

ENHANCED CARE FOR
THE SICK MOTHER
STANDARDS FOR MATERNAL
CRITICAL CARE 2016



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Enhanced Care for the Sick Mother

Maternal age, obesity and co-morbidities are increasing in pregnant women



1 in 20 women

get sick during pregnancy or birth and require extra enhanced maternity care

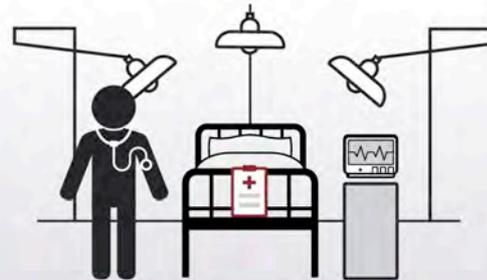


1 in 400 women

go to ICU but most sick women stay on the maternity unit



Enhanced Maternity Care



Designated Critical Care

MULTIDISCIPLINARY TEAM
responding to patient's needs as required



KEY MESSAGES

Working in teams and 'Enhanced Maternity Care'

Enhanced Maternity Care (EMC) is a new standard of care beyond normal maternity care for women with medical or surgical problems during pregnancy or the post-partum period, but without the severity of illness that requires full critical care support. Through EMC competencies we focus on early recognition and response to deterioration and closer working between maternity and critical care teams to optimise care.

Education and training

Integral to the successful implementation of the early warning systems is the focus on improving education and training in maternal critical care (MCC) and EMC for all team members: obstetricians and midwives, obstetric anaesthetists, physicians, intensivists, and critical care nurses. Existing resources can be used for collaboration between critical care and maternity services and their local and regional networks. This should include innovative educational methods such as e-learning, blended learning, human factors, simulator training and an intercollegiate curriculum.

Obstetric early warning system ObsEWS

An obstetric early warning system must be applied to all women presenting to acute care services who are known to be pregnant, or who are within 42 days of delivery. We recommend common components for all obstetric early warning systems that will provide a significant step towards a national Obstetric Early Warning System.

Care of the acutely ill mother in the general critical care unit

Critical care units must have a named lead for maternal critical care to act as the liaison between critical care and obstetric services. An obstetric team (normally consisting of a consultant obstetrician, consultant obstetric anaesthetist and a midwife) must review all obstetric patients admitted to the general critical care unit at least once every 24 hours. All units must have established follow-up/rehabilitation services as recommended by NICE and in the *Guidelines for the Provision of intensive Care Services, 2015*.

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INTRODUCTION

This document revises the former Joint Standing Committee 2011 standards document: *Providing equity of critical and maternity care for the critically-ill pregnant or recently pregnant woman*.¹

This revision has been carried out for the Royal College of Anaesthetists (RCoA) by the Intercollegiate Maternal Critical Care Sub-Committee of the Obstetric Anaesthetists' Association, (OAA). The multidisciplinary working group was formed to review current practice relating to specialist and critical care in pregnancy. In this task the remit was to adapt existing standards and to introduce new ones into clear sections with auditable outcomes.

Membership of the working group includes the Royal College of Anaesthetists (RCoA), Royal College of Obstetricians and Gynaecologists (RCOG), Royal College of Physicians of London (RCP), Royal College of Midwives (RCM), Intensive Care Society (ICS), Faculty of Intensive Care Medicine (FICM), UK Critical Care Nurse Alliance (UKCCNA), National Outreach Forum (NORF), Critical Care Leadership Forum (CCLF), Adult Critical Care Clinical Reference Group, and the Association of Anaesthetists of Great Britain and Ireland (AAGBI) and educationalists.

This document summarises Standards and Recommendations relevant to the care of pregnant or recently pregnant, acutely or chronically unwell women, who require acute hospital maternity and critical care specialist services. Some Standards extend beyond the acute hospital setting, and in such cases, skills are required for early recognition and management of a deteriorating woman, and for decisions regarding transfer to the most appropriate setting.

BACKGROUND

Pregnancy and childbirth is a major life event for women and their families. The same standard of care should be given to those few women who become acutely unwell or suffer chronic illness during this time, delivered by professionals with the same level of competence irrespective of the setting. Clinicians now face increasingly complex medical and obstetric problems. For every maternal death there are at least 70 women who develop severe maternal morbidity.² The Intensive Care National Audit and Research Centre (ICNARC)³ has been collecting data on critical care admissions of pregnant women since 2006. Their latest report in 2013, shows that the majority of these women were 'recently pregnant' rather than 'currently pregnant'. The main obstetric cause of ICU admission in women who were 'recently pregnant' was haemorrhage, whereas respiratory failure was the major reason in the 'currently pregnant' group. The ICNARC numbers translate to 2.4 ICU admissions per 1000 maternity cases. This constitutes a minority of these patients: overall morbidity of this patient group managed in maternity units from the Scottish Confidential Audit on Severe Maternal Morbidity (SCASMM²) identified a rate of *serious* morbidity of 7.3 per 1000 deliveries.

Providing high quality care to sicker patients in overstretched, increasingly busy, and sometimes under-funded maternity units is challenging. A recent OAA survey highlighted the inequities in maternal critical care provision in the UK.⁴ Only 6% of maternity units could provide maternal critical care to the same standard as delivered in general critical care areas.

The 2015 Kirkup Report⁵ recorded serious deficiencies in clinical care and extreme examples of poor teamwork and clinical incompetence: 'We found clear instances of substandard clinical practices....failure to recognise and act upon warning signs in pregnancy, in labour, and in newborn babies.' A similar message has been highlighted in successive reports of enquiries into maternal death.⁵⁻⁷ In 2007 a recommendation was made that maternity units must incorporate a Modified Early Obstetric Warning System (MEOWS) chart into clinical practice. EWS is now used throughout the world, and, in 2013, the Royal College of Physicians introduced the National Early Warning Score (NEWS) into all UK acute hospital settings.⁹ The NEWS and its associated rapid-response systems and electronic data collection involves direct critical care and outreach input to the wards, but excludes obstetric patients. There is a need for a national approach to revisit, revise and develop a standardised tool for obstetrics.

In 2011, the confidential maternal death enquiry identified maternal sepsis as the leading direct cause of maternal death⁸. The RCOG responded quickly by publishing a *Green Top Guideline* on the management of sepsis and signing up to the *Surviving Sepsis* campaign. Fortunately the death rate had declined by the time of the subsequent 2014 report, but a case-control study in UK maternal sepsis in 2013¹¹ reported the widespread incidence and associated morbidity from severe infection, in particular septic shock from Group A Streptococcal infection. Rising co-morbidities and increasing sepsis rates, organism virulence and antibiotic resistance means that maternity services need to keep close links with all critical care resources and new initiatives in our hospitals. Obstetric patients should benefit from these initiatives and be included in critical care sepsis action groups, hospital acutely ill patient groups, and similar groups locally and nationally.

A unified approach to managing the sick mother in our hospitals and beyond is required, including a national early warning score and rapid response system RRS for obstetric patients, electronic data collection, and evidence-based information to inform future developments in this area, mirroring general critical care. In our busy maternity units, we must ensure that we avoid working in 'silos'; if obstetrics patients are excluded from generic policies instituted in our acute hospitals this should be a carefully considered decision.

