

Chapter 7

Guidelines for the Provision of Anaesthesia Services (GPAS)

Guidelines for the Provision of Anaesthesia Services in the Non-theatre Environment 2020



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Declarations of Interest

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

The nature of the involvement in all declarations made above 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.

Medico-legal implications of GPAS guidelines

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

Promoting equality and addressing health inequalities

The Royal College of Anaesthetists 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 to ensure services are provided in an integrated way where this might reduce health inequalities.

GPAS guidelines in context

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

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

- chapter 2: guidelines for the provision of anaesthesia services for preoperative assessment and preparation
- chapter 3: guidelines for the provision of anaesthesia services for intraoperative care

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- chapter 4: guidelines for the provision of anaesthesia services for postoperative care

These guidelines apply to all patients who require anaesthesia or sedation and are under the care of an anaesthetist. For urgent or immediate emergency interventions, this guidance may need to be modified as described in GPAS 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 service provision for anaesthetic care in the non-theatre environment. The guidance is intended for use by anaesthetists with responsibilities for service delivery and healthcare managers.

This guideline does not comprehensively describe clinical best practice in anaesthetic care in the non-theatre environment 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 anaesthetic care in the non-theatre environment applies to all settings where this is undertaken, regardless of funding. 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 for anaesthetic care in the non-theatre environment. 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

Target audience

All staff groups providing anaesthesia to patients under the care of an anaesthetists in the non-theatre environment, including (but not restricted to) consultant anaesthetists, staff grade, associate specialist and specialty(SAS) anaesthetists, anaesthetists in training, operating department practitioners (ODPs)/anaesthetic assistants and nurses.

Target population

All ages of patients undergoing anaesthesia in the non-theatre environment under the care of an anaesthetist.

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Healthcare setting

All non-theatre settings within the hospital in which anaesthesia services are provided.

Clinical management

Key components needed to ensure provision of high quality anaesthesia services in the non-theatre environment.

Areas of provision considered:

- levels of provision of service, including (but not restricted to) staffing, equipment, support services and facilities
- areas of special requirement including:
 - paediatric patients
 - the emergency department (ED)
 - the radiology department
 - interventional radiology
 - magnetic resonance imaging (MRI)
 - anaesthesia for electroconvulsive therapy (ECT)
 - anaesthesia for direct current (DC) cardioversion
 - anaesthesia for radiotherapy
 - general anaesthesia and sedation for dental procedures
 - gastrointestinal procedures.
- training and education
- research and audit
- organisation and administration
- patient information.

Exclusions

Provision of services provided by a specialty other than anaesthesia.

Patients undergoing anaesthesia within a critical care setting.

Patients undergoing anaesthesia in a non-hospital environment.

Introduction

There are increasing numbers of surgical diagnostic and therapeutic procedures performed outside of the main theatre environment. These procedures may require anaesthetic interventions through monitored care, sedation, regional anaesthesia or general anaesthesia. The challenge for anaesthesia is to develop a framework that supports and regulates the safe delivery of care.

Commercial and NHS healthcare providers are expanding non-theatre environments to deliver surgical and diagnostic procedures. The framework guidance should be applied to all non-theatre services delivered that require anaesthetic interventions.

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The complexity and challenges of providing anaesthesia care in the non-theatre environment should be acknowledged through appropriate regulation of healthcare providers and training and certification of anaesthesia providers. Personnel should be certified resuscitation providers.

Facilities delivering anaesthesia and sedation by anaesthetic providers should develop a culture of safety that reflects anaesthesia guidelines. Patients should expect uniform standards of service provision wherever the service is provided and whoever is the provider.

The development of deep sedation techniques and general anaesthesia with total intravenous anaesthesia (TIVA)/target-controlled infusion (TCI) techniques may remove the requirement for complex gas delivery systems and anaesthetic machines. The safe delivery of anaesthesia through preoperative assessment, case selection, anaesthesia delivery, recovery and post-operative care should not be compromised through cost pressures.

The physical environment can be challenging for the safe provision of anaesthesia when compared with the main theatre environment. The anaesthesia providers should develop safe practice guidelines that consider the assessment, induction, recovery and discharge of patients. In addition, procedure-specific risks such as radiation exposure and infection control should be considered. Compliance with the safe surgery checklist is obligatory. Complication management should be written into patient pathways with consideration of access to other medical, surgical and critical care services.

Recommendations

The grade of evidence and the overall strength of each recommendation are tabulated in Appendix I. If sedation is performed without an anaesthetist present, the professionals should adhere to the guidelines of their own colleges and the Academy of Medical Royal Colleges.¹

For the purpose of these guidelines, deep sedation should be held to the same standards as anaesthesia.

