

Guidelines for the Provision of Paediatric Anaesthesia Services

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Declarations of Interest

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

3

4 Declarations were made as follows:

- 5
- three members were involved in producing two of the items of evidence.

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

11 **Medico-legal implications of GPAS guidelines**

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

24 **Promoting equality and addressing health inequalities**

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

- 27 • Given due regard to the need to eliminate discrimination, harassment and victimisation, to
28 advance equality of opportunity, and to foster good relations between people who share a
29 relevant protected characteristic (as cited under the Equality Act 2010) and those who do
30 not share it; and
- 31 • Given regard to the need to reduce inequalities between patients in access to, and outcomes
32 from healthcare services and to ensure services are provided in an integrated way where
33 this might reduce health inequalities.

34 **GPAS guidelines in context**

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

39 Each of the GPAS chapters should be seen as independent but interlinked documents.

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

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

45 **Aims and Objectives**

46 The objective of this chapter is to promote current best practice for service provision in paediatric
47 anaesthesia. These guidelines are intended for use by anaesthetists with responsibilities for service
48 delivery and healthcare managers and cover the patient age group of 0 to 19 years.

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

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

59 The recommendations in this chapter will support the Royal College of Anaesthetists Anaesthesia
60 Clinical Services Accreditation (ACSA) process.

61 **Scope**

62 **Objective**

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

67 **Target Population**

68 *Groups that will be covered*

- 69 • All patients less than 19 years of age undergoing elective or emergency anaesthesia
- 70 • All anaesthetic departments providing services for infants, children and young people in the
71 above age groups
- 72 • All anaesthetists caring for neonates, infants, children and young people

73

74 *Groups that will not be covered*

- 75 • Provision of paediatric services provided by a specialty other than anaesthesia

76 **Healthcare Setting**

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

78 **Clinical Management**

79 *Key issues that will be covered*

- 80 • Key components for the provision of paediatric anaesthesia services for paediatric surgery
81 and/or interventions
- 82 • Key components needed to ensure provision of high quality anaesthetic services for paediatric
83 patients requiring surgery and/or interventions which involve anaesthetists
- 84 • Areas of provision considered:

- 85 - Levels of provision of service, including (but not restricted to) staffing, equipment,
86 support services and facilities
- 87 - Areas of special requirement, such as critical care, resuscitation, interventional and
88 diagnostic radiology, radiotherapy, endoscopy, satellite sites and the Emergency
89 Department (ED)
- 90 - Training and education
- 91 - Research and Audit
- 92 - Organisation and administration
- 93 - Patient Information
- 94 - Quality Improvement
- 95 - Time critical transfers and retrievals

96

97 *Issues that will not be covered*

- 98 - Clinical guidelines specifying how healthcare professionals should care for patients
- 99 - National-level issues

100 **Introduction**

101 Infants, children and young people have different requirements. There are marked developmental
102 changes within the paediatric age range. Neonates, infants, and pre-pubertal children under the age
103 of 8–12 years have particular anatomical and physiological differences. Doses of drugs and fluids
104 need to be more precisely calculated, and anaesthetic equipment for smaller children differs from
105 that used in older children and adults.

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

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

113 Children with significant acute or chronic medical problems, those undergoing complex procedures
114 (including cardiothoracic and neurosurgery), neonates and small infants are usually referred to
115 specialist children's units.

116 Non-specialist centres should generally have arrangements for managing and treating simple surgical
117 emergencies in children; in addition, they should be able to resuscitate and stabilise critically ill
118 infants and children of all ages prior to transfer to a specialist centre for surgery and/or intensive
119 care.

120 Both planned and urgent/emergency anaesthesia and surgery for children should be commissioned
121 within the context of a network of care, with pathways of care agreed by specialist and non-
122 specialist providers.

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

126 All relevant [GPAS chapters](#) include a section on the treatment of children and young people that will
127 have overlap with this document, e.g. [neuroanaesthesia](#), [emergency anaesthesia](#) and [pain](#).

128 Recommendations

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

130 1 Staffing Requirements

131 1.1 Anaesthetists who care for children should have received appropriate training¹ and must
132 ensure that their competency in anaesthesia and resuscitation is adequate for the
133 management of the children they serve.^{1,2}

134 1.2 An appropriately trained and experienced anaesthetist should be present throughout the
135 conduct of anaesthesia for all procedures, including those procedures requiring intravenous
136 sedation (where this service has been agreed to be provided by the anaesthetic department).
137 In exceptional circumstances, for example where urgent treatment for another patient
138 requires the anaesthetist to leave the patient, they should delegate responsibility to another
139 appropriate person in line with GMC guidance on delegation.^{3,4}

140 1.3 There should be an identified consultant anaesthetist with overall responsibility for
141 supervision of anaesthetic trainees and, where necessary, anaesthetists who are neither
142 consultants nor trainees.^{1,5}

143 1.4 There should be a locally agreed policy on the level of consultant supervision required based
144 on the age, complexity and comorbidities of the patient.^{1,6,7}

145 1.5 When a child undergoes anaesthesia or an anaesthetic department provides sedation services,
146 there should be a dedicated trained assistant, i.e. an operating department practitioner (ODP)
147 or equivalent, who has had paediatric experience and maintained their paediatric
148 competencies.⁸

149 1.6 In the period immediately after anaesthesia, the child should be managed in a recovery area,
150 staffed on a one-to-one basis at least until the child can manage their own airway. The staff in
151 this area should have paediatric experience and current paediatric competencies, including
152 resuscitation.^{8,9}

153 1.7 A member of staff with advanced training in life support for children should always be
154 available to assist where required.^{10,11,12}

¹ Curriculum for a CCT in anaesthetics. RCoA, London 2010 (www.rcoa.ac.uk/node/230)

² The Good medical practice framework for appraisal and revalidation. GMC, London 2013
(<http://bit.ly/2dgbuyc>)

³ Good medical practice. GMC, London 2013 (<http://bit.ly/1cNq7UM>)

⁴ Standards of monitoring during anaesthesia and recovery (5th Edition). AAGBI, London 2015
(http://www.aagbi.org/sites/default/files/Standards_of_monitoring_2015_0.pdf)

⁵ Supervision of SAS and other non-consultant anaesthetists in NHS hospitals. London: The Royal College
of Anaesthetists, 2015 (<http://bit.ly/1O2rqhp>)

⁶ Surgery in children. Are we there yet? A review of organisational and clinical aspects of children's
surgery. National Confidential Enquiry into Patient Outcome and Death (NCEPOD), London 2011

⁷ Standards for Non specialist emergency surgical care of Children. Children's Surgical Forum. RCS, 2015

⁸ The anaesthesia team (3rd Edition). Association of Anaesthetists of Great Britain and Ireland (AAGBI),
London 2010

⁹ Immediate post-anaesthesia recovery. AAGBI, 2013 (<http://bit.ly/1O8uXYr>)

¹⁰ Healthcare standards in caring for neonates, children and young people. Royal College of Nursing,
London 2014 Updated

155 1.8 Wherever children undergo anaesthesia, there should be immediate access to a named
 156 consultant paediatrician with acute care responsibilities, at all times. This includes a local
 157 agreement for those sites without inpatient paediatric beds.¹³