Document Layout

This Standards document clearly summarises background information and required standards of care. Although it is recommended that all members of the team are familiar with all sections of this document, some are aimed at specific groups, such as the new Enhanced Maternity Care Framework for midwives in Section 1, and Section 3 for the Intensive Care team.

Each of the sections has Standards and/or Recommendations as defined in *Guidelines for the Provision of Intensive Care Services 2015*.¹² These Standards MUST be followed by UK maternity and critical care services. Standards are expected to be already in place, and where this is not the case there must be a clear action plan to describe the intended timing of implementation. Recommendations SHOULD be routine practice in UK maternity and critical care services. In some cases, recommendations are aspirational in nature, but in the majority of cases implementation reflects good practice. Observance of both Standards and Recommendations will be subject to peer-review processes to inform commissioners and the Care Quality Commission. In time, and where appropriate, Recommendations will evolve into Standards depending on both the available clinical evidence and consensus opinion.

Implementation

Integral to the successful implementation of the early warning systems, is our focus on the importance of improving education and training in maternal critical care for all team members: obstetricians and midwives, obstetric anaesthetists and intensivists.

Section 1 describes a new level of care, 'Enhanced Maternity Care', and Appendix 1 shows the accompanying Framework document developed by a working party within the Sub-Committee. This aims to address national variation in pre- and post-registration midwifery education. It must be emphasised that this is not a designated critical care level of nursing, and will not receive a critical care tariff. Enhanced Maternity Care will be underpinned by obstetric funding; establishing appropriate facilities and properly trained staff will require defined resources.

We are also recommending changes to medical, midwifery and nursing training. We must ensure that all specialties (anaesthetic, obstetric and critical care) incorporate maternal critical care material into their specialist training programmes, despite an understandable resistance to incorporating yet more into overstretched curricula. However it is recognised that the Medical Royal Colleges are reviewing their curricula in the light of the *Shape of Training* report.¹³ An intercollegiate curriculum should be developed for specialty training in which a common knowledge-base and consistency in delivering care will be shared. Much can be achieved in delivering high quality care through collaboration, optimisation of existing resources, co-operation between local and regional networks of the different specialties, and the introduction of innovative educational methods such as e-learning, blended learning and human factors team training. Adequate numbers of staff

should be available with the knowledge and skills to detect deterioration and escalate intensity, and to deliver high quality care to a critically ill mother at any stage between home care and receipt of maximum support in Level 3 critical care units. This will require maternity and critical care networks throughout the country to work together to consider how to implement models of care for all the different configurations of services, from home through to specialist high-risk units.

We must also listen to our women patients, who are increasingly finding a voice to share their experiences and demand appropriate facilities, and who will help us shape the service. In Section 5 we include reflections from two patients who have suffered maternal critical illness. A chronically or acutely unwell woman deserves the best care we can provide, and we need to cast the net widely to involve all who may contribute to this process in hospital and during rehabilitation. This complements many aspects highlighted in the recent National Maternity Review,¹⁴ which together signal the need for safer, multi-professional care working across boundaries. The final step in this process is to ensure that standards and recommendations are implemented through high quality audit and peer review. From our recent national survey⁴ we know that many of these Standards have not been implemented since publishing our first joint document. We owe it to our patients to ensure it happens this time.

Audrey Quinn

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References

1. Providing equity of critical and maternity care for the critically ill pregnant or recently pregnant woman. July 2011 <https://www.rcoa.ac.uk/system/files/CSQ-ProvEqMatCritCare.pdf>
2. Scottish Audit of Severe Maternal Morbidity http://www.healthcareimprovementscotland.org/our_work/reproductive,_maternal_child/programme_resources/scasmm.aspx
3. Female admissions (aged 16–50 years) to adult, general critical care units in England, Wales and Northern Ireland, ICNARC 2009. ICNARC CMP obstetrics <https://www.icnarc.org/Our-Audit/Audits/Cmp/Our-National-Analyses/Obstetrics>
4. VL Williams, D Saul, G Randhawa, A Quinn, G Masterson, Are we providing equity of critical care in UK obstetric units? <http://www.epostersonline.com/oa2015/node/323?sections=true>
5. Morecambe Bay Investigation <https://www.gov.uk/government/organisations/morecambe-bay-investigation>
6. Lewis G, editor; The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: Reviewing Maternal Deaths to make Motherhood Safer. 2003–2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. London: CEEMCH; 2007.
7. Saving Mothers' Lives: Reviewing maternal deaths to make Motherhood Safer 2006–2008. BJOG 2011; 118(S1):1–203.
8. Knight M, Kenyon S, Brocklehurst P, Neilson J, Shakespeare J, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care – Lessons learnt to inform future maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009–12. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2014.
9. Royal College of Physicians. National early warning score (NEWS): standardising the assessment of acute-illness severity in the NHS; report of a working party. London: RCP;2012
10. Chen J, Ou L, Hillman KM, Flabouris A, Bellomo R, Hollis SJ, Assareh H Cardiopulmonary arrest and mortality trends, and their association with rapid response system expansion *Med J Aust.* 2014 Aug 4;201(3):167-70.
11. Acosta C, Kurinczuk J, Lucas DL, Tuffnell DL, Sellers S, Knight M, Severe Maternal Sepsis in the UK, 2011–2012: A National Case-Control Study *Plos medicine* July 8, 2014 DOI: 1371/journal.pmed.1001672
12. GPICS <https://www.ficm.ac.uk/sites/default/files/GPICS%20-%20Ed.1%20%282015%29.pdf>
13. Shape of Training <http://www.shapeoftraining.co.uk/>
14. Maternity Review <https://www.england.nhs.uk/tag/maternity-review/>

Section 1

Delivering care and working in teams

Introducing a new care standard: Enhanced Maternity Care

For most women, the natural processes of labour and delivery proceed without incident. A very small number of women become acutely unwell during pregnancy or childbirth, and may require designated high-dependency or intensive care support.¹ Such patients must have timely access to critical care services, and where possible these patients should be admitted to a critical care unit. If this is not possible, then the critical care service must come to the patient, irrespective of location.

A much larger number of women have a short period where they become unwell with a complication of pregnancy or delivery, or deterioration of an intercurrent medical condition, and require a short period of 'enhanced care' until they recover. For the care needed by this group of women, we propose the introduction of the term 'Enhanced Maternity Care' (EMC) which will usually be administered on the delivery suite. This is a standard of care beyond normal maternity care and, although these women will require close support and monitoring, with the expectation that their condition will resolve with appropriate treatment they do not have the severity of illness that requires full critical care support. There will be overlap in the diagnosis, treatment and management of EMC patients with those who are receiving the traditional ICS levels of care.¹ Clinical decisions on where, how, and by whom the sick mother will be managed will depend on local facilities and expertise.

Figure 1

STANDARD MATERNITY CARE	
ENHANCED MATERNITY CARE Pathology: common obstetric conditions Staffing: Maternity team Location: Maternity Unit Competencies: new EMC competencies for midwives Tariff: Locally defined	LEVEL 2 MATERNITY CRITICAL CARE Pathology: complex obstetric and uncommon conditions Staffing: Critical Care and Maternity team Location: Maternity unit or Critical Care Competencies: full level 2 care nursing and medical competencies Tariff: level 2 critical care tariff
LEVEL 3 MATERNITY CRITICAL CARE	

In response to the most recent confidential enquiry into maternal deaths,² the EMC competencies also focus on recognising and responding to deteriorating illness in pregnant or recently pregnant women. One-third of direct maternal deaths remain attributable to sepsis; of these, a proportion will be due to delay in diagnosis, delay in administration of antibiotics, and/or delay in review by senior staff. This emphasises the importance of both introducing EMC and driving closer working relationships between the obstetric and critical care teams in optimising the delivery of care to these patients. EMC competencies will usually be held by midwives; however, in large centres, there may be scope for critical care nurses to provide EMC in tandem with midwives. It is anticipated that at least one midwife/health professional per shift in the maternity unit will hold EMC competencies and will always be available to deliver EMC to patients in need. Currently, only a small number of maternity units can offer Level 2 critical care, but the expectation is that all delivery suites must be able to deliver EMC.

