

**Clinical Guidelines for Safe Sedation in Children**

**This Guideline is intended only for sedation on the General Paediatric wards and Children Assessment Unit for painless diagnostic radiology procedures.**

#

# Introduction

These guidelines have been produced to help give a structure and continuity of care to patients requiring conscious sedation for a specific, painless, radiological procedure e.g., CT scan, skeletal survey, bone Scan. These guidelines do not guarantee a successful outcome; however, they should provide a basic level of instruction for nurses and doctors to follow and adhere to for safe conscious sedation.

Currently there is no ideal sedative agent that is safe, effective, and easy to administer. Excessive sedation can cause unintended loss of consciousness and dangerous hypoxia.

If initial sedation is unsuccessful and a child requires deeper or extended sedation the person in charge of sedating a child must liaise with a consultant paediatrician or seek assistance from an anaesthetic colleague.

# Aims

The aim of this policy is to ensure good practice across the Health Board when sedation is used by non-anaesthetists for healthcare procedures not withstanding existing guidelines specific to individual specialties. Another aim is to reduce fear, anxiety, and minimising movement during diagnostic procedures.

# Levels of Sedation

The definitions of minimal, moderate, conscious, and deep sedation used in this guideline are based on those of the American Society of Anaesthesiologists (ASA).

**ASA levels of sedation**

| **Sedation level** | **Response to stimulation** | **Associated airway, breathing and cardiovascular effects** |
| --- | --- | --- |
| Minimal sedation  | * Awake and calm.
* Responds normally to verbal command.
* Cognitive function and coordination may be impaired.
 | None  |
| Moderate sedation  | * Sleepy but easily roused.
* Responds purposefully to verbal command with or without light tactile stimulation.
 | * Airway is maintained
* Spontaneous breathing is adequate Cardiovascular function is usually maintained
 |
| Deep sedation  | * Asleep and not easily roused.
* Responds purposefully to repeated or painful stimulation.
* Reflex withdrawal from a painful stimulus is not a purposeful response.
 | * May require assistance to maintain a patent airway.
* Spontaneous ventilation may be inadequate.
* Cardiovascular function is usually maintained
 |

# Pre-sedation Patient Assessment and Communication

* Trained health care professional (Doctor or Nurses trained in sedation) must carry out pre-sedation assessments and should document in the healthcare record.
* Ensure two healthcare professionals are available during sedation. (A separate APLS trained practitioner is essential to monitor airway in addition to the person doing procedure).
* Ensure immediate access to resuscitation and monitoring equipment available during sedation.
* Establish suitability for sedation by completing the attached checklist.
* Starvation time.
* Current medication condition and any surgical problems.
* Weight.
* Past medical problems.
* Current and previous medications.
* Physical status.
* Psychological and developmental status.

**Do any of the following apply?**

* There is a concern about potential airway or breathing problem.
* The child or young person is American Association of Anaesthesiologists (ASA) grade 3 or greater.
* The patient is a neonate or infant.

Yes

Seek advice from consultant.

No

Give verbal and written information to parents, child or young person about proposed sedation technique and associated risks and benefits.

Obtain written consent according to Health Board Policy

**ASA Grades (American Society of Anaesthesiologists)**

|  |  |
| --- | --- |
| **Grades** | **Definition** |
| **I** | Healthy individual with no systemic disease |
| **II** | Mild systemic disease not limiting activity |
| **III** | Severe systemic disease that limits activity but is not incapacitating |
| **IV** | Incapacitating systemic disease which is constantly life-threatening |
| **V** | Moribund, not expected to survive 24 hours with or without surgery |

