

Sedation Manual

Paediatric Procedural Sedation

Emergency Department

Royal Alexandra Children Hospital

Brighton

2018

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Objectives and Limitations

The Emergency Department (ED) Paediatric Procedural Sedation Programme has been developed to minimise risks associated with procedural sedation of children in the Royal Alexandra Children's Hospital (RACH) Children's Emergency Department (CED). As a risk reduction strategy this programme strives to ensure that doctors and nurses are familiar with the theoretical background and have the practical skills to participate in safe procedural sedation of children in the ED setting.

The programme is multifaceted: in addition to this manual, includes

- MCQ knowledge assessment
- Direct bedside sedation training.

Standardised materials are used

- ED Sedation Record (checklist and risk assessment)
- Parent leaflet

The programme requires the completion of Advanced Paediatric Life Support (APLS) training for staff performing sedation. The programme does not specifically include airway training. Paediatric airway training is provided as part of ED teaching for junior doctors and nurses.

The materials were specifically developed for use in the CED at RACH. They are based on sedation protocols used throughout the PERUKI network, and NICE guidance. The agents used, staffing and training background of doctors and nurses, and the back-up systems available are specific to the CED at RACH. Transferring this programme into other settings or other hospitals will require the adjustment of the materials and processes outlined and co-ordination with relevant hospital departments such as Anaesthesia. The methods described in this manual cannot be guaranteed to be safe and efficacious in all circumstances. Unexpected adverse events are possible even in healthy children. Sedative agents should only be used by those with appropriate training and experience in a hospital environment with facilities and back up to the standards recommended by the American Academy of Pediatrics(1) and other relevant bodies.(2, 3)

Sedation Competency: The Process

All doctors and nurses working in the CED must be sedation 'accredited' prior to administering or assisting with the administration of any sedative agents. The process of accreditation is as follows:

- Read sedation manual;
- Complete the MCQ – “**General Sedation and Nitrous oxide**” (+/- “**Ketamine administration**”). NB a pass mark of 90% is required for the multiple choice questions
- Practical demonstration of nitrous oxide delivery systems;
- Practical competency assessment of nitrous oxide delivery system undertaken by one of the accredited members of staff.
- Demonstration of a current APLS certification is expected for junior doctors and nurses.

Module One

General Sedation

Overview

Children experience a more intense physical and emotional reaction to painful or threatening procedures than adults. The goals of sedation of children in the ED include:

- minimising pain, anxiety, the patient's movement which may jeopardise the procedure;
- maximising the chances of success for the procedure performed; and
- returning the patient to his or her pre-sedated state as quickly as possible while assuring the patient's safety.(4)

In addition to minimising the negative psychological experience for the child, sedation will reduce fear and distress in subsequent presentations to health care facilities.

Sedation for diagnostic, interventional medical and surgical procedures includes the administration by any route or technique of all forms of drugs that result in depression of the central nervous system. Sedation is not without risk because of the potential for unintentional loss of consciousness, depression of protective airway reflexes, depression of respiration, depression of cardiovascular system, potential for drug interactions due to the variety and combination of drugs used, the possibility of excessive amounts of drugs being used to compensate for inadequate analgesia, individual variations in response to the drugs used, particularly in children, and the wide variety of procedures performed. However, studies have shown that sedation of children in the ED can be performed safely.(5-10)

The purpose of this education and guideline module is to reduce the risks associated with sedation in children and establish standardised practice in the ED (11-14). It attempts to incorporate guidelines and recommendations developed by paediatric, emergency and anaesthetic societies (1, 2, 15-17) as well as NICE guidance and existing RACH CED clinical guidelines. The general sedation module applies to all paediatric sedations in the ED irrespective of the drug used.

Learning Objectives

To reduce clinical risk by the implementation of this learning package and achieve clinical competency for sedation use in the following four areas:

1. Before the procedure

- Decreasing need for sedation e.g. appropriate analgesia where required
- Alternatives to pharmacological sedation
- Risk assessment
- Assessment of contraindications
- Consultation with a senior doctor
- Fasting status
- Consent and parent information
- Equipment & drug preparation
- Staff required for sedation
- Observations
- Communication with parents and other staff
- Completion of the sedation check list

2. During the procedure

- Drug administration
- Monitoring of child

3. After the procedure

- Monitoring of child
- Discharge criteria
- Discharge instructions

4. Documentation

- Ensure the 'Sedation Record' has been completed and filed in medical notes
- Ensure that all related procedure and sedation codes are recorded on the CED administrative system.

Introduction

The goal for sedation is to minimise physical discomfort or pain for procedures, to control behaviour, particularly movement, to minimise psychological disturbance and distress, to maximise the potential for amnesia and to guard patient safety. The reduction of a child's stress and anxiety and the completion of a successful sedation may subsequently reduce any fear or distress surrounding future presentations to the ED.

The following education modules and guidelines for sedation are intended for use in the ED in patients who are generally healthy (ASA Class I & II).

KEY LEARNING POINT

*Patients with complex medical problems, more severely ill patients and very young children (< 1 year) should **not** be sedated in the ED*

It is unreasonable to expect sedation to be effective for extremely painful or prolonged procedures. Patients who are extremely anxious prior to the procedure need special consideration and might also be more suitable for general anaesthesia.

Sedation is a continuum from minimal anxiolysis to a state of deep sedation but not including general anaesthesia. The response to sedative drugs is not always predictable for an individual patient and staff members need to be prepared to deal with a patient who becomes much more sedated than intended.

The goal for safe and successful sedation can be maximised by excluding patients at high risk for failure and preparing the patient, the family, the environment, and staff as best as possible to handle both expected and unexpected outcomes and ensure a safe discharge from the CED.

The record of sedation on the following page (see also Appendix 1) lists all important considerations prior to, during and after sedation in the CED. The form is completed for all sedations and should be regarded as a crucial checklist to ensure safe sedation. The completed form is filed in the patient history.

All sedations are audited for quality assurance, based on the record of sedation checklist.
All topics noted on the form will be discussed in the subsequent sections of this manual.



NAME
SURNAME
DOB
TRUST ID NUMBER
NHS NUMBER

Paediatric Procedural Sedation Checklist and record of sedation for procedures in the Children's Emergency Department

This is not a medication order. Use this form for procedural sedation with oral, IV, IM, intranasal or inhaled agents

Date:

Time:

PRIOR TO SEDATION – prepare patient, team and equipment	
() * NUMBER CORRESPONDS TO THE INFORMATION PROVIDED ON THE REVERSE	Tick
Consultant in CED must be informed for all procedural sedation:	
1. Risk assessment and exclusion criteria checked (1)* Circle overleaf	
2. Fasting time (hours): (2)* (MUST BE RECORDED FOR EVERY SEDATION) Solids _____ Liquids _____	
3. Sedation agent prescribed on medication chart	
4. Sedation leaflet given and risks discussed with (name of parent / guardian):	
5. Verbal consent for sedation gained by (name of Clinician and signature):	
6. Informed written consent obtained on hospital consent form by procedure clinician:	
7. Allocate staff roles (3)* Sedation Clinician <input type="checkbox"/> Sedation assistant <input type="checkbox"/> Procedure Clinician <input type="checkbox"/>	
8. Equipment is present and functioning: procedure equipment, emergency equipment (4)*	
9. Baseline observations (sedation score, HR, RR, SaO ₂ , pain score) performed immediately prior to administering sedation (include BP for ketamine) then every five minutes	
10. Prepare for difficulty: Plan for vomiting? Plan for over-sedation?	
11. "TIME OUT" or "Positive Patient Identification" (5)*	

SUMMARY OF SEDATION EPISODE (Please circle)	
Sedation used (please circle): nitrous oxide ketamine other (specify) _____	
Route: Inhaled IV IM Intranasal PO	
Total dose: _____ mg OR N ₂ O _____ % for _____ minutes	
Deepest level of sedation: _____ (indicate University of Michigan Sedation Score (UMSS)) (6)*	
Side effects / adverse events (specify): No Yes	
Discharge criteria reached (discussion of post sedation care including safety and injury prevention):(7)*	
Print Name	Signature
Time Out completed by:(5)*	

Paediatric Procedural Sedation Checklist and record of sedation for procedures in the
Children's Emergency Department

1. RISK ASSESSMENT		
If any child meets the risk assessment criteria OR if you have reservations, contact the Consultant in Emergency Medicine for further discussion before using a sedation agent		
Age ≤ 6 months (oral agents) or ≤ 1 year (nitrous oxide and ketamine)		
Significant risk of delayed gastric emptying or vomiting e.g. bowel obstruction	Significant respiratory disease e.g. upper airway obstruction, airway infection, apnoea, exacerbation of asthma, pneumonia	
Significant cardiovascular impairment e.g. pulmonary hypertension, cardiomyopathy, hypovolaemia	Abnormal conscious state/risk of raised ICP e.g. head injury, meningitis, space occupying lesion	
Acute systemic infection e.g. sepsis	Immunosuppression e.g. post-op transplant, neutropenia	
Significant liver disease/liver failure e.g. biliary atresia	Prior adverse event or allergic reaction	
Significant neuromuscular disease/kyphoscoliosis		
EXCLUSION CRITERIA	NITROUS OXIDE	KETAMINE
	< 1 year Pneumothorax Bowel obstruction Lung cyst	< 1 year Glaucoma CNS lesion, epilepsy ADHD, psychosis
2. FASTING TIMES	2 hours solids and liquids	2 hours clear liquids 3 hours solids or milk
3. STAFF LEVELS	2 staff required 1 ED-sedation trained staff	2 staff required (incl. CED Consultant) 2 ED-sedation trained staff (nurse & doctor)
4. LOCATION AND EQUIPMENT CHECK	Location: CED Resus Equipment: this equipment should be in the room at all times, turned on and functioning during the sedation period <ul style="list-style-type: none"> suction device; bag/valve/mask for size of patient with correct mask oxygen available by mask with reservoir monitoring equipment (HR, RR, SaO₂, BP) access to resuscitation trolley with appropriate sized airway equipment 	
5. "TIME OUT" OR POSITIVE IDENTIFICATION"	Both staff involved in the procedure will confirm the following: <ul style="list-style-type: none"> the patient's identity checked by ID band or positive identification with parent/guardian or HCR confirm or mark site (if applicable) procedure to be performed and appropriate sedation agent prescribed 	
6. DETAILS OF SEDATION SCORE (UMSS)	0 = Awake and alert – THIS IS NOT SEDATED 1 = Minimally sedated: may appear tired/sleepy, responds to verbal conversation and / or sound. 2 = Moderately sedated: sleeping, easily roused with light tactile stimulation or simple verbal command. 3 = Deep sedation: deep sleep, rousable only with deep or significant physical stimulation. May require assistance to maintain a patent airway. 4 = Unrousable	
7. DISCHARGE CRITERIA	<ul style="list-style-type: none"> resumption of pre-sedation level of consciousness resumption of purposeful neuromuscular activity ability to ambulate or sit without support (if appropriate) ability to verbalise (if appropriate) final set of vital signs within normal limits for patient's age ability to tolerate oral fluids 	

Prior to the Procedure: Decreasing the Need for Sedation

Factors that may decrease sedation requirements of the paediatric patient include:

Systemic pain relief

Administration of simple analgesia: paracetamol, ibuprofen. Removal or adequate management of pain may decrease patient anxiety and thus can decrease the need for sedation.