STANDARDS

1. All obstetric units must have a lead midwife, obstetrician, and obstetric anaesthetist for EMC.
2. Maternity service providers must establish training resources to enable midwifery and nursing staff to achieve and maintain skills in EMC.
3. The lead midwives must maintain a record of those staff who have EMC competencies. In some units these may be all delivery suite midwives, whilst in others there might be a smaller number of midwives across the whole obstetric service.
4. Pregnant or recently pregnant women must have access at all times to a healthcare professional who has EMC competencies.
5. Classification of care must be formally recorded by the maternity team and reported in ward rounds and handovers.
6. A representative for EMC must be part of their hospital's Critical Care Delivery Group or its equivalent.
7. Women who require care that falls outside EMC must be referred as soon as possible to the general critical care service. The route of escalation to critical care services must be clearly defined.
8. Critical care outreach or an equivalent service must be available, and provide clinical support and education to EMC services.

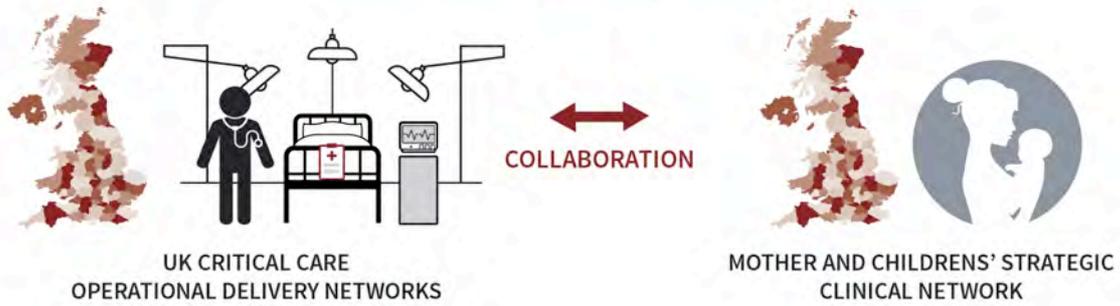
RECOMMENDATION

1. Obstetric units delivering EMC or Level 2 critical care should be members of a regional maternal critical care network, which itself should have a formal relationship with the local critical care operational delivery network and strategic clinical networks.

References

1. [http://www.ics.ac.uk/ics-homepage/guidelines-and-standards/ICS levels of Care](http://www.ics.ac.uk/ics-homepage/guidelines-and-standards/ICS%20levels%20of%20Care)
www.oaa-anaes.ac.uk/assets/_managed/.../2015_IJOA_Supplement.pdf
2. Knight M, Kenyon S, Brocklehurst P, Neilson J, Shakespeare J, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care – Lessons learnt to inform future maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009–12. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2014.

Working in Teams



REGIONAL TEAMS



MCC NETWORKS

Enhanced Care for the Sick Mother:
Standards for Maternal Critical Care

MCC LEADS

Obstetricians, obstetric anaesthetists, midwives, intensivists, critical care nurses, obstetric physicians work in teams and attend networks

MODELS OF CARE

Individual Maternity units to establish EMC and MCC provision via hospital teams



HOSPITAL TEAMS



Section 2

Obstetric early warning systems (ObsEWS)

Failure to identify early signs of illness in obstetric patients has been a recurrent problem in cases of maternal death and serious morbidity. In December 2007, the CEMACH report listed the development of a national obstetric early warning score as one of its top ten key recommendations.¹ Nine years on, UK maternity units are using a variety of early warning systems.² To date, there has been limited progress towards developing a unified national early warning score for obstetric patients.

Early warning systems are well established in acute care settings. They are designed to aid recognition of the deteriorating patient, and to link the recording of abnormal physiological parameters with an appropriate clinical response.

A safe and high quality healthcare system should use technology to tackle these problems, and an increasing number of hospitals in the UK have introduced electronic early warning and rapid response systems RRS for the NEWS score.³ It is time to extend these systems to the obstetric population, and for this reason we recommend the urgent development of electronic rather than paper-based systems.

The Standards that follow can be applied to both electronic and paper systems. When implemented they will establish a common core between the various obstetric early warning systems that are in use, and provide a significant step towards a national ObsEWS.

STANDARDS

1. An obstetric early warning system ObsEWS must be applied to all women presenting to acute care services who are known to be pregnant or who are within 42 days of delivery. Within 12 months of the publication of this document, all obstetric units and acute hospitals in the UK must update their ObsEWS to incorporate the following features:
 - a) Only six physiological parameters may contribute to the early warning score:
 - respiratory rate,
 - oxygen saturation,
 - heart rate,
 - systolic blood pressure,
 - diastolic blood pressure,
 - temperature.
 - b) No other parameters must be included in the calculation of an early warning score and additional supplementary observations (such as urine output or lochia) must be recorded separately from the early warning observations.
 - c) Clinical concern about a woman's condition remains an important criterion for summoning help, regardless of the early warning score.
 - d) Reduced/altered level of consciousness is not an early warning sign but an indication of established critical illness requiring urgent senior clinical attention.
 - e) Where an aggregate score is calculated, the points assigned to abnormal values must be adjusted to align with the numerical values used in the Royal College of Physicians of London National Early Warning Chart i.e. score of 5-6 medium risk, score of 7 or more high risk.
2. Clear guidance must be given regarding the expected frequency of observations; this must include a specific schedule of observations for women after caesarean section. For all other pregnant or recently pregnant women, a minimum expected frequency of observation is usually once every 24 hours, with four hours being the minimum frequency for women at high risk of deterioration.

3. The response to abnormal scores must be clearly described in a simple flow-chart. It must only contain one intermediate step before the involvement of senior clinical staff (usually a consultant).

RECOMMENDATION

1. The Situation-Background-Assessment-Recommendation (SBAR) communication tool⁴ should be promoted for use between healthcare professionals to effect escalation in cases of concern identified by the ObsEWS.

References

1. Lewis G, editor; The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: Reviewing Maternal Deaths to make Motherhood Safer. 2003–2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. London: CEEMCH; 2007.1.
2. Isaacs RA, Wee MYK, Bick DE, et al. A national survey of obstetric early warning systems in the United Kingdom: five years on. *Anaesthesia* 2014; **69**: 687-92.
3. Royal College of Physicians. National early warning score (NEWS): standardising the assessment of acute-illness severity in the NHS; report of a working party. London: RCP;2012
4. SBAR
http://www.institute.nhs.uk/safer_care/safer_care/situation_background_assessment_recommendation.html

PROOF-READ DRAFT

Section 3

The acutely ill pregnant woman in the general ICU

A very small number of pregnancies are complicated by critical illness. These admissions are currently spread across a large number of critical care units and so the ability to develop and maintain expertise in care of the sick mother is limited. The most common reason for a mother to be admitted to intensive care is massive haemorrhage¹. All critical care units which provide support to delivery suites must be able to provide high quality post-partum care to women who have suffered severe blood loss.

