



THE ROYAL
COLLEGE OF
ANAESTHETISTS

Chapter 10

GUIDELINES FOR THE PROVISION OF anaesthetic services

Guidance on the Provision of Paediatric Anaesthesia Services 2016

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When considering the provision of anaesthesia, the Royal College of Anaesthetists recommends that the following areas should be addressed. The goal is to ensure a comprehensive, quality service dedicated to the care of patients and to the education and professional development of staff. The provision of adequate funding to provide the services described should be considered. These recommendations form the basis of the standard expected for departmental accreditation.

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Summary

- Wherever and whenever children and young people undergo anaesthesia and surgery, their particular needs must be recognised and they must be managed in appropriate facilities and looked after by staff with relevant experience and ongoing training.^{1,2,3,4,5} For the purposes of this guidance, 'children and young people' refers to the age range birth to the 16th birthday.
- The service should be led and organised by consultants who maintain competencies to anaesthetise children and young people.⁶
- The anaesthetist must, at all times, have a dedicated assistant who maintains competencies in the peri-operative care of children and young people.⁷
- In emergency cases when transfer is not feasible, the most appropriately experienced senior anaesthetist available should undertake anaesthesia for surgery, and support resuscitation and stabilisation of the sick or injured child, as part of a multidisciplinary team.⁸
- Paediatric resuscitation equipment must be available wherever and whenever children are treated,⁹ and anaesthetists must maintain their skills in a team approach for resuscitation and stabilisation of the sick child.¹⁰
- Neonatal and paediatric high-dependency and intensive care services should be available, as appropriate for the type of planned surgery performed within a hospital.¹¹
- There should be an adequately staffed and resourced acute pain service that covers the needs of children.
- Non-specialist and specialist centres caring for children should participate in multidisciplinary networks for surgery and anaesthesia. Networks will agree standards of care and formulate care pathways for common elective and emergency surgery.^{12,13,14,15,16,17}
- Children and young people, along with their parents and carers, should be involved in all aspects of their care whenever possible.¹⁸ This includes decisions regarding the management of their anaesthesia and analgesia.

Introduction: the importance of paediatric anaesthesia services

- Children and young people aged under 16 years comprise about 20% of the UK population.¹⁹ Many will require anaesthesia to allow treatment for a variety of surgical conditions, much of which will be elective and relatively straightforward and performed in non-specialist centres, usually in fit infants and children. Infants and children increasingly may require anaesthesia or sedation for non-surgical procedures involving radiology, cardiac catheterisation, endoscopy, joint injection or chemotherapy. In total there are approximately 0.5 million anaesthetics delivered annually to children and young people in the UK.²⁰
- Children with significant acute or chronic medical problems, those undergoing complex procedures (including cardiothoracic and neurosurgery), neonates and small infants are usually referred to specialist children's units.^{14,15,16,21}
- Non-specialist centres should generally have arrangements for managing and treating simple surgical emergencies in children; in addition, they should be able to resuscitate and stabilise seriously ill infants and children of all ages prior to transfer for surgery and/or intensive care.⁶ Infants and children have different requirements. They are not just small adults, and there are marked developmental changes within the paediatric age range. After puberty, anatomical and physiological characteristics approach those of adults. At all ages, children and young people have distinct emotional and social requirements.
- Infants, and pre-pubertal children under the age of 8–12 years, have particular anatomical and physiological differences. Doses of drugs and fluids need to be more precisely calculated, and anaesthetic equipment for smaller children differs from that used in older children and adults.
- Anaesthesia for children should be undertaken or supervised by anaesthetists who have undergone appropriate training. In the UK, all anaesthetists with a CCT or equivalent will have obtained higher paediatric anaesthetic training. As a minimum, they should be competent to provide peri-operative care for common elective and emergency surgical conditions in children aged three years and older. There will be anaesthetists who have acquired more advanced competencies, thus allowing provision of anaesthesia, analgesia and intensive care interventions to a wider and more complex paediatric population. Unless there is no requirement to anaesthetise children, it is

expected that competence and confidence to anaesthetise children will need to be maintained through direct care, continuing professional development (CPD) and/or refresher courses, and should be *routinely* considered within annual appraisal and revalidation.

