

## Chapter 9

# Guidelines for the Provision of Anaesthesia Services (GPAS)

## Guidelines for the Provision of Anaesthesia Services for an Obstetric Population 2020



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

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## Guidelines for the Provision of Anaesthesia Services for an Obstetric Population 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 Interests policy as described in the GPAS Chapter Development Process Document.

Declarations were made as follows:

- four members of the CDG were authors of twelve of the items of evidence

The nature of the involvement in all declarations made above was determined as not 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 the GPAS Guidelines

*The 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*

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*of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national Guidelines or any local guidelines derived from them 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 (RCoA) 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 defined in the Equality Act 2010) and those who do not share it
- given regard to the need to reduce inequalities between patients in access to, and outcomes from healthcare services and to ensure services are provided in an integrated way where this might reduce health inequalities.

### GPAS Guidelines in context

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

Each of the GPAS chapters should be seen as independent but interlinked documents.

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

This chapter is intended to define the standards for the provision of anaesthetic care in all consultant-led maternity units in the UK. The guidance is intended to be used by anaesthetists and healthcare managers with service delivery responsibilities, and to describe safe standards of care for the women in their units.

These recommendations are not intended to describe the best practice for clinical care; the main focus is on outlining requirements for a service to be safe and effective and to ensure robust governance and training structures to support the provision of care.

These guidelines have been developed using a process accredited by the National Institute for Health and Care Excellence in accordance with their criteria for guidance production.<sup>1</sup> They are evidence based and peer reviewed. One should note that there are few randomised, controlled trials available in the field of obstetric anaesthetic service provision; the vast majority of data come from retrospective cohort studies and expert opinion. Our analysis of the available literature, combined with other national and international guidelines and recommendations, have been considered in formulating this chapter. We have also given consideration to recommendations made following enquiries and investigations where there have been failings in care with a view to ensuring that lessons are learnt from these tragic cases.<sup>2,3 4</sup>

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Anaesthetists may be involved at all stages of a woman's pregnancy, and there are therefore recommendations in this chapter relevant to the antenatal, peripartum and postpartum periods. While women with risk factors can and should be identified and managed appropriately by the multidisciplinary team during their pregnancies, it is possible for low-risk women to develop acute and potentially serious conditions requiring the need for rapid intervention. There is no 'one size fits all' in terms of maternity units; there is evidence of considerable variation in the care delivered across the UK.<sup>5</sup> Units vary in delivery rates, acuity and dependency of the women they care for, but they should all be prepared to manage acute medical or obstetric deterioration in any woman. Our aim is for our recommendations to ensure that all units are fit for this purpose and, through their implementation, prevent harm to women.

We know that vulnerable high-risk groups of maternity patients exist: women who do not speak English or who are born outside the UK; some ethnic minority groups; women in abusive relationships; older mothers; and, those coming from the most deprived areas. In addition, those with serious pre-existing medical or psychiatric conditions also have a higher mortality rate than that for the general pregnant population.<sup>4,5,6</sup> It is our aim to provide recommendations that address the specific needs of these (and all) women to define a service that reduces their exposure to that risk of harm.

Any service needs a system of 'checks and measures', and we have made recommendations for monitoring the care being provided. It is important to understand, though, that this goes beyond performing routine audits; it requires the development and maintenance of an organisational commitment towards high quality care and a strong safety culture in maternity units. This commitment comes from the hospital management as well as the maternity unit staff, and the unit must be provided with adequate resources to implement this system. We must never miss the opportunity to learn from past experience.

## Scope

### Objective

To provide and describe current best practice in the provision of anaesthetic services for an obstetric population, supported by evidence and national recommendations where available, for anaesthetists with responsibilities for service delivery and healthcare managers.

### Target population

All pregnant women who require anaesthetic input for:

- antenatal anaesthesia
- labour
- peripartum operative procedures.
- high dependency care on labour ward
- obstetric procedures during pregnancy, eg cervical sutures, fetal surgery.

Anaesthetic departments that provide anaesthesia or analgesia input as detailed above.

### Healthcare setting

All settings in which obstetric anaesthesia or analgesia services are provided.

### Clinical management

Key components for the provision of anaesthesia or analgesia services for an obstetric population.

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Key components needed to ensure provision of high quality anaesthetic services for an obstetric population.

Areas of provision considered:

- levels of provision of service, including (but not restricted to) staffing, equipment, support services and facilities
- areas of special requirement, such as maternal critical care and the morbidly obese woman
- training and education
- research, audit and quality improvement
- organisation and administration
- patient information and communication.

Issues that will not be covered:

- clinical guidelines specifying how healthcare professionals should care for patients
- national-level issues.

### Exclusions

Provision of obstetric services by a specialty other than anaesthesia.

Pregnant women who require non-obstetric surgical intervention outside the immediate peripartum period.

### Introduction

Pregnancy and the time around the birth of a baby is usually an exciting time in the life of a family, but it also brings with it potential risks to mother and baby. We are fortunate in the United Kingdom to have a low maternal mortality rate (MMR) but we have seen a plateau in the UK's MMR in the last triennium.<sup>4,7,8</sup> Our continued national learning from the confidential review of every maternal death over the last seven decades has allowed us to determine where deficiencies in service provision have led to substandard or poor care and to identify areas where improvements to care can be made to reduce the risk for mothers and babies. It is vital that we use this shared learning and the currently available evidence to shape our provision of care to pregnant and recently delivered women, both here in the UK and with the wider population globally.

Working on delivery units can be incredibly rewarding for obstetric anaesthetists and the wider multidisciplinary team, but it can also be highly challenging and rapidly changing. It is not possible to identify all women or babies who are at risk of rapid deterioration, but we need to be able to respond appropriately and safely in the event of an emergency. Obstetrics accounts for a large proportion of the emergency surgery performed in hospitals.<sup>9,10</sup> We have emphasised in these recommendations the importance of training and working as a team when delivering care in maternity units. This is truly a multidisciplinary workforce, where obstetricians, anaesthetists, neonatologists, midwives, theatre staff, anaesthetic assistants, and many others work closely alongside each other in situations that can be stressful. To ensure that teams can function effectively in this environment, they need to train together and have the appropriate infrastructure and necessary resources to meet these expectations.

The anaesthetist is now a well recognised and busy member of the delivery unit team. Approximately 60 per cent of women require anaesthetic intervention around the time of delivery of their baby, but the total anaesthetic involvement is higher. It is currently difficult to quantify other non-anaesthetic procedures that anaesthetists carry out on the delivery suite.<sup>11</sup> Approximately 1 in 4 women deliver by caesarean section, and many more require anaesthetic care for

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operative/assisted deliveries and procedures during pregnancy or around the time of delivery.<sup>12</sup> Anaesthetists are also involved in planning the care of high-risk women during the antenatal period. While most women are considered low risk at the start of their pregnancies, the obstetric population is changing. In 2015, the largest percentage increase in fertility rates was for women aged 40 and over (a group whom have been identified as at high risk of mortality in the recent MBRRACE report) and the incidence of obesity in this country continues to rise.<sup>4,13,14</sup> The number of women who have had a previous caesarean delivery has risen, and with that comes the risks of complications related to placental adhesion and uterine rupture. More women with significant pre-existing conditions, e.g. congenital cardiac disease, are proceeding with their pregnancies, and they require specialised services to support them during this time. These recommendations outline areas where tertiary units are expected to take a lead role, but, as a pregnant woman may present to any unit, they should all be ready to recognise and manage the acutely deteriorating woman with pathways in place to obtain expert guidance when required.