Antenatal critical illness can occur in any labour ward, and intensive care doctors (working closely with obstetric anaesthetists) must be skilled in the resuscitation and stabilisation of sick pregnant women. It has been well established across a wide range of rare conditions and specialist services that outcomes can be improved by centralisation.² It is time to rethink where we provide some elements of obstetric critical care to ensure that sick mothers receive the best possible care.

STANDARDS

1. Any critical care unit that admits antenatal women over 20 weeks gestation must have rapid access to obstetric and paediatric services able to attend in an emergency. They must also have a clear plan for performing a peri-mortem caesarean section in the event of maternal cardiac arrest, with appropriate neonatal resuscitation equipment.
2. An obstetric team (normally consisting of a consultant obstetrician, consultant obstetric anaesthetist and a midwife) must review all women admitted to critical care at least once in every 24 hour period.
3. In antenatal admissions, when fetal viability after delivery might be at risk, a healthcare professional trained in neonatal resuscitation should be available within 10 minutes and a senior neonatologist or paediatrician must be able to attend within 30 minutes.
4. Level 3 antenatal admissions and post-natal admissions that are anticipated to last more than 48 hours must be considered for transfer to a nominated regional or supra-regional critical care unit with experience in maternal critical care.
5. All critical care units that admit pregnant or recently pregnant women must have a named lead clinician for maternal critical care. The main function of this role is to be the point of liaison between critical care and obstetric services (including obstetric anaesthesia).
6. Breast feeding (including the use of breast pumps) must be encouraged and supported in all post-natal women admitted to critical care.
7. All women admitted to critical care must be offered an appointment in a critical care follow-up clinic or a post-natal review which includes input from a clinician with experience in critical care follow-up.

RECOMMENDATION

1. Physical contact between a mother and her baby should be maintained during post-natal critical illness, even if the mother is unconscious. This contact and other events of the admission should be recorded in a critical care diary which can be used in psychological rehabilitation after critical care or in bereavement counselling.
2. Intensive care networks should consider nominating specific units as the nominated regional or supra-regional unit for maternal critical care

References

1. Female admissions (aged 16–50 years) to adult, general critical care units in England, Wales and Northern Ireland, ICNARC 2009. ICNARC CMP obstetrics <https://www.icnarc.org/Our-Audit/Audits/Cmp/Our-National-Analyses/Obstetrics>
2. D. Metcalfe, O. Bouamra, N. R. Parsons, M.-O. Aletrari, F. E. Lecky, M. L. Costa Effect of regional trauma centralization on volume, injury severity and outcomes of injured patients admitted to trauma centres BJS June 2014; 101: 959-9

Section 4

Recognising, transferring, and clinical responsibility outside maternity areas

The pregnant or recently pregnant deteriorating woman can present to health professionals in any location where healthcare is provided: A&E, AMU, medical or surgical wards or in the community and General Practice. The timely recognition and management of the deterioration is essential. In some trusts, the critical care outreach teams may be required to respond to the acutely ill pregnant or recently pregnant women as part of an ObsEWS escalation. The MBRRACE–UK reports have highlighted the need for a multidisciplinary team with early involvement of senior staff.

STANDARDS

1. An obstetric early warning system (compliant with the recommendations set out in section 2) must be applied to all women presenting to acute care services who are known to be pregnant, or who are within 42 days of delivery.
2. The early warning score must be linked to a simple response algorithm that meets the requirements in Section 2 and is tailored to local conditions.
3. Critically ill pregnant or recently pregnant patients who undergo intra- or inter-facility transfer must be transferred in accordance with the Intensive Care Society Transfer Guideline.¹
4. A senior clinician* must be involved in accordance with the above escalation policy within one hour of any deterioration.
5. Inter-hospital transfers involving an ambulance must occur as Category A (Red 1) ambulance responses, with an 8-minute response time.³

*ST5 and above or the senior midwife who is responsible for the High Risk Maternity Unit. This is also applicable to all women in midwife and obstetric units, presenting to acute care services, and for intrapartum care in all settings.

RECOMMENDATION

1. The SBAR communication tool must be promoted for use between healthcare professionals at times of deterioration, with immediate referral to the appropriate specialist centres of expertise as soon as symptoms of deterioration develop.
2. Critical Care Outreach Teams, when available, should be called to review pregnant or recently pregnant women with an acute deterioration who are admitted to a general ward area.

References

1. Intensive Care Society (UK). Guidelines for the transport of the critically ill adult (3rd Edition 2011) Intensive Care Society 2011. Available from: <http://www.ics.ac.uk/icshomepage/guidelines-standards/>. Faculty of Intensive Care Medicine and Intensive Care Society. Core Standards for Intensive
2. <http://www.kingsfund.org.uk/search/site/sbar%20maternity>
3. <https://www.england.nhs.uk/statistics?s=AMB-QI-guidance-v1&site=>

Section 5

Patients

STANDARD

Patients must be followed-up to monitor for all the common physical problems after critical illness, most commonly muscle weakness, and also to pick up any psychological problems such as post-traumatic stress disorder (see *Guidelines for the provision of intensive care services, 2015*).

RECOMMENDATION

Patients and their partners should be given access to expertise for counselling including concerns about issues around blood transfusion. All patients who have been critically ill should have a general obstetric follow-up appointment, usually after six weeks. Also, some critical care units offer a specialist follow-up service. Both these visits are opportunities for specialists in both obstetrics and critical care to ensure appropriate advice is available.

Patients' reflections highlighting some challenges we face managing the sick mother; two womens' experiences of critical illness in pregnancy.

Experience 1 A 'unique case'

"I became critically ill after a caesarean section when my baby was 11 days old. I dissected three of my coronary arteries and had to have six bypass grafts."

"I feel really grateful to the sister on intensive care who recognised that I needed to see my son and arranged regular visits for us to spend time together. My husband was given accommodation in the hospital so that he could be with me and my family flew in from all around the world."

"We didn't know how long my recovery was going to take as nobody at the hospital had experience of coronary artery dissections in a woman who had just given birth. They didn't really know what to expect and told me that the medical journals said my condition was usually diagnosed at a post-mortem."

"Whilst in ICU, I developed a fever, they took tests but couldn't find the cause of infection. I was breast feeding my son prior to my surgery and had to stop abruptly when I became sick. My breasts became very engorged. The ICU wasn't used to dealing with women in my circumstances and they didn't recognise the symptoms of mastitis. It was my sister who suggested that there might be a problem with my breasts. They didn't have access to a breast pump and I was too weak to relieve the pain and discomfort myself."

"When I was discharged to the ward I had a side room so I could have my son with me. Somebody wrote in my notes that he could visit me at any time to help me recover and to keep us bonded together."

"When the time came for me to be discharged, there were a lot of problems arranging the support I needed. My other children needed to be properly looked after and even simple tasks, like arranging vaccinations for my new baby, proved difficult when I couldn't take my son to the clinic in person."

"The term 'unique case' was used a lot by the professionals that I met. My case was different to what they were used to dealing with, but sometimes it felt as though no one wanted to take ownership and make things work for me and my family. It has been a struggle every step of the way."

