Chapter 5

Guidelines for the Provision of Anaesthesia Services (GPAS)

Guidelines for the Provision of Emergency Anaesthesia 2017

NICE has accredited the process used by the Royal College of Anaesthetists to produce its Guidance on the Provision of Emergency Anaesthesia Services 2016. Accreditation is valid for five years from 2016.

More information on accreditation can be viewed at www.nice.org.uk/accreditation.
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

Authors
Dr Andrew Hutchinson
Consultant Anaesthetist
Nottingham University Hospital Trust
Lead Author

Dr Craig Morris
Consultant Anaesthetist
Derby Hospitals Foundation Trust
Co-Author

Dr Ieva Saule
Locum Consultant Anaesthetist
Nottingham University Hospital Trust
Co-Author

Dr Jonathan Mole
Consultant Anaesthetist
Nottingham University Hospital Trust
Co-Author

Dr Grainne Catherine O’Dwyer
Regional Advisor
Royal College of Anaesthetists
Consultant Anaesthetist
United Lincolnshire Hospitals NHS Trust
Co-Author

Chapter Development Group members
Mr Shafi Ahmed
Consultant General Surgeon
Royal College of Surgeons
London, UK

Dr Stephanie Bew
Consultant Anaesthetist
Association of Paediatric Anaesthetists
Leeds, UK

Dr David Chambers
Specialty Registrar
Central Manchester NHS Foundation Trust

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

Dr Gerard Gould
Clinical Director
East Sussex Healthcare NHS Trust

Ms Carol Green
Lay representative
Royal College of Anaesthetists Lay Committee
Oxford, UK

Professor Mike Grocott
Consultant Anaesthetist
Faculty of Intensive Care Medicine
Southampton, UK

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

Dr Mahesh Kumar
Consultant Anaesthetist
University of Morecambe Bay Trust

Dr Rashmi Menon
Consultant Anaesthetist
Leeds Teaching Hospital NHS Trust

Dr Dave Murray
Consultant Anaesthetist
NELA Clinical Lead
Middlesbrough, UK

Dr Andy Norris
Consultant Anaesthetist
Nottingham University Hospital Trust

Dr Ellen O’Sullivan
Consultant Anaesthetist
Difficult Airway Society
Dublin, Ireland

Dr Prad Shanmugasundaram
Specialty Registrar
Oxford, UK

Dr Anne Scase
Consultant Anaesthetist
Age Anaesthesia
Coventry, UK
The Chapter Development Group was convened according to the recruitment process outlined in the GPAS Chapter Development Process Document.

Acknowledgements

GPAS Editorial Board
Professor Ravi Mahajan (Chair and Lead Editor)
Dr Simon Fletcher
Dr Andrew Hutchinson (co-opted member)
Dr David Selwyn
Professor Michael (Monty) Mythen
Professor Jaideep Pandit
Dr Peter Venn

Peer Reviewers
Dr Kevin Enright
Consultant in Emergency Medicine
Royal College of Emergency Medicine

Dr Sabeena Qureshi
Consultant Anaesthetist
Imperial College Healthcare NHS Trust

Lt Col Paul Reavley
Consultant in Emergency Medicine
Royal College of Emergency Medicine

Chapter Development Technical Team
Dr Rachel Evley
Research Fellow
University of Nottingham

Ms Polly Kwok
Royal College of Anaesthetists

Ms Carly Melbourne
Royal College of Anaesthetists

Ms Ruth Nichols
Project Co-ordinator (Sep 2015-)
Royal College of Anaesthetists

Ms Emily Young
Royal College of Anaesthetists
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

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 Guidelines for the Provision of Anaesthetic Services (GPAS) documents should be viewed as ‘living documents’. The GPAS guideline 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.

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.

The Royal College of Anaesthetists received accreditation from NICE in 2016 for the process that was used to develop this chapter. NICE accreditation helps health and social care professionals identify the most robustly produced guidance available.

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.
Declarations of interest

All chapter development group members, stakeholders and external peer reviewers were asked 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.

Declarations were made as follows:

- three authors were authors of the GPAS Anaesthesia Services for Emergency Surgery Chapter 2014
- one author held a position on the GPAS Editorial Board as a co-opted member
- one member of the chapter development group held a position as the National Clinical Lead for the National Emergency Laparotomy Audit (NELA)
- one member of the chapter development group held a position as the Chair for the NELA
- one member of the chapter development group held a position on the NICE Diagnostic Advisory Standing Committee
- one member of the chapter development group held a position as a council member of the Royal College of Surgeons
- two members of the chapter development group were authors of items of evidence
- two members of the chapter development group were involved in producing one of the items of evidence.

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.

Aims and objectives

The objective of this chapter is to describe current best practice for service provision in emergency anaesthesia. These guidelines are supported by research evidence and national recommendations where available. The guidelines are intended for anaesthetists with responsibilities for service delivery and healthcare managers.

This guideline does not comprehensively describe clinical best practice in emergency anaesthesia, but is primarily concerned with the requirements for the provision of a safe, effective, well-led service. Some examples of clinical practice are given as supporting evidence for inclusion of the recommendations for service provision.

This chapter differs from previous recommendations [Guidance on the provision of anaesthesia services for emergency surgery 2014] in that the literature search and the review process was much more rigorous than previously undertaken. It includes recommendations from more recent sources, including the National Emergency Laparotomy Audit, Association of Anaesthetists of Great Britain and Ireland Safety Guidelines, and the NHS Five year forward review.

The recommendations in this chapter will support the Royal College of Anaesthetists Anaesthesia Clinical Services Accreditation process.

The scope of this chapter is broad, and each hospital will have its own individual characteristics. There are many different acceptable models of delivering a safe effective and well led service.

This chapter frequently uses the phrase ‘anaesthesia for emergency surgery’, as this is the group of patients most frequently receiving emergency anaesthesia. In general terms, the same principles should be applied to other areas of emergency anaesthesia, such as radiology, cardiology and Emergency Departments.
Scope

Research question
The key question covered by this guideline is:
■ ‘what are the key components needed to ensure provision of high quality emergency anaesthesia services?’

There is no standard definition of ‘emergency anaesthesia’, though it is a commonly used phrase. In these recommendations, the phrase has been used to mean anaesthesia (general, regional or local anaesthetic techniques or sedation) planned to be undertaken within 24 hours. It includes, but is not limited to, anaesthesia for immediate life, limb or organ saving interventions, conditions with acute onset or deterioration that threaten life, limb or organs, and the relief of distressing symptoms.

Areas included are:
■ levels of provision of service, including [but not restricted to] staffing, equipment, support services and facilities
■ areas of special requirement, such as paediatrics and elderly care
■ training and education
■ research and audit
■ organisation and administration
■ patient information.

Emergency aspects of paediatric anaesthesia are dealt with in more detail in Guidelines for the Provision of Paediatric Anaesthesia Services 2017.

These guidelines do not include obstetrics or major trauma, which are dealt with separately in Guidelines for the Provision of Anaesthesia Services for an Obstetric Population 2017 and Guidance on the Provision of Anaesthesia Services for Trauma and Orthopaedic surgery 2016, respectively.

Target population
This chapter covers all ages of patients undergoing emergency anaesthesia and all staff groups working within emergency anaesthesia under the department of anaesthesia. Provision of emergency services provided by a specialty other than anaesthesia is not covered in this chapter.

Healthcare setting
This chapter covers all settings in which emergency anaesthetic services are provided within the hospital. Prehospital emergencies are not covered in this chapter.

Target audience
The target audience for this chapter is anaesthetists with responsibilities for service delivery and healthcare leaders and managers.

The complete definition of the scope of this chapter is available in the Scoping Document.
Introduction

The recommendations within this document describe the features of a high-quality emergency anaesthetic service, with the overall aim of improving the care received by patients. It is recognised that there are many different types of hospitals and healthcare providers in the UK and for this reason the methodology by which hospitals will implement these recommendations will vary from organisation to organisation.3

Lessons learnt from national audits, an extensive literature search and thorough process of consultation and peer review have been used to inform the development of these recommendations. Commissioners, hospitals and departments of anaesthesia should have systems in place to meet these recommendations.3

Emergency surgical service provision is important because there is a large and increasing number of patients who are admitted to hospital with acute surgical conditions. The care of emergency surgical patients is resource intensive:

- emergency general surgical patients are the largest single group of all surgical admissions to the UK NHS4
- the number of surgical emergencies will inevitably increase in the UK because of the demographic changes of an increasingly elderly population
- the cost of acute treatment is high and the long-term cost is unknown
- there is a high level of mortality and morbidity in ‘high-risk groups’.5

Patients undergoing emergency anaesthesia are a heterogeneous group. They range from relatively well patients to the complex and very ill. The outcomes of the majority of patients receiving emergency anaesthesia are good: most patients survive without serious complications and continue to have a similar quality of life to before their acute illness.

Many emergency patients may be regarded as highly vulnerable compared to patients in most other areas of medicine.

Some patients receiving emergency anaesthesia are ‘high risk’. The National Emergency Laparotomy Audit has stratified risk as ‘lower risk’, ‘higher risk’ and ‘highest risk’ by predicted mortalities of less than 5%, 5–10% and greater than 20% respectively.1 Emergency patients have high rates of mortality and complications,6,7 which are increased by delays in treatment, e.g. for emergency laparotomies, the national average mortality is 11%. Their clinical condition may be unstable, necessitating urgent assessment and treatment. There is limited opportunity to optimise a patient’s pre-operative condition because of the urgency of surgery. They are often elderly with significant pre-existing comorbidities, frailty and cognitive impairment.3,8,9,10 Typically they are in pain and frightened.

It is one of the paradoxes of modern medicine that mortality appears to be falling in patients with severe acute illness despite multiple negative research studies and no discovery of a ‘golden bullet’. This includes critical care patients,11 severe sepsis and emergency laparotomies.12 This strongly suggests improvements have been achieved through improved care pathways, increased compliance rates with these pathways and greater attention to detail.

The provision of emergency anaesthesia differs from elective anaesthesia in that it is required every day of the year and 24 hours a day. The demands on the service vary in an unpredictable manner because of the severity of illness, urgency of treatment and number of cases. The unpredictable nature of emergency anaesthesia means that, when compared to elective anaesthesia, there are greater challenges to providing a service that meets published standards of care. This unpredictable nature means that hospitals need to have flexible systems in place that can respond to variations in demand in order that appropriate standards of care are maintained. This will include sufficient capacity and capability to manage peaks of activity.