158 2 Equipment, Services and Facilities

159 Equipment

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

162 2.1 Equipment should be available and maintained that is appropriate for use in neonates, infants
 163 and children of all sizes and ages and includes:

- 164 • equipment for airway management and monitoring, including capnography and invasive
- 165 haemodynamic monitoring
- 166 • pulse oximetry sensors and blood pressure cuffs
- 167 • vascular-access equipment, including intraosseous needles
- 168 • devices to allow rapid and accurate fluid and drug delivery
- 169 • equipment for warming fluids
- 170 • patient warming devices
- 171 • equipment for measuring patient temperature
- 172 • TIVA pumps with paediatric algorithms
- 173 • ultrasound devices (for central venous and nerve identification)^{14,15}
- 174 • equipment for recording weight on the ward

176 2.2 Equipment for point of care testing of glucose, haemoglobin, blood gases and electrolytes
 177 should be readily available.¹⁶

178 2.3 Intravenous fluid management should conform to NICE guidelines and appropriate equipment
 179 to deliver this safely and accurately should be available.¹⁶

180 2.4 Resuscitation drugs and equipment, including an appropriate defibrillator, should be readily
 181 available wherever children are anaesthetised.^{11,17}

182 2.5 There should be ventilators available that have the flexibility to be used over a wide size and
 183 age range, and provide accurate pressure control and positive end-expiratory pressure.

184 2.6 Theatre temperature should be capable of regulation to at least 23°C, and up to 28°C where
 185 neonatal surgery is performed. There should be accurate thermostatic controls that permit
 186 rapid change in temperature.

¹¹ Quality Standards for Care of Critically ill Children (5 Edition). Paediatric Intensive Care Society (PICS), London 2015 (http://picsociety.uk/wp-content/uploads/2016/05/PICS_standards_2015.pdf)

¹² Update on paediatric resuscitation training for non-training grade anaesthetists. APAGBI, London, 2016. (<http://bit.ly/2cycKbg>)

¹³ Standards for Children's Surgery. Children's surgical forum. Royal College of Surgeons of England (RCS), London 2013 (https://www.rcseng.ac.uk/-/media/files/rcs/library-and-publications/non-journal-publications/rcs_standards_for_childrens_surgery_2013.pdf?la=en)

¹⁴ Guidance on the use of ultrasound locating devices for placing central venous catheters (TA49). NICE, London 2002 (www.nice.org.uk/Guidance/TA49)

¹⁵ Ultrasound-guided regional nerve block (IPG285). NICE, London 2009 (www.nice.org.uk/Guidance/IPG285)

¹⁶ Intravenous fluid therapy in children and young people in hospital, NICE December 2015 (<https://www.nice.org.uk/guidance/ng29>)

¹⁷ Paediatric advanced life support guidelines. RCUK, 2015 (<http://bit.ly/23vXAtC>)

187 **Support services**

- 188 2.7 Children undergoing anaesthesia should be offered a pre-assessment service prior to the day
189 of their procedure.
- 190 2.8 Children undergoing anaesthesia, and their families should be offered input from play
191 specialists to help prepare the child for anaesthesia.¹⁸
- 192 2.9 Referral pathways should be available to a paediatric psychology service.¹⁹
- 193 2.10 Blood transfusion and diagnostic services should meet the requirements of neonates, infants
194 and children. A massive transfusion protocol, including provision for children, should be in
195 place.
- 196 2.11 There should be pharmacy staff with paediatric knowledge available to provide advice on the
197 management of drugs in children.
- 198 2.12 There should be awareness that the paediatric population is at greater risk of drug errors.
199 Local systems should be in place to minimise and report prescription and drug-administration
200 errors.
- 201 2.13 There should be local systems in place to disseminate national safety alerts.
- 202 2.14 There should be access to the *British National Formulary for Children*.²⁰
- 203 2.15 There should be a fully resourced acute pain service that covers the needs of children.^{21,22} In
204 hospitals with a smaller paediatric caseload, this may be the adult acute pain service liaising
205 with the paediatric anaesthetic team rather than a dedicated paediatric service.
- 206 2.16 Analgesia guidance appropriate for children²³ should be readily available including protocols
207 for pain scoring using age appropriate validated tools.²²

208 **Facilities**

- 209 2.17 Children should be separated from, and not managed directly alongside adults throughout the
210 patient pathway including reception and recovery areas. Where complete physical separation
211 is not possible, the use of screens or curtains, while not ideal, may provide a solution.
- 212 2.18 The appearance of the anaesthetic induction and recovery areas should take into account the
213 emotional and physical needs of children.
- 214 2.19 Parents and carers should be allowed ready access to the recovery area or, if this is not
215 feasible, children should be reunited with their parents or carers as soon as possible.
- 216 2.20 Services and facilities should take account of the specific needs of adolescents, where these
217 are different from those of children and adults.^{24,25,26,27}

18 Armstrong T.S.H. Aitken H.L. Developing role of play preparation in paediatric anaesthesia *Paediatric Anaesthesia* 2000, Vol 10, Issue 1 Pages1 to 4

19 Evidence-based guidelines for the management of invasive and/or distressing procedures with children. British Psychological Society, 2010, page 1-44

20 British National Formulary for Children 2014–2015 (www.bnf.org/bnf/org_450055.htm).

21 Guidance on the provision of anaesthesia services for acute pain management. RCoA, London 2016 (<https://www.rcoa.ac.uk/system/files/GPAS-2016-11-ACUTEPAIN.pdf>).

22 Core Standards for Pain Management Services in the UK. *Faculty of Pain Medicine*, London 2015 (<http://bit.ly/1NrhpdB>)

23 Good practice in post-operative and procedural pain (2nd Edition). APAGBI, London 2012 (<http://bit.ly/1mrmcTc>)

24 National steering group for specialist children's services. Report of the age appropriate care working group. *National delivery plan for specialist children services*, Scotland 2009 (<http://bit.ly/1cNimOg>)

218 2.21 Arrangements should be in place to enable at least one parent or carer to stay with children
219 who require overnight admission to hospital.

220 3 Areas of Special Requirement

221 The recommendations for the provision of anaesthetic services to children for anaesthetic sub-
222 specialties, e.g. [neuroanaesthesia](#), for [burns and plastics surgery](#), for [cardiac and thoracic surgery](#),
223 are detailed in the 'Areas of Special Requirement' of the relevant chapter of GPAS.

224 Neonates (0 to 28 Days²⁸)

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

229 It should be recognised that babies with congenital problems that are older than 44 weeks post
230 conceptual age, and in particular babies who were born prematurely, i.e. before the 37th week of
231 pregnancy²⁹, may continue to pose a high risk when undergoing anaesthesia.

232 3.1 Where separation from the parents occurs arrangements should be in place to allow
233 communication and visits by the parents as soon as possible.

234 3.2 The multidisciplinary team involved in neonatal anaesthetic care should have regular
235 experience with this age group. In most areas this will require centralisation in specialist
236 centres for both emergency and elective procedures.

237 3.3 A modified WHO checklist specific to this age group should be completed before anaesthesia.

238 3.4 The theatre should have the capacity to reach a temperature of 28°C.

239 3.5 Warming devices for the patient and fluid warming should be available.

