

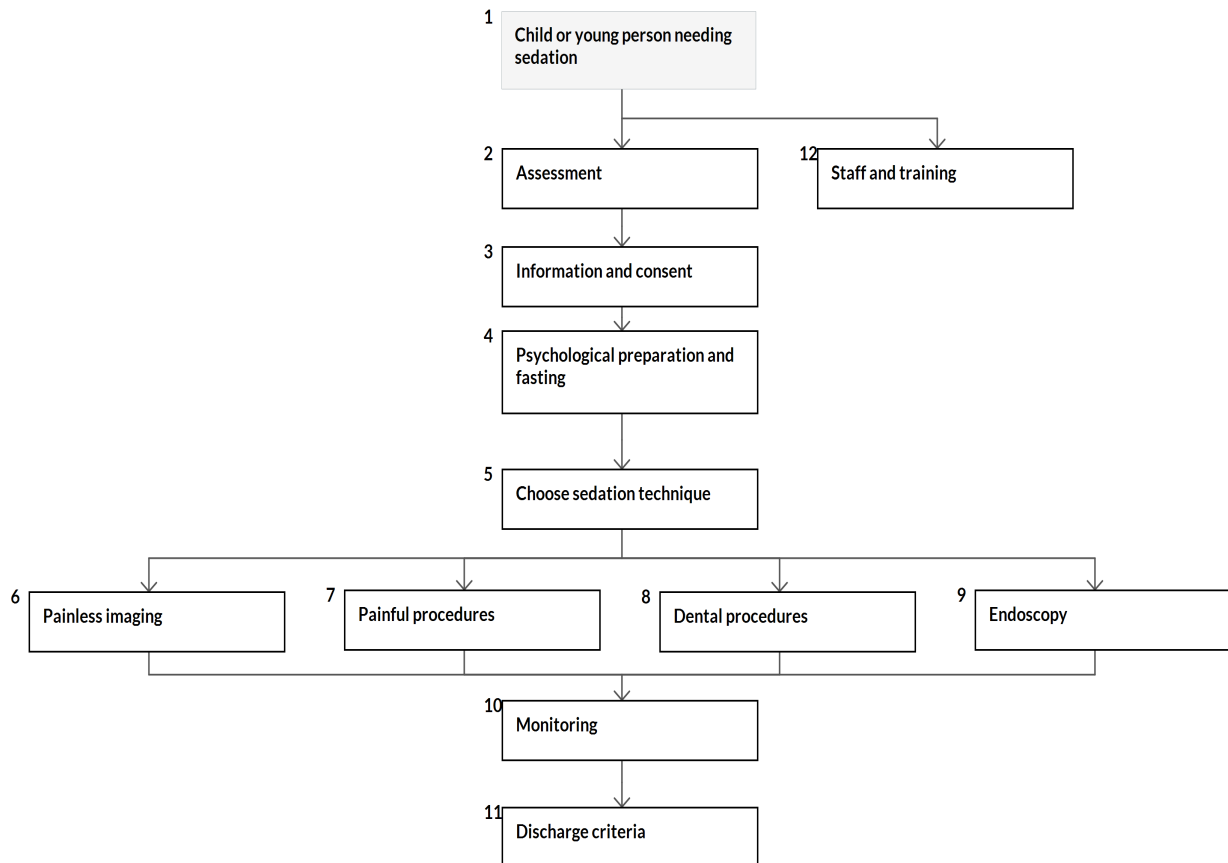
Sedation in children and young people overview

NICE Pathways bring together everything NICE says on a topic in an interactive flowchart. NICE Pathways are interactive and designed to be used online.

They are updated regularly as new NICE guidance is published. To view the latest version of this NICE Pathway see:

<http://pathways.nice.org.uk/pathways/sedation-in-children-and-young-people>
NICE Pathway last updated: 06 November 2020

This document contains a single flowchart and uses numbering to link the boxes to the associated recommendations.



1 Child or young person needing sedation

No additional information

2 Assessment

Ensure that trained healthcare professionals carry out pre-sedation assessments and document the results in the healthcare record. See [staff and training \[See page 11\]](#) in this pathway.

Establish suitability for sedation by assessing all of the following:

- current medical condition and any surgical problems
- weight (growth assessment)
- past medical problems (including any associated with previous sedation or anaesthesia)
- current and previous medication (including any allergies)
- physical status (including the airway)
- psychological and developmental status.

Seek advice from a specialist before delivering sedation:

- if there is concern about a potential airway or breathing problem
- if the child or young person is assessed as American Society of Anesthesiologists (ASA) grade 3 or greater
- for infants (children from birth to 1 year), including neonates (infants aged up to 1 month).

For an elective procedure, consider referring to a mental health specialist children or young people who are severely anxious or who have a learning disability.

Consider referring to an anaesthesia specialist a child or young person who is not able to tolerate the procedure under sedation.

3 Information and consent

To enable the child or young person and their parents or carers to make an informed decision, offer them verbal and written information on all of the following:

- proposed sedation technique

- the alternatives to sedation
- associated risks and benefits.