Maternity services are subject to considerable patient expectation; through media, internet and educational resources, women and their families are often well informed about what to expect at delivery, and many are keen for a particular mode of delivery or type of analgesia. We have to deliver an anaesthetic service that is safe and effective, and that also aims to meet these expectations where appropriate.

Further National Institute for Health and Care Excellence guidelines on intrapartum care for the high risk maternity population was published in 2019, along with Royal College of Anaesthetists' guidance on managing critically ill women (updating recommendations made in 'Providing equity of critical and maternity care for the critically ill pregnant or recently pregnant woman').<sup>15,16,20</sup> These are likely to influence the provision of care for high risk and acutely unwell women in the year to come after publication of this year's Guidelines.

## Recommendations

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

## Glossary

**Busy units** – The busyness of a unit cannot be defined solely by the number of births. For the anaesthetic department, the number of anaesthetic interventions, (defined as the number of regional anaesthetics e.g. epidural, spinal, combined spinal-epidural, where the indication was 'labour', the number of caesarean sections, instrumental deliveries and any other procedure performed in the operating theatre, the number of critically ill women requiring anaesthetic input and the number of women seen in the anaesthetic antenatal clinics) may provide the best proxy measure to judge the busyness of the unit.<sup>17</sup> In this document, the term 'busier units' is used to denote those units that, due to the number of anaesthetic interventions and/or other local factors, require higher levels of resources in order to deliver the necessary anaesthetic service.

**Duty anaesthetist** – The term 'duty anaesthetist' is used here to denote the anaesthetist who is the doctor immediately responsible for the provision of obstetric anaesthetic services during the duty period.

**Lead anaesthetist** – Staff grade, associate specialist and specialty (SAS) anaesthetists 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.



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

**Obstetric unit** – an NHS clinical location in which care is provided by a team, with obstetricians taking primary professional responsibility for women at high risk of complications during labour and birth. Midwives offer care to all women in an obstetric unit, whether or not they are considered at high or low risk, and take primary responsibility for women with straightforward pregnancies during labour and birth. Diagnostic and treatment medical services, including obstetric, neonatal and anaesthetic care, are available on site 24 hours a day.<sup>18</sup>

**Obstetrician-led care** – Care in labour where the obstetrician is responsible for the woman's care. This should only be provided in an obstetric-led unit in a hospital. Much of the woman's care will still be provided by a midwife.<sup>19,20</sup>

**Obstetric team** – The term 'obstetric team' is used here to denote all the members of the multidisciplinary team that work in the maternity unit<sup>21</sup>

**Supervising consultant** – The term 'supervising consultant' is used here to denote the consultant anaesthetist with responsibility for the delivery of obstetric anaesthetic services during the duty period.

**Supervision** – Trainees should be supervised in accordance with the curriculum.<sup>91</sup> The diverse nature of SAS posts means that the standards of education, training and experience that can be expected from post holders can vary quite widely. The degree of supervision a doctor requires should be agreed via a robust, local governance process and follow the RCoA guidance on 'Supervision of SAS and other non-consultant anaesthetists'.<sup>22</sup> More experienced SAS doctors may have the expertise and ability to take responsibility for patients themselves, without consultant supervision, under certain circumstances.

### 1 Staffing Requirements

#### The duty anaesthetist

The duty anaesthetist's focus is the provision of care to women in labour or who, in the antenatal or postpartum period, require medical or surgical attention. The duty anaesthetist will be a consultant, an anaesthetic trainee or a staff grade, associate specialist and specialty (SAS) doctor.

- 1.1 To act as duty anaesthetist without direct supervision from a consultant, the anaesthetist should meet the basic training specifications and have attained the RCoA's Initial Assessment of Competency in Obstetric Anaesthesia.<sup>23</sup>
- 1.2 There should be a duty anaesthetist immediately available for the obstetric unit 24/7. This person's focus is the provision of care to women in labour or who, in the antenatal or postpartum period, require medical or surgical attention. The role should not include undertaking elective work during the duty period.<sup>24</sup>
- 1.3 Busier units should consider having two duty anaesthetists available 24/7, in addition to the supervising consultant.<sup>24</sup>
- 1.4 In units offering a 24-hour neuraxial analgesia service, the duty anaesthetist should be resident on the hospital site where neuraxial analgesia is provided (not at a nearby hospital).
- 1.5 The duty anaesthetist should have a clear line of communication to the supervising consultant at all times.
- 1.6 It is recognised that in smaller units, it may be difficult to have a duty anaesthetist exclusively dedicated to the delivery unit. If the duty anaesthetist has other responsibilities, these should



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be of a nature that would allow the activity to be immediately delayed or interrupted should obstetric work arise. Under these circumstances, the duty anaesthetist should be able to delegate care of their non-obstetric patient immediately to be able to respond to a request for care of obstetric patients. Therefore, for example, they would not simultaneously be able to be a member of the on-call resuscitation team. If the duty anaesthetist covers general theatres, there should be another anaesthetist ready to take over immediately should they be needed to care for obstetric patients.

- 1.7 Adequate time for formal handover between shifts should be built into the timetable.
- 1.8 A structured tool should be considered to facilitate handover.<sup>25</sup>
- 1.9 The duty anaesthetist should participate in delivery suite ward rounds.<sup>26</sup>

### The lead obstetric anaesthetist

- 1.10 Every obstetric unit should have a designated lead anaesthetist (see glossary) with specific programmed activities allocated for this role.
- 1.11 The lead obstetric anaesthetist should be responsible for the overall delivery of the service, which includes ensuring that evidence-based guidelines and protocols are in use and are up to date; monitoring staff training, workforce planning, and service risk management; and ensuring that national specifications are met, and auditing the service against these agreed standards, including anaesthetic complication rates.
- 1.12 The lead obstetric anaesthetist should ensure representation of the anaesthetic department at multidisciplinary meetings for service planning, e.g. labour ward forum.<sup>24</sup>
- 1.13 The lead obstetric anaesthetist should ensure that there are ongoing quality improvement projects in place to maintain and improve the care in their units.<sup>27</sup>

### Consultant responsibilities

- 1.14 As a basic minimum for any obstetric unit, a consultant anaesthetist should be allocated to ensure consultant cover for the full daytime working week (that is, ensuring that mon-fri, morning and afternoon sessions are staffed).<sup>24</sup> This is to provide urgent and emergency care, not to undertake elective work.
- 1.15 In busier units, increased levels of consultant cover should be considered, reflecting the level of consultant obstetrician staffing in the unit.<sup>28</sup> This may involve extending the working day to include consultant presence into the evening session and/or increasing consultant numbers.
- 1.16 Additional consultant programmed activities should be allocated for:
  - elective caesarean deliveries antenatal anaesthetic clinics (or to review referrals if no formal clinic is in place).<sup>24</sup>
- 1.17 In units where trainee anaesthetists work a full or partial shift system, and/or rotate through the department every three months (or more frequently), provision of additional consultant programmed activities should be considered, to allow training and supervision into the evening.<sup>29</sup>
- 1.18 There should be a named consultant anaesthetist responsible for every elective caesarean delivery operating list. This consultant should be immediately available. The named consultant should have no other clinical responsibilities.

