Guidelines for the Provision of Emergency Anesthesia

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Chapter 5
Guidelines for the Provision of Emergency Anaesthesia Services 2022

Introduction

The objective of this chapter is to describe current best practice for emergency anaesthesia services. 'Emergency' within this chapter applies to anaesthesia that is given in immediate (within minutes of a decision to operate) or urgent (within hours of a decision to operate) procedures as classified by the National Confidential Enquiry into Patient Outcome and Death.

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.

Patients undergoing emergency anaesthesia are a heterogeneous group. They range from relatively well patients to the complex and very ill. Most patients, however, requiring emergency anaesthesia survive without serious complications and continue to have a similar quality of life to what they had before their acute illness.

There is a significant variation in outcomes of emergency patients, in both place and time.[23,1] The resources, pathways and compliance with accepted treatment also vary significantly between different hospitals,[2,3] and compliance with accepted standards of care varies from day to day and at different times during the day.

There are a large and increasing number of patients who are admitted acutely to hospital with surgical conditions many requiring surgical intervention.[4] This is projected to increase because of the demographic changes of an increasingly elderly population. This poses unprecedented challenges in the provision of emergency services.[5]

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 may 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'.[6,7,8,9,10] Integral to this is for staff to feel involved and valued.[6,11,12] 'Top down' management approaches are severely limited in creating lasting improvements.[5,13,14]

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.[3,15,16,17] 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 operating theatres, radiology, critical care and other multidisciplinary teams. [23,4,**Error! Bookmark not defined.**,18]

The National Emergency Laparotomy Audit (NELA) has shown how improvements of care and outcomes can be achieved through improved care pathways, increased compliance with these pathways, and greater attention to detail. The audit has also highlighted the importance of risk assessment and appropriate care and treatment throughout the hospital journey of the patient. The Royal College of Anaesthetists has been developing the concept of the anaesthetist as the perioperative physician. Improved care pathways and role of anaesthetist as a peripherative physician will have a significant impact on provision of emergency anaesthesia services. [19]

Reduction of unnecessary deaths is one of the top NHS priorities and services for emergency patients is one of the areas highlighted for improvement.[5] 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. Adequate resources and funding will be crucial to the delivery of a high-quality emergency anaesthesia service.[20,21,22]

Despite the challenges, 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.[23] The recommendations within this document describe the features of a high quality emergency anaesthetic service. The implementation of these recommendations will enable consistency in the standards of care provided at all times and in all places. It is recognized that the implementation of these recommendations will depend on type, volume and complexity of the emergency workload, and likely to vary from organisation to organisation.[23]

Recommendations

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

1 Organisation and Administration

Quality should be at the heart of every aspect of the delivery of emergency anaesthetic and surgical care.[4,13,18,24]

1.1 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.[18] The required standards set out in this document apply to all organisations, but the methods used to achieve them may vary.[23]

1.2 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.

1.3 The hospital business plan should address the predicted growth in surgical emergencies, aging population and any changes as a result of regional specialisation.[15] Future planning should be based on accurate and timely data. Mathematical modelling for matching theatre demand and capacity could be beneficial.[25]

1.4 Each department of anaesthesia should have a plan in place for the emergency anaesthetic workload to be delivered effectively and safely.[26]

1.5 Organisations should have a service improvement team that coordinates 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.[23,27] Quality improvement tools together with good data entry and organisational support should be considered as they can create feedback strategies which drive improvement.[28]

1.6 Emergency and elective work should be separated (whenever practically feasible), to improve clinical care for patients.[3,29]

1.7 Rapid and effective communication is crucial in emergency situations. Communication strategies should consider the use of technologies e.g. smart phones, and standardised methodology such as Situation, Background, Assessment, Recommendation (SBAR).[30]

1.8 There should be adequate provision of postoperative beds for emergency surgical patients including high level care to allow timely discharge of patients from theatre recovery areas.

Medical leadership structure

1.9 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.[18] This role could include liaison with other departments.

1.10 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.[23]

1.11 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.

1.12 The emergency operating list 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.[31,32] The operating list displayed in theatre should be the most current version.

1.13 The language in all communications relating to the scheduling and listing of procedures must be unambiguous and avoid the use of abbreviations. Laterality must always be written in full, i.e. 'left or 'right'.[12]

1.14 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 staffing of additional evening (twilight) emergency sessions with autonomously practising anaesthetists.

1.15 Dedicated emergency lists for some individual surgical services (e.g. paediatrics) should be considered as they may be an effective use of resources and improve patient flow and care.[29]

1.16 Efficient management of emergency list is essential to ensure timely access to emergency theatre. Golden patient concept to identifying and getting the first patient on the list ready has been effective in prompt starting of emergency lists. Dedicated holding bays have shown to reduce turnaround times. Such and other innovative sustems should be considered to improve efficiency of emergency lists. [3334]

Emergency/ CEPOD booking system

1.17 Documentation and communication of information on preoperative preparation are essential. Electronic systems should be considered to enable the capture and sharing of information, support risk identification and allow data to be collected and available for audit and research purposes.[35]

1.18 Departments should consider a web-based live system which can be remotely accessed by all relevant personnel including senior staff that are on call off site. A dynamic system can be set to order the list according to clinical priority, cepod classification and time of booking. Real time updates should avoid delays and improve workflow.