For severe pain intranasal fentanyl (INF) or intravenous morphine may be required. Analgesia should never be administered intramuscularly.

Local pain relief

Topical use of lignocaine/adrenaline/tetracaine (LAT) to provide local topical anaesthesia into open wounds, typically head/forehead lacerations:

- For application you should soak a cotton ball in the gel, apply directly to the wound and cover with an *Opsite/Tegaderm* for 30 minutes. This will cause vasoconstriction, blanching the surrounding skin. Effective skin anaesthesia will last approximately 4 hours.

Local *Ametop*® (tetracaine 4%) cream applied to skin prior to IV insertion, blood taking or lumbar puncture. The cream should cover the area you wish to use and must only be applied onto intact skin. *Ametop* cream takes 30-45 minutes to provide local anaesthesia. Effective skin anaesthesia will last approx 4-6 hrs after removal.

Non-painful wound repair

Consider the use of tissue adhesive/glue (e.g. *Derma+flex*® (n-butyl 2-cyanoacrylate) or *Steristrips*® or both in place of sutures. It is often quick, painless and has similar cosmetic outcomes when used appropriately.

Prior to the Procedure: Non-Pharmacological Approaches

Non-pharmacological approaches will, in some children, reduce or avoid the need for sedation; in many instances it will make procedures less distressing for patients, family and staff.

The integration of non-pharmacological techniques will help achieve the goals of sedation by:

- decreasing the anticipatory anxiety of the child and his/her family before the procedure;
- reducing the pain and anxiety of the child and distress of his/her parents during the procedure; and
- promoting effective coping with subsequent medical procedures.
- Involve the play therapist team

Non-pharmacological techniques described here can be used by staff in the ED with little training, who can then model them for the parents and other primary caregivers. These approaches and techniques will be more difficult to apply in children who are <3 years of age, children who are cognitively impaired, children who have a significant behavioural disorder and especially children who have been previously traumatised by medical procedures (many of these patients will be unsuitable for ED procedural sedation anyway).

It is best to think of the procedure in four stages: preparation, immediately before, during and after the procedure.

Staff Preparation (20)

Examine your own beliefs around pain and be aware how this could influence your interaction with a patient. (For example: Do you believe non-pharmacological techniques are helpful, even possible? How do you personally cope with pain and anxiety?).

All staff team members need to know who is responsible for what during the procedure, in particular who can function as a “safe” person for the child and is providing emotional/social support to the child and the family.

Role of the Parents (21)

Think of parents as allies who can interact with their child and relax/distract them. Invite parents and the child to be part of the team as active participants and not just passive recipients.

Most children want their parents to be present and most parents want to be there. Evidence is mixed as to whether parents' presence is helpful during painful procedures; it appears to depend on what they do.

Research has identified behaviours which promote coping and behaviours which promote distress (see below). It is effective for staff to model coping promoting behaviours, especially if there is not enough time or resources to coach parents directly.

Coping promoting behaviours

- Non-procedural talk and distraction
- Prompting children to use coping behaviours
- Breathing techniques (for example slow deep breathing)
- Humour

Behaviour to be avoided

- Apologising, criticising, bargaining with the child
- Giving the child control over when to start the procedure
- Catastrophising and becoming agitated

Prepare the Child

Find out a bit about them, their likes and dislikes. Ask them what they would rather be doing right now. Find out about their knowledge and expectations about the procedure. Let them ask questions. Be honest about what will happen and correct any misconceptions (see language section regarding discussing pain). Find out child's previous experiences with medical procedures and any coping skills. Instil confidence (see language).

Provide age-appropriate information about the procedure, including any sensations to expect (smells, noises, and physical sensations). Children need to know what they will look and feel like afterwards (e.g. if there will be a bandage, tube, IV). Use books, drawings or a doll if necessary.

Tell the child when the procedure will happen, with enough time to prepare but not so long that increases anticipatory anxiety. Agree on goals and interventions with the child (e.g. breathing to feel calm and talking about last birthday party).

Tell the child how they can be helpful to increase his/her sense of competency. For example, get them to hold mask.

Environment

Remember children may see you as big and threatening, thus the child should be attended to by calm, friendly adults. Do not get equipment ready in front of children but they may need to see and touch it to feel less anxious. Keep unexpected events to a minimum and explain any surprises, like a loudspeaker noise.

Holding

Use “positioning for comfort” and avoid forceful restraint. Have the child sitting rather than lying wherever possible. Do not use parents for restraint, only comfort hold (Refer to Parent Handout – Appendix 2).

Language including choice and control

Choices of words/phrases/imagery in the first seconds of the therapeutic encounter may set the stage for the child’s response to the procedure. It is very important to comment positively on some aspect of the child’s physical state. Be very careful with your choice of words. Use language to suggest that the child will get well and will return home.

Acknowledge what is happening and suggest its positive side. This indicates some control over something. Make positive suggestions related to treatment procedures and imply change, possibly for the better e.g. “as I wash the cut, the hurt can wash away”. Emphasise the qualitative sensation that children may experience such as cold, tingling and pressure so that the child focuses on what he/she is feeling and not just on a hurting aspect.

If the procedure is likely to cause some pain, describe the pain in familiar terms that he/she will understand. The parents will have some examples of pain that their child has experienced during play or pain that their child may have observed someone else experience without distress.

Avoid deceptive statement such as “this shouldn’t hurt”. Children do not forget dishonest statements easily. Rather provide suggestions for coping e.g. “I wouldn’t be surprised if this hardly bothers you, especially when you see what’s happening in the video cartoon.”

Immediately before the Procedure

Remain calm and firm. Do not focus on feelings once the procedure is imminent. Do not bargain, negotiate or apologise, as it increases distress. Give children a sense of control by letting them make choices e.g. where to sit for the procedure or which hand to use for the IV insertion. Do not give the child a choice about when to start the procedure as it increases anticipatory anxiety. Just before the procedure, stop talking about the procedure or focusing on it in any way and encourage the use of relaxation and distraction.

During the Procedure

Distraction involves actively engaging the child onto a positive focus away from the negative focus without tricking the child. Find out from the child what he or she likes doing best: if sport, which one; if the Xbox, which game; if playing with a pet, what name (so you can engage them).

To promote relaxation encourage breathing exercises, muscle relaxation and imagining a favourite place, sport or activity (see table below). Continue the verbal distraction/imagery. Prompt the child to use coping behaviours and praise all attempts.

After the procedure

Only say "it is finished" at the very end of the procedure. Focus on positive coping efforts and continue distraction. Allow the child time to recover. Instil a sense of achievement no matter what happened. Use pain medication as required. Avoid focusing on any further procedures till nearer the time.

Health Evaluation

Health evaluation prior to sedation includes standard history and physical examination as documented on the standard ED medical record as well as health issues specific for children undergoing procedural sedation.

Allergies and also the weight should be recorded on the ED medical record to allow easy calculation of any medications used during the sedation or in case of an emergency.

A risk assessment should be performed using the risk assessment prompt on the back of the sedation checklist and listed below. The list intends to identify children at higher risk of complications who might be unsuitable for sedation in the ED. The list includes features indicating a higher risk of airway complications and cardiovascular instability during sedations.

Risk Assessment

Increased risk of airway compromise leading to obstruction

- Snoring, stridor, sleep apnoea
- Craniofacial abnormalities
- History of airway difficulties
- Children < 1 year

Increased risk of hypoventilation

- Patients with reduced sensitivity to CO₂ retention – chronic lung disease, neuromuscular disorders
- Abnormalities of the respiratory centre – brainstem tumours

Increased risk of aspiration

- Vomiting, bowel obstruction, gastro-oesophageal reflux
- Altered mental status
- Cerebral palsy
- History of aspiration
- Not appropriately fasted

Increased risk of bronchospasm or laryngospasm

- Asthma, recent upper or lower respiratory tract infection

Increased risk of cardiovascular compromise

- Cardiac disease, hypovolaemia, sepsis

History of sedation failure

Moderate or severe systemic disease which limits the activity of the child

Exclusion Criteria

In addition there are drug specific contraindications that need to be considered as part of a sedation plan. Drug specific contraindications are addressed in detail in the drug modules and are also listed on the back of the sedation checklist.

KEY LEARNING POINT

Any positive finding on risk assessment or any drug specific contraindications precludes sedation in the CED and should be discussed with a Consultant in CED.

Fasting Pre-Procedure

Most patients who present to the ED are likely to have consumed solids and or fluids within 4 hours of their presentation.

In general, when the procedure does not need to be performed immediately, the patient should be fasted from the time a procedural sedation becomes a consideration, ideally at triage, and at least until the recommended minimum fasting times have been met.

The relationship between minimum fasting times and the risk of adverse outcomes in sedation has not been well studied and minimum fasting times for sedation are under debate. Some recent data indicate that fasting and adverse events in emergency department sedation in children are not closely linked.(22-24) Recommended minimum fasting times are based on existing literature. As a reminder they are listed on the back of the sedation checklist. Actual fasting times must be recorded on the sedation checklist.

The recommended minimum fasting times are as follows:

Nitrous oxide

- 2 hours fasting for solids, milk and liquids.

Ketamine

- 3 hours fasting status for solids or milk & 2 hours for clear liquids

KEY LEARNING POINT

Please note that after an injury even prolonged fasting does not guarantee an empty stomach.

In circumstances where the child's fasting status is not assured, the increased risks of vomiting during sedation must be carefully weighed against its benefits, and the lightest effective sedation should be used. (4)

Options for patients who are not fasted

Children who are being fasted in the CED prior to sedation should be able to sit in the waiting room until the required time.

In circumstances where the child requires continuing management of the injury or other conditions, that child should remain in the cubicle area.

If the procedure is non-urgent and the child is not fasted, consider referring the child to an in-patient team for assessment and to be booked for a day case in-patient theatre list. Patients may NOT be brought back to CED for procedural sedation.

Timing

All procedural sedation in the CED must be discussed with the CED Consultant. We do not routinely perform sedation out of hours (e.g. after 20:00), but cases can be discussed on an individual basis.