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- 1.19 Consultant support should be available at all times with a response time of not more than half an hour to attend the delivery suite, and maternity operating theatre. The supervising consultant should not therefore be responsible for two or more geographically separate obstetric units.
- 1.20 In busy units, consideration should be given to extending resident consultant cover into the evening
- 1.21 Staff working in the maternity unit should be aware of their supervisor's identity, location and how to contact them.<sup>30</sup> The name(s) of the consultant(s) covering the delivery suite should be clearly displayed and easily visible to all staff, and contact numbers readily available.
- 1.22 The anaesthetist caring for the woman should not be responsible for neonatal resuscitation and the care of the newborn baby.<sup>21</sup>

### Anaesthetic assistance

- 1.23 Women requiring anaesthesia in the peripartum period should have at least the same standards of perioperative care as for any surgical patient.<sup>31</sup>
- 1.24 The anaesthetist should have a competent trained assistant immediately available for the duration of any anaesthetic intervention and this practitioner should not have any other duties.<sup>31</sup>
- 1.25 All theatre staff acting as anaesthetic assistants should comply fully with current national qualification standards, and be required to have attained and maintained the relevant competencies to perform the role (an example of these competencies is referenced).<sup>32,33</sup>
- 1.26 Anaesthetic assistants who cover obstetrics should demonstrate additional knowledge and skills specific to the care of pregnant women.<sup>32</sup>
- 1.27 Anaesthetists and anaesthetic assistants working without direct supervision in obstetric theatres and on the delivery suite should be familiar with the environment and working practices of that unit, and work there on a frequent basis to maintain that familiarity.

### Post-anaesthetic recovery staff

- 1.28 All women requiring postoperative recovery care should receive the same standard of care as the non-obstetric postoperative population.<sup>33,34,35,36</sup>
- 1.29 All theatre and post-anaesthetic recovery staff looking after the obstetric population should be familiar with the area for recovery of obstetric patients and be experienced in the use of the different early warning scoring systems for obstetric patients. They should have been trained to the same standard as for all recovery nurses, have maintained these skills through regular work on the theatre recovery unit, and have undergone a supernumerary preceptorship in this environment before undertaking unsupervised work.<sup>33,36</sup>

### Other members of the team

- 1.30 An adult resuscitation team trained in resuscitation of the pregnant patient should be immediately available.<sup>37</sup>
- 1.31 There should be secretarial support for the department of anaesthesia, including the obstetric anaesthetic service.

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- 1.32 Provision should be made to ensure access to appropriate healthcare professionals to support women who require their services, such as clinical pharmacists, dietitians, outreach nurses and physiotherapists.<sup>16</sup>
- 1.33 Locum anaesthetists should be assessed to ensure their competence prior to undertaking work without direct supervision.<sup>24</sup>

## 2 Equipment, services and facilities

### Equipment

- 2.1 Blood gas analysis (with the facility to measure serum lactate and the facility for rapid estimation of haemoglobin and blood sugar) should be available on the delivery suite.
- 2.2 Delivery suite rooms should be equipped with monitoring equipment for the measurement of non-invasive blood pressure, oxygen saturation and heart rate.
- 2.3 Delivery suite rooms should have oxygen, suction equipment and access to resuscitation equipment. Equipment should be checked daily in accordance with the Association of Anaesthetists published guidelines.<sup>38</sup>
- 2.4 Delivery suite rooms must comply with Control of Substances Hazardous to Health (COSHH) Regulations 2002 and guidelines on workplace exposure limits on waste gas pollution.<sup>39,40</sup>
- 2.5 The standard of monitoring in the obstetric theatre should allow the conduct of safe anaesthesia for surgery as detailed by the Association of Anaesthetists standards of monitoring.<sup>41</sup>
- 2.6 A fluid warmer device allowing rapid transfusion of blood products and intravenous fluids should be available.<sup>42</sup>
- 2.7 A rapid infusion device should be available for the management of major haemorrhage.<sup>42</sup>
- 2.8 In tertiary units, with a high risk population, it is recommended that there should be equipment to enable near patient estimation of coagulation such as thromboelastography (TEG) or thromboelastometry.<sup>57</sup>
- 2.9 Cell salvage may be considered for women who refuse blood products or where massive obstetric haemorrhage (MOH) is anticipated but it should not be used routinely for caesarean delivery. Women should be informed of the risks and benefits of its use and staff who operate this equipment should receive training in how to operate it, and use it frequently to maintain their skills.<sup>43,44</sup>
- 2.10 Devices, such as warming mattresses should be available to prevent and/or treat hypothermia.<sup>45</sup>
- 2.11 A difficult intubation trolley with a variety of laryngoscopes, including video laryngoscopes; tracheal tubes (size 7 and smaller); laryngeal masks, including second generation supraglottic airway devices; and other aids for airway management, should be available in theatre. The difficult intubation trolley should have a standard layout which is identical to trolleys in other parts of the hospital so that users will find the same equipment and layout in all sites.<sup>46,47</sup>
- 2.12 Patient controlled analgesia (PCA) equipment should be available for postoperative pain relief, and staff operating it should be trained in its use and how to look after women with PCA.<sup>48</sup>

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- 2.13 The maximum weight that the operating table can support should be known, and alternative provision made for women who exceed this.
- 2.14 Equipment to facilitate the care of morbidly obese women (including specialised electrically operated beds, and positioning aids such as commercially produced ramping pillows, weighing scales, sliding sheets, and hover mattresses or hoists) should be readily available and staff should receive training on how to use the specialised equipment.<sup>49</sup>
- 2.15 Ultrasound imaging equipment should be available for invasive procedures such as central vascular access, transversus abdominis plane (TAP) blocks and the provision of central neuraxial blockade.<sup>50,51</sup>
- 2.16 Ultrasound equipment should be available for use by trained staff for transversus abdominis plane (TAP) blocks, central neuraxial blockade, placing lines and transthoracic echocardiography. Other tasks, such as airway and gastric volume assessment, may also benefit from the availability of ultrasound.<sup>52,53</sup>
- 2.17 Synchronised clocks should be present in all delivery rooms and theatres to facilitate the accurate recording of events and to comply with medicolegal requirements.<sup>54</sup>
- 2.18 Resuscitation equipment, including an automated defibrillator, should be available on the delivery suite and should be checked regularly.<sup>55</sup> A perimortem caesarean section pack containing a scalpel, surgical gloves and cord clamp should be available on all resuscitation trolleys in the Maternity Unit and areas admitting pregnant women e.g. emergency departments.<sup>56</sup> A range of various sizes of tracheal tubes of no >7 mm internal diameter should also be kept on the resuscitation trolleys.<sup>4</sup>

### Support services

- 2.19 There should be arrangements or standing orders in place for agreed preoperative laboratory investigations. There should be a standard prescription or a local Patient Group Directive for preoperative antacid prophylaxis.
- 2.20 Haematology and biochemistry services to provide analysis of blood and other body fluids should be available 24/7.
- 2.21 A local policy should be established with the haematology department to ensure blood and blood products once available are able to be transferred to the delivery suite rapidly for the management of major haemorrhage.<sup>57,58</sup>
- 2.22 O negative blood should be immediately available, and ideally stored on the delivery suite.
- 2.23 There should be rapid availability of radiology services.
- 2.24 In tertiary referral centres, there should be 24-hour access to interventional radiology services.<sup>55</sup>
- 2.25 Echocardiography should be available at all times in units that routinely deal with cardiac patients.<sup>6</sup>
- 2.26 Robust and reliable local arrangements should be in place to ensure the supply and maintenance of all medicines required in obstetric anaesthesia. There must be a system for ordering, storage, recording and auditing of controlled drugs, in accordance with legislation.<sup>59,60,61</sup>
- 2.27 There should be access to a clinical pharmacist of an appropriate competency level and with appropriate experience in obstetrics, to advise on day-to-day medication or prescribing

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issues in the obstetric population, and to provide input in local policies and procedures pertaining to any aspects of medicines management.<sup>62</sup>

- 2.28 Sterile prefilled syringes or bags of low dose local anaesthetic combined with opioid solutions for regional analgesia should be available.
- 2.29 Prefilled syringes of commonly used emergency drugs, e.g. suxamethonium and phenylephrine, should be used where available.<sup>63</sup>
- 2.30 Local anaesthetic solutions intended for epidural infusion should be stored separately from intravenous infusion solutions to minimise the risk of accidental intravenous administration of such drugs.<sup>64</sup>
- 2.31 Medication for rare but life threatening anaesthetic emergencies, in particular Intralipid, sugammadex and dantrolene, should be immediately available to the delivery suite, and their location should be clearly identified. There should be a clear local agreement on the responsibility for maintenance of these emergency medicines, i.e. regular checks of stock levels, integrity, and expiry dates.
- 2.32 Physiotherapy services should be available 24/7 for patients requiring high dependency care.