Prioritisation of non-elective/emergency surgery

Emergency surgical patients are at risk of deterioration if delayed. Determining patient priority and enabling timely access is crucial to reduce harm. Local arrangements to prioritise patients based on clinical urgency should be established.[36]

1.19 There should be local systems in place to triage patients with surgical emergencies. NELA reports proporion of patients for laparotomy arriving in theatre within three separate timeframes (<2 hours; 2-6 hours; 6-18 hours).[23] The World Society of Emergency Surgery study group proposed a classification to triage patietns for surgical emergencies. These timeframes could be used as a guide and adapted to design local triage systems.[37]

1.20 Prioritisation of cases based on their clinical 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.[3]

1.21 There should be a locally agreed policy which explains prioritisation of non-elective cases according to clinical urgency.

1.22 Priority of access should be given to emergency patients over elective patients.[4,9,**Error! Bookmark not defined.**,38] There should be a clear policy for cancelling elective surgery to enable additional emergency theatre provision.[2]

1.23 The theatre booking system should enable the identification and prioritisation of high risk cases.

1.24 The urgency of emergency cases should be clearly and unambiguously coded.[3]

1.25 There should be regular review of delays to facilitate improved theatre access and to promote accurate urgency coding at booking.

1.26 Certain urgent procedures can not be performed out of hours due to patient, specialist staff or equipment factors. Hospitals should consider collecting data on these procedures and creating alternative pathways.

1.27 There should be local arrangements in place to facilitate scheduling of procedures that not meet the description of either emergency or elective surgery.

Preanaesthetic assessment

Guidelines for preoperative assessment and preparation are comprehensively described in GPAS chapter 2: Guidelines for the provision of anaesthesia services for the perioperative care of elective and urgent care patients.

1.28 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.[23,3,39]

Preoperative

1.29 There should be a formalised integrated pathway for non-elective adult general surgical care which should be patient centred and include:[23,4,18,29,40]

- a clear diagnostic and management plan made on admission[41]

- early identification of comorbidities (including diabetes, dementia, cardiac pacemakers and internal defibrillators) and their management according to hospital guidelines
- medicine reconciliation to assess the risk of existing medications (including anticoagulation) and the risk associated with stopping long term medication[42]
- preoperative investigations and testing as appropriate[43,44]
- adequate testing capacity appropriate for the patient group and nature of local procedures to avoid delayed admission to the theatre/procedure room
- an investigation, such as echocardiograms, should be considered a core skill for an emergency anaesthetist
- building capacity for provision of special investigations, such as focused cardiac ultrasound (FICE) among emergency anasethetists trained to carry out the procedure
- 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[23,3]
- informed consent for surgery including identification of decision making proxies i.e. a lasting power of attorney[23,4]
- a plan for postoperative care[23,4]

1.30 All hospitals should have guidelines in place for the recognition and management of patients with sepsis, and compliance with these should be regularly audited.**Error! Bookmark not defined.**,[45,46]

1.31 An anaesthetist, AA or advanced nurse practitioner should preoperatively assess all patients undergoing emergency surgery who require anaesthesia. Adequate time should be available for this to occur as clinical urgency allows.[47,48]

1.32 A full anaesthetic management plan should be recorded in the patient's records or anaesthetic chart and initiated preoperatively.[73]

1.33 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.[4,3,18]

1.34 Preoperative assessment of patients, especially those at very high risk, can benefit from a multidisciplinary team approach involving cross specialty advice.[49] Early consultation with appropriate medical specialties should occur for appropriate conditions, e.g. delirium, acute kidney injury, diabetes mellitus and ischaemic heart disease.[3]

1.35 All decisions concerning the consent process (See Section 9) 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.[47,50]

1.36 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.[41,51]

1.37 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.[23,]**Error! Bookmark not defined.**

1.38 Guidelines for fasting before anaesthesia for emergency surgery should comply with national guidelines.[52]

1.39 Guidelines for postoperative planning should include plans for nutrition, including facilitation of enteral access or vascular access for parenteral support.[53,54,55]

Preoperative risk assessment

General recommendations pertaining to preoperative risk assessment are described in GPAS chapter 2: Guidelines for the provision of anaesthesia services for the perioperative care of elective and urgent care patients.