Consent and Parent Information

Verbal consent must be obtained from the parent or legal guardian of the child before proceeding with any drug administration for the purposes of sedation. An advanced nurse practitioner or doctor may obtain the verbal consent for nitrous oxide, however, **consent for ketamine or IV midazolam must be obtained by a trained CED doctor.**

An explanation must be provided to the responsible adult with reference to the type of sedation considered, an explanation of the procedure and the associated risks of the sedation as well as the procedure itself. The elements which should be discussed with the parent or guardian are outlined in the parent handout for procedural sedation.

The relevant section of the handout explaining what sedation is and outlining the risks associated with sedation is included below.

In addition to verbal explanation and consent for use of sedation, the clinical team performing the procedure must also take written consent for the procedure, if this is routine for the procedure.

The Procedural Information leaflets are agent specific and are given to each individual patient as a part of their sedation documentation. These are used to help inform parents make informed decisions (See Appendix 3).

Preparation Prior to Sedation

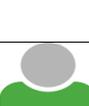
Staff



Nitrous oxide

	One doctor or nurse practitioner to perform the procedure
	One doctor or nurse, trained in nitrous oxide use

Ketamine

	One doctor or nurse practitioner to perform the procedure
	One doctor to administer the sedation. This doctor must be credentialed in ketamine sedation and APLS certified
	One registered nurse capable of supporting airway management and advanced monitoring of patients. This nurse must be trained in ketamine sedation and PLS/APLS certified
	Consultant in CED available and present. They may also be the administrator.

All required staff must be present before any drug is administered. One staff member must be continuously responsible for observation of the patient's vital signs, airway patency, adequacy of ventilation, oxygen saturation, heart rate, blood pressure and level of sedation for all of the sedation.

Location

Initially all procedural sedation is to be performed in the resuscitation area. This will ensure that resuscitation equipment is available in case of any adverse events.

Equipment

Equipment must be checked and readily available **prior** to commencing procedural sedation. A reminder of the necessary equipment is listed on the back of the record of sedation:

- Bag / valve / mask set up for appropriate size and able to deliver O₂ with O₂ tubing attached. Appropriate range of masks. The correct mask size must be used. It should fit snugly on the child's face over nose and mouth.
- Suction working with a Yankauer sucker attached
- Oxygen tubing attached to oxygen source with appropriate size mask
- Pulse oximetry operative – to monitor oxygen saturation pre, during & post procedure
- ECG monitoring equipment readily available for all sedations and operative for ketamine use
- Blood pressure monitoring readily available for all sedations and operative for ketamine use.

End-tidal capnography for moderate and deep sedation is recommended in NICE guidance but at present the CED does not have the required equipment to perform this.

Note: If the child is very unsettled pre-procedure it may be helpful to apply the BP cuff, oxygen saturation probe or attach the ECG leads once sedation is taking effect.

Observations

An initial set of observations must be obtained within one hour prior to the administration of the sedation and must be documented on the PEWS observation chart.

If the child is agitated and unsettled prior to the procedure consider the accuracy of observations due to distress.

Observations include: (PEWS)

- Pulse
- Respiratory Rate
- Blood Pressure (ketamine)
- Oxygen saturation
- Pain Scale, coping and distress
- Depth of sedation measured using the Sedation Score (based on University of Michigan Sedation Score (25)) – See table below:

Sedation Score

Sedation Score	Depth of Sedation
0	Awake and alert
1	Minimally sedated: may appear tired/sleepy, responds to verbal conversation &/or sound
2	Moderately sedated: sleeping, easily roused with light tactile stimulation or simple verbal command
3	Deep sedation: deep sleep, rousable only with deep or significant physical stimuli
4	Unrousable

Medication Orders

All medications used in sedations, including nitrous oxide, require written orders on the medication chart:

- The full generic name of the agent must be written in **BLOCK** capitals
- Calculate the correct dose of sedation medication for the child based on the correct patient weight;
- Write the dose, route, and time of administration on the observation chart (**legibly**).

Time Out

<p>5. “TIME OUT” OR POSITIVE IDENTIFICATION”</p>	<p>Both staff involved in the procedure will confirm the following:</p> <ul style="list-style-type: none"> • the patient’s identity checked by ID band or positive identification with parent/guardian or HCR • confirm or mark site (if applicable) • procedure to be performed and appropriate sedation agent prescribed
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Completion of the Record of Sedation form

All sedations require the completion of the sedation checklist. It lists the main issues to be considered pre-procedure on the front and more detailed explanations on the back of the form.

1. A patient label sticker should be placed at the top of the sedation checklist.
2. The boxes for the type of procedure, sedation used, time and date should be completed.
3. All pre-sedation tick boxes on the front of the form should be checked prior to commencing the sedation.

All patients sedated in the CED should be entered into the CED Sedation Log which is kept in the Sedation Folder in resus. . All completed sedation records must be filed in the patient’s notes.

During the procedure

Drug Administration

Intravenous sedation drugs are only to be administered by a doctor. Drugs should always be checked with a second person prior to administration. Drug syringes should be labelled with the drug content and concentration.

Nitrous oxide can be administered by trained nurses or doctors.

Monitoring of Child

Communication between all staff involved with the procedure is essential to ensure safe practice and detection of possible complications.

The treating doctor must be informed of any observations that fall outside normal values to ensure appropriate interventions.

Normal Observation Values Guide

Respiratory Rate Values ¹

Age	≤ - 2 S/D	- 1 S/D	Normal	+ 1 S/D	+ 2 S/D	> + 2 S/D
0 – 3 months	< 20	20 – 30	30 – 60	60 – 70	70 – 80	> 80
4 – 6 months	< 20	20 – 30	30 – 60	60 – 70	70 – 80	> 80
7 -12 months	< 17	17 – 25	25 – 45	45 – 55	55 – 60	> 60
1 – 3 years	< 15	15 – 20	20 – 30	30 – 35	35 – 40	> 40
4 – 6 years	< 12	12 – 16	16 – 24	24 – 28	28 – 32	> 32
> 7 years	< 10	10 – 14	14 – 20	20 – 24	24 – 26	> 26

Heart Rate Values ²

Age	≤ - 2 S/D	- 1 S/D	Normal	+ 1 S/D	+ 2 S/D	> + 2 S/D
0 – 3 months	< 65	65 – 90	90 – 180	180 – 205	205 – 230	> 230
4 – 6 months	< 63	63 – 80	80 – 160	160 – 180	180 – 210	> 210
7 -12 months	< 60	60 – 80	80 – 140	140 – 160	160 – 180	> 180
1 – 3 years	< 58	58 – 75	75 – 130	130 – 145	145 – 165	> 165
4 – 6 years	< 55	55 – 70	70 – 110	110 – 125	125 – 140	> 140
> 7 years	< 45	45 – 60	60 – 90	90 – 105	105 – 120	> 120

Pulse oximetry should be continuously monitored in all sedations. Heart rate, oxygen saturation, respiratory rate and conscious state (using the Sedation Score) should be recorded 5-minutely following the administration of the sedation medication until the child is beginning to rouse following the procedure.

During ketamine sedations continuous cardiac monitoring should be employed and blood pressure should be obtained and recorded 5-minutely until the patient begins to rouse.

Any change in vital signs, change in the sedation scores or oxygen saturation should be immediately communicated with the doctor responsible for the sedation and might require immediate intervention for airway compromise or cardiovascular depression. After the procedure is complete, the stimulation (e.g. pain) associated with the procedure is reduced, and this may cause children to become more sedated than during the procedure.

After the procedure

Observation

The child must be observed by a member of nursing staff until full recovery.

Following the procedure, observations and sedation scores should be taken and recorded every 15 minutes.

If the child remains deeply sedated following the procedure, they should have observations and sedation scores recorded every 5 minutes until they are more awake, show age appropriate activity and respond to the parents.

Keep the child nil orally until fully alert.

All side effects or adverse events should be documented on the observation chart and the sedation record.

The deepest level of sedation should also be recorded on the record of sedation. Please note that sedation with ketamine (a dissociative agent) does not fit the standard depth of sedation scores. Therefore the patient sedated with ketamine can be described and documented as being "ketaminised".

Discharge Criteria

The child cannot be discharged until all discharge criteria are met. It is impossible to set a specific 'discharge time' post administration of the drug. Each patient responds to sedation on an individual basis. It is essential to assess each patient individually by using the following discharge criteria as listed on the back of the sedation checklist:

- Return to baseline / pre-sedation level of consciousness
- Resumption of purposeful neuromuscular activity
- Ability to ambulate (if appropriate) or able to sit without support
- Ability to verbalise appropriate for age
- Final set of vital signs within normal limits for the child's age
- Ability to tolerate oral fluids (initial fluids offered can include water, an ice pop or cordial)

For a very young child, the aim is to achieve return to pre-sedation level of responsiveness or as close as possible to the normal level of functioning for the particular child. This should be achieved by communicating with the parent or guardian to establish what is normal for that child.

In addition, a responsible adult needs to be available to accompany the patient home.

Discharge Instructions

A parent or guardian will be advised on discharge instructions as per section 3 of the parent handout shown below:

Part THREE: Care of your child on your way home and for the next 24 hours

Sometimes the delayed effects of the medicines may make your child a bit confused, sleepy or clumsy for a while after the procedure. You need to be extra careful in caring for and supervising your child for the next 24 hours.

- If your child falls asleep in the car seat, watch them to make sure that they do not have any difficulty breathing. DO NOT leave your child alone in a car seat or alone in the car;
- Let your child sleep. Children may go to sleep again after getting home from the hospital. Sometimes children may sleep more because of the sedation medicine;
- Check on your child's sleeping pattern the night after getting home. If their sleeping seems heavy or strange then wake them up gently. If you cannot wake them or something seems wrong in their appearance or breathing, call an ambulance and return to the hospital immediately;
- Sometimes children may feel sick or vomit if they eat a big meal too soon after sedation. Give your child clear liquids such as diluted fruit juice, ice pops, jelly, clear soup, etc;
- Supervise all playing and bathing for the next 8 hours after getting home. DO NOT let your child swim or use play equipment (bikes, monkey bars, etc) that might cause an accident (for the next 24 hours).

Key points to remember

- Sedation is commonly used in children for procedures;
- You need to give consent before your child has sedation;
- Make sure you understand the reasons for and the risks of sedation;

- Be as open and honest as you can with your child about what is going to happen and it helps not to be too upset yourself.

When to return to the Emergency Department

Please return to the ED at the Alex if your child:

- Vomits more than twice;
- Has strange or unusual behaviour;
- If you have any concerns.

It is essential that all points on the information sheet are discussed by either medical or nursing staff and the parent/guardian verbalise an understanding of discharge instructions. A discharge letter to the child's GP will be required detailing any follow up instructions related to the diagnosis or procedure.

