient transfer
Oxygen
Face mask
Pulse oximetry
Suction unit/Yankauer and Y-suction catheters
UMSS > 2 Additional requirements
Medical staff
Blood Pressure monitoring
Appropriate size airway/self-inflating bag/air cushion mask/anaesthetic bag
Emergency equipment as prepared by Medical staff

Discharge criteria
The patient returns to baseline level of consciousness and observations are within normal limits for the patient
IV cannula removed
Pain controlled
Nausea +/- vomiting controlled
Demonstrates adequate cough and tolerates fluids +/- diet
Discharge is indicated by the medical team
Motor function returned to baseline Patient can sit up unaided or walk (as developmentally appropriate)
A responsible adult is present to accompany the patient (all ages)
Post sedation fact sheet provided Sedation for procedures 4: Care at home
Complete the “Record of sedation for procedure” summary of sedation episode

Summary of sedation

Summary of procedural sedation episode	
Pharmacological agent & adjuncts	
Procedure	Specify
Procedure(s)	List
Procedural attempts	number
Procedural outcome	successful / not = specify
Sedation agent (can be more than one)	Y/N
Midazolam IV / oral	mg
Chloral hydrate	mg
Nitrous oxide	%
Analgesic response to Nitrous oxide	Y = poor / moderate / excellent N = specify
Deepest level of sedation	UMSS 1-4
Anxiolytic response to sedation agent	Select one response
Asleep	
Calm, cooperative	
Anxious, reassurable	
Anxious, not reassurable	
Crying, resisting, verbal refusal	
Analgesic Oral (can be more than one)	Y/N
Paracetamol	mg
Ibuprofen	mg
Oxycodone	mg
Tramadol	mg
Clonidine	mcg
Analgesic response	Y = poor / moderate / excellent N = specify
Analgesic IV (can be more than one)	Y/N
Paracetamol	mg
Tramadol	mg
Clonidine	mcg
Fentanyl infusion	mcg/kg/hr
Fentanyl bolus	mcg/kg
Fentanyl PCA	mcg/kg
Morphine infusion	mcg/kg/hr
Morphine bolus	mcg/kg
Morphine PCA	mcg/kg
Ketamine infusion	mcg/kg/hr
Ketamine bolus	mcg/kg
Analgesic response	Y = poor / moderate / excellent N = specify

Consultation for this event	Y/N
Comfort Kids Program (p7933)	(Y = issue/ advice)
CPMS (p5773)	(Y = issue/ advice)
Anaesthetist In Charge (52000)	(Y = issue/ advice)
Other (treating medical team)	(Y = issue/ advice)
Side effects/Adverse events	**Y/N (Y = specify)**
CNS	Y/N
Prolonged sedation/recovery time	
Excessive sedation UMSS >2 (ward/ambulatory)	
Failure to sedate	
LOC (Loss of Consciousness)	
Agitation unrelated to pain (Hyperactivity /Delirium /Paradoxical agitation)	
Hallucination- Scary or Nightmare	
Other	
Airway / Respiratory	Y/N
Airway obstruction	
Respiratory distress	
Desaturation (< 92 %)	Y= (%)
Apnoea - hypoventilation	
Aspiration	
Other	
CVS	Y/N
Hypotension	
Bradycardia	
Tachycardia	
Arrhythmia	
Other	
GIT	Y/N
Nausea	
Vomiting	
Allergy	Y/N
Rash	
Anaphylaxis	
Injury	Y/N
Fall	
Other	
Escalation of care	Y/N
Reversal agent	Y= flumazenil or naloxone + dose mcg/kg
Airway manoeuvre or airway adjunct	
Bag Mask Ventilation	
MET	
Intubation	
Transfer to higher level of care	

Summary of sedation

Summary of procedural sedation episode	
Non pharmacological techniques	
Preparati	Y/N
Carer or parental presence/ role	Y/N Y = specify
Educational Play Therapist/Comfort First present	Y/N
Medical play / Medical education prior	Y/N Y = specify
Child actively participates	Y/N Y = specify
Coping techniques	Y/N
Positioning for comfort	Y/N Y = specify
Distraction / Alternative focus	Y/N Y = specify
CaBreathing & Relaxation techniques	Y/N Y = specify
Dummy / Swaddle	Y/N
Non-medical talk	Y/N
Positive self-talk	Y/N
Guided Imagery	Y/N
Music therapy / Singing	Y/N
Hypnosis	Y/N
Devices	Y/N
Buzzy Bee	Y/N
Other	Y/N Y = specify
Procedural Support team involvement	**Name / ascom pager / reason /plan**
Educational Play Therapy	Y = specify
Comfort First	Y = specify
Palliative Care	Y = specify
Psychology	Y = specify
Other	Y = specify