### Facilities

- 2.33 There should be easy and safe access to the delivery suite from the main hospital at all times.
- 2.34 An emergency call system should be provided.
- 2.35 There should be at least one fully equipped obstetric theatre within the delivery suite, or immediately adjacent to it. Appropriately trained staff should be available to allow emergency operative deliveries to be undertaken without delay.<sup>21</sup> The number of operating theatres available for obstetric procedures will depend on the number of deliveries and the operative risk profile of the women delivering in the unit.
- 2.36 There should be medication storage facilities within maternity theatres which provide timely access to medicines when clinically required, while maintaining integrity of the medicinal product and allowing the organisation to comply with safe and secure storage of medicines regulations.<sup>62,65</sup>
- 2.37 Adequate recovery room facilities, including the ability to monitor blood pressure, ECG, oxygen saturation, end-tidal carbon dioxide and temperature, should be available within the delivery suite theatre complex.<sup>41</sup>
- 2.38 Anaesthetic machines, monitoring and infusion equipment and near patient testing devices should be maintained, repaired and calibrated by medical physics technicians.
- 2.39 All units should have facilities, equipment and appropriately trained staff to provide care for acutely ill obstetric patients. If this is unavailable, women should be transferred to the general critical care area in the same hospital with staff trained to provide care to obstetric patients.<sup>16</sup>
- 2.40 All patients should be able to access level 3 critical care if required; units without such provision on site should have an arrangement with a nominated level 3 critical care unit and an agreed policy for the stabilisation and safe transfer of patients to this unit when required.<sup>16,55</sup> Portable monitoring with the facility for invasive monitoring should be available to facilitate safe transfer of obstetric patients to the ICU.<sup>66</sup>

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- 2.41 An anaesthetic office, within five minutes from the delivery suite, should be available to the duty anaesthetic team. The room should have a computer with intra/internet access for access to specialist reference material and local multidisciplinary evidence based guidelines and policies. The office space, facilities and furniture should comply with the standards recommended by the Association of Anaesthetists guidelines.<sup>67</sup> This office could also be used to allow teaching, assessment and appraisal.<sup>67</sup>
- 2.42 A communal rest room in the delivery suite should be provided to enable staff of all specialties to meet.
- 2.43 A seminar room should be accessible for training, teaching and multidisciplinary meetings.
- 2.44 All hospitals should ensure the availability of areas that allow those doctors working night shifts to take rest breaks essential for the reduction of fatigue and improve safety.<sup>26</sup> These areas should not be used by more than one person at a time and allow the doctor to fully recline.
- 2.45 Standards of accommodation for doctors in training should be adhered to.<sup>26</sup> Where a consultant is required to be resident, on-call accommodation should be provided.
- 2.46 Hotel services should provide suitable on-call facilities, including housekeeping services for resident and non-resident anaesthetic staff. Refreshments should be available 24/7.

### Guidelines

- 2.47 All obstetric departments should provide and regularly update multidisciplinary guidelines. A comprehensive list of recommended guidelines can be found in the Obstetric Anaesthetists' Association (OAA)/Association of Anaesthetists guidelines for obstetric anaesthesia services.<sup>55</sup>
- 2.48 Guidelines for the management of pregnant women receiving anticoagulation should be available.<sup>68</sup>

## 3 Areas of special requirement

### Care for the acutely ill obstetric patient<sup>69</sup>

- 3.1 NICE guidance on the recognition of and response to acute illness in adults in hospitals should be implemented.<sup>70</sup>
- 3.2 An early warning score system, modified for use in obstetrics, with a graded response system should be used for all obstetric patients to aid early recognition and treatment of the acutely ill woman.<sup>71,72</sup>
- 3.3 All units should be able to escalate care to an appropriate level, and critical care support should be provided as soon as required, regardless of location.<sup>57</sup>
- 3.4 Whenever possible, escalation in care should not lead to the separation of mother and baby.<sup>4,16</sup>
- 3.5 When midwives provide a level of care beyond their routine scope of practice, they should be appropriately trained.
- 3.6 There should be a named consultant anaesthetist and obstetrician responsible 24/7 for all women requiring a higher level of care.<sup>16</sup>
- 3.7 Women requiring critical care in a non-obstetric facility should be reviewed daily by a maternity team including an anaesthetist.<sup>4</sup>

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### Care for the obese woman

The incidence of obesity is rising in the obstetric population. Obesity is associated with increased incidence of both obstetric and medical complications.<sup>73</sup>

- 3.8 There should be a system in place for antenatal anaesthetic review of obese women with a body mass index (BMI) >40 kg/m<sup>2</sup>.<sup>74</sup> Assessment should be arranged to ensure timely delivery planning can take place.<sup>75</sup>
- 3.9 The duty anaesthetist should be informed as soon as a woman with a BMI above a locally agreed threshold is admitted.
- 3.10 There should be appropriate equipment to care for obese women.<sup>76</sup>

### Care for women under the age of eighteen

The following recommendations apply to units that admit young women and girls under the age of eighteen years for obstetric services.

- 3.11 There should be a multidisciplinary protocol governing care of these patients that includes: consent, the environment in which these patients are cared for, and the staff responsible for caring for these young people.
- 3.12 Anaesthetists should be aware of legislation and good practice guidance<sup>77,78,79</sup> relevant to children and according to the location in the UK.<sup>80,81,82,83</sup> These documents refer to the rights of the child, child protection processes and consent.
- 3.13 Anaesthetists must undertake at least level 2 training in safeguarding/child protection,<sup>84</sup> and must maintain this level of competence by regular annual updates on current policy and practice and case discussion.<sup>85</sup>
- 3.14 At least one anaesthetist in each anaesthetic department, not necessarily an obstetric anaesthetist, should take the lead in safeguarding/child protection<sup>86</sup> and undertake training and maintain core level 3 competencies. The lead anaesthetist for safeguarding/child protection should liaise with their multidisciplinary counterparts within the obstetric unit.