Experience 2 "The most challenging experience we have ever encountered"

"For me, the birth of my first child turned from what should have been a wonderful time for all my family to the most challenging experience we have ever encountered. Anyone giving birth hopes that everything will

go well. Being admitted to intensive care is really frightening and the elation after a birth quickly turns to worry.”

“The rest of the family are thrown into caring for a newborn baby whilst visiting the baby’s mum who is in a critical situation with an uncertain prognosis. Most people have never seen an intensive care unit except in television programmes. The reality is very different. ICUs can be very noisy, equipment alarms sound frequently, and the bright lights can be overwhelming.”

“From my experience the most important thing is to maintain some contact between a new mother and her baby and to try to keep some normal experiences going after birth even if the circumstances aren’t what you had hoped for. Expressing milk to keep the option of breast feeding open and taking photos of what is going on with your baby can be really helpful in dealing with the psychological impact of time in intensive care.”

“The family will also require support and they need to be aware of the complications the mother may encounter in order to help everyone cope better with some of these feelings.”

The patients’ perspectives detailed above are not isolated or uncommon accounts. Similar stories can be heard in critical care follow-up clinics and in qualitative studies of mothers’ experiences. There is also increasing recognition of the impact that critical illness in a mother has on her entire family.

There is a wide range of physical and psychological consequences that can occur after any critical illness. New mothers may have to deal with these at the same time as adapting to the life-changing experience of having a baby and caring for other children. There is increasing recognition of long term effects on morbidity and quality of life following critical care admission. It is difficult to over-estimate the impact on a woman of unexpectedly waking up in the intensive care unit, being separated from her baby, and possibly being told that she is now unable to have any more children after a life-saving hysterectomy. Efforts to maximise interaction and bonding, including facilitating breast feeding, may help to ease psychological trauma.

The short duration of many maternal critical care admissions does not protect against lasting psychological damage for these women and critical care follow-up is highly valued by patients.

Support and further information for patients can be found at:

<http://www.icusteps.org/>

<http://www.healthtalk.org/peoples-experiences/intensive-care/intensive-care-patients-experiences/icu-follow-care>

Appendix 3: Enhanced Maternity Care Patient Satisfaction Survey and Patient feedback survey

Section 6

Education

Early recognition of critical illnesses is an ongoing challenge for all maternity healthcare professionals, as the exposure to basic medical and critical illness training has decreased over recent years. There is now a pressing need for dedicated leads in each subspecialty to work together to ensure high quality, critical-care-associated training. To develop a workforce with enhanced skills in maternity care will require changes to undergraduate curricula and postgraduate education programs. There is room for improvement in the theoretical knowledge of all staff groups, but of equal importance is the translation of this knowledge into practical, high quality care. It will also be important to develop CPD guidance for all clinicians, to enable them to keep up to date and have access to quality-assured mandatory training once in a substantive post.

We believe that cross-specialty training is an effective, practical and economic way to improve standards in maternal critical care. Midwives will acquire and maintain enhanced maternity care skills even from short attachments to critical care units. Critical care outreach nurses spending time on the delivery suite will quickly build up their confidence to assess sick pregnant women by exposure to normal labour-ward care. This peer-to-peer, cross-specialty training also helps to build mutual understanding and personal connections, which are often identified as key factors when things go well in caring for sick mothers.

MIDWIVES

This is the first document to set out the enhanced maternity care competencies (see Appendix 1) that midwives should attain at different stages of their careers. Midwives working on the labour ward of obstetric units require a higher set of 'core' competencies, and a smaller number of midwives should receive additional training to a standard of 'specialist enhanced skills', underpinned by national training standards and continuous collaboration with critical care nursing. Some maternity units may have conventional Level 2 critical care competencies available on site, either from midwives who have trained in critical care medicine or from critical care nurses embedded into the midwifery staff based on a delivery suite. However such units remain unusual

STANDARD

1. All midwives must be able to recognise and provide a first response to women who become sick, and these skills must be included in the pre-registration programme.
2. EMC/MCC training needs as defined must be expanded in line with the new EMC Framework.
3. Midwives providing enhanced maternity care must spend time on a designated critical care unit to satisfy the requirements of the EMC Framework.

RECOMMENDATIONS

1. The nominated specialty midwife with enhanced skills should be supported in this role, including the provision of access to appropriate education.
2. The competency Framework document must be translated into high quality clinical preceptorship training, underpinned by midwifery, critical care and critical care outreach collaboration.

CRITICAL CARE NURSES

Women who are pregnant or who have recently given birth may require admission to general critical care units. Depending on the type and size of both the maternity and critical care services, this may occur on a regular basis, or it may be an event that is seen rarely. Figures from the UK ICNARC Case Mix Programme show that around 1,700 women each year are admitted and reported to be currently pregnant or recently pregnant in a ratio of 1:5. Where nursing staff are required to care for pregnant or recently pregnant women, they will need knowledge and skill to underpin their practice.

RECOMMENDATIONS

1. Post-registration critical care nurse education courses should include aspects of maternal care as part of the core curriculum. Content should include:
 - Overview of common reasons for admission to critical care,
 - Differences in caring for the pregnant or recently pregnant woman (including physiological changes in pregnancy),
 - Maternal emergencies/obstetric haemorrhage,
 - Psychological support and care of mother and baby.
2. Each unit admitting obstetric patients should identify a nurse who is the lead for matters relating to maternal critical care including training and education.
3. Each critical care unit should have a nominated link midwife to support training and education.

CRITICAL CARE OUTREACH

RECOMMENDATIONS

1. Additional training for critical care outreach teams should include aspects of maternal care as part of the core curriculum (as for critical care nursing above) to underpin their practice and recognise any specific issues related to maternal care.
2. Where possible, critical care outreach team members should spend some time on a delivery unit in order to have exposure to the uncomplicated birth and well/normal pregnancy.
3. Critical Care Outreach teams should work collaboratively with the critical care unit and maternity unit to ensure seamless transition of care between units.
4. Critical Care Outreach teams and midwives should work collaboratively in providing joint multidisciplinary education relating to recognition of acute illness to encourage sharing of knowledge and skills.

DOCTORS

For doctors, postgraduate training programs already have content relating to maternal critical care. These sections should be reviewed and developed in the light of this report. Maternal critical care competencies are required for senior trainees in obstetrics, medicine, critical care and anaesthesia, and we call on the education/curriculum committees of the RCOG, JRCPTB, RCoA and FICM to devise a common, cross-specialty curriculum for senior trainees with an interest in maternal critical care. The cross-specialty MCC leads should participate in national courses for identifying deteriorating patients.

MULTIDISCIPLINARY SKILLS TRAINING

At a local level, the most important educational priority is multidisciplinary skills training. This often takes place in the form of simulated scenarios. It is vital that all obstetric units develop the skills and resources to provide maternal critical illness scenarios in multidisciplinary simulation, and that these sessions provide appropriate feedback/debriefing so that lessons learnt can be rapidly adopted into clinical practice.

Multidisciplinary training (which should include simulation and the impact of human factors on clinical performance) must be available to all healthcare professionals who have a role in enhanced maternity care at least once a year. The responsibility for ensuring that such training takes place lies with the lead clinicians for EMC. A list of MCC/EMC courses (including human factors and multidisciplinary training) are listed in Appendix 4 of this document.

