

Chapter 10

Guidelines for the Provision of Anaesthesia Services (GPAS)

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

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Authors

Dr Alistair Cranston
Consultant Paediatric Anaesthetist
Birmingham Children's Hospital NHS
Foundation Trust
Association of Paediatric Anaesthetists of
Great Britain and Ireland

Dr Jane Lockie
Consultant Anaesthetist
University College Hospital,
London, UK
(2015–2017)

Dr Chris Gildersleve
Consultant Paediatric Anaesthetist
Children's Hospital for Wales, Cardiff
Association of Paediatric Anaesthetists of Great
Britain and Ireland

Dr Karen Bartholomew
Lead Paediatric Anaesthetist
Calderdale and Huddersfield NHS Foundation Trust
Association of Paediatric Anaesthetists of Great
Britain and Ireland

Chapter development group members

Dr Alistair Keith
Trainee Anaesthetist
Bristol School of Anaesthesia

Dr Carolyn Smith
Consultant Paediatric Anaesthetist
Royal Hospital for Sick Children, NHS Lothian

Dr Kevin Enright
Consultant in Emergency Medicine
Royal College of Emergency Medicine
London, UK

Dr Peter Wilson
Consultant in Paediatric Intensive Care
Paediatric Intensive Care Society, Immediate
Past President

Dr Sarah Stibbards
Consultant in Emergency Medicine
Royal College of Emergency Medicine
Cheshire, UK

Dr Stephanie Bew
Consultant Paediatric Anaesthetist
Association of Paediatric Anaesthetists of
Great Britain and Ireland
Leeds, UK

Lt Col. Paul Reavley
Consultant in Paediatric Emergency Medicine
Bristol Royal Hospital for Children

Ms Rhian Isaac
Pharmacy Clinical Lead
Birmingham Children's Hospital NHS
Foundation Trust

Dr Annette Davis
Service Lead for Anaesthesia
Alder Hey Children's NHS Foundation Trust

Dr Simon Courtman
Consultant Paediatric Anaesthetist
Plymouth Hospitals NHS Trust

Dr Matthew Bowler
Anaesthetist in training
North West Deanery
Manchester, UK

Dr Roger Langford
Consultant Anaesthetist and Training
Programme Director
Royal Cornwall Hospital NHS Trust

Dr Giles Armstrong
Consultant in Paediatric Emergency Medicine
Royal College of Paediatrics and Child Health
London, UK

Dr Zoe Harclerode
Anaesthetist in training
Sheffield and South Yorkshire School of
Anaesthesia

Mr Darren Darby
Paediatric Critical Care Nurse
Paediatric Intensive Care Society

Ms Tina Clegg
Chair, Healthcare Play Specialist Education
Trust

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Dr Billy White
Consultant in Adolescent Diabetes & Obesity
University College London Hospitals

Ms Irene O'Donnell
Chair of NAHPS National Executive Committee
National Association of Health Play Specialists
London, UK

Mr John Hitchman
Royal College of Anaesthetists
Lay Committee
Durham, UK

Mr Paul Finnemore
College of Operating Department Practitioners
Birmingham, UK

Acknowledgements

Peer reviewers

Dr Russell Evans
Consultant Paediatric Anaesthetist
Oxford University Hospitals NHS Foundation
Trust

Dr Isabeau Walker
Consultant Paediatric Anaesthetist
Great Ormond Street Hospital, London

Dr Colin Dryden
Consultant Paediatric Anaesthetist
Alder Hey Children's NHS Foundation Trust
Liverpool, UK

Dr Amy Norrington
Consultant Paediatric Anaesthetist
The James Cook University Hospital,
Middlesbrough, UK.

Chapter development technical team

Dr Rachel Evley
Research Fellow
University of Nottingham

Ms Nicola Hancock
Royal College of Anaesthetists

Ms Ruth Nichols
Royal College of Anaesthetists

Ms Carly Melbourne
Royal College of Anaesthetists

Declarations of Interest

All chapter development group (CDG) members, stakeholders and external peer reviewers were asked to declare any pecuniary or non-pecuniary conflict of interest, in line with the Guidelines for the Provision of Anaesthetic Services (GPAS) conflict of interest policy as described in the [GPAS Chapter Development Process Document](#).

Declarations were made as follows:

- three members were involved in producing two of the items of evidence.

The nature of the involvement in all declarations made above was determined as not being a risk to the transparency or impartiality of the chapter development. Where a member was conflicted in relation to a particular piece of evidence, they were asked to declare this, and then, if necessary, removed themselves from the discussion of that particular piece of evidence and any recommendation pertaining to it.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Medicolegal implications of GPAS Guidelines

GPAS guidelines are not intended to be construed or to serve as a standard of clinical care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

Promoting equality and addressing health inequalities

The Royal College of Anaesthetists (RCoA) is committed to promoting equality and addressing health inequalities. Throughout the development of these guidelines we have:

- given due regard to the need to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations between people who share a relevant Protected Characteristic (as defined in the Equality Act 2010) and those who do not share it
- given regard to the need to reduce inequalities between patients in access to, and outcomes from healthcare services and to ensure services are provided in an integrated way where this might reduce health inequalities.

GPAS Guidelines in context

The GPAS documents should be viewed as 'living documents'. The GPAS guidelines development, implementation and review should be seen not as a linear process, but as a cycle of interdependent activities. These in turn are part of a range of activities to translate evidence into practice, set standards and promote clinical excellence in patient care.

Each of the GPAS chapters should be seen as independent but interlinked documents. Guidelines on the general provision of anaesthetic services are detailed in the following chapters of GPAS:

- [chapter 2: guidelines for the provision of anaesthesia services for preoperative assessment and preparation](#)
- [chapter 3: guidelines for the provision of anaesthesia services for intraoperative care](#)
- [chapter 4: guidelines for the provision of anaesthesia services for postoperative care](#)

These guidelines apply to all patients who require anaesthesia or sedation, and are under the care of an anaesthetist. For urgent or immediate emergency interventions, this guidance may need to be modified as described in [chapter 5: guidelines for the provision of emergency anaesthesia](#).

The rest of the chapters of GPAS apply only to the population groups and settings outlined in the 'Scope' section of these chapters. They outline guidance that is additional, different or particularly important to those population groups and settings included in the 'Scope'. Unless otherwise stated within the chapter, the recommendations outlined in chapters 2–5 still apply.

Each chapter will undergo yearly review, and will be continuously updated in the light of new evidence.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Guidelines alone will not result in better treatment and care for patients. Local and national implementation is crucial for changes in practice necessary for improvements in treatment and patient care.

Aims and objectives

The objective of this chapter is to promote current best practice for service provision in paediatric anaesthesia. This guidance is intended for use by anaesthetists with responsibilities for service delivery and healthcare managers, and covers the patient age group of 0 to 19 years.

This Guideline does not comprehensively describe clinical best practice in paediatric anaesthesia, but is primarily concerned with the requirements for the provision of a safe, effective, well-led service, which may be delivered by many different acceptable models. The guidance on provision of paediatric anaesthesia applies to all departments who treat children and young people.

