



# BEST PRACTICE GUIDANCE FOR PROCEDURAL SEDATION OF CHILDREN AND YOUNG PEOPLE

## A South London and South East of England approach

### Introduction:

This guidance has been developed, in consultation with colleagues from South Thames Paediatric Networks and retrieval services. The process collated available guidance documents from the Network regions, alongside the latest evidence base to produce and implement a guideline that will standardise practice across the Networks.

Please note that this guidance is to be used in all paediatric areas in conjunction with existing trust guidance on pain management, use of IV/IM Ketamine, Fentanyl and Diamorphine, if applicable, and existing trust competencies for the administration of Ketamine, Fentanyl and Diamorphine.

### The contents for the Guideline are as follows:

Main document: Best Practice guidance for Procedural Sedation of children and young people

Appendix A: Team Screen

Appendix B: Intranasal fentanyl, Intranasal diamorphine and IV/IM Ketamine competencies

Appendix C: References and Team credits

### Change History:

Date	Change details, since approval:	Approved by:	Document Version:

## Procedural Sedation of children and young people - A South London and South East of England approach

### Pre-procedural patient assessment

This assessment should be completed by the nurse in charge and registrar and discussed with the appropriate consultant prior to the procedure.

- Weight**
- Current medical condition and any surgical problems**
- Current and recent medication and allergies**
- Physical status including an assessment of the airway**
  - Noisy breathing, snoring, nasal speech, sleep apnoea, mouth breathing and drooling
  - Mandibular hypoplasia, small mouth or limited mouth opening, micrognathia
- Fasting status**  
Follow national recommendation of 1-4-6 for moderate sedation or above.
- PMH including any history of problems with sedation or anaesthesia, injury to neck**
- Psychological and developmental status**

### Contra-indications and specialist support required for sedation

Contra- indications to Sedation – Conscious Sedation should not be used in the following situations:	Cautions 1- Conscious sedation should only be performed after Consultation with Senior Anaesthetic support and with on-site availability of Critical Care support (L1, or 2/HDU as appropriate)	Cautions 2- ,As for Cautions 1 with additional consultation with specialist team, anaesthetic team and tertiary centre
<ul style="list-style-type: none"> <li>Active respiratory tract infection</li> <li>SpO<sub>2</sub> &lt;94% in air</li> <li>Apnoeic episodes</li> <li>Decreased level of consciousness (e.g. Raised ICP, encephalopathy, head injury)</li> <li>Bowel obstruction</li> <li>Allergy to drugs being used</li> <li>Child too distressed despite adequate preparation</li> <li>Informed refusal by parent or child</li> </ul>	<ul style="list-style-type: none"> <li>&lt;5kg</li> <li>&lt;12 months post term</li> <li>ASA ≥ 2 (See ASA classification table)</li> <li>Congenital abnormalities or dysmorphic features</li> <li>Any airway problems including obstructive sleep apnoea, snoring and stridor</li> <li>Large tonsils</li> <li>Any other respiratory problems</li> <li>Previous failed sedation</li> <li>Severe gastroesophageal reflux requiring treatment</li> <li>Previous paradoxical agitation</li> <li>Previous history of aspiration</li> <li>Obesity</li> </ul>	<ul style="list-style-type: none"> <li>Receding Mandible- On-site ENT</li> <li>ASA ≥ 3 (See ASA classification table) L3 CC support</li> <li>Severe liver, kidney, cardiac, neuromuscular disease- Consult appropriate specialist Consultant</li> </ul>

### American Society of Anaesthesiologists Classification\*

ASA1: No organic, physiological, biochemical or psychiatric disturbance.

ASA2: Mild to moderate systemic disturbance, not disabling e.g. well controlled diabetes, moderate anaemia, well-controlled asthma.

ASA3: Severe systemic disease which is disabling e.g. poorly managed diabetes with vascular, fluid or electrolyte complications, severe pulmonary or cardiac insufficiency.

ASA4: Severe systemic disorders which are already life-threatening.