1.40 There should be a formalised integrated pathway for non-elective adult general surgical care which should be patient centred and include risk assessment and identification of the high risk patient[23,4,3,40]

1.41 There should be locally agreed guidelines for risk assessment and documentation.

1.42 All patients should undergo venous thromboembolism risk assessment and receive appropriate thromboprophylaxis.[4,56] This should include guidance on the novel oral anticoagulants and the management of patients requiring emergency surgery who are receiving them.[57]

1.43 Preoperative risk stratification should inform the decision making process for critical care admission.[23,24]

Postoperative

1.44 All areas, including emergency departments, admitting acutely ill patients should have early warning pathways in order to ensure prompt recognition of a deteriorating patient to trigger an appropriate response.[69] This should include policies for early medical review and early escalation to the responsible consultant surgeon or equivalent.**Error! Bookmark not defined.**,41,58,59,60,61

Transportation of the emergency patient

1.45 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.**Error! Bookmark not defined.**,62,63,64,65

1.46 Staffing should be provided at a level such that emergency theatre activity and critical patient care are not compromised when intra and inter hospital transfers are undertaken.[62]

1.47 All necessary equipment to facilitate safe transport of the patient should be available at all times.**Error! Bookmark not defined.**,62,65 Standardisation of transfer bags should be considered.[66]

1.48 Departments should have local guidelines for intrahospital transfers.

1.49 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.[66]

1.50 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.**Error! Bookmark not defined.**,62,64

1.51 Hospitals should collect data on inter and intra hospital transfers, including the effects on the emergency theatre and critical patient care. The transfer arrangements should not result in the interruption of a busy emergency list.

Handover

The handover of a patient's care happens at multiple points. Effective handover is a critical component of a patient safety culture.[67] 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 emergency patients. There is evidence that implementing a structured handover programme is associated with reducing medical errors and preventable adverse events.[68,69]

1.52 Handovers for patients requiring an emergency procedure should be structured to ensure continuity of care.[70]

1.53 Handover protocols for patients requiring an emergency procedure should include clear documentation of care delivered and and the future treatment plan for the patient.[12,71]

1.54 Organisations must create standardised documentation for patients undergoing invasive emergency procedures that promotes the sharing of patient information between individuals and teams at points of handover, and forms a documented record for future reference.[12]

1.55 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.[72,73]

Policies

General policies pertaining to the perioperative pathway are comprehensively described in GPAS chapter 2: Guidelines for the provision of anaesthesia services for the perioperative care of elective and urgent care patients.

1.56 The following policies (see Glossary) should be immediately and reliably available at sites where emergency anaesthesia and sedation are provided:

- management and running of the emergency theatre including an escalation plan for emergency theatre capacity and staffing[4]
- management of anaesthetic emergencies including guidelines for children
- difficult airway management, including the 'can't ventilate, can't oxygenate' scenario, fasting times, preanaesthetic assessment of the airway, availability and maintenance of the equipment and training of staff[74,75,76]
- major haeomorrhage protocol including clinical, laboratory and logistic responses[77,78]
- blood transfusion policy including transfusion for inter and intra hospital transfers[79]
- safe extubation of patients following emergency anaesthesia
- management of the deteriorating patient.[80,81]
- whom to call and what facilities can be utilised if two or more emergencies occur simultaneously
- a policy for the management of organ donation and retrieval**Error! Bookmark not defined.**,[82]
- a policy for managing delirium in the perioperative period.

1.57 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.[83]

1.58 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.[12]

1.59 An escalation policy should be in place for all medical, healthcare professional and managerial staff. An emergency protocol 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.

1.60 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.[84]

1.61 All patients undergoing emergency procedures must have the World Health Organization checklist completed. A modified checklist with fewer items may be more appropriate in some emergencies.[4, 18,85,86,87]

1.62 There should be a clear process in place for the referral of emergency patients requiring critical care, including paediatric patients, to an appropriate facility.[Error! Bookmark not defined.,41,51]

1.63 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.[77]

1.64 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.[79] Hospitals should have systems in place to ensure that blood can be cross matched, issued and supplied in a timely manner.

2 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).[9,29,88] The systems and environment within which people work and treat patients should be supportive of staff, enabling them to provide the best treatment possible, and are outlines in further detail in GPAS Chapter 1: The Good department.[6,89]

Anaesthesia team and theatre team

2.1 Hospitals admitting emergency surgical patients should provide at all times, a dedicated, fully staffed, operating theatre appropriate to the clinical workload. There should be provision to increase necessary resources to manage fluctuating workload and provide an acceptable standard of care.[2,18,Error! Bookmark not defined.]

2.2 The level of staffing should be sufficient 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.[12] Such service requirements should not result in interruption of busy emergency lists.[90]

2.3 Staff working in emergency theatres have to deal with multiple surgical teams, a wide range of procedures, unpredictable situations at short notice and changes to planned activity.

Staffing levels in the emergency theatres should reflect appropriate skill mix and seniority to deal with the demands of the service.[13]

2.4 Staff working in emergency theatres should have a wide range of competencies to manage a range of multi-specialties and complexities.[67]

2.5 The role of an 'emergency theatre coordinator' (see Glossary) should be considered for departments with a large emergency workload so that patient flow and prioritisation of cases can be actively managed.