A wide range of evidence has been rigorously reviewed during the production of this chapter, including recommendations from peer reviewed publications and national guidance where available. However, both the authors and the CDG agreed that there is a paucity of level 1 evidence relating to service provision in paediatric anaesthesia. In some cases it has been necessary to include recommendations for good practice based on the clinical experience of the CDG. We hope that this document will act as a stimulus to future research.

The recommendations in this chapter will support the RCoA's Anaesthesia Clinical Services Accreditation process.

Scope

Objective

To provide and describe current best practice in the provision of anaesthetic services within paediatric surgery and paediatric interventions for anaesthetists with responsibilities for service delivery and healthcare managers, supported by evidence and national recommendations where available.

Target population

Groups that will be covered

All patients less than 19 years of age undergoing elective or emergency anaesthesia.

All anaesthetic departments providing services for infants, children and young people in the above age groups.

All anaesthetists caring for neonates, infants, children and young people.

Groups that will not be covered

Provision of paediatric services by a specialty other than anaesthesia.

Healthcare setting

All settings within the hospital in which paediatric anaesthetic services are provided.

Clinical management

Key components needed to ensure provision of high quality anaesthetic services for paediatric patients requiring surgery and/or interventions which involve anaesthetists.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Areas of provision considered:

- levels of provision of service, including (but not restricted to) staffing, equipment, support services and facilities
- areas of special requirement, such as critical care, resuscitation, interventional and diagnostic radiology, radiotherapy, endoscopy, satellite sites and the emergency department
- training and education
- research and audit
- organisation and administration
- patient information
- time-critical transfers and retrievals.

Issues that will not be covered

Clinical guidelines specifying how healthcare professionals should care for patients.

National level issues.

Introduction

Infants, children and young people have different requirements. There are marked developmental changes within the paediatric age range, and neonates, infants, and prepubertal 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.

After puberty, anatomical and physiological characteristics approach those of adults. At all ages, children and young people have distinct emotional and social requirements.

Children and young people aged under 19 years may require anaesthesia to allow treatment for a variety of surgical conditions, much of which will be elective and relatively straightforward and which, in healthy infants and children, can usually be performed in non-specialist centres. Infants and children may also require anaesthesia or sedation for non-surgical procedures involving radiology, cardiac catheterisation, endoscopy, joint injection or chemotherapy.

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.

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 critically ill infants and children of all ages prior to transfer to a specialist centre for surgery and/or intensive care.

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.

Resuscitation services are included in this guidance, as anaesthetists play a crucial role in these services in most hospitals at present. Sedation services not provided by an anaesthetist are not included.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

All relevant GPAS chapters include a section on the treatment of children and young people that will overlap with this document, e.g. neuroanaesthesia, emergency anaesthesia and acute pain.

Recommendations

The grade of evidence and the overall strength of each recommendation are tabulated in Appendix I.

1 Staffing Requirements

- 1.1 Anaesthetists who care for children should have received appropriate training,¹ and must ensure that their competency in anaesthesia and resuscitation is adequate for the management of the children in their care.^{1,2}
- 1.2 An appropriately trained and experienced anaesthetist should be present throughout the conduct of anaesthesia for all procedures, including those procedures requiring intravenous sedation (where provision of this service has been agreed by the anaesthetic department). In exceptional circumstances, for example, where urgent treatment for another patient requires the anaesthetist to leave the patient, they should delegate responsibility to another appropriate person, in line with GMC guidance on delegation.^{3,4}
- 1.3 There should be an identified consultant anaesthetist with overall responsibility for supervision of anaesthetic trainees and, where necessary, anaesthetists who are neither consultants nor trainees.^{1,5}
- 1.4 There should be a locally agreed policy on the level of consultant supervision required, based on the age, complexity and co-morbidities of the patient.^{1,6,7}
- 1.5 When a child undergoes anaesthesia or an anaesthetic department provides sedation services, there should be a dedicated trained assistant, i.e. an operating department practitioner (ODP) or equivalent, who has had paediatric experience and maintained their paediatric competencies.⁸
- 1.6 In the period immediately after anaesthesia, the child should be managed in a recovery area, staffed on a one-to-one basis at least until the child can manage their own airway. The staff in this area should have paediatric experience and current paediatric competencies, including resuscitation.^{8,9}
- 1.7 A member of staff with advanced training in life support for children should always be available to assist where required.^{10,11,12}
- 1.8 Wherever children undergo anaesthesia, there should be immediate access to a named consultant paediatrician with acute care responsibilities at all times. This includes a local agreement for those sites without inpatient paediatric beds.¹³

2 Equipment, services and facilities

Equipment

A range of monitoring devices and paediatric anaesthetic equipment should be readily available in all areas where children are anaesthetised and in recovery areas.⁴

- 2.1 Equipment should be available and maintained that is appropriate for use in neonates, infants and children of all sizes and ages, including:
 - equipment for airway management and monitoring, including capnography and invasive haemodynamic monitoring

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

- pulse oximetry sensors and blood pressure cuffs
 - vascular access equipment, including intraosseous needles
 - devices to allow rapid and accurate fluid and drug delivery
 - equipment for warming fluids
 - patient warming devices
 - equipment for measuring patient temperature
 - TIVA pumps with paediatric algorithms
 - ultrasound devices (for central venous and nerve identification)^{14,15}
 - equipment on the ward for recording weight.
- 2.2 Equipment for near patient testing of glucose, haemoglobin, blood gases and electrolytes should be readily available.¹⁶
- 2.3 Intravenous fluid management should conform to NICE guidelines, and appropriate equipment to deliver this safely and accurately should be available.¹⁶
- 2.4 Resuscitation drugs and equipment, including an appropriate defibrillator, should be readily available wherever children are anaesthetised.^{11,17,18,19}
- 2.5 There should be ventilators available that have the flexibility to be used over a wide size and age range, and that provide accurate pressure control and positive end-expiratory pressure.
- 2.6 Theatre temperature should be capable of regulation to at least 23°C, and up to 28°C where neonatal surgery is performed. There should be accurate thermostatic controls that permit rapid change in temperature.

Support services

- 2.7 Children undergoing anaesthesia should be offered a preassessment service prior to the day of their procedure.
- 2.8 Children undergoing anaesthesia and their families should be offered input from play specialists to help prepare the child for anaesthesia.²⁰
- 2.9 Referral pathways should be available to a paediatric psychology service.²¹
- 2.10 Blood transfusion and diagnostic services should meet the requirements of neonates, infants and children. A massive transfusion protocol, including provision for children, should be in place.
- 2.11 There should be pharmacy staff available with clinical knowledge appropriate to the local paediatric case mix to provide advice on the management of drugs in children.
- 2.12 There should be awareness that the paediatric population is at greater risk of drug errors. Local systems should be in place to minimise and report prescription and drug administration errors.^{22,23}
- 2.13 There should be local systems in place to disseminate national safety alerts.
- 2.14 There should be access to the 'British National Formulary for Children'.²⁴
- 2.15 There should be a fully resourced acute pain service that covers the needs of children.^{25,26} In hospitals with a smaller paediatric caseload, this may be provided by the adult acute pain

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

service liaising with the paediatric anaesthetic team, rather than a dedicated paediatric service.