- In all centres where children are admitted for surgery, there should be a nominated consultant who is responsible for policies and procedures relating to emergency and elective anaesthesia of children. This consultant should be involved in the delivery of the service.
- There should be locally agreed guidelines that specify which cases can generally be managed on site and which will require transfer to a more specialised unit. Emergency life-threatening situations will dictate when it may be necessary to consider providing initial management locally. Both planned and urgent/emergency anaesthesia and surgery for children should be commissioned within the context of a network of care, with pathways of care agreed by specialist and non-specialist providers.

Levels of provision of service

1 Staffing requirements

- 1.1 Children should be anaesthetised by consultants who maintain competencies for safe paediatric anaesthesia practice. Children may also be anaesthetised by staff grade or associate specialist anaesthetists (SASs) or specialty doctors (SDs), provided that they fulfil the same criteria. They should work with a nominated supervising consultant anaesthetist, except in circumstances where local governance arrangements have agreed in advance that an individual is able to work without consultant supervision.²² When trainees anaesthetise children, they should be supervised by a consultant. They may be supervised by an SAS/SD with appropriate experience but there must be an identified consultant with overall responsibility.
- 1.2 The level of supervision of a trainee will vary according to their competence, and take into account patient age, co-morbidity, and the location and complexity of the procedure or surgery. A locally agreed policy should specifically advise on the circumstances when in-theatre consultant supervision is required. In all cases, consultant advice should be readily available. If clinical supervision of a trainee is provided by an SAS/SD, the trainee must have unimpeded access to a consultant.
- 1.3 When a child undergoes anaesthesia, the anaesthetist should be assisted by staff (operating department practitioners/assistants/anaesthetic nurses) who have had paediatric training and experience, and who have maintained these skills.
- 1.4 In the period immediately after anaesthesia, the child should be managed in a recovery ward or post-anaesthesia care unit, on a one-to-one basis, by designated staff with up-to-date paediatric competencies, particularly in resuscitation. A registered children's nurse should be directly involved with the organisation of the service and training in this area. A member of staff with advanced training in life support for children should always be present.
- 1.5 Ideally, children should be nursed on a ward where there are at least two registered children's nurses on duty for every shift.²³ It is accepted that there will be fewer staff in remote and rural areas,²⁴ and that competencies are the most important factor.
- 1.6 If children undergo surgery and anaesthesia on a site without inpatient paediatric beds, there should be ready access to a named paediatric consultant with acute care responsibilities, at all times.⁴
- 1.7 Units without inpatient paediatric beds should also have a formal arrangement with a neighbouring unit, to ensure that practical assistance is available should a child require transfer.⁴
- 1.8 In the context of emergency surgery that cannot be delivered on site, and if the patient is also physiologically unstable and requires airway and/or complex intensive care support during transfer, this may require the input of an appropriately skilled anaesthetist. This situation is rare except for neurosurgical emergencies (see 3.7).¹⁷

