Royal College of Anaesthetists

Chapter 5

Guidelines for the Provision of Anaesthesia Services (GPAS)

Guidelines for the Provision of Emergency Anaesthesia 2020

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Declarations of Interest

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

Declarations were made as follows:

- three authors were authors of the GPAS Anaesthesia Services for Emergency Surgery Chapter 2014
- one author holds 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 was not determined as being a risk to the transparency or impartiality of the chapter development. Where a member was conflicted in relation to a particular piece of evidence, they were asked to declare this and then if necessary removed themselves from the discussion of that particular piece of evidence and any recommendation pertaining to it.

Medico-legal implications of GPAS guidelines

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

Promoting equality and addressing health inequalities

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

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

GPAS guidelines in context

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

Each of the GPAS chapters should be seen as independent but interlinked documents. Guidelines on the general provision of anaesthetic services are detailed in the GPAS chapter 2: Guidelines for the Provision of Anaesthesia Services for the Perioperative Care of Elective and Urgent Care Patients.

These guidelines apply to all patients who require anaesthesia or sedation, and are under the care of an anaesthetist.

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

These guidelines apply to all patients who require anaesthesia or sedation, and are under the care of an anaesthetist. For urgent or immediate emergency interventions, this guidance may need to be modified as described in GPAS chapter 5: Guidelines for the Provision of Emergency Anaesthesia.

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

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

Aims and objectives

The objective of this chapter is to promote current best practice for service provision in emergency anaesthesia. The guidance is intended for use by anaesthetists with responsibilities for service delivery and healthcare managers.

This guideline does not comprehensively describe clinical best practice in emergency anaesthesia, but is primarily concerned with the requirements for the provision of a safe, effective, well led service, which may be delivered by many different acceptable models. The guidance on provision of emergency anaesthesia applies to all settings where this is undertaken, regardless of funding. All age groups are included within the guidance unless otherwise stated, reflecting the broad nature of this service.

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

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

Scope

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 chapter 10.

These guidelines do not include obstetrics or major trauma, which are dealt with separately in chapter 9 and chapter 16.

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.

Introduction

The recommendations within this document describe the features of a high quality emergency anaesthetic service. There are many different types of hospitals and for this reason the implementation of these recommendations will vary from organisation to organisation.[1]

Lessons from national audits, an extensive literature search, a thorough process of consultation and peer review have all been used to inform these recommendations. Commissioners, hospitals and departments of anaesthesia should have systems in place to meet these recommendations.[1]

The NHS is facing unprecedented challenges in the provision of emergency services.[2] Emergency surgical service provision is important because there are a large and increasing number of patients who are admitted acutely to hospital with surgical conditions many of these requiring anaesthesia and surgical intervention.[3] This will inevitably increase because of the demographic changes of an increasingly elderly population.

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.

The provision of emergency anaesthesia differs from elective anaesthesia in that it is required 24/7. 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 creates greater challenges to providing a service that meets recommended standards of care. This unpredictable nature means that hospitals need to have sufficient capacity and flexible systems in place that can respond to variations in demand and severity of patients' illnesses.

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

The National Emergency Laparotomy Audit (NELA) has stratified risk as 'lower risk', 'higher risk' and 'highest risk' by predicted mortalities of <5%, 5-10% and > 20% respectively.[1] Emergency patients have high rates of mortality and complications,[4,5] which are increased by delays in treatment, e.g. for emergency laparotomies, the national average mortality is 9.5%.[1] Their clinical condition may be

unstable, necessitating urgent assessment and treatment. There is limited opportunity to optimise a patient's preoperative condition because of the urgency of surgery. Patients are often elderly with significant pre-existing comorbidities, frailty and cognitive impairment.[1,6,7,8] Many emergency patients may be regarded as highly vulnerable and typically they are in pain and frightened.

One of the paradoxes of modern medicine is that mortality is falling in patients with severe acute illness despite multiple negative research studies and no discovery of a 'golden bullet'. This includes critical care patients,[9] severe sepsis and emergency laparotomies.[1,10] This strongly suggests improvements have been achieved through improved care pathways, increased compliance with these pathways and greater attention to detail.

There is a significant lack of consistency in outcomes of emergency patients, in both place and time.[1,11,12] The resources, pathways and compliance with accepted treatment also vary significantly between different hospitals,[13,14] 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 including the seniority of the anaesthetist treating the patient.[1]

Complications following emergency surgery have a major impact upon both long term and short term mortality,[4,15] and there is a need to find and implement ways of reducing these. There is a long tail to the posthospital discharge mortality curve, and little is known about how this may be improved.[16] Similarly, long term disability and its effect upon patients' quality of life following emergency surgery are poorly studied.

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. This type of improvement is much more about sociological, cultural and behavioural change rather than just 'medical technology' or 'yet another protocol'.[17,18,19,20,21,22,23] Integral to this is for staff to feel involved and valued.[17,24,25] 'Top down' management approaches are severely limited in creating lasting improvements.[2,26,27]

An individual simply 'doing his or her best' is no longer enough. Evidence based pathways and quality improvement programmes need to be implemented. Within this, individuals can still strive for excellence, but as part of a whole team.[14,28,29,30,31]

To enable patients to receive high quality emergency anaesthesia, local and national supporting services and facilities are required. Of particular importance is timely access to critical care, radiology and operating theatres.[1,3,9,32,33]

Supporting clinical policies need to be in place, including preoperative assessment, management of severe sepsis and postoperative care.[1,9,14,34]

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.[35]

Key to the delivery of a high quality emergency anaesthesia service is adequate resourcing and finance.[36,37,38,39]

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 work load (patient case load, case mix, and severity of illness, together with the out of theatre work load).[20,40,41] The systems and environment within which people work and treat patients should be supportive of staff, enabling them to provide the best treatment possible.[17]

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.[13,33,42]

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.[13,43] Part of this role should include liaison with other departments such as radiology, medicine and emergency departments (ED).