240 3.6 Equipment suitable for this age group, e.g. pulse oximeter sensors of appropriate size, should
241 be available and checked.

242 Paediatric Trauma

243 Networks are now nationally agreed for trauma management in children. Anaesthetists have a key
244 role in these teams. The recommendations on the provision of anaesthetic services for paediatric
245 trauma can be found in the [Guidance on the provision of anaesthesia services for trauma and
246 orthopaedic surgery](#).

247 The increased centralisation of elective surgical services for young children³⁰ has reduced the
248 proportion of staff who are confident in the emergency management of critically ill or injured
249 children. Children and young people present at a range of hospital settings, or may deteriorate
250 anywhere in the hospital. All staff find these situations stressful and therefore plans and simulated

²⁵ Bridging the gaps: health care for adolescents. *RCPCH*, London 2003

²⁶ "You're Welcome" Quality Criteria for young people friendly health services. *Department of Health*,
2011 Gateway 15388 DH England

²⁷ Transition from Children to adult services for Young people using health and social care services. *NICE*,
February 2016

²⁸ World Health organisation definition of a neonate (http://www.who.int/topics/infant_newborn/en/)

²⁹ World Health Organisation. Definition of premature birth
(<http://www.who.int/mediacentre/factsheets/fs363/en/>)

³⁰ Cochrane H, Tanner S. Trends in Children's Surgery 1994–2005: Evidence From Hospital Episodes
Statistics Data. London: DH; February 2007.

251 training for paediatric resuscitation anywhere in the hospital provide valuable learning
252 opportunities.

253 3.7 Where children present with major trauma to a non-trauma centre, the guidelines for
254 emergency resuscitation, stabilisation and transfer detailed below should apply.

255 **The critically ill child**

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

259 Sick children may require short-term admission to a general critical care facility, e.g. while awaiting
260 the arrival of the PICU retrieval team or when only a very short period of intensive care that does
261 not necessitate transfer to a PICU is required. This is acceptable, provided there is a suitable facility
262 within the hospital, there are staff with the appropriate competencies and the episode will last only
263 a few hours.

264 3.8 Hospitals admitting children should be part of a fully funded critical care network.

265 3.9 Paediatric early warning scores should be used to help identify the deteriorating or critically ill
266 child.

267 3.10 There should be local hospital protocols in place that are clear on the roles and responsibilities
268 of the multidisciplinary team in caring for the critically ill child.³¹ Individual hospitals will have
269 different personnel providing anaesthetic support to these teams.

270 3.11 Hospitals should have clear operational policies regarding the care of young people aged 16-
271 18 years of age and for pre-term babies who have been discharged from neonatal units.¹¹

272 3.12 Individuals with responsibilities for paediatric resuscitation and stabilisation should fulfil the
273 training requirements and maintain their competencies.³²

274 3.13 Staff without recent paediatric experience or training may be able to contribute transferable
275 skills as part of the multidisciplinary team, e.g. expertise with ultrasound to assist line
276 placement or echocardiography skills, and should be supported by local protocols.

277 3.14 In all emergency departments receiving infants and children, neonatal and paediatric
278 resuscitation equipment, medications (including anaesthetic drugs) and fluids should be
279 available to prepare an infant or child for PICU transfer.³³

280 3.15 There should be immediate access to protocols for management of acute life threatening
281 conditions. These will often be agreed with the local PICU network or PIC transport team.
282 Protocols should include acute respiratory, cardiovascular or neurological emergencies,
283 trauma, poisoning and major burns.¹¹

284 3.16 Hospitals without a suitable PICU/NICU bed should obtain the advice of the local PICU
285 transport team as soon as possible during the management of the sick or critically injured
286 child or young person.

287 3.17 Specialist centres with PICU facilities should provide clinical advice and help in locating a
288 suitable PICU bed once a referral has been made.

³¹ The acutely or critically sick or injured child in the DGH – a team response. Report of a Working Party. Department of Health, London 2005 (www.rcoa.ac.uk/node/635)

³² Paediatric advanced life support guidelines. Resuscitation Council UK, 2015 (<http://bit.ly/23vXAtC>)

³³ Standards for children and young people in the emergency care settings (3rd Edition). Developed by the Intercollegiate Committee for Standards for Children and Young People in Emergency Care Settings. RCPCH, London 2012 (<http://bit.ly/1RW3zmp>)

- 289 3.18 There should be data collection of all referrals to PICU.
- 290 3.19 There should be a nominated lead consultant and nurse within general critical care units who
291 are responsible for the policies and procedures for babies and children when admitted.¹¹
- 292 3.20 In the event of unusual circumstances, e.g. pandemic flu, adult critical care units should have a
293 contingency plan for longer periods of paediatric intensive care delivery.
- 294 3.21 Infants and children who are likely to require intensive care following an operation should
295 undergo their surgery in a hospital/unit with a designated PICU or NICU.³⁴
- 296 3.22 If the patient is too sick to transfer to such a hospital prior to surgery and their current
297 hospital has surgeons capable of operating, then transfer should occur as soon after surgery
298 as it is clinically appropriate to do so.¹¹

299 **Transfer of critically ill children**

300 The transfer of critically ill children to specialist centres is generally undertaken by paediatric
301 intensive care transport teams.³⁵ In some circumstances, it may be necessary for the referring
302 hospital to provide an emergency transfer of a sick child who is intubated and ventilated. This may
303 occur particularly in the case of a child who presents at a non-specialist centre and requires a time
304 critical transfer e.g. for an acute neurosurgical emergency or major trauma. In these circumstances,
305 the child will need to be accompanied by an appropriate senior anaesthetist.³⁶ The usual transport
306 team should provide advice, even where urgent transfer is undertaken by the local referring
307 hospital.

- 308 3.23 There should be a designated consultant with responsibility for transfers who provides and
309 updates a written policy for emergency transfers of intubated children.
- 310 3.24 There should be portable monitors, transfer equipment (including a portable ventilator) and
311 drugs readily available to transfer critically ill children.
- 312 3.25 There should be local, relevant written guidelines, with telephone numbers of the receiving
313 unit.
- 314 3.26 Patients being transferred should normally be accompanied by a doctor with relevant
315 competencies in the care of a critically ill child and transfer of intubated patients, including
316 airway management skills. They should be accompanied by a suitably trained assistant.
- 317 3.27 Transport services should ensure that appropriate multi-disciplinary arrangements are in place
318 to review transfers and provide feedback to networked hospitals.