2 Equipment, support services and facilities

Equipment

- 2.1** A full range of monitoring devices and paediatric anaesthetic equipment should be readily available in theatres, and all other areas where children are anaesthetised and recovered.²⁵ Equipment must be appropriate for use in infants and children of all sizes and ages and include:
- equipment for airway management and monitoring, including for capnography
 - paediatric pulse oximetry sensors and blood pressure cuffs
 - vascular-access equipment, including intraosseous needles
 - burettes and syringe pumps to allow rapid and accurate fluid and drug delivery
 - fluid and external warming devices
 - temperature probes
 - ultrasound devices (for central venous and nerve identification).^{26,27}
- 2.2** Resuscitation drugs and equipment, including an appropriate defibrillator, should be readily available wherever children are anaesthetised.
- 2.3** Anaesthetic machines should incorporate ventilators which have the flexibility to be used over the entire size and age range, and provide accurate pressure control and positive end-expiratory pressure.
- 2.4** There should be accurate thermostatic control of the operating theatre to permit rapid change of temperature to at least 23°C. While this temperature is recommended within National Institute for Health and Care Excellence (NICE) guidance for adults,²⁸ in practice the theatre temperature should be capable of regulation up to 26–28°C, if necessary, when neonatal surgery is performed. Patient temperature should be routinely measured when external means of warming are employed, except when surgery is very short.
- 2.5** If intravenous fluids are required in infants (after the neonatal period) and children in the peri-operative period, they should generally be isotonic²⁹ and administered in a way that allows rapid and accurate delivery. Baseline plasma sodium/potassium should be measured at the outset and at least every 24 hours thereafter if intravenous maintenance fluids are to be continued post-operatively. When infants and children undergo prolonged surgery, require an extended period of fasting, or have a low weight/body mass, blood glucose should also be estimated in the peri-operative period and intravenous dextrose supplementation considered.
- 2.6** Fluid warming should always be available and used when volumes administered are large relative to patient size, when fluid administration could result in an unwanted reduction in patient temperature, or when the patient is already hypothermic, e.g. in the context of trauma resuscitation and/or surgery.

Support services

- 2.7** Paediatric high-dependency and intensive care facilities should be available and delivered within a network of care that supports major/complex surgery, and critically ill or injured infants and children.
- 2.8** Although it is acknowledged that critical care facilities for children are not available in all hospitals where children are anaesthetised, there should be the facilities and expertise to initiate intensive care prior to transfer/retrieval to a designated regional paediatric intensive care unit (PICU)/high-dependency unit (HDU) facility. This may involve short-term use of adult/general ICU facilities.¹¹ On-site ICU and HDU services should be appropriate to the type of surgery performed and the age and co-morbidity of patients, and should be available to support the delivery of more complex post-operative analgesic techniques.
- 2.9** Children undergoing anaesthesia and surgery as day cases or inpatients will benefit from the input of play specialists, who can help in the preparation of the child for surgery. Some children and young people will require the more intensive preparation provided by paediatric psychologists.³⁰
- 2.10** Children undergoing surgery benefit from a pre-assessment service to identify relevant co-morbidities and provide timely information regarding the conduct of anaesthesia and pain relief. This will include the range of options for induction of anaesthesia, emphasising that the ultimate decision-making should be done on the day of surgery, according to the needs and safety of the child and as judged by the attending anaesthetist. Common

side effects and significant risks should be mentioned, as well as those particular to the child, the planned anaesthetic and analgesia and the surgery/procedure, e.g. blood transfusion, regional blockade and emergence delirium. Anaesthetists should also be prepared to discuss particular risks, according to surgical context and as raised in discussion with a child or young person or parent/carer, e.g. awareness,³¹ and the risk to the developing brain of anaesthesia in infants.³² Families should be provided with written or web-based resources that provide information specific to anaesthesia,³³ and contact details for the anaesthetic team should be provided in case they have further questions.