1.4 All patients should have a named and documented supervisory consultant anaesthetist who has overall responsibility for the care of the patient.[44,45] 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.[25] 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 (SPA).[46]

1.6 A dedicated, skilled anaesthetic assistant should be available in all locations outside the operating theatre where anaesthesia is undertaken by an anaesthetist.[4748]

1.7 Anaesthesia Associates (AAs) should work under the supervision of a consultant anaesthetist at all times as outlined by the RCoA.[48,49] 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 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 the theatre environment. Certain circumstances may require additional assistance, and local arrangements should allow sufficient personnel and resources to support this.[47,50,51] 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.

1.9 There should be sufficient administrative staff to support all aspects of the emergency anaesthesia service.[25,46]

Recovery

1.10 Whenever emergency surgery is undertaken, the post-anaesthesia care unit (PACU) should be open continuously and adequately staffed.[47] Until patients can maintain their own 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.[44]

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

1.12 Members of clinical staff working within the recovery area should be certified to a standard equivalent to intermediate life support providers, and training should be provided.[44] An advanced life support provider or an anaesthetist should be available at all times.

1.13 When a critically ill patient is managed in a PACU because of a critical care bed is temporarily unavailable, it is neccesary to have clarity as to who has the primary responsibility for the management of the patient. Usually the primary responsibility for the patient lies with the hospital's critical care team, but other specific local arrangements may be sometimes necessary. The standard of nursing and medical care should be equal to that in the hospital's critical care units.[44] In some circumstances, such as during 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.[18,40,52,53]

1.14 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.[54]

1.15 Staff should be empowered to shape their working environment and ensure their workload is not overwhelming.[26]

1.16 Appropriate rest breaks during and at the end of work must be provided by departmental rostering.[55] Appropriate facilities for these breaks should be provided according to defined norms.[54,56] Local arrangements might apply (depending upon the nature of the emergency work load) but they should still be within the legal requirements.

1.17 Departments should review the on-call responsibilities of anaesthetists as part of annual appraisal and job planning.[57] 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.[54,58]

1.18 When members of the healthcare team are involved in a critical incident, this carries a significant personal burden.[59] 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.[60] Following 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.

1.19 There is evidence that errors are associated with increased time spent on a 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 so that they are not likely to lead to predictable fatigue, and should be reviewed regularly.[54,61,62]

2 Equipment, Services and Facilities

Equipment

2.1 All theatres must be compliant with Department of Health building regulations.[63] There should be provision of emergency call systems.

2.2 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.[63,64]

2.3 The geographical arrangement of theatres, emergency departments, critical care units, cardiac care, interventional radiology and imaging facilities should allow for the rapid transfer of critically ill patients.

2.4 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.[65]

2.5 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 to be effectively performed in e.g. interventional radiology suites.

Support Services

General

2.6 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.[1,45,66,67]

2.7 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 2016 publication, Guidelines for the Provision of Intensive Care Services.[4]

Adequate critical care facilities are integral to the care of 'high risk' patients receiving emergency anaesthesia.[1,9,32,68] It is known that patients identified as requiring critical care and admitted directly from theatre have significantly improved outcomes than those admitted following a period of postoperative deterioration (e.g. from a ward).[69,70,71]

2.8 There should be adequate critical care facilities to allow the timely admission of high risk general surgical patients.[14] Preoperative risk stratification should inform the decision making process for critical care admission.[1,72]

2.9 Critical care should be considered for all patients requring emergency surgery. There should be close preoperative 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.[33]

2.10 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).[3] 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.

2.11 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.[1]

Acutely ill patients on wards

2.12 All areas, including emergency departments, admitting acutely ill patients should have early warning pathways.[45] Acutely ill or deteriorating emergency surgical patients on a general surgical ward require 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.[9,73,74,75,76,77]

Transportation of the emergency patient

2.13 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.[9,78,79,80,81]

2.14 Staffing needs to be provided at a level such that emergency theatre activity and HDU/ICU patient care are not compromised when intra and inter hospital transfers are undertaken.[78]

2.15 All necessary equipment to facilitate safe transport of the patient should be available at all times.[9,78,81]

2.16 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.[9,78,80]

Equipment and drugs[48]

2.17 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.

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

2.19 Medication errors are consistently the second highest type of errors reported in anaesthetic practice and so all staff involved in the prescribing, preparation, administration and monitoring of drugs must be appropriately trained.[82]

2.20 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.[83,84]

2.21 Theatre operating tables should be available for all types of surgery undertaken, including imaging access (carbon fibre), and adjuncts for safe positioning and transfer. Specialist operating tables, transfer equipment and positioning aids should be available for obese patients.[85]

2.22 There must be appropriate equipment available for transfer of the patient within the theatre, together with the appropriate staff trained to use it safely.[83,86,87]

2.23 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 provided on its usage.[86,88,89]

2.24 Near patient testing for haemoglobin, blood gases, lactate, blood sugar and ketones should be readily available for theatres.

2.25 Near patient testing for coagulopathy should be considered, particularly in areas where major blood loss is likely.[90] If near patient testing is not available laboratory testing should be readily and promptly available.