As well as reducing mortality and complications, the provision of a high quality emergency anaesthetic service should be responsive to patients’ needs and be aimed at improving patient experience.

Reduction of unnecessary deaths is one of the top NHS priorities and improvement in services for emergency patients is one of the areas highlighted for improvement.2

The NHS is facing unprecedented challenges in the provision of emergency services.2 This is likely to increase because of demographic changes of an increasingly elderly population and financial constraints.13,14 Currently national tariffs only cover approximately two-thirds of the costs of treatment for the emergency laparotomy patient.15
Within the NHS there is a significant lack of consistency in outcomes of emergency patients, in both place and time of procedure. The resources, pathways and compliance with accepted treatment also vary significantly between different hospitals, and compliance with accepted standards of care varies from day to day and at different times during the day. There should be consistency in the standards of care provided at all times and in all places. The quality of the anaesthetic services provided for emergency patients should match that provided for elective patients, and this includes the seniority of the anaesthetist.

This lack of consistency has given rise to a belief in the possibility of improvement. The removal of inequality is one of the NHS’s objectives.

Complications following emergency surgery have a major impact upon both long-term and short-term mortality, and there is a need to find and implement ways of reducing these. There is a long tail to the post-hospital discharge mortality curve, and little is known about how this may be improved. Similarly, long-term disability and its effect upon patients’ quality of life following emergency surgery are poorly studied. This presents potential opportunities for areas of further research and improvement.

‘Top down’ management approaches are severely limited in creating lasting improvements. This type of improvement is much more about sociological, cultural and behavioural change than just ‘medical technology’ or ‘yet another protocol’.

The recommendations in this chapter include the basic requirements to provide an emergency anaesthesia service, but the provision of a good quality service is much more than this. It is about creating a culture of improvement, and providing the facilities to enable this to flourish. This will not happen by accident. Integral to this is for staff to feel involved and valued.

An individual simply ‘doing his or her best’ is no longer enough. Pathways need to be developed and quality improvement programmes implemented, based upon the best available evidence. Within this, individuals can still strive for excellence, but as part of a whole team. Local and national leadership is necessary, and anaesthetists are well placed to play their part in this.

To enable patients to receive high-quality emergency anaesthesia, local and national supporting services and facilities are required, and these are outlined in these recommendations. Of particular importance is timely access to critical care, radiology and theatre.

Supporting clinical policies need to be in place, including pre-operative assessment, management of severe sepsis and postoperative care.

The Royal College of Anaesthetists has been developing the concept of the anaesthetist as the perioperative physician. Emergency anaesthesia is one of the areas where the skills of the anaesthetist can be used in this role.

Key to the delivery of a high-quality emergency anaesthesia service is adequate resourcing and finance.

**Recommendations**

The grade of evidence and the overall strength of each recommendation are tabulated in Appendix 1.
1 Staffing requirements

Patients receiving emergency anaesthesia are amongst the sickest in the hospital, and are often treated by multiple teams. It is imperative for good patient care that the nature of staffing should be sufficient in quantity, quality, seniority and skill mix for the expected workload (patient case load, case mix, and severity of illness, together with the out-of-theatre work load).26,41,42 The systems and environment within which people work and treat patients should be supportive of staff, enabling them to provide the best treatment possible.23

Anaesthesia team and theatre staff

1.1 Hospitals admitting emergency surgical patients should provide, at all times, a dedicated, fully staffed, operating theatre appropriate to the clinical workload that they accept. There should be provision to increase resources if necessary to manage fluctuating work load demands and still provide an acceptable standard of care.1,37,43

1.2 At all times, there should be an on-site anaesthetist who has the ability and training to undertake immediate clinical care of all emergency surgical patients. Explicit arrangements should be in place to provide support from additional anaesthetists appropriate to local circumstances.

1.3 The emergency anaesthesia team should be led by a consultant anaesthetist and include all medical and other healthcare professionals involved in the delivery of anaesthesia for emergency surgery.1,44 Part of this role should include liaison with other departments such as radiology, medicine and Accident and Emergency.

1.4 All patients should have a named and documented supervisory consultant anaesthetist who has overall responsibility for the care of the patient.45 A suitably trained and experienced Staff Grade, Associate Specialist and Specialty (SAS) doctor could be the named anaesthetist on the anaesthetic record if local governance arrangements have agreed in advance that the individual doctor can take responsibility for patients in the particular circumstances, without consultant supervision.

1.5 The level of staffing should be sufficient for the consultant leading the emergency anaesthesia team to be able to provide a continuous emergency anaesthesia service in the theatre complex without interruption. Other service requirements, e.g. remote sites, trauma calls and advice should be anticipated and managed through local arrangements.31 Anaesthetists assigned to provide cover for emergency lists should not also be assigned to elective work; neither should anaesthetists be assigned to undertake emergency work while also assigned to Supporting Professional Activities.46

1.6 There should be adequate staffing provision to provide trained assistance for the anaesthetist wherever anaesthesia is provided. This includes operating department practitioners or appropriately trained, registered nurses. When assigned to the role of anaesthetic assistant, they should not have other duties that would prevent them from providing dedicated assistance.47

1.7 Consideration may be given to Physicians’ Assistants (Anaesthesia) or PA(A)s working as part of a team-based approach to deliver anaesthesia. The ratio of two PA(A)s to one consultant anaesthetist has been suggested and should remain the maximum, and each PA(A) working in this way should have their own qualified assistance.47 In some emergency situations, a ratio of 1:1 may be more appropriate in view of the high incidence of comorbidities, complications and mortality.

1.8 Specialist acute pain management advice and intervention should be available. All acute hospitals providing inpatient emergency surgical services should have an acute pain service led by a consultant anaesthetist. Dedicated acute pain nurse specialists are a key part of this team.47

1.9 Patients receiving emergency anaesthesia care in a non-theatre location should be cared for by anaesthetists with the same level of competency and assistance as those receiving emergency care in the theatre environment. There should be the same access to anaesthetic equipment, monitoring, drugs and personnel as in theatre. Certain circumstances may require additional assistance, and local arrangements should allow sufficient personnel and resources to support this.47,48,49 Pragmatically, it is not feasible to have every possible piece of equipment available for every possible eventuality in every possible location. However, robust local arrangements should be in place to be able to obtain more specialised equipment and drugs promptly when necessary.
1.10 There should be sufficient administrative staff to support all aspects of the emergency anaesthesia service.\textsuperscript{31,46}

**Recovery**

1.11 Whenever emergency surgery is undertaken, the post-anaesthesia care unit should be open continuously and adequately staffed.\textsuperscript{47} Until patients can maintain their airway, breathing and circulation, they should be cared for on a one-to-one basis, with an additional member of staff available at all times.\textsuperscript{45}

1.12 Recovery staff should have immediate access to the appropriate clinician in the perioperative period, e.g. anaesthetist, surgeon, radiologist.

1.13 At least one member of the recovery staff at all times should be certified as an Immediate Life Support (ILS) provider or equivalent appropriate to area e.g. paediatrics.\textsuperscript{45} Immediate support must be available from more skilled providers.

1.14 When a critically ill patient is managed in a Post Anaesthetic Care Unit because of a critical care bed is temporarily unavailable, the primary responsibility for the patient lies with the hospital’s critical care team. The standard of nursing and medical care should be equal to that in the hospital’s critical care units.\textsuperscript{45} In some circumstances, such as a flu pandemic or a major incident involving mass casualties, this may not be possible due to a huge surge in demand, but this should be seen as exceptional rather than the accepted norm.

**Staff Health and Patient Safety**

There is a clear link between levels of engagement and wellbeing of NHS staff, and the quality of care that they are able to deliver.\textsuperscript{24,41,50,51}

1.15 Working to deliver emergency surgery is often a stressful, challenging environment. Stress, ‘burn out’ and mental ill-health are major causes of sickness absence. NHS organisations should ensure that those in leadership positions work to promote and protect the health and well-being of staff.\textsuperscript{52}

1.16 Staff should be empowered to shape their working environment and ensure their workload is not overwhelming.\textsuperscript{21}

1.17 Appropriate rest breaks during and at the end of work must be provided by departmental rostering.\textsuperscript{53} Appropriate facilities for these breaks should be provided according to defined norms.\textsuperscript{52,54} Local arrangements might apply (depending upon the nature of the emergency workload) but they should still be within the legal requirements.

1.18 Departments should review the on call responsibilities of anaesthetists as part of annual appraisal and job planning.\textsuperscript{55} Reviews should take into consideration subjective assessment of fatigue and consider seeking advice from an accredited specialist in occupational medicine if necessary. This may apply, but not exclusively, to older anaesthetists.\textsuperscript{52,56}

1.19 When members of the healthcare team are involved in a critical incident, this carries a significant personal burden.\textsuperscript{57} 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.\textsuperscript{58} After a significant critical incident, the clinical director should review promptly the clinical commitments of the staff involved. Explicit local arrangements should be in place to ensure timely individual feedback, dissemination of learning and prevention of a further similar critical incident.

1.20 There is evidence that errors are associated with increased time on task. The effect of shift patterns on work-life balance should be considered when designing rotas. Job plans, including on-call responsibilities, should be constructed such that they are not likely to lead to predictable fatigue, and should be reviewed regularly.\textsuperscript{52,59,60}
2 Equipment, services and facilities

Facilities

2.1 All theatres must be compliant with Department of Health building regulations. There should be provision of emergency call systems.

2.2 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.

2.3 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.62

2.4 Appropriate blood storage facilities should be in close proximity to the emergency operating theatre and clearly identifiable. Satellite storage facilities or a clear process for preservation of the cold chain should be in place to enable resuscitation at additional sites such as interventional radiology.

Services

General

2.5 Facilities and suitable staff to enable immediate life, limb or organ saving surgery should be available at hospitals accepting emergency surgical patients. Sites that accept patients for emergency surgery should ensure access to all core specialties and include postoperative care facilities, a full range of laboratory and radiological services and sufficient critical care capacity appropriate to the case load and case mix.3,63,64

2.6 There should be explicit arrangements made for the provision of care from specialties that are not available onsite, such as neurosurgery, cardiothoracic, vascular, ENT, maxillofacial, hepatobiliary, burns and plastic surgery.