319 **Day care procedures and anaesthesia**

320 Day surgery is particularly appropriate for children, provided the operation is not complex or
321 prolonged and the child is well with either no, or only mild, well-controlled co-morbidity. Even
322 children with relatively complex needs, e.g. cerebral palsy and cystic fibrosis, can be managed as day
323 cases, provided they are stable with minimal cardiorespiratory problems, and the proposed surgery
324 is minor.³⁷

³⁴ Toolkit for high quality neonatal services. *Department of Health*, London 2009 (<http://bit.ly/1YIQqIh>)

³⁵ PICS Acute Transport group, <http://picsociety.uk/pics-subgroups/acute-transport-group/>

³⁶ Joint statement from Society of British Neurological Surgeons and Royal College of Anaesthetists regarding the provision of emergency paediatric neurosurgical services. *RCoA*, London 2010 (<http://bit.ly/22cM6uB>)

³⁷ Issues in paediatric day surgery. *British Association of Day Surgery (BADs)*, London 2007 (<http://bit.ly/1cNomGV>)

- 325 3.28 Infants, children and young people should have their day surgery delivered to the same
326 standards as inpatient care, but with additional consideration of measures to promote early
327 discharge. In particular younger infants should be scheduled early in the day to allow
328 sufficient time for recovery and discharge on the same day.
- 329 3.29 Infants, children and young people should be managed in a dedicated paediatric unit or have
330 specific time allocated in a mixed adult/paediatric unit and separated from adult patients.
- 331 3.30 The lower age limit for day surgery will depend on the facilities and experience of staff and the
332 medical condition of the infant. Ex-preterm infants should generally not be considered for day
333 surgery unless they are medically fit and have reached a post-conceptual age of 60 weeks.
334 Risks should be discussed on an individual basis.
- 335 3.31 Parents, carers, children and young people should be provided with good-quality pre-
336 operative information, including fasting guidelines and what to do if the child becomes unwell
337 before the operation date. Post-operative analgesia requirements should be anticipated, and
338 discussed at the pre-assessment visit.
- 339 3.32 Specific guidance for the prevention and treatment of post-operative nausea and vomiting in
340 children and young people should be available.³⁸
- 341 3.33 There should be clear documented discharge criteria following day case surgery.
- 342 3.34 Discharge advice should be detailed and carefully worded to facilitate on-going care by
343 parents or carers.
- 344 3.35 A local policy on analgesia for home use should be in place, with either provision of
345 medications or advice to parents and carers to purchase suitable simple analgesics before
346 admission. In both instances, there should be clear instructions to parents and carers about
347 their regular use in the correct dose and for a suitable duration. Parents and carers should be
348 given written instructions on administration of analgesia and know who to contact if problems
349 arise. In addition safe practice with medicines around children should be emphasised.

350 **Teenagers and young adults**

351 Teenagers and young people have particular physical and psychosocial needs.

- 352 3.36 The decision on the most appropriate place for the treatment of a teenager or young person
353 should be carried out on an individual basis, balancing the expertise of the clinician in the
354 patient's condition versus desire to fully separate adult patients from teenagers. Local
355 operating policies should be in place to support this decision.
- 356 3.37 Where treatment is carried out in facilities normally used by adult patients, such as obstetric
357 units or for patients requiring ECT treatment, guidelines should be in place for staff training
358 and organisation of services.^{39,40}

359 **Transitional care**

- 360 3.38 Where children are transferring from paediatric to adult services there should be the
361 opportunity to advise them about possible changes in anaesthesia management. Examples

³⁸ Guidelines on the Prevention of Postoperative Vomiting in Children. APAGBI, London 2016.
<http://www.apagbi.org.uk/publications/apa-guidelines>

³⁹ Getting maternity Services Right for pregnant teenagers and young Fathers. Royal College of
Midwives 2008

⁴⁰ Royal College of Psychiatrists ECT accreditation standards

- 362 may include the use of sedation for some procedures that previously would have been
363 managed with general anaesthesia or alternatives to the use of topical anaesthesia.²⁷
- 364 3.39 A person-centred approach should be used to ensure that the young person is an equal
365 partner in decisions regarding their care during this transitional period.⁴¹
- 366 3.40 Anaesthesia records from their previous care should be available to the new service (or a
367 summary document should be provided).²⁷
- 368 3.41 Health and social care service managers in children's and adults' services should work
369 together in an integrated way to ensure a smooth and gradual transition for young people.⁴²

370 **4 Training and Education**

- 371 Anaesthesia for children should be undertaken or supervised by anaesthetists who have undergone
372 appropriate training. In the UK all anaesthetists with a CCT or equivalent will have undertaken
373 higher-level paediatric anaesthesia training.¹ As a minimum they should be competent to provide
374 perioperative care for common elective and emergency procedures in children aged 3 years and
375 older. Anaesthetists providing care to a wider and more complex paediatric population will have
376 acquired more advanced competencies.
- 377 Unless there is no requirement to anaesthetise children, either for elective or emergency
378 procedures, it is expected that the competence and confidence to treat children will be maintained.
379 This may be via direct care, continuing professional development (CPD) activities, refresher courses
380 or visits to other centres. This should be assured through annual appraisal and revalidation.
- 381 4.1 Consultants with a substantial commitment to paediatric anaesthesia should have satisfied
382 the higher and advanced-level competency-based training requirements in paediatric
383 anaesthesia of the RCoA⁴³ or equivalent. It is recognised that anaesthetists involved in highly
384 specialised areas such as paediatric cardiac and neurosurgery will require additional training
385 that is individually tailored to their needs.
- 386 4.2 All anaesthetists who provide elective or emergency care for children should have advanced
387 training in life support for children, and should maintain these competencies by annual
388 training that ideally is multidisciplinary and scenario based.⁴⁴
- 389 4.3 Anaesthetists should be aware of legislation and good practice guidance⁴⁵ relevant to children
390 and according to the location in the UK.^{46,47,48,49} These documents refer to the rights of the
391 child, child protection processes and consent.
- 392 4.4 All anaesthetists must undertake at least level 2 training in safeguarding/child protection⁵⁰
393 and must maintain this level of competence by annual updates of current policy and practice
394 and case discussion.⁵¹

⁴¹ NICE NG43: Transition from children's to adults' services for young people using health or social care services. 2016 (<https://www.nice.org.uk/guidance/ng43/chapter/Recommendations>)

⁴² Children and family care act. HMSO, 2014.

⁴³ CCT in Anaesthetics. Higher and advanced levels (Annex D and E). RCoA, London 2010 (www.rcoa.ac.uk/node/230)

⁴⁴ Recommended paediatric resuscitation training for non-training grade anaesthetists. APAGBI, London 2014 (www.rcoa.ac.uk/node/19034)

⁴⁵ 0–18 years: guidance for all doctors. GMC, London 2007 (<http://bit.ly/1cNqZsz>)

⁴⁶ The Family Proceedings Courts (Children Act 1989) (Amendment) Rules 2004 (<http://bit.ly/1h9UVvA>)

⁴⁷ Age of Legal Capacity (Scotland) Act 1991 (<http://bit.ly/1h9V7uU>)

⁴⁸ Children (Scotland) Act 1995 (<http://bit.ly/1h9Ve9O>)