2.26 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.[91,92,93]

2.27 A difficult airway trolley, including the equipment necessary to manage failed intubation and surgical airway access, should be available in all areas where anaesthesia may be undertaken.[94,95] Equipment for fibre optic intubation and video laryngoscopy should also be available and properly maintained.[94,95,96]

2.28 Warming devices for patients should be available for use in the anaesthetic room, operating theatre, recovery unit and ED.[97,98]

2.29 A rapid infuser allowing the infusion of warmed intravenous fluids and blood products should be available.[97,98,99]

2.30 A cell salvage service should be available for cases where massive blood loss is anticipated. Staff who operate this equipment should receive training in how to operate it, and use it with sufficient frequency to maintain their skills.[98,100]

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

2.32 Equipment necessary to provide a range of patient analgesia should be available. There should be adequate facilities for postoperative monitoring of patient analgesia.[7,101]

2.33 Programmable infusion pumps and other devices should be available, e.g. intravenous anaesthesia, vasoactive or epidural.[148]

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 provided by their own Colleges, when using anaesthetic drugs and undertaking these procedures.

2.34 An anaesthetist should be present at all times while the patient is anaesthetised.[102]

2.35 Routine anaesthesia monitoring according to the Association of Anaesthetists standards of monitoring should be available for all areas where anaesthesia is undertaken.[102] Departments should follow national clinical guidelines for the use of monitoring equipment, or local guidelines when national guidelines are not available.

2.36 The alarm limits on monitors should be set appropriately, and audible alarms should not be inactivated.[102]

2.37 End-tidal carbon dioxide (Et CO_2) monitoring should be available in all locations where tracheal intubation occurs and where intubated patients are being cared for. This includes out of theatre areas and transfers.[79,94,102]

2.38 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.[102,148]

2.39 Equipment for monitoring the depth of anaesthesia should be available for patients receiving emergency anaesthesia.[103,148]

2.40 Invasive cardiovascular monitoring should be immediately available. Equipment required for goal directed therapy should be available for all major surgery and high risk patients.[102,104,105,106,107]

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.[108] Poor cognition, hearing and eyesight may make communication difficult.

The outcomes following emergency sugery for elderly patients (particularly those who require support for daily living) are worse than for younger patients. For emergency laparotomy patients, the mortality of a patient aged >70 years is six times higher than that of a patient aged <50 years old.[1] Functional outcomes are unpredictable, but one-third of octogenarian survivors will not recover to their preoperative function.[109,110]

General guidelines for the anaesthetic management of the elderly patient can be found in The Association of Anaesthetists publication, Perioperative Care of the Elderly 2014 and is reviewed elsewhere.[7,111,112]

3.1 Departments should consider the appointment of a specified consultant anaesthetist to lead the anaesthetic service for the elderly.[7]

3.2 All elderly emergency surgery patients should be serially assessed for multimorbidity, frailty and cognition.[1,6,7]

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. 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 involving the patient, families and carers.[7]

3.4 Failure to recognise and treat the deteriorating patient ('failure to rescue') has been has been shown to increase mortality, particularly in the elderly surgical patient, and so hospitals should have policies in place to prevent this.[113,114] Audits 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 their next of kin, prior to anaesthesia if at all possible.[115,116]

3.6 In the elderly, anaesthesia and surgery should be undertaken by senior staff with experience and expertise in this area in order to limit the duration of the operation and its physiological impact to a minimum.[7]

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 patients who suffer with cognitive impairement. Specific algorithms for the assessment of pain, and postoperative analgesia protocols, are recommended in the elderly.[7]

3.8 Perioperative delirium/confusion is common and often under recognised. Hospitals should have policies to recognise and manage perioperative delirium/confusion.[7,9,117]

3.9 Care pathways and the involvement of health care of the elderly support teams are strongly recommended. Care of older people in hospital should be delivered by staff with the correct set of skills to meet their needs. For some, this will include review by a Health care of the Elderly (HCE) consultant and nutritional assessment. Provision for HCE involvement in the care of older patients should be planned over the short and long term.[1,6,118,119]

3.10 There should be planning at local and regional level for the increase in resources that will be required for increasing numbers of elderly surgical patients.[7]

Paediatric emergencies

Most paediatric emergency anaesthesia is for minor surgery in previously fit and healthy children. A large proportion of this work is undertaken in non-specialist hospitals, where arrangements should be in place for treating simple emergencies in children without complex comorbidity. All anaesthetists with a CCT or equivalent should be competent to provide perioperative 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 comprehensively described in chapter 10.

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 care providers. Networks should agree standards of care and formulate care pathways for emergency surgery. Departments should participate in regular network audits of emergency surgical work.[120,121,122,123]

3.13 Children with severe comorbidity who require emergency anaesthesia should be treated in a specialist paediatric centre. However, if transfer is not feasible, the most appropriately

experienced senior anaesthetist should provide anaesthesia and support resuscitation and stabilisation, as part of the multidisciplinary team.[124,125]

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.[126]

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).[85,127]

3.15 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.[48,85,127]

3.16 Specialist positioning equipment for the induction of anaesthesia and intubation in the morbidly obese patient should be available.[85,127]

3.17 Bariatric patients requiring emergency surgery should have experienced surgeons and anaesthetists available (typically, but not exclusively, at a consultant level), in order to minimise operative time.[85,127]

3.18 Bariatric patients should be considered for level 2 or 3 critical care postoperatively.[85,127]

High risk patients including emergency laparotomy patients

While there is no standard definition of 'high risk', the phrase has been applied to patients with a predicted mortality > 5%.[3] 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.[1,3,33,128,129,130]

3.19 There is evidence that introduction of evidence based care bundles for the management of emergency laparotomies can improve outcomes.[28] Hospitals should have care bundles for the anaesthetic management of common and high risk surgical emergency patients.[1]

3.20 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.[4,15,113]

3.21 To facilitate optimal care of high risk patients, systems should be in place to ensure:[1,3,33]

- 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[131,132]
- communication of risk to the multidisciplinary clinical team, to allow appropriate preoperative 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[131]

- timely access to appropriate care (including resuscitation, antibiotics, interventional radiology or surgery)[131]
- the presence of a consultant surgeon and anaesthetist in the operating theatre for patients with an estimated mortality >5% (a national recommendation);[1,133]
- 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.