### Care for women requiring specialist services

- 3.15 There should be policies defining how women are referred to and access specialist or tertiary services (e.g. neurosurgery, acute stroke services).<sup>4</sup>

## 4 Training and education

- 4.1 All anaesthetists involved in the care of pregnant women should be competent to deliver high quality, safe care that takes into account the physiological changes in and other requirements of pregnant women.<sup>87</sup>
- 4.2 There should be a nominated consultant responsible for training in obstetric anaesthesia, with adequate programmed activities allocated for these responsibilities.<sup>55</sup>
- 4.3 Elective caesarean deliveries should be utilised for training purposes.<sup>88</sup>
- 4.4 The successful completion of the initial assessment of competence in obstetric anaesthesia should be obtained by all core trainees before they are allowed to work in an obstetric unit without direct supervision.<sup>89,90</sup>



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- 4.5 A process should be in place for the formal assessment of anaesthetists prior to allowing them to join the on-call rota for obstetric anaesthesia with distant supervision.<sup>89,91</sup>
- 4.6 In situ simulation training can help to identify system process gaps.<sup>92</sup> Simulation-based learning techniques should be used to assist anaesthetists to resolve these issues and develop the necessary technical and non-technical skills.<sup>93,94,95,96,97,98,99,100,101,102,103</sup>
- 4.7 There should be induction programmes for all new members of staff, including locums. Induction for a locum doctor should include familiarisation with the layout of the labour ward, the location of emergency equipment and drugs (e.g. MOH trolley/intralipid/dantrolene), access to guidelines and protocols, information on how to summon support/assistance, and assurance that the locum is capable of using the equipment in that obstetric unit. All inductions should be documented.
- 4.8 Anaesthetists with a job plan that includes obstetric anaesthesia must demonstrate ongoing continuing education in obstetric anaesthesia, and continuing professional development as needed for this aspect of their work.<sup>104</sup> Hospitals have a responsibility to enable this with local teaching where appropriate, and by facilitating access to other education and training.<sup>96,105,106</sup>
- 4.9 Any non-trainee anaesthetist who undertakes anaesthetic duties in the labour ward should have been assessed as competent to perform these duties in accordance with OAA and RCoA guidelines.<sup>31,55,89</sup> Such a doctor should work regularly in the labour ward but should also regularly undertake non-obstetric anaesthetic work to ensure maintenance of a broad range of anaesthetic skills.
- 4.10 All staff working on the delivery suite should have annual resuscitation training, including the specific challenges of pregnant women.<sup>107</sup>
- 4.11 Anaesthetists should contribute to the education and updating of midwives, anaesthetic assistants and obstetricians.
- 4.12 Anaesthetists should help organise and participate in regular multidisciplinary courses and 'skills drills' for emergency situations.<sup>8,99,100,101,108</sup>

## 5 Organisation and administration

### Organisation

- 5.1 A system should be in place to ensure that women requiring antenatal referral to an anaesthetist are seen and assessed by an anaesthetist, normally a consultant, within a suitable time frame. Ideally, this should be in the form of multidisciplinary team management of these high risk women. Where the workload is high consideration should be given to risk stratification so that not all women are required to attend in person, by using targeted telemedicine / distribution of relevant literature.<sup>109</sup>
- 5.2 An anaesthetist should be included in the multidisciplinary team (MDT) antenatal planning of management for women with complex medical needs.<sup>4</sup> Planning should include consideration of the woman's wishes and preferences.
- 5.3 All women requiring caesarean section should, except in extreme emergency, be visited and assessed by an anaesthetist before arrival in the operating theatre. This should be timed to allow women sufficient time to weigh up the information they have been given, in order to give informed consent for anaesthesia.

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- 5.4 There should be a local guideline on the monitoring of women after regional anaesthesia and the management of post anaesthetic neurological complications.<sup>110</sup>
- 5.5 All women who have received regional analgesia/anaesthesia or general anaesthesia for labour and delivery should be reviewed following delivery. Locally agreed discharge criteria should be met before women go home with written information provided.<sup>111</sup> There should be local guidelines on preoperative, intraoperative and postoperative care for those cases where the enhanced recovery process is appropriate.<sup>112</sup>

### Consent

- 5.6 Women must be assumed to have capacity unless there is evidence to the contrary, as per the Mental Capacity Act.<sup>113</sup>
- 5.7 There should be documentation of any discussions informing consent for any procedures undertaken by the anaesthetist.<sup>113</sup>
- 5.8 Written consent should be obtained prior to undertaking an epidural blood patch.<sup>113</sup>

### Neuraxial and opioid analgesia

- 5.9 Obstetric units should be able to provide neuraxial analgesia on request. Smaller units may be unable to provide a 24-hour service; women booking at such units should be made aware that neuraxial analgesia may not always be available.<sup>55</sup>
- 5.10 Midwifery care of a woman receiving neuraxial analgesia in labour should comply with local guidelines that have been agreed with the anaesthetic department. Local guidelines should include required competencies, maintenance of those competencies and frequency of training. If the level of midwifery staffing is considered inadequate, neuraxial analgesia block should not be provided.
- 5.11 Units should have local guidelines on the recognition and management of complications of neuraxial analgesia that include training on the recognition of complications and access to appropriate imaging facilities when neurological injury is suspected.
- 5.12 Units should provide low-dose neuraxial analgesia.<sup>19,114</sup>
- 5.13 Neuraxial analgesia should not be used in labour unless the obstetric team is immediately available.
- 5.14 There should be a locally agreed neuraxial analgesia record and a protocol for the prescription and administration of drugs.
- 5.15 When the anaesthetist is informed of a request for neuraxial analgesia (and the circumstances would be suitable for this type of analgesia) the anaesthetist should attend within 30 minutes of being informed. Only in exceptional circumstances should this period be longer, and in all cases attendance should be within one hour. This should be the subject of regular audits.<sup>27,115</sup>
- 5.16 When remifentanyl PCA is provided as an alternative to neuraxial analgesia, there should be local multidisciplinary guidelines.<sup>116</sup>
- 5.17 Midwives caring for women receiving remifentanyl PCA should be trained specifically in the use of the technique, and stay with the woman continuously without any break in observation. Remifentanyl PCA should only be provided in units where it is frequently used. Rapid reversal of respiratory depression/arrest and airway resuscitation equipment should be

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immediately available.

### Emergency caesarean delivery

- 5.18 There should be a clear line of communication between the duty anaesthetist, theatre staff and anaesthetic assistant once a decision is made to undertake an emergency caesarean delivery.
- 5.19 The anaesthetist should be informed about the category of urgency of caesarean delivery at the earliest opportunity.<sup>117</sup>
- 5.20 A World Health Organization (WHO) checklist adapted for maternity should be used in theatre.<sup>118</sup>
- 5.21 Before induction of general anaesthesia, there should be a multidisciplinary discussion about whether to wake the woman or to continue with anaesthesia in the event of failed tracheal intubation.<sup>119</sup>
- 5.22 Women should be informed of the risks of accidental awareness under general anaesthesia during emergency caesarean delivery. Precautions should be taken to minimise these risks.<sup>10,117,118,120</sup>
- 5.23 There should be clear arrangements in contingency plans and an escalation policy for use should two emergencies occur simultaneously, including whom to call.
- 5.24 Hospitals should have approved documentation defining safe staffing levels for anaesthetists and anaesthetic assistants, including contingency arrangements for managing staffing shortfalls, and annual reviews of compliance with these should be performed.

### The multidisciplinary team

Care of the pregnant woman is delivered by teams rather than individuals. Effective teamwork has been shown to increase safety, while poor teamwork has the opposite effect.<sup>71,96</sup> It is, therefore, important that obstetric anaesthetists develop effective leadership and team membership skills, with good working relationships and lines of communication with all other professionals, including those whose care may be needed for difficult cases. This includes midwives, obstetricians and neonatologists, as well as professionals from other disciplines such as intensive care, obstetric physicians, neurology, cardiology, haematology, radiology, general practitioners and other physicians and surgeons.