Adverse Events

Adverse events should be recorded on the nursing observation chart as they occur. They should also be recorded on the sedation checklist after the procedure. Adverse events and complications include:

ADVERSE EVENTS AND RISK CLASS		
Minimal Risk	Minor Risk	Sentinel Risk
Vomiting/retching	O ₂ desat (75-90%) for <60s	O ₂ desat severe (<75% at any time) or prolonged (<90% for >60s)
Subclinical respiratory depression	Apnoea, not prolonged	Apnoea, prolonged (>60s)
Muscle rigidity, myoclonus	Airway obstruction	Cardiovascular collapse/shock
Hypersalivation	Failed sedation	Cardiac arrest/absent pulse
Paradoxical response	Allergic reaction without anaphylaxis	
Recovery agitation	Bradycardia	
Prolonged recovery	Tachycardia	
	Hypotension	
	Hypertension	
	Seizure	

- Failure to achieve adequate sedation*
- Unintentional loss of consciousness
- Prolonged or excessive sedation*
- Hypoxaemia (O₂ saturation <94%)*
- Depression of protective airway reflexes – airway obstruction requiring airway adjunct or sustained jaw lift manoeuvre

- Respiratory depression and apnoea – requiring oxygen administration, bag-mask-ventilation or intubation
- Laryngospasm, bronchospasm and increased airway secretions*
- Depression of cardiovascular system - hypotension, bradycardia*
- Vomiting*
- Aspiration
- Allergic reaction*
- Unscheduled admission related to sedation.

Summary of Documentation

Documentation of sedations includes the following elements:

1. History and physical examination on the standard medical record by the sedation clinician.
2. Recording of weight, allergies, risk assessment, contraindications and fasting times on the sedation checklist after sedation order is signed by the sedation clinician and countersigned by the sedation nurse.
3. Checkmarks on the sedation checklist for all other issues listed pre-, during and post-procedure as a joint responsibility of sedation clinician and nurse.
4. Consent form for procedure signed by parents and countersigned by clinician undertaking the procedure.
5. Medication order on the observation chart signed by the sedation clinician.
6. Recording of observations before, during the procedure and during recovery on the observation chart by the sedation nurse.

Module Two

Nitrous Oxide

Background

Nitrous oxide is an anaesthetic gas which is delivered in variable concentrations with oxygen. The exact mechanism of nitrous oxide is unknown. It has modest analgesic and sedative properties, with minimal respiratory and cardiovascular depression (26).

Studies in children have shown nitrous oxide to be an effective agent for reducing pain during painful procedures (27), and it can be delivered painlessly through inhalation. Its quick onset of action and recovery makes it ideal for use in the ED.(28) It is being used in a number of countries and has been shown to be a safe agent in several large series (5, 28-34). It is mainly used as 50% nitrous oxide (*Entonox*) or less; more recently 70% nitrous oxide (with 30% oxygen) has been shown to have a similar safety profile as 50% (34, 35).

Nitrous oxide has a short duration of action. Onset is within minutes and peak effect is at 3-5 minutes to induce the effects with a nitrous oxide-oxygen mixture and a few minutes for them to wear off.

Nitrous oxide in the ED is generally available in two different forms. It is available as *Entonox* in a premixed cylinder of 50% oxygen and 50% nitrous oxide and via the Porter MDM machine which allows nitrous oxide to be administered in a concentration varying between 0% and 70% (further details are explained below).

It is not clear for how long patients who receive nitrous oxide as a single agent should be fasted. In a study on nitrous oxide sedation from RCH Melbourne ED, the frequency of vomiting was not associated with the duration of pre-procedural fasting (23). Current guidelines from the Royal Australasian College of Physicians recommend a fasting period of 2 hours if a concentration of nitrous oxide of more than 50% is used (36). Consensus seems to be that fasting is not typically required for nitrous oxide use. If, however, nitrous oxide is used in conjunction with other sedative agents (and this should not be encouraged), then a fasting time of 2 hours is required.

Indications for use

Nitrous oxide can be used where short acting analgesia is required for procedures that may cause pain, discomfort or anxiety.

Useful for:

- Suturing (with topical anaesthesia)
- IV insertion (with topical anaesthesia)
- Removal of foreign bodies from ear / soft tissues
- Minor fracture manipulation/moulding of plaster
- Burns dressings
- Injection of local anaesthetic
- Other painful procedures

Limitations:

- Very painful procedures (manipulation of significantly displaced fracture or abscess incision and drainage)
- Facial (peri-oral) lacerations
- Procedures requiring immobility

Adverse Reactions

Nitrous oxide is usually well tolerated by children in the ED. Most children only have mild side effects such as vomiting, nausea, dizziness, light-headedness and occasionally nightmares. Parents should be warned that vomiting occurs relatively frequently both during and after the procedure and even after arrival home (37).

In a series of 762 patients from RCH Melbourne ED who received nitrous oxide alone (35), 6% of patients vomited, 1% became agitated and less than 5% became light headed, hyperventilated, or had hallucinations. One patient desaturated after the sedation and required oxygen administration. He was admitted for observation and discharged without further sequelae. No patient aspirated or required airway support. Children who received 70% nitrous oxide had deeper sedation levels than children who received 50% but there was no significant difference in adverse events.

One possible adverse event is aspiration if the vomiting occurs while the patient is deeply sedated. With deeper sedation airway patency can be lost. Patients with underlying airway problems or acute respiratory infections or illnesses are particularly vulnerable. In the RCH series 3% of patients were deeply sedated, mainly after receiving 70% nitrous oxide (35).

Nitrous oxide is known to increase intracranial pressure and increase pulmonary vascular pressure. Nitrous oxide diffuses more rapidly than nitrogen and can expand air-containing spaces within the body (27). If the cavity does not have rigid walls, the volume increases. Therefore it is contraindicated in all patients with the possibility of closed air spaces such as in the gastrointestinal tract, middle ear, sinus cavities, pneumocephalus, pneumothorax or after diving accidents (decompression sickness).

Nitrous oxide oxidizes the cobalt ion in the vitamin B12 dependent enzyme methionine synthetase resulting in the formation of hydroxyl radicals which are responsible for the inactivation and destruction of this enzyme and the subsequent depletion of vitamin B12 stores (38). Methionine synthetase is required for DNA synthesis and therefore the production of rapidly dividing tissues such as bone marrow and gastrointestinal mucosa. Methionine is necessary for the formation of myelin, a key building block for nerves. Nitrous oxide-induced bone marrow toxicity is progressive but reversible and can be prevented by the administration of folinic acid. Neurotoxicity associated with nitrous oxide is rare but can be rapid and irreversible, even after brief exposure (38). Those at risk of vitamin B12 deficiency include some vegetarians, the newborn of vegetarian mothers, patients with gastrointestinal pathology, the elderly or patients taking proton pump inhibitors and H2 blockers (38). Nitrous oxide-induced inactivation of methionine synthetase can also affect homocysteine metabolism, although the significance of this is unknown. Information about these rare adverse events comes from case reports only. There are no data to guide the appropriate maximum duration or number of times a patient can be safely exposed to nitrous oxide. If nitrous oxide is to be used repeatedly it may be reasonable to administer methionine, vitamin B12 and possibly folic or folinic acid (38). Nitrous oxide should be avoided in patients with metabolic diseases such as methionine synthetase deficiency, homocystinuria and methylmalonic acidemia. Patients with an oncological history should be screened for the current use of bleomycin chemotherapy. Bleomycin produces a pseudo-enzyme that reacts with O₂ (nitrous oxide is delivered with a minimum of 30% O₂) to produce a superoxide and hydroxide free radicals that cleave DNA causing a bleomycin associated-pulmonary toxicity (33).

Occupational exposure should be kept to a minimum by ensuring a suitable scavenging system is used and a consistent and adequate mask seal to the patient's face is maintained. The scavenging system should be connected directly to piped wall suction only (never portable) and turned to a medium flow.

Exposure to nitrous oxide should be avoided during pregnancy. The data on fertility risks of nitrous oxide are unclear, even in staff exposed to the agent repeatedly (39). However, it is recommended that exposure to nitrous oxide not occur in the first trimester of pregnancy. Repeated exposure should be avoided in the 2nd and 3rd trimesters as well (29, 40).

Contraindications for use

Nitrous oxide should not be used in the following situations:

Increased risk of airway loss

- Less than 1 year of age
- Acute respiratory infection (URTI) or exacerbation of asthma
- Airway obstruction or history of difficult airway management

Risk of expansion of air filled closed space

- Chest injury, suspicion of pneumothorax or lung cyst
- Abdominal distension or bowel obstruction
- Head injury
- Decompression sickness or air embolism
- Middle ear disease

Increase in pulmonary vascular pressure

- Pulmonary Hypertension

Patients at risk for nitrous oxide induced bone marrow suppression, neurotoxicity or increased homocysteine levels

- History of B12 or folate deficiency
- Nutritionally compromised patients, vegetarians, patients on H2 blockers or proton pump inhibitors
- Concurrent underlying serious illness, severe infection or extensive tissue damage

- Patients with metabolic diseases associated with homocysteine metabolism (methionine synthetase deficiency, homocystinuria and methylmalonic acidaemia)
- History of Bleomycin chemotherapy administration

Nitrous oxide administration requires:

- Health Evaluation and Risk Assessment (See Module 1)
- Verbal consent for administration of nitrous oxide along with written consent for procedure. (See Module 1)

Fasting prior to procedure

Two hours fasting is recommended, however there is no absolute requirement to be fasted for nitrous oxide. It is likely in practice that the child will have fasted prior to the procedure whilst waiting to be seen.

Equipment

All required equipment should be in the room, functioning and turned on for the sedation (See Module 1).

For nitrous oxide sedation the following additional equipment required:

- An oxygen source with mask **separate** from the nitrous oxide oxygen source
- Bacterial filters (Breathing filters) for use in the nitrous oxide circuit, allowing for re use of circuits.

It is important that the child is familiarised with the equipment prior to its use. This will result in improved cooperation and decrease anxiety.

Staffing requirements

A minimum of two staff members present

	<p>One doctor or nurse practitioner to perform the procedure</p>
	<p>One doctor or nurse, trained in nitrous oxide use</p>

Observations

There should be continuous monitoring and 5 minutely documentation of:

- Respiratory rate
- Oxygen saturation (including 5 minutes post procedure)
- Heart rate
- Conscious state (sedation score) / pain, coping and distress

On completion of the procedure and administration of nitrous oxide the child needs to be monitored until their conscious state returns to the baseline. Please note that if the patient is developmentally impaired, the parents can aid in the assessment of when the child returns to normal mental status.

Cautions

- Staff or parents thought to be pregnant at ANY STAGE should avoid being present during nitrous oxide administration.
- A scavenging unit should be used at all times when administering nitrous oxide to decrease the exposure to staff.