3.22 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 performing this work should be supported by hospitals and have this recognised as part of their job plan.[1]

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.[134]

National clinical guidelines for the management of the patient with diabetes have recently been updated and hospital should be familiar with these updates.[134,135]

3.23 Hospitals should provide the services and resources required for the management of the emergency surgical patient with diabetes including explicit managerial and clinical policies.[134]

3.24 Hospitals should consider appointing a lead anaesthetist for diabetes.

3.25 Hospitals should have mechanisms to promote early identification of the emergency surgical patient with diabetes.

3.26 Hospitals should have clinical guidelines including:[134]

- 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 have an individualised explicit plan for managing their diabetes during the periods of starvation and surgical stress. This may require the involvement of senior anaesthetic staff, multidisciplinary review, and specialist diabetic medical and nursing staff.
- the prevention and prompt recognition and treatment of hypo and hyperglycaemia, and hospital acquired diabetic ketoacidosis.

- 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 500–2000 pregnancies), cholecystitis (1 in 1600–10000 pregnancies), intestinal obstruction, acute pancreatitis (1 in 1000–3000), hepatic rupture and traumatic injuries.[136]

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.

3.27 A multidisciplinary team approach is highly recommended, typically involving anaesthetists, obstetricians, surgeons, paediatricians and midwives.[137,138,139,140]

3.28 Surgery should be undertaken where neonatal and paediatric services are readily available whenever possible.[137]

3.29 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.[137,138,141,142]

3.30 Informed consent for the surgical procedure should include consideration of fetal wellbeing and the possibility of caesarean delivery.[139]

3.31 Equipment for maternal positioning and uterine displacement should be available.[138,142]

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

- aspiration prophylaxis[138,142,143]
- difficult airways and failed intubation[94,139,144,145,]
- cardiopulmonary resuscitation in the pregnant woman and perimortem caesarean delivery[136,141,144,146]
- anti-D immunoglobulin administration[136,147]
- major haemorrhage[141,148] and venous thromboembolism prophylaxis[149] and sepsis[137,146,150]
- prevention of accidental awareness during general anaesthesia[102,103,148]
- anaesthesia and surgery in breast-feeding mothers[142,151,152]
- safe drug administration including avoidance of codeine in breast feeding mothers[153]

3.33 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 tracheal tubes should not be removed prior to post mortem examination.[146]

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.

3.34 Hospitals must have local policies in place for the identification, support and safeguarding of vulnerable adults.[2,154]

3.35 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.[155] This is a rapidly changing area and clinicians should have access to expert advice.

Diverse cultures and languages

3.36 Hospitals should have policies to support patients and staff of diverse religious beliefs and cultural backgrounds.[154]

3.37 Hospitals should have arrangements in place to provide language support, including interpretation and translation services (including sign language and Braille).This information should comply with the NHS England 'Accessible information Standard'.[156]

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.[25]

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.[25]

4.3 Organisations should commit themselves to provide the time and resources to educate those who provide care for patients.[25]

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.[25]

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.[157,158]

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.[25]

4.7 Anaesthetists with a job plan that includes emergency anaesthesia should demonstrate ongoing continuing education in emergency anaesthesia, and continuing professional development as required 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.[33] 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 Anaesthetists should be given support and time to familiarise themselves with non theatre locations and local working arrangements, e.g. during induction sessions.[25,159]

4.9 Regular daytime emergency lists should be used as a teaching resource and staffed appropriately to facilitate this.[160]

4.10 All efforts should be made to ensure trainees receive adequate experience in emergency anaesthesia, and completion of workplace based assessments should be supported.[11]

4.11 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.[161] Where a non-consultant anaesthetist is supervised, they should be aware of their supervisor's identity, location and how to contact them.

4.12 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.[162] Evidence for benefit through routine application of ultrasound is less prevalent. NICE and their recommendations during internal jugular vein cannulation are well established[163] and reaffirmed in the Association of Anaesthetists guidance.[164] Several workers have demonstrated improved outcomes and altered diagnoses using echocardiography during elective preoperative assessment[165] 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[166,167] endorsed and hosted by the intensive Care Society and endorsed by British Society of Echocardiography.