- 2.11** On-site haematology, chemical pathology, radiology, histopathology and blood transfusion services should meet the requirements of infants and children, e.g. small blood samples, reduced use of radiation. The use of routine pre-operative blood testing should be kept to a minimum, unless there are specific clinical indications.³⁴ Equipment for point-of-care testing of haemoglobin, blood gases and glucose should be readily available. Radiology services should adopt a networked approach, with expertise being readily available and images transferred electronically if required.³⁵
- 2.12** There should be pharmacy staff with specialist paediatric knowledge available to provide advice and ensure safe and effective management of drugs in children. Copies of the British National Formulary for Children,³⁶ as well as national or evidence-based local guidelines for management of pain, nausea and vomiting and post-operative fluids, should be readily available in theatres and ward areas, e.g. on the hospital intranet. Protocols for common anaesthetic emergencies (anaphylaxis, malignant hyperthermia, airway obstruction and local anaesthetic toxicity) should also be readily available and appropriate for children.
- 2.13** Particular care should be taken with all drug and infusion calculations.³⁷ Nursing staff in wards and post-anaesthesia recovery areas should undergo regular training in drug doses for children, and in preparation and safe administration of fluids and medication, and local systems should facilitate easy checking of doses. Staff at all levels should consider 'double checking' drug ampoules/doses with a second trained member of staff, particularly if a medicine is unfamiliar or infrequently used.
- 2.14** There should be a fully resourced acute pain service that covers the needs of children.³⁸ Analgesia guidance appropriate for children³⁹ should be readily available, and pain scoring using validated tools appropriate to developmental age should be performed routinely on any child who undergoes a surgical procedure. All patients who have had major surgery should be assessed regularly and a member of the acute pain service should attend the paediatric wards. Nursing staff in wards and the recovery areas should undergo regular training including on care of opioid and epidural infusions when used.
- 2.15** Multi-modal analgesia for children should be available in all settings, with paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) generally providing the mainstay of simple painkillers for both hospital and home use after minor surgery. Opioids may be required for more severe pain and for 'rescue' analgesia, particularly if paracetamol or NSAIDs are contraindicated. They should be used with caution in children with obstructive sleep apnoea,^{40,41} and in other groups that may have problems with central control of respiration.
- 2.16** Parental education on the use of analgesia after surgery and discharge from hospital is vital, and simple, clear written instructions should be provided.
- 2.17** Particular care is required when infants and children undergo investigations or surgical procedures under sedation alone. Recommended published guidance for the conduct of paediatric sedation should be used.^{42,43}

Facilities

- 2.18** Children should be separated from, and not managed directly alongside, adults, whether in the operating department (including reception and recovery areas), inpatient ward, day ward or critical care unit.
- 2.19** Theatre design, the appearance of the anaesthetic and recovery areas and working practices should reflect the emotional and physical needs of children. If there are genuine problems, such as the need to use older buildings or the need for children to be cared for within a facility that is essential to any aspects of their care, efforts should be made to comply with the overall requirement for separation from adult patients. The features of the environment should also be safe for children.
- 2.20** Recovery areas for children should be separate or screened from those used by adults and provided with paediatric airway and recovery equipment. Parents and carers should be allowed ready access to the recovery area, and easy communication with recovery staff should be facilitated (e.g. through a paging device).
- 2.21** In the general intensive care unit and emergency department, there should be a separate area for children, together with the necessary resuscitation equipment, and guidelines for care of the sick child.^{9,11}
- 2.22** Services and facilities should take account of the specific needs of adolescents, where these are different from those of children and adults.^{44,45,46,47}
- 2.23** Resident accommodation should be available for parents of children who require overnight admission to hospital.

3 Areas of special requirement

The emergency department and intensive care: care of the critically ill baby and child