1 Staffing requirements

- 1.1 A clinical lead (see glossary) for anaesthesia in the non-theatre environment (ANTE) should be appointed with adequate time provided within their job plan. They should be involved in developing the service, training and revalidation of staff, and ensuring that safety standards and audit are appropriate.^{1,2}
- 1.2 A dedicated, skilled anaesthetic assistant should be available in all locations outside the operating theatre where anaesthesia is undertaken by an anaesthetist.³
- 1.3 If sedation is administered by an anaesthetist, then a suitably trained individual should be present to assist the anaesthetist.
- 1.4 If sedation is performed without an anaesthetist present, a designated, appropriately trained individual should be responsible for monitoring the patient and keeping records. This should be their sole responsibility¹ and should comply with the hospital's sedation policy.
- 1.5 Patients recovering from anaesthesia or sedation in an isolated unit should receive the same standard of care as that required in an operating theatre post anaesthetic care unit (PACU).⁴ For major vascular surgery, transfer to the main PACU by appropriately trained personnel may be required.
- 1.6 If a radiology department provides an emergency interventional service for which general anaesthesia may be required, plans for staffing this anaesthetic service should be made, particularly outside of normal working hours.^{5,6,7,8}

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2 Equipment, services and facilities

Facilities

- 2.1 Access to lifts for easy trolley transfer should be available.
- 2.2 Procedure rooms should be large enough to accommodate equipment and personnel, with enough space to move about safely and to enable easy access to the patient at all times.
- 2.3 Environments in which patients receive anaesthesia or sedation should have full facilities for resuscitation available, including a defibrillator, suction, oxygen, airway devices and a means of providing ventilation.⁹
- 2.4 The procedure room should be easily accessible to the resuscitation team and large enough to accommodate them and appropriate equipment if required.
- 2.5 It should also be possible to arrange transfer of a patient from the procedure room to other areas within the institution if necessary.
- 2.6 A PACU or equivalent should be available for each patient at the end of the procedure.
- 2.7 Facilities to allow access to online information, such as electronic patient records, local guidelines and clinical decision aids, should be available.

Equipment

- 2.8 All patient trolleys should be capable of being tipped into the head-down position and be easily transferrable to the rest of the hospital.¹⁹
- 2.9 Equipment for monitoring should be available at all sites where patients receive anaesthesia or sedation.¹⁰ For patients receiving conscious sedation, this should include pulse oximetry.
- 2.10 Continuous waveform capnography should be available for all patients undergoing general anaesthesia and moderate or deep sedation.^{10,11}
- 2.11 The anaesthetist should ensure that an adequate supply of oxygen is available before starting any procedure. Many of the sites where anaesthesia is provided outside the main operating theatres do not have piped oxygen; if anaesthesia is provided frequently in such a location, the use of the location should be reviewed or piped oxygen provided.
- 2.12 Where piped oxygen is available, back-up cylinders should always be available and appropriately stored.
- 2.13 All anaesthetic equipment should be standardised where possible in all areas providing anaesthetic services, including equipment for resuscitation and life support, and such equipment subject to a standardised programme of maintenance.
- 2.14 All staff should be provided with opportunities to familiarise themselves with all equipment by way of documented formal training sessions.
- 2.15 Equipment standards where anaesthesia is planned, including with controlled ventilation, should replicate the facilities available in the main theatre suites as outlined in chapter 3 and commensurate with local hospital anaesthetic facilities.¹⁹
- 2.16 All anaesthetic equipment should be checked before use in accordance with the Association of Anaesthetists published guidelines.¹² Anaesthetic machine checks should be recorded in a log and on the anaesthetic chart.

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2.17 All procedures should be compliant with National Safety Standards for Invasive Procedures (NatSSIPs) and the Safe Surgery Checklist.^{13,14} An appropriate 'pre list check' of the anaesthesia systems, facilities, equipment, supplies and resuscitation equipment should be performed prior to the start of each list.

Medication

2.18 Wherever anaesthesia or sedation is undertaken, a full range of emergency drugs including specific reversal agents such as naloxone, sugammadex and flumazenil should be made available.

2.19 In remote locations where anaesthesia is undertaken, drugs to treat rare situations, such as dantrolene for malignant hyperthermia, or intralipid for local anaesthetic toxicity should be immediately available and located in a designated area.