5 Organisation and Administration

Organisation strategy and organisational culture

Quality should be at the heart of every aspect of the delivery of emergency anaesthetic and surgical care.[3,26,33,72,129]

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.[33] The required standards set out in this document apply to all organisations, but the methods used to achieve them may vary.[1]

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.[29,129,168,169,170] Future

planning should be based on accurate and timely data. Mathematical modelling for matching theatre demand and capacity could be beneficial.[171]

5.4 Each department of anaesthesia should have a plan in place for the emergency anaesthetic workload to be delivered effectively and safely.[172]

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.[59, 173,174]

5.6 Hospitals should review their local standards to ensure that they are harmonised with the relevant national safety standards, e.g. National Safety Standards for Invasive Procedures in England or the Scottish Patient Safety Programme in Scotland. [25,175]

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 organised from the bottom up, with ownership and decision making in the hands of professionals and patients. [2,16,154,176]

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.[26,176]

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.[25]

5.10 Emergency and elective work should be separated (whenever practically feasible), to improve clinical care for patients.[14,41]

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.[1,128]

5.12 Rapid and effective communication is one of the key components of 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).[177]

Medical leadership structure

5.13 Every department of anaesthesia undertaking emergency surgery should appoint a senior clinical lead (see glossary) with adequate provision within their job plan and support to develop and lead emergency anaesthesia within the organisation.[33] 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.[1]

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.[3,20,42,178] There should be a clear policy for cancelling elective surgery to enable additional emergency theatre provision.[13]

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.[179]

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.[180,181]

5.19 The urgency of emergency cases should be clearly and unambiguously coded.[14] 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.[14] 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'.[25]

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.[33,41,42]

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.[41]

Preanaesthetic assessment and preparation

Guidelines for preoperative assessment and preparation are given in chapter 2.

5.23 Some aspects of preanaesthetic 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 preanaesthetic 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.[1,14]

Preoperative

5.24 There should be a formalised integrated pathway for unscheduled adult general surgical care which should be patient centred and include:[1,3,33,41,130]

- a clear diagnostic and management plan made on admission[73]
- risk assessment and identification of the high risk patient[1,3,130]

- early identification of comorbidities (including diabetes, cardiac pacemakers and internal 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 medication[182]
- pregnancy testing as appropriate[183]
- an assessment of mortality risk that is made explicit to the patient and recorded clearly on the consent form and in the medical record[14]
- 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 surgery[1,14]
- timely investigations and surgery[1,3]
- a plan for postoperative care[1,3]

5.25 All hospitals should have guidelines in place for the recognition and management of patients with sepsis. Compliance with these policies should be regularly audited.[9,104,105]

5.26 An anaesthetist should preoperatively 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.[184]

5.27 A full anaesthetic management plan should be recorded in the patient's records or anaesthetic chart and initiated preoperatively.[179]

5.28 The experience and expertise of the anaesthetist assessing the patient preoperatively 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 postoperative care.[3,14,33]

5.29 Preoperative 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.[14]

5.30 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.[184,185] (See also section 9)

5.31 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.[73,186]

5.32 There should be provision for preoperative admission of the critically ill patient to level 2 and/or level 3 care facilities for stabilisation and optimisation if required.[1,9]

5.33 Guidelines for fasting before anaesthesia for emergency surgery should comply with national standards.[187]

5.34 Guidelines for postoperative planning should include plans for nutrition, including facilitation of enteral access or vascular access for parenteral support.[188,189,190]

Policies

5.35 There should be locally agreed policies for the 24/7 cover of emergency surgery, prioritisation of emergency cases according to clinical urgency, and seniority of anaesthesia staff according to patient risk.[1]

5.36 Appropriate clinical policies and standard operating procedures for operating theatres should be in place and available at all times, including a resuscitation policy and major incident plans.[158]

5.37 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.[25]

5.38 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.

5.39 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]

5.40 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, 33,173,191,192]

5.41 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.'[25]

5.42 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.[78]

5.43 There should be a clear process in place for the referral of patients requiring critical care, including paediatric patients, to an appropriate facility.[8,73,186]

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

- guidelines for the management of anaesthetic emergencies including guidelines for children
- difficult airway management including 'can't ventilate', and 'can't intubate'[94,195]

5.45 The following policies should be held and easily accessible along with those outlined in chapter 3:

- infection control (including antibiotic prophylaxis, staff protection and post-exposure prophylaxis)[193]
- 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 required[3]
- 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 theatre[60]
- a documented policy for the management of organ donation and retrieval.[9,194]

5.46 Hospitals should have policies for the management of the airway in emergency situations, which should include fasting times, preanaesthetic assessment of the airway, availability and maintenance of the equipment and training of staff.[94,195]

5.47 Hospitals should have guidelines for the safe extubation of patients following emergency anaesthesia.

5.48 Clinicians undertaking emergency anaesthesia must be familiar with managing patients with a tracheostomy.[94,195]

5.49 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.[103,148]

5.50 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.[90]

5.51 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.[196] Hospitals should have systems in place to ensure that blood can be cross matched, issued and supplied in a timely manner.

5.52 Hospitals should have a protocol for major haemorrhage in place and this should include clinical, laboratory and logistic responses.[90,98]

5.53 Near patient coagulation testing should be considered in bleeding patients or centres where major bleeding is a regular occurrence.[90]

5.54 Hospitals should have a policy covering the transfer of blood products with patients to and from other hospitals.[196]

5.55 Thromboprophylaxis protocols: all patients should undergo venous thromboembolism risk assessment and appropriate prophylaxis methods should be employed.[3,197] This should include guidance on the novel oral anticoagulants and the management of patients requiring emergency surgery who are receiving them.[198,199]

Handover

The handover of a patient's care happens at multiple points. Effective handover is a critical component of a patient safety culture.[200] 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.[45,201]

5.56 Handover should be structured to ensure continuity of care.[202]

5.57 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.[25,44]

5.58 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.[25]

5.59 There should be appropriate overlap between shift changes, to ensure adequate time for handover. Time for handover should be included in job plans and rotas and accounted for in work shift planning.[179,203]

5.60 Handover of care should always be to a member of staff who is competent to look after the patient at that time.[200]

Clinical governance

5.61 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.[33,172]

