

# PROCEDURAL SEDATION (PAEDIATRIC WARD, CLINIC AND IMAGING AREAS)

## PRACTICE GUIDELINE<sup>®</sup>

### DOCUMENT SUMMARY/KEY POINTS

**This Guideline has been developed for use within the Sydney Children's Hospital Network (Randwick and Westmead Campuses).**

**Section 8 of this document contains Westmead site specific information.**

Sedating children carries serious associated risks including airway obstruction, hypoxia, hypoventilation, apnoea and cardiopulmonary arrest. In selected cases, sedation by non-anaesthetists can be a safe and flexible alternative to general anaesthesia.

#### STATEMENT OF INTENT

- This document provides guidelines for the management of children undergoing diagnostic and therapeutic interventions that require a degree of pharmacological analgesia and sedation.
- It does NOT describe sedation within the intensive care setting, emergency department or sedation for psychological illness.

**Note:** This document is relevant to clinical staff in **general ward and out-patient areas only**. Staff caring for children with urgent, emergent, life-threatening illness or psychological illness should consult guidelines from the appropriate area (ED, ICU or Psychological medicine)

- **Within the SCHN, only minimal sedation and moderate sedation can be administered by non-anaesthetists.**
- Deep sedation, when required or when inadvertently obtained, requires the involvement of anaesthetic personnel.
- Relative analgesia using inhaled nitrous oxide must be administered by accredited clinical staff or members of the Pain Service.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

<b>Approved by:</b>	SCHN Policy, Procedure and Guideline Committee	
<b>Date Effective:</b>	1 <sup>st</sup> January 2019	<b>Review Period:</b> 3 years
<b>Team Leader:</b>	Deputy Head Pain and Palliative Care	<b>Area/Dept:</b> Anaesthesia CHW

## CHANGE SUMMARY

- This document applies across both campuses of the Sydney Children's Hospital Network (Randwick and Westmead).
- The document incorporates standards and approaches from the ANZCA guideline on Sedation and/or Analgesia for Diagnostic and Interventional Medical, Dental or Surgical Procedures<sup>2</sup> (PS9 2014) as far as it can be applied to paediatric practice.
- Agents used to achieve sedation will vary from institution to institution depending upon local environment and available resources.

## READ ACKNOWLEDGEMENT

This document should be read by all SCHN staff that care for children who require analgesia or sedation for diagnostic or therapeutic procedures.

### **Education and Training requirements**

Staff administering sedation must:

- Annually complete mandatory Life Support Assessment Skills Training as per requirements on My Health Learning. Staff administering Nitrous oxide must complete training and assessment requirements. This involves workshop attendance, completion of a learning package and competency assessment. Refer to related policies and teaching packages where appropriate.

### **How to use this document:**

- Sections 1 – 7 apply across both campuses of the Sydney Children's Hospital Network (Randwick and Westmead).
- Section 8 contain procedure specific information that is specific to the Westmead campus only.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

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## 1 Introduction

Many children undergo painful or distressing interventions as part of their medical care. Procedural sedation can facilitate successful intervention, if the intervention is brief, simple and minimally painful. Effective procedural sedation can reduce a child's anxiety; and minimise post-traumatic stress<sup>1</sup>. Complex, painful or prolonged procedures may be better managed with general anaesthesia.

Interventions vary according to:

- the amount of pain, discomfort and anxiety induced
- the need for immobility
- the potential need for urgent invasive intervention i.e. the risk of procedural complications.

Three grades of interventions can be described:

Grade	Characteristics	Typical management/ examples
I	No pain, minimal discomfort, moderate anxiety Does not need immobility, little/no risk of procedural complication	Minimal sedation ("Anxiolysis") <i>e.g. Pre-med prior to general anaesthesia</i>
II	Mild- Moderate pain and discomfort. Anxiety may be major problem. Does not need complete immobility. Low risk of procedural complications.	Moderate sedation ("Conscious sedation") <i>e.g. Oral premed prior to MRI/CT, Inhaled N2O for botox injections, Oral sedation ± inhaled N2O for burns dressing change.</i>
III	Pain, discomfort and anxiety can be severe. Needs to be immobile. Significant risk of procedural complications.	General anaesthesia

While most situations mandate that children requiring anaesthesia or sedation be admitted to the hospital (at least on a Day-Stay basis), procedural sedation is possible for some selected outpatients.

Sedation is a continuum ranging from anxiolysis to a state of deep sedation approaching general anaesthesia. Sedating children carries serious associated risks including airway obstruction, hypoxia, hypoventilation, apnoea and cardiopulmonary arrest<sup>2</sup>.

This document provides guidelines for the safe administration of procedural sedation by non-anaesthetists at the Sydney Children's Hospital Network (SCHN). These guidelines should be consulted whenever procedural sedation is being considered for a child. It does not cover critical care areas such as the Emergency Department, Operating Theatres and Intensive Care or Neonatal Intensive Care.

Minimum standards of care are also outlined in the ANZCA Professional Document PS9 2014 "Guidelines on Sedation and/or Analgesia for Diagnostic and Interventional Medical, Dental or Surgical Procedures<sup>2</sup> (<http://www.anzca.edu.au/documents/ps09bp-2014-guidelines-on-sedation-and-or-analgesi>).

**The aims of procedural sedation are to:**

- minimise pain and physical discomfort,
- reduce movement (and therefore the need for physical restraint)
- reduce fear and anxiety

***These aims must never compromise patient safety.***

**SEDATION FAILURE:**

**It is important to accept that all sedation regimens have a failure rate.**

**Should the sedation techniques chosen fail, consider re-scheduling the procedure under general anaesthesia.**

## 2 Definitions

Sedation ranges from easily rousable to almost complete unconsciousness. The boundary between sedation and general anaesthesia is sometimes hard to distinguish. On the other hand, analgesia is the specific reduction or elimination of pain perception or pain related behaviours.

There are several ways to describe the depth of sedation.

For the purposes of this guideline, **four levels** will be used to describe the sedation continuum<sup>3</sup>.

### **1. Minimal sedation (“anxiolysis”)**

- A medication-induced state during which patients do not exhibit fear or anxiety but continue to respond normally to verbal commands.
- Cognitive function and coordination may be impaired.
- Respiratory and cardiovascular functions are minimally affected.

### **2. Moderately sedated (“conscious sedation”)**

- A medication-induced state of depressed consciousness wherein patients will tolerate moderately uncomfortable or painful stimuli.
- Patients may be somnolent/sleeping but able to respond purposefully to verbal command (e.g. ‘open your eyes’) or light tactile stimulation.
- Airway protective reflexes and cardiovascular function are preserved.
- A degree of amnesia is usual.
- Techniques should provide a margin of safety that is wide enough to render loss of consciousness unlikely.

### **3. Deep sedation**

- A state of depressed consciousness that may be accompanied by depression of protective reflexes, including the ability to maintain a patent airway independently and will respond only to vigorous physical stimulation or verbal command.