⁴⁹ Northern Ireland Child Care law – the rough guide. DHSSPSNI, 2004

- 395 4.5 At least one consultant in each department should take the lead in safeguarding/child
396 protection⁵² and undertake training and maintain core level 3 competencies. The lead
397 anaesthetist for safeguarding/child protection should advise on and co-ordinate training
398 within their department, but will not have responsibility to decide upon management of
399 individual clinical cases.
- 400 4.6 Anaesthetists who do not have regular children's lists but have both daytime and out-of-hours
401 responsibility to provide care for children requiring emergency surgery should maintain
402 appropriate clinical skills. There should be arrangements for undertaking regular
403 supernumerary attachments to lists or secondments to specialist centres. The Certificate of
404 Fitness for Honorary Practice⁵³ may facilitate such placements and provides a relatively simple
405 system for updates in specialist centres. Paediatric simulation work may also be useful in
406 helping to maintain paediatric knowledge and skills. There should be evidence of appropriate
407 and relevant paediatric CPD in the five-year revalidation cycle.⁵⁴
- 408 4.7 There should be funding and arrangements for study leave such that all consultants and
409 career grade staff who have any responsibility to provide anaesthesia for children are able to
410 participate in relevant CPD that relates to paediatric anaesthesia and resuscitation, and to
411 their level of specialty practice. Individual CPD requirements should be jointly agreed during
412 the appraisal process.
- 413 4.8 The establishment of regional networks for paediatric anaesthesia should facilitate joint CPD
414 and refresher training in paediatric anaesthesia and resuscitation. Where appropriate, joint
415 appointments may be considered, allowing designated anaesthetists from non-specialist
416 centres a regular commitment within a specialist centre in order to maintain and develop
417 skills.
- 418 **5 Organisation and Administration**
- 419 5.1 Hospitals should define the extent of elective and emergency surgical provision for children,
420 and the thresholds for transfer to other centres.
- 421 5.2 Each hospital should have a multidisciplinary committee to formulate and review provision.
422 This committee should involve anaesthetists, paediatricians, surgeons, emergency department
423 representatives, senior children's nurses, managers and other professionals e.g. paediatric
424 pharmacists. In some hospitals, this will also include PICU physicians.
- 425 5.3 The multidisciplinary committee should be responsible for the overall management,
426 governance and quality improvement of anaesthetic and surgical services for children and
427 should report directly to the hospital board.
- 428 5.4 The opinions of children, young people and their families should be sought in the design and
429 evaluation of services and future planning.⁵⁵

50 Protecting children and young people – the responsibilities of all doctors. GMC, London 2012
(<http://bit.ly/1cNoXZk>).

51 Safeguarding children and young people: roles and competencies for health care staff (third edition).
Intercollegiate document. RCPCH, London 2014 (www.rcoa.ac.uk/node/16273).

52 Lead anaesthetist for child protection/safeguarding. RCoA and APAGBI, London 2010 (updated 2016)
(www.rcoa.ac.uk/node/7126)

53 Certificate of Fitness for Honorary Practice. NHS England, London 2013 (<http://bit.ly/29gGMPd>)

54 Continuing professional development: guidance for doctors in anaesthesia, intensive care and pain
medicine. RCoA, London 2013 (www.rcoa.ac.uk/node/1922)

55 Not just a phase- a guide to the participation of children and young people in health services. RCPCH,
London 2010 (<http://bit.ly/1ZfqCuy>)

- 430 5.5 All hospitals that provide surgery for children and young people should have clear operational
431 policies regarding who can anaesthetise children for elective and emergency surgery. This will
432 be based on on-going clinical experience, the age of the child, the complexity of surgery and
433 the presence of any co-morbidities.^{6,13}
- 434 5.6 In all centres admitting children, one consultant should be appointed as lead consultant for
435 paediatric anaesthesia. Typically, they might undertake at least one paediatric list each week
436 and will be responsible for co-ordinating and overseeing anaesthetic services for children, with
437 particular reference to teaching and training, audit, equipment, guidelines, pain management,
438 sedation and resuscitation.
- 439 5.7 Children and young people undergoing surgery should be placed on designated children's
440 operating lists, ideally in a separate children's theatre area. When this is not possible, children
441 and young people should be given priority by placing them at the beginning of a mixed list of
442 elective or emergency cases.
- 443 5.8 A World Health Organization checklist should be performed before and during surgical and
444 radiological procedures in children. Appropriate checklists should include issues particularly
445 pertinent to the paediatric age group, e.g. flushing of IV cannulae prior to discharge to the
446 recovery/post anaesthesia care unit.⁵⁶
- 447 5.9 Hospitals should review their local standards to ensure that they are harmonised with the
448 relevant national safety standards, e.g. National Safety Standards for Invasive Procedures in
449 England⁵⁷ or the Scottish Patient Safety Programme in Scotland⁵⁸. Organisational leaders are
450 ultimately responsible for implementing local safety standards as necessary.
- 451 5.10 A child-centred approach should be employed whenever possible throughout the care
452 pathway such that there is physical separation between adult patients and children and young
453 people in the operating department, recovery area, day unit wards and in the emergency
454 department.¹³
- 455 5.11 All children and young people should be assessed before their operations by an anaesthetist.
456 Parents and carers, as well as the child, should be given the opportunity to ask questions and
457 to be involved in the physical and psychological preparation for surgery.
- 458 5.12 Parents and carers should be involved throughout the care process. With the agreement of
459 the anaesthetist in charge of the case on the day, they should be able to accompany children
460 to the anaesthetic room, remain present for induction of anaesthesia and be able to gain easy
461 access to the recovery area. In special circumstances, such as some small neonates and in
462 anticipated difficult intubation, this may not be possible.

463 Regional Networks

464 Paediatric services should be coordinated through regional networks for surgery and anaesthesia,
465 which are established and maintained by commissioning groups.⁵⁹ Surgical and anaesthetic
466 networks work with those networks established for care of the critically ill child and provide links

⁵⁶ Patient Safety Alert on residual anaesthetic in cannulae and intravenous lines, *NHS England*, April 2014 (<http://bit.ly/1mbYMRv>)

⁵⁷ National Safety Standards for Invasive Procedures (NatSSIPs). *NHS England*, 2015 (<http://bit.ly/1K6fRY2>).

⁵⁸ <http://www.scottishpatientsafetyprogramme.scot.nhs.uk/>

⁵⁹ Commissioning guide: provision of general children's surgery. *British Association of Paediatric Surgeons, Association of Paediatric Anaesthetists of Great Britain and Ireland, Royal College of General Practitioners, Royal College of Nursing and Royal College of Surgeons of England*. *RCS*, London 2014

467 between departments of paediatrics, surgery, anaesthesia and critical care in non-specialist centres
468 and the corresponding specialist paediatric centres.

469 5.13 Hospitals should engage with networks in order to develop agreed care pathways based on
470 age, co-morbidity and complexity of procedure, as well as clinical urgency. Care pathways
471 should relate to local service provision, staffing and geography.

472 5.14 Hospitals should liaise with the regional network lead for surgery and anaesthesia to provide
473 input to regional audit and standards.

474 5.15 Hospitals that are regional specialist paediatric units should have access to a Paediatric
475 Intensive Care Transport Service commissioned for the retrieval or transfer of critically ill or
476 injured infants, children and young people.¹¹

477 5.16 Units without inpatient paediatric beds should have a formal arrangement with a
478 neighbouring unit, to ensure that practical assistance is available should a child require
479 transfer.⁷ Protocols should be in place for the rapid assessment and transfer of patients to the
480 local specialist unit within the network.¹¹

481 **Access to critical care facilities**

482 Critical care facilities for children are not available in all hospitals where children are anaesthetised.
483 Paediatric high-dependency and critical care facilities should be available and delivered within a
484 network of care that supports major/complex surgery, and critically ill or injured infants and
485 children.

486 5.17 On-site ICU and HDU services should be appropriate to the type of surgery performed and the
487 age and co-morbidity of patients, and should be available to support the delivery of more
488 complex post-operative analgesic techniques.