5.62 Robust data collection underpins much of the success in documenting and learning from experiences.[1,33,128] 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.[32,173]

5.63 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 should recognise the duty of candour and foster a culture for reporting incidents and concerns.[17,25,58]

5.64 There must be systematic measures in place to respond to serious incidents. These measures should 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 internal and external to the organisation.[204]

5.65 Organisations should 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.[205,206]

5.66 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.[33,207]

5.67 Hospitals should have systems in place to facilitate multidisciplinary Morbidity and Mortality meetings.[1,45]

5.68 Hospitals should have an 'at risk register' at departmental, divisional and board level. There should be a clear policy on its ownership and maintenance of the risk register. Relevant local issues pertinent to emergency anaesthesia should be included.[208]

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.[39]

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. A follow up document, 'Next Steps for the NHS Five Year Forward View',[209] recognises this and places Urgent and Emergency care as one of the NHS priority areas for 2017-2018 and 2018-2019. Without adequate, dedicated funding for emergency anaesthesia, driving up the quality of care will be difficult and variable.[2,36,154]

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.[154] However, with an ageing population with more extensive comorbidities, emergency anaesthesia and surgery are likely to increase and associated costs are likely to rise.

7 Research, audit and quality improvement

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.[33,210,211]

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.[1,157,212,213,214,215,216]

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. [217]

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.[58,128,129,211]

8 Implementation Support

The Anaesthesia Clinical Services Accreditation (ACSA) scheme, run by the RCoA, aims to provide support for departments of anaesthesia to implement the recommendations contained in the GPAS chapters. The scheme provides a set of standards, and requires departments of anaesthesia to benchmark themselves against these using a self-assessment form available on the RCoA website. Every standard in ACSA is based on recommendation(s) contained in GPAS. The ACSA standards are reviewed annually and republished approximately four months 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 an appropriate fee. Once engaged, departments are provided with a 'college guide', either a member of the ACSA committee 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 RCoA. This is confirmed during a visit to the department by a group of four ACSA reviewers (two clinical reviewers, a lay reviewer and an administrator), who submit a report back to the ACSA committee.

The ACSA committee has committed to building a 'good practice library' (GPL), which will be used to collect and share documentation such as policies and checklists, as well as case studies of how departments that 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 ACSA committee has committed to measuring and reporting feedback of this type from departments engaging in the scheme back to the CDGs updating the guidance via the GPAS technical team.

9 Patient Information

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.[218] 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 comorbidities 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 i.e. 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 Association of Anaesthetists.[219] It should include information about the process they will experience, and what their postoperative care will mean for them.[220,221]

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.[207]

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.[222]

- Healthcare professionals should assume patients have capacity to make decisions until assessed and proven otherwise. Clinicians should 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.[155,184,222,223]

- Every effort should be made to allocate adequate time for preoperative 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.[184] 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.[224]
- The information shared should 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.[222]
- 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.[222]
- 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.[222]
- 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.[225] 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.[117]

9.4 If needed, patients and/or advocates should have access to an interpreter wherever possible to facilitate communication.[226]

9.5 Support should be made available and information given should be tailored for patients with individual or special needs, and for children.[227]

9.6 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.[45,223]

9.7 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).[184,220,221]

9.8 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.[155,228] 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.

9.9 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.[155]

Breaking bad news, futility and end of life decisions

9.10 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.[229]

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

9.12 Discussion and reasons behind decisions taken, as well as the information given to the patient and relatives, should be clearly recorded.[230,231]

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.[232]

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.[60]

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.[233]

9.17 Hospitals should have a DNACPR guidance and documentation that complies with national requirements.[96,234]

9.18 Patients who may require surgical procedures with DNACPR decisions in place should have senior members of the anaesthetic and surgical team 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.[113,235]

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:[7,236]

- 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.
- 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 postoperative 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 posthospital discharge.

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

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

Drugs – the word 'drug' is used to include all medicinal products including medications, inhalational agents, fluids, certain dressings, and external medicines.

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.

Abbreviations

AAs	Anaesthesia Associates
ACSA	Anaesthesia Clinical Services Accreditation
CCT	Certificate of Completion of Training
CDG	Chapter Development Group
CPD	Continued Professional Development
CT	computerised tomography
DAS	Difficult Airway Society
DNACPR	Do Not Attempt Cardio Pulmonary Resuscitation
ED	Emergency Department
ENT	Ear, nose and throat
EtCO2	End-tidal carbon dioxide
GMC	General Medical Council
GPAS	Guidelines for the Provision of Anaesthetic Services
HCE	Health care of the Elderly
HDU	High dependency unit
ICU	Intensive care unit
MDT	Multidisciplinary Team
MRI	Magnetic resonance imaging
NCEPOD	National Confidential Enquiry into Patient Outcome and Death
NELA	National Emergency Laparotomy Audit
NICE	National Institute for Health and Care Excellence
RCoA	Royal College of Anaesthetists
SAS	Staff grade, associate specialist and specialty

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Appendix 1: Recommendations Grading