# Psychological Preparation

* Ensure that the child or young person is prepared psychologically for sedation by offering information about:
	+ the procedure itself - where possible conduct the preparation session in a quiet room, limit the number of distractions for the child (i.e., turn off televisions). The explanation of the procedure should be truthful. Give information from the child’s point of view, using the words and phraseology that the child/family use and understand. Clear, consistent and concise explanations should be used. To support understanding utilise iPad-based apps *(e.g., Siemens MRI app, ‘Okee’ app, ‘Hetty’s hospital’, ‘simply sayin’),* show the child photographs in a preparation booklet of the room etc as a step-by-step guide, demonstrate the procedure using play Mobil or other mini figures, Lego MRI, play any sounds the machine will make. Direct the child and parents to websites such as ‘What why children in hospital’ for informative videos e.g., [What happens when my child has a CT scan? - What Why Hospital For Children (whatwhychildreninhospital.org.uk)](https://www.whatwhychildreninhospital.org.uk/video-happens-in-ct)
	+ the sensations the child will feel (e.g., feeling sleepy)
	+ what the child should do and what the healthcare professional will do.
	+ how to cope with the procedure (e.g., playing sleeping lions to help them stay still). Non-pharmalogical techniques such as distraction (e.g., watching favourite cartoons on YouTube during MRI or listening to nursery rhymes/favourite songs), relaxation techniques, simple breathing exercises, guided imagery (e.g., imagining they are in their favourite place etc) and parental involvement (for comfort) are effective for many children. Providing children with cognitive strategies helps to lessen their discomfort and allows them some control in the medical procedure
* Ensure that the information is appropriate for the developmental stage of the child or young person and check they have understood. Each patient may be at a different stage of cognitive development and explanations should be given in a developmentally appropriate manner.
* Consider the child’s current anxiety levels, coping style, previous hospital experiences, cultural background and language and parental anxiety.
* Allow the child to ask questions and discuss any concerns. Feelings should be acknowledged and reassurance given that fears and anxieties are normal reactions. Be aware of the implications if the procedure is to be performed on vulnerable body parts.
* Offer parents and carers the opportunity to be present during sedation if appropriate. Separation of children from their parents often accentuates anxiety and results in uncooperative behaviour especially in children under 5 years. If a parent or carer decides to be present, offer them advice about their role during the procedure.

The aims of pre-sedation and/or preprocedural psychological preparation is to:

* Reduce anxiety for the child and parent
* Improve patient cooperation
* Less distress and improved adjustment for child
* Enhance patient recovery
* Improve long term emotional/behavioural adjustment for child and parents.

**Following the Procedure**

* Praise- certificates and/or stickers will reinforce this.
* An evaluation of the coping strategies used.
* An opportunity to express feelings following the procedure.

**Restraint**

The Royal College of Nursing have produced guidelines on restraint. Forcible restraint is not acceptable whether carried out by parents or staff.

# Contraindications & Cautions with Sedation

|  |  |
| --- | --- |
| **Contraindication** | **Caution** |
| * Not appropriately fasted.
* Abnormal airway e.g., large tonsils or craniofacial anomalies.
* Raised intracranial pressure.
* Decreased consciousness.
* History of sleep apnoea.
* Respiratory failure.
* Neuromuscular disease.
* Bowel obstruction.
* Active respiratory tract infection.
* Known allergy to sedative drug/ previous adverse reaction.
* Child too distressed despite adequate preparation.
* Older child with behavioural problems.
 | * Neonates especially if prem or ex-prem.
* Children with cardio-vascular instability or impaired cardiac function.
* Renal impairment.
* Hepatic impairment.
* Children on anti-convulsant therapy.
* Severe respiratory distress.
* Gastro-oesophageal reflux impaired.
* Emergency cases.
* Children receiving opioids or other sedatives.
* Child receiving drugs which potentiate the action of sedatives.
 |

# Fasting

* Before starting sedation, confirm and record the time of last food and fluid intake in the healthcare record.
* Apply the following fasting rules:
	+ 1 hours for clear fluid
	+ 4 hours for breast milk
	+ 6 hours for solids, cow’s milk and formula feeds

**Resuscitation**

Equipment for the maintenance of the airway, breathing and circulation and drugs for the treatment of medical emergencies, e.g., anaphylaxis, cardiovascular or respiratory system emergencies, must be immediately available.

**S** - **Suction**: size appropriate functioning suction.

**O** - **Oxygen**: adequate O2 supply (portable cylinder).

**A** - **Airway**: size appropriate and other equipment. \*

**P** - **Pharmacy**: basic drugs needed to support life including flumazenil and naloxone.

**M** - **Monitor:** temperature, blood pressure and functioning pulse oximeters.

**E** - **Equipment**: specific to patient or procedure.

\*Ensure you have access to a fully stocked and checked arrest trolley including resuscitation bags and masks of appropriate sizes, also oral, nasopharyngeal, and laryngeal masks, airways and end tracheal tubes of appropriate sizes.

