

Chapter 3

Guidelines for the Provision of Anaesthesia Services (GPAS)

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019



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Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Authors

Dr Vishal Patil
Consultant Anaesthetist
Cambridge University Hospitals NHS
Foundation Trust
Cambridge, UK

Surg Cdr Dan Connor RN
RCoA Clinical Director Executive Group
Portsmouth, UK

Dr Suganthi Joachim
Clinical Director
Pilgrim Hospital, Boston and United
Lincolnshire Hospitals NHS Trust
Boston, UK

Dr Arnab Banerjee
Consultant Anaesthetist
Royal Liverpool and Broadgreen University
Hospital NHS Trust
Liverpool, UK

Dr Manisha Kumar
Consultant Anaesthetist
Aberdeen Royal Infirmary
Aberdeen, UK

Chapter development group members

Dr Anoop Patel
Trainee Anaesthetist
London, UK

Dr David Chambers
Trainee Anaesthetist
Cheshire, UK

Dr Gautam Kumar
Consultant Anaesthetist
University College Hospital
London, UK

Dr Wilson Thomas
Consultant Anaesthetist
Dudley Group of Hospitals NHS Foundation
Trust
Dudley, UK

Mr Paul Forsythe
Association of Physicians' Assistants
(Anaesthesia)

Mr Bob Evans
Lay representative
Royal College of Anaesthetists Lay
Committee

Professor Rupert Pearse
Professor of Intensive Care Medicine
Faculty of Intensive Care Medicine
London, UK

Mr Baljit Singh
Colorectal Surgeon
University Hospitals of Leicester
Leicester, East Midlands

Mr Alexander Harmer
Lecturer in Operating Department
Practice/Perioperative Practice
College of Operating Department
Practitioners
Cardiff, UK

Dr Nicholas Kennedy
Consultant Anaesthetist
Society for Obesity and Bariatric Anaesthesia
Taunton, UK

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Acknowledgements

Dr Andrew Hutchinson
Consultant Anaesthetist
Nottingham University Hospital NHS Trust

Dr Jonathan Mole
Consultant Anaesthetist
Nottingham University Hospital NHS Trust

Dr Craig Morris
Consultant Anaesthetist
Derby Hospitals Foundation NHS Trust

Dr Grainne Catherine O'Dwyer
Consultant Anaesthetist
United Lincolnshire Hospitals NHS Trust

Peer reviewers

Dr Milind Bhagwat
Consultant Anaesthetist
Epsom and St Heliers University Hospital

Dr Tasneem Katawala
Consultant Anaesthetist
Epsom and St Heliers University Hospital

Chapter development technical team

Dr Rachel Evley
Senior Research Fellow
University of Nottingham

Ms Ruth Nichols
Royal College of Anaesthetists

Ms Nicola Hancock
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 interests policy as described in the [GPAS Chapter Development Process Document](#).

Declarations were made as follows:

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

The nature of the involvement in all declarations made was not determined as 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.

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 a successful outcome in every case, nor should they be construed as including all proper methods of care or as 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.

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Promoting equality and addressing health inequalities

The Royal College of Anaesthetists 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 cited under 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 the need 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: guidance on the provision of anaesthesia services for preoperative assessment and preparation](#)
- [chapter 3: guidance on the provision of anaesthesia services for intraoperative care](#)
- [chapter 4: guidance on the provision of anaesthesia services for postoperative care.](#)

These guidelines apply to all patients who require anaesthesia or sedation, and who 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.

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 the delivery of inpatient pain management by anaesthesia services. The guidance is intended for use by anaesthetists with responsibilities for service delivery and by healthcare managers.

This guideline does not comprehensively describe clinical best practice relating to inpatient pain management, 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 inpatient pain management applies to all settings where this is

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

undertaken, regardless of funding arrangements. All age groups are included within the guidance unless otherwise stated, reflecting the broad nature of this service.

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 inpatient pain management. In some cases, it has been necessary to include recommendations of 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 (ACSA) process.

Scope

Objective

To describe current best practice in anaesthesia service provision for intraoperative care supported by evidence and national recommendations where available, for anaesthetists with responsibilities for service delivery and healthcare managers.

Target population

Groups that will be covered:

- all ages of patients undergoing elective or emergency anaesthesia during the period of induction of anaesthesia until the patient leaves the theatre
- provision of intraoperative services provided by the department of anaesthesia.

Groups that will not be covered:

- provision of intraoperative services provided by a specialty other than anaesthesia (i.e. when an anaesthetist is not involved in the intraoperative patient care).

Healthcare setting

All settings in which intraoperative anaesthetic services are provided (referred to through chapter as 'hospital').

Clinical management

Key components needed to ensure provision of high quality anaesthetic services within the intraoperative phase.

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 critically ill patients, morbidly obese patients, diabetic patients
- training and education
- research and audit
- organisation and administration
- patient information.