Instructions for the delivery of 70 % Nitrous oxide

Prior to the procedure (documentation and patient preparation)

1. Identify yourself to the patient and his/her family.
2. Check the patient's identity – ensure a hospital ID band is present.
3. Begin to fill out the ED Sedation Record.
4. Perform a risk assessment and check exclusion criteria to ensure the patient is suitable for nitrous oxide sedation.
5. Provide parents and patient with written and verbal information concerning nitrous oxide sedation allowing time for all questions to be answered. Discuss the importance of pregnant/potentially pregnant family members leaving the room for the duration of the procedure.
6. Obtain and document verbal consent for nitrous oxide administration from the parents.
7. Ensure nitrous oxide is appropriately prescribed in the ED record.
8. If appropriate, administer other analgesic agents.
9. Plan the use of non-pharmacological/distraction techniques with the patient and his/her family.
10. Attach oxygen saturation probe to the patient and perform an initial set of observations (pulse, respiratory rate, oxygen saturation and sedation score).
11. Ensure adequate staff are available.
12. Time out – confirm patient ID and confirm procedure

Prior to the procedure (room and equipment preparation)

Prepare the Procedure Room for the patient – ensure adequate space is available for the procedure to be safely carried out and move other patients / relatives from the room.

Safety – First check of airway equipment

13. Check wall suction is in working order with a Yankauer suction catheter attached.
14. Check wall oxygen is in working order with an appropriate size non-rebreathing face mask available.
15. Check appropriate size bag-valve-mask (BVM) with oxygen tubing and appropriate size face mask are available.
16. Check pulse oximetry is available and operating.

Setting up the Nitrous MDM system

17. Turn on the scavenging disposal system located on the wall over Bed 1 in Resus room (Figure 1) and ensure the green light remains on.



Figure 1. Scavenger Disposal system

18. Turn the scavenger knob (Figure 2). You will now hear a suction noise.

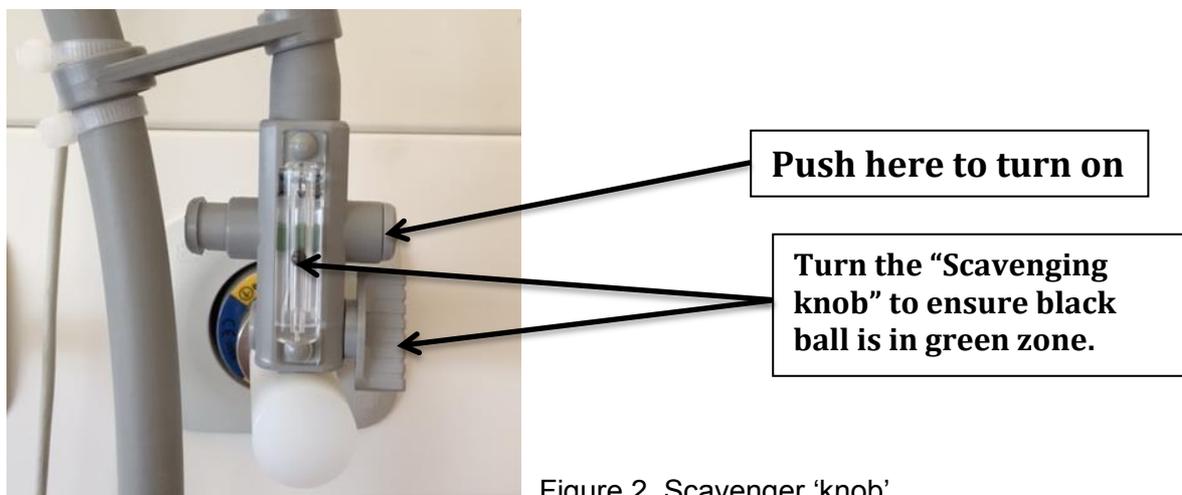


Figure 2. Scavenger 'knob'

19. Check that the oxygen (white), nitrous oxide (blue) and scavenging (grey) hoses are securely connected to the wall outlets (see Figure 3).

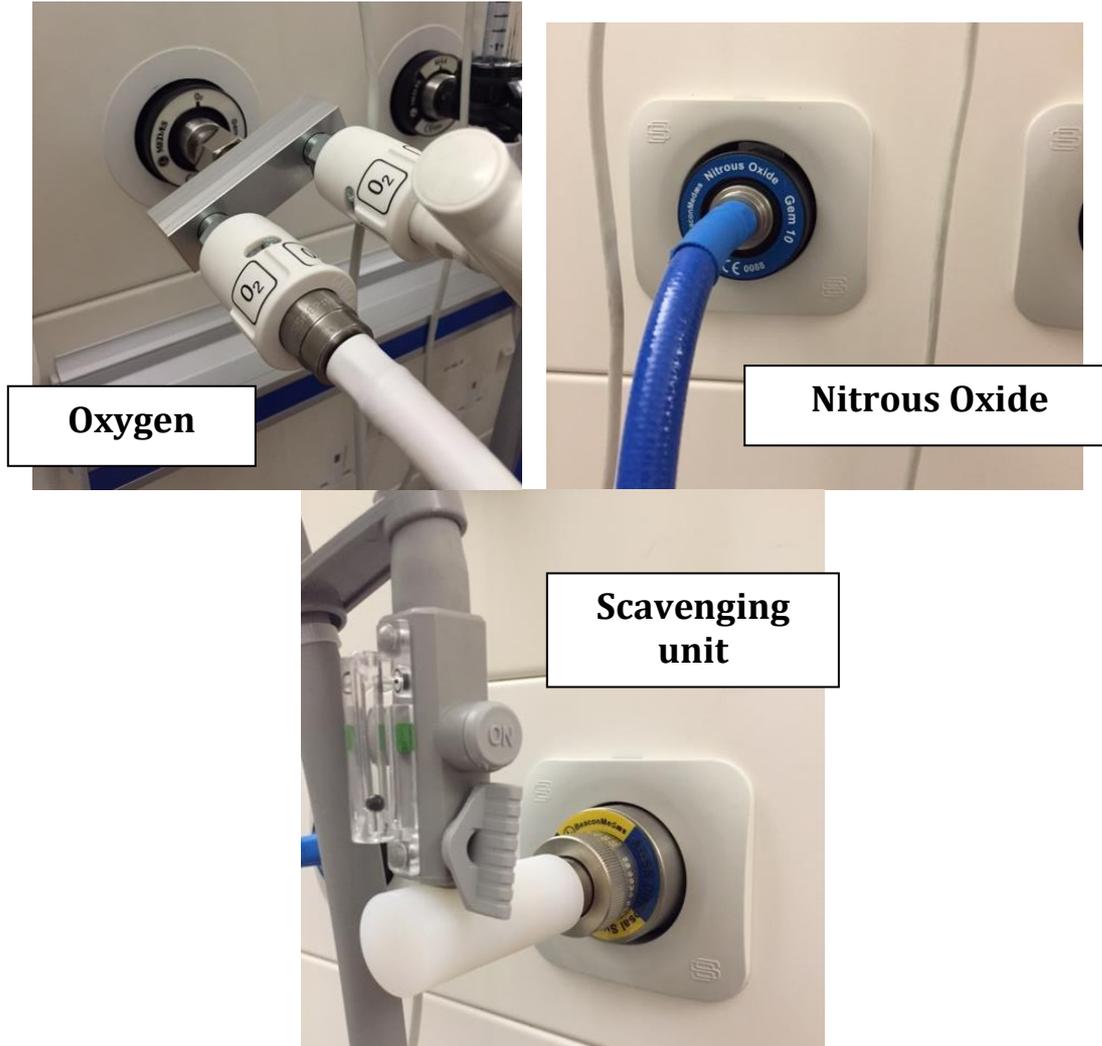


Figure 3. Oxygen, nitrous oxide and scavenging hoses attached to wall sockets

20. Source a new bacterial filter and an appropriate sized face mask from the resus store room (see Figure 6 for items).
21. Ensure the breathing circuit is attached to the MDM system as shown in Figure



Figure 4. Breathing circuit attached to the MDM system

22. Ensure the scavenging hose is attached to the breathing circuit (Figure 5).

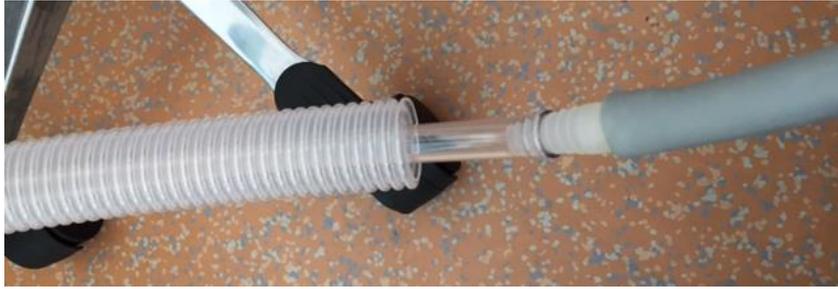


Figure 5. Scavenging hose attached to the breathing circuit

23. Ensure the face mask is an appropriate fit for the patient to maintain a good seal. (See Figure 6).
24. Attach the L-piece from the breathing circuit to the face mask/delivery device (See Figure 6).
25. Attach a bacterial filter to the L-piece and connect to breathing circuit (Figure 6).



Figure 6. Bacterial filter, L-piece and face mask connected to the breathing circuit

26. Turn on the MDM system (See Figure 7).
- Turn up the % Flow Dial of Oxygen to 100%.
 - Commence oxygen flow at a rate of 5 L/minute (sufficient to inflate bag) and check system for leaks – both reservoir bags should remain inflated.

- c. During the actual sedation a higher flow rate may be necessary depending on the size of the patient (and their minute ventilation) – see point 28 a.
27. Occlude the end of the breathing circuit (remove the mask and replace with the red cap or cover the mask opening) and check the oxygen power flush by pressing and holding for 1 – 2 seconds – both reservoir bags (grey and green) should inflate.