- 5.25 Team briefing and the WHO checklist should be in routine use on the labour ward to promote good communication and team working and reduce adverse incidents.<sup>117,118,121,122</sup>
- 5.26 The use of handover tools, which reduce critical omissions during handovers in obstetric anaesthesia, should be promoted.<sup>25,123</sup>
- 5.27 Units with high numbers of caesarean delivery should have elective caesarean delivery lists to minimise disruption due to emergency work.<sup>87,124</sup> Any elective caesarean delivery list should have dedicated obstetric, anaesthetic and theatre staff.
- 5.28 If any major restructuring of the provision of local maternity services are planned, the lead obstetric anaesthetist should be involved in that process.<sup>24</sup>
- 5.29 Anaesthesia should be represented on all committees responsible for maternity services (e.g. the Maternity Services Liaison Committee, Delivery Suite Forum, Obstetric Multidisciplinary Guidelines Committee, Obstetric Risk Management Committee).<sup>24,55</sup>
- 5.30 Hospitals should have systems in place to facilitate multidisciplinary morbidity and mortality meetings.<sup>125</sup>

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5.31 The route of escalation to critical care services should be clearly defined.<sup>126</sup>

### Serious incidents

5.32 When members of the healthcare team are involved in a critical incident, they can be profoundly affected. 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. After a significant critical incident, the lead clinician should review the clinical commitments of the staff concerned promptly.

5.33 There should 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 should be reported to all relevant bodies within and beyond the hospital. A system of peer review or external evaluation of serious incident reports should be in place.<sup>127,128</sup>

5.34 An anaesthetist should be involved in all case reviews where the case includes anaesthetic input.

## 6 Financial considerations

There is a paucity of evidence regarding the financial implications of many of the recommendations we make here. Many of them are not new however and, although we do not have data about the compliance of every unit with previous versions of these guidelines, the vast majority of units will already adhere to most of the standards outlined here. Many of the recommendations represent a financial impact on workforce and time allowance and this should be dealt with in robust job planning and specification in each anaesthetic department and, in the case of hospital managers, at trust or board level.

Where we have made recommendations about specific equipment, this may have implications for capital and operational expenditure in terms of acquisition of the equipment and its ongoing use and maintenance. Where these recommendations are made, it is based on evidence that there is benefit to patients in terms of outcome and/or improved safety, or that it offers a cost-effective alternative to other treatment options available. Local business cases and action plans may need to be developed. The cost of implementing any of these evidence-based recommendations should always be considered in relation to the financial risks of providing substandard care. Apart from the human costs of this, litigation in maternity services is an expensive issue.

Any service implications will have to be considered against the background of the need for all NHS trusts in England and Wales to reduce expenditure, and in the context of the proposed changes to the budgetary structure of maternity services.<sup>129</sup> We recognise that staff in some units, particularly those with smaller delivery rates, may feel it is burdensome to implement some of these service specifications. It is not the purpose of this guidance to dictate how these recommendations are met – that is to be decided locally. Individual trusts/boards and their executives will need to consider the ongoing viability of any maternity unit that continues to fail to meet these standards. The amalgamation or formalised intertrust/board partnerships of smaller consultant-led units, for example, which are an effort to pool resources more efficiently, may require consideration if service provision consistently falls short of the expected standards.

## 7 Research, audit and quality improvement

7.1 The lead obstetric anaesthetist should audit and monitor the duty anaesthetist workload to ensure that there is sufficient provision for the busyness of the unit.

7.2 There should be regular audits of the quality of clinical governance, with particular attention being paid to provision and updating of local guidelines, reviews of adverse events, and record keeping.<sup>24</sup>

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- 7.3 There should be regular audits relating to the provision of neuraxial analgesia, with particular attention paid to midwifery staffing levels and delays between request for and delivery of pain relief, maternal satisfaction rates and recognised complications.<sup>130,131</sup>
- 7.4 There should be a regular audit of delays to elective caesarean deliveries.<sup>55</sup>
- 7.5 The use of an obstetric appropriate WHO style checklist before all surgical obstetric interventions should be the subject of regular audit and observational study.<sup>118</sup>
- 7.6 All cases of maternal death, significant permanent neurological deficit, failed intubation or awareness during general anaesthesia should undergo case review, with learning from this shared locally and/or nationally.<sup>27</sup>
- 7.7 Provision of supernumerary training sessions for non-specialist anaesthetists expected to provide out-of-hours or emergency care on the maternity unit should be the subject of review.<sup>132</sup>
- 7.8 In units providing a programme of enhanced recovery from caesarean delivery, there should be regular audits of readmission rates for these women.<sup>133</sup>
- 7.9 As well as the specific topics detailed above, a regular audit programme should encompass national audit recipes and standards.<sup>27</sup>
- 7.10 Care should be taken to ensure that all audit, standards and guidelines documents carry clear definitions of terms such as 'neuraxial analgesia rate'.<sup>17</sup>
- 7.11 Research in obstetric anaesthesia and analgesia should be encouraged. Research must follow strict ethical standards as stated by the General Medical Council (GMC).<sup>134</sup>

## 8 Implementation support

The Anaesthesia Clinical Services Accreditation (ACSA) scheme, run by the RCoA, aims to provide support for departments of anaesthesia to implement the recommendations contained in the GPAS chapters. The scheme provides a set of standards, and asks departments of anaesthesia to benchmark themselves against these using a self-assessment form available on the RCoA website. Every standard in ACSA is based on recommendation(s) contained in GPAS. The ACSA standards are reviewed annually and republished approximately four months after GPAS review and republication to ensure that they reflect current GPAS recommendations. ACSA standards include links to the relevant GPAS recommendations so that departments can refer to them while working through their gap analyses.

Departments of anaesthesia can subscribe to the ACSA process on payment of an appropriate fee. Once subscribed, they are provided with a 'College guide' (a member of the RCoA working group that oversees the process), or an experienced reviewer to assist them with identifying actions required to meet the standards. Departments must demonstrate adherence to all 'priority one' standards listed in the standards document to receive accreditation from the RCoA. This is confirmed during a visit to the department by a group of four ACSA reviewers (two clinical reviewers, a lay reviewer and an administrator), who submit a report back to the ACSA committee.

The ACSA committee has committed to building a 'good practice library', which will be used to collect and share documentation such as policies and checklists, as well as case studies of how departments have overcome barriers to implementation of the standards, or have implemented the standards in innovative ways.

One of the outcomes of the ACSA process is to test the standards (and by doing so to test the GPAS recommendations) to ensure that they can be implemented by departments of anaesthesia and to consider any difficulties that may result from implementation. The ACSA committee has

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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 communication and information

- 9.1 Information should be made available to commissioners and to women in the early antenatal period about availability of neuraxial analgesia and anaesthetic services in their chosen location for delivery.<sup>55</sup>
- 9.2 Every unit should provide, in early pregnancy, advice about pain relief and anaesthesia during labour and delivery. An anaesthetist should be involved in preparing this information and approve the final version.<sup>113</sup>
- 9.3 Information must be made available to women in the antenatal period about possible deviations from normal delivery and of emergencies that might arise in the peripartum period, in anticipation of constraints imposed by time and circumstances in the event of such situations arising.<sup>113, 135, 136, 137</sup>
- 9.4 Information should be made available to non-English speaking women in their native languages.<sup>138, 139</sup>
- 9.5 Units should consider local demographics, such as the prevalence of particular languages, when designing information or commissioning interpreting services.
- 9.6 Hospitals should ensure that the mother's need for information in other languages should be assessed and recorded during antenatal care so that interpreting services can be planned for.
- 9.7 Interpreting services should be made available for non-English speaking women, with particular attention paid to how quickly such services can be mobilised and their availability out of hours.
- 9.8 Face to face interpreting services should be considered as most suitable, given the practical requirements for women in labour. However, telephone based services may be able to serve a greater number of languages and be more quickly mobilised, particularly out of hours.
- 9.9 The use of family members to interpret or translate should be avoided unless absolutely necessary or the woman specifically declines an independent interpreter. It should be a rare occurrence that there is no alternative translation method available.<sup>140, 141</sup>
- 9.10 Women who refuse transfusion of blood or blood products, whether because of adherence to the Jehovah's Witness faith or for other reasons, should be identified early in the antenatal period. They should meet with an anaesthetist to discuss their specific restrictions, and should receive information about the potential risks associated with their decision.<sup>142, 143</sup> Their decision should be documented as part of the informed consent process. Such conversations should be conducted with appropriate privacy to avoid the risk of coercion.
- 9.11 Women with potential capacity to consent issues should be identified early in the antenatal period, and arrangements made to both maximise their competency and to ensure that they are adequately represented and advocated for, in keeping with current legislation.<sup>144</sup>
- 9.12 All explanations given to women should be clearly documented in their records.