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Exclusions

Clinical guidelines specifying how healthcare professionals should care for people
National level issues.

Introduction

All patients who undergo anaesthesia or sedation are at risk of intraoperative complications during induction, maintenance, and emergence from anaesthesia, including compromise to the airway, breathing and circulation. When considering the provision of anaesthetic services in all locations in which an anaesthetist provides care to patients undergoing elective or emergency procedures, the Royal College of Anaesthetists recommends that specific areas of clinical and non-clinical care should be addressed to reduce complications and harm, improve outcomes and promote patient wellbeing. These areas include appropriate staffing, equipment, services and facilities; training and education; research and quality improvement; financial management and appropriate organisation and administration.

The effects of anaesthesia, and of the surgical procedure itself, can have profound physiological consequences for the patient and so always requires monitoring and constant attention throughout anaesthesia. The continuous presence of an appropriately trained and experienced anaesthetist, or Physicians' Assistant (Anaesthesia), is essential for patient safety during anaesthesia, along with the help of competent dedicated anaesthetic assistance at all times. Sufficient rest breaks for staff are also vital for patient safety. The skill mix of the anaesthetist should match the case mix of the operating list, with adequate support for doctors in training.

Availability of equipment, support services and other facilities need to be as per the recommended standards in this document to minimise the risks to the patient posed by anaesthesia. Monitoring needs to comply with the minimum monitoring standards, and additional monitoring should be available as required. Reliable medicine-management systems should be in place, and appropriate safety measures should be taken to minimise errors.

Anaesthetists are an essential part of the theatre team. Optimum organisation is described in the 'Preoperative Preparation' module of the NHS Institute for Innovation and Improvement 'Productive Operating Theatre' tool. This toolkit has been designed to help theatre teams work together more effectively, and to improve the quality of patient experience, the safety and outcomes of surgical services, the effective use of theatre time, and overall staff experience. If appropriate resources are not available, the level of clinical activity should be limited to ensure safe provision of intraoperative care.

Ultimately, the goal of these guidelines is to ensure a comprehensive, quality service dedicated to the care and wellbeing of patients at all times, and to the education and professional development of staff.

Recommendations

The grade of evidence and the overall strength of each recommendation are tabulated in Appendix I. These recommendations should be read in conjunction with [chapters 2 and 4](#), which detail recommendations for service provision for the other parts of the perioperative pathway.

1 Staffing Requirements

The outcomes for patients undergoing elective surgery are largely dependent on the complexity of the procedure and the associated comorbidities of the patient. Nevertheless appropriate staffing to match the skill mix to the case mix is crucial.

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

- 1.1 All anaesthetists, Physician Assistants (Anaesthesia) [PA(A)s] and anaesthetic assistants, whether permanent or locum/agency staff, should undergo an appropriate induction process, which includes the contents of relevant policies and Standard Operating Procedures.^{1,2} This should be documented.
- 1.2 The anaesthetist should be with the patient at all times while the patient is under anaesthesia. In hospitals employing PA(A)s, this responsibility may be delegated to a PA(A), supervised by a consultant anaesthetist in accordance with the scope of practice for PA(A)s.^{3,4}
- 1.3 In exceptional circumstances, anaesthetists working singlehandedly may be called on briefly to assist with or perform a life saving procedure nearby. This is a matter for individual judgement and the dedicated anaesthetic assistant should be present to monitor the unattended patient.⁴
- 1.4 Anaesthesia departments should have a nominated anaesthetist immediately available to provide cover in clinical emergencies, as well as advice and support to other anaesthetists.⁵
- 1.5 Anaesthesia departments should make arrangements to allow anaesthetists working solo during long surgical procedures or on overrunning lists to be relieved by a colleague or PA(A) for meal and comfort breaks.^{3,6}

Physicians' Assistants (Anaesthesia) (PA(A))

- 1.6 The PA(A) should work at all times within an anaesthesia team led by a consultant anaesthetist who has overall responsibility for anaesthesia care of the patient and whose name should be recorded in the individual patient's medical notes.³
- 1.7 The consultant anaesthetist should be easily contactable, and should be available to attend within two minutes of being requested by the PA(A).³
- 1.8 The supervising consultant anaesthetist should not be responsible for more than two anaesthetised patients simultaneously, where one involves supervision of a PA(A).³
- 1.9 The RCoA and Association of Anaesthetists currently do not support enhanced roles for PA(A)s until the statutory regulation for PA(A)s is in place. Where such role enhancement exists or is proposed, responsibility should be defined by local governance arrangements.³
- 1.10 Clinical governance of PA(A)s should follow the same principles as applied to medically qualified staff. This should include training that is appropriately focused and resourced, supervision and support in keeping with practitioners' needs and practice responsibilities, and practice centred audit and review processes.