Section 7

Monitoring standards and quality indicators

EMC mandatory dataset

Quality indicators specific for EMC and MCC should be used to signpost possible deviations from recognised standards of care. Those women who are admitted to critical care units providing Level 2 and/or Level 3 care will be captured under the Critical Care Minimum Data Set, and reported through the ICNARC Case Mix Programme in England and Wales and through SICSAG in Scotland. There are ill-defined boundaries between designated critical care and EMC, and classification will depend on location, availability of trained staff, severity of illness, and ultimately funding streams.

Quality indicators are a measure of a structure, process or outcome that can be used by local teams to improve care in line with national data. Only data collected in a reliable and robust way can be used to drive improvement.

The following represent the mandatory dataset for collection on pregnant or recently pregnant women admitted for EMC for assessment on a daily basis:

- Hospital number or unique identifier.
- Postcode.
- Age (in whole years at last birthday) at the point of first receiving EMC.
- Body mass index.
- Currently pregnant or recently pregnant.
- Parity.
- Gestation.
- Multiple pregnancy.
- Surgical status (elective/scheduled, emergency/urgent, non-surgical).
- Mode of delivery (caesarean, instrumental, vaginal).
- Diagnosis on admission to EMC unit.
- Time and date of admission.
- Highest level of care during admission* (As defined by GPICS and CCMDS).
- Evidence of multidisciplinary review.
- Admission of neonate to NICU.
- Neonate contact with mother in EMC unit.
- Transfer to unit for higher level of care.
- Readmission for EMC.
- Time and date ready for discharge from EMC.
- Discharge destination.
- Length of stay (hours or days and fractions of days) in the original EMC unit.
- Outcome after EMC (improvement, deterioration, death).
- Availability of staff with appropriate competencies for women receiving EMC.
- Staffing ratios to reflect workload associated with caring for women requiring EMC and their babies.
- Evidence of daily documented plan at senior multidisciplinary ward round.

* this is calculated by recording levels of organ support (basic or enhanced respiratory support, basic or enhanced CVS support, neurological, hepatic or other system) as defined by CCMDS.

STANDARDS

1. An EMC mandatory dataset must be collected and reported.
2. Data must be collected prospectively, validated locally and stored electronically. Many of these data may already be collected locally on other reporting systems, and can be retrieved from these systems.
3. Data must be collected by appropriately trained staff, quality assured and stored securely in accordance with local guidelines on safe data storage.

RECOMMENDATIONS

1. The EMC dataset and the designated critical care data collection (CCMDS) should be of equally high quality irrespective of where the care is delivered.
2. A traffic-light system or similar should be used to assess compliance with agreed quality indicators, and a system should be in place for responding to deviations from agreed standards. These can be added to a maternity dashboard for monthly review.

References and links:

GPICS

<https://www.ficm.ac.uk/sites/default/files/GPICS%20-%20Ed.1%20%282015%29.pdf>

ICNARC CMP obstetrics

<https://www.icnarc.org/Our-Audit/Audits/Cmp/Our-National-Analyses/Obstetrics>

SICSAG

<http://www.scottishintensivecare.org.uk/quality-improvement/quality-indicators-SICSAG/>

<http://www.sicsag.scot.nhs.uk/docs/2015-08-11-SICSAG-Annual-Report.pdf?22>

GPAS

<http://www.rcoa.ac.uk/news-and-bulletin/rcoa-news-and-statements/guidelines-the-provision-of-anaesthetic-services-gpas>

RCoA, *Raising the Standard: a compendium of audit recipes* 3rd Edition 2012

<http://www.rcoa.ac.uk/document-store/audit-recipe-book-3rd-edition-2012>

CCMDS

<http://webarchive.nationalarchives.gov.uk/+http://www.isb.nhs.uk/library/standard/112>

RCOG, *Good Practice No.7: Maternity Dashboard*

<https://www.rcog.org.uk/globalassets/documents/guidelines/goodpractice7maternitydashboard2008.pdf>

RCOG, *Good Practice No 12: Improving patient hand over*

<https://www.rcog.org.uk/globalassets/documents/guidelines/goodpractice12patienthandover.pdf>

GLOSSARY

AAGBI	Association of Anaesthetists of Great Britain and Ireland
BMFMS	British Maternal and Fetal Medicine Society
CCLF	Critical Care Leadership Forum
UKCCNA	UK Critical Care Nurse Alliance
CCMDS	Critical Care Minimum Dataset
CPD	Continuing Professional Development
CRG	Critical Care Clinical Reference Group
CVS	Cardiovascular Support
EMC	Enhanced Maternal Care
EWS	Early Warning Systems
FICM	Faculty of Intensive Care Medicine
GPAS	General Provision of Anaesthetic Services
GPICS	Guidelines for the Provision of Intensive Care Services
ICNARC	Intensive Care National Audit and Research Centre
ICS	Intensive Care Society
JRCPTB	Joint Royal Colleges of Physicians Training Board
MCC	Maternal Critical Care
MEOWS	Modified Early Obstetric Warning System
NORF	National Outreach Forum
OAA	Obstetric Anaesthetists' Association
Obs EWS	Obstetric Early Warning System
PALG	Patient Association Liaison Group
RCM	Royal College of Midwives
RCoA	Royal College of Anaesthetists
RCOG	Royal College of Obstetricians and Gynaecologists
RCP	Royal College Physicians
SAM	Society of Acute Medicine
SCASSM	Scottish Audit of Severe Maternal Morbidity
SICSAG	Scottish Intensive Care Society Audit group

APPENDIX 1

Enhanced Maternity Care: a Competency Framework for Midwives Caring for Ill and Acutely Ill Women.

Intercollegiate Maternal Critical Care Sub-Committee of the Obstetric Anaesthetists Association

Version 3.3,
31 March 2016

INTRODUCTION

These competencies have been developed on behalf of the Intercollegiate Maternal Critical Care Sub-Committee of the Obstetric Anaesthetist Association. The purpose is to provide a competency framework for midwives on entry to the Nursing and Midwifery Council (NMC) register, and for core midwives who care for women who are ill, and are at risk of deteriorating but do not need a critical care nurse or midwife, and can be looked after in a delivery suite/recovery area.

This competency Framework is to be used in conjunction with NMC pre-registration midwifery education standards, NMC Code of Professional Standards of Practice and Behaviour for Nurses and Midwives (2015), **as well as** local preceptorship and staff-development arrangements. These skills are to be undertaken with reference to appropriate underpinning theory and with evidenced-based decision making.

This Framework identifies the competencies but not the accompanying underpinning theory that is additionally required.

ENHANCED MATERNITY CARE

Enhanced Maternity Care is defined as: the care needed by a sick woman that is provided by a maternity team.

A maternity team will normally include a midwife, an obstetrician, and an obstetric anaesthetist with support from appropriate specialists. Care will be provided in an area designated for the delivery of enhanced maternity care.

There are three levels of competency required by midwives:

Level 1 - **Registration (R)** = competencies required at the point of entry to the midwifery part of the Nursing and Midwifery Council's register.

Level 2 - **Core (C)** = competencies required for core midwifery staff employed on a delivery suite on a continuous basis.

Level 3 - **Enhanced Maternity Care (EMC)** = enhanced specialist skills required by at least one midwife or nurse per shift, in an area designated to deliver enhanced maternity care.