- 3.1** Arrangements for the immediate care of critically ill patients should be in place in any hospital that manages children. This need can arise suddenly and unpredictably in the accident and emergency department, the operating theatre or inpatient wards. In-house arrangements are therefore required for providing emergency treatment, stabilising critically ill infants and children, and initiating intensive care prior to their transfer to a paediatric or neonatal intensive care unit (PICU or NICU).
- 3.2** In all emergency departments receiving infants and children, neonatal and paediatric resuscitation equipment, medications (including anaesthetic drugs) and fluids should be available to prepare an infant or child for PICU transfer.^{11,48} Equipment should include a suitable ventilator, infusion devices and full monitoring, including capnography.
- 3.3** Infants and children may require admission to critical care facilities as a planned part of their care, e.g. after surgery, or because of trauma or an acute illness or because of extreme prematurity or illness at birth. Paediatric and neonatal intensive care is provided in designated units, staffed by doctors and nurses with specialised training. Infants and children who are likely to require intensive care following an operation should therefore undergo their surgery in a hospital/unit with a designated PICU or NICU.⁴⁹
- 3.4** There should be hospital protocols for management of critically ill children. These include the management of acute respiratory, cardiovascular or neurological emergencies, trauma, poisoning and major burns. Clinical management of these children in both specialist and non-specialist units will require close co-operation and multidisciplinary teamwork between nurses, paediatricians, surgeons, anaesthetists, intensivists and other relevant clinicians. Local guidelines should be clear on the roles and responsibilities of the members of the multidisciplinary team, including anaesthetic services.¹¹ It is important that further stabilisation and management are not left within the sole remit of the anaesthetist.⁸
- 3.5** Sick children may require short-term admission to a general critical care facility while awaiting the arrival of the PICU retrieval team. There may also be occasions when a child requires a very short period of intensive care that does not necessitate transfer to a PICU. This is acceptable, provided there is a suitable facility within the hospital, there are staff with the appropriate competencies and the episode will last only a few hours. In the event of unusual circumstances, e.g. pandemic flu, units must have a contingency for longer periods of intensive care delivery. There should be a nominated lead consultant and nurse within general critical care units who are responsible for the policies and procedures for babies and children when admitted.¹¹

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- 3.6** Hospitals admitting children should be part of a fully funded critical care network. Specialist centres with PICU facilities within the network have a responsibility to provide ongoing education. They also have a clear responsibility to provide clinical advice and help in locating a suitable PICU bed once a referral has been made.
- 3.7** Transfer of critically ill children to specialist centres is generally undertaken by paediatric emergency transfer teams. In some circumstances, it may be necessary for the referring hospital to provide an emergency transfer of a sick child who is intubated and ventilated. This may occur particularly in the case of a child who presents at a non-specialist centre with an acute neurosurgical emergency (e.g. an expanding intracranial haematoma or blocked ventriculoperitoneal shunt). In these circumstances, an appropriate senior anaesthetist will need to accompany the child.⁵⁰ In order to prepare for this possibility, there should be:
- a designated consultant with responsibility for transfers who provides and updates a written policy for emergency transfers of intubated children
 - ready availability of portable monitors, transfer equipment (including a portable ventilator) and drugs
 - ready availability of relevant written guidelines, with telephone numbers of the receiving unit.

The on-call consultant has a duty to deploy staff appropriately. Patients being transferred should normally be accompanied by a doctor with relevant competencies in the care of a critically ill child and transfer of intubated patients, including airway management skills. They should be accompanied by a suitably trained assistant.

Day care surgery and anaesthesia

- 3.8** Day surgery is particularly appropriate for children, provided the operation is not complex or prolonged and the child is well with either no, or only mild, well controlled co-morbidity. Even children with relatively complex needs, e.g. cerebral palsy, cystic fibrosis, can be managed as day cases, provided they are stable with minimal cardiorespiratory problems, and surgery is minor.⁵¹
- 3.9** Children should have their day surgery delivered to the same standards as inpatient care, but with additional consideration of measures to promote early discharge. This should be irrespective of whether they are managed in a dedicated paediatric unit or have specific time allocated in a mixed adult/paediatric unit.
- 3.10** The lower age limit for day surgery will depend on the facilities and experience of staff and the medical condition of the infant. Ex-preterm infants should generally not be considered for day surgery unless they are medically fit and have reached a post-conceptual age of 55–60 weeks. Risks should be discussed on an individual basis.
- 3.11** Parents and children should be provided with good-quality pre-operative information, which includes fasting guidelines and what to do if the child becomes unwell before the operation date. Post-operative analgesia requirements should be anticipated, and discussed at the pre-assessment visit.
- 3.12** Specific guidance for the prevention and treatment of post-operative vomiting in children and young people should be available.⁵²
- 3.13** There should be clear discharge criteria following day case surgery. Discharge criteria should be detailed and carefully worded to facilitate ongoing care by parents. A local policy on analgesia for home use should be in place, with either provision of medications or advice to parents/carers to purchase suitable simple analgesics before admission. In both instances, there must be clear instructions to parents about their regular use in the correct dose and for a suitable duration. Parents should be given written instructions on administration of analgesia and know who to contact if problems arise.