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

Recommendation number	Level of evidence	Strength of recommendation
1.1	B	Strong
1.2	GPP	Strong
1.3	B	Strong
1.4	C	Strong
1.5	C	Strong
1.6	C	Strong
1.7	C	Weak
1.8	C	Strong
1.9	C	Strong
1.10	C	Strong
1.11	GPP	Strong
1.12	C	Strong
1.13	C	Strong
1.14	C	Strong
1.15	C	Strong
1.16	M	Mandatory
1.17	C	Strong
1.18	C	Strong
1.19	C	Strong
2.1	M	Mandatory
2.2	M	Mandatory
2.3	GPP	Weak
2.4	M	Mandatory
2.5	GPP	Strong
2.6	C	Strong
2.7	GPP	Weak
2.8	C	Strong
2.9	C	Strong
2.10	C	Strong
2.11	C	Strong
2.12	C	Strong
2.13	C	Strong
2.14	C	Strong
2.15	C	Strong
2.16	C	Strong
2.17	GPP	Strong
2.18	GPP	Strong
2.19	M	Mandatory
2.20	C	Strong
2.21	C	Strong
2.22	M	Mandatory
2.23	M	Mandatory
2.24	GPP	Strong

2.25	C	Weak
2.26	C	Strong
2.27	C	Strong
2.28	B	Strong
2.29	B	Strong
2.30	C	Strong
2.31	GPP	Strong
2.32	C	Strong
2.33	B	Strong
2.34	C	Strong
2.35	C	Strong
2.36	C	Strong
2.37	B	Strong
2.38	B	Strong
2.39	C	Weak
2.40	B	Strong
3.1	C	Strong
3.2	B	Strong
3.3	C	Strong
3.4	B	Strong
3.5	C	Strong
3.6	B	Strong
3.7	B	Strong
3.8	C	Strong
3.9	C	Strong
3.10	C	Strong
3.11	GPP	Strong
3.12	C	Strong
3.13	C	Strong
3.14	B	Strong
3.15	C	Strong
3.16	C	Strong
3.17	C	Strong
3.18	C	Strong
3.19	B	Strong
3.20	B	Strong
3.21	B	Strong
3.22	B	Strong
3.23	C	Strong
3.24	GPP	Weak
3.25	C	Strong
3.26	C	Strong
3.27	C	Strong
3.28	C	Strong
3.29	C	Strong
3.30	C	Strong
3.31	C	Strong
3.32	C	Strong
3.33	C	Strong

3.34	C	Strong
3.35	M	Mandatory
3.36	C	Strong
3.37	C	Strong
4.1	C	Strong
4.2	C	Strong
4.3	C	Strong
4.4	C	Strong
4.5	C	Strong
4.6	C	Strong
4.7	C	Strong
4.8	C	Strong
4.9	C	Strong
4.10	C	Strong
4.11	C	Strong
4.12	C	Weak
5.1	C	Strong
5.2	GPP	Strong
5.3	C	Strong
5.4	C	Strong
5.5	M	Mandatory
5.6	M	Mandatory
5.7	M	Mandatory
5.8	C	Strong
5.9	M	Mandatory
5.10	C	Strong
5.11	C	Strong
5.12	C	Strong
5.13	C	Strong
5.14	GPP	Strong
5.15	GPP	Strong
5.16	C	Strong
5.17	C	Strong
5.18	M	Mandatory
5.19	M	Strong
5.20	M	Mandatory
5.21	C	Strong
5.22	C	Weak
5.23	C	Strong
5.24	C	Strong
5.25	C	Strong
5.26	GPP	Strong
5.27	C	Strong
5.28	C	Strong
5.29	C	Strong
5.30	C	Strong
5.31	C	Strong
5.32	C	Strong
5.33	C	Strong

5.34	C	Strong
5.35	C	Strong
5.36	M	Mandatory
5.37	M	Strong
5.38	GPP	Strong
5.39	C	Strong
5.40	C	Mandatory
5.41	M	Mandatory
5.43	C	Strong
5.44	C	Strong
5.45	C	Strong
5.46	B	Strong
5.47	GPP	Strong
5.48	B	Strong
5.49	B	Strong
5.50	C	Strong
5.51	M	Mandatory
5.52	C	Strong
5.53	C	Weak
5.54	C	Strong
5.55	B	Strong
5.56	C	Strong
5.57	C	Strong
5.58	C	Strong
5.59	C	Strong
5.60	C	Strong
5.61	C	Strong
5.62	C	Strong
5.63	C	Strong
5.64	M	Mandatory
5.65	C	Strong
5.66	C	Strong
5.67	C	Strong
5.68	C	Strong
7.1	M	Mandatory
7.2	GPP	Weak
7.3	C	Strong
7.4	C	Strong
9.1	C	Strong
9.2	C	Strong
9.3	M	Mandatory
9.4	C	Strong
9.5	C	Strong
9.6	M	Mandatory
9.7	C	Mandatory
9.8	M	Mandatory
9.9	M	Mandatory
9.10	C	Strong
9.11	GPP	Weak

9.12	M	Mandatory
9.13	C	Strong
9.14	C	Strong
9.15	GPP	Strong
9.16	C	Strong
9.17	M	Mandatory
9.18	C	Strong

About these guidelines

Methodology

The process by which this chapter has been developed has been documented within the GPAS chapter development process document.

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

Search strategy

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

The literature search was performed in November 2017.

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

Inclusion criteria

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

- all patients undergoing elective or emergency anaesthesia
- all staff groups working within ent, oral maxillofacial and dental surgery, under the responsibility of an anaesthetic clinical director, including (but not restricted to) consultant anaesthetists, anaesthetists in training, nurses, operating department practitioners, surgeons, pharmacists, general practitioners, radiologists and radiographers.

Exclusion criteria

The literature review used the following exclusion criteria:

- provision of an ENT, Oral Maxillofacial and Dental service provided by a speciality other than anaesthesia.