**It is possible for patients to progress from a state of moderate sedation into a state of deep sedation/obtundation very quickly.**

**Only minimal sedation and moderate sedation can be administered by non-anaesthetists.**

**Deep sedation, when required or when inadvertently obtained requires the involvement of anaesthetic personnel.**

#### **4. General anaesthesia**

General anaesthesia is a drug-induced state characterised by absence of purposeful response to any stimulus, loss of protective airway reflexes, depression of respiration and changes to circulatory reflexes. An anaesthetist is required.

**Analgesia** is a reduction or elimination of pain perception or pain-related behaviours usually induced by medications that reduce pain perception by inhibiting peripheral mediators of pain, interfering with nerve conduction or by depressing nociceptive pathways in the central nervous system<sup>2</sup>.

**The Sedation Period** is the period of time commencing with the administration of sedative medications and ending when the patient has recovered to the point where pre-determined discharge criteria are met (see section on [Discharge criteria](#) for sedated inpatients and outpatients).

**The Sedationist** is the staff member who is clinically responsible for the sedated patient. They must have an understanding of the sedation agents administered and the capacity to recognise and respond to adverse events.

#### **Responsibilities of the sedationist include:**

- pre-sedation assessment,
- confirming the prescription of the sedation agent/s,
- confirming an appropriate 'sign in',
- administration of the sedation agent/s,
- monitoring the patient until they have recovered adequately and
- a comprehensive clinical hand over (appropriate 'sign out')

**IMPORTANT: The sedationist may change during the course of the sedation period.**

**If there is more than one staff member responsible for the patient during this time, a comprehensive clinical handover must occur between the designated staff members**



## 3 General Medical Assessment

### **Initial assessment**

All patients scheduled for procedural sedation should be assessed by a medical officer/ approved prescriber prior to drug prescription and administration.

Even seemingly painless or minor procedures can be extremely fear and anxiety-provoking experiences for a child. Therefore an assessment of a patient's suitability for procedural sedation should include:

- The emotional maturity of the child.
- The level of understanding about the procedure (cognitive maturity).
- The current level of pain and distress.
- Any past or trauma experience of the child.

### **Key questions for all paediatric procedures<sup>1</sup>:**

1. What is the procedure required?
2. Is the procedure really necessary?
3. How urgent is the procedure?
4. What is the expected intensity and duration of pain or discomfort for this child?
5. Has the child had this procedure before? If so, was it successful?
6. What is the understanding of the child, parent/carer and what are their expectations?
7. What coping strategies have helped the child cope in the past?

### **Pre-sedation patient assessment:**

1. Age & weight
2. Fasting status (i.e. time of last oral intake for solids and clear fluids)
3. Past medical history:
  - major illnesses, particularly chronic respiratory or cardiac diseases
  - operations
  - known allergies/medication reactions
  - current medication and
  - previous sedation/anaesthesia history & complications.
4. Systems review:
  - Evidence of major organ dysfunction with particular attention to possibility of airway or respiratory compromise (e.g. recent respiratory tract infection, history of snoring, apnoeas, aspirations, chronic or frequent infections, current asthma or croup).
5. Examination:
  - Baseline observations - temp, pulse, respiratory rate, and SaO<sub>2</sub>
  - Baseline BP
  - Evidence of airway obstruction/limited neck movement etc if appropriate.
6. Sedation/anaesthesia history:
  - Previous experience during procedures and
  - Previous use of pharmacologic and non-pharmacological techniques and their effect.



### **Documentation and 'sign in'**

The pre-sedation assessment should be documented in the patient's medical records or on the **Procedural Sedation** Record:

At CHW: M16B [http://intranet.schn.health.nsw.gov.au/files/procedural\\_sedation\\_0.pdf](http://intranet.schn.health.nsw.gov.au/files/procedural_sedation_0.pdf)

At SCH: [http://intranet.schn.health.nsw.gov.au/files/scn130345\\_0.pdf](http://intranet.schn.health.nsw.gov.au/files/scn130345_0.pdf)

A formal 'sign in' process must be completed and include:

- patient identification
- procedure and consent verification
- acknowledgement of drug allergies and adverse reactions
- medication (e.g. antibiotic) and imaging requirements

## **4 Risk Assessment and Preparation**

### **Risks associated with sedation:**

Sedating children carries serious risks including respiratory depression, unintentional loss of consciousness, cardiovascular depression and anaphylaxis, and there is always a risk of the patient slipping into deeper levels of sedation approaching general anaesthesia. It is widely accepted in the literature that the use of three (3) or more sedation agents given concurrently increases risk of adverse outcomes<sup>3</sup>. Thus, it is important that all members of staff caring for the sedated patient are fully aware of the risks associated with the administration of sedatives, can monitor and recognise different levels of sedation, and are able to respond to any complications appropriately. Additionally, procedural sedation requires an appropriately equipped environment (see [5.3 below](#)).

### **Specific risk assessment and exclusion criteria**

Procedural sedation can be delivered safely by non-anaesthetists to healthy children or those with mild systemic disease. Children with significant illness or severe disease (i.e. illness or disease that limits activity) should be reviewed by senior medical staff before procedural sedation is commenced.

### **Conditions associated with increased risk**

- Prematurity and current age < 60 weeks post conceptual age<sup>5</sup>
- History of apnoea or disordered control of breathing
- Cardio-respiratory compromise
- Airway compromise/sleep apnoea/stridor
- Abnormal conscious state/risk of raised ICP
- Neurologic injury or chronic neurologic condition (e.g.: uncontrolled seizures)
- Renal or liver disease
- Neuromuscular disease

- Increased risk of delayed gastric emptying or vomiting which may increase risk of aspiration
- Gastro-oesophageal reflux
- 'New' tracheostomy (i.e. less than one week old)
- Craniofacial abnormality or neck swellings
- Patients receiving opioids or other sedative agents (\*see Pain Guidelines: Nitrous Oxide administration guidelines: 'Contraindications section' (3.2) if relevant).

## 4.1 Preparing children and their carers for procedures

### ***Parental involvement***

- In most circumstances (but certainly not all) parents and carers can help their child through a procedure, however in some instances the parent finds the procedure too distressing to remain present. Alternative support should be considered- see Child life therapy below.
- The procedure should be explained to the parent beforehand so that they can make an informed decision about staying for the procedure.
- It is important that parents who remain present during the procedure understand their role. Parents should be positioned in close proximity to the child and offered guidance in comfort positioning. Parents can facilitate distraction techniques with the support of a health care worker where appropriate.
- Children and their carers should be adequately prepared prior to any procedural intervention.
- The information provided should be timely and developmentally appropriate.
- Good preparation and support for coping strategies can minimise pharmacological sedation and enhance patient and carer satisfaction.
- Preparation should be based on the needs of the individual child and their situation.

### ***Play therapy /Child life therapy***

- Child Life Therapists can assess a child and provide education that meets their unique needs with a range of resources- including social stories or a procedure plan.
- Child Life Therapist (or music therapist) may be present during the procedure to assist with coping strategies and distraction, particularly if the child is known to have elevated levels of anxiety or distress.
- Therapists should be contacted as early as possible to allow time to prepare the child; assist with assessment; and facilitate coping strategies.
- Consider contacting your Child Life services for assistance.