2.6 Non-clinical aspects of managing an emergency list should be adequately supported for efficient running of the list.[73]

2.7 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.

2.8 The emergency anaesthesia team should be led by an autonomously practising anaesthetist (see Glossary) and include other healthcare professionals involved in the delivery of anaesthesia for emergency surgery including other departments such as radiology, medicine and emergency departments (ED).[2]

2.9 Anaesthetists assigned to provide cover for emergency lists should not also be assigned to undertake other activities such as elective work or supporting professional activities (SPA).[91]

2.10 Anaesthesia for emergency surgery should be 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 in accordance with the RCoA's Guidance on supervision arrangements for anaesthetists.[92]

2.11 Anaesthetists in training should be given the appropriate level of responsibility according to their competence and level of training, in order to gain the experience of emergency anaesthesia to be able to function as a consultant later in their career. Anaesthetists in training must be appropriately supervised at all times, and rotas and staffing arrangements should be in place to facilitate this.[93]

2.12 Anaesthesia Associates (AAs) should work under the supervision of a consultant anaesthetist at all times as outlined by the RCoA.[94,95] In some emergency situations, a ratio of 1:1 and direct supervision may be more appropriate in view of the high incidence of comorbidities, complications and mortality.

2.13 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. Certain circumstances may require additional assistance, and local arrangements should allow sufficient personnel and resources to support this.[84,96]

2.14 There should be dedicated administrative staff to support all aspects of the emergency anaesthesia service and to support and coordinate non-clinical activity.[12,91]

2.15 Whenever emergency surgery is undertaken, the revoery unit should be open continuously and adequately staffed.[84] 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.[71]

2.16 Recovery staff should have immediate access to the appropriate clinician in the perioperative period.

Staff wellbeing

General recommendations for staff wellbeing can be found in GPAS Chapter 1: The Good department.

2.17 Working to deliver emergency surgery is often a stressful, challenging environment. Stress, 'burnout' 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 wellbeing of staff.[97]

2.18 There should be adequate staffing levels to ensure rest breaks can be taken without interrupting the flow of the emergency theatre(s).[98] Appropriate facilities for these rest breaks should be provided.[97,99]

2.19 When members of the emergency team are involved in a critical incident, it may not be possible to find an immediate replacement. The situation and clinical commitment of individuals involved should be immediately reviewed by an appropriate senior person and if necessary alternative arrangements to cover emergency service should be made.[100]

3 Equipment, Services and Facilities

Equipment

3.1 In all areas in which emergency anaesthesia is undertaken the following equipment is required for the safe delivery of anaesthesia, and should be readily available at all sites where patients received anaesthetic intervention:

- oxygen supply including an emergency back up supply
- self-inflating bag
- facemasks
- suction equipment
- airways (nasopharyngeal and oropharyngeal)
- laryngoscopes, including at least one type of video laryngoscope
- intubation aids (bougies, forceps, etc.)
- supraglottic airways
- appropriate range of tracheal tubes and connectors
- heat and moisture exchange filters
- trolley/bed/operating table that can be rapidly tilted head down
- method of delivering anaesthesia using volatile anaesthetic agents or infusions (including target controlled infusion algorithms)
- equipment for invasive blood pressure and central venous pressure
- cardiac output monitoring

3.2 Patients receiving emergency anaesthesia care in a non-theatre location should have access to anaesthetic equipment, monitoring, drugs and personnel as in the theatre environment.

3.3 Specialist equipment that is not commonly used, or that is not time critical, should be available if required (e.g. oxford pillow, cell saver, hoists and transoesophageal echocardiogram).

3.4 Emergency theatres should be equipped with an appropriate ventilation system. Details of ventilation and air change times should be known and factored in to list management in all areas where an aerosol generating procedure may be performed during emergency anaesthesia.[101,102]

3.5 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.

3.6 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 appropriate non-theatre locations e.g. interventional radiology suites.

3.7 Hospitals should ensure that staff are trained and competent to use the equipment provided.

3.8 Equipment should be properly maintained and replaced in a timely and planned fashion.[103,104]

3.9 Theatre operating tables should be available to permit all types of emergency surgery to be undertaken. Appropriate operating tables with imaging access (carbon fibre), adjuncts for proper positioning and warming devices should be available.

3.10 There must be appropriate equipment available for transfer of the patient within the theatre, together with the appropriate staff trained to use it safely.[103,105,106]

3.11 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.[105,107,108]

3.12 Near patient testing for haemoglobin, blood gases, lactate, blood sugar and ketones should be readily available (see Glossary) for emergency theatres.[109]

3.13 Near patient testing for coagulopathy should be considered, particularly in areas where major blood loss is likely.[77] If near patient testing is not available laboratory testing should be readily available.