489 5.18 In hospitals with no on-site paediatric high-dependency and critical care facilities, there should
490 be the facilities and expertise to initiate intensive care prior to transfer/retrieval to a
491 designated regional paediatric intensive care unit (PICU)/high-dependency unit (HDU) facility.
492 This may involve short-term use of adult/general ICU facilities.¹¹

493 **Guidelines**

494 5.19 There should be ready access to evidence-based guidelines that are appropriate for children
495 on the following topics:

- 496 • management of pain, nausea and vomiting
- 497 • intravenous fluid management¹⁶
- 498 • death of the child in theatre
- 499 • protocols for anaesthetic emergencies including
 - 500 - anaphylaxis
 - 501 - malignant hyperthermia
 - 502 - difficult airway management
 - 503 - airway obstruction
 - 504 - resuscitation
 - 505 - local anaesthetic toxicity
 - 506 - major haemorrhage
 - 507 - emergency paediatric tracheostomy management⁶⁰

⁶⁰ National Tracheostomy Safety Project. Paediatric emergency algorithms
<http://www.tracheostomy.org.uk/Templates/NTSP-Paeds.html>

508 5.20 When infants and children undergo procedures under sedation alone, recommended
509 published guidance for the conduct of paediatric sedation should be used.^{61,62}

510 5.21 Guidance on pre-procedure pregnancy testing in female patients should be followed.⁶³

511 **6 Financial Considerations**

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

515 The vast majority of the recommendations are not new recommendations, but they are a synthesis
516 of already existing recommendations. The current compliance rates with many of the
517 recommendations are unknown and so it is not possible to calculate the financial impact of the
518 recommendations in this chapter being widely accepted into future practice. It is impossible to make
519 an overall assessment of the financial impact of these recommendations with the current available
520 information.

521 **7 Research, audit and quality improvement**

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

524 7.1 Quality indicators, such as unplanned inpatient admission following day case surgery,
525 readmission within 28 days or unanticipated admission to PICU following surgery, should be
526 measured, collated and analysed and can be compared within regional networks. A number of
527 suggested audit topics, specifically relating to paediatric anaesthesia are set out in the RCoA
528 document *Raising the standard: a compendium of audit recipes*.⁶⁴

529 7.2 Regional networks could provide agreed quality standards for the peri-operative care of
530 infants and children and young people, and units could be encouraged to participate in regular
531 collation of data relating to these standards. Participation in national audit should also be
532 encouraged.⁶⁵

533 7.3 Quality-improvement projects⁶⁴ in relevant areas of paediatric anaesthetic practice should be
534 agreed and implemented.

535 7.4 Adoption of national initiatives, for example “Hellomynameis” should be encouraged and
536 measured.⁶⁶

537 7.5 Multidisciplinary audit and morbidity and mortality meetings relating to paediatric
538 anaesthesia and procedures including resuscitation should be held regularly. Peri-operative
539 death in infants and children is rare. When a death occurs within 30 days of surgery, a
540 multidisciplinary meeting should be convened and a note made in the clinical record.¹³ In the
541 event of any unexpected child death, whether related to surgery or not this must be reported
542 to the local Child Death Overview Panel (CDOP). This will usually be the responsibility of the

⁶¹ Sedation in under 19s: using sedation for diagnostic and therapeutic procedures (CG112). NICE, London 2010 (www.nice.org.uk/CG112).

⁶² Safe Sedation Practice for Healthcare Procedures. Standards and Guidance. Academy of Medical Royal Colleges (AoMRC), London 2013 (www.rcoa.ac.uk/node/15182)

⁶³ Pre-procedure pregnancy checking for under 16s – guidance for clinicians. RCPCH, London 2012 (www.rcpch.ac.uk/pregnancychecks)

⁶⁴ Raising the standard: a compendium of audit recipes (3rd Edition). RCoA, London 2012 (www.rcoa.ac.uk/node/8640).

⁶⁵ Good medical practice. GMC, London 2013 (<http://bit.ly/1cNq7UM>)

⁶⁶ <http://hellomynameis.org.uk>

543 local designated paediatrician and the process for notification of a child death must be
544 followed.⁶⁷

545 7.6 Audit activity should include the regular analysis and multidisciplinary review of untoward
546 incidents. Serious events and near misses need to be thoroughly investigated and reported to
547 the relevant national agency, in line with national requirements.⁶⁸

548 7.7 There should be on-going audit of all children transferred between hospitals for surgery, and
549 this should be monitored by the referring hospital's paediatric surgical committee. Delays
550 should be critically examined by the regional network.

551 7.8 Anaesthetic research in children should be facilitated when possible, and should follow strict
552 ethical standards.⁶⁹

553 7.9 Anaesthetists who care for children and young people should be familiar with relevant patient
554 safety issues.⁷⁰

555 **8 Implementation Support**

556 The Anaesthesia Clinical Services Accreditation (ACSA) scheme, run by the College, aims to provide
557 support for departments of anaesthesia to implement the recommendations contained in the GPAS
558 chapters. The scheme provides a set of standards, and asks departments of anaesthesia to
559 benchmark themselves against these using a self-assessment form available on the College [website](#).
560 Every standard in ACSA is based on recommendation(s) contained in GPAS. The ACSA standards are
561 reviewed annually and republished approximately four months following GPAS review and
562 republication, to ensure that they reflect current GPAS recommendations. ACSA standards include
563 links to the relevant GPAS recommendations, for departments to refer to whilst working through
564 their gap analyses.

565 Departments of anaesthesia are given the opportunity to engage with the ACSA process for an
566 appropriate fee. Once engaged, departments are provided with a 'College Guide', a member of the
567 Quality Management of Service Group (QMSG - the College working group that oversees the
568 process), or an experienced reviewer to assist them with identifying actions required to meet the
569 standards outlined in the document. Departments must demonstrate adherence to all 'priority one'
570 standards listed in the document to receive accreditation from the College. This is confirmed during
571 a visit to the department by a group of four ACSA reviewers (two clinical reviewers, a lay reviewer
572 and an administrator), who submit a report back to QMSG.

573 The QMSG has committed to building a 'good practice library' (GPL), which will be used to collect
574 and share documentation such as policies and checklists, as well as case studies of how departments
575 that have overcome barriers to implementation of the standards, or have implemented the
576 standards in innovative ways.

577 One of the outcomes of the ACSA process is to test the standards, and by extension the GPAS
578 recommendations, to ensure that they are able to be implemented by departments of anaesthesia
579 and consider any difficulties that may result from implementation. The QMSG has committed to

⁶⁷ Working together to Safeguard Children: March 2015.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/419595/Working_together_to_Safeguard_Children.pdf

⁶⁸ NHS England: Reporting patient safety incidents. <https://www.england.nhs.uk/patientsafety/report-patient-safety/>

⁶⁹ Guidelines for the ethical conduct of research in children. *Archives of Disease in Childhood*, 2000;82:177–182

⁷⁰ Safe Anaesthesia Liaison Group (<http://www.salg.ac.uk/salg>)

580 measuring and reporting feedback of this type from departments engaging in the scheme back to
581 the CDGs updating the guidance via the GPAS technical team.