## 5 Sedation by non-anaesthetists

### 5.1 General Guidelines

#### ***Fasting***

Procedural sedation (minimal and moderate sedation) in children should avoid any loss of airway reflexes. The following guidelines reflect this approach.

Sedation Agent	Fasting Time
Oral agent only	2 hours for solids and fluids (including breast milk).
Nitrous Oxide only	2 hours for solids and fluids
Combination of Nitrous oxide with any one of the following: <ul style="list-style-type: none"> <li>i) oral agent</li> <li>ii) opioid PCA/infusion,</li> <li>iii) intra-nasal fentanyl</li> </ul>	4 hours for solids and 2 hours clear fluids
*Consider a longer fasting time (6 hours for solids and 2 hours for clear fluids) for children with risk factors for delayed gastric emptying and when 3 or more sedating agents are to be administered.	

#### ***Venous access***

In general patients deemed suitable to undergo minimal or moderate (“conscious”) sedation by a non-anaesthetist will not require intravenous access unless specifically indicated<sup>3</sup>.

#### ***Consent***

- Consent must be obtained and documented for both the procedure and sedation and documented in the patient’s health care records.
- The proceduralist should gain consent for the procedure and the sedation; however it is the responsibility of the person/s identified as accountable for the sedated patient (sedationist) to provide information about the sedation.
- Parents/carers and their children should be provided with appropriate information, time to ask relevant questions and a clear opportunity to make informed decisions about their care.
- Consent should include information on:
  - the aims of the intervention
  - proposed sedation technique
  - anticipated effects
  - potential adverse effects during and after the intervention.

- **Fact sheets for parents/carers on procedural sedation can be accessed at:**  
<http://www.schn.health.nsw.gov.au/parents-and-carers/fact-sheets/sedation-procedural-sedation>

## 5.2 Staffing, Training and Accreditation

### **Staffing**

- Staffing for the procedure should be in accordance with PS9 'Guidelines on Sedation and/or Analgesia for Diagnostic and Interventional Medical, Dental or Surgical Procedures'<sup>2</sup> <http://www.anzca.edu.au/documents/ps09-2014-guidelines-on-sedation-and-or-analgesia>
- Except for cases of minimal sedation there must be a minimum of three (3) appropriately trained staff present or in close proximity.

### **All staff present during a procedure need to understand their role and clearly identify:**

1. the proceduralist: the staff member performing the procedure.
2. the sedationist: staff member accountable and responsible for sedated patient. The sedationist should be a dedicated clinician (who is not the proceduralist) with appropriate competency-based training. He/she has primary responsibility for monitoring the patient's level of consciousness and cardio-respiratory during the procedure.
3. an additional staff member who is immediately available to assist both.

### **Consider also:**

- a 'safe/ support' person for the child (this may be their parent/carer or child-life therapist) and
- the provider of emotional/social support to the child and the family e.g. Child-life therapist.
  - This person should be the main focus for the child along with the parent/carer..
  - It is helpful for the child to be able to listen to 'one voice' so all other unnecessary conversations should be avoided.

### **Education and Training**

The staff member administering sedation/monitoring the patient requires sufficient training to be able to:

- understand the action of the medications being administered,
- modify the chosen technique appropriately in patients of different ages, or with concurrent medication or disease states
- monitor the patient's level of consciousness and cardio-respiratory status
- detect and respond appropriately to any complications arising from sedation
- understand the actions and use of antagonists (e.g. naloxone and flumazenil) and know where they are located
- respond appropriately if resuscitation is required and contact an emergency response team. All staff members are encouraged to obtain advanced life support skills.
- Annually complete mandatory Life Support Assessment Skills Training as per requirements on My Health Learning Certification for nitrous oxide administration (both

CHW and SCH) involves workshop attendance, completion of a learning package and competency assessment. Contact the respective Pain services for details

### **CHW Nitrous Oxide (N<sub>2</sub>O) Relative Analgesia accreditation**

In order to become nitrous oxide N<sub>2</sub>O relative analgesia accredited and administer N<sub>2</sub>O to paediatric patients for procedural sedation as non- anaesthetists, a Registered Nurse must:

1. Have at least 12 months paediatric nursing experience.
2. Attend the Nitrous Oxide Relative Analgesia Workshop (facilitated by the Pain Team).  
HETI Code: 176094430
3. Successfully complete the Nitrous oxide relative analgesia learning package as deemed satisfactory by the Pain Team. Completion of the learning package to be entered into HETI by the Nurse Educator Oncology Services.
4. Safely administer N<sub>2</sub>O relative analgesia on three separate occasions under observation from a Registered Nurse accredited to administer N<sub>2</sub>O relative analgesia or Medical Officer.
5. Successfully complete the Administration of Nitrous Oxide N<sub>2</sub>O relative analgesia competency assessment. Completion of the competency assessment to be entered into HETI by the Nurse Educator Oncology Services.
6. All accredited staff are encouraged to attend a refresher session whenever they desire. These sessions are comprehensive education sessions and are available throughout the year.

## **5.3 Environmental considerations and Equipment**

- If possible, use a well ventilated treatment room or procedure room and avoid performing the procedure at the child's bedspace.
- The procedure must be performed in a location, which is adequately sized and staffed and equipped to deal with a cardiopulmonary emergency. It must include<sup>2</sup>:
  - A bed (operating table, trolley or chair) which can be tilted easily.
  - Appropriate lighting: to safely observe, monitor and document the patient's colour and vital signs.
  - Oxygen and suitable devices for the administration of oxygen to spontaneously breathing patients.
  - Adequate suction device with appropriately sized suction catheters available.
  - Appropriate size mask and self-inflating bag.
  - Correct sized Guedel's airway, plus one size below and one size above.
  - Pulse oximetry.
  - Available blood pressure monitoring.
  - Easy access to relevant antagonist agents e.g.: naloxone and flumazenil
  - Easily accessible Emergency Call System to summon help.

- Easy access to a Resuscitation trolley with medications for cardiopulmonary resuscitation, fluids, ECG, and defibrillator.
- All necessary preparation to occur before the child enters the treatment room to reduce potential anxiety
- Accessible distraction tools and resources which may assist to promote a calm child centred environment

## 5.4 Monitoring and documentation

Sedated patients must be observed in 'line of sight/line of hearing' by the accountable staff member (sedationist) until the patient has returned to their pre-sedation state.