3.14 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.[77,110]

3.15 High flow nasal oxygen should be available in the emergency theatres.[76,111,112,113,114]

3.16 A rapid infuser allowing the infusion of warmed intravenous fluids and blood products should be available in the emergency theatre.[78,115,116] Staff should undergo regular training in its use and they should be able to troubleshoot common problems.

3.17 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.[78,117]

3.18 Equipment necessary to provide a range of patient analgesia should be available. There should be adequate facilities for postoperative monitoring of patient analgesia.**Error! Bookmark not defined.**,118

Monitoring

3.19 The standards of monitoring provided in all locations where emergency procedures are performed including non-theatre locations should be to the same standard as those provided in theatres.[109] This includes temperature and EtCO2 in recovery.

3.20 Appropriate equipment for invasive blood pressure, central venous pressure and cardiac output monitoring should be readily available.

3.21 Equipment for monitoring the depth of anaesthesia should be available for patients receiving emergency anaesthesia e.g. processed EEG particularly if TIVA is used for emergency surgery.[119,120]

Medication

3.22 All areas in which emergency anaesthesia is undertaken should be adequately stocked at all times with the range of medications required for immediate use in all types of urgent cases appropriate to the case mix accepted by the hospital. Prefilled syringes supplied by pharmacy should be considered especially in busy units.

3.23 Anaesthetic teams should consider carrying prelabbelled and/or prefilled drug boxes.[121]

3.24 Specialist medications that are not commonly used, or that are not time critical, should be readily available (see Glossary) if required (e.g. dantroline, esmolol, N acetylcysteine, octreotide).

Facilities

General

3.25 Facilities 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.[23,69,122,123]

3.26 There should be explicit arrangements made for the provision of care from specialties that are not available onsite, e.g. neurosurgery, cardiothoracic, vascular, ENT, maxillofacial, hepatobiliary, burns and plastic surgery, geriatric medicine, palliative care medicine.

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 2019 publication, Guidelines for the Provision of Intensive Care Services.**Error! Bookmark not defined.**

Adequate critical care facilities are integral to the care of 'high risk' patients receiving emergency anaesthesia.[23,]**Error! Bookmark not defined.**,124 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).[125,126]

3.27 There should be provision for high level of care for emergency patients where necessary.[3]

3.28 Critical care should be considered for all high risk patients requring emergency surgery. As a minimum, patients with an estimated risk of mortality of ≥5% should be considered for critical care.[4] 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.[18]

3.29 There should be locally agreed protocols for postoperative critical care admission, and compliance with these protocols should be audited.

3.30 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 patients to be cared for on a critical care unit after surgery.[23]

4 Training and Education

Teamwork is fundamental to the safe delivery of patient care in emergency surgery. Staff working in emergency theatres have to deal with multiple surgical teams with repeated changes to the composition of the team.

4.1 The core theatre team (see Glossary) should remain consistent where possible.[12]

4.2 Anaesthetists should be given support and time to familiarise themselves with non theatre locations and local working arrangements, e.g. during induction sessions prior to undertaking on call responsibilities.[12,127]

4.3 Multidisciplinary teams working together in emergency theatres should undergo training together, with a focus on teamwork, communication, human factors and handover.[12,70,128,129,130]

4.4 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.[83,131,132]

4.5 All staff should have access to adequate time, facilities (including simulation) and funding to undertake training.

4.6 Anaesthetists with a job plan that includes emergency anaesthesia should demonstrate ongoing continuing education in emergency anaesthesia, and continuing professional development (CPD) 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.[18]

4.7 Regular daytime emergency lists should be used as a teaching resource and staffed appropriately to facilitate this.[133]

4.8 All efforts should be made to ensure anaesthetists in training receive adequate experience in emergency anaesthesia, and completion of workplace based assessments should be supported.[1] Departments should monitor the frequency and the nature of non theatre calls to establish if the anaesthetists in training receive appropriate support and training, and the patients receive adequate care. Departments should use this data to review resource allocation.

4.9 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.[12]

4.10 Departments should consider developing diagnostic ultrasound skills as appropriate to emergency anaesthesia.

4.11 Clinicians undertaking emergency anaesthesia must be familiar with managing patients with a tracheostomy.[75,76]

5 Patient Information

The basic principles of information and consent that apply to elective patients also apply to emergency patients. 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 medications, 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.

The Royal College of Anaesthetists have developed a range of Trusted Information Creator Kitemark accredited patient information resources that can be accessed from our website. Our main leaflets are now translated into more than 20 languages, including Welsh.

5.1 If needed, patients and/or advocates should have access to an interpreter wherever possible to facilitate communication.[134]

5.2 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) and/or carer(s).[47,135] When this is not feasible in an emergency situation communicating the decisions to the next of kin should be considered. If there is no next of kin, independent medical advice or a second opinion should be sought.