2.20 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.^{15,16,17,18,19}

2.21 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.^{19,20}

2.22 All local anaesthetic solutions should be stored separately from intravenous infusion solutions, to reduce the risk of accidental intravenous administration of such drugs.^{19,21}

2.23 All drug containing infusions and syringes should be clearly labelled.^{19,22}

Environment

2.24 The anaesthetist should consider all environmental factors when planning administration of anaesthesia or sedation.

2.25 When rooms are darkened hindering direct observation of the patient, availability of an alternative light source to record notes and observe the patient should be considered.

2.26 Appropriate equipment should be available to minimise heat loss by the patient and to provide active warming.²³

Services

2.27 Patients should be appropriately monitored during their recovery.²⁴

2.28 The care of the patient remains the responsibility of the anaesthetist up to discharge for ambulatory procedures or ward transfer for inpatient procedures.

3 Areas of special requirement

Children

Children presenting for anaesthesia outside the operating room may present challenges relating to the procedure, the environment, or physical, physiological and psychological challenges. Children may often require repeat treatments or investigations. Minor procedures and diagnostic tests may be performed with sedation techniques.

3.1 Children should always be managed in accordance with RCoA and Association of Paediatric Anaesthetists of Great Britain and Ireland recommendations.^{25,26}

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- 3.2 Each facility should develop written policies, designating the types of paediatric operative, diagnostic and therapeutic procedures requiring anaesthesia.
- 3.3 The paediatric anaesthetist should consider the patient age, physical capacity, complexity of the procedure and the status of the surgical facility before administering anaesthesia.
- 3.4 The standard of care provided to children during sedation or anaesthesia outside of theatre should be delivered to the same standards of care as applied to procedures performed in theatre.²⁷
- 3.5 Equipment available in remote sites should mirror equipment available in the main paediatric facility.
- 3.6 Guidance for paediatric sedation should be developed for the local context, by a multidisciplinary team.²⁷
- 3.7 Paediatric sedation should be managed in accordance with recognised national guidelines.²⁸

The emergency department

Patients requiring anaesthesia in the emergency department (ED) are frequently critically ill or injured. Their physiological derangement and sensitivity to anaesthetic agents, coupled with the potential for increased difficulty in tracheal intubation, requires the presence of an anaesthetist competent to manage these challenges in a timely and effective manner.²⁹

- 3.8 In a designated major trauma centre the receiving trauma team should include an anaesthetist,³⁰ and, where possible, this should be an appropriately experienced consultant.³¹
- 3.9 The safe management of unstable patients depends on close liaison between emergency physicians and anaesthetists,^{32,33} to ensure that clear guidelines are in place, emergency department support staff are trained to assist with tracheal intubation, and audit and discussion of complications is undertaken regularly.
- 3.10 Emergency airway management in the ED should follow the joint guidance from the RCoA and Royal College of Emergency Medicine (RCEM).
- 3.11 The use of an emergency induction checklist is recommended.^{32,33}
- 3.12 Many of these patients will require inter-hospital transfer to the regional trauma centre and local and national guidelines for transfer should be followed.^{34,35}
- 3.13 Transfer of patients within the hospital to the intensive care unit (ICU), radiology or the operating theatre is not without risk and will require the use of a tipping transfer trolley, oxygen cylinders, suction, a transport ventilator, infusion pumps, monitor with adequate battery life and a portable defibrillator if appropriate. Local guidelines along with use of a formal intra-hospital transfer form should be considered to mitigate procedure specific issues.
- 3.14 Procedural sedation and analgesia in the ED should follow the recommendations from the RCoA and the RCEM.³⁶

The radiology department

The frequency with which complex procedures are carried out in the radiology department is increasing. Patients requiring general anaesthesia in the radiology department may have life-threatening conditions. The radiology department represents a more challenging environment in which to provide anaesthesia compared with an operating theatre.²

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- 3.15 Exposure to ionising radiation should be kept to a minimum by the use of screens or lead gowns; remote slave monitors in screened viewing areas should be provided and staff should remain as distant from the imaging source as possible if they must remain in the x-ray environment.³⁷
- 3.16 The anaesthetist accompanying transferred patients from the ED should be suitably skilled and experienced to manage all eventualities in an isolated environment and should be accompanied by a dedicated trained assistant.³⁸
- 3.17 As not all radiology tables tilt into a head down position, a tipping trolley should be available for patients who require general anaesthesia.

Interventional radiology

- 3.18 Procedure specific agents, such as those required to manipulate coagulation, intracranial pressure or arterial blood pressure, should be available.
- 3.19 Interventional vascular radiology may involve treating unstable patients with severe haemorrhage. Such patients may include those with significant gastrointestinal bleeding or patients with post partum haemorrhage.³⁹ Equipment to deal with these patients should be immediately available. This includes that necessary to introduce and monitor a variety of intravascular catheters, rapid infusion devices, blood and fluid warming devices and patient warming devices.
- 3.20 The hospital's protocol for major haemorrhage should be available and periodically rehearsed.