ASA5: The moribund patient who has little chance of survival with or without operative intervention

### Monitoring & Observations

**Continuously monitor patient - document every 5 minutes once sedation given and every 15 minutes post procedure until minimal sedation reached.**

Sedation depth	Sedation score	Conscious State	Monitoring and Observations - Immediate access to resus equipment required	Personnel required	
				All members	At least one member
	0	Awake, normal conscious level			
<b>Minimal sedation</b>	1	Patient awake and calm, responds normally to verbal commands. Cognitive function and coordination impaired, ventilation and cardiovascular functions unaffected.		Basic life support	Inform senior member of nursing or medical team
<b>Moderate sedation</b>	2	Patient sleepy but responds purposefully to verbal commands or light tactile stimulation. Airway patent and spontaneous ventilation. Cardiovascular function maintained.	<input type="checkbox"/> Sedation Level/AVPU <input type="checkbox"/> Respiratory Rate <input type="checkbox"/> Oxygen Saturations – maintain above 94% <input type="checkbox"/> HEART RATE <input type="checkbox"/> Depth of Sedation	Basic life support	Advanced life support
<b>Deep sedation</b>	3	Patient asleep and cannot be easily roused. Responds purposefully to repeated or painful stimulation. May require assistance to maintain a patent airway. Spontaneous ventilation may be inadequate. Cardiovascular function maintained.	<input type="checkbox"/> Sedation Level/AVPU <input type="checkbox"/> Respiratory Rate <input type="checkbox"/> Oxygen Saturations – maintain above 94% <input type="checkbox"/> Facemask capnography	<input type="checkbox"/> HEART RATE <input type="checkbox"/> Depth of Sedation <input type="checkbox"/> 3-Lead ECG <input type="checkbox"/> ETCO2	Advanced life support Anaesthetic support
	4	Unrousable	<b>To be avoided but if this occurs monitor as above and call anaesthetic support.</b>	<b>Call Anaesthetic support</b>	

### Discharge Criteria

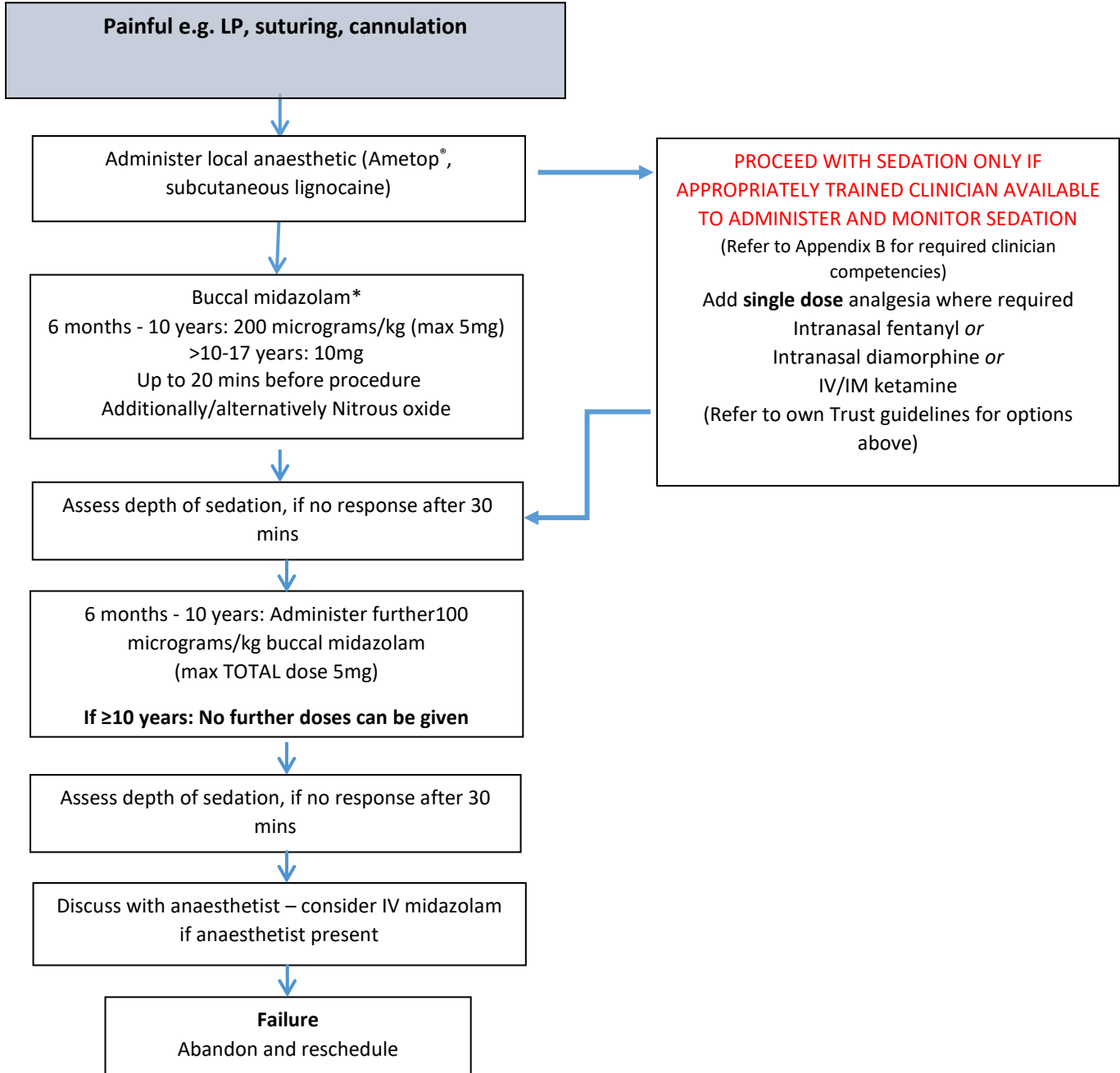
**Ensure all the criteria are met before the patient is discharged**