5.3 Paper and/ or electronic based patient information leaflets in addition to a verbal explanation should be provided to emergency patients to improve retention of information.[136]

Consent

5.4 All practitioners must follow the practices outlined in the GMC *Decision making and consent* guidance. Documentation of the risks discussed or the dialogue leading to a decision is required in accordance with paragraphs 50–55.[137]

5.5 Informed consent should take into account benefits and risks of the procedure, alternative options available and the option of doing nothing. This should happen at the earliest possible opportunity in view of limited time available for the patients having emergency surgery to consider the information.[5,**Error! Bookmark not defined.**,138,139] All discussions that take place should be clearly documented.

5.6 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.[140]

5.7 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.[69,141]

Breaking bad news, clinical benefit and end of life decisions

5.8 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.[142]

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

5.10 Discussion and reasons behind decisions taken, as well as the information given to the patient and relatives, should be clearly recorded.[143,144]

5.11 Mortality discussions (see Glossary) should be documented for patients undergoing an emergency laparotomy.[145]

5.12 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.[146]

5.13 Hospitals should have local policies (see Glossary) 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.

5.14 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.

5.15 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.[147]

5.16 Hospitals should have a treatment escalation plan and/ or DNACPR guidance and documentation that complies with national requirements.[112,148]

5.17 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.[80]

6 Areas of Special Requirement

Patients who are older

There is an increasingly older population presenting to hospitals for emergency surgery, reflecting the changing population demographics. Patients who are older have a decreased physiological reserve and higher incidence of comorbidities, polypharmacy, frailty and cognitive decline, making decision making more complex in this patient group.[149] Poor cognition, hearing and eyesight may make communication difficult. 50% of patients undergoing emergency laparotomy are over 70 years old and 55% of these patients are ASA 3 or above.[44]

When patients who are older are admitted following trauma, a geriatrician assessment is associated with reduced mortality.[150] In laparotomy patients who are older, postoperative geriatric medicine review is associated with substantial lower mortality.[151]

The outcomes following emergency surgery for patients who are older (particularly those who require support for daily living) are worse than for younger patients. For emergency laparotomy patients, the mortality of a patient aged over 70 years is six times higher than that of a patient aged younger than 50 years old.[23] Functional outcomes are unpredictable, but one-third of octogenarian survivors will not recover to their preoperative function.[152,153]

General recommendations for patients who are older are described in GPAS chapter 2: Guidelines for the provision of anaesthesia services for the perioperative care of elective and urgent care patients.

6.1 Patients who are older that are admitted following trauma should have a geriatric assessment.[150]

6.2 All patients who are older requiring emergency surgery should be routinely assessed for multimorbidity, frailty,cognition and polypharmacy.[23,Error! Bookmark not defined.,Error! Bookmark not defined.,48]

6.3 Planning of care and decisions to operate should reflect the outcomes for patients who are older having emergency surgery and should include discussion of issues around risk versus benefit, clinical benefit and realistic longer-term outcomes, e.g. requirement for nursing home care. This discussion should involve the multidisciplinary team, as well as the patient, families and carers where possible.[Error! Bookmark not defined.]

6.4 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.[154,155]

6.5 Postoperative pain protocols should be individualised to suit each patient and should take account of any possible cognitive impairment.[156] Specific algorithms for the assessment of pain and postoperative analgesia protocols are recommended in older patients.[Error! Bookmark not defined.]

6.6 The risk of postoperative functional decline following emergency surgery should be considered. Policies (see Glossary) should be developed for the prevention, recognition and management of common postoperative geriatric complications and/or syndromes, including delirium, falls, functional decline and pressure area care.[Error! Bookmark not defined.,Error! Bookmark not defined.,157]

6.7 Patient with a fraily score of 5 and above should receive a comprehensive geriatric assessment. There should be a focus on multidisciplinary working and integrated pathways to reduce complications. This includes shared decision making based on best treatment options and informed patient preferences.

6.8 There should be planning at local and regional level for the increase in resources that will be required for increasing numbers of older emergency surgical patients.[Error! Bookmark not defined.]

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.

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.

Detailed recommendations for paediatric patients are comprehensively described in GPAS Chapter 10: Guidelines for the Provision of Paediatric Anaesthesia Services.

6.9 Anaesthesia for children should be undertaken or supervised by anaesthetists who have undergone appropriate training and maintained their competence.[133,158]

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

6.11 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.

6.12 Departments should participate in regular network audits of emergency surgical work.[159,160,161,162]

6.13 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 stabilization.[163,164]

6.14 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 policies (see Glossary) should be in place for the management of such transfers and the most experienced anaesthetist with appropriate skills, and an anaesthetic practitioner, should accompany the child.[165]

Patients with obesity

Obesity is an increasingly significant health issue in the UK.[166] The health survey for England 2019 estimates that 28% of adults in England are obese and a further 36% are overweight. Patients with obesity are at an increased risk of heart disease, diabetes, cancer and stroke. Obesity can make surgery particularly challenging.[167]

6.15 An operating table in the emergency area, hoists, beds, positioning aids and transfer equipment appropriate for patients with obesity should be available and staff should be trained in its use and its limitations.[94,166]

6.16 Specialist positioning equipment for the induction of anaesthesia and intubation in the patient with obesity should be available in the emergency area.[166]

6.17 Patients with morbid obesity requiring emergency surgery should have experienced anaesthetists and surgeons available (typically, but not exclusively, at a consultant level), in order to minimise operative time.[166]

6.18 Patients with morbid obesity should be considered for level 2 or 3 critical care postoperatively including the provision of continuous positive airway pressure therapy (CPAP) and other respiratory support measures.[166]

6.19 As there are additional risks for patients with obesity, consider undertaking these procedures within daylight hours.