Procedural Sedation order set

DR 2 Order

Procedural Sedation Agent

- Chloral
- Midazolam
- Nitrous oxide
- Fentanyl

Adjuncts

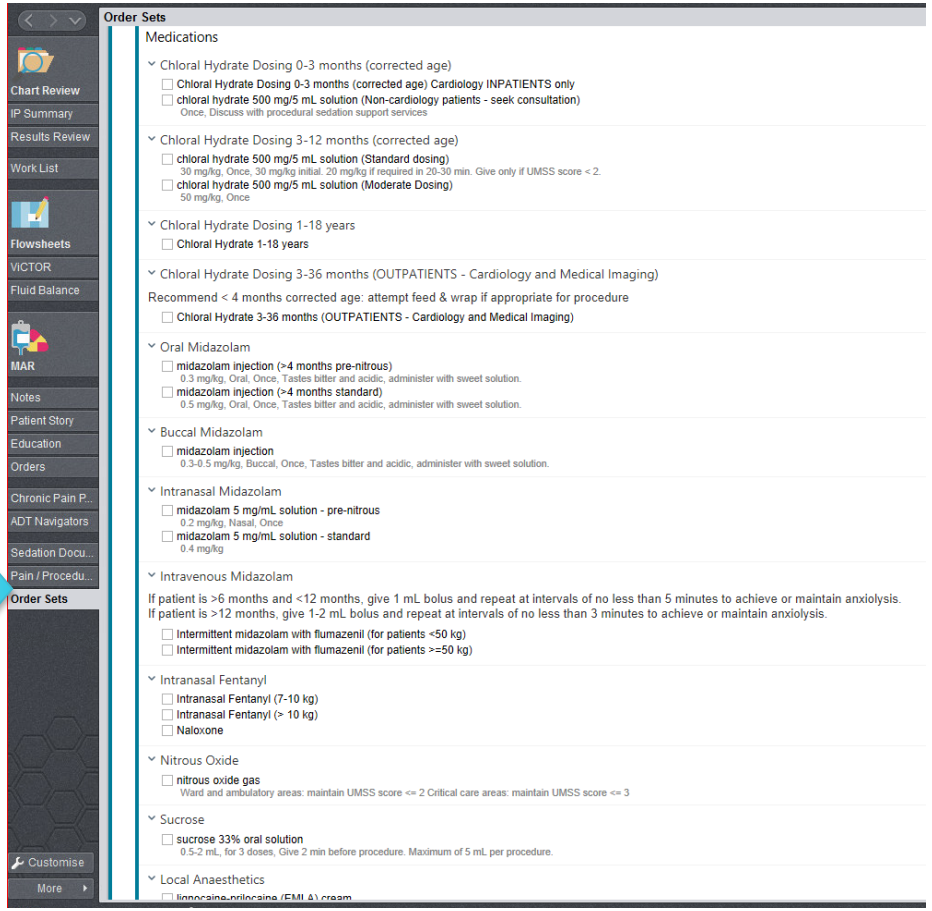
- Topical LA's (Emla, AnGEL)
- Sucrose

Procedural Support

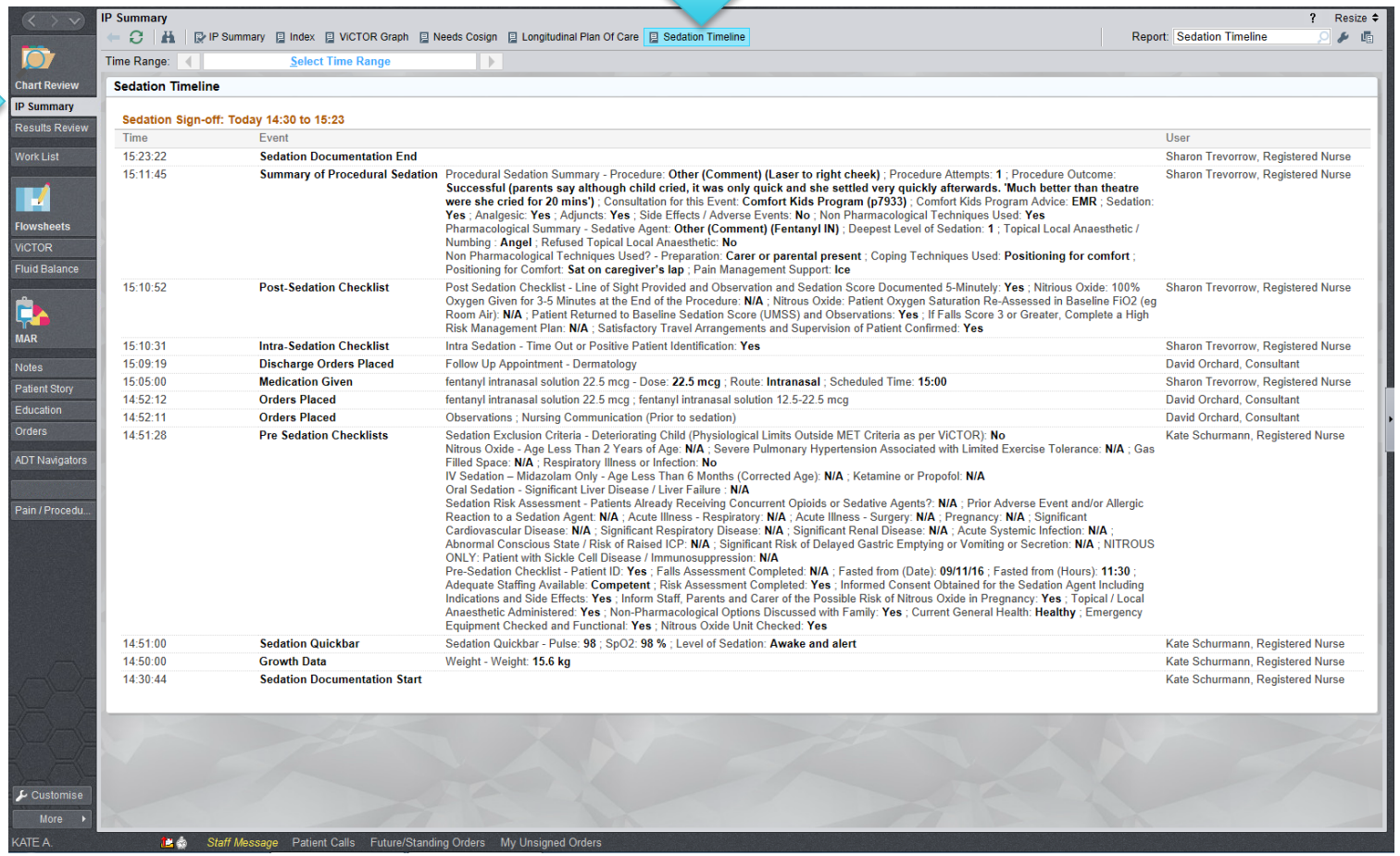
- EPT Referral
- PSWA Procedure & CPG's

Activates Nursing order

- Sedation Narrator
- Observations & Weight



Sedation Timeline



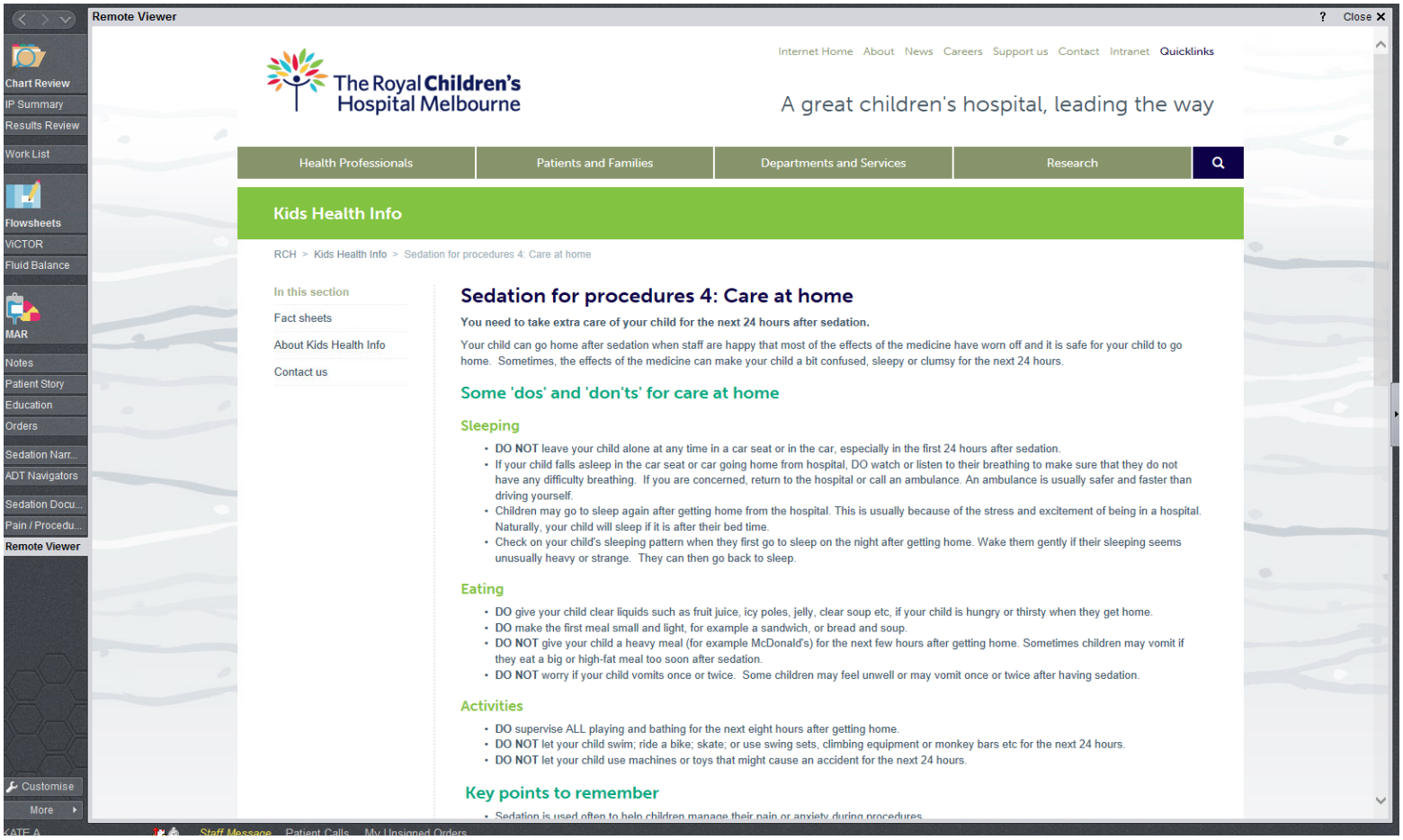
Sedation Timeline

Sedation Sign-off: Today 14:30 to 15:23

Time	Event		User
15:23:22	**Sedation Documentation End**		Sharon Trevorrow, Registered Nurse
15:11:45	**Summary of Procedural Sedation**	Procedural Sedation Summary - Procedure: **Other (Comment) (Laser to right cheek)** ; Procedure Attempts: **1** ; Procedure Outcome: **Successful (parents say although child cried, it was only quick and she settled very quickly afterwards. 'Much better than theatre were she cried for 20 mins')** ; Consultation for this Event: **Comfort Kids Program (p7933)** ; Comfort Kids Program Advice: **EMR** ; Sedation: **Yes** ; Analgesic: **Yes** ; Adjuncts: **Yes** ; Side Effects / Adverse Events: **No** ; Non Pharmacological Techniques Used: **Yes** Pharmacological Summary - Sedative Agent: **Other (Comment) (Fentanyl IN)** ; Deepest Level of Sedation: **1** ; Topical Local Anaesthetic / Numbing : **Angel** ; Refused Topical Local Anaesthetic: **No** Non Pharmacological Techniques Used? - Preparation: **Carer or parental present** ; Coping Techniques Used: **Positioning for comfort** ; Positioning for Comfort: **Sat on caregiver's lap** ; Pain Management Support: **Ice**	Sharon Trevorrow, Registered Nurse
15:10:52	**Post-Sedation Checklist**	Post Sedation Checklist - Line of Sight Provided and Observation and Sedation Score Documented 5-Minutely: **Yes** ; Nitrious 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** ; Satisfactory Travel Arrangements and Supervision of Patient Confirmed: **Yes**	Sharon Trevorrow, Registered Nurse
15:10:31	**Intra-Sedation Checklist**	Intra Sedation - Time Out or Positive Patient Identification: **Yes**	Sharon Trevorrow, Registered Nurse
15:09:19	**Discharge Orders Placed**	Follow Up Appointment - Dermatology	David Orchard, Consultant
15:05:00	**Medication Given**	fentanyl intranasal solution 22.5 mcg - Dose: **22.5 mcg** ; Route: **Intranasal** ; Scheduled Time: **15:00**	Sharon Trevorrow, Registered Nurse
14:52:12	**Orders Placed**	fentanyl intranasal solution 22.5 mcg ; fentanyl intranasal solution 12.5-22.5 mcg	David Orchard, Consultant
14:52:11	**Orders Placed**	Observations ; Nursing Communication (Prior to sedation)	David Orchard, Consultant
14:51:28	**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?: **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: **N/A** ; Fasted from (Date): **09/11/16** ; Fasted from (Hours): **11:30** ; 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** ; Topical / Local Anaesthetic Administered: **Yes** ; Non-Pharmacological Options Discussed with Family: **Yes** ; Current General Health: **Healthy** ; Emergency Equipment Checked and Functional: **Yes** ; Nitrous Oxide Unit Checked: **Yes**	Kate Schurmann, Registered Nurse
14:51:00	**Sedation Quickbar**	Sedation Quickbar - Pulse: **98** ; SpO2: **98 %** ; Level of Sedation: **Awake and alert**	Kate Schurmann, Registered Nurse
14:50:00	**Growth Data**	Weight - Weight: **15.6 kg**	Kate Schurmann, Registered Nurse
14:30:44	**Sedation Documentation Start**		Kate Schurmann, Registered Nurse

Sedation Timeline allows review of previous sedation events

Provide Fact sheet 4 home



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, indepe 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 Departm an internal sedation accreditation program
- Designated staff members from the Department of Anaesthesia and Pain Management, are the on 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 Procedura 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, CN 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 oxid guide
6. Orientate self to the required documentation including; the Record of Sedation, Prescription and Vi 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 a 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 tir
10. Provide evidence of meeting all of the competency requirements to the Manager and or Educator, skills competency into Trendcare and email kate.austin@rch.org.au
11. Administer nitrous oxide independently