# Medication

# Before prescribing check doses in BNFc as doses may have changed since guideline was published.

* **Chloral Hydrate** (first line for children <15kg)

Hypnotic & sedative effects

**For children already established on chloral hydrate see advice below\*\***

**Always discuss with responsible consultant before prescribing and administering.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Age** | **Dose**  | **Frequency**  | **Additional Information** |
| **Neonate\*\*\*** | 30mg-50mg/kg | single dose 45 to 60 minutes before procedure. | \*\*\*Before using chloral hydrate, try feed and wrap first. |
| **Child >1month (term infant) with a weight <15kg** | 75mg/kg followed by an additional 25mg/kg 30 minutes later if adequate sedation not achieved. Max total dose 1.5g. | single dose 45 to 60 minutes before procedure. | Max total dose 100mg/kg (max 1.5g). |

\*\* Chloral hydrate can be administered to children already established on chloral hydrate if it has been 8 hours or more since their last dose was administered. If child is an existing in-patient, check the patients regular and when required sections of their administration chart to see when last dose administered or if day case confirm with patient/carer when child had their last dose. Give 50mg/kg as a single dose 45 to 60 minutes before procedure. If this is not effective discuss with responsible consultant for further advice. Also check when next regular dose is due and ensure it is not administered until 8 hours after the stat dose.

**Side effects:**

Agitation, allergic skin reactions, stomach irritation, lack of co-ordination (ataxia), confusion,

respiratory depression, heart problems (slow, fast or irregular heartbeat), ketonuria, renal injury (see BNFc &/or summary of product characteristics [SPC] for further information).

**Midazolam (Miprosed use only)**

Midazolam can be used if chloral hydrate is unsuccessful, inappropriate or contraindicated and must be discussed with responsible consultant before prescribing & administering.

Sedative, hypnotic and anxiolytic, also has an anticonvulsant and muscle-relaxant effect.

|  |  |  |  |
| --- | --- | --- | --- |
| **Age** | **Dose**  | **Frequency**  | **Additional Information** |
| **6 months – 14 years** | 250-500 micrograms/kg (max dose 20mg) \* | single oral dose 15 to 30 minutes before procedure.  | \*Miprosed is a licensed oral product of Midazolam, dosage is specific to this product only. |

Miprosed may be mixed and administered with a very small amount of apple juice or diluted blackcurrant squash if required. Be honest with the child if the medicine has been added to apple juice/squash as there is a small possibility of this causing aversions to drinking.

**Side effects:**

Agitation, paradoxical reactions, nausea and vomiting (see BNFc &/or summary of product characteristics [SPC] for further information).

**Reversal agent**:

Flumazenil dose should be calculated, prepared, and kept ready to administer.

# Monitoring during sedation

Continuously monitor and document – depth of sedation, respiratory rate, oxygen saturation, heart rate, pain, coping and distress. (Interpret and respond to changes)

# Discharge Criteria

* Airway patent and stable unsupported.
* Easily arousable.
* Oxygen saturation >95% in room air.
* Haemodynamically stable.
* Adequate hydration (eg: urine output).
* Returned to normal levels of responsiveness and orientation for age.
* No nausea or vomiting.
* Pain controlled.

 **This is generally a minimum of 4 hours from when the sedation is given.**

**For Elective Admission From Neonatal Team**

1. NICU team would have requested for MRI head and obtained a date for the MRI.
2. Neonatal Colleague to provide a letter on CWS stating there is no known contraindication for sedation.
3. NICU team would inform Sister in charge and Consultant of the Week about the admission.
4. Sedation policy of the general paediatric team would be followed.
5. Appropriate medical (APLS/NLS trained) registrar and nursing staff to accompany the child with continuous monitoring. This is subject to the fact that a paediatric registrar is free to accompany the child. Neonatal colleagues have acknowledged that it may not always be possible to spare a registrar due to staffing issues and they have agreed to be the backup team to accompany children in such situations.
6. Please consider IV fluids during fasting period.