High risk patients including emergency laparotomy patients

High risk patients are those that are defined as having a predicted risk of death greater than or equal to 5%.[23,4] Some lower risk patients are still at significant risk following emergency surgery (e.g. 2% mortality risk is higher than almost all elective surgery). Those patients undergoing emergency

laparotomy constitute a defined group, of whom the majority are in the 'high risk' category. The National Emergency Laparotomy Audit (NELA) 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 high risk patients undergoing emergency anaesthesia.[23,4,18,27,40]

6.20 Hospitals should have care bundles for the anaesthetic management of common and high risk surgical emergency patients to improve outcomes.[23,44,168]

6.21 Systems should be in place to ensure timely surgical review (typically at a consultant level) of high risk patients and access to diagnostic imaging and urgent reporting.

6.22 There should be a documented evaluation of mortality and relevant morbidity risk prior to surgery using a standardised perioperative risk tool.[169,170,171] This will inform both clinicians and the patient about decision making and consent.[23]

6.23 High risk patients should have timely access to appropriate care including resuscitation, antibiotics, interventional radiology or surgery.[169]

6.24 Hospitals should have policies for the assessment and management of suspected sepsis. 'The Sepsis Six' is a pragmatic approach to this.[169] Early consideration of surgery and antibiotic prophalxis should be considered in patients who are at high risk of sepsis.

6.25 High risk patients (5%+ mortality risk) or lower risk patients undergoing high risk surgery, should receive direct consultant anaesthetist and consultant surgeon delivered care in the operating theatre.[23,172]

6.26 High risk patients who are older undergoing an emergency laparotomy should have a postoperative geriatric medicine review.[151]

6.27 High risk patients (5%+ mortality risk) or lower risk patients lower risk patients undergoing interventions that require higher postoperative care due to the nature of the procedure, such as liver resection durgery, should receive postoperative care in the critical care unit.[23]

6.28 Hospitals should consider postoperative critical care if >4 units has been transfused as this increases risk of pulmonary and infectious complications and mortality.[23,173]

6.29 Postoperative facilities should be provided to support the best choice of analgesia for patients undergoing an emergency laparotomy.[174]

6.30 Multidisciplinary clinical involvement including critical care, geriatric, paediatric, diabetic teams and other specialists should be considered throughout the perioperative pathway of the patient as appropriate.

6.31 Hospitals should have clinical and managerial strategies to reduce complications which have been shown to have a major impact on both short and long term outcomes.**Error! Bookmark not defined.**,80

Diabetes management

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 patients without diabetes.[175,176]

6.32 Patients who have poorly controlled diabetes are at risk of serious complications and may require meticulous management of fluid, electrolyte and insulin therapy. All locations

including remote sites where emergency surgery is performed should be able to manage patients with poorly controlled diabetes 24/7. [175]

6.33 Hospitals should consider appointing a lead anaesthetist for diabetes.

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

6.35 Hospitals should involve patients in their own diabetes management.[175] Most patients with diabetes are experts in managing their own disease and the management of the emergency surgical patient with diabetes can usually be undertaken with only minor modifications in the patient's usual regime.

6.36 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. Hospitals should consider a multidisciplinary review of these patients including the involvement of senior anaesthetic staff and specialist diabetic medical and nursing staff.

6.37 Hospitals should have explicit policies (see Glossary) 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 critical care environment rather than a surgical ward.

6.38 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 patients with diabetes for investigations and for theatre.

6.39 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. Although the primary duty of care is to the mother, fetal and maternal wellbeing are inextricably linked.

Elective anaesthetic services for the peripartum period are covered in GPAS chapter 9: Guidelines for the Provision of Anaesthesia Services for an Obstetric Population.