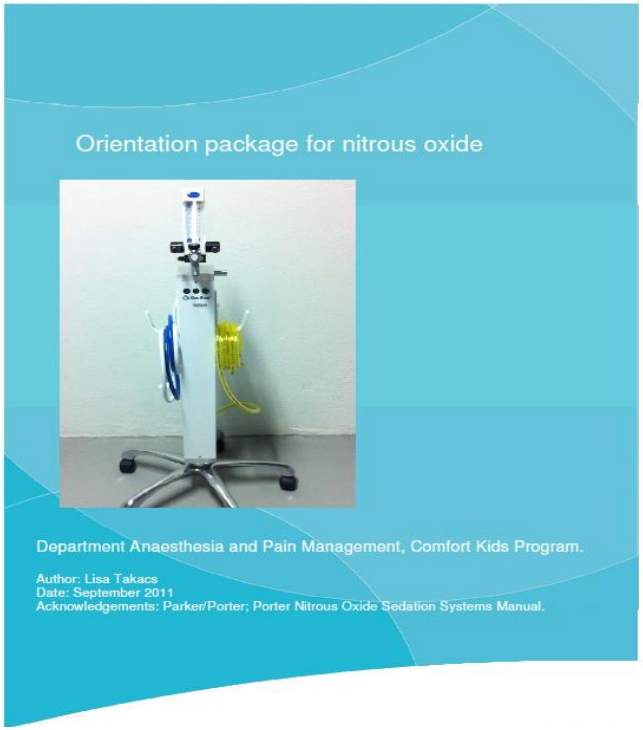
Stage	Procedural Sedation	Foundations of Procedural Pain Management (PPM)
1	Principles of Procedural Sedation (45mins) KA • Introduction to Procedural Sedation for Ward and Ambulatory areas (Procedure) • EMR Sedation narrator / Procedural sedation order sets	What is pain? (30 mins) KP • Rationale for multimodal approaches to PPM • Enablers and barriers to procedural PPM
2	Nitrous oxide (45- 60mins) KA • Theory - Introduction to Nitrous oxide(30-45 mins) • Skill - Clinical facilitation of Nitrous oxide (45mins) • Skill - Partnering in accreditation – supervision of Nitrous oxide delivery with KA (60min)	Introduction to procedural pain management (45 mins) KP • The 5 essential elements of PPM
3	Procedural Analgesia and Adjuncts (30mins) • Introduction to Intranasal Fentanyl (30min) KA • Local anaesthesia and adjuncts (30min) KP/ KA	Procedural coaching for children and their families (30-45 mins) EPT • Communicating with children and their families about medical procedures • Coping and distraction coaching • Visual schedules • Advocacy – one voice
4	Incremental IV Midazolam (30-60 mins) KA • Theory - Introduction to IV Midazolam (30min) • Skill - Partnering in accreditation – supervision of IV Midazolam administration with KA (60min)	Be sweet to babies (30 mins) KP/ KA • Pharmacological: use of local anaesthesia, sucrose, sedation • Non-pharmacological: kangaroo care, touch etc
5	Procedural Sedation Trainer Program - KA TBA Sept (for existing and new nurse trainers) • Procedural sedation agents • Pt Assessment and Documentation • Human Factors and Adverse Event management • Facilitation and Accreditation training • Simulation Based Training and Assessment	One day interactive workshop KP TBA late 2016 (multidisciplinary presenters and participation) • Foundations of Procedural Pain Management

CKP PPM Resources

Distraction equipment

Coolsense

Buzzy Bee



PPM eLearning

https://www.eviq.org.au/eviQEd/PICSProceduralpain.aspx

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PICS Procedural pain is everyone's responsibility

Procedural pain is everyone's responsibility

Background

Pain related to medical procedures is often the most distressing cause of pain for children with cancer. As part of their antineoplastic treatment children are exposed to multiple invasive medical procedures for example bone marrow biopsies, lumbar punctures, care of central venous access devices i.e. access and dressings, venipuncture, insertion of nasogastric tubes, finger pricks and intramuscular or subcutaneous injections.

With the length of treatments children with cancer face these procedures can be repetitious and may occur in clusters over short periods of time. The cumulative effects of these painful experiences may result in adverse psychological outcomes or development of a conditioned anxious response for the child or adolescent and family. It has been established children have a long term memory for pain which may influence a child's response and behaviour in subsequent painful procedures.

These modules have been developed by the Paediatric Integrated Cancer Service (PICS) with input from the Children's Cancer Centres at the Royal Children's Hospital Melbourne and Monash Children's Hospital and families of children undergoing treatment for cancer. The aim is an overview of how to ensure any exposure to a painful experience be the best experience possible for the child.

Target audience

1. Clinical staff who have recently started working in Paediatric Oncology.
2. Clinical staff working with children undergoing medical procedures.

Content

These interactive modules takes approximately 30 minutes to complete.

The intended learning outcomes include:

- describing the rationale for providing effective procedural pain management to children
- describing patient's rights in regards to effective procedural pain management
- recognising the consequences of poorly managed procedural pain management
- identifying the impact of psychological factors on the child's perception of pain
- describing the implications of inadequate analgesia
- describing the components of a good medical procedure.

Access

Click on the links below to access the modules.

- **Procedural pain is everyone's responsibility**
- **Procedural pain - being prepared**

Comfort Kids Program
CNC PPM Team

Kate Austin

- CKP lead CNC
- Procedural Sedation consultation
- PSWA simulation training & education

Karin Plummer

- CKP Research lead
- PPM Integrative modalities Consultation
- Foundations of PPM Education

Marnie Pascoe

- Return April 2017
- Clinical support role
- Specialist skills set ASD & DD children

What matters…