- ✓ Vital signs (usually body temperature, heart rate, blood pressure and respiratory rate) have returned to baseline levels
- ✓ The child or young person is awake (or returned to baseline level of consciousness) and there is no risk of further reduced level of consciousness
- ✓ Nausea, vomiting and pain have been adequately managed

**Choice of Medication**

**Painful Procedures:**

Venepuncture, Venous cannulation/midline insertion, Chest drain, Suturing, Fracture manipulation, Dislocation reduction, Eye irrigation, Burns management, Skeletal survey, Wound dressing, Removal of foreign body, Reducing paraphimosis, Incision and drainage, Lumbar puncture, Insertion of nasogastric tube, Short long lines, PICC lines



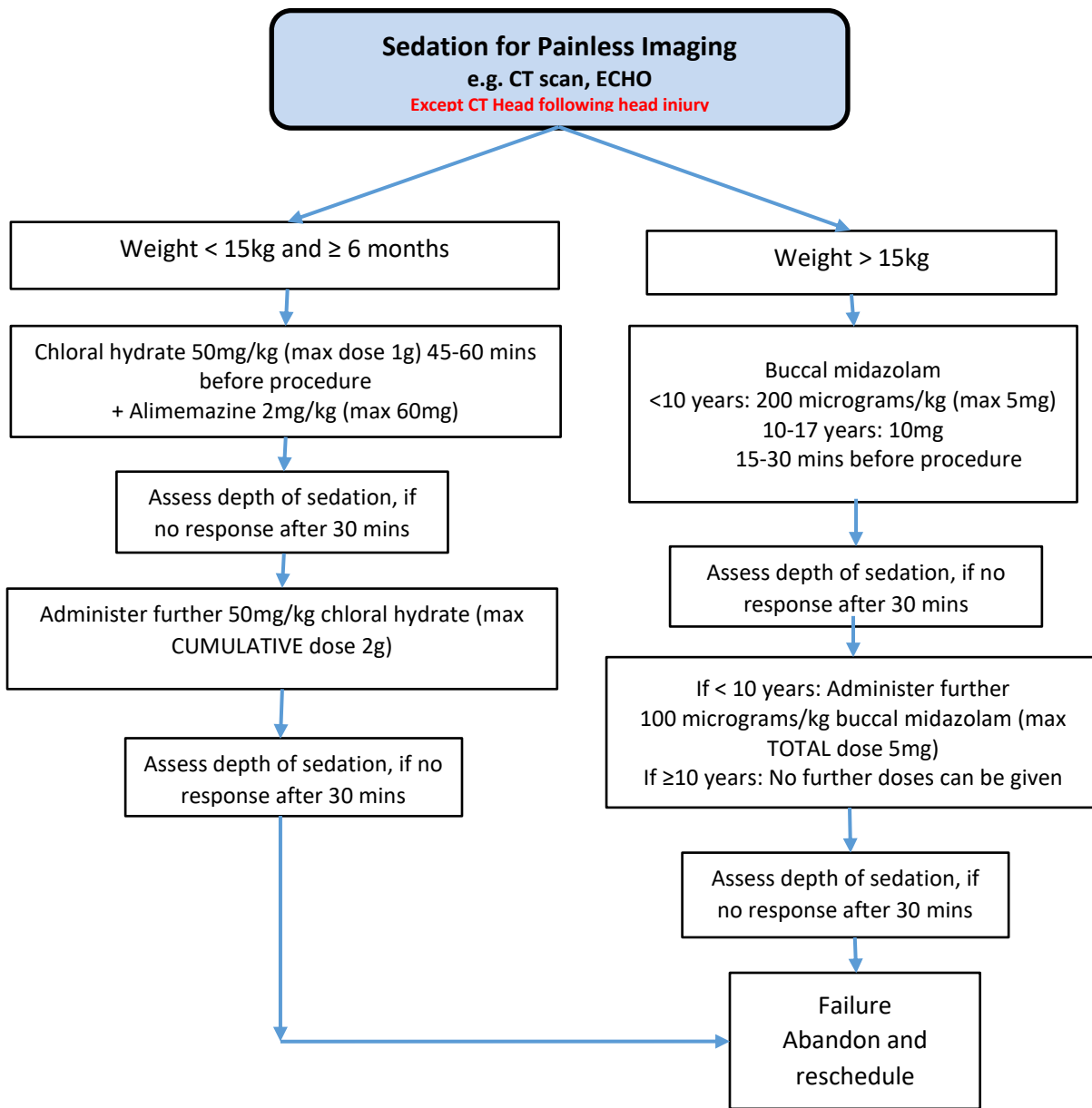
\*Sedation onset should begin 5-10 minutes after administration, with peak effects seen by 20-30 minutes.

## Choice of Medication

### Painless Procedures:

Minimal/ Moderate sedation  
CT, Ultrasound, Echocardiogram

Deep sedation  
MRI