Obtain and document informed consent for sedation.

NICE has written information for the public explaining its guidance on [sedation for children and young people](#).

4 Psychological preparation and fasting

Psychological preparation

Ensure that the child or young person is prepared psychologically for sedation by offering information about:

- the procedure
- what the child or young person should do and what the healthcare professional will do
- the sensations associated with the procedure (for example, a sharp scratch or numbness)
- how to cope with the procedure.

Ensure that the information is appropriate for the developmental stage of the child or young person and check that the child or young person has understood the information.

Offer parents and carers the opportunity to be present during sedation if appropriate. If a parent or carer decides to be present, offer them advice about their role during the procedure.

Fasting

Before starting sedation, confirm and record the time of last food and fluid intake in the healthcare record.

Fasting is not needed for:

- minimal sedation
- sedation with nitrous oxide (in oxygen)
- moderate sedation during which the child or young person will maintain verbal contact with the healthcare professional.

Refer to professional guidance for fasting for elective procedures using any sedation technique

other than those described immediately above (that is, for deep sedation and moderate sedation during which the child or young person might not maintain verbal contact with the healthcare professional).

Note that in 2018 a change to the 2-4-6 fasting rule (fasting times should be as for general anaesthesia: 2 hours for clear fluids; 4 hours for breast milk; 6 hours for solids) was endorsed by the relevant professional bodies, supporting a reduction in the fasting period for clear fluids to 1 hour (see for example the Association of Paediatric Anaesthetists of Great Britain and Ireland [consensus statement on clear fluids fasting for elective pediatric general anaesthesia](#)).

For an emergency procedure in a child or young person who has not fasted, base the decision to proceed with sedation on the urgency of the procedure and the target depth of sedation.

5 Choose sedation technique

Choose the most suitable sedation technique based on all the following factors:

- what the procedure involves
- target level of sedation
- contraindications
- side effects
- patient (or parent or carer) preference.

Ensure that both the following will be available during sedation:

- a healthcare professional and assistant trained in delivering and monitoring sedation in children and young people (see [staff and training](#) [See page 11] in this pathway)
- immediate access to resuscitation and monitoring equipment (see [discharge criteria](#) [See page 11] in this pathway).

6 Painless imaging

Do not routinely use ketamine or opioids for painless imaging procedures¹.

For children and young people who are unable to tolerate a painless procedure (for example, during diagnostic imaging) consider one of the following drugs, which have a wide margin of safety:

- chloral hydrate for children under 15 kg

¹ At the time of publication (December 2010), no drugs have a UK marketing authorisation specifically for sedation in all ages of infants, children and young people under 19. The prescriber should follow relevant professional guidance, taking full responsibility for the decision, and using a drug's summary of product characteristics and the [British national formulary for children](#). Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

- midazolam.

For children and young people who are unable to tolerate painless imaging with the above drugs, consider one of the following, used in specialist techniques, which have a narrow margin of safety (see [staff and training](#) in this pathway):

- propofol
- sevoflurane.

7 Painful procedures

For children and young people undergoing a painful procedure (for example suture laceration or orthopaedic manipulation), when the target level of sedation is minimal or moderate, consider:

- nitrous oxide (in oxygen) and/or
- midazolam (oral or intranasal)¹.

For all children and young people undergoing a painful procedure, consider using a local anaesthetic, as well as a sedative.

For children and young people undergoing a painful procedure (for example, suture laceration or orthopaedic manipulation) in whom nitrous oxide (in oxygen) and/or midazolam (oral or intranasal) are unsuitable consider:

- ketamine (intravenous or intramuscular), or
- intravenous midazolam with or without fentanyl (to achieve moderate sedation).

For children and young people undergoing a painful procedure (for example suture laceration or orthopaedic manipulation) in whom ketamine (intravenous or intramuscular) or intravenous midazolam with or without fentanyl (to achieve moderate sedation) are unsuitable, consider a specialist sedation technique such as propofol with or without fentanyl.

8 Dental procedures

For a child or young person who cannot tolerate a dental procedure with local anaesthesia alone, to achieve conscious sedation consider:

- nitrous oxide (in oxygen) or
- midazolam².

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² At the time of publication (December 2010), no drugs have a UK marketing authorisation specifically for sedation in all ages of infants, children and young people under 19. The prescriber should follow relevant professional guidance, taking full responsibility for the decision, and using a drug's summary of product characteristics and the [British national formulary for children](#). Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

If these sedation techniques are not suitable or sufficient, refer to a specialist team for an alternative sedation technique.

9 Endoscopy

Consider intravenous midazolam to achieve minimal or moderate sedation for upper gastrointestinal endoscopy¹.

Consider fentanyl (or equivalent opioid) in combination with intravenous midazolam to achieve moderate sedation for lower gastrointestinal endoscopy.

10 Monitoring

Consider referring to an anaesthesia specialist a child or young person who is not able to tolerate the procedure under sedation.

For moderate sedation excluding with nitrous oxide alone (in oxygen) continuously monitor, interpret and respond to changes in all of the following:

- depth of sedation
- respiration
- oxygen saturation
- heart rate
- pain
- coping
- distress.