Midwives must be able to undertake the following competencies in a safe and professional manner within the NMC Code of Professional Standards of Practice and Behaviour for Nurses and Midwives (2015). All competencies marked "R" are required at the point of entry to the midwifery part of the NMC register.

Respiratory System

The following competency statements relate to caring for women who require respiratory support, including monitoring, observation, and respiratory care.

Accurately perform and correctly document a thorough respiratory assessment.

Assess and monitor the patient requiring respiratory support and take appropriate action where required.

Assessment will include:

- Respiratory rate/depth/pattern of respirations (R).
- Pulse oximetry (R).
- Use of accessory muscles (R).
- Sputum (R).
- Peak Flow (R).

Demonstrate an appropriate response to the observations that you have recorded including:

- Re-positioning the patient (R).
- Referral to and working with physiotherapist (R).
- Obtaining and processing samples (R).
- Assisting with deep breathing and expectoration (C).
- Safely perform ABG sampling from arterial lines and report results to appropriate team member (EMC).
- Offer basic interpretation (EMC).
- Suggest actions following interpretation (EMC).

Oxygen therapy

Assemble relevant equipment and administer oxygen therapy via:

- A simple face mask (R).
- A variable flow O₂ delivery system (R).
- Nasal cannula (R).
- Reservoir mask (R).
- Set-up and use humidification methods (R).

Set-up and use pulse oximetry

- Select appropriate probe site (R).
- Set alarms appropriately (R).
- Understand limitations of pulse oximetry (R.)

Provide appropriate intervention for women experiencing airway problems:

- Position (R).
- Head-tilt/chin-lift/jaw-thrust (R).
- Have knowledge of emergency equipment (R).
- Have appropriate airway device (R).
- Demonstrate safe insertion of airway (R).
- Demonstrate bag-valve-mask ventilation two-person technique (R).

Pharmacology

- Safely prepare and administer medications used in respiratory care:
 - Bronchodilators and steroid inhalers (R),
 - Systemic steroids (C).
- Monitor effects of medication (R).

Cardiovascular System

The following competency statements relate to monitoring and caring for a woman who requires cardiovascular monitoring and management.

Assess and monitor the women requiring cardiovascular support.

Accurately perform and correctly document a full cardiovascular assessment including:

- Pulse strength/volume/character - manual if irregular **(R)**.
- Blood pressure, including manual systolic and diastolic with different cuff sizes and lying and standing assessment **(R)**.
- Temperature **(R)**.
- Urine output and fluid balance **(R)**.
- Capillary refill time **(R)**.
- Skin turgor **(R)**.
- Basic blood results **(R)**.

Manage fluid replacement

- Recognise altered fluid status **(R)**.
- Recognise the need for fluid intervention and therapies **(R)**.
- Recognise the need for fluid restriction **(R)**.
- Administer fluids in accordance with local guidelines **(R)**.
- Accurately record fluid balance **(R)**.

Central venous access

- Safely prepare for and assist with the insertion of a central line **(EMC)**.
- Discuss checking the line position before use in accordance with local policy **(EMC)**.
- Correctly prime a transducer **(EMC)**.
- Correctly attach a transducer to a central line **(EMC)**.
- Correctly zero a transducer **(EMC)**.
- Correctly identify when re-zeroing is required **(EMC)**.
- Correctly set appropriate alarm limits **(EMC)**.
- Apply an appropriate dressing in accordance with local policy **(EMC)**.
- Safely use and change needle-free ports **(EMC)**.
- Safely remove a central line **(EMC)**.

Arterial line management

- Prepare for and assist in the safe insertion of an arterial line **(EMC)**.
- Correctly prime a transducer **(EMC)**.
- Correctly attach a transducer to an arterial line **(EMC)**.
- Correctly zero a transducer **(EMC)**.
- Correctly identify when re-zeroing is required **(EMC)**.
- Correctly set appropriate alarm limits **(EMC)**.
- Apply an appropriate dressing in accordance with local policy **(EMC)**.
- Correctly obtain a blood sample from the arterial line **(EMC)**.
- Safely remove an arterial line **(EMC)**.

Shock

Recognise and interpret signs and symptoms of:

- Cardiovascular shock **(R)**.
- Hypovolaemic shock **(R)**.
- Anaphylactic shock **(R)**.
- Septic shock (including 1st hour care duties) **(R)**.

Cardiac rhythms

- Correctly attach the patient to a cardiac monitor (C).
- Correctly check 'emergency' equipment including defibrillator (C).
- Correctly identify from the cardiac monitor output:
 - Bradycardia (C),
 - Tachycardia (C),
 - Ectopic beats (C).

Correctly identify and follow BLS/ILS guidelines where appropriate for the following life threatening dysrhythmias:

- Asystole (C).
- Pulseless Electrical Activity (C).
- Ventricular tachycardia (C).
- Ventricular fibrillation (C).

Associated pharmacology

Demonstrate knowledge and understanding of prescribed medications used to support the cardiovascular system including:

- Anti-hypertensive drugs (R).
- Magnesium Sulphate (R).
- Safely prepare and administer prescribed medications used to support the cardiovascular system, including:
 - Anti-hypertensive drugs (C),
 - Magnesium Sulphate (C).
- Titrate medication under supervision to achieve targets set by medical staff (e.g. MAP, systolic pressure) (EMC).

Renal System

The following competency statements relate to the safe and effective assessment of renal function, monitoring of fluid balance, and care of women at risk of acute kidney injury:

- Determine the monitoring needs for women at risk of deteriorating renal function (R).
- Demonstrate the ability to accurately measure and record fluid balance and report abnormalities appropriately (R).
- Identify factors which may affect the assessment of renal function (e.g. blocked catheters and urinary retention) (R).
- Evaluate the effectiveness of fluid replacement (R).
- Administer appropriate care to the patient with a urinary/urinary tract catheter (according to national guidelines and local policy) (R).
- Utilise locally available equipment:
 - Catheterisation equipment (R),
 - Urometers (R).
- Identify women who are fluid-depleted (C).
- Identify women who are fluid-overloaded (C).
- Review biochemistry results and take appropriate action (C).
- Monitor and review women's biochemistry and haematology results (C).

Neurological System

The following competency statements relate to the assessment and management of neurologically compromised women.

Identify deterioration in neurological status:

- Undertake a neurological assessment using the AVPU scoring system (R).
- Check blood glucose and take appropriate action (R).

Identify focal deficits such as:

- Gag and swallow reflex (R).
- Pupillary response (R).

Demonstrate an appropriate response to the observations recorded, including:

- Protecting the airway (R).
- Placing patient in recovery position (R).

General

The following competency statements relate to general elements of care required when supporting women in need of enhanced maternal care:

- Complete the MEOWS accurately (R).
- Follow 'track and trigger' system to escalate care (R).
- Provide accurate documentation of assessment/intervention/evaluation and referrals (R).
- Contribute to ongoing management plan (R).

APPENDIX 2

Obstetric early warning system (ObsEWS) scores

National Early Warning System scores for general hospital patients

It is vital that hospitals do not use different numerical scores for general patients and obstetric patients. This could lead to confusion between responders such as outreach nurses or critical care teams who work predominantly with non-obstetric patients.