## Reversal Agents:

### Flumazenil: *Rapid reversal of sedative effects of Midazolam*

- IV: 10 micrograms/kg (max 200 micrograms per dose) at 1 minute intervals. Dose to be administered over 15 seconds. Max 5 DOSES per course (i.e. 50 micrograms/kg per course or 1mg per course). Max one dose ONLY for neonates (ECH advises against repeat doses for preterm infant and neonates < 7 days).
- If drowsiness recurs after IV, consider IV infusion 2-10 micrograms/kg/hour (max 400 micrograms/hour)
- **Do not give to epileptic child on long terms benzodiazepines; may precipitate withdrawal seizure**

**Drug doses:** Please refer to the latest edition of BNFC or the Evelina Paediatric Formulary

[https://bnfc.nice.org.uk/CMS\(ubqo.com\)](https://bnfc.nice.org.uk/CMS(ubqo.com))

### Chloral hydrate

<b>Action</b>	<b><i>Hypnotic drug with no analgesic properties</i></b>
<b>Dose</b>	50 mg/kg (max 100 mg/kg, up to 1g)
<b>Timing</b>	45 min before procedure, max effect 1-2 hrs
<b>Second Dose</b>	50 mg/kg if adequate sedation not achieved at 30 mins (max CUMMULATIVE dose 2g)
<b>Recovery time</b>	1-6 hrs minimum
<b>Contraindications</b>	Acute porphyria, gastritis, severe cardiac disease
<b>Cautions</b>	Obstructive sleep apnoea, severe hepatic and renal impairment
<b>Other</b>	Can mix squash/sugar water to disguise taste