6.40 There should be a multidisciplinary team approach to care for pregnant women requiring non-obstetric emergency surgery involving anaesthetists, obstetricians, surgeons, paediatricians and midwives.[177,178,179]

6.41 Surgery should be undertaken where neonatal and paediatric services are readily available whenever possible.[177]

6.42 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.[177,178,180]

6.43 Informed consent for the surgical procedure should include consideration of fetal wellbeing, the possibility of caesarean delivery and any risks related to anaesthesia for mother and child.[179]

6.44 Equipment for maternal positioning and uterine displacement should be available.[178]

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

- aspiration prophylaxis[178]
- difficult airways and failed intubation[76,179,181,182]
- cardiopulmonary resuscitation in the pregnant woman and perimortem caesarean delivery[180,181,183]
- anti-D immunoglobulin administration[184]
- major haemorrhage, venous thromboembolism prophylaxis and sepsis[120,177,180,183,185]
- anaesthesia and surgery in breast-feeding mothers[186,187]
- safe medication administration including avoidance of codeine in breastfeeding mothers[188]

6.46 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.[183]

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, patients who are older and patients with cognitive impairment including dementia and delirium.

6.47 Hospitals must have local policies in place for the identification, support and safeguarding of vulnerable adults.[5,138]

6.48 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.[189] This is a rapidly changing area and clinicians should have access to expert advice.

Diverse cultures and languages

6.49 Hospitals should have policies to support patients and staff of diverse religious beliefs and cultural backgrounds.[138]

6.50 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'.[190]

7 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.[78]

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).[5] 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',[191] 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.[5,20,138]

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

8 Audit, Quality Improvement and Research

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.[18,192]

Detailed recommendations for clinical governance are comprehensively described in GPAS chapter 1: The Good Department.

8.1 Robust data collection underpins much of the success in documenting and learning from experiences.[23,18,27] All institutions providing anaesthesia care to emergency surgery patients should collect the required data to be able to produce an annual report. This report should be reviewed regularly and used for organisational learning.[87]

8.2 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.[193]

8.3 Ongoing audits of mortality and morbidity outcomes, patient experience, demad on services, emergency theatre capacity, efficiency and productivity should be performed. Reports of relevant data should be made readily available to staff. [13,139]

8.4 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.[23,131,193,194,195,196,197]

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

8.6 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.[27,192]

8.7 Quality improvement teams should be considered to drive change. 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. [27, 191]

8.8 Anaesthetic departments should participate in research activities of national bodies including the National Institute of Academic Anaesthesia, Health Services Research Centre, UK Perioperative Medicine Clinical Trials Network and Research and Audit Federation of Trainees.

9 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.

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 older patient:**Error! Bookmark not defined.**,198

- 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
- 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 aging 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
- development of mathematical models to determine the optimal size of emergency teams on call[199]
- network collaboration to establish standards for the top 20 emergency procedures.

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

Autonomous practising anaesthetist – a consultant or SAS doctor who can function autonomously to a level of defined competencies, as agreed within local clinical governance frameworks.

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.

Core theatre team – the emergency theatre team comprises of surgical, anaesthetic and nursing staff. It may not be possible for the staff working in emergencies to form a core team, which is regularly present on the shop floor every day of the week. At the very least, one member of the surgical, anaesthetic and nursing team should be someone who works in emergency theatre on a regular basis.

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

Emergency anaesthesia – emergency anaesthesia within this chapter applies to anaesthesia that is given in immediate (within minutes of a decision to operate) or urgent (within hours of a decision to

operate) procedures as classified by the National Confidential Enquiry into Patient Outcome and Death.**Error! Bookmark not defined.**

Emergency theatre coordinator - an individual that supports the autonomously practising anaesthetist with non-clinical aspects of the emergency list on the day. The non-clinical aspects include but are not limited to; coordinating meetings with multidisciplinary teams, updating electronic booking system if applicable, patient preparation on the wards including liaising with bed management to improve postoperative flow, availability of surgeons, any special equipment requirement, night handover and order of cases. The emergency theatre coordinator may also assist with incident reporting and activating escalation pathways. The objective is to facilitate the management of cases in an efficient manner and free the clinician to focus on clinical aspects of the patient care.

Mortality discussions – all high risk patients should be given a clear idea of risk of death. These discussions should be based on an objective risk assessment and involve appropriate members of the multidisciplinary team. The objective is to make clinician recommendations, a shared decision process. These discussions need documenting in medical records, particularly in high risk patients.

Policies - is used as an umbrella to refer to a form of locally agreed process that is maintained, kept up-to-date (reviewed at least every three years), can be used as a reference and is used during induction. This could be in the form of a policy document, practice document or even a piece of software that fulfils the function of the standard. The important criteria are that everyone knows the reference point exists and where to find it, and that the reference point is kept up to date in accordance with the trust/board policies. Policy documents should be standardised in format, have clear review dates and have been ratified in accordance with trust/board policies.

Readily available - unrestricted access to a facility or a device in a timely manner so that the necessary care and treatment of the patient is not delayed.

Recovery unit – may also be referred to as post-anaesthetic recovery unit, theatre recovery, recovery or recovery unit. It is an area, normally attached to theatres, designed to provide care for patients recovering from general anaesthesia, regional anaesthesia, or local anaesthesia. In this document the term post anaesthesia care unit (PACU) is only used to refer to a unit that can offer level 1+ or enhanced care as defined by the Faculty of Intensive Care Medicine.

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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