Anaesthetic assistant

- 1.11 There should be a dedicated trained assistant, i.e. an operating department practitioner (ODP) or equivalent, who holds a valid registration with the appropriate regulatory body, immediately available in every location in which anaesthesia care is being delivered, whether this is by an anaesthetist or a PA(A).^{3,5}
- 1.12 Staff assigned to the role of anaesthetic assistant should not have any other duties that would prevent them from providing dedicated assistance to the anaesthetist during anaesthesia.⁵

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

2 Equipment, services and facilities

Facilities

- 2.1 The operating theatre, and anaesthetic room where available, should conform to Department of Health building standards and be appropriately maintained.⁷
- 2.2 There should be provision of an emergency call system, including an audible alarm.⁷ A visible indication of where the emergency is should also be considered.
- 2.3 The geographical arrangement of theatres, emergency departments, critical care units, cardiac care, interventional radiology and imaging facilities should allow for the rapid transfer of critically ill patients.⁷
- 2.4 Anaesthetic sites must have scavenging systems that meet the Health and Safety Executive's occupational exposure standards for anaesthetic agents.⁸
- 2.5 Appropriate blood storage facilities should be in close proximity to the operating theatre and clearly identifiable.⁷
- 2.6 Transport and distribution of blood and blood components at all stages of the transfusion chain must be under conditions that maintain the integrity of the product.⁹
- 2.7 Facilities to allow access to online information, such as electronic patient records, local guidelines and clinical decision aids, in the theatre suite should be considered.
- 2.8 Appropriate facilities for rest breaks should be provided according to defined norms.^{6,10,11,12,13}
- 2.9 Facilities for medication storage should be located and designed in a way that allows timely access when required for patient care, while maintaining integrity of the medicines and aiding organisations to comply with safe and secure storage requirements.^{14,15}
- 2.10 Access to theatres and associated clinical areas should be appropriately restricted.⁷

Support services

- 2.11 Services should be available for:
 - blood transfusion
 - radiology
 - haematology
 - clinical pathology
 - electrocardiography.
- 2.12 Near patient testing for blood sugar should be readily available for theatres.
- 2.13 Near patient testing for haemoglobin, blood gases, lactate, ketones and coagulation should be considered, particularly in areas where major blood loss is likely.¹⁶ If near patient testing is not available, laboratory testing should be readily and promptly available.
- 2.14 Decision support systems for crisis scenarios should be available, for example the advanced life support algorithm, difficult airway guidelines and major haemorrhage protocols.^{17,18}
- 2.15 Policies and equipment must be in place to protect patients and staff from cross infection, including the safe disposal of sharps¹⁹ and healthcare waste.²⁰
- 2.16 The separation of clinical and non-clinical recyclable waste should be considered.²¹

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Equipment

- 2.17 Facilities for monitoring, ventilation of patients' lungs and resuscitation, including defibrillation, should be available at all sites where patients are anaesthetised.^{4,22}
- 2.18 The following ancillary anaesthetic equipment is required for the safe delivery of anaesthesia, and should also be available at all sites where patients are anaesthetised:
- oxygen supply
 - self-inflating bag
 - facemasks
 - suction
 - airways (nasopharyngeal and oropharyngeal)
 - laryngoscopes including videolaryngoscopes and fiberoptic scopes as clinically required
 - appropriate range of tracheal tubes and connectors
 - intubation aids (bougies, forceps, etc)
 - supraglottic airways
 - heat and moisture exchange filters
 - defibrillators and equipment for external cardiac pacing²³
 - trolley/bed/operating table that can be tilted head down rapidly
 - positioning equipment²⁴ (stirrups for lithotomy, arm boards, head rest for prone positions, bariatric supports etc)
 - ultrasound imaging equipment for vascular access
 - equipment for administering a volatile free anaesthetic, including infusion pumps or volatile free anaesthetic machine and/or activated charcoal filters
 - adequate numbers and types of infusion pumps and syringe drivers available for high risk medicines.²⁵
- 2.19 Anaesthetic machines should never be able to supply a hypoxic gas mixture.²⁶
- 2.20 There should be at least one readily available portable storage unit with specialised equipment for management of the difficult airway in every theatre suite.^{27,28,29} In addition, a fiberoptic laryngoscope should also be readily available.
- 2.21 Appropriate equipment should be available to minimise heat loss by the patient and to provide active warming.³⁰
- 2.22 A fluid warmer, allowing the warmed transfusion of blood products and intravenous fluids, should be available.³¹
- 2.23 A rapid infusion device should be available for the management of major haemorrhage.
- 2.24 Equipment for placement and monitoring of local and regional blocks should be available where necessary.
- 2.25 All anaesthetic equipment should be checked before use in accordance with the Association of Anaesthetists published guidelines.³² Anaesthetic machine checks should be recorded in a log and on the anaesthetic chart.