Sedation should be regularly monitored and documented using the following tool<sup>6</sup>:

Sedation Score	Description and suggested monitoring
<b>0</b>	<b>Awake and alert</b>
<b>1</b>	<b>Minimal sedation (anxiolysis)</b> <ul style="list-style-type: none"> <li>• May appear tired/sleepy, responds to verbal conversation and/or sound</li> <li>• <b>Observe in 'line of sight/line of hearing'. Continuous pulse oximetry</b></li> </ul>
<b>1S</b>	<b>Asleep</b> <ul style="list-style-type: none"> <li>• Easy to rouse</li> <li>• <b>Observe in 'line of sight/line of hearing'. Continuous pulse oximetry</b></li> </ul>
<b>2</b>	<b>Moderate sedation (conscious sedation)</b> <ul style="list-style-type: none"> <li>• Somnolent/sleeping, easily aroused with light tactile stimulation or simple verbal command <b>Continuous pulse oximetry &amp; 15 minutely observations (HR, RR, SaO<sub>2</sub> and sedation level) recorded until sedation score &lt; 2</b></li> </ul>
<b>3</b>	<b>Deep sedation</b> <ul style="list-style-type: none"> <li>• deep sleep, arousable only with significant physical stimulation The patient is at risk of loss of protective reflexes, inability to maintain a patent airway independently therefore anaesthetic support required for this level of sedation</li> <li>• Rapid response call required/request anaesthetic support</li> <li>• Do not leave a deeply sedated patient unattended</li> <li>• <b>Place patient in a recovery position and support airway as required. Continuous pulse oximetry &amp; 5 minutely observations (RR, HR, SaO<sub>2</sub> and sedation level) recorded until sedation score &lt; 3</b></li> </ul>

### ***Pre-sedation period***

- Document baseline vital signs on observation chart immediately prior to commencing sedation. Stop and complete a 'sign in' including a team time-out to confirm patient identity, consent, procedure, site, allergies, drug and imaging requirements.

### ***Sedation period (from sedative administration to achievement of discharge criteria)***



- All patients undergoing sedation must be monitored continuously with pulse oximetry. Appropriate (audible) alarm limits must be set prior to commencement of sedation.
- If, at any time during the sedation period, hypoxaemia is detected ( $\text{SaO}_2 < 93\%$  unless special circumstances exist e.g., congenital heart disease) staff must devote their whole attention to correcting this situation which will generally include ceasing the procedure until the hypoxemia is corrected.
- The sedation score and vital signs should be documented regularly on the
- **Procedural Sedation Documentation Form**  
[http://intranet.schn.health.nsw.gov.au/files/procedural\\_sedation\\_0.pdf](http://intranet.schn.health.nsw.gov.au/files/procedural_sedation_0.pdf) (CHW) or [http://intranet.schn.health.nsw.gov.au/files/scn130345\\_0.pdf](http://intranet.schn.health.nsw.gov.au/files/scn130345_0.pdf) (SCH) or an appropriate clinical observation chart (e.g. eBTF documentation).
- **For sedation score of 2** (moderate sedation), observations should be recorded **every 5 -10 minutes** until the patient's sedation level **returns to 0 or 1**.
- **For a sedation score of 3** (deep sedation), observations (pulse rate (HR), oxygen saturation ( $\text{SpO}_2$ ) and respiratory rate (RR)) should be recorded **every 5 minutes**.
  - Do not leave the deeply sedated patient unattended.
  - Rapid response call required. Request anaesthetic support if unable to maintain a patent airway.
  - If possible, place the patient in a recovery position

## 5.5 Internal Transportation

- Sedated patients, who require oxygen therapy or who have received opioids (oral, intranasal or parenteral) within the last hour, must be accompanied by a Registered Nurse who is appropriately trained in resuscitation skills (annual paediatric resuscitation training 'RESUS4KIDS'). The patients' sedation score should be at a level of  $\leq 2$  (**i.e. not deeply sedated**) in order to transfer between departments.
- A portable pulse oximeter must be used with appropriately set limits and an audible alarm.
- In the event of inadvertent deep sedation (i.e., an unrousable patient):
  - **Do not** transport the patient without a nurse escort and anaesthetic support.
  - A rapid response call must be lodged.
  - Appropriate resuscitation equipment (i.e., oxygen, suction, resuscitation bag and Guedel's airway) must be available during transport.
  - These patients must only be transported by bed, cot or trolley with a porter.

### **Transport of the sedated patient:**

The sedated patient should be accompanied by a staff member at all times who must be continuously responsible for observation of the patient's vital signs, airway patency, ventilation and level of sedation.

The staff member must be trained and competent (BLS + resuscitation e-learning package completed) to initiate resuscitation procedures if required; and know how to call for additional help.

The patient should be continuously monitored with a portable pulse oximeter which has audible alarms set at appropriate limits.



## 5.6 Recommended discharge criteria and 'sign out'

### ***For outpatients:***

1. Cardiovascular function & airway patency are satisfactory & stable.
2. The patient is easily rousable & protective reflexes are intact.
3. The patient can communicate age appropriately.
4. Sedation score of '0' (i.e.: fully awake and alert)
5. The patient can sit up unaided or has returned to baseline state of function

**Note:** *For the very young or disabled child incapable of the usual expected responses, the pre-sedation level of responsiveness or a level as close as possible to the normal level for that child should be achieved.*

6. Minimal pain score (< 4/10).
7. Drinking fluids is desirable but not essential if state of hydration is adequate.
8. Verbal and written discharge information should be provided.  
This should include information on<sup>4</sup>:
  - o specific medications administered
  - o management of side effects (nausea, vomiting, and pain)
  - o contact numbers if problems persist
  - o follow-up instructions and
  - o travel safety tips.

### ***Inpatients to general ward:***

1. Cardiovascular function and airway patency are satisfactory and stable.
2. The patient is rousable and protective reflexes are intact.
3. Absence of respiratory distress.
4. Minimal pain (< 4/10).
5. A comprehensive handover of patient from RN in procedural location to RN receiving the patient on the ward.

**Complete a 'sign out' process:** i.e. ensure that all relevant patient documentation is completed and that appropriate clinical handover has been conducted. This should be completed before the patient / team leave the procedural area.

## 6 Techniques and Formulary

### 6.1 Non-pharmacological Approaches:

- Non-pharmacological approaches will, in some children, reduce or avoid the need for sedation and in many instances will make procedures less distressing for patients, family and staff.
- Combining pharmacological with non-pharmacological techniques is more likely to minimise the distress associated with procedures than either approach alone. Child Life Therapists can educate children and families and facilitate non-pharmacological techniques.
- Staff should be aware of how their own beliefs around pain and non-pharmacological techniques can influence and impact their interaction with the patient and family.

#### ***The benefits of non-pharmacological approaches:***

- Decrease anticipatory anxiety before procedures for children and their families.
- Provide a sense of mastery of stressful situations.
- Encourage the active involvement of parents.
- Promote effective coping with subsequent procedures.
- Promotes timely recovery and re-engagement with daily routine

#### ***Non-pharmacological approaches in children include but are not limited to<sup>1</sup>:***

- Preparation/explanation appropriate for the individual.
- Position for comfort
- Distraction.Guided Imagery.
- Relaxation techniques e.g. deep breathing
- iPads, tablets & DVD players/other electronic media including specific 'pain apps'

#### ***Non-pharmacological approaches in neonates:***

- Swaddling.
- Non-nutritive sucking (e.g.: pacifier).
- Oral sucrose (0 -18 months).
- Refer to:
  - [Sucrose: Management of short duration Procedural Pain in Infants](#)

**Note:** Some of these techniques may be difficult to apply to children <3 years of age, children who are cognitively impaired, children who have a significant behavioural disorder or who have been significantly traumatised by medical procedures. In these circumstances pharmacological approaches as well as general anaesthesia should be considered.