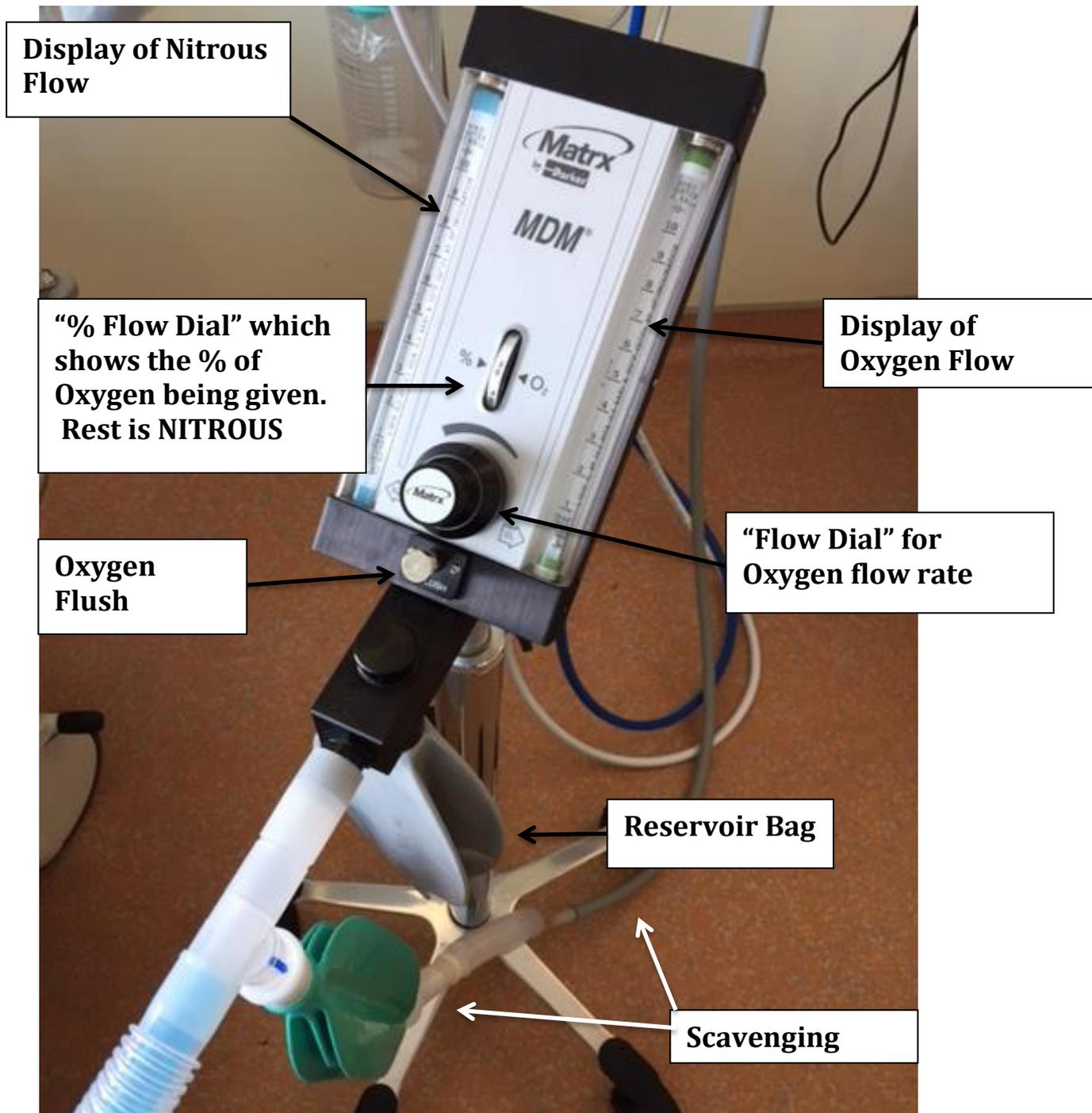


Figure 7. MDM nitrous machine

During the procedure

Delivering up to 70% nitrous oxide (Figure 7)

26. Place mask on patient, ensuring adequate seal. Allow the patient to breathe oxygen only for 2 minutes prior to introducing nitrous oxide (allows patient to get used to system and allows operator to establish if adequate flow rate to maintain appropriate reservoir bag inflation)
27. Commence nitrous oxide at 50% - (50% oxygen on the % Flow Dial). Check levels on meters are approximately equal (i.e. 5 L/minute on both oxygen and nitrous oxide readings).
28. Increase the nitrous dose gradually using the % Flow Dial to 30% Oxygen – 70% Nitrous (as required to achieve desired sedation effect).
 - a. Control the flow with the flow dial to ensure inflation of bag with the child's breathing.

After the procedure

29. Administer 100% oxygen (turn % Flow Dial to 100%) for 2 minutes after the procedure is finished to avoid diffusion hypoxia.
30. Turn off machine by turning the flow dial clockwise to off position.
31. Disconnect and dispose of the filter and discard – the scavenging hose must be left attached.
32. Turn off scavenging system at the wall.
33. Monitor the child until their conscious state returns to baseline – patient must meet discharge criteria prior to discharge.
34. Ensure the ED Sedation Record is completed, patient details are entered into the Sedation Log Book and discharge code is entered on Symphony.

Discharge Criteria

For post-procedural discharge criteria and documentation please refer to Module 1: (General Sedation).

Module Three

Ketamine

Background

Ketamine is a dissociative anaesthetic agent. The unique “dissociative state” resulting from ketamine can be described as a general trance-like state characterised by profound analgesia, sedation, amnesia and immobilization (41, 42). Protective airway reflexes and spontaneous respiration as well as cardiovascular stability are maintained. This trance-like state has been described by the expression, “the lights are on, but no one’s home”, as the eyes remain open with a “disconnected” stare and nystagmus. Ketamine acts by binding to N-methyl-D-aspartate (NMDA) receptors and creates dissociation (disconnection) between the cortex and the limbic system and prevents the higher centres from perceiving visual, auditory or painful stimuli (38, 43). Ketamine “dissociative” sedation is different from moderate or deep sedation or general anaesthesia and cannot be described in these terms to assess sedation depth. It also does not follow the typical dose response relationship of sedative agents on a continuum of gradually increasing levels of sedation and concurrent cardiorespiratory depression (44, 45).

Ketamine is an ideal agent to facilitate short painful procedures, especially in children, who might otherwise require other general anaesthetic agents. It has many features that are attractive in the ED setting: rapid onset (about 1 minute for IV, 3-5 minutes for IM – see table page 56), consistently effective analgesia and amnesia, and airway stability.

Its safe use in children has been documented in numerous case series (46, 47). A study by Green *et al* of ketamine use in 1,022 children in the ED produced acceptable sedation in 98% of patients; airway complications occurred in 1% but were transient, quickly identified and did not require intubation. Vomiting occurred in 7% and emergence reactions, mostly mild, in 19%. Another study of 266 children receiving IV ketamine reported an adverse respiratory event in 5%, vomiting in 19% and emergence reactions, mostly mild, in 27% (48). In a series of 229 patients from RCH Melbourne ED 72% had no adverse events (49). The most frequent adverse event was vomiting, mainly during the recovery phase, in 14%. Ten patients had airway complications and required oxygen and airway repositioning. One patient required bag mask ventilation. No patient required intubation, suffered an aspiration or needed to be admitted.

Ketamine is also used extensively in developing countries for major and minor surgery and in disaster and battlefield settings where no anaesthetist or facilities are available.

In the emergency setting ketamine is used via IM or IV injection. Both routes seem safe and effective but there are only limited data directly comparing IM and IV use (50, 51).

A randomised controlled trial of 225 patients comparing IM and IV ketamine for orthopaedic procedures in children found that IM ketamine sedation at 4mg/kg was significantly longer than IV sedation at 1mg/kg (median 129 minutes vs 80 minutes) (52). As in other centers using Ketamine (RCH, Melbourne), IV is used preferentially. Time to discharge from drug administration is 30 minutes shorter with IV ketamine administration compared to IM, but time from triage to discharge is not significantly shorter (IM 5.7 hours, IV 5.3 hours; $p=0.66$) (49). In both studies IM administration was associated with more vomiting than after IV administration (50, 51). IV administration should be used if an IV cannula is already in situ, if one can be inserted quickly and with minimal distress to the child, or for prolonged procedures (50). Some physicians may feel more comfortable with IV access in case of an adverse event. However, there are no reported cases in which prophylactic IV access averted a ketamine associated adverse event (41).

Recommended ketamine dosing for IM injection is 4mg/kg, for IV injection 1mg/kg slowly over 1 minute (53). Younger children (< 3 years old) require higher doses of ketamine (1.5mg/kg) per bodyweight than older children.

Fasting times for sedation have traditionally been as recommended by the NICE guidance, American Society of Anesthesiologists and the American Academy of Pediatrics for general anaesthesia, at 6 hours for solids and infant formula (1, 4). Ketamine, however, is an agent which maintains protective airway reflexes and there have been no documented reports of clinically significant ketamine-associated aspiration in patients without contraindications (54). In the UK, a 3-hour fast is recommended for ketamine sedation in the ED (3).

Indications for use

- Very painful procedures
- Laceration repair in young children
- Reduction of fractures or dislocations
- Abscess incision and drainage
- Wound exploration for foreign body
- Removal of foreign bodies from eye, ear, nose and skin

Adverse Reactions

- Respiratory depression
- Airway malposition
- Hypersalivation
- Laryngospasm
- Cardiovascular stimulation
- Musculoskeletal effects
- Seizures
- Intracranial pressure elevation
- Ataxia
- Emergence reaction
- Vomiting

Respiratory depression

Ketamine may cause mild respiratory depression. Severe respiratory depression is rare but is increased in frequency if ketamine is pushed by rapid IV bolus, when CNS abnormalities are present or in young infants. Neonates and small infants have greater difficulty maintaining a patent airway with any sedative agent. Therefore, in RACH **Ketamine is contraindicated in infants less than 1 year of age**. Ketamine IV must be given slowly (over 1 minute) (3, 41).

Airway Malposition

Malposition of the airway can occur. It is critical to continuously pay attention to airway patency and reposition head or jaw if snoring respirations or stridor develop.

Hypersalivation

Ketamine stimulates salivary and tracheobronchial secretions. Atropine or glycopyrrolate have been recommended as adjunctive agents to be co-administered with IV or IM ketamine. A randomized controlled trial of 83 paediatric patients showed a lower hypersalivation rate with atropine (11% vs 31%; $p=0.03$) (55). However, since then a large prospective series of 947 patients without atropine use showed a low rate of hypersalivation (56). In RCH Melbourne ED 91% of ketamine sedations are undertaken without atropine (49). Currently at RACH **we will not be using atropine in any ketamine sedations**.

Laryngospasm

In a series of 1,022 paediatric patients who received IM ketamine four episodes of laryngospasm occurred; all were transient and without further sequelae (57). Generally with anaesthesia, young age and respiratory infections increase the risk of laryngospasm. **Clinicians need to be prepared to treat laryngospasm with oxygen and assisted ventilation until the episode subsides.**

Cardiovascular stimulation

Ketamine is sympathomimetic and can produce mild to moderate increases of blood pressure, heart rate, cardiac output and oxygen consumption. In patients with maximal sympathetic drive (e.g. severe hypovolaemia, pericardial tamponade) the intrinsic cardiac depressant effects of ketamine may be revealed.

Musculoskeletal effects

Skeletal muscle hypertonicity and random movement of head and extremities are often observed. Parents might interpret this as lack of sedation and need to be forewarned.

Seizures

There are case reports of brief seizures related to ketamine in patients with underlying seizure disorders. In a series of 229 children from RCH Melbourne ED there was one brief, self-resolving seizure (49).

Intracranial pressure elevation

There is inconclusive evidence that ketamine increases intracranial and intraocular pressure (58, 59).