- 2.16 Analgesia guidance appropriate for children²⁷ should be readily available, including protocols for pain scoring using age-appropriate validated tools.²⁶

Facilities

- 2.17 Children should be separated from, and not managed directly alongside adults throughout the patient pathway, including reception and recovery areas. Where complete physical separation is not possible, the use of screens or curtains, whilst not ideal, may provide a solution.
- 2.18 The appearance of the anaesthetic induction and recovery areas should take into account the emotional and physical needs of children.
- 2.19 Parents and carers should be allowed ready access to the recovery area or, if this is not feasible, children should be reunited with their parents or carers as soon as possible.
- 2.20 Services and facilities should take account of the specific needs of adolescents where these are different from those of children and adults.^{28,29,30,31}
- 2.21 Arrangements should be in place to enable at least one parent or carer to stay with children who require overnight admission to hospital.

3 Areas of Special Requirement

The recommendations for the provision of anaesthetic services to children for anaesthetic subspecialties, e.g. neuroanaesthesia, for burns and plastics surgery, for cardiac and thoracic surgery, are detailed in the 'Areas of Special Requirement' of the relevant chapters of GPAS.

Neonates (0 to 28 Days³²)

Neonates presenting for anaesthesia and surgery are at high risk. They frequently have complex multisystem congenital problems requiring specialist intensive care perioperatively. Anaesthesia in this age group requires knowledge of the particular pathophysiology of these conditions and the impact of anaesthesia on the neonatal physiology.

It should be recognised that babies with congenital problems that are older than 44 weeks postmenstrual age, and in particular babies who were born prematurely, i.e. before the week 37 of pregnancy,³³ may continue to pose a high risk when undergoing anaesthesia.

- 3.1 Where separation from the parents occurs, arrangements should be in place to allow communication and visits by the parents as soon as possible.
- 3.2 The multidisciplinary team involved in neonatal anaesthetic care should have regular experience with this age group. In most areas this will require centralisation in specialist centres for both emergency and elective procedures.
- 3.3 A modified WHO checklist specific to this age group should be completed before anaesthesia.
- 3.4 The theatre should have the capacity to reach a temperature of 28°C.
- 3.5 Warming devices for the patient and fluid warming should be available.
- 3.6 Equipment suitable for this age group, e.g. pulse oximeter sensors of an appropriate size, should be available and checked.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Paediatric trauma

Networks are now nationally agreed for trauma management in children. Anaesthetists have a key role in these teams. The recommendations on the provision of anaesthetic services for paediatric trauma can be found in the [chapter 16](#).

The increased centralisation of elective surgical services for young children³⁴ has reduced the proportion of staff who are confident in the emergency management of critically ill or injured children. Children and young people present at a range of hospital settings, or may deteriorate anywhere in the hospital. All staff find these situations stressful, and therefore plans and simulated training for paediatric resuscitation anywhere in the hospital provide valuable learning opportunities.

- 3.7 Where children present with major trauma to a non-trauma centre, the guidelines for emergency resuscitation, stabilisation and transfer detailed below should apply.

The critically ill child

The general provision of services for the critically ill child within a critical care setting is not within the scope of this chapter. Further information can be found in the Paediatric Intensive Care Society's 'Quality Standards for the care of critically ill children' 2015.¹¹

Sick children may require short-term admission to a general critical care facility, e.g. while awaiting the arrival of the paediatric intensive care unit (PICU) retrieval team, or when only a very short period of intensive care that does not necessitate transfer to a PICU is required. 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.

- 3.8 Hospitals admitting children should be part of a fully funded critical care network.
- 3.9 Paediatric early warning scores should be used to help identify the deteriorating or critically ill child.
- 3.10 There should be local hospital protocols in place that are clear on the roles and responsibilities of the multidisciplinary team in caring for the critically ill child.³⁵ Individual hospitals will have different personnel providing anaesthetic support to these teams.
- 3.11 Hospitals should have clear operational policies regarding the care of young people aged 16-18 years of age and for preterm babies who have been discharged from neonatal units.¹¹
- 3.12 Individuals with responsibilities for paediatric resuscitation and stabilisation should fulfil the training requirements and maintain their competencies.¹⁷
- 3.13 Staff without recent paediatric experience or training may be able to contribute transferable skills as part of the multidisciplinary team, e.g. expertise with ultrasound to assist line placement or echocardiography skills, and such contribution should be supported by local protocols.
- 3.14 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.³⁶
- 3.15 There should be immediate access to protocols for management of acute life-threatening conditions. These will often be agreed with the local PICU network or PIC transport team. Protocols should include acute respiratory, cardiovascular or neurological emergencies, trauma, poisoning and major burns.¹¹

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

- 3.16 Hospitals without a suitable PICU/NICU bed should obtain the advice of the local PICU transport team as soon as possible during the management of the sick or critically injured child or young person.
- 3.17 Specialist centres with PICU facilities should provide clinical advice and help in locating a suitable PICU bed once a referral has been made.
- 3.18 There should be data collection for all referrals to PICU.
- 3.19 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
- 3.20 In the event of unusual circumstances, e.g. pandemic flu, adult critical care units should have a contingency plan for longer periods of paediatric intensive care delivery.
- 3.21 Infants and children who are likely to require intensive care following an operation should undergo their surgery in a hospital/unit with a designated PICU or NICU.³⁷
- 3.22 If the patient is too sick to transfer to such a hospital prior to surgery and their current hospital has surgeons capable of operating, then transfer should occur as soon after surgery as is clinically appropriate.¹¹

Transfer of critically ill children

The transfer of critically ill children to specialist centres is generally undertaken by paediatric intensive care transport teams.³⁸ 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 and requires a time critical transfer e.g. for an acute neurosurgical emergency or major trauma. In these circumstances, the child will need to be accompanied by an appropriate senior anaesthetist.³⁹ The usual transport team should provide advice, even where urgent transfer is undertaken by the local referring hospital.

- 3.23 There should be a designated consultant with responsibility for transfers who provides and updates a written policy for emergency transfers of intubated children.
- 3.24 There should be portable monitors, transfer equipment (including a portable ventilator) and drugs readily available to transfer critically ill children.
- 3.25 There should be relevant written local guidelines, with telephone numbers of the receiving unit.
- 3.26 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.
- 3.27 Transport services should ensure that appropriate multidisciplinary arrangements are in place to review transfers and provide feedback to networked hospitals.