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

- 2.26 A named anaesthetist should oversee the provision and management of anaesthetic equipment.³³
- 2.27 All anaesthetists and anaesthetic assistants should receive systematic training in the use of new equipment. This should be documented.³³
- 2.28 User manuals should be available as needed for anaesthetic equipment.³³
- 2.29 There should be a planned maintenance and replacement programme for all anaesthetic equipment.^{33,34}

Monitoring

- 2.30 The recommended standards of monitoring, by instrument or otherwise, should be met for every patient.⁴
- 2.31 The following equipment should be available:⁴
- oxygen analyser
 - device to display airway pressure whenever positive pressure ventilation is used, with alarms that warn if the pressure is too high or too low
 - vapour analyser whenever a volatile anaesthetic agent is in use
 - pulse oximeter
 - non-invasive blood pressure monitor
 - electrocardiograph
 - capnograph
 - a means of measuring the patient's temperature
 - a nerve stimulator when a neuromuscular blocking drug is used.
- 2.32 Some patients may require additional monitoring equipment. The following should be considered:⁴
- invasive pressure monitoring
 - cardiac output monitors
 - depth of anaesthesia monitoring.³⁵
- 2.33 All monitors should be fitted with audible alarms.⁴

Medication

- 2.34 All staff involved in the prescribing, dispensing, preparing, administering and monitoring of drugs must be appropriately trained.^{36,39}
- 2.35 All theatre staff involved in any aspects of medicines use should have access to up to date resources on safe preparation and administration of medicines, and access to a clinical pharmacy service for advice.^{32,35}
- 2.36 There must be a system for ordering, storage, recording and auditing of controlled drugs in all areas where they are used, in accordance with legislation.^{37,38,39,40}
- 2.37 Robust systems should be in place to ensure reliable medicines management, including storage facilities, stock review, supply, expiry checks, and access to appropriately trained pharmacy staff to manage any drug shortages.³⁶

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

2.38 All local anaesthetic solutions should be stored separately from intravenous infusion solutions, to reduce the risk of accidental intravenous administration of such drugs.⁴¹

2.39 All drug containing infusions and syringes should be clearly labelled.⁴²

3 Areas of special requirement

Children

Recommendations on the provision of anaesthesia services for children are comprehensively described in [chapter 10](#).

Obstetric patients

Recommendations on the provision of anaesthesia services for the obstetric population are comprehensively described in [chapter 9](#).

Non-peripartum pregnant patients

3.1 A policy should be in place for the management of non-peripartum pregnant patients. This should detail the involvement of the multidisciplinary obstetric team, including midwives, neonatologists and obstetricians, depending on gestational stage.⁴³

Frail older patients

With the change in population demographics, a larger number of elderly patients require operative procedures. In older patients, a decreased physiological reserve, cognitive decline, higher incidence of comorbidities and of multiple comorbidities, polypharmacy, and frailty add to the complexity of decision making and medical management. Poor cognition, hearing and eyesight may make communication difficult. Older patients are at a relatively higher risk of mortality and morbidity after elective and emergency surgery.

3.2 Multidisciplinary care improves outcomes. Protocol driven integrated pathways guide care effectively, but should be individualised to suit each patient, with emphasis on management of postoperative pain and avoidance of postoperative delirium.⁴⁴

Morbidly obese patients

Obesity is an increasingly significant health issue in the UK, with 25% of the population classed as obese, and more than 3% as Class 3 obese (previously termed morbid obesity).⁴⁵

3.3 Every hospital should nominate an anaesthetic lead for obese patients undergoing surgery.⁴⁵

3.4 Medical records should include patients' weight and body mass index.⁴⁵

3.5 The safe movement and positioning of obese patients may require additional staff and specialised equipment. An operating table, hoists, beds, positioning aids and transfer equipment appropriate for the care of obese patients should be available, and staff should be trained in its use.⁴⁵ Additional members of staff should be available where necessary, and manual handling should be minimised where possible.

3.6 Specialist positioning equipment for the induction of anaesthesia and intubation in the morbidly obese should be available.⁴⁵

3.7 There should be a policy for the clinical and technical management of the obese patient.⁴⁵

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Critically ill patients

This guideline relates only to critically ill patients undergoing procedures in theatre. General provision of critical care is outside the scope of this document. Further information can be found in the Faculty of Intensive Care Medicine and Intensive Care Society publication, '[Guidelines for the Provision of Intensive Care Services](#)'.

3.8 Critically ill patients coming to theatre should have access to ongoing organ support.⁴⁶

Diabetic patients

Diabetes affects 10–15% of the surgical population, and patients with diabetes undergoing surgery have greater complication rates, mortality rates and length of hospital stay. Modern management of the surgical patient with diabetes focuses on:⁴⁷

- thorough preoperative assessment and optimisation of their diabetes in a multiprofessional team
- deciding if the patient can be managed by simple manipulation of pre-existing treatment during a short starvation period (maximum of one missed meal) rather than use of a variable rate intravenous insulin infusion
- safe use of the latter when it is the only option.