Critical care

This guideline relates only to the provision of critical care for patients receiving emergency anaesthesia. General provision of critical care is outside of the scope of this document. Further information can be found in the Faculty of Intensive Care Medicine and Intensive Care Society 2015 publication, Guidelines for the Provision of Intensive Care Services.11

Adequate critical care facilities are integral to the care of ‘high-risk’ patients receiving emergency anaesthesia.3,11, 36, 65 It is known that patients identified as needing critical care and admitted directly from theatre have significantly better outcomes than those admitted following post-operative deterioration, e.g. from a ward.66,67,68

2.7 There should be adequate critical care facilities to allow the timely admission of high-risk general surgical patients. Pre-operative risk stratification should inform the decision-making process for critical care admission.3,69

2.8 Critical care should be considered for all patients needing emergency surgery. There should be close pre-operative liaison and communication between the surgical, anaesthetic and critical care teams, with the common goal of ensuring appropriate safe care in the best interests of the patient.37

2.9 All high-risk patients should be considered for critical care. As a minimum, patients with an estimated risk of death of ≥10% should be admitted to a critical care location (unless there is a contraindication).4 The 10% threshold for risk of death is historical and should be perceived as an absolute minimum standard. The exact percentage mortality risk that warrants critical care admission is unknown, and probably varies from condition to condition. There should be locally agreed protocols for postoperative intensive care admission. It may be, with improvements in modern intensive care, that in the future this threshold is lower than 10%. The efficacy and compliance of local intensive care admission protocols should be audited.

2.10 Hospital-level audit data should be examined to determine whether national standards for postoperative critical care admission are being adhered to. Where compliance is poor, a change of local policies and reconfiguration of services should be considered, to enable all high-risk emergency laparotomy patients to be cared for on a critical care unit after surgery.3
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

Acutely ill patients on wards

2.11 All areas, including Accident and Emergency departments, admitting acutely ill patients should have early warning pathways. Acutely ill or deteriorating emergency surgical patients on a general surgical ward need prompt recognition and definitive care, so early-warning pathways should be established that automatically trigger an appropriate response. This should include policies for early medical review and early escalation to the responsible consultant surgeon or equivalent.11,70,71,72,73

Transportation of the emergency patient

2.12 Transport of patients within the hospital and between hospitals should be undertaken in a timely manner, without unnecessary delays and in accordance with established guidelines and standards.11,75,76,77,78

2.13 Staffing needs to be of a level that emergency theatre activity and HDU/ICU patient care are not compromised when intra- and inter-hospital transfers are undertaken.75

2.14 All necessary equipment to facilitate safe transport of the patient should be available at all times.11,75,78

2.15 Where transfers between hospitals are foreseeable, e.g. transfers to Major Trauma, Neurosurgical or Paediatric Centres, local arrangements should be in place to ensure safe and timely transfer, which may involve a retrieval service. Arrangements should be in place for appropriately trained and competent staff, insurance (personal and medical indemnity), crash-test-compliant equipment, ambulance-booking procedures, procedures for receiving patients, communication between medical teams and families and documentation and procedures for repatriation of staff and equipment once the transfer and handover are completed.11,75,77

Equipment and Drugs

2.16 All areas in which emergency anaesthesia is undertaken should be adequately equipped and stocked at all times with the range of equipment and drugs required for immediate use in all types of urgent cases that might be reasonably expected in that hospital area. This would include equipment for children in hospitals accepting paediatric emergencies.

2.17 Specialist equipment and drugs that are not commonly used, or that are not time critical, should be available.

2.18 Medication errors are consistently the second highest type of errors reported in anaesthetics and so all staff involved in the prescribing, preparation, administration and monitoring of drugs must be appropriately trained.79

2.19 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. 79

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 statutory legislation.90,91,92,93

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.79

2.22 Hospitals should ensure that staff are trained and competent to use the equipment provided. Equipment should be properly maintained and replaced in a timely and planned fashion.84,85

2.23 There must be an adequate ventilation system within theatres to minimise infection and to provide the capacity for effective temperature control of the operating theatre environment.61,86

2.24 Theatre tables should be available for all types of surgery undertaken, including imaging access (carbon fibre), and adjuncts for safe positioning and transfer. Specialist tables, transfer equipment and positioning aids should be available for obese patients.87

2.25 There must be appropriate equipment available for transfer of the patient within the theatre, together with the appropriate staff trained to use it safely.84,88,89

2.26 There must be full provision of personal protective equipment and shields from blood spray, radiation and hazardous substances for all staff working in the operating theatre, and guidance on its usage.96,98,99
2.27 Near-patient testing for haemoglobin, blood gases, lactate, blood sugar and ketones should be readily available for theatres.

2.28 Near-patient testing for coagulopathy should be considered, particularly in areas where major blood loss is likely. If near patient testing is not available laboratory testing should be readily and promptly available.

2.29 A fully equipped resuscitation trolley should be available in all areas in which emergency anaesthesia is undertaken. These trolleys should be colour coded and maintain uniformity within the trust, to improve safety.

2.30 A difficult airway trolley, including the equipment necessary for failed intubation and surgical airway access, should be available in all areas in which tracheal intubation may be required.

2.31 Equipment for fibre optic intubation and video laryngoscopy should be available and properly maintained.

2.32 All necessary equipment should be available to ensure normothermia can be maintained throughout the perioperative period. Policies should be in place to facilitate and monitor the maintenance of normothermia.

2.33 A high-performance fluid-warming system should be immediately available, including one that is capable of rapid infusion, together with Standard Operating Policies to ensure its safe use.

2.34 Availability of a cell salvage system should be considered for procedures associated with a risk of blood loss exceeding 1.5 litres.

2.35 Ultrasound scanning, nerve stimulators and all equipment and drugs necessary for local and regional techniques should be available.

2.36 Equipment necessary to provide a range of patient analgesia should be available. There should be adequate facilities for postoperative monitoring of patient analgesia.

2.37 Programmable infusion devices should be available, e.g. intravenous anaesthesia, vasoactive or epidural.

**Monitoring**

Some non-anaesthetic specialists such as those in Emergency Medicine, Emergency Departments and Critical Care Medicine are trained in the use of anaesthetic drugs to enable ‘rapid sequence induction’ or emergency tracheal intubation. Trained specialists in these areas should adhere to the guidelines of their own Colleges, when using anaesthetic drugs and undertaking these procedures.

2.38 An anaesthetist should be present at all times when a patient is receiving a general anaesthetic.

2.39 Routine monitoring for anaesthesia according to AAGBI standards of monitoring should be available for all areas where anaesthesia is undertaken. Departments should follow national clinical guidelines for the use of monitoring equipment, or local guidelines when national guidelines are not available.

2.40 The alarm limits on monitors should be set appropriately, and audible alarms should not be switched off.

2.41 End-tidal carbon dioxide monitoring should be available everywhere that tracheal intubation takes place and where intubated patients are being cared for. This includes out-of-theatre areas and transfers.

2.42 Patient temperature monitoring should be available.

2.43 Equipment to monitor the depth of neuromuscular blockade should be available for patients receiving neuromuscular blocking drugs and the limitations of qualitative monitoring should be recognised.

2.44 Equipment for monitoring the depth of anaesthesia should be available for patients receiving emergency anaesthesia.

2.45 Invasive cardiovascular monitoring should be immediately available. Equipment required for goal-directed therapy should be available for all major surgery and high-risk patients.
2.46 Departments should consider developing diagnostic ultrasound skills as appropriate to emergency anaesthesia. There has been a rise in interest in point of care ultrasound and its extension into emergency anaesthesia and critical care. Diverse applications include haemodynamic assessment and monitoring with echocardiography, assessment of lung and pleura (e.g. pneumothorax or pulmonary oedema), vascular access and evaluating gastric residual volumes prior to induction anaesthesia. Evidence for benefit through routine application of ultrasound is less prevalent. NICE and their recommendations during internal jugular vein cannulation are well established and recently re-affirmed in AAGBI guidance. Several workers have demonstrated improved outcomes and altered diagnoses using echocardiography during elective preoperative assessment and considering the structural anomalies often identified this may translate to the emergency setting. There are established training pathways for anaesthetists to learn point of care ultrasound endorsed and hosted by the Intensive Care Society and endorsed by the British Society of Echocardiography.

3 Areas of special requirement

Elderly Patients

There is an increasingly elderly population presenting to hospitals for emergency surgery, reflecting the changing population demographics. In the elderly, 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 in this group of patients. Poor cognition, hearing and eyesight may make communication difficult.

The outcomes following emergency surgery for elderly patients (particularly those who require support for daily living) are worse than for younger patients. For emergency laparotomies, the mortality of a patient aged over 70 years is six times higher than that of a patient aged less than 50 years old. Functional outcomes are unpredictable, but one-third of octogenarian survivors will not recover to their pre-operative function.

General guidelines for the anaesthetic management of the elderly patient can be found in The Association of Anaesthetists of Great Britain and Ireland 2014 publication, Peri-operative Care of the Elderly 2014.

3.1 Departments should consider the appointment of a specific consultant anaesthetist to lead the anaesthetic service for the elderly.

3.2 All elderly emergency surgery patients should be serially assessed for multimorbidity, frailty and cognition.

3.3 The outcomes following emergency surgery for elderly patients (particularly patients who are either partially or wholly dependent) are considerably worse than for younger patients. Consequently, planning of care and decisions to operate require very careful consideration at a level. This should include discussion of issues around risk versus benefit, futility and realistic longer-term outcomes, e.g. requirement for nursing home care. This should also involve the multidisciplinary team, ideally with the patient, families and carers.

3.4 Failure to recognise and treat the deteriorating patient (‘failure to rescue’) has been shown to increase mortality, particularly in the elderly surgical patient, and so hospitals should have policies to prevent this. Audit should be undertaken to ensure the effectiveness and compliance of these policies.

3.5 Previous ‘do not attempt cardiopulmonary resuscitation’ (DNACPR) orders are not necessarily a contraindication to surgery and should be reviewed on a case-by-case basis by the multidisciplinary team, in discussion with the patient and next of kin, prior to anaesthesia if at all possible.