Day care procedures and anaesthesia

Day surgery is particularly appropriate for children provided the operation is not complex or prolonged, and the child is well, with either no comorbidity, or only mild, well controlled comorbidity. Even children with relatively complex needs, e.g. those with cerebral palsy or cystic fibrosis, can be managed as day cases, provided they are stable with minimal cardiorespiratory problems, and the proposed surgery is unlikely to preclude same day discharge.⁴⁰

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

- 3.28 Infants, children and young people should have their day surgery delivered to the same standards as inpatient care, but with additional consideration of measures to promote early discharge. In particular, younger infants should be scheduled early in the day to allow sufficient time for recovery and discharge on the same day.
- 3.29 Infants, children and young people should be managed in a dedicated paediatric unit, or have specific time allocated in a mixed adult/paediatric unit, where they are separated from adult patients.
- 3.30 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 postmenstrual age of 60 weeks. Risks should be discussed with parents and carers on an individual basis.
- 3.31 Parents, carers, children and young people should be provided with good quality preoperative information, including information on fasting and on what to do if the child becomes unwell before the operation. Postoperative analgesia requirements should be anticipated, and discussed at the preassessment visit.
- 3.32 Specific guidance for the prevention and treatment of postoperative nausea and vomiting in children and young people should be available.⁴¹
- 3.33 There should be clear documented discharge criteria following day case surgery.
- 3.34 Discharge advice should be detailed and carefully worded to facilitate ongoing care by parents or carers.
- 3.35 A local policy on analgesia for home use should be in place, with either provision of medications, or advice to parents and carers before admission to purchase suitable simple analgesics. In both instances, there should be clear instructions to parents and carers about their regular use in the correct dose and for a suitable duration. Parents and carers should be given written instructions on administration of analgesia and know who to contact if problems arise. In addition, safe practice with medicines when children are present should be emphasised.

Teenagers and young adults

Teenagers and young people have particular physical and psychosocial needs.

- 3.36 The decision on the most appropriate place for the treatment of a teenager or young person should be made on an individual basis, balancing the expertise of the clinician in the patient's condition against any effort to fully separate adult patients from teenagers. Local operating policies should be in place to support this decision.
- 3.37 Where treatment is carried out in facilities normally used by adult patients, such as obstetric units or for patients requiring ECT treatment, guidelines should be in place for staff training and organisation of services.^{42,43}

Transitional care

- 3.38 Where children are transferring from paediatric to adult services there should be the opportunity to advise them about possible changes in anaesthesia management. Examples may include the use of sedation for some procedures that previously would have been managed with general anaesthesia, or the use of alternatives to topical anaesthesia.³¹
- 3.39 A person centred approach should be used to ensure that the young person is an equal partner in decisions regarding their care during this transitional period.^{31,31}

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

- 3.40 Anaesthesia records from their previous care should be available to the new service (or a summary document should be provided).³¹
- 3.41 Health and social care service managers in children's and adults' services should work together in an integrated way to ensure a smooth and gradual transition for young people.⁴⁴

4 Training and education

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 undertaken higher level paediatric anaesthesia training.¹ As a minimum they should be competent to provide perioperative care for common elective and emergency procedures in children aged 3 years and older. Anaesthetists providing care to a wider and more complex paediatric population will have acquired more advanced competencies.

Unless there is no requirement to anaesthetise children, either for elective or emergency procedures, it is expected that the competence and confidence to treat children will be maintained. This may be via direct care, continuing professional development (CPD) activities, refresher courses, or visits to other centres. This should be assured through annual appraisal and revalidation.

- 4.1 Anaesthetists with a substantial commitment to paediatric anaesthesia should have satisfied the higher and advanced level competency based training requirements in paediatric anaesthesia of the RCoA⁴⁵ 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.
- 4.2 All anaesthetists who provide elective or emergency care for infants, children or young adults should have advanced training in life support that covers their expected range of clinical practice and responsibilities.^{46,47} These competencies should be maintained by annual training that are ideally multidisciplinary and scenario based.⁴⁸
- 4.3 Anaesthetists should be aware of legislation and good practice guidance⁴⁹ relevant to children and according to the location in the UK^{50,51,52,53} These documents refer to the rights of the child, child protection processes, and consent.
- 4.4 All anaesthetists must undertake at least level 2 training in safeguarding/child protection,⁵⁴ and must maintain this level of competence by annual updates of current policy and practice and case discussion.⁵⁵ Safeguarding resources to support learning can be found on the RCoA website (www.rcoa.ac.uk/safeguardingplus).
- 4.5 At least one consultant in each department should take the lead in safeguarding/child protection⁵⁶ and undertake training and maintain core level 3 competencies. The lead anaesthetist for safeguarding/child protection should advise on and co-ordinate training within their department, but will not have responsibility for deciding on management of individual clinical cases.
- 4.6 Anaesthetists who do not have regular children's lists but who do have both daytime and out of hours responsibility for providing care for children requiring emergency surgery should maintain appropriate clinical skills. There should be arrangements for undertaking regular supernumerary attachments to lists or secondments to specialist centres. The Certificate of Fitness for Honorary Practice⁵⁷ may facilitate such placements, and provides a relatively simple system for updates in specialist centres. Paediatric simulation 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.⁵⁸

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

- 4.7 There should be funding and arrangements for study leave such that all consultants and career grade staff who have any responsibility to provide anaesthesia for children are able to participate in relevant CPD that relates to paediatric anaesthesia and resuscitation and to their level of specialty practice. Individual CPD requirements should be jointly agreed during the appraisal process.
- 4.8 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 Organisation and administration

- 5.1 Hospitals should define the extent of elective and emergency surgical provision for children, and the thresholds for transfer to other centres.
- 5.2 Each hospital should have a multidisciplinary committee for paediatric care to formulate and review provision. This committee should involve anaesthetists, paediatricians, surgeons, emergency department representatives, senior children's nurses, managers and other professionals, such as paediatric pharmacists. In some hospitals, this will also include PICU physicians.
- 5.3 The multidisciplinary 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.
- 5.4 The opinions of children, young people and their families should be sought in the design and evaluation of services and future planning.⁵⁹
- 5.5 All hospitals that provide surgery for children and young people should have clear operational policies regarding who can anaesthetise children for elective and emergency surgery. This will be based on ongoing clinical experience, the age of the child, the complexity of surgery and the presence of any comorbidities.^{6,13}
- 5.6 In all centres admitting children, one anaesthetist should be appointed as clinical lead (see glossary) 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.
- 5.7 Children and young people undergoing surgery should be placed on designated children's operating lists in a separate children's theatre area. When this is not possible, children and young people should be given priority by placing them at the beginning of a mixed list of elective or emergency cases.
- 5.8 A World Health Organization checklist should be completed before and during all procedures and investigations under anaesthesia and sedation, if provided by the anaesthetic department. Appropriate checklists should include issues particularly pertinent to the paediatric age group, such as flushing of IV cannulae prior to discharge to the recovery/post-anaesthesia care unit.⁶⁰
- 5.9 Hospitals should review their local standards to ensure that they are harmonised with the relevant national safety standards, e.g. National Safety Standards for Invasive Procedures in England⁶¹ or the Scottish Patient Safety Programme in Scotland.⁶² Organisational leaders are ultimately responsible for implementing local safety standards as necessary.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

- 5.10 A child centred approach should be employed whenever possible throughout the care pathway, so that there is physical separation between adult patients and children and young people in the operating department, recovery area, day unit wards and in the emergency department.¹³
- 5.11 All children and young people should be assessed before their operation by an anaesthetist. Parents and carers, as well as the child, should be given the opportunity to ask questions and to be involved in the physical and psychological preparation for surgery.
- 5.12 Parents and carers should be involved throughout the care process. With the agreement of the anaesthetist in charge of the case on the day, they should be able to accompany children to the anaesthetic room, remain present for induction of anaesthesia and be able to gain easy access to the recovery area. In special circumstances, such as with some small neonates and with anticipated difficult intubations, this may not be possible.