3.9 Consideration should be given to scheduling patients with diabetes at the start of the theatre list, to minimise disruption to the patient's glycaemic control.

3.10 Hospitals should provide the services and resources required for the management of the surgical patient with diabetes, including explicit managerial and clinical policies.⁴⁷

3.11 Hospitals should consider appointing a lead anaesthetist for diabetes.

3.12 Hospitals should have clinical guidelines, including:⁴⁷

- involving patients in the management of their own diabetes
- ensuring that surgical patients with diabetes have an individualised explicit plan for managing their diabetes during the periods of starvation and surgical stress; this may require the involvement of senior anaesthetic staff and the availability of equipment to continue or institute variable-rate intravenous insulin infusions
- ensuring the prevention, and prompt recognition and treatment of hypo and hyperglycaemia, and hospital acquired diabetic ketoacidosis
- recognising that the surgical patient with diabetes is at additional risk of pressure ulcers and having policies to prevent these.

4 Training and education

4.1 Trusts should commit themselves to provide the time and resources to educate those who provide intraoperative care for patients.²

4.2 Theatre teams should undergo regular, multidisciplinary training that promotes teamwork, with a focus on human factors, effective communication and openness.²

4.3 All staff should have access to adequate time, funding and facilities to undertake and update training that is relevant to their clinical practice, including annual mandatory training such as basic life support.²

4.4 All members of the anaesthetic team should receive non-clinical training and education, which should be reflected in job plans and job planning. This might include a locally arranged

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

list of topics – for example, fire safety, consent, infection control, blood product administration, mental capacity, safeguarding children and vulnerable adults, communication skills. Some of this will be mandatory under the legislation for health and safety at work.^{48,49}

- 4.5 All trainees must be appropriately clinically supervised at all times.⁵⁰
- 4.6 All patients undergoing anaesthesia should be under the care of a consultant anaesthetist whose name is recorded as part of the anaesthetic record. A staff grade, associate specialist and specialty doctors (SAS) anaesthetist could be the named anaesthetist on the anaesthetic record if local governance arrangements have agreed in advance that, based on the training and experience of the individual doctor and the range and scope of their clinical practice, the SAS anaesthetist can take responsibility for patients themselves in those circumstances, without consultant supervision.⁵¹
- 4.7 Departments of anaesthesia should ensure that a named supervisory consultant is available to all non-consultant anaesthetists (except those SAS anaesthetists that local governance arrangements have agreed in advance are able to work in those circumstances without consultant supervision) based on the training and experience of the individual doctor and the range and scope of their clinical practice.⁵¹ Where an anaesthetist is supervised by a consultant, they should be aware of their supervisor's identity, location and how to contact them.
- 4.8 There should be induction programmes for all new members of staff, including locums. Induction for a locum doctor should include familiarisation with the layout of the hospital and the location of emergency equipment and drugs, access to guidelines and protocols, information on how to summon support/assistance, and assurance that the locum is capable of using the equipment in that hospital. All inductions should be documented.

5 Organisation and Administration

Optimum organisation is described in the 'preoperative preparation' module of the NHS Institute for Innovation and Improvement's 'Productive Operating Theatre' tool. This toolkit has been designed to help theatre teams work together more effectively to improve the quality of the patient experience, the safety and outcomes of surgical services, the effective use of theatre time and staff experience.⁵²

- 5.1 If appropriate resources are not available, the level of clinical activity should be limited to ensure safe provision of intraoperative care.⁵³
- 5.2 The theatre team should all engage in the use of the WHO surgical safety process,^{53,54} commencing with a team brief, and concluding the list with a team debrief. Debrief should highlight things done well and also identify areas requiring improvement. Teams should consider including the declaration of emergency call procedures specific to the location as part of the team brief.
- 5.3 Up to date, clear and complete information about operating lists should be available to the preoperative area, theatre and recovery area.
- 5.4 The language in all communications relating to the scheduling and listing of procedures should be unambiguous. Laterality should always be written in full, i.e. 'left' or 'right'.²
- 5.5 Any changes to the list should be agreed by all relevant parties, to ensure that the correct operation is performed on the correct side (if relevant) of the correct patient. List amendments should be clear and unambiguous. The list should be rewritten or reprinted, including the date and time of the update.