4 Training and education

- 4.1 Anaesthetists who care for children should have received appropriate training⁵³ and should ensure that their competency in anaesthesia and resuscitation is adequate for the management of the children they serve.
- 4.2 Consultants with a substantial commitment to paediatric anaesthesia, including full-time paediatric anaesthetists, are usually appointed to posts in specialist children's hospitals or paediatric units within larger university hospitals. They will normally have satisfied the higher and advanced-level competency-based training requirements in paediatric anaesthesia of the RCoA⁵⁴ or equivalent. It is recognised that anaesthetists involved in highly specialised areas such as paediatric cardiac and neurosurgery will require additional training that is individually tailored to their needs.
- 4.3 Some consultants are appointed to posts with a designated sub-specialty interest in paediatric anaesthesia, in non-specialist centres. They should normally acquire the competencies listed for higher training in paediatric anaesthesia or equivalent.
- 4.4 Specialist and non-specialist paediatric anaesthetists should have advanced training in life support for children, and should maintain these competencies by regular annual training that is ideally multidisciplinary and scenario based.¹⁰
- 4.5 In all centres admitting children, one consultant should be appointed as lead consultant for paediatric anaesthesia. Typically, they might undertake at least one paediatric list each week and will be responsible for co-ordinating and overseeing anaesthetic services for children, with particular reference to teaching and training, audit, equipment, guidelines, pain management, sedation and resuscitation.
- 4.6 All anaesthetists should undertake level 2 training in safeguarding/child protection⁵⁵ and must maintain this level of competence by regular annual updates of current policy and practice and case discussion.⁵⁶ At least one consultant in each department should take the lead in safeguarding/child protection⁵⁷ and undertake training and maintain core level 3 competencies. They are well positioned to advise on and co-ordinate training within their department, but do not have responsibility to decide upon management of individual clinical cases.
- 4.7 All anaesthetists who work with children should maintain appropriate clinical skills. In paediatric anaesthesia, as in all areas of practice, anaesthetists must recognise and work within the limits of their professional competence. Some anaesthetists working in non-specialist centres will not have regular children's lists but may have both daytime and out-of-hours responsibility to provide care for children requiring emergency surgery. There should be arrangements for undertaking regular supernumerary attachments to lists or secondments to specialist centres. The Certificate of Fitness for Honorary Practice⁵⁸ may facilitate such placements and provides a relatively simple system for updates in specialist centres. Paediatric simulator work may also be useful in helping to maintain paediatric knowledge and skills. There should be evidence of appropriate and relevant paediatric CPD in the five-year revalidation cycle.⁵⁹
- 4.8 In centres without an on-site PICU, anaesthetic involvement will also be required in the management of critically ill children who frequently require intubation, resuscitation and initiation of intensive care before the arrival of the retrieval team or direct transfer to PICU. While all career grade anaesthetists will have received paediatric training, several years may have elapsed since this was obtained, and exposure to very sick children may have been limited. Therefore, all anaesthetists should maintain advanced paediatric resuscitation skills, unless they work in a unit that does not have open access for children.
- 4.9 There must be funded arrangements for all consultants and career grade staff who have any responsibility to provide anaesthesia for children to participate in relevant CPD that relates to paediatric anaesthesia and resuscitation, and to their level of specialty practice.
- 4.10 The establishment of regional networks for paediatric anaesthesia should facilitate joint CPD and refresher training in paediatric anaesthesia and resuscitation. Where appropriate, joint appointments may be considered, allowing designated anaesthetists from non-specialist centres a regular commitment within a specialist centre in order to maintain and develop skills.