3.6 In the elderly, anaesthesia and surgery should be undertaken by senior staff with experience and expertise in this area in order to keep the duration of the operation and its physiological impact to a minimum.

3.7 Poor or inadequate analgesia contributes to postoperative morbidity in the elderly. Pain is poorly assessed and treated in the elderly, particularly in those who are cognitively impaired. Specific algorithms for the assessment of pain, and postoperative analgesia protocols, are recommended in the elderly.

3.8 Perioperative delirium/confusion is common and often under-recognised. Hospitals should have policies to recognise and manage perioperative delirium/confusion.
3.9 Care pathways and the involvement of geriatric support teams are strongly recommended. Care of older people in hospital should be delivered by staff with the right set of skills to meet their needs. For some, this will include review by a medicine for care of older people – MCOP consultant and nutritional assessment. Provision for MCOP involvement in the care of older patients should be planned over the short and long term.3,8,123

3.10 There should be planning at local and regional level for the increase in resources that will be required for elderly surgical patients.9

Paediatric emergencies
Most paediatric emergency anaesthesia is for minor surgery in previously fit and healthy children. A large proportion of this work is carried out in non-specialist hospitals, where arrangements should be in place for treating simple emergencies in children without complex co-morbidity. All anaesthetists with a CCT or equivalent should be competent to provide peri-operative care for common emergency surgical conditions in children aged 3 years and above. Emergency anaesthesia may also be required for non-surgical procedures such as magnetic resonance imaging (MRI) or computed tomography (CT) scans. Anaesthetists will often be part of the multidisciplinary team responsible for the initial resuscitation and stabilisation of the critically ill or injured child, prior to transfer to a specialist centre.

Standards for children’s services are described in Guidelines for the Provision of Paediatric Anaesthesia Services 2017.

3.11 Hospitals should define the extent of emergency surgical provision for children and the thresholds for transfer.

3.12 Emergency paediatric surgical care should be provided within a network of secondary and tertiary providers. Networks will agree standards of care and formulate care pathways for emergency surgery. Departments should participate in regular network audits of emergency surgical work.124,125,126,127

3.13 Children with severe comorbidity who require emergency anaesthesia should be treated in a specialist centre. However, if transfer is not feasible, the most appropriately experienced senior anaesthetist should undertake anaesthesia and support resuscitation and stabilisation, as part of the multidisciplinary team.128,129

3.14 Transfer of children to specialist centres is usually undertaken by regional paediatric emergency transfer services. Time-critical transfers such as neurosurgical emergencies may need to be transferred by the referring hospital. Local guidelines should be in place for the management of such transfers and the most experienced anaesthetist with appropriate skills, together with a trained assistant, should accompany the child.130,131

Morbidly obese patients
Obesity is an increasingly significant health issue in the UK, with 25% of the population classed as obese, and over 3% as Class 3 obesity (previously termed morbid obesity).87,132

3.15 Every hospital should nominate an anaesthetic lead for obese patients undergoing surgery.87,132

3.16 An operating table, hoists, beds, positioning aids and transfer equipment appropriate for the care of bariatric patients should be available and staff should be trained in its use.87,132

3.17 Specialist positioning equipment for the induction of anaesthesia and intubation in the morbidly obese should be available.87,132

3.18 Bariatric patients requiring emergency surgery should have experienced surgeons and anaesthetists (typically, but not exclusively, at a consultant level), in order to minimise operative time.87,132

3.19 Bariatric patients should be considered for level 2 or 3 critical care post-operatively.87,132

High Risk Patients including Emergency Laparotomy
While there is no standard definition of ‘high-risk’, the phrase has been applied to patients with a predicted mortality in excess of 5%.4 Many patients undergoing emergency surgery will be high risk. Those patients undergoing emergency laparotomy constitute a defined group, of whom the majority are in the ‘high-risk’ category. The National Emergency Laparotomy Audit has demonstrated an approach to auditing provision of care against national standards in order to drive improvements in care and, ultimately, patient outcomes. These principles can be applied to the care of high risk patients undergoing emergency anaesthesia.2,4,37,133,134,135
3.20 There is evidence that introduction of evidence-based care bundles for the management of emergency laparotomies can improve outcomes. Hospitals should have care bundles for the anaesthetic management of common and high-risk surgical emergency patients.

3.21 Complications have been shown to have a major impact on both short-term and long-term outcome, and so hospitals should have clinical and managerial strategies to reduce these to a minimum.

3.22 To facilitate optimal care of high-risk patients, systems should be in place to ensure:

- timely surgical review (typically at a consultant level), and access to diagnostic imaging and urgent reporting
- documented evaluation of mortality and relevant morbidity risk prior to surgery
- communication of risk to the multidisciplinary clinical team, to allow appropriate pre-operative review and allocation of resources according to risk
- patient assessment for the presence of sepsis and severe sepsis; hospitals should have in place policies for the management of sepsis, in particular the early administration of antibiotics – ‘The Sepsis Six’ is a pragmatic approach to this
- timely access to appropriate care [including resuscitation, antibiotics, interventional radiology or surgery]
- the presence of a consultant surgeon and anaesthetist in the operating theatre for patients with an estimated mortality >5% [a national recommendation]; in the UK 74% of emergency laparotomies have a consultant anaesthetist present in the operating theatre
- anaesthesia for emergency surgery is delivered by a competent individual, with appropriate supervision; the level of supervision should reflect the severity of the case and the seniority of the individual; local supervision policies should be reviewed, taking into consideration national recommendations and new evidence as it arises
- trainees are given the appropriate level of responsibility, in order to gain the experience of emergency anaesthesia to be able to function as a consultant later in their career; however, trainees must be appropriately supervised at all times – rotas and staffing arrangements should be in place to facilitate this
- The recommendation that all high-risk patients are considered for critical care is followed; as a minimum, patients with an estimated risk of death of ≥10% should be admitted to a critical care location (unless there is a contraindication). The threshold of 10% for risk of death is historical and should be perceived as an absolute minimum standard. The exact percentage mortality risk that warrants critical care admission is unknown, and probably varies from condition to condition. There should be locally agreed protocols for postoperative intensive care admission. The efficacy and compliance of local intensive care admission protocols should be audited.

3.23 Hospitals should contribute to national audits; benchmark themselves against national recommendations resulting from these audits and change practice in response to rapidly developing national guidance. Hospitals should develop local quality-improvement programmes that are responsive to local requirements. Where data are not available from national data collections, data collection should be responsive to local issues. Clinicians doing this work should be supported by hospitals and have this recognised as part of their job plan.

Diabetic Patients

An increasing number of patients presenting for emergency surgery have diabetes. These patients have a higher incidence of comorbidities and polypharmacy, which adds to the complexity of diagnosis, and decision making and their medical management. Clinical outcomes following emergency surgery for patients with diabetes are worse than for non-diabetic patients.

National clinical guidelines for the management of the patient with diabetes have recently been updated and hospital should be familiar with these updates.

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

3.25 Hospitals should consider appointing a lead anaesthetist for diabetes.
3.26 Hospitals should have mechanisms to promote early identification of the emergency surgical patient with diabetes.

3.27 Hospitals should have clinical guidelines including:

- Involving patients in the management of their own diabetes. Most diabetic patients are experts in managing their own disease, and the management of the emergency diabetic surgical patient can usually be undertaken with only minor modifications in the patient’s usual regime.
- Emergency surgery patients with diabetes should be assessed for multimorbidity and polypharmacy, and should and have an individualised explicit plan for managing their diabetes during the periods of starvation and surgical stress. This may require the involvement of consultant anaesthetic staff, multidisciplinary review, and specialist diabetic medical and nursing staff.
- The prevention and prompt recognition and treatment of hypo and hyperglycaemia, and hospital acquired diabetic keto-acidosis.
- It is now recognised that the use of a variable rate intravenous insulin infusion can be associated with death and hyponatraemia in the surgical patient. Therefore hospitals should have explicit guidelines on the safe use of variable rate intravenous insulin infusions. The use of a variable rate intravenous insulin infusion adds extra complexity to the fluid and electrolyte management of the surgical patient and this will require additional medical and nursing resources, which sometimes may be better provided in an intensive care environment rather than a surgical ward.
- To reduce the harm associated with variable rate intravenous insulin infusions, periods of starvation should be kept to a minimum. This may involve prioritisation of diabetic patients for investigations and for theatre.
- The emergency surgical patient with diabetes is at additional risk of pressure ulcers and hospitals should have policies to prevent these.

Non-obstetric emergency surgery in pregnant patients

Pregnant women may present for non-obstetric surgical emergencies, e.g. appendicitis (1 in 500–2,000 pregnancies), cholecystitis (1 in 1,600–10,000 pregnancies), intestinal obstruction, acute pancreatitis (1 in 1,000–3,000), hepatic rupture and traumatic injuries. Non-obstetric surgical emergencies in the pregnant woman present additional considerations to the non-pregnant patient. Although the primary duty of care is to the mother, fetal and maternal wellbeing are inextricably linked.

3.28 A multidisciplinary team approach is highly recommended, typically involving anaesthetists, obstetricians, surgeons, paediatricians and midwives.

3.29 Surgery should be undertaken where neonatal and paediatric services are readily available whenever possible.

3.30 Fetal heart rate monitoring should be available and local policies should outline its use taking into account fetal viability, the physical ability to perform it and availability of a healthcare provider able to intervene for fetal indications.

3.31 Informed consent for the surgical procedure should include consideration of fetal wellbeing and the possibility of caesarean delivery.

3.32 Equipment for maternal positioning and uterine displacement should be available.

3.33 Local guidance, including provision for training and audit, should be available for:

- aspiration prophylaxis
- difficult airways and failed intubation
- cardiopulmonary resuscitation in the pregnant woman and perimortem caesarean delivery
- anti-D immunoglobulin administration
- major haemorrhage and venous thromboembolism prophylaxis and sepsis
- prevention of accidental awareness during general anaesthesia
- anaesthesia and surgery in breast-feeding mothers
- safe drug administration including avoidance of codeine in breast feeding mothers.
3.34 In the event of a maternal death the case must be reported to the coroner and should be reported to MBRRACE-UK (Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK). Medical devices such as intravenous lines and endotracheal tubes should not be removed prior to post mortem. 149

Special considerations

Vulnerable adults

Many patients receiving emergency anaesthesia may be regarded, in some ways, as vulnerable. Some particular groups should be regarded as especially vulnerable, including patients with learning difficulties, mental illness, communication difficulties, drug and alcohol dependency, dementia, confusion and the elderly.