Magnetic resonance imaging

National guidelines for the management of patients in the magnetic resonance (MR) suite are available.^{40,41,42}

- 3.21 Anaesthetic equipment that is used in the magnetic resonance imaging (MRI) scanning room should be MR compatible.^{2,41}
- 3.22 Remote monitoring of the patient with slave screens should be available to allow the anaesthetic team to monitor the patient from outside of the magnetic field.
- 3.23 Particular consideration should be given to the problems of using infusion pumps. All non-essential pumps and equipment should be removed from the patient before entering the magnetic field. MRI compatible infusion pumps should be available wherever anaesthesia is provided regularly. Infusions with extra-long giving sets can be used when MRI-specific pumps are not available.⁴²
- 3.24 All staff involved with transferring a patient to the MRI scanner should understand the unique problems caused by monitoring and anaesthetic equipment in this environment.⁴³ It is not acceptable for inexperienced staff unfamiliar with the MR environment to escort or manage a patient in this environment, particularly out of hours.⁴¹
- 3.25 The patient and all staff should have an MRI safety and exclusion questionnaire completed before entering the magnetic field.
- 3.26 In the event of an adverse incident in the MRI scanning room, the patient should be removed from the scanning room without delay; immediate access to an anaesthetic preparation room or resuscitation area is essential.²

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Anaesthesia for electroconvulsive therapy

- 3.27 Anaesthesia provided for electroconvulsive therapy (ECT) is frequently performed in remote locations. Ideally, a consultant or suitably experienced SAS doctor should provide general anaesthesia; the guidance provided for anaesthetic provision in remote sites should be followed.⁴⁴
- 3.28 The ECT clinic should adhere to the ECT Accreditation Service (ECTAS) or Scottish ECT Accreditation Network (SEAN) standards for administration of ECT and have been assessed and accredited by ECTAS or SEAN.
- 3.29 There should be a clinical lead (see glossary) for ECT who is responsible for provision of the service in each anaesthetic department. The named consultant should be responsible for determining the optimal location for provision of anaesthesia for patients of American Society of Anesthesiologists (ASA) Classification III or above. Contingency plans for transfer to an acute care facility should also be in place.^{44,45}
- 3.30 Anaesthetists should have specialised knowledge of the effect of concurrent medications, anaesthetic agents and anaesthetic techniques on the conduct and efficacy of ECT, as well as the specific anaesthetic contraindications.⁴⁴
- 3.31 Standards specific to ECT clinics include a minimum of four rooms: a waiting room, treatment room, recovery area and post ECT waiting area.⁴⁵ The clinic should have a reliable source of oxygen supplied either by pipeline or cylinder with a reserve supply immediately available.
- 3.32 Equipment for managing the airway, including the difficult airway, emergency drugs, resuscitation equipment and defibrillator should all be available.
- 3.33 Standards for monitoring and recovery are stipulated by the Association of Anaesthetists and should be adhered to for all ECT cases.¹⁰

Anaesthesia for direct current cardioversion

Patients requiring direct current (DC) cardioversion may present as an emergency or be elective cases. The disturbance of physiological rhythm, the reduction in cardiac performance and the risk of embolic phenomena all place these patients at risk of serious complications when undergoing both anaesthesia and DC cardioversion.

- 3.34 Precautions prior to embarking on DC cardioversion should include the immediate availability of external pacing equipment.^{1,46}
- 3.35 Facilities to check recent serum electrolytes, in particular potassium, and preferably magnesium, as well as the patient's anticoagulation status and a recent electrocardiogram (ECG) should be available prior to embarking on anaesthesia. A preprocedure echocardiogram is likely to provide useful information.⁴⁷
- 3.36 The anaesthetist should not be responsible for performing the cardioversion; an appropriately trained physician, cardiologist or supervised nurse specialist is responsible for this role. Wherever possible, the anaesthetic should be administered by an appropriately experienced anaesthetist.³¹

Anaesthesia for radiotherapy

- 3.37 Anaesthesia may be required for radiotherapy, to facilitate patient positioning and to alleviate pain. Owing to the unique nature of the procedures involved in radiotherapy, the remoteness of the location and the lack of direct access to the patient, only anaesthetists familiar with the therapy should embark on anaesthesia for these patients.^{46,48} The anaesthetic should be provided by an appropriately experienced anaesthetist.