Data Extraction and Analysis

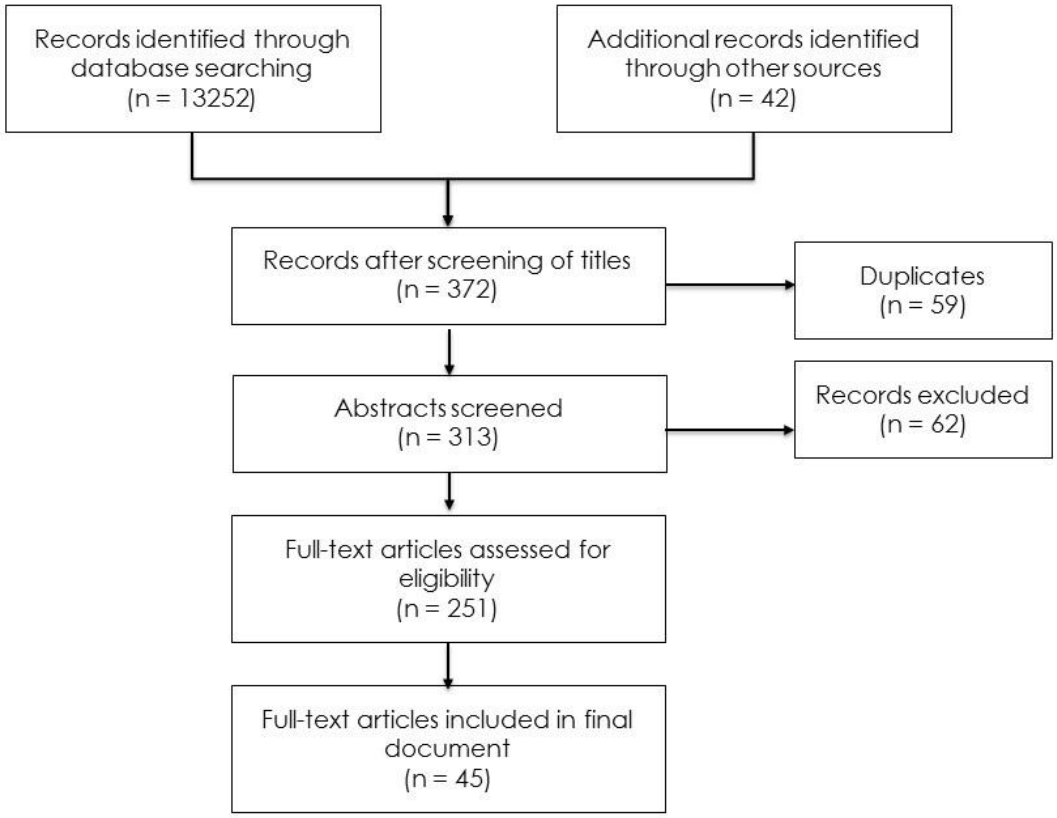
Data were extracted by the authors using a proforma. The study characteristics data included:

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

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

The results of the literature review can be seen below:

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



The evidence that is included in this chapter has been graded according to a grading system adapted from NICE and outlined below:

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

Adapted from Eccles M, Mason J. How to develop cost-conscious guidelines. *Health Technology Assessment* 2001;5(16) and Mann T. Clinical guidelines: using clinical guidelines to improve patient care within the NHS. *Department of Health*, London 1996.

Strengths and limitations of body of evidence

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

The limitations of the evidence are:

- the 'unmeasurables' (attitudes, behaviour, motivation, leadership, teamwork)
- few randomised controlled trials (RCTS); studies frequently use mixed populations of emergency and elective patients, or all emergency patients grouped together despite different underlying diagnoses
- papers often examine a single intervention within complex system or bundle
- papers are often examining small numbers and/or patients from a single centre
- poor use of outcome measures, frequently concentrating on easily measured short term outcomes which are not patient-centred
- generally, a paucity of long-term follow up
- there is no standard definition used of 'high risk'
- use of different risk-scoring systems
- decrease in outcome over time and geography when 'good papers' are used in quality Improvement programmes
- application of international studies in systems with either more or less resources than the UK into NHS practice
- older studies may no longer be applicable within the NHS
- very few studies included any analysis of financial implications
- evidence was mainly based on literature graded III and IV.

Methods used to arrive at recommendations

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

Recommendations were worded using the following system of categorisation:

Strength	Type of evidence	Wording
Mandatory	The evidence supporting the recommendation includes at least one with an 'M' grading	Wording should reflect the mandatory nature of the recommendation, ie 'must'
Strong	Confidence that for the vast majority of people, the action will do more good than harm (or more harm than good)	Wording should be clearly directive 'should' or 'should not'

Weak	The action will do more good than harm for most patients, but may include caveats on the quality or size of evidence base or patient preferences	Wording should include 'should be considered'
Aspirational	While there is some evidence that implementation of the recommendation could improve patient care, either the evidence or the improvement is not proven or substantial	Wording should include 'could'
Equipoise	There is no current evidence on this recommendation's effect on patient care	Wording should include 'there is no evidence of this recommendation's effect on patient care'

Consultation

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

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

Following peer review, the chapter was reviewed by the College's Clinical Quality and Research Board (CQRB) along with the College's Lay Committee. Comments from all groups were considered and incorporated into a consultation draft.

The consultation draft of this chapter was circulated for public consultation from 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 directly by the College for their work on GPAS, the GPAS Editors' employing organisation receives two programmed activities (PA) backfill funding. All funding decisions by the College are made by the CEO, in collaboration with the senior management team and College Council.

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

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

The role of the GPAS Editorial Board and CQRB

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

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

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

Updating these guidelines

This chapter was updated in January 2020.

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

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

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

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

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

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

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