582 9 Patient Information

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

589 Information

590 9.1 Families should be provided with written or web-based resources that provide information
591 specific to anaesthesia before the planned surgery/procedure,⁷¹ and contact details for the
592 pre-assessment team should be provided in case they have further questions or need to speak
593 directly with their anaesthetist. The 'Information for teenagers, children and parents' available
594 from the [RCoA website](#) and the [Association of Paediatric Anaesthetists of Great Britain and
595 Ireland \(APAGBI\)](#) provides examples of leaflets and other patient, parent and carer
596 information resources.^{71, 72, 73}

597 9.2 Information provided pre-operatively should include:

- 598 • anaesthetic technique, analgesia plan, including regional blockade, any additional
599 procedures e.g. invasive monitoring, blood transfusion, and planned post-operative
600 care in a critical care environment.
- 601 • a statement that the ultimate decision-making will take place on the day of surgery,
602 according to the needs and safety of the child and as judged by the attending
603 anaesthetist. Planned resources, e.g. critical care beds, could be unexpectedly
604 unavailable on the day and this may also be part of the decision-making.
- 605 • a description of generally common side effects, e.g. sore throat and post-operative
606 nausea and vomiting and significant risks, e.g. allergic reactions. Also, any additional
607 risks particular to the individual child and their co-morbidities.
- 608 • concerns raised in discussion with a child or young person or parents and carers, e.g.
609 fear of needles, fear of facemasks, loss of control (which is common in teenagers),
610 emergence delirium, awareness, post-operative pain, PONV,⁷⁴ and the risk to the
611 developing brain of anaesthesia in infants⁷⁵

⁷¹ Your child's general anaesthetic. RCoA, AAGBI and APAGBI patient information. RCoA, London 2014
(www.rcoa.ac.uk/node/1849)

⁷² McEwen A, Moorthy C, Quantock C, Rose H, Kavanagh R The effect of videotaped preoperative
information on parental anxiety during anesthesia induction for elective pediatric procedures

⁷³ Franck LS, Spencer C Informing parents about anaesthesia for children's surgery: a critical literature
review

⁷⁴ Accidental awareness during General anaesthesia in the United Kingdom and Ireland (5th national
audit project of the Royal College of Anaesthetists, Chapter 15 "AAGA in children". RCoA, London
2014 (<http://bit.ly/1TTz5A1>)

⁷⁵ Anaesthesia and the developing brain. APAGBI, London, 2015 (<http://bit.ly/1QQVr5U>)

- 612 • pre-operative fasting instruction should be given verbally and in writing. The timing
613 should be appropriate to the proposed theatre list start time.⁷⁶
- 614 9.3 Information provided post-operatively should include the safe use of analgesia after surgery
615 and discharge from hospital, and what to do and who to contact in the event of a problem or
616 concern. This should include telephone numbers where advice may be sought 24 hours a day.
- 617 9.4 Information should be clear and consistent. It should be given verbally and also in written
618 and/or electronic form.⁷⁷
- 619 9.5 Children should receive information before admission that is appropriate to their age and level
620 of understanding. Information can be provided at face-to-face meetings by nurses and play
621 therapists and enhanced with booklets,⁷⁸ web links or videos.
- 622 9.6 Young people have additional needs and may wish to speak to the anaesthetist or another
623 member of staff without direct parental presence.^{79,80} Anaesthetists should make it clear that
624 they are willing to speak with young people on their own, on request.
- 625 9.7 Female patients following the menarche should be made aware of the need for clinicians to
626 establish pregnancy status before surgery or procedures involving anaesthesia. While
627 obtaining and documenting this information is primarily the responsibility of the operating
628 surgeon or paediatrician, anaesthetists may also feel it necessary to check that such checks
629 have been performed.⁸¹

630 Consent

- 631 In infants and younger children, consent for medical and surgical treatment is obtained from the
632 parent or legal guardian. It is important to be aware of who has parental responsibility⁸² when
633 discussions take place. This is particularly the case when family arrangements are complex or
634 unclear, e.g. the child is under the care of grandparents, in foster care or is otherwise looked after.
- 635 In England and Wales,⁴⁶ young people aged 16 and over can consent independently to medical
636 treatment. However, there are children and young people under the age of 16 who have sufficient
637 maturity and understanding to contribute to a decision about their surgery, and anaesthesia and
638 consent forms allow their signature to be included.
- 639 In England,⁴⁶ children and young people under the age of 18 years cannot legally refuse life-saving
640 treatment. Their views should be very seriously considered and legal/ethical advice sought if there is
641 time to do so and doubt exists.
- 642 In Scotland, children and young people may consent to and refuse treatment independently when
643 they are deemed to have capacity.^{47,48} Additional parental consent is not required.
- 644 9.8 Anaesthetists treating children and young people must ensure that they understand the
645 arrangements for consent in the part of the UK in which they are working.^{46,47,48,49}

⁷⁶ Cantellow S, Lightfoot J, Beringer R Survey of parent's understanding and compliance with fasting advice for paediatric day case surgery

⁷⁷ Spencer C, Franck LS; Giving parents written information about children's anesthesia: Are setting and timing important?

⁷⁸ RCoA and APAGBI information for children and parents. RCoA, London 2010 (www.rcoa.ac.uk/node/429)

⁷⁹ Smith L, Gallery P Children's accounts of their preoperative information needs

⁸⁰ RCPCH Not just a phase- a guide to the participation of children and young people in health services. RCPCH, London 2010

⁸¹ Pre-procedure pregnancy checking for under 16s – guidance for clinicians. RCPCH, London 2012 (www.rcpch.ac.uk/pregnancychecks)

⁸² Parental rights and responsibilities. UK Government, London 2014 (<http://bit.ly/1meLdQE>)

- 646 9.9 Parental responsibility should be established in advance of admission, and appropriate
647 consent procedures followed, involving the court and/or social care as appropriate.
- 648 9.10 For planned procedures, if there is doubt about parental responsibility, advice should be
649 sought from senior hospital medico-legal advisors and/or defence organisations.
- 650 9.11 Although separate written consent for anaesthesia is not mandatory in the UK, there should
651 be a written record of all discussions with the child and/or parent/carers about methods of
652 induction, and provision of post-operative pain relief (including the use of suppositories).
- 653 9.12 Where special techniques such as epidural blockade, invasive monitoring and blood
654 transfusions, are anticipated, there should normally be written evidence that this has been
655 discussed with the child or young person as appropriate and their parents or carers.
- 656 9.13 Children may require anaesthesia for diagnostic procedures such as MRI scans. Anaesthetists
657 should ensure that parents and legal guardians have been informed about the associated risks
658 and common side effects of the anaesthetic.
- 659 9.14 If withdrawing or withholding life-sustaining treatments is being considered,⁸³ possible
660 outcomes and plans should be carefully discussed and documented by the multidisciplinary
661 team of professionals and the family/young person (as appropriate), in advance of planned
662 anaesthesia and including suspension of ‘do not attempt cardiopulmonary resuscitation’
663 (DNACPR) orders.^{84,85}
- 664 9.15 Duty of Candour guidelines must be followed.⁸⁶

665 Areas for Future Development

666 The following areas are suggested for further research:

- 667 • Pre-assessment services for children
- 668 • Quality Improvement in paediatric services

669 References

670 **DN:** During drafting, the references should be inserted as footnotes. When the chapters are
671 formatted for publication, these will automatically be turned into endnotes.