## 6.2 Pharmacological Approaches

### ***Sedation agent choice:***

Choice of the most suitable sedation technique should be based on:

- Target level of sedation
- Contraindications
- Side effects
- Patient/parent/carer preference

Consider the application of topical anaesthetic agents (eg: EMLA™, LMX-4™, Almmetop™) whenever possible and where appropriate.

### ***Nitrous Oxide administration***

Refer to:

- **'Nitrous Oxide Analgesia Policy':**
  - At CHW: <http://webapps.schn.health.nsw.gov.au/epolicy/policy/4289>

### ***Intranasal fentanyl administration***

Refer to:

- **'Intranasal Fentanyl Administration Guidelines':**
  - At CHW: <http://webapps.schn.health.nsw.gov.au/epolicy/policy/1736>

### 6.3 Drug Formulary

**Note:** The information outlined in this document does not contain a full list of adverse effects, interactions and precautions. Please refer to individual Product Information for a complete listing. *Dose ranges are suggestions and should be adjusted after taking into account the nature of the procedure and the physical status of the patient.*

Drug/ Formulary	Onset-duration	Dose	Administration	Side effects
<p><b>Chloral hydrate</b></p> <p><u>Oral:</u> Syrup 1g/10mL (i.e.100 mg/mL)</p>	<p><b>Onset:</b> within 30 minutes.</p> <p><b>Duration:</b> 60 mins – 120 mins Effects can last 4-8 hours</p>	<p><b>Neonates:</b> Seek specialist advice</p> <p><b>3 months to 1 year:</b> 50mg/kg as a single dose; or 30mg/kg initially, followed by 20mg/kg if required after 30 minutes.</p> <p><b>1-6 years:</b> 50-75 mg/kg as a single dose; may give a second dose of 25–50 mg/kg if required after 30 minutes. Total maximum 100 mg/kg (not to exceed 1 g).</p>	<p>Give 45-60 mins before procedure.</p> <p>Administer undiluted slowly or dilute with equal volumes of water or milk to increase palatability and avoid gastric irritation.</p> <p>Monitor child according to level of sedation</p> <p>Most effective in children &lt;2years old and &lt;15kg</p> <p>Most effective given in a quiet, calm environment avoiding unnecessary disturbances.</p>	<p><b>GIT:</b> nausea, vomiting, gastric irritation</p> <p><b>CNS:</b> hangover, disorientation, paradoxical excitement, delirium, ataxia, headaches, nightmares, hallucinations</p> <p><b>Respiratory:</b> Depression, airway obstruction (especially at higher doses)</p> <p><b>Other:</b> Dermatologic, acute intermittent porphyria, ketonuria, leukopenia</p>
<p><b>Fentanyl</b></p> <p><u>Intranasal:</u> use Parenteral preparation 100 microgram/ 2 mL</p> <p><b><u>For children over 20kg consider: 600 microgram /2mL (Westmead Campus)</u></b></p>	<p><b>Onset:</b> <i>Intra-nasal:</i> 2 minutes</p> <p><b>Duration:</b> 30-60 minutes</p>	<p><b>Intranasal:</b> Minimum age 1yr</p> <p>1-2 micrograms/kg/dose at 5 minutes intervals. Up to a maximum of 4 micrograms/kg (maximum: 75 micrograms cumulative</p>		<p><b>CNS:</b> miosis, seizures</p> <p><b>CVS:</b> bradycardia or tachycardia,</p> <p><b>Respiratory:</b> respiratory depression</p> <p><b>GIT:</b> nausea, vomiting, constipation</p> <p><b>Other:</b> urinary retention, pruritus, urticarial, wheals, flushing</p>

<p><b>Ketamine</b></p> <p><u>Oral:</u> use Parenteral 100 mg/mL</p>	<p><b>Onset:</b> Oral- Maximum effect within 30-60 minutes.</p> <p><b>Duration:</b> Up to 2hrs</p>	<p><b>Oral:</b> 1-3 mg/kg (Max 200mg)</p>		<p><b>CNS:</b> seizure activity, emergence reactions incl. vivid dreams, restlessness, confusion, hallucinations, raised intracranial pressure.</p> <p><b>CVS:</b> hypertension, tachycardia</p> <p><b>GIT:</b> nausea, vomiting,</p> <p><b>Other:</b> raised intra-ocular pressure, salivation</p>
<p><b>Midazolam</b></p> <p><u>Oral/Nasal/Buccal:</u> use Parenteral preparation: 5mg/mL</p>	<p><b>Onset:</b> <u>Oral:</u> Maximum effect within 15-30 minutes <u>Nasal/Buccal-</u> Maximum effect within 10mins</p> <p><b>Duration:</b> Up to 2hrs</p>	<p><b>Oral:</b> 6 months – 18 years: 0.25–0.5 mg/kg (maximum 15 mg).</p> <p><b>Nasal:</b> 6 months – 18 years: intranasal 0.2–0.3 mg/kg (maximum 10 mg) up to 0.4 mg/kg may be required. Repeat in 5–15 minutes if required.</p> <p><b>Buccal:</b> 6 months – 18 years: buccal 0.3–0.5 mg/kg (maximum 10 mg)</p> <p><i>Use the lower dose if combining with other sedating agents.</i></p>	<p><b>Oral:</b> Give 30-60 mins before procedure</p> <p><b>Nasal: Use IV solution and a mucosal atomization device (MAD). N.B: Painful as irritating to mucosa- should only be used if rapid effect required.</b></p> <p><b>Buccal:</b> Use IV solution 15-20 mins before procedure.</p>	<p><b>CNS:</b> paradoxical excitement, coma, confusion, synergistic effects with opioids</p> <p><b>CVS:</b> Hypotension</p> <p><b>Respiratory:</b> Depression, airway obstruction (especially at higher doses), apnoea.</p> <p><b>Other:</b> ataxia <b>CAUTION</b> – close supervision required to prevent falls.</p>
<p><b>Morphine</b></p> <p><u>Oral:</u> <b>CAUTION!</b> Various concentrations available (1-10 mg/mL)</p>	<p><b>Onset:</b> Oral 30mins</p> <p><b>Duration:</b> 3-7 hours</p>	<p><b>Oral:</b> 0.2 -0.5 mg/kg (Usual max dose for opioid-naïve patients 10mg)</p>	<p>If used as an adjunct to N<sub>2</sub>O, give 30minutes prior to procedure</p>	<p><b>CNS:</b> miosis, seizures, dizziness</p> <p><b>CVS:</b> bradycardia or tachycardia, orthostatic hypotension</p> <p><b>Respiratory:</b> respiratory depression</p> <p><b>GIT:</b> nausea, vomiting, constipation</p> <p><b>Other:</b> urinary retention, pruritus, urticarial, flushing</p>