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

- 5.6 All anaesthetic records should contain the relevant portion of the recommended anaesthetic data set for every anaesthetic and be kept as a permanent document in the patient's medical record.⁵⁵

Organisation strategy and organisational culture

- 5.7 Hospitals should have a clear and explicit strategy for developing a strong safety culture that includes the following characteristics: recognition of the inevitability of errors, commitment to discuss and learn from errors, proactive identification of latent threats, and the incorporation of non-punitive systems for reporting and analysing adverse events.^{56,57}
- 5.8 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 England or the Scottish Patient Safety Programme in Scotland.⁵⁸ Organisational leaders are ultimately responsible for implementing local safety standards as necessary.²
- 5.9 The organisational culture should seek to empower health professionals to implement patients' preferences, informed by discussions around risk and benefit. Healthcare should be run from the bottom up, with ownership and decision making in the hands of professionals and patients.^{59,60,61}
- 5.10 Information relevant to front line staff concerning clinical outcomes, patient experience and productivity (such as theatre efficiency) should be readily available to them.^{61,62}
- 5.11 The organisation should ensure that patient safety concerns are addressed and that the recommendations or changes that result are fed back to procedural teams.²
- 5.12 Emergency and elective work should be separated (whenever practically feasible), to improve clinical care for patients.^{63,64}

Medical leadership structure

- 5.13 There should be clarity of leadership and roles in the supervision of the day to day running of theatres.

Day to day management of workload

- 5.14 Elective theatres should offer spare capacity (such as that resulting from cancellations) to the emergency theatres.⁶⁵ Elective cases may be cancelled to make way for emergency work if required.
- 5.15 When members of the healthcare team are involved in a critical incident, the personal impact on individual team members can be significant.⁵⁶ A team debriefing should take place after a significant critical incident. Critical incident stress debriefing by trained facilitators, with further psychological support, may assist individuals to recover from a traumatic event.⁶⁶ After a significant critical incident, the clinical director should review the immediate clinical commitments of the staff concerned promptly.
- 5.16 Hospitals should have local guidelines for when a patient dies in theatre or recovery. This should include arrangements to maintain dignity for the patient and to give relatives the best support possible. It should also include arrangements to minimise the impact on other patients being treated in the theatre complex.⁶⁶

Policies

- 5.17 Appropriate clinical policies, checklists and standard operating procedures for operating theatres should be in place.

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

5.18 The following policies should be immediately and reliably available at sites where anaesthesia and sedation are provided:

- guidelines for anaesthetic machine check³²
- guidelines on the management of anaesthetic emergencies, including anaphylaxis,^{67,68,69} malignant hyperpyrexia⁷⁰ and major haemorrhage
- periarrest and arrest algorithms¹⁷
- difficult airway management, including 'can't ventilate, can't intubate',²⁹

5.19 The following policies should be held and easily accessible for:

- WHO checklist, including time out⁵³
- 'Stop Before You Block'⁷¹
- 'Do not attempt cardiopulmonary resuscitation'⁷²
- death in theatre⁶⁶
- major incident
- infection control (including antibiotic prophylaxis, staff protection and post exposure prophylaxis)¹⁹
- prevention of hypothermia³⁰
- management of the obese patient⁴⁵
- management of the older patient⁴⁴
- major haemorrhage⁷³
- blood and blood products administration^{74,75,76}
- thromboprophylaxis (including management of patients receiving any anticoagulant therapy)^{77,78,79}
- diabetes management.⁴⁷
- handover and continuity of clinical care⁵⁷
- medicines management
- local anaesthetic toxicity.

5.20 Policies for the management of children in accordance with [chapter 10](#) should be held wherever children are anaesthetised or sedated.⁸⁰

5.21 Access to paperless guidelines through a readily available hospital intranet repository is encouraged.

Handover

Further recommendations on handover are included in [chapter 4](#).

5.22 Handover, including on moving to the postoperative care environment or to the intensive care unit, should always be to a member of staff who is competent to look after the patient at that time, and this should be clearly documented.⁸¹

5.23 Handover should be structured to ensure continuity of care.⁵⁷

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Clinical Governance

- 5.24 A system for reporting and regular audit of critical incidents and near misses is an essential part of a well-led safety structure, and there should be multiprofessional involvement in this. The methodology must be explicit and identify underlying relevant factors to inform learning and development of safe systems. All staff must recognise the duty of candour and foster a culture for reporting incidents and concerns.^{2,50,82}
- 5.25 All critical incidents should be reported.⁸³
- 5.26 Hospitals should have systems in place to facilitate multidisciplinary Morbidity and Mortality meetings.

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 the financial impact of the recommendations in this chapter being widely accepted into future practice. It is impossible to make an overall assessment of the financial impact of these recommendations with the currently available information.

The current tariffs for some of the complex major surgical procedures, particularly those done in tertiary referral centres, do not reflect the true cost incurred. Under the circumstances, the utilisation of theatre time and theatre efficiency will come under the spotlight to balance the expenses incurred versus the revenue generated.

The use of electronic health records, with their precise documentation of start times, finish times and the ability to differentiate the time taken to set the patient up for surgery versus the actual duration of the surgical procedure means that intraoperative anaesthetic practice will come under close scrutiny. As the implementation of electronic health records diffuses across the health service it is vital that anaesthetists engage with the design and standardise documentation to ensure that the data collected is valid and can be meaningfully used to generate information contributing to theatre utilisation and efficiency, and in the future to national data sets.