For deep sedation continuously monitor, interpret and respond to changes in all of the following:

- depth of sedation
- respiration
- oxygen saturation
- heart rate
- three-lead electrocardiogram
- end-tidal CO₂ (capnography)
- blood pressure (monitor every 5 minutes)
- pain

¹ At the time of publication (December 2010), no drugs have a UK marketing authorisation specifically for sedation in all ages of infants, children and young people under 19. The prescriber should follow relevant professional guidance, taking full responsibility for the decision, and using a drug's summary of product characteristics and the [British national formulary for children](#). Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

- coping
- distress.

For deep sedation, a healthcare professional should be involved only in continuously monitoring, interpreting and responding to all of the above.

End-tidal CO₂ and blood pressure should be monitored, if possible, provided that monitoring does not cause the patient to awaken and so prevent completion of the procedure.

Ensure that data from continuous monitoring during sedation are clearly documented in the healthcare record.

After the procedure, continue monitoring until the child or young person:

- has a patent airway
- shows protective airway and breathing reflexes
- is haemodynamically stable
- is easily roused.

11 Discharge criteria

Ensure that all of the following criteria are met before the child or young person is discharged:

- vital signs (usually body temperature, heart rate, blood pressure and respiratory rate) have returned to normal 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.

12 Staff and training

Healthcare professionals delivering sedation should have knowledge and understanding of and competency in:

- sedation drug pharmacology and applied physiology
- assessment of children and young people
- monitoring
- recovery care

- complications and their immediate management, including paediatric life support.

Healthcare professionals delivering sedation should have practical experience of:

- effectively delivering the chosen sedation technique and managing complications
- observing clinical signs (for example, airway patency, breathing rate and depth, pulse, pallor and cyanosis, and depth of sedation)
- using monitoring equipment.

Life support skills

Ensure that members of the sedation team have the following life support skills:

	Minimal sedation ^a	Moderate sedation	Deep sedation
All members	Basic	Basic	Basic
At least one member		Intermediate	Advanced
^a Including sedation with nitrous oxide alone (in oxygen) and conscious sedation in dentistry.			

Ensure that a healthcare professional trained in delivering anaesthetic agents¹ is available to administer:

- sevoflurane
- propofol
- opioids combined with ketamine.

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 children and young people performed under supervision
 - successful completion of work-based assessments.

¹ At the time of the 2018 surveillance review, no drugs have a UK marketing authorisation specifically for sedation

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

in all ages of infants, children and young people under 19. The prescriber should follow relevant professional guidance, taking full responsibility for the decision, and using a drug's summary of product characteristics and the [British national formulary for children](#). Informed consent should be obtained and documented. See the General Medical Council's [Good practice in prescribing and managing medicines and devices](#) for further information.

Glossary

ASA

American Society of Anesthesiologists physical status classification system (grades 1–6) is a system to classify and grade a patient's physical status before anaesthesia

Conscious sedation

drug-induced depression of consciousness, similar to moderate sedation, except that verbal contact is always maintained with the patient. The term is commonly used in dentistry

Deep sedation

drug-induced depression of consciousness during which patients are asleep and cannot easily be roused but do respond purposefully to repeated or painful stimulation. The ability to maintain ventilatory function independently may be impaired. Patients may require assistance to maintain a patent airway. Spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained

Minimal sedation

a drug-induced state during which patients are awake and calm, and respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected

Moderate sedation

drug-induced depression of consciousness during which patients are sleepy but respond purposefully to verbal commands (known as conscious sedation in dentistry) or light tactile stimulation (reflex withdrawal from a painful stimulus is not a purposeful response). No interventions are required to maintain a patent airway. Spontaneous ventilation is adequate. Cardiovascular function is usually maintained

Specialist sedation technique

a sedation technique that has a reduced margin of safety and increased risk of unintended deep sedation or anaesthesia, accompanied by airway obstruction and/or inadequate spontaneous ventilation. Healthcare professionals using a specialist sedation technique need to be trained to

administer sedation drugs safely, to monitor the effects of the drugs and to use equipment to maintain a patent airway and adequate respiration

Sources

Sedation in under 19s: using sedation for diagnostic and therapeutic procedures (2010) NICE guideline CG112

Your responsibility

Guidelines

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Technology appraisals

The recommendations in this interactive flowchart represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, health

professionals are expected to take these recommendations fully into account, alongside the individual needs, preferences and values of their patients. The application of the recommendations in this interactive flowchart is at the discretion of health professionals and their individual patients and do not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Commissioners and/or providers have a responsibility to provide the funding required to enable the recommendations to be applied when individual health professionals and their patients wish to use it, in accordance with the NHS Constitution. They should do so in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Medical technologies guidance, diagnostics guidance and interventional procedures guidance

The recommendations in this interactive flowchart represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take these recommendations fully into account. However, the interactive flowchart does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Commissioners and/or providers have a responsibility to implement the recommendations, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this interactive flowchart should be interpreted in a way that would be inconsistent with compliance with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.