Regional networks

Paediatric services should be co-ordinated through regional networks for surgery and anaesthesia which are established and maintained by commissioning groups.⁶³ Surgical and anaesthetic networks 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.

- 5.13 Hospitals should engage with networks in order to develop agreed care pathways based on age, comorbidity and complexity of procedure, as well as clinical urgency. Care pathways should relate to local service provision, staffing and geography.
- 5.14 Hospitals should liaise with the regional network lead for surgery and anaesthesia to provide input to regional audit and standards.
- 5.15 Hospitals that are regional specialist paediatric units should have access to a paediatric intensive care transport service commissioned for the retrieval or transfer of critically ill or injured infants, children and young people.¹¹
- 5.16 Units without inpatient paediatric beds should have a formal arrangement with a neighbouring unit, to ensure that practical assistance is available should a child require transfer.⁷ Protocols should be in place for the rapid assessment and transfer of patients to the local specialist unit within the network.¹¹

Access to critical care facilities

Critical care facilities for children are not available in all hospitals where children are anaesthetised. Paediatric high dependency and critical 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.

- 5.17 Onsite ICU and HDU services should be appropriate to the type of surgery performed and the age and comorbidity of patients, and should be available to support the delivery of more complex postoperative analgesic techniques.
- 5.18 In hospitals with no onsite paediatric high dependency and critical care facilities, there should be the facilities and expertise to initiate intensive care prior to transfer/retrieval to a designated regional PICU/HDU facility. This may involve short-term use of adult/general ICU facilities.¹¹

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Guidelines

5.19 There should be ready access to evidence based guidelines that are appropriate for children on the following topics:

management of pain, nausea and vomiting

- fluid fasting⁶⁴
- intravenous fluid management¹⁶
- prevention of perioperative venous thromboembolism⁶⁵
- death of the child in theatre
- protocols for anaesthetic emergencies, including:
 - anaphylaxis
 - malignant hyperthermia
 - difficult airway management
 - airway obstruction
 - resuscitation
 - local anaesthetic toxicity
 - major haemorrhage
 - emergency paediatric tracheostomy management.⁶⁶

5.20 When infants and children undergo procedures under sedation alone, recommended published guidance for the conduct of paediatric sedation should be used.^{67,68}

5.21 Guidance on preprocedure pregnancy testing in female patients should be followed.⁶⁹

6 Financial Considerations

Part of the methodology used for making recommendations in the chapter is a consideration of the financial impact for each of the recommendations. Very few of the literature sources from which these recommendations have been drawn have included financial analysis.

The vast majority of the recommendations are not new recommendations; rather they are a synthesis of already existing recommendations. The current compliance rates with many of the recommendations are unknown and so it is not possible to calculate their financial impact when widely accepted into future practice. It is impossible to make an overall assessment of this financial impact with the currently available information.

7 Research, audit and quality improvement

The use of improvement science methodology plays an important role in the quality assurance process and in measuring performance.

7.1 Quality indicators, such as unplanned inpatient admission following day case surgery, readmission within 28 days, or unanticipated admission to PICU following surgery, should be measured, collated and analysed, and can be compared 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'.⁷⁰

7.2 Regional networks could provide agreed quality standards for the perioperative care of infants, children and young people, and units could be encouraged to participate in regular collation of data relating to these standards. Participation in national audit should also be encouraged.³

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

- 7.3 Quality improvement projects⁷⁰ in relevant areas of paediatric anaesthetic practice should be agreed and implemented.
- 7.4 Adoption of national initiatives, for example 'Hello my name is' should be encouraged and evaluated.⁷¹
- 7.5 Multidisciplinary audit and morbidity and mortality meetings relating to paediatric anaesthesia and procedures, including resuscitation, should be held regularly. Perioperative death in infants and children is rare. When a death occurs within 30 days of surgery, a multidisciplinary meeting should be convened and a note made in the clinical record.¹³ In the event of any unexpected child death, whether related to surgery or not, this must be reported to the local Child Death Overview Panel. This will usually be the responsibility of the local designated paediatrician, and the process for notification of a child death must be followed.⁷²
- 7.6 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.⁷³
- 7.7 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. Delays should be critically examined by the regional network.
- 7.8 Anaesthetic research in children should be facilitated when possible, and should follow strict ethical standards.⁷⁴
- 7.9 Anaesthetists who care for children and young people should be familiar with relevant patient safety issues.⁷⁵

8 Implementation Support

The Anaesthesia Clinical Services Accreditation (ACSA) scheme, run by the RCoA, aims to provide support for departments of anaesthesia to implement the recommendations contained in the GPAS chapters. The scheme provides a set of standards, and asks departments of anaesthesia to benchmark themselves against these using a self-assessment form available on the RCoA website. Every standard in ACSA is based on recommendation(s) contained in GPAS. The ACSA standards are reviewed annually and republished approximately four months after GPAS review and republication to ensure that they reflect current GPAS recommendations. ACSA standards include links to the relevant GPAS recommendations so that departments can refer to them while working through their gap analyses.

Departments of anaesthesia can subscribe to the ACSA process on payment of an appropriate fee. Once subscribed, they are provided with a 'College guide' (a member of the RCoA working group that oversees the process), or an experienced reviewer to assist them with identifying actions required to meet the standards. Departments must demonstrate adherence to all 'priority one' standards listed in the standards document to receive accreditation from the RCoA. This is confirmed during a visit to the department by a group of four ACSA reviewers (two clinical reviewers, a lay reviewer and an administrator), who submit a report back to the ACSA committee.

The ACSA committee has committed to building a 'good practice library', which will be used to collect and share documentation such as policies and checklists, as well as case studies of how departments have overcome barriers to implementation of the standards, or have implemented the standards in innovative ways.

One of the outcomes of the ACSA process is to test the standards (and by doing so to test the GPAS recommendations) to ensure that they can be implemented by departments of anaesthesia

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

and to consider any difficulties that may result from implementation. The ACSA committee has committed to measuring and reporting feedback of this type from departments engaging in the scheme back to the CDGs updating the guidance via the GPAS technical team.

9 Patient Information

All parents or legal guardians of children and young people undergoing anaesthesia should be as well informed as possible about the planned procedure, including methods for induction of anaesthesia and analgesia. Information should be given about the associated risks and side effects, and families should be encouraged to ask questions and be involved in decisions about their child's care. Children and young people should receive information appropriate to their age and understanding. Young people should be encouraged to participate in decisions about their own care.