5 Research, audit and quality improvement

- 5.1 The use of improvement science methodology plays an important role in the quality-assurance process and in measuring performance. Simple quality indicators such as unplanned inpatient admission following day case surgery, or transfer to intensive care following surgery, can easily be measured and the reasons documented. This information should be collated and analysed and can be compared usefully within regional networks. A number of suggested audit topics, specifically relating to paediatric anaesthesia are set out in the RCoA document *Raising the standard: a compendium of audit recipes*.⁶⁰ Quality-improvement projects⁶¹ in relevant areas of paediatric anaesthetic practice should be agreed and implemented.
- 5.2 Regional networks should provide agreed quality standards for the surgical care of infants and children, and units should be encouraged to participate in regular collation of data relating to these standards. Participation in national audit should also be encouraged.⁶²
- 5.3 Multidisciplinary audit and morbidity and mortality meetings relating to paediatric surgery and anaesthesia should be held regularly. Peri-operative death in infants and children is rare. When a post-operative death occurs within 30 days of surgery, a multidisciplinary meeting should be convened and a note made in the clinical record.⁴
- 5.4 Audit activity should include the regular analysis and multidisciplinary review of untoward incidents. Serious events and near misses need to be thoroughly investigated and reported to the relevant national agency, in line with national requirements.
- 5.5 There should be ongoing audit of all children transferred between hospitals for surgery, and this should be monitored by the referring hospital's paediatric surgical committee (see 6.3). Delays should be critically examined by the regional network.
- 5.6 Anaesthetic research in children should be facilitated when possible, and should follow strict ethical standards.⁶³

Patient safety

- 5.7 Anaesthetists who care for children and young people should be familiar with relevant patient safety issues.⁶⁴

In particular, it is important that a World Health Organization checklist is performed before and during surgical and radiological procedures in children, and that it is appropriate for use. Such a checklist should include issues particularly pertinent to the paediatric age group, e.g. flushing of IV cannulae prior to discharge to the recovery/post anaesthesia care unit.⁶⁵

6 Organisation and administration

- 6.1 Regional networks for surgery and anaesthesia should be in place and be maintained by commissioning groups.⁶⁶
- 6.2 Networks should agree standards of care and develop policies and agreed care pathways based on the complexity of procedure, age and co-morbidity, as well as clinical urgency. Policies should relate to local service provision and geography and be developed in consultation with representative groups within the network.
- 6.3 Surgical and anaesthetic networks should work with those networks established for care of the critically ill child and provide links between departments of paediatrics, surgery, anaesthesia and critical care in non-specialist centres and the corresponding specialist paediatric centres. This should facilitate provision of advice (when required) and the production of evidence-based protocols and guidelines. Arrangements should be in place with the regional specialist paediatric unit(s) for the transfer of sick infants and children.
- 6.4 Hospitals should define the extent of elective and emergency surgical provision for children, and the thresholds for transfer to other centres. An appropriately constituted committee consisting of a paediatrician, anaesthetist, surgeon, senior children's nurse and other relevant health professionals e.g. a paediatric pharmacist, alongside managers, should formulate and review these policies. The committee should be responsible for the overall management, governance and quality improvement of anaesthetic and surgical services for children and should report directly to the hospital board. A representative from this committee should also liaise with the regional network lead for surgery and anaesthesia and provide input to regional audit, standards and care pathways.