Therefore **any patient with hydrocephalus or CNS lesions or with glaucoma or acute globe injury should not receive ketamine sedation.** Head-injured patients have conventionally not received ketamine for the same reason, but this dogma is increasingly challenged and many practitioners now use ketamine in head injury.

Ataxia

With ketamine ataxia can be pronounced during recovery. Ambulation must be avoided until full equilibrium is restored.

Emergence reactions

Ketamine usually stimulates hallucinations and dreaming during recovery. Their frequency is age-dependent. They are more frequent in adults than in adolescents and rare in children under 10 years. In a study of 1,022 children, 18% had mild agitation and 2% had more pronounced agitation but only 2 children required treatment. Both responded rapidly to small dosages of midazolam (57). Although evidence is limited a number of strategies have been used to reduce emergence reactions (41). They include planned topics for dreaming, guided imagery, dim lighting and maintaining a quiet environment. **Patients with psychosis or behavioural abnormalities should not be given ketamine due to the risk of increased recovery reactions.**

Co-administration of low dose benzodiazepines has been used to prevent and treat ketamine emergence reactions. However, these agents slow ketamine metabolism, which may prolong recovery time and may lead to respiratory depression. Two randomised controlled trials of ketamine used in children with or without low dose midazolam failed to show any difference in the rate of recovery agitation (48, 60). Therefore, **midazolam should not be used routinely as an adjunctive agent for ketamine sedation.**

Vomiting

Vomiting may occur in late recovery phase when the patient is already alert. There are no documented reports of clinically significant ketamine associated aspiration syndrome (24). A recent large randomized controlled trial of IV ketamine sedation plus ondansetron versus IV ketamine sedation plus placebo showed a significantly lower rate of vomiting with ondansetron (5% vs 13%; $p=0.02$) (61). If a patient experiences vomiting (1 episode) post-ketamine sedation a single dose of ondansetron IV (0.1mg/kg slow bolus) or PO (8-15kgs body weight = 2mg; 15-35kg = 4mg; >35mg = 8mg) can be administered.

Contraindications

There is insufficient data to safely administer ketamine to children under 1 year in the ED setting. These children are at increased risk of airway complications. Procedures requiring sedation in infants should take place in the operating theatre. Children over 12 years of age experience an increase in emergence reaction. Therefore, while it may be reasonable (and safe) to use ketamine in this age group, alternative sedation agents e.g. combination of N₂O and topical/local anaesthesia, should be considered.

Table: Contraindications for ketamine use (relative and absolute)

Contraindications	Potential adverse effects of ketamine
Children < 1 year	Increased risk of airway complications
Previous adverse reaction to ketamine	
Any respiratory complaint: asthma, active respiratory tract infection or disease, pneumonia, procedures involving the airway or pharynx	Increased bronchospasm, airway secretions & laryngospasm
Cardiovascular disease	Increases heart rate, oxygen consumption and workload of the heart.
Head Injury associated with loss of consciousness, altered level of consciousness or emesis	Altered conscious state
CNS mass lesions, hydrocephalus other conditions associated with raised intracranial pressure	Increased intra-cranial pressure
Glaucoma or acute globe injury	Increased intra-ocular pressure
Bowel obstruction	Increase incidence of vomiting as a result of the bowel obstruction & potential airway complications when sedated
Psychosis, ADHD	More severe emergence reaction / recovery agitation
Porphyria, thyrotoxicosis, unstable epilepsy	Anecdotal evidence of enhanced sympathomimetic responses ³¹ Brief seizures

Ketamine administration requires:

- Health Evaluation and Risk Assessment
- Written consent

For further information on these topics please refer to Module 1 “General Sedation Module”.

Additional information on obtaining consent for Ketamine

The trance-like state, open eyes and occasional random movements seen during ketamine administration can be frightening for parents. Therefore it is important to explain the effects of ketamine to the parent.

The sedation handout provides good talking points in the discussion with parents about the expected events during the sedation and possible sequelae after the procedure.

Fasting prior to procedure

The recommended fasting times for ketamine IV and IM are:

- 3 hours fasting status for solids & 2 hours for liquids

Equipment

All required equipment should be in the room, functioning and turned on for the sedation (See Module 1).

For ketamine sedation, the following equipment is required:

- Bag / valve / mask set up for appropriate size and able to deliver O₂ with O₂ tubing attached
- Resuscitation area (or trolley) with full intubation equipment setup (ETT, laryngoscope, introducer, McGill's forceps, ties)
- Appropriate size Guedel airway
- Suction with a yankauer sucker attached
- Oxygen tubing attached to oxygen source with appropriate size mask
- Pulse oximetry operative – to monitor oxygen saturation pre, during & post procedure
- ECG monitoring equipment
- Blood pressure monitoring

A three-lead cardiac monitor, saturation probe and non-invasive BP monitoring should be applied for the duration of the procedure and recovery period.

Staff required for procedure

A minimum of three staff members:

	One doctor or nurse practitioner to perform the procedure
	One doctor to administer the sedation. This doctor must be credentialed in ketamine sedation and PLS/APLS certified
	One registered nurse capable of supporting airway management and advanced monitoring of patients. This nurse must be trained in ketamine sedation and PLS/APLS certified
	Consultant in EM available and present

All required personnel must be present and equipment checked and available prior to the administration of ketamine.

Ketamine must only be administered by the sedation doctor.

Observations

Observations should be continuously monitored and documented every 5 minutes until the child returns to normal conscious state:

- Pulse
- Respiratory rate
- Blood pressure
- Oxygen saturation
- Sedation score
- Continuous 3-lead ECG

For more detailed information please refer to Module 1: General Sedation Module.

Location

Sedations with ketamine can only be performed in the Resuscitation area.

Ketamine dose

There is no reversal agent for ketamine. The following table explains the differences between administration of ketamine IV and IM.

Ketamine IV must be given as a slow IV push over 1 minute, to avoid transient respiratory depression.

Route of administration	Intramuscular (IM)	Intravenous (IV)
Advantages	No IV necessary	Ease of repeat dosing Slightly faster recovery
Clinical onset	3-5 minutes	1 minute
Duration of Effective sedation	15 – 30 minutes	15 minutes
Recovery	90-150 minutes	60 minutes
Initial dose	4mg/kg	1mg/kg
Subsequent dose	Insert IV and give further doses 0.25-0.5 mg/kg IV	0.25-0.5 mg/kg
Maximum dose	5mg/kg	5 mg/kg

Drug preparation

IV administration

Ketamine should be diluted with 0.9% NaCl to facilitate slower IV bolusing e.g. dilute ketamine to 10mls total volume of injection.

IM administration

Give 'neat' into a large muscle e.g. thigh.

Administration of a 'top-up' dose

The decision to administer a 'top-up' will be at the discretion of the sedation doctor. Two is the maximum number of 'top-ups' that should be administered in the ED.

If further doses are required then the appropriateness of continuing the sedation procedure in ED should be questioned and consideration made of referring the patient for general anaesthesia.

Prior, During and Post Procedure Management

See Module 1: General Sedation.

Discharge Criteria

See Module 1: General Sedation.

Atropine

Pharmacological Action

Relaxes smooth muscles, inhibits salivary and bronchial secretions, increases heart rate and dilates pupils. These effects are due to competitive inhibition of muscarinic acetylcholinergic parasympathetic postganglionic receptors. It can be used to reduce salivary and tracheobronchial secretions associated with ketamine administration.

Dose

It may be administered IV or IM (the dose is the same irrespective of the route of delivery).

Route of administration	Intravenous (IV)
<i>Initial dose</i>	20mcg/kg (0.02mg/kg)
<i>Maximum single dose</i>	600mcg/kg (0.6mg/kg)

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Appendices

- Appendix 1: Sedation record
- Appendix 2: Nitrous parent information
- Appendix 3: Ketamine parent information

Record of sedation of a child for procedure in the **Children's Emergency Department**

1. RISK ASSESSMENT If any child meets the risk assessment criteria OR if you have reservations, contact the Consultant in Emergency Medicine for further discussion before using a sedation agent		
Age ≤ 6 months (oral agents) or ≤ 1 year (nitrous oxide and ketamine)		
Significant risk of delayed gastric emptying or vomiting e.g. bowel obstruction	Significant respiratory disease e.g. upper airway obstruction, airway infection, apnoea, exacerbation of asthma, pneumonia	
Significant cardiovascular impairment e.g. pulmonary hypertension, cardiomyopathy, hypovolaemia	Abnormal conscious state/risk of raised ICP e.g. head injury, meningitis, space occupying lesion	
Acute systemic infection e.g. sepsis	Immunosuppression e.g. post-op transplant, neutropenia	
Significant liver disease/liver failure e.g. biliary atresia	Prior adverse event or allergic reaction	
Significant neuromuscular disease/kyphoscoliosis		
EXCLUSION CRITERIA	NITROUS OXIDE	KETAMINE
	< 1 year Pneumothorax Bowel obstruction Lung cyst	< 1 year Glaucoma CNS lesion, epilepsy ADHD, psychosis
2. FASTING TIMES	2 hours solids and liquids	2 hours clear liquids 3 hours solids or milk
3. STAFF LEVELS	2 staff required 1 ED-sedation trained staff	2 staff required (incl. CED Consultant) 2 ED-sedation trained staff (nurse & doctor)
4. LOCATION AND EQUIPMENT CHECK	Location: CED Resus Equipment: this equipment should be in the room at all times, turned on and functioning during the sedation period <ul style="list-style-type: none"> suction device; bag/valve/mask for size of patient with correct mask oxygen available by mask with reservoir monitoring equipment (HR, RR, SaO₂, BP) access to resuscitation trolley with appropriate sized airway equipment 	
5. "TIME OUT" OR POSITIVE IDENTIFICATION	Both staff involved in the procedure will confirm the following: <ul style="list-style-type: none"> the patient's identity checked by ID band or positive identification with parent/guardian or HCR confirm or mark site (if applicable) procedure to be performed and appropriate sedation agent prescribed 	
6. DETAILS OF SEDATION SCORE (UMSS)	0 = Awake and alert – THIS IS NOT SEDATED 1 = Minimally sedated: may appear tired/sleepy, responds to verbal conversation and / or sound. 2 = Moderately sedated: sleeping, easily roused with light tactile stimulation or simple verbal command. 3 = Deep sedation: deep sleep, rousable only with deep or significant physical stimulation. May require assistance to maintain a patent airway. 4 = Unrousable	
7. DISCHARGE CRITERIA	<ul style="list-style-type: none"> resumption of pre-sedation level of consciousness resumption of purposeful neuromuscular activity ability to ambulate or sit without support (if appropriate) ability to verbalise (if appropriate) final set of vital signs within normal limits for patient's age ability to tolerate oral fluids 	



**Nitrous oxide sedation of children for
procedures in the Children's Emergency
Department**

Parent Information Leaflet

This information booklet is for parents of children undergoing sedation with nitrous oxide for a procedure while in the Children's Emergency Department (CED) at the Royal Alexandra Children's Hospital.