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- 3.38 Anaesthetists should be familiar with the specific needs of patients with cancer, including the following:
- the adverse effects of high concentrations of oxygen in the presence of some antineoplastic agents, for example Bleomycin, and adjust their technique accordingly.^{49,50} Recent evidence confirms the association between unnecessarily high intraoperative FiO₂ and increased risk of major respiratory complications and 30-day mortality. Inspired oxygen levels may require adjustment to maintain an acceptable level of tissue oxygenation⁵⁰
 - the interference of nitrous oxide with vitamin B12 and folate metabolism.⁵¹
- 3.39 Patients with tumours of the lower body may be amenable to regional anaesthesia,⁴⁹ and so equipment and facilities to instigate, monitor and manage regional blockade should be available.

General anaesthesia and sedation for dental procedures

- 3.40 General anaesthesia for dentistry should be administered only by anaesthetists in a hospital setting as defined by the Department of Health report reviewing general anaesthesia and conscious sedation in primary dental care.⁵²
- 3.41 Guidelines including those published by the Association of Paediatric Anaesthetists of Great Britain and Ireland for the management of children referred for dental extractions under general anaesthesia should be followed.⁵³

Gastrointestinal procedures

Many of the initial concerns relating to the safety of patients receiving sedation and anaesthesia outside operating theatres relate to gastrointestinal endoscopy. Despite marked improvements in procedures, this is still a high risk area with problems frequently caused by inadequate oxygenation or ventilation.

Anaesthetists are not usually involved in the routine sedation of patients for endoscopy, and non-anaesthetic personnel should follow the guidance on sedation provided by their respective colleges. Anaesthetic involvement may be requested for high risk patients, or complex procedures.

- 3.42 The complexity of endoscopic techniques is increasing and patient comorbidities are challenging to operator delivered sedation. Hospitals should have a protocol for the delivery of sedation. Appropriately trained personnel should deliver these techniques and follow locally developed protocols.
- 3.43 Anaesthetic staff providing care in the endoscopy suite should be familiar with the facility, equipment and techniques.
- 3.44 Protocols should be in place to manage high risk patients, e.g. those with significant gastrointestinal bleeds within an operating theatre, especially out of hours.

4 Training and education

- 4.1 All anaesthetists should be fully familiarised with all remote areas of anaesthetic provision, e.g. as part of their induction process, prior to undertaking anaesthetic procedures in that location.⁵⁴ This 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.

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- 4.2 Anaesthetic trainees should have successfully completed the relevant higher units of training.⁵⁸
- 4.3 All anaesthetists with a job plan in non-theatre anaesthesia should be able to demonstrate continued competency through maintenance of an appropriate level of experience, and ongoing participation in relevant continuing professional development.^{1,55}
- 4.4 Difficult tracheal intubation equipment, waveform capnography and training for the management of the emergency airway should be available.^{9,56,57}
- 4.5 Sedation techniques are frequently used in the non-theatre environment along with anaesthetic techniques. Sedation is regarded as a core competency for anaesthetic practice and training/exposure should be provided to current standards at basic, intermediate and higher levels.^{2,58}
- 4.6 Hospitals should consider involving an anaesthetist in the training of non-anaesthetists in the provision of safe sedation.

5 Organisation and administration

- 5.1 Patient safety is, as always, of paramount importance, and particular attention should be paid to teamwork, communication and the use of checklists when working in less familiar environments. At the team briefing, an explicit plan should be agreed for getting help if needed, recognising the risk of, and preparing adequately for, high blood loss, and life-threatening loss of the airway or respiratory function.⁵⁹
- 5.2 Many patients undergoing elective procedures outside the operating theatre can be managed as day cases and should be assessed accordingly in conjunction with local guidelines. More complex patients require assessment to at least the same standard as that required for surgery.^{60,64}
- 5.3 Hospitals should have a system for multidisciplinary involvement in reporting and regular audit of critical incidents and near misses.
- 5.4 Environmental hazards such as radiation exposure, magnetic resonance (MR) fields and lack of a scavenging system should be considered by staff before the start of each list. Volatile agent scavenging canisters, air-oxygen mixtures and avoidance of nitrous oxide can mitigate environmental risks. Pregnant personnel may be particularly at risk in these environments and should follow local occupational health policy.
- 5.5 In remote off site locations, such as psychiatric hospitals where anaesthesia is provided for ECT, advanced plans should be made to manage patient transfer if required.
- 5.6 If there is any concern about the safety of the procedure being undertaken at a remote location, for example ECT in a psychiatric hospital, then arrangements should be made to perform the procedure in an operating theatre environment.
- 5.7 Documentation, to the standard used in the operating theatre, should be kept for all cases and this should include the grade and specialty of the doctor performing and supervising the anaesthetic along with the name of the supervising consultant designated to provide direct or indirect advice.¹⁹ Access to the electronic patient record should be available at all remote sites.
- 5.8 The department of anaesthesia should be involved in the design and planning of any service requiring the provision of anaesthesia or deep sedation.⁶¹