Information

- 9.1 Families should be provided with written or web-based resources that provide information specific to anaesthesia before the planned surgery/procedure,⁷⁶ and contact details for the preassessment team should be provided in case they have further questions or need to speak directly with their anaesthetist. The leaflet 'Information for teenagers, children and parents' is available from the [RCoA website](#), and other leaflets there and on the [Association of Paediatric Anaesthetists of Great Britain and Ireland \(APAGBI\)](#) website provide other patient, parent and carer information resources.^{76, 77, 78}
- 9.2 Information provided preoperatively should include:
- anaesthetic technique; analgesia plan, including regional blockade; any additional procedures, e.g. invasive monitoring, blood transfusion; and planned postoperative care in a critical care environment
 - a statement that the ultimate decision making will take place on the day of surgery, according to the needs and safety of the child and as judged by the attending anaesthetist; and that planned resources, e.g. critical care beds, could be unexpectedly unavailable on the day and this may also be part of the decision making
 - a description of generally common side effects, e.g. sore throat and postoperative nausea and vomiting, and significant risks, e.g. allergic reactions; also, any additional risks particular to the individual child and their comorbidities
 - concerns raised in discussion with a child or young person or parents and carers, e.g. fear of needles, fear of facemasks, loss of control (which is common in teenagers), emergence delirium, awareness, postoperative pain, postoperative nausea and vomiting,⁷⁹ and the risk to the developing brain of anaesthesia in infants⁸⁰
 - preoperative fasting instruction should be given verbally and in writing; the timing should be appropriate to the proposed theatre list start time⁸¹
 - information on the use of unlicensed medicines and/or licensed medicines for off label indication.⁸²
- 9.3 Information provided postoperatively should include the safe use of analgesia after surgery and discharge from hospital, and what to do and who to contact in the event of a problem or concern. This should include telephone numbers where advice may be sought 24 hours a day.
- 9.4 Information should be clear and consistent. It should be given verbally and also in written and/or electronic form.⁸³

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

- 9.5 Children should receive information before admission that is appropriate to their age and level of understanding. Information can be provided at face-to-face meetings by nurses and play therapists, and enhanced with booklets,⁸⁴ web links or videos.
- 9.6 Young people have additional needs and may wish to speak to the anaesthetist or another member of staff without direct parental presence.^{59,85} Anaesthetists should make it clear that they are willing to speak with young people on their own, on request.
- 9.7 Postmenarcheal female patients should be made aware of the need for clinicians to establish pregnancy status before surgery or procedures involving anaesthesia. While obtaining and documenting this information is primarily the responsibility of the operating surgeon or paediatrician, anaesthetists may also feel it necessary to confirm that such checks have been performed.⁶⁹

Consent

All children should be included in discussions regarding their health and treatment as much as possible given their level of comprehension. When a child is not able to consent for themselves (see below), consent should be sought from someone with parental responsibility, but the child can also be invited to signify their assent on the consent form if they wish to do so.^{50,86}

Young people of 16 and 17 years can independently give consent unless they can be shown not have capacity. Where they do not have capacity, someone with parental responsibility can give consent (except in Scotland where the same rules as for adults apply).^{51,52}

Children under the age of 16 who have sufficient intelligence and maturity to fully understand treatments that are proposed are referred to as being 'Gillick competent' and can give consent themselves.⁸⁷

- 9.8 Anaesthetists treating children and young people must ensure that they understand the requirements for consent in the part of the UK in which they are working.^{50,51,52,53}
- 9.9 Parental responsibility should be established in advance of admission, and appropriate consent procedures followed, involving the court and/or social services as appropriate.
- 9.10 For planned procedures, if there is doubt about parental responsibility, advice should be sought from senior hospital medicolegal advisors and/or defence organisations.
- 9.11 Although separate written consent for anaesthesia is not mandatory in the UK, there should be a written record of all discussions with the child and/or parent/carers about methods of induction, and provision of postoperative pain relief (including the use of suppositories).
- 9.12 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 or young person and/or their parents or carers as appropriate.
- 9.13 Children may require anaesthesia for diagnostic procedures such as MRI scans. Anaesthetists should ensure that parents and legal guardians have been informed about the associated risks and common side effects of the anaesthetic.
- 9.14 If withdrawing or withholding life-sustaining treatments is being considered,⁸⁸ 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 the management of 'do not attempt cardiopulmonary resuscitation' orders.^{89,90}
- 9.15 Duty of Candour guidelines must be followed.⁹¹

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Areas for future development

The following areas are suggested for further research:

- preassessment services for children
- quality improvement in paediatric services.

Abbreviations

CDG	Chapter Development Group
GPAS	Guidelines for the Provision of Anaesthetic Services
NICE	National Institute for Health and Care Excellence
PICU	Paediatric Intensive Care Unit
RCoA	Royal College of Anaesthetists
SAS	staff grade, associate specialist and specialty

Glossary

Clinical lead - SAS doctors undertaking lead roles should be autonomously practicing doctors who have competence, experience and communication skills in the specialist area equivalent to consultant colleagues. They should usually have experience in teaching and education relevant to the role and they should participate in Quality Improvement and CPD activities. Individuals should be fully supported by their Clinical Director and be provided with adequate time and resources to allow them to effectively undertake the lead role.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

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Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Appendix 1: Recommendations grading

The grading system is outlined in the methodology section of this chapter. The grades for each of the recommendations in this chapter are detailed in the table below.

Recommendation Number	Level of Evidence	Strength of Recommendation
1.1	M	Mandatory
1.2	M	Strong
1.3	C	Strong
1.4	C	Strong
1.5	C	Strong
1.6	C	Strong
1.7	C	Strong
1.8	C	Strong
2.1	C	Strong
2.2	C	Strong
2.3	C	Strong
2.4	C	Strong
2.5	GPP	Strong
2.6	GPP	Strong
2.7	C	Strong
2.8	C	Strong
2.9	GPP	Strong
2.10	GPP	Strong
2.11	GPP	Strong
2.12	GPP	Strong
2.13	GPP	Strong
2.14	C	Strong
2.15	C	Strong
2.16	C	Strong
2.17	GPP	Strong
2.18	GPP	Strong
2.19	GPP	Strong
2.20	C	Strong
2.21	GPP	Strong
3.1	GPP	Strong
3.2	GPP	Strong
3.3	GPP	Strong
3.4	GPP	Strong

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Recommendation Number	Level of Evidence	Strength of Recommendation
3.5	GPP	Strong
3.6	GPP	Strong
3.7	GPP	Strong
3.8	GPP	Strong
3.9	C	Strong
3.10	C	Strong
3.11	C	Strong
3.12	C	Strong
3.13	GPP	Strong
3.14	C	Strong
3.15	C	Strong
3.16	GPP	Strong
3.17	GPP	Strong
3.18	GPP	Strong
3.19	C	Strong
3.20	GPP	Strong
3.21	C	Strong
3.22	C	Strong
3.23	GPP	Strong
3.24	GPP	Strong
3.25	GPP	Strong
3.26	GPP	Strong
3.27	GPP	Strong
3.28	GPP	Strong
3.29	GPP	Strong
3.30	GPP	Strong
3.31	GPP	Strong
3.32	C	Strong
3.33	GPP	Strong
3.34	GPP	Strong
3.35	GPP	Strong
3.36	GPP	Weak
3.37	C	Strong
3.38	GPP	Strong
3.39	C	Strong
3.40	GPP	Strong