### Complaints

- 9.13 If complaints are made about aspects of care, a consultant anaesthetist should review and assess the patient's complaint, discussing her concerns and examining her where appropriate. This should be documented. Referral for further investigations may be required.
- 9.14 Complaints should be handled according to local policies.

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9.15 The lead obstetric anaesthetist should be made aware of all complaints.

### Areas for future development

Areas of research currently identified as deficient by the GPAS CDG include:<sup>4</sup>Error! Bookmark not defined.  
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- efficacy of obstetric early-warning systems
- risks and benefits of 'natural' caesarean delivery
- oral intake in labour
- defining the 'busyness' of an obstetric unit.



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## Guidelines for the Provision of Anaesthesia Services for an Obstetric Population 2020

### Abbreviations

ACSA	Anaesthesia Clinical Services Accreditation scheme
BMI	Body mass index
CDG	Chapter Development Group
COSHH	Control of Substances Hazardous to Health
ECG	Electrocardiogram
GPAS	Guidelines for the Provision of Anaesthetic Services
GMC	General Medical Council
MDT	Multidisciplinary team
MOH	Massive obstetric haemorrhage
NICE	National Institute for Health and Care Excellence
OAA	Obstetric Anaesthetists' Association
PCA	Patient-controlled analgesia
RCoA	Royal College of Anaesthetists
SAS	Staff grade, associate specialist and specialty
TEG	Thromboelastography
WHO	World Health Organization

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### Appendix 1: Recommendations Grading

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

Recommendation Number	Level of Evidence	Strength of Recommendation
1.1	C	Strong
1.2	C	Strong
1.3	C	Weak
1.4	GPP	Strong
1.5	GPP	Strong
1.6	GPP	Strong
1.7	GPP	Strong
1.8	C	Weak
1.9	B	Strong
1.10	GPP	Strong
1.11	GPP	Strong
1.12	C	Strong
1.13	C	Strong
1.14	C	Strong
1.15	C	Weak
1.16	GPP	Strong
1.17	C	Weak
1.18	B	Strong
1.19	GPP	Strong
1.20	GPP	Strong
1.21	C	Strong
1.22	C	Strong
1.23	C	Strong
1.24	C	Strong
1.25	C	Strong
1.26	GPP	Strong
1.27	C	Strong
1.28	GPP	Strong
1.29	C	Strong
1.30	GPP	Strong
1.31	C	Strong
1.32	C	Strong
2.1	GPP	Strong
2.2	GPP	Strong



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Recommendation Number	Level of Evidence	Strength of Recommendation
2.3	GPP	Strong
2.4	M	Mandatory
2.5	C	Strong
2.6	GPP	Strong
2.7	GPP	Strong
2.8	M	strong
2.9	C	Strong
2.10	C	Strong
2.11	C	Strong
2.12	C	Strong
2.13	GPP	Strong
2.14	C	Strong
2.15	C	Strong
2.16	C	Strong
2.17	C	Strong
2.18	C	Strong
2.19	GPP	Strong
2.20	GPP	Strong
2.21	C	Strong
2.22	GPP	Strong
2.23	C	Strong
2.24	C	Aspirational
2.25	C	Strong
2.26	C	Strong
2.27	C	Strong
2.28	C	Strong
2.29	GPP	Aspirational
2.30	C	Strong
2.31	GPP	Strong
2.32	GPP	Strong
2.33	GPP	Strong
2.34	GPP	Strong
2.35	GPP	Strong
2.36	C	Strong
2.37	C	Strong
2.38	GPP	Strong
2.39	C	Strong
2.40	C	Strong

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Recommendation Number	Level of Evidence	Strength of Recommendation
2.41	C	Strong
2.42	GPP	Strong
2.43	GPP	Strong
2.44	C	Strong
2.45	C	Strong
2.46	GPP	Strong
2.47	C	Strong
2.48	C	Strong
3.1	C	Strong
3.2	C	Strong
3.3	GPP	Strong
3.4	C	Strong
3.5	GPP	Strong
3.6	GPP	Strong
3.7	C	Strong
3.8	GPP	Strong
3.9	GPP	Strong
3.10	GPP	Strong
3.11	C	Strong
3.12	M	Mandatory
3.13	C	Strong
3.14	C	Strong
3.15	C	Strong
4.1	C	Strong
4.2	C	Strong
4.3	B	Strong
4.4	C	Strong
4.5	C	Strong
4.6	B	Strong
4.7	GPP	Strong
4.8	M	Mandatory
4.9	C	Strong
4.10	B	Strong
4.11	GPP	Strong
4.12	C	Strong
5.1	GPP	Strong
5.2	C	Strong
5.3	GPP	Strong

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Recommendation Number	Level of Evidence	Strength of Recommendation
5.4	C	Strong
5.5	GPP	Strong
5.6	C	Mandatory
5.7	C	Strong
5.8	C	Strong
5.9	C	Strong
5.10	GPP	Strong
5.11	GPP	Strong
5.12	C	Strong
5.13	GPP	Strong
5.14	GPP	Strong
5.15	C	Strong
5.16	C	Strong
5.17	GPP	Strong
5.18	GPP	Strong
5.19	C	Strong
5.20	B	Strong
5.21	C	Strong
5.22	B	Strong
5.23	GPP	Strong
5.24	GPP	Strong
5.25	B	Strong
5.26	B	Strong
5.27	C	Strong
5.28	C	Strong
5.29	C	Strong
5.30	C	Strong
5.31	GPP	Strong
5.32	C	Strong
5.33	GPP	Strong
7.1	GPP	Strong
7.2	C	Strong
7.3	C	Strong
7.4	C	Strong
7.5	B	Strong
7.6	C	Strong
7.7	C	Strong
7.8	C	Strong

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Recommendation Number	Level of Evidence	Strength of Recommendation
7.9	C	Strong
7.10	C	Strong
7.11	M	Mandatory
9.1	C	Strong
9.2	M	Mandatory
9.3	C	Strong
9.4	GPP	Strong
9.5	GPP	Strong
9.6	GPP	Strong
9.7	GPP	Strong
9.8	C	Strong
9.9	C	Strong
9.10	M	Mandatory
9.11	GPP	Strong
9.12	GPP	Strong
9.13	GPP	Strong
9.14	GPP	Strong

### About these guidelines

#### Methodology

The process by which this chapter has been developed has been documented within the [GPAS Chapter Development Process Document](#).

The evidence included in this chapter is based on a systematic search of the literature. Abstracts were independently screened by two investigators and reviewed against inclusion and exclusion criteria. Data were extracted by one investigator in accordance with predefined criteria. The review's objective was to determine the key components needed to ensure provision of high-quality anaesthetic services for an obstetric population.

#### Search strategy

Searches were performed on Embase (1980 to present), Ovid MEDLINE (1996 to present), CINAHL and the Cochrane Library, for the literature search strategy, outcomes, databases, criteria for inclusion and exclusion of evidence (for the full Obstetrics chapter search protocol please contact 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 October 2015 with a final update in August 2016.