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- 5.9 Patients meeting discharge criteria following anaesthesia or sedation who are to be discharged home should be discharged into the care of a responsible third party. Verbal and written instructions for post-procedural care should be provided if a procedure has been performed.⁶⁴

Sedation

The RCoA recognises the definitions of minimal, moderate and deep sedation as outlined in the Academy of Medical Royal Colleges' guidance on safe sedation.¹ Deep sedation equates to anaesthesia and the recommendations outlined in chapters 2–5 should be followed.

The RCoA does not provide recommendations for sedation given by non-anaesthetists and they are encouraged to follow the guidance of their own College's and the Academy of Medical Royal Colleges.

- 5.10 A named anaesthetist should be responsible for liaising with consultants in other departments with responsibility for sedation, to establish local guidelines and training for the provision of safe sedation by non-anaesthetists.^{1,62}
- 5.11 Each facility should develop written policies, designating the types of operative, diagnostic and therapeutic procedures requiring anaesthesia or sedation.
- 5.12 Guidelines for the management of rare emergencies must be prominently displayed at all sites where sedation is administered.
- 5.13 Midazolam over sedation during sedation is defined as a 'never event' by the Department of Health.⁶³ Hospitals should report these incidents to the National Reporting and Learning System.
- 5.14 All institutions where sedation is practised should have a sedation committee. This committee should include key clinical teams using procedural sedation and there should be a nominated clinical lead for sedation. In most institutions, the sedation committee should include an anaesthetist, at least in an advisory capacity.

6 Financial considerations

Part of the methodology used in this chapter in making recommendations 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, but 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.

7 Research, audit and quality improvement

- 7.1 There should be a multidisciplinary programme for auditing anaesthesia and sedation in the non-theatre environment.
- 7.2 Audit should be under regular review by a clinical lead and those relating to sedation should be coordinated by a hospital sedation committee.
- 7.3 Regular feedback and improvement of standards should be provided to anaesthetic staff.

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- 7.4 Compliance with agreed guidelines should be audited including World Health Organization (WHO) checklists, team brief, and a post anaesthesia discharge checklist.

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

- 9.1 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. Recommendations about the provision of information and consent processes outlined in chapter 2 should be followed.⁶⁴
- 9.2 Although separate written consent for anaesthesia is not mandatory in the UK, there should be a written record of all discussions with patients undergoing sedation or anaesthesia for diagnostic procedures such as MRI scans about methods of induction, associated risks and side effects.^{1,40}
- 9.3 In cases when rolling consent is used, e.g. radiotherapy treatment, appropriate documentation should be kept as part of the patient record, including dates for review of consent. This should be included in the trust's policy on consent.
- 9.4 Information regarding planned procedures outside of the operating theatre and the requirement for sedation or anaesthesia should be given to the patient in advance of their admission. Details on fasting times and medications to continue or omit should be included. The patient needs to be aware that they require a competent adult to escort them home after receiving sedation.¹

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- 9.5 Information to patients should include what to expect in the anaesthetic room and treatment room.⁶⁵
- 9.6 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.⁶⁶ Patients with learning and other difficulties may need special assistance and consideration.
- 9.7 The relevant mental capacity legislation must be complied with.^{67,68,69} Staff should have regular training in its application and have defined access to patient advocates. This is a rapidly changing area, and clinicians should have access to expert advice.
- 9.8 Hospitals should have local policies in place for the identification, support and safeguarding of vulnerable adults.⁷⁰

Areas for future development

- A more detailed national audit of critical incidents associated with anaesthesia in the non-theatre environment should be considered.
- Paediatric surgical techniques and practices are evolving, and it is likely that the demand for out of theatre surgical procedures and radiological investigations will increase.
- The use of upright MRI scanners for claustrophobic patients as an alternative to anaesthesia or sedation is available in some hospitals. Current evidence shows that the image quality is not yet comparable to that of enclosed MRI scanners. However, with further research and improvements this may become a consideration for the future.