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Recommendation Number	Level of Evidence	Strength of Recommendation
3.41	M	Strong
4.1	C	Strong
4.2	C	Strong
4.3	C	Strong
4.4	M	Mandatory
4.5	C	Strong
4.6	C	Strong
4.7	GPP	Strong
4.8	GPP	Weak
5.1	GPP	Strong
5.2	GPP	Strong
5.3	GPP	Strong
5.4	C	Strong
5.5	M	Strong
5.6	GPP	Strong
5.7	GPP	Strong
5.8	C	Strong
5.9	C	Strong
5.10	C	Strong
5.11	GPP	Strong
5.12	GPP	Strong
5.13	GPP	Strong
5.14	GPP	Strong
5.15	C	Strong
5.16	C	Strong
5.17	GPP	Strong
5.18	C	Strong
5.19	C	Strong
5.20	C	Strong
5.21	C	Strong
7.1	C	Strong
7.2	M	Strong
7.3	C	Strong
7.4	GPP	Weak
7.5	C	Strong
7.6	GPP	Strong

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Recommendation Number	Level of Evidence	Strength of Recommendation
7.7	GPP	Strong
7.8	C	Strong
7.9	C	Strong
9.1	M	Mandatory
9.2	B	Strong
9.3	B	Strong
9.4	GPP	Strong
9.5	B	Strong
9.6	C	Strong
9.7	B	Strong
9.8	C	Strong
9.9	M	Mandatory
9.10	M	Mandatory
9.11	GPP	Strong
9.12	GPP	Strong
9.13	GPP	Strong
9.14	GPP	Strong
9.15	C	Strong

About these guidelines

Methodology

The process by which this chapter has been developed has been documented within the [GPAS Chapter Development Process Document](#).

The evidence included in this chapter is based on a systematic search of the literature. Abstracts were independently screened by two investigators and reviewed against inclusion and exclusion criteria. Data were extracted by one investigator in accordance with predefined criteria. The review's objective was to determine the key components needed to ensure provision of high-quality post-anaesthetic services for patients who have undergone surgery and/or interventions which involve anaesthesia.

Search strategy

Searches were performed on Embase (1980 to 2015), Ovid MEDLINE (1946 to present), CINAHL and the Cochrane Library, for the literature search strategy, outcomes, databases, criteria for inclusion and exclusion of evidence (for the Paediatric Services chapter search protocol please contact RCoA). A hand search of the literature was also conducted by the authors using the reference lists of relevant original articles and review articles.

The literature search was performed in September 2015.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

The authors and researcher independently reviewed the abstracts and titles of the studies found in the initial search. After agreement on the primary selection of papers, full text versions were accessed and reviewed against the following predefined inclusion and exclusion criteria. The full text papers were also reviewed by the CDG for suitability. The final list of publications used can be found in the References.

Inclusion criteria

The literature review considered studies that included the following patient population with all of the inclusion criteria listed below:

- all patients undergoing elective or emergency anaesthesia
- all staff groups working within paediatric anaesthesia, including (but not restricted to) consultant anaesthetists, staff grade, associate specialist and specialty (SAs) doctors, anaesthetists in training, nurses, operating department practitioners, surgeons, pharmacists, general practitioners, radiologists and radiographers, play specialists.

Exclusion criteria

The literature review used the following exclusion criteria:

provision of paediatric services provided by a specialty other than anaesthesia.

Data extraction and analysis

Data were extracted by the authors using a pro forma. The study characteristics data included:

- the journal and country of publication
- the number of patients recruited into the study
- the study design
- patient characteristics
- outcome data
- the logic of the argument
- author's conclusions
- reviewer's comments.

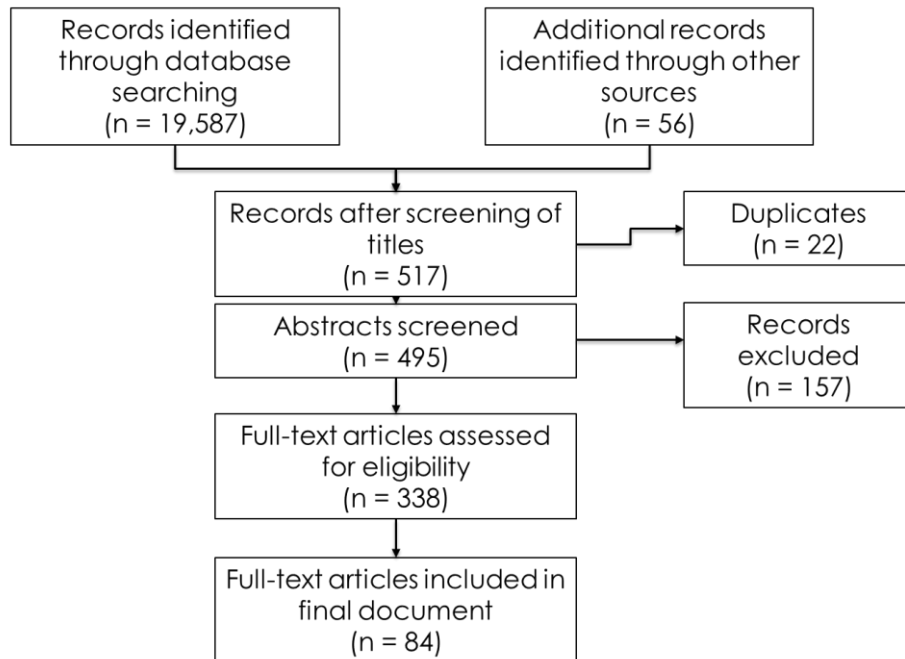
The patient characteristics data extracted were age, gender and type of surgery. The analysis considered studies that included any clinical outcome, including (but not restricted to) survival, length of stay - critical care or total length of hospital stay, morbidity, adverse effects and complications.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

The results of the literature review can be seen below:

**Preferred Reporting Systems for Systematic Review and Meta-analysis (PRISMA)
flow chart**



Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

The evidence that is included in this chapter has been classified in accordance with a grading system adapted from one used by the National Institute for Health and Care Excellence and outlined below.