7 Research, audit and quality improvement

- 7.1 There should be a multidisciplinary programme for auditing intraoperative care.
- 7.2 There should be a system in place to allow reporting and regular audit of critical incidents and near misses.
- 7.3 Systematic audit should include the pattern of work in operating theatres.^{55,84}
- 7.4 Anaesthetists should be involved in audit and quality improvement cycles, preferably using a 'rapid cycle' quality improvement approach. This approach benchmarks standards of care, and may be an effective change driver. It is also an excellent way of providing evidence of good practice as defined by the GMC, and mapping the contribution that individuals make to any service within their hospitals.⁸⁵

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

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 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 patients (and relatives where appropriate and relevant) should be fully informed about the planned procedure and be encouraged to be active participants in decisions about their care. Detailed recommendations about the provision of information and consent processes are contained in the [chapter 2](#).

- 9.1 Information to patients should include what to expect in the anaesthetic room and operating theatre.⁸⁶
- 9.2 Patients from non-English speaking groups may need interpreters. Hospitals should have arrangements in place to provide language support, including interpretation and translation (including sign language and Braille). This information should comply with the NHS England 'Accessible information Standard'.⁸⁷ Patients with learning and other difficulties may need special assistance and consideration.
- 9.3 The Mental Capacity Act 2005 must be complied with.⁸⁸ Staff should have regular training in the application of the Mental Capacity Act 2005 and have defined access to patient advocates. This is a rapidly changing area, and clinicians should have access to expert advice.
- 9.4 Hospitals must have local policies in place for the identification, support and safeguarding of vulnerable adults.⁶⁰

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

9.5 Hospitals should have policies to support patients and staff of diverse religious beliefs and cultural backgrounds.⁶⁰

Areas for future development

Following the systematic review of the evidence, the following areas of research are suggested:

- utility of anaesthetic rooms
- utility of multimodal monitoring, including haemodynamic and EEG depth of anaesthesia monitoring on outcomes
- use of ethnographers in theatre to develop an understanding of why certain bundles/checklists work
- long-term follow up of intraoperative complications
- the logistics of matching complexities of surgical procedure and skills of anaesthetists, particularly as subspecialty expertise develops.
- there is significant association between poor quality of communication in the team reported during robotic surgery and poor outcome.⁸⁹ Strategies to improve communication in high complexity environments including robotic surgery are recommended for study.

Abbreviations

ACSA	Anaesthesia Clinical Services Accreditation
CDG	Chapter Development Group
CPR	Cardiopulmonary resuscitation
CQC	Care Quality Commission
EEG	Electroencephalography
GMC	General Medical Council
GPAS	Guidelines for the provision of anaesthetic services
NAP	National Audit Project
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
ODP	Operating Department Practitioner
PA(A)s	Physician Assistants (Anaesthesia)
RCoA	Royal College of Anaesthetists
SAS	Staff grade, associate specialist and specialty doctors
WHO	World Health Organization

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

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Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 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
1.01	C	Strong
1.02	C	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
1.09	C	Strong
1.10	GPP	Strong
1.11	C	Strong
1.12	C	Strong
2.01	C	Strong
2.02	GPP	Strong
2.03	C	Strong
2.04	M	Mandatory
2.05	C	Strong
2.06	M	Mandatory
2.07	GPP	Weak
2.08	C	Strong
2.09	C	Strong
2.10	GPP	Strong
2.11	GPP	Strong
2.12	B	Strong
2.13	A	Strong
2.14	M	Mandatory
2.15	C	Weak
2.16	C	Strong
2.17	C	Strong
2.18	C	Strong
2.19	B	Strong

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Recommendation Number	Level of Evidence	Strength of Recommendation
2.20	C	Strong
2.21	C	Strong
2.22	GPP	Strong
2.23	GPP	Strong
2.24	C	Strong
2.25	C	Strong
2.26	C	Strong
2.27	C	Strong
2.28	C	Strong
2.29	C	Strong
2.30	C	Strong
2.31	B	Weak
2.32	C	Strong
2.33	M	Mandatory
2.34	M	Mandatory
2.35	M	Mandatory
2.36	C	Strong
2.37	B	Strong
2.38	C	Strong
3.01	C	Strong
3.02	C	Strong
3.03	C	Strong
3.04	C	Strong
3.05	C	Strong
3.06	C	Strong
3.07	C	Strong
3.08	C	Strong
3.09	GPP	Strong
3.10	C	Strong
3.11	GPP	Weak
3.12	C	Strong
4.01	C	Strong
4.02	C	Strong
4.03	C	Strong