3.35 Hospitals must have local policies in place for the identification, support and safeguarding of vulnerable adults. 2,158

3.36 Staff should have regular training in the application of the legislation determining mental capacity in the part of the UK in which they are working and have defined access to Patient advocates. 129 This is a rapidly changing area and clinicians should have access to expert advice.

Diverse cultures and languages

3.37 Hospitals should have policies to support patients and staff of diverse religious beliefs and cultural backgrounds. 158

3.38 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’. 160

4 Training and education

Organisational commitments

4.1 Teamwork is fundamental to the safe delivery of patient care during the procedural pathway. Organisations should ensure, as far as possible, that procedural teams are consistent and coherent. 31

4.2 Multidisciplinary procedural teams that work together should train together. Teams should undergo regular, multidisciplinary training that promotes teamwork, with a focus on human factors, effective communication and openness. 31

4.3 Organisations should commit themselves to provide the time and resources to educate those who provide care for patients. 31

The anaesthetic team (including non-medical staff)

4.4 All staff should have access to adequate time, funding and facilities to undertake and update training that is relevant to their clinical practice, including resuscitation training. 31

4.5 Teams should train for and practise their Standard Operating Procedures for serious, complex and rare emergencies, as well as major incidents. There should be regular multidisciplinary training for emergency situations, and simulation training should be considered. 161

4.6 When new members join teams, particular care should be taken to introduce them to the teams and to ensure that their care is harmonised with that of other team members and teams. 31

4.7 Anaesthetists with a job plan that includes emergency anaesthesia should demonstrate ongoing continuing education in emergency anaesthesia, and continuing professional development as needed for this aspect of their work. Departments have a responsibility to enable this with local teaching where appropriate and by facilitating access to other education and training. 37 Hospitals should provide a comprehensive training programme and support members of the anaesthetic team in attending training on, for example, fire safety, infection control and blood product administration.
4.8 All members of the anaesthetic team must receive non-clinical training and education, reflected in job plans and job planning. This might include a local arranged list of topics, e.g. fire safety, consent, mental capacity, safeguarding children and vulnerable adults. Some of this will be mandatory under the legislation for health and safety at work.46,162

4.9 Anaesthetists must be given support and time to familiarise themselves with non-theatre locations and local working arrangements, e.g. during induction sessions.31,163

4.10 All trainees must be appropriately clinically supervised at all times.56

4.11 All patients undergoing anaesthesia should be under the care of a consultant anaesthetist, whose name is recorded as part of the anaesthetic record. A non-consultant non-trainee anaesthetist, e.g. Staff Grade, Associate Specialist and Specialty Doctors, could be 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 non-consultant non-trainee anaesthetist can take responsibility for patients themselves in those circumstances, without consultant supervision.164

4.12 Regular daytime emergency lists should be used as a teaching resource and staffed appropriately to facilitate this.165

4.13 All efforts should be made to ensure trainees receive adequate experience in emergency anaesthesia, and completion of workplace-based assessments should be supported.165

4.14 Departments of anaesthesia must ensure that a named supervisory consultant is available to all non-consultant anaesthetists, except those non-consultant non-trainee 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.164 Where a non-consultant anaesthetist is supervised, they should be aware of their supervisor’s identity, location and how to contact them.

5 Organisation and administration

Organisation strategy and organisational culture

Quality should be at the heart of every aspect of the delivery of emergency surgical care.4,21,37,69,134

5.1 The provision of a high-quality emergency service should be an explicit aim of the hospital executive and senior staff team. This should be reflected in hospital-published plans and by the provision of a management structure to support this aim.37 The required standards set out in this document apply to all organisations, but the methods used to achieve them may vary.3

5.2 Organisations should explicitly recognise the 24/7 nature of emergency work, and this requires a specific organisational approach for standards to be achieved throughout the whole of the week.

5.3 The hospital business plan should address the predicted growth in surgical emergencies, ageing population and any changes as a result of regional specialisation.12,134,166,167,168 Future planning should be based on accurate and timely data. Mathematical modelling for matching theatre demand and capacity could be beneficial.169

5.4 Each department of anaesthesia should have a plan in place for the emergency anaesthetic workload to be delivered effectively and safely.270

5.5 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.57,77,172

5.6 Hospitals in England and Wales should review their local standards to ensure that they are harmonised with the recently produced National Safety Standards for Invasive Procedures. Organisational leaders are ultimately responsible for implementing local Safety Standards for Invasive Procedures as necessary.31
5.7 The organisational culture should seek to empower health professionals to implement the 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.2,20,158,173

5.8 Information relevant to front-line staff concerning clinical outcomes, patient experience and productivity (such as theatre efficiency) should be readily available to them.2,173

5.9 The organisation must ensure that patient safety concerns are addressed and the recommendations or changes that result are fed back to procedural teams.31

5.10 Emergency and elective work should be separated (whenever practically feasible), to improve clinical care for patients.18,42

5.11 Organisations should have a service-improvement team that co-ordinates national and local projects and encourages a multidisciplinary approach to emergency surgical care, using data to provide high-quality information to drive change and support service development.3,133

5.12 Rapid and effective communication is one of the keys to good patient care. Communication strategies should consider the use of new technologies, e.g. smart phones, and standardised methodology such as Situation, Background, Assessment, Recommendation (SBAR).174

**Medical leadership structure**

5.13 Every department of anaesthesia undertaking emergency surgery should appoint a consultant clinical lead with adequate provision within their job plan and support to develop and lead emergency anaesthesia within the organisation.37 This role could include liaison with other departments.

5.14 The anaesthetic clinical lead for emergency anaesthesia should be part of a multidisciplinary team with access within the governance structure to trust board level, with explicit pathways of communication.

**Day-to-day management of emergency workload**

Access to theatres should be based on the principle that no patient should deteriorate while waiting for surgery. Unnecessary delays to accessing theatre should be actively avoided.5

5.15 There should be clarity of leadership and roles to supervise the day-to-day running of emergency theatres and the emergency anaesthesia service. Those undertaking these roles should be clearly identifiable to all working that day and easily accessible at all times.

5.16 The theatre booking system should enable the identification and prioritisation of high risk cases. Priority of access should be given to emergency patients over elective patients.4,26,43 There should be a clear policy for cancelling elective surgery to enable additional emergency theatre provision.1

5.17 The role of an ‘emergency theatre co-ordinator’ should be considered for departments with a large emergency workload, so that patient flow and prioritisation of cases can be actively managed.175

5.18 A current list of emergencies should be easily accessible to all medical and operating department staff, so that there is shared awareness of the emergency load and resource requirements, within the principles of patient confidentiality.176

5.19 The urgency of emergency cases should be clearly and unambiguously coded.18 There should be regular review of delays to facilitate improved theatre access and to promote accurate urgency coding at booking. Prioritisation of cases based on their urgency is not the sole domain of any single specialty. It requires a team approach involving discussion between different surgical groups, anaesthetists and, in some cases, critical care.18 Prioritisation should consider not only the surgical condition of the patient but also any pre-existing medical conditions such as cardiovascular or diabetic disease.

5.20 The language in all communications relating to the scheduling and listing of procedures must be unambiguous. Laterality must always be written in full, i.e. ‘left’ or ‘right’.31
5.21 Adequate emergency theatre time should be provided throughout the day to minimise delays and avoid emergency surgery being unnecessarily undertaken out of hours when the hospital may have reduced staffing to care for complex postoperative patients. Consideration should be given to consultant, or suitably experienced and trained SAS doctor, staffing of ‘twilight’ or evening emergency theatre sessions. Job plans may have to be reviewed to achieve this, depending upon local circumstances.37,42,43

5.22 Dedicated emergency lists for some individual surgical services, e.g. paediatrics, may be an effective use of resources and improve patient flow and care.42

Pre-anaesthetic assessment and preparation
Guidelines for pre-operative assessment and preparation are given in Guidelines for the Provision of Anaesthesia Services for Pre-operative Assessment and Preparation 2017.

5.23 Some aspects of pre-anaesthetic assessment and preparation of the emergency patient differ from those of the elective patient. These include severity of illness, fluctuating condition of the patient, and the 24/7 nature of emergency work. Staffing levels and seniority of anaesthetists should be adequate to enable pre-anaesthetic planning and assessment that is appropriate to the patient’s risks associated with surgery. This should be informed by a formal assessment of risk of mortality and morbidity.3,18

Pre-operative
5.24 There should be a formalised integrated pathway for unscheduled adult general surgical care which should be patient centred and include:3,4,37,42,135

■ a clear diagnostic and management plan made on admission70
■ risk assessment and identification of the high-risk patient3,4,135
■ early identification of comorbidities (including diabetes, pacemakers and internal cardiac defibrillators) and their management according to hospital guidelines
■ medicine reconciliation to assess risk of existing medications (including anticoagulation) and to assess the risk of stopping long term medication177
■ pregnancy testing as appropriate178
■ an assessment of mortality risk that is made explicit to the patient and recorded clearly on the consent form and in the medical record3
■ communication of mortality risk to members of the multidisciplinary team; this allows early senior input, including senior members of the anaesthetic team, and allocation of resources commensurate to the patient’s risk of death following surgery3,178
■ timely investigations and surgery3,4
■ a plan for post-operative care3,4

5.25 All elderly emergency surgery patients should be assessed for multimorbidity, frailty and cognitive function, and this may include MCOP teams.3,8,9

5.26 All hospitals should have guidelines in place for the recognition and management of patients with sepsis. Compliance with these policies should be regularly audited.11,108,109

5.27 An anaesthetist should pre-operatively assess all patients undergoing emergency surgery who require anaesthesia. This should take place outside of the theatre complex if possible and adequate time should be available for this to occur as clinical urgency allows.379

5.28 A full anaesthetic management plan should be recorded in the patient’s records or anaesthetic chart and initiated pre-operatively.135