Abbreviations

ACSA	Anaesthesia Clinical Services Accreditation
ANTE	Anaesthesia in the non-theatre environment
CDG	Chapter Development Group
CQC	Care Quality Commission
DC	Direct current
ECT	Electroconvulsive therapy
ECTAS	ECT Accreditation Service
ED	Emergency department
GMC	General Medical Council
GP	General practitioner
GPAS	Guidelines for the Provision of Anaesthetic Services
MR	Magnetic resonance
MRI	Magnetic resonance imaging
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
PSC	Professional Standards Committee
QMSG	Quality Management of Service Group
RCoA	Royal College of Anaesthetists
RCEM	Royal College of Emergency Medicine
RCTs	Randomised controlled trials
SAS	Staff grade, associate specialist and specialty doctors
SEAN	Scottish ECT Accreditation Network

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Glossary

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

Deep sedation – Describes a state where the patient cannot easily be roused but responds purposefully to repeated or painful stimulation. It may be accompanied by clinically significant ventilatory depression. The patient may require assistance maintaining a patent airway, and positive pressure ventilation.

Immediately – Unless otherwise defined, 'immediately' means within five minutes.

Minimal sedation – Is a drug-induced state during which the patient responds normally to verbal commands. Cognitive function and physical coordination may be impaired, but airway reflexes, and ventilatory and cardiovascular functions are unaffected.

Moderate sedation – Describes a state where a purposeful response to verbal commands either alone (~ conscious sedation), or accompanied by light tactile stimulation, is maintained.

MR compatible – Equipment that is designated as MR compatible is MR safe, functions normally in the MR environment, and does not interfere with the correct operation of the MR imaging equipment providing instructions concerning its proper use are correctly followed.

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Appendix 1: Recommendations grading

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

Recommendation Number	Level of Evidence	Strength of Recommendation
1.1	C	Strong
1.2	C	Strong
1.3	C	Strong
1.4	GPP	Strong
1.5	C	Strong
1.6	C	Strong
2.1	GPP	Strong
2.2	GPP	Strong
2.3	C	Strong
2.4	GPP	Strong
2.5	GPP	Strong
2.6	GPP	Strong
2.7	GPP	Strong
2.8	C	Strong
2.9	C	Strong
2.10	B	Strong
2.11	GPP	Strong
2.12	GPP	Strong
2.13	GPP	Strong
2.14	GPP	Strong
2.15	GPP	Strong
2.16	C	Strong
2.17	C	Strong
2.18	GPP	Strong
2.19	GPP	Strong
2.20	M	Mandatory
2.21	C	Strong
2.22	C	Strong
2.23	C	Strong
2.24	GPP	Strong
2.25	GPP	Weak
2.26	C	Strong
2.27	C	Strong

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Recommendation Number	Level of Evidence	Strength of Recommendation
2.28	GPP	Strong
3.1	C	Strong
3.2	GPP	Strong
3.3	GPP	Strong
3.4	C	Strong
3.5	GPP	Strong
3.6	C	Strong
3.7	C	Strong
3.8	C	Strong
3.9	B	Strong
3.10	C	Strong
3.11	B	Strong
3.12	C	Strong
3.13	GPP	Strong
3.14	C	Strong
3.15	C	Strong
3.16	C	Strong
3.17	GPP	Strong
3.18	GPP	Strong
3.19	C	Strong
3.20	GPP	Strong
3.21	C	Strong
3.22	GPP	Strong
3.23	C	Strong
3.24	C	Strong
3.25	GPP	Strong
3.26	C	Strong
3.27	C	Strong
3.28	GPP	Strong
3.29	C	Strong
3.30	C	Strong
3.31	C	Strong
3.32	C	Strong
3.33	C	Strong
3.34	C	Strong
3.35	C	Strong

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Recommendation Number	Level of Evidence	Strength of Recommendation
3.36	C	Strong
3.37	B	Strong
3.38	B	Strong
3.39	C	Strong
3.40	C	Strong
3.41	C	Strong
3.42	GPP	Strong
3.43	GPP	Strong
3.44	GPP	Strong
4.1	C	Strong
4.2	C	Strong
4.3	C	Strong
4.4	C	Strong
4.5	C	Strong
4.6	GPP	Strong
5.1	C	Strong
5.2	C	Strong
5.3	GPP	Strong
5.4	C	Strong
5.5	GPP	Strong
5.6	GPP	Strong
5.7	C	Strong
5.8	C	Strong
5.9	C	Strong
5.10	C	Strong
5.11	GPP	Strong
5.12	GPP	Strong
5.13	C	Strong
5.14	GPP	Strong
7.1	GPP	Strong
7.2	GPP	Strong
7.3	GPP	Strong
7.4	GPP	Strong
9.1	C	Strong
9.2	C	Strong
9.3	GPP	Strong

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Recommendation Number	Level of Evidence	Strength of Recommendation
9.4	C	Strong
9.5	C	Strong
9.6	C	Strong
9.7	M	Mandatory
9.08	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 objective was to determine the key components needed to ensure provision of high-quality anaesthetic care in the non-theatre environment for patients who have undergone surgery and/or interventions which involve anaesthesia.