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Recommendation Number	Level of Evidence	Strength of Recommendation
4.04	C	Strong
4.05	M	Mandatory
4.06	C	Strong
4.07	C	Strong
4.08	GPP	Strong
5.01	C	Strong
5.02	C	Strong
5.03	GPP	Strong
5.04	C	Strong
5.05	GPP	Strong
5.06	GPP	Strong
5.07	B	Strong
5.08	C	Strong
5.09	C	Strong
5.10	C	Strong
5.11	C	Strong
5.12	C	Strong
5.13	GPP	Strong
5.14	C	Strong
5.15	B	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
5.22	C	Strong
5.23	M	Mandatory
5.24	C	Strong
5.25	GPP	Strong
7.01	GPP	Strong
7.02	GPP	Strong
7.03	C	Strong
7.04	C	Strong

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Recommendation Number	Level of Evidence	Strength of Recommendation
9.01	C	Strong
9.02	C	Strong
9.03	M	Mandatory
9.04	C	Mandatory
9.05	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 intra-anaesthetic services for patients who undergo 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 full vascular chapter search protocol please contact the 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 2017.

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. All the 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 vascular surgery, under the responsibility of an anaesthetic clinical director, including (but not restricted to) consultant anaesthetists, anaesthetists in training, nurses, operating department practitioners, surgeons, pharmacists, general practitioners, radiologists and radiographers.

Exclusion criteria

The literature review used the following exclusion criteria:

- provision of a vascular service provided by a specialty other than anaesthesia

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Data extraction and analysis

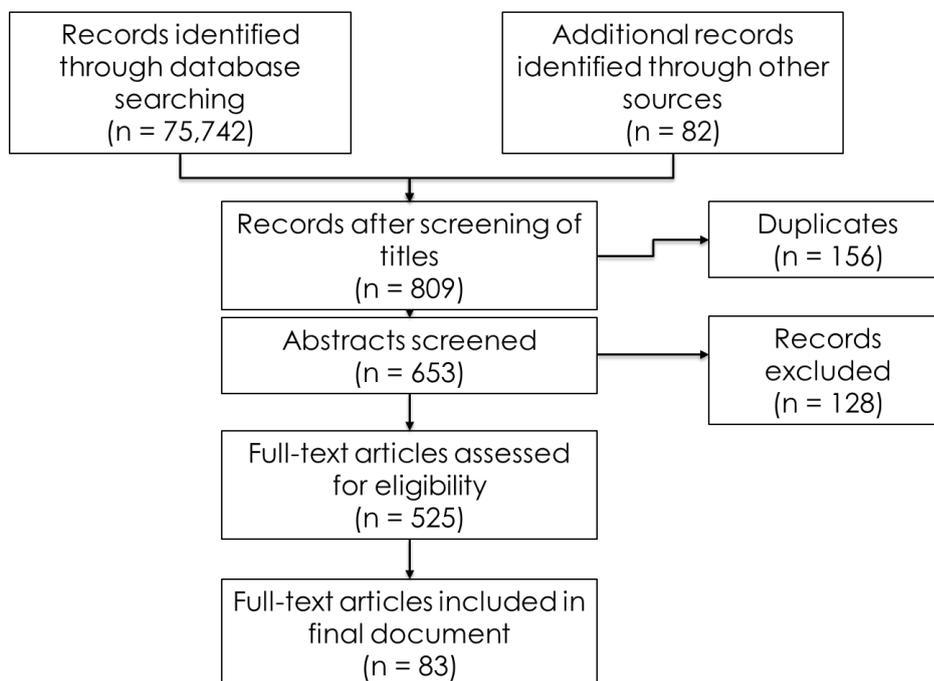
Data were extracted by the authors using a proforma. The study characteristics data included:

- 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 considers studies that included any clinical outcome, including (but not restricted to) survival, length of stay, critical care admission or hospital, morbidity, adverse effects and complications.

The results of the literature review can be seen below:

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



Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

The evidence that is included in this chapter has been graded according to grading system, adapted 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		
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 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

Strengths and limitations of body of evidence

Most of the published evidence on inpatient pain services is descriptive. There are publications describing aspects of this process based on expert opinion.

The limitations of the evidence are:

- the 'unmeasurables' (attitudes, behaviour, motivation, leadership, teamwork)
- few randomised controlled trials; studies frequently use mixed populations of emergency and elective patients, or all emergency patients grouped together despite different underlying diagnoses
- 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
- there is no standard definition used of 'high risk'
- use of different risk-scoring systems
- decrease in outcome over time and geography when 'good papers' are used in quality Improvement programmes
- application in NHS practice of international studies in systems with either more or less resources than the UK
- older studies may no longer be applicable within the NHS
- very few studies included any analysis of financial implications
- evidence was mainly based on literature graded III and IV.

Methods used to arrive at recommendations

Recommendations were initially drafted based on the evidence 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	Wording should include 'should be considered'

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

	of evidence base or patient preferences	
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'

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-

Chapter 3

Guidelines for the Provision of Anaesthesia Services for Intraoperative Care 2019

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.

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 the 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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