<p><b>Nitrous Oxide</b></p> <p><u>Inhalation:</u> Colourless, odourless gas from ward wall outlets or cylinders.</p>	<p><b>Onset:</b> 30-60 seconds</p> <p><b>Duration:</b> Rapid offset once administration discontinued.</p>	<p>Inspired concentrations between 30 and 70% in oxygen.</p>	<p>Inhaled using appropriate breathing circuit and supervised by accredited staff.</p> <p>See specific guidelines.</p>	<p><b>CNS:</b> Dose-dependent depression, increased CBF and ICP whilst maintaining response to CO<sub>2</sub></p> <p><b>CVS:</b> depression, release of endogenous catecholamines.</p> <p><b>Other:</b> nausea and vomiting, expansion of gas filled spaces therefore contra-indicated in the presence of pneumothorax, bowel obstruction, some middle ear disease and recent craniotomy.</p>
<p><b>Oxycodone</b></p> <p><u>Oral:</u> 1 mg/mL syrup 5 mg tablets</p>	<p><b>Onset:</b> <u>Oral:</u> 30 minutes</p> <p><b>Duration:</b> 3-7 hours</p>	<p><b>Oral:</b> 0.1 - 0.2 mg/kg (Usual max dose for opioid-naïve patients 10 mg)</p>	<p>If used as an adjunct to N<sub>2</sub>O, give 30 minutes prior to procedure</p>	

\* Dose ranges are suggestions and should be adjusted after taking into account the nature of the procedure and the physical status of the patient.

## Antagonists

Drug	Dose	Special Consideration	Access at CHW	Access at SCH
<b>Naloxone</b>	5 micrograms/kg/dose given intravenously over 1 – 2 minutes for <b>opioid-induced respiratory depression</b> . Can be repeated every 2 – 3 minutes. Maximum cumulative dose 2 mg	As the duration of action of naloxone is shorter than that of the typical opioids it reverses, any child requiring naloxone must be observed carefully for a return of opioid-induced side-effects	<ul style="list-style-type: none"> <li>All ward areas.</li> <li>Resuscitation trolleys.</li> <li>Pharmacy</li> <li>Op-suite</li> <li>Recovery</li> </ul>	<ul style="list-style-type: none"> <li>All ward areas</li> <li>Resuscitation trolleys</li> <li>Pharmacy</li> <li>Op-Suite</li> <li>Recovery</li> </ul>
<b>Flumazenil</b>	5 micrograms/kg/dose given intravenously over 15 seconds for <b>benzodiazepine-induced over-sedation</b> . Can be repeated every 1 – 2 minutes. Maximum individual dose 200mcg. Maximum cumulative dose 40 micrograms/kg or 2 mg.	Re-sedation may occur. May increase the risk of seizures in pre-disposed patients.	<ul style="list-style-type: none"> <li>Pharmacy (including after hours)</li> <li>Op-suite</li> <li>Recovery</li> <li>CT ward</li> <li>Cardiac Cath lab</li> <li>(not stocked in ED)</li> </ul>	<ul style="list-style-type: none"> <li>Pharmacy</li> <li>Recovery Unit</li> <li>Op-Suite</li> <li>C2North (Medical Day Unit Procedures)</li> <li>C1SW</li> <li>Paediatric ED</li> <li>CICU</li> <li>After hours Drug Cupboard</li> <li>Nuclear Medicine POWH</li> </ul>



## 7 References

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### **IMPORTANT:**

The following guidelines are specific to the Westmead campus and should only be used by Westmead staff.

This document currently does not contain Randwick site specific information.

## 8 Procedural Sedation Procedure Specific Guidelines at CHW

Information for this **CHW specific procedure** is to be used in conjunction with the above general guidelines which is applicable to Randwick and Westmead campuses.

### 8.1 Sedation for Abdominal Paracentesis at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

#### Conditions

Description	Usual Age Range	Usual Duration of Procedure
A cannula is inserted per-cutaneously into the distended abdomen of a child who is thought to have developed a peritoneal collection e.g. following renal transplantation. Some of these children may be systemically unwell. Gross abdominal distension may compromise the child's respiratory efforts.	>12 months	15 minutes

- **Site where procedure is undertaken:** Ward procedure room or operating suite.
- **Nearest resuscitation trolley:** within ward
- **This protocol can be used for:** inpatients only
- **Consent obligations:** Formal consent for procedure and sedation should be documented

#### Usual sedation protocol(s)

Relative analgesia using inhaled nitrous oxide administered by accredited nursing staff or Pain Service: see [CHW Pain Management Guidelines](#).

- Local anaesthetic infiltration reduces the discomfort of the cannulation.

#### Monitoring

- Pulse oximetry is mandatory when using nitrous oxide.

#### Following sedation and the procedure:

- Children receiving nitrous oxide alone can be returned to general ward care as soon as the procedure and 'sign out' is completed.

## 8.2 Sedation for Auditory Evoked Responses at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### Conditions

Description	Usual Age Range	Usual Duration of Procedure
Three skin electrodes are placed on the head, earphones placed on the ears and recordings made. The infants need to be almost motionless to prevent artefacts in the recording.	6 weeks to 2 years	1 – 2 hours

- **Site where procedure is undertaken:** Turner ward.
- **Nearest resuscitation trolley:** Turner ward
- **This protocol can be used for:** inpatients only (Short stay admissions can be arranged through Turner ward).
- **Consent obligations:** Formal consent for procedure and sedation should be documented.
- Usual sedation protocol(s)

Age	Sedation
0 – 3 months	Fast, Feed and wrap
>3 months	Chloral Hydrate 50 mg/kg/dose (Single dose) Give 45 minutes prior to study.

### Monitoring

- A staff member (usually the audiologist) must remain with the child at all times.
- Continuous pulse oximetry should be used.

### Following sedation and the procedure

- Children will be recovered in Turner ward.

### 8.3 Sedation for Botulinum Toxin Injections at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

#### Conditions

Description	Usual Age Range	Usual Duration of Procedure
Multiple intramuscular injections into arms and/or legs. These are moderately painful. The patient needs to lie relatively still and will require analgesia.	2 – 16 years	10 – 20 minutes

- **Site where procedure is undertaken:** Outpatient Department procedure room
- **Nearest resuscitation trolley:** in procedure room
- **This protocol can be used for:** inpatients and outpatients using the same protocol.
- **Consent obligations:** Formal consent for procedure and sedation should be documented.

#### Usual sedation protocol(s)

- Topical local anaesthesia using EMLA cream reduces the pain of the procedure.
- Distraction therapy using a play therapist is also very useful.

Relative analgesia using inhaled nitrous oxide administered by accredited nursing staff or Pain Service: see [CHW Pain Management Guidelines](#).

- For anxious children oral midazolam (0.5 mg/kg) may be used as a premed. Give this orally 30minutes before the study.

**NB.** if children are likely to require a midazolam premed, they should be fasted for 4 hours (solids) and 2 hours (clear fluids) prior to the treatment.

#### Monitoring

- Pulse oximetry is mandatory when using nitrous oxide.

#### Following sedation and the procedure

- Children receiving only nitrous oxide can be discharged to the care of their parents as soon as the injection is complete and oxygenation after N<sub>2</sub>O washout is confirmed.
- Children who have received oral midazolam must remain under supervision within the outpatient department until 'sign out' and discharge criteria are met.

## 8.4 Sedation for Burns Baths and Dressing Changes at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children. Please refer also to the Burns Management Guidelines.