5.29 The experience and expertise of the anaesthetist assessing the patient pre-operatively should be appropriate for the complexity and level of risk of the patient.46 The decision to operate on high-risk patients should be made at a senior level, involving surgeons and those who will provide intra- and post-operative care.4,118,37
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

5.30 Pre-operative assessment of patients, especially those at very high risk, can benefit from a team approach involving cross-specialty advice from anaesthetists, surgeons and intensivists. Early consultation with appropriate medical specialties should occur for appropriate conditions, e.g. acute kidney injury, diabetes mellitus and ischaemic heart disease.18

5.31 All decisions concerning the consent process and treatment plans, including decisions about whether or not to operate, should be documented clearly, noting what risks, benefits and alternatives were explained to the patient within the time constraints of emergency care.179,180 (see also section 9)

5.32 There should be a system in place for alerting medical staff to any change in the clinical condition of the emergency surgical patient whilst awaiting surgery.70,181

5.33 There should be provision for pre-operative admission of the critically ill patient to level 2 and/or level 3 care facilities for stabilisation and optimisation if required.3

5.34 Guidelines for fasting before anaesthesia for emergency surgery should comply with national standards.

5.35 Guidelines for postoperative planning should include plans for nutrition, including facilitation of enteral access or vascular access for parenteral support.182,183,184

Policies

5.36 There should be locally agreed policies for the 24-hour cover of emergency surgery, prioritisation of emergency cases according to clinical urgency, and seniority of anaesthesia staff according to patient risk.3

5.37 Appropriate clinical policies and Standard Operating Procedures for operating theatres should be in place, and should be available at all times, including a resuscitation policy and major incident plans.

5.38 All staff, including anaesthetic assistants, locum, agency and trust grade staff must have undergone an appropriate induction that includes the contents of relevant policies and Standard Operating Procedures.31

5.39 An escalation policy should be in place for all medical, healthcare professional and managerial staff. An emergency call system should be in place and understood by all relevant staff. This should include the names and method of contact, which should be prominently displayed in appropriate areas. Internal hospital telephone switchboards should have ready access to rotas and methods of contacts.

5.40 A clear method of communication between and within theatre teams, including related areas, e.g. obstetric or paediatric wards, should be in place concerning the urgency category of an emergency, escalation and who to contact.47

5.41 The World Health Organization checklist must be completed for all patients undergoing surgical or invasive procedures. An appropriate review prior to surgery, e.g. a ‘stop moment’, should be used.4,37,71,185,186

5.42 Safety requires a combination of checklists, teamwork and human factors. ‘Checklists must be conducted by teams of healthcare professionals who have trained together and who have received appropriate education in the human factors that underpin safe teamwork.31’
5.43 There should be a documented policy for the transfer of patients requiring anaesthetic supervision and care, including any additional requirements for transfers to another geographical site.75

5.44 There should be a clear process in place for the referral of patients requiring critical care, including paediatric patients, to an appropriate facility.10,70,181

5.45 Emergency theatres should ensure that policies on the following areas are readily available:

- guidelines for the management of anaesthetic emergencies displayed prominently in sites where anaesthesia and sedation are provided, including guidelines for children and difficult airway management; access to paperless guidelines through a readily accessed hospital intranet repository is encouraged
- infection control policies, including staff protection/health and safety (HIV, hepatitis, chemical)/antimicrobial prophylaxis and post-exposure prophylaxis guidelines187
- an escalation plan for theatre capacity and staffing, including a locally agreed policy for the deferment of elective activity to accommodate emergency surgical activity when required1
- clear guidelines on whom to call and what facilities can be utilised if two or more emergencies occur simultaneously
- a guideline to address death in the operating theatre58
- a documented policy for the management of organ donation and retrieval.11,188

5.46 Hospitals should have policies for the management of the airway in emergency situations, which should include fasting times, pre-anaesthetic assessment of the airway, availability and maintenance of the equipment and training of staff.96,189

5.47 Hospitals should have policies for ‘can’t ventilate’, and ‘can’t intubate’ situations, and facilities for staff training in this situation.96,189

5.48 Hospitals should have guidelines for the safe extubation of patients after emergency anaesthesia.

5.49 Clinicians undertaking emergency anaesthesia must be familiar with managing patients with a tracheostomy.96,189

5.50 Anaesthetic personnel should be aware of the increased risk of awareness in emergencies, and take the necessary steps to minimise this risk, including monitoring the depth of anaesthesia, where indicated.103,107

5.51 Utilisation of blood products should be minimised whenever possible by the employment of restrictive transfusion thresholds together with methods to minimise blood loss and allogenic transfusion.92

5.52 Hospitals must have audited policies and procedures for the administration of blood and blood components that comply with standards set out by the National Blood Transfusion Committee.190 Hospitals should have systems being in place to ensure that blood can be cross matched, issued and supplied in a timely manner.

5.53 Hospitals should have a protocol for major haemorrhage in place and this should include clinical, laboratory and logistic responses.92,100

5.54 Point-of-care coagulation testing should be considered in bleeding patients or centres where major bleeding is a regular occurrence.92

5.55 Hospitals should have a policy covering the transfer of blood products with patients to and from other hospitals.190

5.56 Thromboprophylaxis protocols: all patients should undergo venous thromboembolism risk assessment and appropriate prophylaxis methods should be employed.4,391 This should include guidance on the novel oral anticoagulants and the management of patients requiring emergency surgery who are taking them.192,393

5.57 Hospitals should have policies to promote safe care of the emergency surgical patient with diabetes.137
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

Handover
The handover of a patient’s care happens at multiple points. Effective handover is a critical component of a patient safety culture. At handover, there is potential to introduce additional risk because of a loss of information and a lack of clarity. This is of particular relevance to the care of emergency patients. There is evidence that implementing a structured handover programme is associated with reducing medical errors and preventable adverse events.

5.58 There should be agreed policies and documentation for the handover of patient care from one team to another throughout the perioperative pathway, including between shifts and multidisciplinary teams. Handover protocols should include clearly communicating and documenting the care that has been delivered and the future treatment plan for the patient. This should include DNACPR documentation if appropriate.

5.59 Organisations must create standardised documentation for patients undergoing invasive procedures that promotes the sharing of patient information between individuals and teams at points of handover, and forms a record for future reference.

5.60 There should be appropriate overlap between shift changes, to ensure adequate time for handover. Time for handover should be included in job plans and rota and accounted for in work-shift planning.

5.61 Handover of care should always be to a member of staff who is competent to look after the patient at that time.

Clinical Governance
5.62 A defined governance structure should focus on clinical outcomes, audit and regular review of practice through critical incident reporting, clinical risk management, complaints monitoring, research and development and Continuing Professional Education and Development. This should include regular discussion at Hospital Board level, executive and divisional levels and via the clinical quality review process.

5.63 Robust data collection underpins much of the success in documenting and learning from experiences. All institutions providing anaesthesia care to emergency surgery patients should collect the required data to be able to produce an annual report on a variety of relevant patient morbidity and mortality metrics, including return to theatre within 24 hours. This report should be reviewed regularly and used for organisational learning.

5.64 A system for reporting and regular audit of critical incidents and near-misses should be in place and be multiprofessional. The methodology should 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.

5.65 There must be systematic measures in place to respond to serious incidents. These measures must protect patients and ensure that robust investigations are carried out by trained safety leads. When an incident occurs, it must be reported to all relevant bodies within and without the hospital.

5.66 Organisations must have a mechanism in place for handling complaints. This should include timely full and transparent investigation and feedback to the patient and their supporters, as well as the staff involved.

5.67 Patient-reported outcomes and patient-experience measures are vital and individual organisations should ensure they have mechanisms in place to capture and monitor these and take action when required.

5.68 Hospitals should have systems in place to facilitate multidisciplinary Morbidity and Mortality meetings.

5.69 Hospitals should have an ‘at-risk register’ at departmental, divisional and board level. There should be a clear policy on its ownership and maintenance. Relevant local issues pertinent to emergency anaesthesia should be included.
6 Financial considerations

Part of the methodology used in the 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 current available information.

At present there is no tariff for the majority of emergency surgical care and funding for emergencies is less than the cost of providing the service. It is estimated that in 2012 there was a national funding reimbursement shortfall of £300 million for care of emergency laparotomy patients.15

It is recognised that the funding streams for emergencies must be reviewed. Financial sustainability is a key component of the NHS 5 year Forward View [2014].2 In order for this to happen a ‘whole-system transformation’ programme is being undertaken: this is the development of business models and economic impact assessments to support development of new care models and major service-change proposals. Without adequate, dedicated funding for emergency anaesthesia, driving up the quality of care will be difficult and variable.2,40,158

The principles laid out in this chapter of having defined care pathways for emergencies, with a strong emphasis on quality improvement programmes fit well with the NHS financial and commissioning principles.158 However, with an ageing population with more extensive co-morbidities, emergency anaesthesia and surgery are likely to increase and associated costs are likely to rise.

7 Research, audit and quality improvement

Clinical audit

It is important that audit services closely identify areas of best practice and areas where improvements can be made. Regular, systematic audit has been shown to improve outcomes.37,202,203

7.1 National-level audit of emergency surgical activity and outcome is essential, and all hospitals delivering emergency surgical care must contribute to the recognised national or other major audits of safe practice and critical incident reporting systems.161,204,205,206,207,208

7.2 Outcomes for types of emergency surgery not covered by national audits should be audited via Hospital Episode Statistics for benchmarking purposes.

7.3 Local-level audit of service provision and adherence to the national clinical standards for delivery of anaesthesia for emergency surgery should be an ongoing and important part of departmental audit activity.209

7.4 Anaesthetists should be involved in audit cycles, preferably using a ‘rapid-cycle’ quality improvement approach. These benchmark standards of care, and may be an effective change driver. This approach is 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.56,133,134,203
8 Implementation support

The Anaesthesia Clinical Services Accreditation (ACSA) scheme, run by the College, 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 College website. Every standard in ACSA is based on recommendation(s) contained in GPAS. The ACSA standards are reviewed annually and republished approximately four months following GPAS review and republication, to ensure that they reflect current GPAS recommendations. ACSA standards include links to the relevant GPAS recommendations, for departments to refer to while working through their gap analyses.