Part 1: ABOUT SEDATION

Reasons for having sedation

Sedation is a medicine given to children to make them feel sleepy and relaxed. Your child may become distressed and afraid when having certain tests or treatments. Fear can make their pain worse. Procedural sedation (sedation for procedures) aims to reduce your child's anxiety and fear.

Children do not always sleep with sedation medicines. The sedation may make them feel sleepy and/or make them unable to remember the procedure. The procedure can then be done without causing too much distress for you and your child.

About Nitrous Oxide

Nitrous Oxide is an anaesthetic gas that your child breathes in through a mask. Nitrous oxide is otherwise known as 'laughing gas', and is commonly used for minor procedures in the ED in children. The gas will cause your child to become sleepy, dazed and easier to manage for procedures that require co-operation from the patient such as suturing (stitches). This may also cause some minor memory loss which is generally related to the procedure itself (and is considered a good thing)

The most common side effects related to Nitrous Oxide are vomiting or nausea, this occurs approximately with only 1 in 10 children. In the event of any side effect your child will be managed by the CED staff until it is deemed safe for you and your child to be discharged home.

Permission to give sedation

As the parent or legal guardian we cannot sedate your child without your consent.

You need to understand the reasons for sedation and the risks that are involved. This booklet will form part of the informed consent process as it contains all the information you need to make a decision.

What you need to know before consenting for sedation

1. A staff member will remain with your child until they are awake and if required, we will give your child oxygen through a mask or breathing tube;
2. Children may vomit. Very rarely, they may breathe the vomit into their lungs, which would require additional treatment;
3. Occasionally children develop an allergic reaction to the medicine which may require additional treatment.
4. Children can sometimes become extra sleepy and need some breathing support. This is likely to be short lived as the gas wears off quickly.
5. Your child will be discharged when it is safe to do so. Expect to wait for an hour or more after the procedure;

6. We will use a hospital consent form for the procedure under sedation which you will sign with the doctor completing the procedure.

7. We will log the details of your child's sedation event into a CED Sedation Registry to use for future research purposes.

Please inform us immediately if you do not wish for us to keep your child's information

Part 2: HELPING YOUR CHILD

Helping your child before the procedure

- Check with the nurse or doctor before giving your child anything to eat or drink;
- Ask the doctor/ nurse to explain the procedure to you and to your child;
- Before the procedure the ED staff (e.g. nurses and doctors) will try to help your child cope using interactive games, toys, playing with equipment, etc.
- Talk to your child about some ways to cope (for example – looking at an interactive book, using their imagination to be in a nice place, blowing bubbles);
- It helps not being too upset or nervous yourself – your child will notice this.

Helping your child during the procedure

- There will always be a Children's Emergency Department staff member present during the procedure to help;
- Having a parent (or another adult) who knows the child stay with them is usually helpful;
- The level in which you will be able to engage/involve your child will depend on how deeply sedated your child becomes. Your child may need reminders of the coping methods you decided upon earlier (for example, "blow away the hurt"). This sort of distraction is very helpful;
- Giving your child a sense of control with some simple choices is helpful. We can allow them to choose things they may like e.g. music or video options, which finger the oxygen probe may be placed on;
- It is not helpful to allow your child to decide the exact moment the procedure is going to occur.

Helping your child after the procedure

- Remain with your child. They may not remember where they are or why they are in hospital;
- Focus on the good things your child did. For example "you did a great job blowing away the hurt."

- You will be required to remain in the Emergency Department until fully awake and the doctor has discharged your child.

**Part 3: CARE OF YOUR CHILD ON YOUR WAY HOME
& FOR THE NEXT 24 HOURS**

Sometimes the delayed effects of the medicines may make your child a bit confused, sleepy or clumsy for a while after the procedure. You need to be extra careful in caring for and supervising your child for the next 24 hours.

- If your child falls asleep in the car seat, watch them to make sure that they do not have any difficulty breathing. DO NOT leave your child alone in a car seat or alone in the car;
- Let your child sleep. Children may go to sleep again after getting home from the hospital. Sometimes children may sleep more because of the sedation medicine;
- Check on your child's sleeping pattern the night after getting home. If their sleeping seems heavy or strange then wake them up gently. If you cannot wake them or something seems wrong in their appearance or breathing, call an ambulance and return to the hospital immediately;
- Sometimes children may feel sick or vomit if they eat a big meal too soon after sedation. Give your child clear liquids such as diluted fruit juice, ice pops, jelly, clear soup, etc.
- Supervise all playing and bathing for the next 8 hours after getting home. DO NOT let your child swim or use play equipment (bikes, monkey bars, etc.) that might cause an accident (for the next 24 hours).

Key points to remember

- Sedation is commonly used in children for procedures;
- You need to give consent before your child has sedation;
- Make sure you understand the reasons for and the risks of sedation;
- Be as open and honest as you can with your child about what is going to happen and it helps not to be too upset yourself

When to return to the Emergency Department

Please return to the CED at the Alex if your child:

- Vomits more than twice;
- Has strange or unusual behaviour;
- If you have any concerns.

Useful numbers:

NHS – 111 - 24hr

Children's Emergency Department – 01273 696955 ext. 2593

Produced by the **Children's Emergency Department** August 2018.

Version: 3 created by Dr. M. Lazner, Dr. C. Bevan and PNP D. Baldwin.

Review August 2020.



Ketamine sedation of children for procedures in the Children's Emergency Department

Parent Information Leaflet

This information booklet is for parents of children undergoing sedation with ketamine for a procedure while in the Children's Emergency Department (CED) at the Royal Alexandra Children's Hospital.

PART ONE: about sedation

Reasons for having sedation

Sedation is a medicine given to children to make them feel sleepy and relaxed.

Your child may become distressed and afraid when having certain tests or treatments. Fear can make their pain worse. Procedural sedation (sedation for procedures) aims to reduce your child's anxiety and fear.

Children do not always sleep with sedation medicines. The sedation may make them feel sleepy and/or make them unable to remember the procedure. The procedure can then be done without causing too much distress for you and your child.

About Ketamine

Ketamine is commonly used for sedation in children. When we give your child ketamine they get sleepy and do not remember what happened. There are some special features about sedation with ketamine for you to know:

- Ketamine sedations are only ever performed in the CED with an attending Consultant;
- It is given by injection either into a vein, or into muscle;
- Your child may seem to be awake after receiving ketamine – this is because ketamine causes a 'trance-like' state;
- Your child may move and need someone to hold them still;
- Your child may drool more than usual;
- Sometimes as your child wakes up they may have some agitation, hallucinations or nightmares. These sensations usually improve if you comfort your child in a quiet dark area until they are fully awake.

Permission to give sedation

As the parent or legal guardian we cannot sedate your child without your consent. You need to understand the reasons for sedation and the following risks:

What you need to know before consenting for sedation

1. A staff member will remain with your child until they are awake and if required, we will give your child oxygen through a mask or breathing tube;
2. Children may vomit. Very rarely, they may breathe the vomit into their lungs, which may require some specific treatment;
3. They may need to be treated with extra medicines such as anti-allergy medicine;
4. For your child's safety, do not take your child home until staff tell you it is safe to do so. Expect to wait for an hour or more after the procedure;
5. We will use a consent form for the sedation procedure and to allow the CED to log the details of your child's sedation event into a CED Sedation Registry;

6. The details of your child's sedation event will be recorded for research purposes in an encrypted and password protected database for prospective recording and analysis;
7. All details recorded will be recorded and maintained in accordance with the Data Protection Act 2003.

PART TWO: helping your child

Helping your child before the procedure

- Check with the nurse or doctor before giving your child anything to eat or drink;
- Ask the doctor/ nurse to explain the procedure to you and to your child;
- Before the procedure the ED staff (e.g. nurses and doctors) will try to help your child cope using interactive games, toys, playing with equipment, etc;
- Talk to your child about some ways to cope (for example – looking at an interactive book, using their imagination to be in a nice place, blowing bubbles);
- It helps not being too upset or nervous yourself – your child will notice this.

Helping your child during the procedure

- There will always be a Children's Emergency Department staff member present during the procedure to help;
- Having a parent (or another adult) who knows the child stay with them is usually helpful;
- The level in which you will be able to engage/involve your child will depend on how deeply sedated your child becomes.
- Your child may need reminders of the coping methods you decided upon earlier (for example, "blow away the hurt"). This sort of distraction is very helpful;
- Giving your child a sense of control with some simple choices is helpful. We can allow them to choose things they may like e.g. music or video options, which finger the oxygen probe may be placed on;
- It is not helpful to allow your child to decide the exact moment the procedure is going to occur.

Helping your child after the procedure

- Remain with your child. They may not remember where they are or why they are in hospital;
- Focus on the good things your child did. For example "*you did a great job blowing away the hurt*";
- You will be required to remain in the Emergency Department until fully awake and the doctor has discharged you.

PART THREE: Care of your child on your way home and for the next 24 hours

Sometimes the delayed effects of the medicines may make your child a bit confused, sleepy or clumsy for the next 24 hours. You need to be extra careful in caring for and supervising your child for the next 24 hours.

- If your child falls asleep in the car seat, watch them to make sure that they do not have any difficulty breathing. DO NOT leave your child alone in a car seat or alone in the car;
- Let your child sleep. Children may go to sleep again after getting home from the hospital. Sometimes children may sleep more because of the sedation medicine;
- Check on your child's sleeping pattern the night after getting home. If their sleeping seems heavy or strange then wake them up gently. If you cannot wake them or something seems wrong in their appearance or breathing, call an ambulance and return to the hospital immediately;
- Sometimes children may feel sick or vomit if they eat a big meal too soon after sedation. Give your child clear liquids such as diluted fruit juice, ice pops, jelly, clear soup, etc;
- Supervise all playing and bathing for the next 8 hours after getting home. DO NOT let your child swim or use play equipment (bikes, monkey bars, etc) that might cause an accident (for the next 24 hours).

Key points to remember

- Sedation is commonly used in children for procedures;
- You need to give consent before your child has sedation;
- Make sure you understand the reasons for and the risks of sedation;
- Be as open and honest as you can with your child about what is going to happen and it helps not to be too upset yourself.

When to return to the Emergency Department

Please return to the CED at the Alex if your child:

- Vomits more than twice;
- Has strange or unusual behaviour;
- If you have any concerns.

The name of the doctor or nurse who performed the sedation is:

Doctor _____

Nurse _____

Useful numbers:

Children's Emergency Department – 01273 623 608 ext 2593

NHS – 111 - 24hr

Brighton and Sussex 
University Hospitals
NHS Trust



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