### Buccal midazolam

<b>Action</b>	<b><i>Sedative drug with anxiolytic and amnesic properties, with no analgesic properties.</i></b>
<b>Dose</b>	<b>Buccal:</b> 6 months to 10 years 200micrograms/kg (max 5mg) > 10 to 17 years 10mg
<b>Timing</b>	Up to 20 mins before procedure with peak effects after 20-30 minutes
<b>Second Dose</b>	May be indicated in <10 years if required, not to exceed TOTAL daily dose of 5mg Not required in ≥10 years as TOTAL daily dose would have been given
<b>Recovery time</b>	1-2 hrs
<b>Contraindications</b>	CNS depression, compromised airway, severe respiratory depression
<b>Side Effects</b>	Can cause severe cardio/respiratory depression
<b>Reversal Agent</b>	<b>Flumazenil</b>
<b>Other</b>	IV solution can be given via buccal route not orally as the dose is different

### Alimemazine

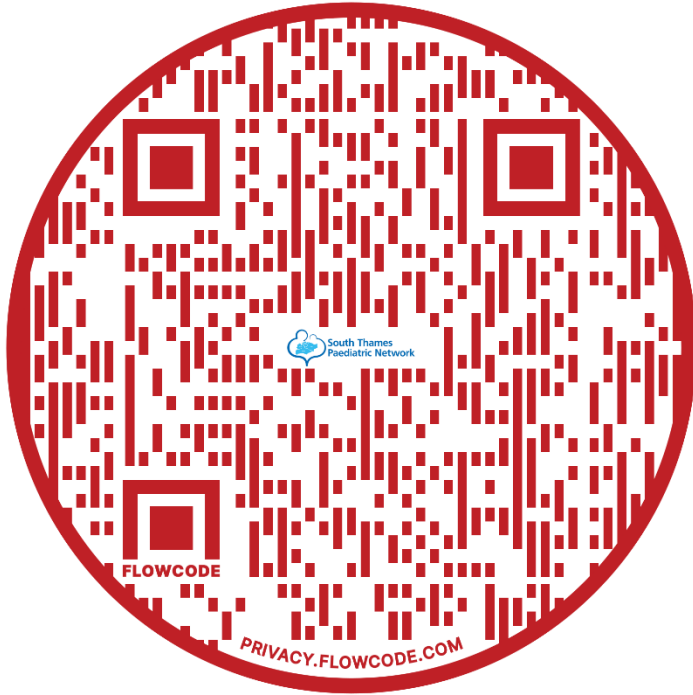
<b>Action</b>	<b><i>Antihistamine with sedative effects, with no analgesic properties.</i></b>
<b>Dose</b>	<b>Oral:</b> From 6 months: 2mg/kg (max 60mg)
<b>Timing</b>	30 mins before procedure
<b>Second Dose</b>	Not required
<b>Recovery time</b>	1-4 hours
<b>Contraindications</b>	Epilepsy, hepatic and renal impairment, myasthenia gravis
<b>Cautions</b>	Caution use in children under 6 months due to the possible association with cot deaths, volume depleted patients susceptible to orthostatic hypotension, cardiac disease, hypokalaemia, concurrent tricyclic antidepressant
<b>Side Effects</b>	Respiratory depression
<b>Other</b>	Can cause ECG changes including prolonged QT interval. Pre-existing cardiac disease, hypokalaemia and concurrent use of tricyclic antidepressants can predispose this.