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

The QMSG 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 extension the GPAS recommendations, to ensure that they are able to be implemented by departments of anaesthesia and consider any difficulties that may result from implementation. The QMSG has committed to measuring and reporting feedback of this type from departments engaging in the scheme back to the Chapter Development Groups updating the guidance via the GPAS technical team.

9 Patient information

The basic principles of information and consent that apply to elective patients also apply to emergency patients. Both have been the subject of recent legal rulings emphasising patient autonomy, the concept of the reasonable patient, material risk and rejecting medical paternalism. For emergency patients, there are additional considerations that may make this process more complex and difficult to deliver. These include patient factors (fear, pain, analgesic drugs, pre-existing co-morbidities and frailty), disease (uncertainty of diagnosis and prognosis) and situational factors (speed of decision-making, multiple medical inputs, and uncertainty of critical care requirements). These additional issues should be understood, and taken into account when an emergency patient is given information or consent is sought. This is particularly true in vulnerable patients – patients with learning disabilities, dementia and communication difficulties.

Evidence of the efficacy and feasibility of delivery of these principles for emergency anaesthesia is limited.

9.1 Organisations should provide up-to-date, reliable information resources for patients and their relatives, e.g. based on literature available from the Royal College of Anaesthetists and AAGBI. It should include information about the process they will experience, and what their post-operative care will mean for them.

9.2 As part of a quality improvement programme, hospitals should develop a local understanding of the adequacy of their consent process and information supplied to patients undergoing emergency surgery, by proactively seeking patient feedback and allocating appropriate resources to this process.

9.3 Organisations should have clear guidance, policies and training for all staff taking consent, which is in accordance with GMC guidance. Anaesthetists must work in partnership with patients and other healthcare professionals, to ensure good care guided by the principles listed next.

- Healthcare professionals should assume patients have capacity to make decisions until assessed and proven otherwise. Clinicians must support patient autonomy in reaching decisions and should enable patients to reach decisions supported by medical advice and, where feasible, include their chosen supporter(s) or relatives.
Every effort should be made to allocate adequate time for pre-operative assessment, to allow patients to consider and reflect upon the information they are given, and adequate facility for privacy and confidentiality to be maintained, within the time constraints of delivering urgent or immediate care. Departments should include these considerations when assessing staffing requirements and development of facilities.

Reasonable care should be taken to ensure that the patient is aware of any material risks involved in any recommended treatment, and of any reasonable alternatives or varied treatments.

The information shared must be in accordance with patients' wishes, in proportion to the nature of their condition, the complexity of the proposed investigation or treatment, and the seriousness of any potential side effects, complications or other risks.

A competent adult patient has the right to refuse treatment and their refusal of treatment must ultimately be respected, even if it will result in their death or perceived harm.

The scope of the authority that has been given by an adult patient should not be exceeded, except in an emergency. In an emergency clinical situation, where it is not possible to find out a patient's wishes, a patient must be treated without their consent, provided the treatment is immediately necessary to save their life or to prevent a serious deterioration of their condition. The treatment provided should be the least restrictive of the patient's future choices.

Doctors are under no legal or ethical obligation to agree to a patient's request for treatment if they consider the treatment is not in the patient's best interests. In an emergency, the doctor must make decisions that they view to be in the best interests of the patient, using whatever information is available.

If needed, patients and/or advocates should have access to an interpreter wherever possible to facilitate communication.

Support should be made available and information given should be tailored for patients with individual or special needs, and for children.

Consent should be seen as an important part of the process of discussion and decision-making, rather than as something that happens in isolation. Assessment of capacity must be time- and decision-specific; an individual's capacity to make particular decisions may fluctuate or be temporarily affected by factors such as pain, fear, confusion, the effects of medication or intoxication by alcohol or other drugs.

Consideration should be given to assessing a patient's understanding of information given. At the end of an explanation, patients should be asked if they have any questions. Any such questions should be addressed fully and details recorded. If urgency allows, this is better undertaken in the presence of patient's relative(s) or supporter(s).

Making decisions about treatment and care for patients who lack capacity is governed in England and Wales by the Mental Capacity Act 2005 and in Scotland by the Adults with Incapacity (Scotland) Act 2000. All clinical staff must be familiar with, and apply the principles of, this legislation and receive training in assessment of mental capacity and making decisions about treatment and care for patients who lack capacity.

Organisations must ensure that provision is made for appropriate assessments to be carried out for patients whose care falls under the Deprivation of Liberty Safeguards, as specified by the Mental Capacity Act 2005. Provision must also be made for the involvement of independent mental capacity advocates.

Breaking bad news, futility and end-of-life decisions

Where interventions are unlikely to alter outcomes and may add to patient distress, this should be recognised and communicated with the patient and their relatives or supporters at the earliest opportunity.

A team approach should be considered for breaking bad news and discussions around futility and end-of-life decisions with patients and relatives.

Discussion and reasons behind decisions taken, as well as the information given to the patient and relatives, should be clearly recorded.
9.13 Hospitals should have pathways to alleviate pain and suffering, which should be individualised to the needs of the patient and discussed with their relatives or supporters.224

9.14 Hospitals should have local guidelines for when a patient dies in theatre or soon after in 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.58

9.15 Hospitals should offer the same level of access for discussion and explanation to relatives of patients who die in the theatre complex, or don’t undergo surgery, as those who die in critical care.

9.16 Where end-of-life care is instituted, this should be in accordance with national and local guidance and audited for quality in the same way that surgical care is audited.225

9.17 Hospitals should have a DNACPR guidance and documentation that complies with national requirements. 98, 226

9.18 Patients who may require surgical procedures with DNACPR decisions in place should have senior members of the anaesthetic and surgical team (typically at a consultant level) review the condition of the patient and the DNACPR status. Where feasible, a discussion should take place with the patient and their next of kin and it may be appropriate to suspend components of a DNACPR decision, e.g. tracheal intubation, to allow surgery to safely proceed.121,227

Areas for future development

Recommendations for further research

Following the systematic review of the literature, the following areas for future research are suggested. Though these recommendations apply to all emergency patients they are particularly pertinent to the elderly.9, 228

- research including longer-term follow-up to assess post-discharge complications and readmission rates. Where morbidity and mortality are measured, this should be over at least six months. (Most of the research studies measure 30-day or in-hospital mortality, but the few studies that have looked at longer-term mortality show a long ‘tail’ to the post-discharge mortality curve)
- research that includes patient-centred outcomes, particularly addressing longer-term issues such as admission to a residential care facility, residual cardiovascular morbidity, difficulties with stoma and tracheostomy care and the impact of post-operative complications
- research on the impact of rehabilitation on medium and longer term mortality, morbidity and patient centred outcomes
- definition of high-risk (and low-risk) emergency surgical patients
- calibration and validation of risk assessment tools, including predictive values for case sensitivity versus specificity, with the outcomes being patient centred
- research on the impact of changes in population demographics, for example the ageing population, upon the future resources that will be required
- further research on the use of care bundles, particularly looking at outcomes from care bundles compared to single interventions
- research considering consent in the emergency context
- training methodology and the place of simulation
- the costing of emergency surgery, including critical care services, cancellation or delay of elective work and care post-hospital discharge.
Guidelines for the Provision of Anaesthesia Services (GPAS) 2017

Recommendations for local audit

- Scheduled reports e.g. National Confidential Enquiry into Patient Outcome and Death (NCEPOD), National Emergency Laparotomy Audit (NELA)
- Participation in local and national audit of risk-adjusted mortality and morbidity
- Variation in work patterns, resource allocation, efficiency, systems of care

Glossary

Emergency anaesthesia - anaesthesia planned to be undertaken within less than 24 hours. It includes, but is not limited to, anaesthesia for immediate life-saving or limb- or organ-saving interventions; conditions with acute onset or deterioration that threaten life, limb or organs; and the relief of distressing symptoms.

Drugs – the word ‘drug’ is used to include all medicinal products including medications, inhalational agents, fluids, certain dressings, and external medicines.
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

References

Guidelines for the Provision of Anaesthesia Services (GPAS) 2017


46 Working Arrangements for Consultant Anaesthetists in The United Kingdom.

47 The Anaesthesia Team.


49 Guidelines for the provision of Anaesthesia services for care in the non-theatre environment.


60 Facilities for surgical procedures: Volume 1 (HBN 26).


81 Misuse of Drugs Act 1971.

Chapter 5

Guidelines for the Provision of Emergency Anaesthesia 2017

104 Guidance on the provision of anaesthesia services for acute pain management. RCoA, London 2017 [www.rcoa.ac.uk/qaas].
111 Grocott MP et al. Perioperative increase in global blood flow to explicit defined goals and outcomes following surgery. The Cochrane Library, 2012.
154 Depth of anaesthesia monitors – Bispectral Index (BIS), E-Entropy and Narcotrend-Compact M.
159 Mental Capacity Act 2005 (c.9).
161 Accessible Information Standard.
162 Job Planning.
163 Supervision of SAS and other non-consultant anaesthetists in NHS hospitals.
164 CCT in Anaesthetics: Annex B – Basic Level Training.
Chapter 5  
Guidelines for the Provision of Emergency Anaesthesia 2017

193 Choi S, Douketis JD. Management of patients who are receiving warfarin or a new oral anticoagulant and require urgent or emergency surgery. Polskie Archiwum Medycyny Wewnętrznej 2012;122:437–442.
197 Serious Incident Framework.
210 McCrimbe K, Bogod D. Paternalism and consent: has the law finally caught up with the profession? Anaesth 2015;70(9):1016–1019.
217 R (the application of Oliver Leslie Burke) v General Medical Council (defendant) and Ors [2005] EWCA Civ 1003 [http://bit.ly/1VkmJl9].
Guidelines for the Provision of Anaesthesia Services (GPAS) 2017