Particular caution should be used with burns patients as they are often also receiving large doses of opioid analgesia which can interact with sedative drugs.

### Conditions

Description	Usual Age Range	Usual Duration of Procedure
Patients are physically moved into the bath and dressings removed. The burned surfaces are inspected, cleaned and superficially debrided. New dressings are applied. For burn depth assessment a Laser Doppler Image may also be taken.	0 – 16 years	20 to 90 minutes

- **Site where procedure is undertaken:** Burns Ward and Burns Outpatient Clinic.
- **Nearest resuscitation trolley:** Burns Ward nursing station.
- **This protocol can be used for:** inpatients. Outpatient clinic patients may also be appropriately managed using this protocol.
- **Consent obligations:** Formal consent for procedure and sedation should be documented.

### Usual sedation protocol(s)

Details (including recommended drug doses) can be found in the CHW Burns Management Guidelines (<http://webapps.schn.health.nsw.gov.au/epolicy/policy/3988/download>)

**Simple dressing:** Use paracetamol, ibuprofen and oxycodone. Consider midazolam for significant anxiety.

**Complex dressing:** (first debridement or more painful site): Add nitrous oxide and/or intranasal fentanyl

**Previously unsatisfactory dressing change sedation:** Add ketamine for significant pain. Add clonidine for behavioural issues.

Relative analgesia using inhaled nitrous oxide. This is usually administered during weekdays by accredited nursing staff or by the Anaesthetic Burns Fellow. see [CHW Pain Management Guidelines](#).

**Larger & complicated burns patients:** Consult the Anaesthetic burns Fellow.

- Opioid infusions in these patients may continue during the sedation period so long as opioid requirements have been stable in the hour prior to sedation.

### Monitoring

- Pulse oximetry is mandatory when using nitrous oxide.

## Following sedation and the procedure

- Inpatients will be recovered in the Burns ward. Outpatients must remain under supervision within the outpatient department until 'sign out' and discharge criteria are met. A close observation bed can be made available for sedated patients on request (see Clubbe ward NUM).

## 8.5 Sedation for CT Scanning at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### Conditions

Description	Usual Age Range	Usual Duration of Procedure
The child is placed on a moving table that enters an X ray tunnel. The tunnel isolates the child from physical contact with carers. For completion of the procedure the child needs anxiolysis and to lie still. Natural sleep represents good conditions. Carers or parents may sometimes accompany the child within the CT room if adequately protected from radiation.	0 – 4 years	15 minutes

- **Site where procedure is undertaken:** CT suite (Radiology department). N.B. There is currently no facility for administering sedation or recovering children within the CT suite. *Sedation is prescribed and administered on the ward. Recovery is likewise carried out on the ward.*
- **Nearest resuscitation trolley:** corridor outside CT suite.
- **This protocol can be used for:** inpatients only. Short stay admissions are arranged through Turner ward. N.B. if prescribing sedation for scans after-hours, please ensure that patients receive continuous nursing care at all times during the sedation period (there are no after-hours radiology nurses).
- **Consent obligations:** Formal consent for procedure and sedation should be documented.
- **Usual sedation protocol(s)**

Age	Sedation
0 – 3 months	Fast, Feed and wrap.
3 months – 4 years	Chloral Hydrate 50 mg/kg/dose (Single dose) give 30mins prior to scan time. (Check timing with CT radiographer)
>4 years and unable to co-operate	Consider general anaesthesia

### Monitoring

- Pulse oximetry is mandatory. Oxygen via face mask may be used to keep SaO<sub>2</sub>>94%

### **Following sedation and the procedure**

- Children will be recovered in their ward (Turner ward for short stay admissions) after 'sign out'.

*Neonates cared for within the Grace Centre for Newborn Care (and Westmead NICU), often receive sedative drugs as part of their care. This may include oral chloral hydrate. The neonatology team may prescribe sedative agents for babies undergoing imaging procedures. In this event, a doctor or neonatal nurse who knows the baby well will accompany and remain with the baby for the sedation period.*

## **8.6 Sedation for Transthoracic Echo Studies at CHW**

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### **Conditions**

<b>Description</b>	<b>Usual Age Range</b>	<b>Usual Duration of Procedure</b>
The child must lie reasonably still for this essentially non-invasive, non-painful procedure. The protocol aims at providing anxiolysis only.	1 – 4 years	20 – 30 minutes

- **Site where procedure is undertaken:** Cardiology Department
- **Nearest resuscitation trolley:** mobile arrest team called
- **This protocol can be used for:** inpatients and outpatients using the same protocol.
- **Consent obligations:** Formal consent for sedation should be documented.

### **Usual sedation protocol(s)**

<b>Intra-nasal midazolam</b>	
Formulation	5 mg/mL (intravenous preparation)
Dose	0.5 mg/kg (intra-nasal or oral) (Max doses 10mg intra-nasal, 15mg oral)
Timing	administer 20 minutes before study

### **Monitoring**

- Pulse oximetry during the procedure (which is completed in a darkened room) should be considered a standard of care. (ECG monitoring is routine during echocardiography)



### **Following sedation and the procedure**

- Children who have received midazolam must remain under supervision within the department until 'sign out' and discharge criteria are met, or be recovered in Turner ward by Turner ward nursing staff.

## **8.7 Sedation for EEG Studies at CHW**

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### **Conditions**

Description	Usual Age Range	Usual Duration of Procedure
Sedation for EEG recording is used when a child is uncooperative or when a "sleep EEG" is specifically required. Multiple surface electrodes are placed on the child's scalp and recordings made. The child needs to remain still as muscle activity can interfere with recordings.	1 – 16 years	30 minutes

- **Site where procedure is undertaken:** Neurophysiology department
- **Nearest resuscitation trolley:** CT ward
- **This protocol can be used for:** inpatients and outpatients using the same protocol.
- **Consent obligations:** Formal consent for procedure and sedation should be documented.

### **Usual sedation protocol(s)**

- Infants and children unable to lie still are first scheduled to receive a simple sedative regime:
- Chloral hydrate 30 - 50 mg/kg oral or per rectum (max 1 gm) given 30 minutes before the recording.

### **Monitoring**

- Both the parent and the EEG nurse specialist remain with the patient during the recordings. Pulse oximetry during the procedure (which is completed in a darkened room) should be considered a standard of care.

### **Following sedation and the procedure**

- Children who have received chloral hydrate sedation can be discharged into the care of their parents/guardians as soon as 'sign out' and discharge criteria are met.

## 8.8 Sedation for Change of Gastrostomy Feeding Tube at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### Conditions

Description	Usual Age Range	Usual Duration of Procedure
Old gastrostomy tube has to be pulled out. This may require some force. ("Mickey buttons" tend to be easier to remove).	2 – 10 years	10 – 15 minutes

- **Site where procedure is undertaken:** Ward procedure room or Outpatient Department.
- **Nearest resuscitation trolley:** within ward
- **This protocol can be used for:** inpatients and outpatients using the same protocol.
- **Consent obligations:** Formal consent for procedure and sedation should be documented.