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

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### Inclusion criteria

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

- all women of childbearing age undergoing elective or emergency anaesthesia or analgesia for pregnancy or labour
- all staff groups working within anaesthetic departments that provide analgesia or anaesthesia for pregnancy and labour, including (but not restricted to) consultant anaesthetists, staff grade, associate specialist and specialty (SAS) doctors, anaesthetists in training, nurses, midwives, operating department practitioners, surgeons, pharmacists, general practitioners.

### Exclusion criteria

The literature review used the following exclusion criteria:

- studies that investigated the provision of an obstetric anaesthesia service provided by a specialty other than anaesthesia were excluded
- publications that duplicated data that had been reported in an earlier publication were also excluded.

### Data extraction and analysis

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

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

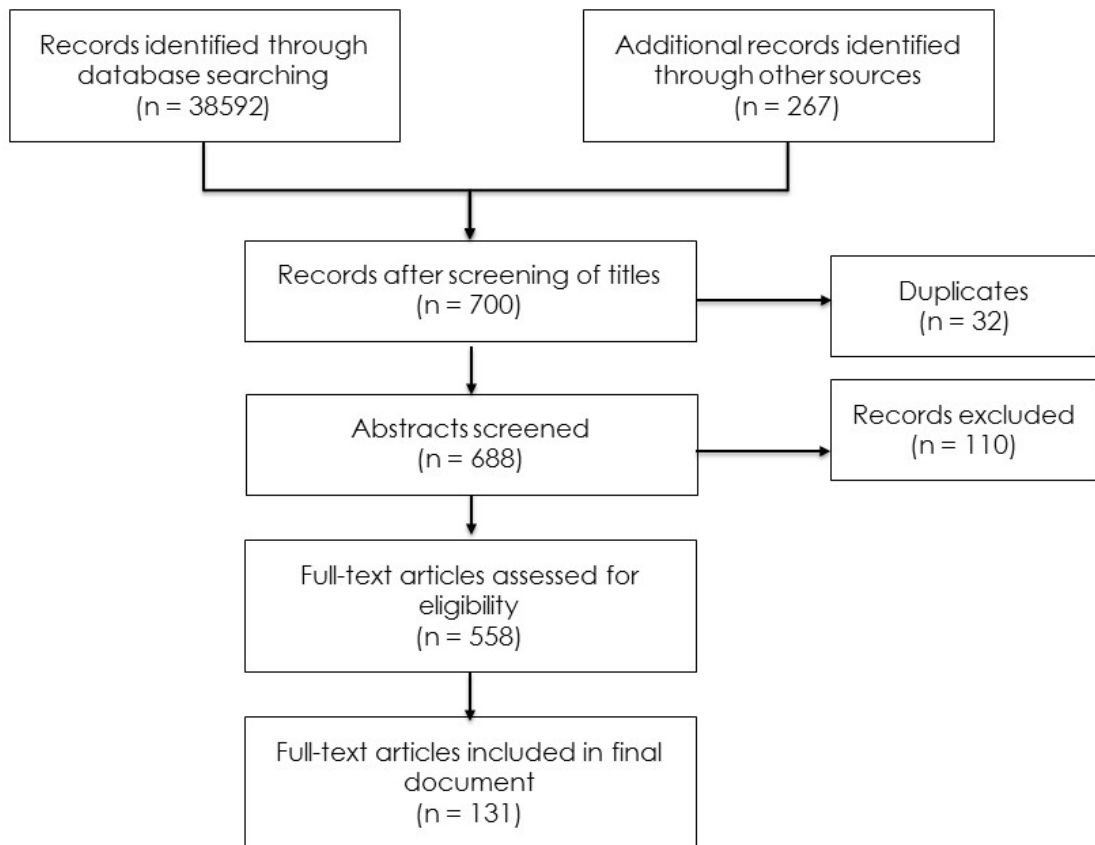
The patient characteristics data extracted were age, gender and type of surgery. The analysis considered studies that included any clinical outcome, including (but not restricted to) survival, length of stay - critical care or hospital, morbidity, adverse effects and complications.

The results of the literature review can be seen below:

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



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

Level	Type of evidence	Grade	Evidence
<b>Ia</b>	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	<b>A</b>	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
<b>Ib</b>	Evidence obtained from meta-analyses, systematic reviews of RCTs or RCTs with a high risk of bias	<b>B</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
<b>IIa</b>	Evidence obtained from at least one well-designed controlled study without randomisation		
<b>IIb</b>	Evidence obtained from at least one well-designed quasi-experimental study		
<b>IIc</b>	Evidence obtained from case control or cohort studies with a high risk of confounding bias		
<b>III</b>	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case-studies		
<b>IV</b>	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities	<b>C</b>	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
<b>UG</b>	Legislative or statutory requirements	<b>M</b>	This grading indicates that implementation of this recommendation is a statutory requirement, or is required by a regulatory body (e.g. CQC, GMC)
		<b>GPP</b>	Recommended good practice based on the clinical experience of the CDG

**Adapted from Eccles M, Mason J (2001) How to develop cost-conscious guidelines. Health Technology Assessment 5:16 and Mann T (1996) Clinical Guidelines: Using Clinical Guidelines to Improve Patient Care Within the NHS. London: Department of Health.**



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### Strengths and limitations of body of evidence

Comments should be made about the quality of the evidence, including any strengths or limitations, and how decisions were made between conflicting evidence. This should detail the resolution method, state how often it was used and what the impact was on the recommendations. This section will be in a narrative format.

### Methods used to arrive at recommendations

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

Strength	Type of evidence	Wording
<b>Mandatory</b>	The evidence supporting the recommendation includes at least one with an 'M' grading	Wording should reflect the mandatory nature of the recommendation, ie 'must'
<b>Strong</b>	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'
<b>Weak</b>	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'
<b>Aspirational</b>	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'
<b>Equipoise</b>	There is no current evidence on this recommendation's effect on patient care	Wording should include 'there is no evidence of this recommendation's effect on patient care'

### Consultation

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

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CDG members were involved in drafting the recommendations, and were provided with an opportunity to comment on all subsequent drafts of the chapter.

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

Following peer review, the chapter was reviewed by the College's Professional Standards Committee and the College's Lay Committee. Comments from all groups were considered and incorporated into a consultation draft.

The consultation draft of this chapter was circulated for public consultation from 22 December 2016 to 22 January 2017. As well as being made available on the College's website and promoted via Twitter, the draft was also circulated to all key stakeholder groups identified by the authors and the College. A list of organisations contacted by the College is available from the GPAS team at the College: [GPAS@rcoa.ac.uk](mailto:GPAS@rcoa.ac.uk).

### The editorial Independence of GPAS

The development of GPAS is wholly funded by the Royal College of Anaesthetists. However, only the GPAS technical team and the GPAS researcher are paid directly by the College for their work on GPAS: the GPAS Editors' employing organisation receives two programmed activities (PA) backfill funding. All funding decisions by the College are made by the chief executive officer, in collaboration with the senior management team and College Council.

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

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

### The role of the GPAS Editorial Board and CQRB

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

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

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

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### 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 the light of this new evidence.

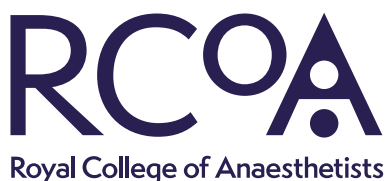
If new evidence contradicts or strengthens existing recommendations, the authors decide whether or not to involve the remainder of the CDG in revising the recommendations accordingly.

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

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

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

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



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