## 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:

<table>
<thead>
<tr>
<th>Recommendation number</th>
<th>Level of evidence</th>
<th>Strength of recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>1.2</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>1.3</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>1.4</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.5</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.6</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.7</td>
<td>C</td>
<td>Weak</td>
</tr>
<tr>
<td>1.8</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.9</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.10</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.11</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.12</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>1.13</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.14</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.15</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.16</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.17</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>1.18</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.19</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>1.20</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.1</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>2.2</td>
<td>GPP</td>
<td>Weak</td>
</tr>
<tr>
<td>2.3</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>2.4</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>2.5</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.6</td>
<td>GPP</td>
<td>Weak</td>
</tr>
<tr>
<td>2.7</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.8</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.9</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.10</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.11</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.12</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.13</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.14</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.15</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>Recommendation number</td>
<td>Level of evidence</td>
<td>Strength of recommendation</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>2.16</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>2.17</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>2.18</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>2.19</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.20</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>2.21</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.22</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.23</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>2.24</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.25</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>2.26</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>2.27</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>2.28</td>
<td>C</td>
<td>Weak</td>
</tr>
<tr>
<td>2.29</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.30</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.31</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.32</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>2.33</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>2.34</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.35</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>2.36</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.37</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>2.38</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.39</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>2.40</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>2.41</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>2.42</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>2.43</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>2.44</td>
<td>C</td>
<td>Weak</td>
</tr>
<tr>
<td>2.45</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>2.46</td>
<td>C</td>
<td>Weak</td>
</tr>
<tr>
<td>3.1</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.2</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>3.3</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.4</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>3.5</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.6</td>
<td>B</td>
<td>Strong</td>
</tr>
</tbody>
</table>
### Chapter 5
#### Guidelines for the Provision of Emergency Anaesthesia 2017

<table>
<thead>
<tr>
<th>Recommendation number</th>
<th>Level of evidence</th>
<th>Strength of recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>3.8</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.9</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.10</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.11</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>3.12</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.13</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.14</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>3.15</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.16</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.17</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.18</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.19</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.20</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>3.21</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>3.22</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>3.23</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>3.24</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.25</td>
<td>GPP</td>
<td>Weak</td>
</tr>
<tr>
<td>3.26</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.27</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.28</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.29</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.30</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.31</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.32</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.33</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.34</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.35</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.36</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>3.37</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>3.38</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.1</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.2</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.3</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.4</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.5</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.6</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>Recommendation number</td>
<td>Level of evidence</td>
<td>Strength of recommendation</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>4.7</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.8</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>4.9</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>4.10</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>4.11</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.12</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.13</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>4.14</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.1</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.2</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>5.3</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.4</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.5</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.6</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.7</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.8</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.9</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.10</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.11</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.12</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.13</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.14</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>5.15</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>5.16</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.17</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.18</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.19</td>
<td>M</td>
<td>Strong</td>
</tr>
<tr>
<td>5.20</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.21</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.22</td>
<td>C</td>
<td>Weak</td>
</tr>
<tr>
<td>5.23</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.24</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.25</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.26</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.27</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>5.28</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.29</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.30</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>Recommendation number</td>
<td>Level of evidence</td>
<td>Strength of recommendation</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>5.31</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.32</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.33</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.34</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.35</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.36</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.37</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.38</td>
<td>M</td>
<td>Strong</td>
</tr>
<tr>
<td>5.39</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>5.40</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.41</td>
<td>C</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.43</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.44</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.45</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.46</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>5.47</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.48</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>5.49</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>5.50</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>5.51</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.52</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.53</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.54</td>
<td>C</td>
<td>Weak</td>
</tr>
<tr>
<td>5.55</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.56</td>
<td>B</td>
<td>Strong</td>
</tr>
<tr>
<td>5.57</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.58</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.59</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.60</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.61</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.62</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.63</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.64</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.65</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.66</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.67</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>5.68</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>5.69</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>Recommendation number</td>
<td>Level of evidence</td>
<td>Strength of recommendation</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>7.1</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>7.2</td>
<td>GPP</td>
<td>Weak</td>
</tr>
<tr>
<td>7.3</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>7.4</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.1</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.2</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.3</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>9.4</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.5</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.6</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>9.7</td>
<td>C</td>
<td>Mandatory</td>
</tr>
<tr>
<td>9.8</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>9.9</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>9.10</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.11</td>
<td>GPP</td>
<td>Weak</td>
</tr>
<tr>
<td>9.12</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>9.13</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.14</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.15</td>
<td>GPP</td>
<td>Strong</td>
</tr>
<tr>
<td>9.16</td>
<td>C</td>
<td>Strong</td>
</tr>
<tr>
<td>9.17</td>
<td>M</td>
<td>Mandatory</td>
</tr>
<tr>
<td>9.18</td>
<td>C</td>
<td>Strong</td>
</tr>
</tbody>
</table>

The completed recommendation grading forms are available on request.
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

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 (Embase, Ovid MEDLINE, CINAHL, Cochrane Library). 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 services for the patient requiring surgery.

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 see GPAS Supporting Documents for the Emergency Anaesthesia 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 initial literature search was performed in December 2014. An updated search was performed in August 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 Chapter Development Group for suitability; the final list of publications used can be found in the reference list.

Inclusion criteria
This review considered studies that included the following criteria:

■ all ages of patient undergoing emergency anaesthesia

■ all staff groups working within emergency anaesthesia, including (but not restricted to) anaesthetists, nurses, physician’s assistants in anaesthesia, operating department practitioners, surgeons, pharmacists and general practitioners

Exclusion criteria

■ Studies that investigated the provision of an emergency anaesthesia service provided by a speciality other than anaesthesia were excluded.

■ Publications that duplicated data that had been reported in an earlier publication were also excluded.

Data extraction and analysis
Data were extracted by the authors using a pro-forma. The study characteristics data included; the journal and country of publication, the number of patients recruited into the study, the study design, patient characteristics, outcome data, the logic of the argument, author’s conclusions and reviewer’s comments.

The patient characteristics data extracted were; age, sex and type of surgery. The analysis considered studies that included any clinical outcome, including (but not restricted to) survival, length of stay in critical care or hospital, morbidity, adverse effects and complications.
The results of the initial literature review can be seen below:

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

- Records identified through database searching \(n = 85,808\)
- Additional records identified through other sources \(n = 259\)
- Records after screening of titles \(n = 632\)
- Duplicates \(n = 6\)
- Abstracts screened \(n = 626\)
- Records excluded \(n = 190\)
- Full-text articles assessed for eligibility \(n = 436\)
- Full-text articles included in final document \(n = 199\)
The evidence that is included in this chapter has been graded according to an adapted version of the National Institute for Health and Care Excellence (NICE) ‘Hierarchy of evidence and recommendations grading scheme’, outlined below:

<table>
<thead>
<tr>
<th>Level</th>
<th>Type of evidence</th>
<th>Grade</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ia</td>
<td>Evidence obtained from a single large/multicentre randomised controlled trial (RCT), a meta-analysis of RCTs or a systematic review</td>
<td>A</td>
<td>At least one RCT as part of a body of literature of overall good quality and consistency addressing the specific recommendation (evidence level I) without extrapolation</td>
</tr>
<tr>
<td>Ib</td>
<td>Evidence obtained from meta-analyses, systematic reviews of RCTs or RCTs with a high risk of bias</td>
<td>B</td>
<td>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</td>
</tr>
<tr>
<td>IIa</td>
<td>Evidence obtained from at least one well-designed controlled study without randomisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IIb</td>
<td>Evidence obtained from at least one well-designed quasi-experimental study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IIc</td>
<td>Evidence obtained from case control or cohort studies with a high risk of confounding bias</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities</td>
<td>C</td>
<td>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.</td>
</tr>
<tr>
<td>UG</td>
<td>Legislative or statutory requirements</td>
<td>M</td>
<td>This grading indicates that implementation of this recommendation is a statutory requirement, or is required by a regulatory body (e.g. Care Quality Commission [CQC], General medical Council [GMC])</td>
</tr>
<tr>
<td>GPP</td>
<td>Recommended good practice based on the clinical experience of the Chapter Development Group</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted from
Strengths and limitations of the body of evidence

Most of the published evidence on emergency anaesthesia 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 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
- poor or limited outcome measures
- small numbers in studies
- 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 lead authors for the chapter. These were discussed with the chapter development group, and comments were received on both 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 (see above for details), 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 Development Process Document].
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

Recommendations were worded using the following system of categorisation

<table>
<thead>
<tr>
<th>Strength</th>
<th>Type of evidence</th>
<th>Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>The evidence supporting the recommendation includes at least one with an 'M' grading</td>
<td>Wording should reflect the mandatory nature of the recommendation i.e. ‘must’</td>
</tr>
<tr>
<td>Strong</td>
<td>Confidence that for the vast majority of people, the action is more likely to benefit the patient than cause harm</td>
<td>Wording should be clearly directive ‘should’ or ‘should not’</td>
</tr>
<tr>
<td>Weak</td>
<td>The action is more likely to benefit the patient than cause harm for most patients, but may include caveats on the quality or size of evidence base or patient preferences</td>
<td>Wording should include ‘should be considered’</td>
</tr>
<tr>
<td>Aspirational</td>
<td>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</td>
<td>Wording should include ‘could’</td>
</tr>
<tr>
<td>Equipoise</td>
<td>There is no current evidence on this recommendation’s effect on patient care</td>
<td>Wording should include ‘there is no evidence of this recommendation’s effect on patient care’</td>
</tr>
</tbody>
</table>

Limitations and any potential bias of the guideline

- There is a wide variety of National Health Service (NHS) hospitals (size, population).
- The sustainability and acceptability of applying new findings has not been tested.

Consultation

The chapter has undergone several rounds of consultation. The multidisciplinary chapter development group (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 23 November to 21 December 2015. 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 by the College for their work on GPAS. 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 chapter development group, as this individual has the deciding vote under the consensus method of decision making used in the chapters. Where College Council members have been involved in chapter development, this has been declared and recorded.

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

The role of PSC and the GPAS Editorial Board

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

Responsibility for managing the scope of the document, and providing clinical oversight to the project technical team is delegated by the PSC 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 lead author 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. The College Council is responsible for sign-off before final publication.
Chapter 5
Guidelines for the Provision of Emergency Anaesthesia 2017

Updating these guidelines

This chapter will be updated for re-publication in January 2018.
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 will decide whether or not to involve the remainder of the Chapter Development Group 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 2021.
Every five years guidance will be submitted to a full review involving reconvening the Chapter Development Group (or appointment of a new, appropriately qualified Chapter Development Group), and the process described in the methodology section of this chapter begins again.