### Inhaled nitrous oxide

<b>Action</b>	<b><i>Analgesic and sedative properties.</i></b> <b><i>Only suitable in &gt;5 years for co-operation</i></b>
<b>Dose</b>	Entonox (50% O <sub>2</sub> + 50% nitrous oxide)
<b>Timing</b>	Rapid onset, peak 3-5 minutes
<b>Recovery time</b>	Wears off rapidly
<b>Contraindications</b>	Patients with closed air spaces (pneumothorax, GI obstruction, middle ear infection, head injury), patients at risk of bone marrow suppression, raised homocysteine, acute asthma.
<b>Side Effects</b>	Vomiting, nausea, dizziness
<b>Other</b>	Avoid in first trimester pregnancy

## **Appendix A:**

### Team Screen



## Appendix B:

### Intranasal fentanyl, Intranasal diamorphine and IV/IM Ketamine competencies:

Healthcare professionals delivering sedation should have documented up to date evidence of competency including:

- Satisfactory completion of a theoretical training course covering the principles of sedation practice
- A comprehensive record of practical experience of sedation techniques, including details of
  - Sedation in CYP performed under supervision
  - Successful completion of work-based assessments

Each healthcare professional delivering sedation should ensure they update their knowledge and skills through programmes designed for continuing professional development

**Name:** \_\_\_\_\_

**Grade/ Post:** \_\_\_\_\_

Competency	Y/N	Date Achieved	Cons. Initials
A minimum of 3 months clinical experience in anaesthetics with evidence of successful completion of the Royal College of Anaesthetists' Initial Assessment of Competencies (IAC) or equivalent. <b>OR</b> A minimum of 6 months clinical experience as an advanced practitioner or middle grade doctor in PICU.			
Current APLS provider or instructor			
Evidence of successful completion of the Royal College of Emergency Medicine's e-learning module and short answer questions on ketamine sedation in children: <a href="https://www.rcemlearning.co.uk/?s=sedation">https://www.rcemlearning.co.uk/?s=sedation</a>			
Demonstrates working knowledge of ketamine (pharmacology, dosage, contraindications and side effects) to a PEM consultant.			
Demonstrates familiarity with the departmental paediatric sedation guideline (including checklists, observation chart and advice sheets).			
Teaching from PEM consultant on consenting parents for ketamine sedation.			
Demonstrates working knowledge of basic and advanced airway equipment.			
Demonstrates ability to set up and use suction.			
Demonstrates ability to set up and use a Waters circuit.			
Observes 2 paediatric ketamine, fentanyl or diamorphine procedural sedations: 1 2			
Performs 3 supervised paediatric ketamine, fentanyl or diamorphine procedural sedations: 1st: no WPBA required 2nd: <b>FORMATIVE</b> SLE (DOPS) required 3rd: <b>SUMMATIVE</b> SLE (DOPS) required			

**Final sign off by PEM Consultant:**

**Signature:** \_\_\_\_\_

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

## Appendix C:

### References and Team credits

With Special thanks to the South Thames Paediatric Network Sedation Task and Finish Group. The following people worked collaboratively over several months to produce the new Procedural Sedation Guidance for South London and South East England.

Name	Role	Organisation/ Trust
<b>Project Leads</b>		
Stacey Bedford	Lead Nurse Practice Development Nurse	South Thames Paediatric Network; PCC ODN Kings College NHS Foundation Trust
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<b>Sedation Task and Finish Group members</b>		
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<b>Clinical Director review and Endorsement of South London and South East England Procedural Sedation Guideline</b>		
Dr Marilyn McDougall	Clinical Director STPN & Paediatric Intensivist	South Thames Paediatric Network (STPN) Evelina Children's Hospital GSTT

#### Reference list/ Bibliography

- BNF for Children British National Formulary – NICE. [online] Available at: <https://bnfc.nice.org.uk>
- Cms.ubqo.com. 2021. CMS. [online] Available at: <http://cms.ubqo.com/public/d2595446-ce3c-47ff-9dcc-63167d9f4b80>
- Asahq.org. 2021. *ASA Physical Status Classification System | American Society of Anesthesiologists (ASA)*. [online] Available at: <<https://www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system>> [Accessed 28 July 2021].\* The classification has been modified to provide clarity for clinicians utilising the guideline for paediatric patients.