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- 6.5** When children are admitted for surgery, their care should generally be supervised jointly by a surgeon and paediatrician. In specialist centres, care may be by specialist paediatric surgeons.
- 6.6** Children undergoing surgery should generally be placed on designated children's operating lists, ideally in a separate children's theatre area. When this is not possible, children should be given priority by placing them at the beginning of a mixed list of elective or emergency cases, thus minimising fasting times.
- 6.7** All patients should be assessed before their operations by an anaesthetist. Parents and carers, as well as the child, should be given the opportunity to ask questions.
- 6.8** There should be systems in place to minimise prescription and drug-administration errors. There should be awareness of using off-label and unlicensed drugs for children. Copies of the British National Formulary for Children or equivalent should be available (see 2.12).
- 6.9** Parents and carers should be involved in the care process. This includes physical and psychological preparation for surgery. A child-centred approach should be employed at all times, whenever possible, allowing:
- physical separation between adult patients and children in the operating department, recovery area, day unit, wards and accident and emergency department
 - provision for parents and carers to accompany children to the anaesthetic room, where they should generally be able to remain for induction of anaesthesia, except in special circumstances, e.g. some neonates and small infants, anticipated difficult intubation; parents and carers should also be able to gain easy access to the recovery area
 - involvement, where possible, of parents and carers in evaluation of services and future planning.
- 6.10** The opinions of children and young people should, wherever possible, be sought in the evaluation of services and future planning.⁶⁷

7 Patient information

- 7.1** Before the admission of a child for elective surgery, parents should receive written information, together with a contact telephone number should they have further questions. Information about anaesthesia and analgesia should be based on, or make reference to, that provided in 'Information for teenagers, children and parents' available from the [RCoA website](#). While advice on the availability of other local or national web-based resources may be provided, it is important that this is clear and consistent and families should not be over-burdened with information.
- 7.2** Children should also receive information before admission that is appropriate to their age and level of understanding. Information can be provided at face-to-face meetings with nurses and play therapists and enhanced with booklets,⁶⁸ web links or videos. Anaesthetists should make it clear that they are willing to speak with young people on their own, on request.
- 7.3** Young people should be made aware of the need for clinicians to establish pregnancy status before surgery or procedures involving anaesthesia. Where appropriate, this will generally result in relevant confidential questioning on admission. While obtaining and documenting this information is primarily the responsibility of the operating surgeon/cardiologist or paediatrician, anaesthetists may also feel it necessary to check that such checks have been performed.⁶⁹
- 7.4** Anaesthetists should be aware of legislation and good practice guidance⁷⁰ relevant to children and according to the location in the UK.^{71,72,73,74} These documents refer to the rights of the child, child protection processes and consent. Specific guidance is required in relation to withdrawing or withholding life-sustaining treatments.⁷⁵ Possible outcomes and plans should be carefully discussed and documented by the multidisciplinary team of professionals and the family/young person (as appropriate), in advance of planned anaesthesia and including suspension of 'do not attempt cardiopulmonary resuscitation' (DNACPR) orders.

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- 7.5** Although separate written consent for anaesthesia is not mandatory in the UK, there should be discussions with the child and/or parent about methods of induction, and provision of post-operative pain relief, including the use of suppositories. Where special techniques such as epidural blockade, invasive monitoring and blood transfusions, are anticipated, there should normally be written evidence that this has been discussed with the child/young person (as appropriate) and parents/carers.
- 7.6** In infants and younger children, consent for medical and surgical treatment is obtained from the parent or legal guardian. In England and Wales, young people aged 16 and over can consent independently to medical treatment. However, there are children and young people under the age of 16 who have sufficient maturity and understanding to contribute to a decision about their surgery, and anaesthesia and consent forms allow their signature to be included. While, in England, children and young people under the age of 18 years cannot legally refuse life-saving treatment, their views should be very seriously considered and legal/ethical advice sought if there is time to do so and doubt exists. In Scotland, children and young people may consent and refuse treatment independently when they are deemed to have capacity.⁷³ Additional parental consent is not required.
- 7.7** It is important to be aware of who has parental responsibility⁷⁶ when discussions take place. This is particularly the case when family arrangements are complex or unclear, e.g. the child is under the care of grandparents, in foster care or is otherwise looked after. Parental responsibility should be established in advance of admission, and appropriate consent procedures followed, involving the court and/or social care as appropriate. For planned procedures, if there is doubt about parental responsibility, advice should be sought from senior hospital medico-legal advisors and/or defence organisations.

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