Where an aggregate score is calculated with the ObsEWS, the points assigned to abnormal values must be used in such a way that they align correctly with the numerical values used in the Royal College of Physicians of London National Early Warning Chart

NEWS scores	Clinical risk
0	Low
Aggregate 1–4	
RED score* (Individual parameter scoring 3)	Medium
Aggregate 5–6	
Aggregate 7 or more	High

The NEWS trigger system aligned to the scale of clinical risk

Table of suggested frequency of observations

How frequently should observations be taken?		
Frequency Required	Observation schedule	
<input type="checkbox"/>	<p style="text-align: center;">After Caesarean Section</p> <p>Twice an hour for two hours (usually completed in recovery) Once an hour until stable (stable = two consecutive sets of observations with no amber or red values)</p>	<p style="text-align: right;">Signature</p> <hr/> <p>Date</p>
<input type="checkbox"/>	<p style="text-align: center;">Four sets of observations in 24 hours</p>	<p style="text-align: right;">Signature</p> <hr/> <p>Date</p>
<input type="checkbox"/>	<p style="text-align: center;">Two sets of observations in 24 hours</p>	<p style="text-align: right;">Signature</p> <hr/> <p>Date</p>
<input checked="" type="checkbox"/>	<p style="text-align: center;">One set of observations in 24 hours (usual minimum frequency of observations)</p>	<p style="text-align: right;">Signature</p> <hr/> <p>Date</p>
<input type="checkbox"/>	<p>Patient specific plan of observation frequencysets of observations in..... Well, post-natal women who remain admitted solely because of a problem with their baby do not require regular observations</p>	<p style="text-align: right;">Signature</p> <hr/> <p>Date</p>

PROOF-REAL

APPENDIX 3

Patient satisfaction, patient feedback

ENHANCED MATERNITY CARE PATIENT SATISFACTION SURVEY

The Enhanced Maternity Care team is continuously striving to improve the quality of care that we are able to offer to our patients. As part of ongoing evaluation of the service we are very interested in the views of our patients.

We would be grateful if you could take a few minutes to complete this questionnaire by marking the appropriate boxes with a cross and/or, if necessary, commenting in the comment boxes provided. The survey is anonymous, and you cannot be identified.

We would like to emphasise that you are always welcome to discuss any aspect of your care with any member of the team at any time in the future.

Q1. Do you understand why you needed specialist care? Yes No

Q2. Who discussed with you the need for this specialist care?
(Please tick as many as applicable):

Obstetric Consultant
Obstetric Trainee
Enhanced Care Midwife
Midwife on delivery suite
Anaesthetist
Other– please specify: _____

Q3. Did you understand the information you received? Yes No

Q4. Did you feel involved with the decision making surrounding your care? Yes No

Q5. Was your partner/family made to feel welcome? Yes No

Q6. Was your partner/family given relevant information about your treatment? Yes No

Q7. Were you satisfied with the care you received? Yes No

Q8. Did you feel you received the necessary help to care for your baby? Yes No

Q9. Did you feel you were cared for in an appropriate setting? Yes No

Q10. Do you feel any aspect of your care could have been improved?
If yes, please comment further in the box below:

Yes No

Q11. We are looking to develop the service further: would an appointment with a member of the Enhanced Maternity Care Team be beneficial following discharge? Yes No

Please write any other comments about your care below or any suggestions for additional questions to include in future versions of this survey:

PROOF-READ DRAFT

ENHANCED MATERNITY CARE PATIENT/RELATIVE FEEDBACK SURVEY

About you –

How old are you? Under 25 25-69 Over 65

Are you: Male Female

Are you: the Patient the patient's relative

Please rate the following based on the consultation from the consultant who was on the ward round today.
Place an X in the circle which fits best

	Poor	Fair	Good	Very Good	Excellent
1. My overall satisfaction with this visit from the consultant on the ward round is:	<input type="radio"/>				
2. On this ward round I would rate the consultant's ability to really listen to me as:	<input type="radio"/>				
3. The consultant's explanation of things to me was:	<input type="radio"/>				
4. The extent to which I felt reassured by this consultant was:	<input type="radio"/>				
5. My confidence in the consultant's ability is:	<input type="radio"/>				
6. The opportunity the consultant gave me to express my concerns or fears was:	<input type="radio"/>				
7. The respect shown to me by the consultant was:	<input type="radio"/>				
8. The amount of time given to me for this ward round consultation was:	<input type="radio"/>				
9. The consultant's consideration of my views and wishes regarding my treatment was:	<input type="radio"/>				
10. The consultant's concern for me as a person on this visit was:	<input type="radio"/>				
11. The recommendation I would give friends and family about this department would be:	<input type="radio"/>				

We would appreciate any comments on how our consultants could improve:

Please fill in the following questions about the ward team that you have come into contact with today (Nursing Staff, Physiotherapists, Pharmacists, Junior Doctors, etc)

	Poor	Fair	Good	Very Good	Excellent
12. My overall satisfaction with the ward team on the EMC unit was:	<input type="radio"/>				
13. The warmth of the ward team's greeting to me was:	<input type="radio"/>				
14. Today I would rate the team's ability to	<input type="radio"/>				

really listen to me as:					
15. The ward team's explanation of things to me was:	<input type="radio"/>				
16. The extent to which I felt reassured by being cared for by this team was:	<input type="radio"/>				
17. My confidence in the ward team's ability is:	<input type="radio"/>				
18. The opportunity the ward team gave me to express my concerns or fears was:	<input type="radio"/>				
19. The respect shown to me by the ward team was:	<input type="radio"/>				
20. The ward team's consideration of my views and wishes regarding my treatment was:	<input type="radio"/>				
21. The ward team's concern for me as a person today was:	<input type="radio"/>				

We would appreciate any comments on how our ward team could improve:

Thank you for taking the time to complete this questionnaire.

APPENDIX 4

National Courses/Modules with MCC content

1. SCOTTIE
http://scottishmaternity.org/Courses/Introduction%20to%20The%20Courses/obstetric_emergencies.html
2. REACTS
<http://www.scottishmaternity.org/Courses/Introduction%20to%20The%20Courses/scottish-maternity-reacts-course.htm>
3. PROMPT
<http://www.promptmaternity.org/training/>
4. BABYLIFELINE
<http://babylifelinetraining.org.uk/home/courses/maternal-critical-care/>
5. Greater Manchester Critical Care Skills Institute
<http://gmccsi.org.uk/aim-courses>
6. Managing Obstetric Emergencies and Trauma (MOET)
(<http://www.alsg.org.uk/MOET>)
7. Advanced Life Support in Obstetrics (ALSO®)
<http://www.aafp.org/cme/cme-topic/maternity/also.html>
8. MCC Course, James Cook University Hospital
<https://www.southteeslri.co.uk/event/maternal-critical-care-and-enhanced-care->
9. Medical Complications in Pregnancy (annual 3 day course held at the Royal College of Physicians of London) (<http://www.symposia.org.uk/main/main.asp>)
10. Obstetric Medicine for trainees (annual 1 day course for trainees)
(<http://www.symposia.org.uk/main/main.asp>)
11. Recognising the Acutely Deteriorating Pregnant Woman simulation course.
(<http://sailcentres.kcl.ac.uk>)
12. HDU Midwifery and Nursing Module
<http://www.kcl.ac.uk>
13. Specialist Skill for AIM; Obstetric Medicine
http://www.jrcptb.org.uk/sites/default/files/Specialist%20Skills%20for%20AIM%202015_0.pdf
14. e-Learning for medical problems in pregnancy
(www.e-lfh.org.uk/programmes/medical-problems-in-pregnancy)