672 Abbreviations

673 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

⁸³ “Making decisions to limit treatment in life limiting and life threatening conditions; A framework of practice” Larcher V et al *Archives of Disease in childhood* 2015;100;s1-23-Approved RCPCH guidance

⁸⁴ From December 2016, NICE guide on end of life care for infants, children and young people:
(<https://www.nice.org.uk/guidance/indevelopment/gid-cgwave0730>)

⁸⁵ Decisions relating to Cardiopulmonary Resuscitation, BMA, RCUK and RCN, 2016
(<https://www.resus.org.uk/dnacpr/decisions-relating-to-cpr/>)

⁸⁶ Openness and honesty when things go wrong: the professional duty of candour. General Medical Council, 2015. (http://www.gmc-uk.org/static/documents/content/DoC_guidance_english.pdf)

674 **Appendix I: Recommendations Grading**

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

Recommendation Number	Level of Evidence	Strength of Recommendation
1.01	M	Mandatory
1.02	M	Strong
1.03	C	Strong
1.04	C	Strong
1.05	C	Strong
1.06	C	Strong
1.07	C	Strong
1.08	C	Strong
2.01	C	Strong
2.02	C	Strong
2.03	C	Strong
2.04	C	Strong
2.05	GPP	Strong
2.06	GPP	Strong
2.07	C	Strong
2.08	C	Strong
2.09	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
3.01	GPP	Strong
3.02	GPP	Strong
3.03	GPP	Strong
3.04	GPP	Strong
3.05	GPP	Strong
3.06	GPP	Strong
3.07	GPP	Strong
3.08	GPP	Strong
3.09	C	Strong
3.10	C	Strong
3.11	C	Strong
3.12	C	Strong

Recommendation Number	Level of Evidence	Strength of Recommendation
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
3.41	M	Strong
4.01	C	Strong
4.02	C	Strong
4.03	C	Strong
4.04	M	Mandatory
4.05	C	Strong
4.06	C	Strong
4.07	GPP	Strong
4.08	GPP	Weak
5.01	GPP	Strong
5.02	GPP	Strong
5.03	GPP	Strong
5.04	C	Strong
5.05	M	Strong
5.06	GPP	Strong
5.07	GPP	Strong
5.08	C	Strong

Recommendation Number	Level of Evidence	Strength of Recommendation
5.09	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
7.01	C	Strong
7.02	M	Strong
7.03	C	Strong
7.04	GPP	Weak
7.05	C	Strong
7.06	GPP	Strong
7.07	GPP	Strong
7.08	C	Strong
7.09	C	Strong
9.01	M	Mandatory
9.02	B	Strong
9.03	B	Strong
9.04	GPP	Strong
9.05	B	Strong
9.06	C	Strong
9.07	B	Strong
9.08	C	Strong
9.09	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

677

678

679 **About these guidelines**

680 **Methodology**

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

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

689 **Search strategy**

690 Searches were performed on Embase (1980 to 2015), Ovid MEDLINE (1946 to present), CINAHL and
691 Cochrane Library, for the literature search strategy, outcomes, databases, criteria for inclusion and
692 exclusion of evidence; please see [GPAS Supporting Documents](#) for the [Chapter Name] Chapter
693 Search Protocol. A hand search of the literature was also conducted by the authors using the
694 reference lists of relevant original articles and review articles.

695
696 The literature search was performed in September 2015.

697
698 The authors and researcher independently reviewed the abstracts and titles of the studies found in
699 the initial search. After agreement on the primary selection of papers, full text versions were
700 accessed and reviewed against the following predefined inclusion and exclusion criteria. The full text
701 papers were also reviewed by the Chapter Development Group (CDG) for suitability, the final list of
702 publications used can be found in the references.

703 **Inclusion Criteria**

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

- 706 • All patients undergoing elective or emergency anaesthesia
- 707 • All staff groups working within paediatric anaesthesia, including (but not restricted to)
708 Consultant Anaesthetists, Specialty and associate specialist (SAS) doctors, Trainee
709 Anaesthetists, Nurses, Operating Department Practitioners, Surgeons, Pharmacists, General
710 Practitioners, Radiologists and Radiographers, play specialists

711 **Exclusion Criteria**

712 The literature review used the following exclusion criteria:

- 713 • Provision of Paediatric service provided by a speciality other than anaesthesia

714 **Data extraction and analysis**

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

- 716 • the Journal and country of publication
- 717 • the number of patients recruited into the study
- 718 • the study design
- 719 • patient characteristics

- 720 • outcome data
- 721 • the logic of the argument
- 722 • author's conclusions
- 723 • reviewer's comments

724
725 The patient characteristics data extracted were; age, gender and type of surgery. The analysis
726 consider studies that included any clinical outcome, including (but not restricted to) survival, length
727 of stay - critical care or hospital, morbidity, adverse effects and complications.

728
729 The results of the literature review can be seen below:

730 **DN:** Literature results flowchart to be inserted prior to publication

731

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732 The evidence that is included in this chapter has been graded according to grading system, adapted
733 from NICE 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	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.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities		
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.
<p>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.</p>			

735 **Strengths and limitations of body of evidence**

736 Comments should be made about the quality of the evidence, including any strengths or limitations,
737 and how decisions were made between conflicting evidence. This should detail the resolution
738 method, state how often it was used and what the impact was on the recommendations. This
739 section will be in a narrative format.

740 **Methods used to arrive at recommendations**

741 Recommendations were initially drafted based on the evidence by the authors for the chapter.
742 These were discussed with the chapter development group, and comments were received both on
743 the content and the practicality of the recommendations. The level of evidence that was the basis
744 for each recommendation was graded according to a grading system, and the recommendation was
745 then graded taking into account the strength of the evidence and the clinical importance using a
746 recommendations criteria form (see GPAS Chapter Process Document). Recommendations were
747 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'
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'

748 **Consultation**

749 **DN:** to be completed prior to publication

750 The methodology section will also outline the recruitment process for CDG members and details
751 about how often they met as well as explaining the role of the PSC, peer reviewers and the general
752 public in providing input. This will explain how the peer reviewers and stakeholder organisations
753 included in the public consultation were identified, and how their views were taken into account in
754 devising the recommendations. The date range for the public consultation will also be included.

755 **The Editorial Independence of GPAS**

756 The development of GPAS is solely funded by the Royal College of Anaesthetists. However, only the
757 GPAS technical team and the GPAS researcher are paid by the College for their work on GPAS. All
758 funding decisions by the College are made by the CEO, in collaboration with the senior management
759 team and College Council.

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

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

769 **The role of PSC and the GPAS Editorial Board**

770 The overall development of the entire GPAS document is overseen by the Professional Standards
771 Committee (PSC) of the Royal College of Anaesthetists, which includes representatives from all
772 grades of anaesthetist, clinical directors and stakeholder organisations including the Association of
773 Anaesthetists of Great Britain and Ireland.

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

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

784 **Updating these guidelines**

785 This chapter will be updated for re-publication in January 2018.

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

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

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

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

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

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

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