### Usual sedation protocol(s)

Relative analgesia using inhaled nitrous oxide administered by accredited nursing staff or Pain Service: see [CHW Pain Management Guidelines](#).

- For appropriate children, oxycodone (0.1 mg/kg) with paracetamol (15 mg/kg, maximum dose 1 gm) may be used as a premed. Give this orally or via the feeding tube 30 minutes before changing feeding tube.

### Monitoring

- Pulse oximetry is mandatory when using nitrous oxide.

### Following sedation and the procedure

- Children receiving only nitrous oxide can be discharged into the care of their parents as soon as the feeding tube is changed. Children who have also received oral oxycodone must remain under supervision within the ward/ department until 'sign out' and discharge criteria are met.

## 8.9 Sedation for MRI Scanning at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### Conditions

Description	Usual Age Range	Usual Duration of Procedure
The child is placed on a moving table that enters a magnetic tunnel. The tunnel isolates the child from any physical contact with carers and exposes the child to loud noise. For completion of the procedure the child needs anxiolysis and to lie still. Natural sleep represents good conditions. Ear plugs will be used to encourage sleep and protect against noise.	0 – 6 months	20 – 40 minutes

- **Site where procedure is undertaken:** MRI suite (Radiology department).  
N.B. There is currently no facility for administering sedation or recovering children within the MRI suite.  
**Sedation is prescribed and administered on the ward. Recovery is likewise carried out on the ward.**
- **Nearest resuscitation trolley:** corridor outside MRI suite.
- **This protocol can be used for:** inpatients only. Short stay admissions are arranged through Turner ward. N.B. if prescribing sedation for MRI scans after-hours, please ensure that patients receive continuous nursing care at all times during the sedation period (there are no after-hours radiology nurses).
- **Consent obligations:** Formal consent for procedure and sedation should be documented.

### Usual sedation protocol(s)

- **Age Sedation:**
  - 0 – 3 months: Fast, Feed and wrap
  - 3 months – 6months: Chloral Hydrate 50 mg/kg/dose (Single dose). Give 30 minutes prior to scan time. (Check timing with MRI radiographer)
  - >6 months and unlikely to remain asleep: Consider general anaesthesia

### Monitoring

- Pulse oximetry is mandatory. Oxygen via face mask may be used to keep SaO<sub>2</sub>>94%

### Following sedation and the procedure

- Children will be recovered in their ward after 'sign out' (Turner ward for short stay admissions).

*Neonates cared for within the Grace centre for newborn care (and Westmead NICU), often receive sedative drugs as part of their care. This may include oral chloral hydrate. The neonatology team may prescribe sedative agents for babies undergoing imaging procedures. In this event, a doctor or neonatal nurse who knows the baby well will accompany and remain with the baby for the sedation period.*

## 8.10 Sedation for Urodynamic Studies at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### Conditions

Description	Usual Age Range	Usual Duration of Procedure
Patients need to be catheterised and the bladder filled. Pressures and residual volumes are measured. The bladder is screened during voiding. Patients need moderate anxiolysis but need to remain cooperative.	3 – 16 years	20 minutes

- **Site where procedure is undertaken:** Fluoroscopy room, Radiology
- **Nearest resuscitation trolley:** in room.
- **This protocol can be used for:** inpatients and outpatients using the same protocol.
- **Consent obligations:** Formal consent for procedure and sedation should be documented.

### Usual sedation protocol(s)

Relative analgesia using inhaled nitrous oxide administered by accredited nursing staff or Pain Service: see [CHW Pain Management Guidelines](#).

- For particularly anxious children oral midazolam (0.5mg/kg) may be used as a premed. Give this orally 30minutes before the study.  
(NB. if children are likely to require a midazolam premed, they should be fasted for 4 hours prior to the study)

### Monitoring

- Pulse oximetry is mandatory when using nitrous oxide.

### Following sedation and the procedure

- Children receiving only nitrous oxide can be discharged into the care of their parents as soon as the study is complete. Children who have received oral midazolam must remain under supervision until 'sign out' and discharge criteria are met.

## 8.11 Sedation for Intravenous Cannulation (Short Stay Ward) at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### Conditions

Description	Usual Age Range	Usual Duration of Procedure
Venous cannulation of hand, forearm, cubital fossa or foot veins. For completion of the procedure the child needs mild anxiolysis, to lie still and analgesia.	2 – 10 years	10 – 20 minutes

- **Site where procedure is undertaken:** Turner ward
- **Nearest resuscitation trolley:** corridor outside treatment room
- **This protocol can be used for:** inpatients and outpatients using the same protocol.
- **Consent obligations:** Formal consent for sedation should be documented.

### Usual sedation protocol(s)

Relative analgesia using inhaled nitrous oxide administered by accredited nursing staff or Pain and Palliative Care Service: see [CHW Pain Management Guidelines](#).

- For appropriate children, oral midazolam (0.5 mg/kg) may be used as an alternative. Give this 30 minutes before attempting cannulation.

### Monitoring

- Pulse oximetry is mandatory when using nitrous oxide.

### Following sedation and the procedure

- Children will be recovered in Turner ward by Turner ward nursing staff after 'sign out'.

## 8.12 Sedation for Nuclear Medicine Imaging at CHW

The following guidelines are provided on the basis that only staff members who are familiar with the pharmacology of the sedative agents being used and their adverse effects profile will administer sedative agents to children.

### Conditions

Description	Usual Age Range	Usual Duration of Procedure
<b>Cystograms.</b> Children need to be catheterized and have their bladder filled. No IV injection.	2mo – 10 years	35-40 minutes
<b>MIBG diagnostic scans.</b> Children have an isotope injected on the day before imaging. They must lie reasonably still under the imaging camera.	2mo – 6yrs	60- 120 minutes
<b>Bone scans/ Brain scans.</b> Children require IV access for injection of an isotope just prior to imaging. Images are captured at 10-15 mins and again, 2hrs after injection.	2mo – 10 years	30-45 minutes

- **Site where procedure is undertaken:** Nuclear medicine Department
- **Nearest resuscitation trolley:** Ct/MRI scan area
- **This protocol can be used for:** inpatients and outpatients using the same protocol.
- **Consent obligations:** Formal consent for sedation should be documented.

### Usual sedation protocol(s)

Study
<b>Cystograms.</b> Oral midazolam 0.5 mg/kg 30mins before procedure. Relative analgesia using inhaled nitrous oxide administered by accredited nursing staff. See <a href="#">CHW Pain Management Guidelines</a> .
<b>MIBG diagnostic scans.</b> Oral chloral hydrate 50mg/kg 45 minutes before procedure. Use comfort measures such as wrapping in blankets to encourage sleep.
<b>Bone scans/ Brain scans.</b> Most children do not require sedation. Oral chloral hydrate 50mg/kg 45 minutes before procedure. Use comfort measures such as wrapping in blankets to encourage sleep.

### Monitoring

- Pulse oximetry is mandatory when using nitrous oxide.

### Following sedation and the procedure

- Children receiving only nitrous oxide can be discharged into the care of their parents as soon as the study is complete. Children who have received oral midazolam or chloral hydrate must remain under supervision until 'sign out' and discharge criteria are met.