Level	Type of evidence	Grade	Evidence
Ia	Evidence obtained from a single large/multicentre randomised controlled trial, a meta-analysis of randomised controlled trials or a systematic review with a low risk of bias	A	At least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing the specific recommendation (evidence level I) without extrapolation
Ib	Evidence obtained from meta-analyses, systematic reviews of RCTs or RCTs with a high risk of bias	B	Well-conducted clinical studies but no high-quality randomised clinical trials on the topic of recommendation (evidence levels Ib, II or III); or extrapolated from level Ia evidence
IIa	Evidence obtained from at least one well-designed controlled study without randomisation		
IIb	Evidence obtained from at least one well-designed quasi-experimental study		
IIc	Evidence obtained from case control or cohort studies with a high risk of confounding bias		
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case-studies		
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities	C	Expert committee reports or opinions and/or clinical experiences of respected authorities (evidence level IV) or extrapolated from level I or II evidence. This grading indicates that directly applicable clinical studies of good quality are absent or not readily available.
UG	Legislative or statutory requirements	M	This grading indicates that implementation of this recommendation is a statutory requirement, or is required by a regulatory body (e.g. CQC, GMC)
		GPP	Recommended good practice based on the clinical experience of the CDG
Adapted from Eccles M, Mason J (2001) How to develop cost-conscious guidelines. Health Technology Assessment 5:16 and Mann T (1996) Clinical Guidelines: Using Clinical Guidelines to Improve Patient Care Within the NHS. London: Department of Health.			

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Strengths and limitations of body of evidence

The limitations of the evidence are:

- the 'unmeasurables' (attitudes, behaviour, motivation, leadership, teamwork)
- poor or limited outcome measures
- decrease in outcome over time and geography when 'good papers' are used in Quality Improvement programmes
- few RCTs; evidence was mainly based on opinion (e.g. editorials)
- papers often examine a single intervention within a complex system or bundle
- papers are often examining small numbers and/or patients from a single centre
- poor use of outcome measures, frequently concentrating on easily measured short-term outcomes which are not patient-centred
- generally a paucity of long-term follow up-up
- culture of significant under-reporting of complications/adverse events.

Methods used to arrive at recommendations

Recommendations were initially drafted by the authors for the chapter. These were discussed with the CDG, and comments were received both on the content and the practicality of the recommendations. The level of evidence that was the basis for each recommendation was graded according to a grading system, and the recommendation was then graded taking into account the strength of the evidence and the clinical importance using a recommendations criteria form (see [GPAS Chapter Process Document](#)). Recommendations were worded using the following system of categorisation:

Strength	Type of evidence	Wording
Mandatory	The evidence supporting the recommendation includes at least one with an 'M' grading	Wording should reflect the mandatory nature of the recommendation, i.e. 'must'
Strong	Confidence that for the vast majority of people, the action will do more good than harm (or more harm than good)	Wording should be clearly directive - 'should' or 'should not'
Weak	The action will do more good than harm for most patients, but may include caveats on the quality or size of evidence base or patient preferences	Wording should include 'should be considered'
Aspirational	While there is some evidence that implementation of the recommendation could improve patient care, either the evidence or the improvement is not proven or substantial	Wording should include 'could'

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Equipoise	There is no current evidence on this recommendation's effect on patient care	Wording should include 'there is no evidence of this recommendation's effect on patient care'
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Consultation

The chapter has undergone several rounds of consultation. The multidisciplinary CDG formed the first part of the consultation process. The authors and GPAS Editorial Board identified key stakeholder groups. Where stakeholders are represented by an association or other medical college, they were asked to nominate delegates to join the CDG. The chapter process document explains the recruitment process for those CDG members who were not directly nominated. The CDG members were involved in drafting the recommendations, and were provided with an opportunity to comment on all subsequent drafts of the chapter.

The chapter underwent peer review. Peer reviewers were identified by the GPAS Editorial Board or Professional Standards Committee. Nominees were either anaesthetists of consultant grade or were nominated by a key stakeholder group. Nominees had not had any involvement in the development of GPAS to date, and were asked to comment upon a late draft of the chapter.

Following peer review, the chapter was reviewed by the College's Professional Standards Committee and the College's Lay Committee. Comments from all groups were considered and incorporated into a consultation draft.

The consultation draft of this chapter was circulated for public consultation from 22 December 2016 to 22 January 2017. As well as being made available on the College's website and promoted via Twitter, the draft was also circulated to all key stakeholder groups identified by the authors and the College. A list of organisations contacted by the College is available from the GPAS team at the College: GPAS@rcoa.ac.uk.

The editorial independence of GPAS

The development of GPAS is wholly funded by the Royal College of Anaesthetists. However, only the GPAS technical team and the GPAS researcher are paid directly by the College for their work on GPAS; the GPAS Editors' employing organisation receives two programmed activities (PA) backfill funding. All funding decisions by the College are made by the chief executive officer, in collaboration with the senior management team and College Council.

The authors of the chapters are all fellows of the Royal College of Anaesthetists. Members of College Council cannot act as chair of any CDG, as this individual has the deciding vote under the consensus method of decision making used in the chapters. Where College Council members have been involved in chapter development, this has been declared and recorded.

All persons involved in the development of GPAS are required to declare any pecuniary or non-pecuniary conflict of interest, in line with the GPAS conflict of interest policy as described in the GPAS Chapter Development Process Document. Any conflicts of interest are managed on a case-by-case basis to maintain the transparency and impartiality of the GPAS document. The conflicts, and the way they were managed, are outlined at the beginning of the chapter.

The role of the GPAS Editorial Board and CQRB

The overall development of the entire GPAS document is overseen by the CQRB of the Royal College of Anaesthetists, which includes representatives from all grades of anaesthetist and from clinical directors, and which also has lay representation.

Chapter 10

Guidelines for the Provision of Paediatric Anaesthesia Services 2019

Responsibility for managing the scope of the document and providing clinical oversight to the project technical team is delegated by the CQRB to the GPAS Editorial Board, which includes individuals responsible for the various internal stakeholders (see above for membership). On the inclusion/exclusion of specific recommendations within each chapter, the Editorial Board can only provide advice to the authors. In the event of disagreement between the authors, the majority rules consensus method is used, with the GPAS Editor holding the deciding vote.

Both of these groups, along with the College's Lay Committee, review each chapter and provide comment prior to public consultation and are responsible for signoff before final publication. In the event of disagreement, consensus is reached using the majority rules consensus method, with the chair of CQRB holding the deciding vote.

Updating these guidelines

This chapter will be updated for republication in January 2020.

Guidelines will be updated on an annual basis. The researcher will conduct the literature search again using the same search strategy to uncover any new evidence and members of the public will be able to submit new evidence to the GPAS project team. Where new evidence is uncovered, the lead author will decide whether the recommendations that were originally made are still valid in light of this new evidence.

If new evidence contradicts or strengthens existing recommendations, the authors decide whether or not to involve the remainder of the CDG in revising the recommendations accordingly.

If new evidence agrees with existing recommendations, then a reference may be added but no further action is required.

If there is no new evidence then no action is required.

This chapter is due to be fully reviewed for publication in January 2022.

Every five years, guidance will be submitted to a full review involving reconvening the CDG (or appointment of a new, appropriately qualified CDG), and the process described in the methodology section of this chapter begins again.



Royal College of Anaesthetists

Royal College of Anaesthetists, Churchill House, 35 Red Lion Square, London WC1R 4SG
020 7092 1500 | www.rcoa.ac.uk/gpas | gpas@rcoa.ac.uk

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