**References**

Paediatric Formulary Committee. *BNF for Children* (online) London: BMJ, Pharmaceutical Press, and RCPCH Publications <http://www.medicinescomplete.com> [Accessed on June 2023]

National Guidelines Clearinghouse (2008) Guidelines for monitoring and management of paediatric patients during and after sedation for diagnostic and therapeutic procedures: an update. National Guidelines Clearinghouse. USA

<http://www.guideline.gov/summary/summary.aspx?doc_id=10391&nbr=5437&ss=6&x1=999>

Scottish Intercollegiate Guidelines Network (2004) Safe Sedation of Children Undergoing Diagnostic and Therapeutic Procedures: a national clinical guideline. Scotland

<http://www.sign.ac.uk/pdf/sign58.pdf>

National Institute for Health and Care Excellence. (2010). Sedation in under 19s: using sedation for diagnostic and therapeutic procedures [NICE Guidelines No. 112].

<https://www.nice.org.uk/guidance/cg112>

National Institute for Health and Care Excellence. (2012). Sedation in children and young people: Evidence Update May 2012 A summary of selected new evidence relevant to NICE clinical guideline 112 ‘Sedation for diagnostic and therapeutic procedures in children and young people’ (2010) [Evidence update 19]

[Sedation in children and young people: Evidence Update May 2012 (nice.org.uk)](https://www.nice.org.uk/guidance/cg112/documents/cg112-sedation-in-children-and-young-people-evidence-update2)



***PAEDIATRIC SEDATION RECORD***

Addressograph

Date: Time:

Weight: \_\_\_\_\_\_\_\_ Kg Written Consent

Doctor responsible for Sedation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Named Nurse:\_\_\_\_\_\_\_\_\_\_\_\_\_­­­

Date & time of last oral intake: Solids:\_\_\_\_\_\_\_\_\_\_\_Liquids:\_\_\_\_\_\_\_\_\_\_\_\_

**History & Examination:**

Any adverse reactions to previous sedation:

If yes, Details:

**Medications: Allergies:**

**Examination:**

ENT: CVS:

RS: Abdomen:

CNS: Other:

**Contraindications to sedation:**

|  |  |
| --- | --- |
| Compromised airway(e.g. large tonsils, sleep apnoea, Craniofacial anomalies): Yes / No | Active infection: Yes / No |
| Active respiratory tract infections: Yes / No | Cardiac dysfunction: Yes / No |
| Respiratory failure: Yes / No | Neuromuscular disease: Yes / No  |
| Gastro oesophageal reflux: Yes / No | Hepatic dysfunction: Yes / No |
| Raised ICP: Yes / No | Renal dysfunction: Yes / No |



Addressograph

**Risk assessment:**

**ASA status: I / II / III / IV**

***ASA Classification (American Society of Anaesthesiologist)***

*I Healthy*

*II Mild systemic disease*

*III Severe systemic disease*

*IV Patient with severe systemic disease that is constant threat to life*

***(ASA grade III and above is a contraindication for sedation)***

**Patient Safety:**

W (Weight):

E (Energy):

T (E T tube):

F (Fluids):

A (Adrenaline):

G (Glucose):

Flumazenil (if using Midazolam )

I V Cannula

Emergency drugs drawn up

Suction available

Face mask with reservoir

**Medication:**

|  |  |  |
| --- | --- | --- |
| **Date and time** | **Drug and dose** | **Given by (name & signature)** |
|  |  |  |
|  |  |  |

If child is less than 6 months try feed and wrap technique.

**If child is already established on chloral hydrate – please see medication section on page 4 of guideline and discuss with responsible consultant.**

* *For medication doses see page 4 & 5 and current BNFc.*
* *If patient is not sedated by 30 minutes, contact the consultant to check whether top-up sedation should be given.*
* *If patient disinhibited/restless, this may represent paradoxical sedation: do not give further sedation. AVOID multiple sedative agents.*



Addressograph

**Monitoring:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Time** | **Temp** | **HR** | **RR** | **SpO2** | **BP** |
| **Baseline** |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **At discharge** |  |  |  |  |  |

Continue observations on ward observation chart every 15 minutes until criteria for

discharge met.

**Discharge Criteria:**

Airway stable Well hydrated, good urine output

Back to normal level of consciousness SpO2 > 95% on air

Haemodynamically stable Complications resolved? (eg. vomiting)

Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_