Search strategy

Searches were performed on Embase (1980 to 2015), Ovid MEDLINE (1946 to present), CINAHL and Cochrane Library, for the literature search strategy, outcomes, databases, criteria for inclusion and exclusion of evidence (please contact the RCoA for the anaesthesia in the non-theatre environment chapter search protocol). 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 November 2016.

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

Inclusion criteria

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

- all patients undergoing elective or emergency anaesthesia
- all staff groups working within the non-theatre environment, including (but not restricted to) consultant anaesthetists, staff grade, associate specialist and specialty (SAS) 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 services provided by a speciality other than anaesthesia
- patients undergoing anaesthesia within a critical care setting.

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Data extraction and analysis

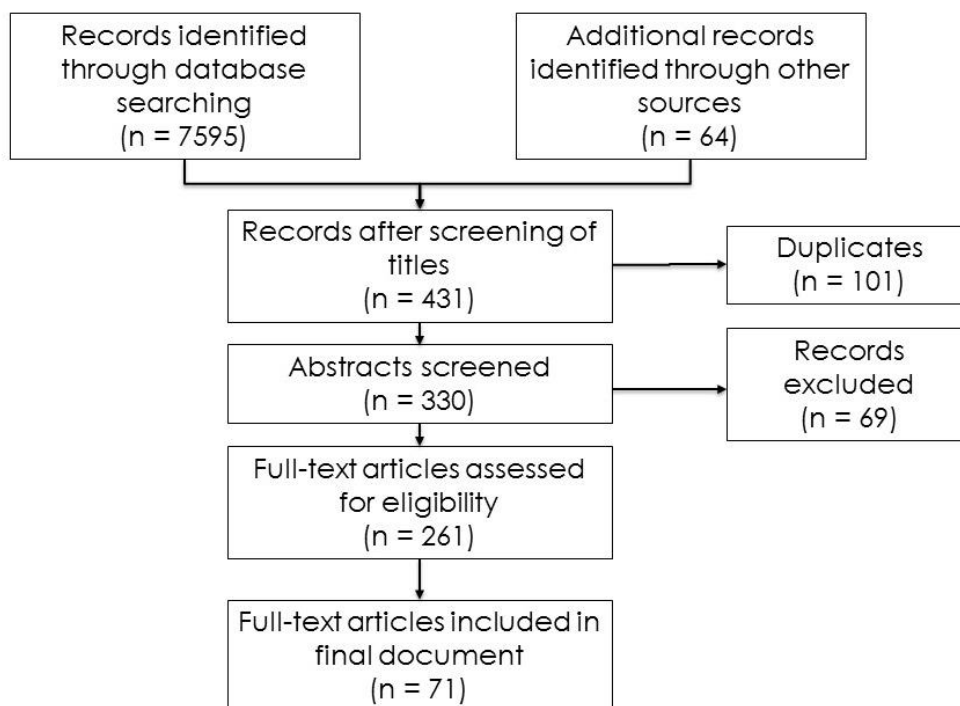
Data were extracted by the authors using a proforma. The study characteristics data included:

- 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 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



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The evidence that is included in this chapter has been graded according to a 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. How to develop cost-conscious guidelines. *Health Technology Assessment* 2001;5(16) and Mann T. Clinical guidelines: using clinical guidelines to improve patient care within the NHS. *Department of Health*, London 1996.

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Strengths and limitations of body of evidence

Most of the published evidence on anaesthesia in the non-theatre environment 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 (RCTS); 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 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 of international studies in systems with either more or less resources than the UK into NHS practice
- 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, ie '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'

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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'

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 [GPAS Chapter Development 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 authors or GPAS Editorial Board. 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 Clinical Quality and Research Board (CQRB) along with 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 15 January 2018 – 12 February 2018. As well as being made available on the College's website and promoted via Twitter and the President's newsletter to members, 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 solely 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 2 programmed activities (PA) backfill funding. All funding decisions by the College are made by the CEO, 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.

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

The role of the GPAS Editorial Board and CQRB

The overall development of the entire GPAS document is overseen by the CQRB of the Royal College of Anaesthetists, which includes representatives from all grades of anaesthetist, clinical directors and 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 re-publication in January 2021.

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

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

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

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

This chapter is due to be fully reviewed for publication in January 2023.

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.

