5th East Midlands Critical Care

and Peri-Operative Medicine Conference

Crowne Plaza Hotel, Nottingham - 18th - 19th October 2018

Organised by Dr Sandeep Dhir

Approved by the Royal College of Anaesthetists for 12 CPD credits

Maternal Critical Care
Time for a Redesign

Audrey Quinn

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Honorary Clinical Associate Professor, Leeds University

Chair OAA MCC sub-committee & obstetric ICNARC lead til 2016

Conflicts of Interest

OBSTETRICS

- Northern Network Maternal critical care Group
- **Obstetric Anaesthetists Association Maternal Critical Care Intercollegiate Committee**

COMMISSIONING

- Yorkshire & Humber Quality Improvement NHS England

STANDARDS

- Forthcoming MCC chapter GPICS v2

Obstetric Anaesthesia

UK Maternal Critical Care team

"One Born every Minute, Channel 4"

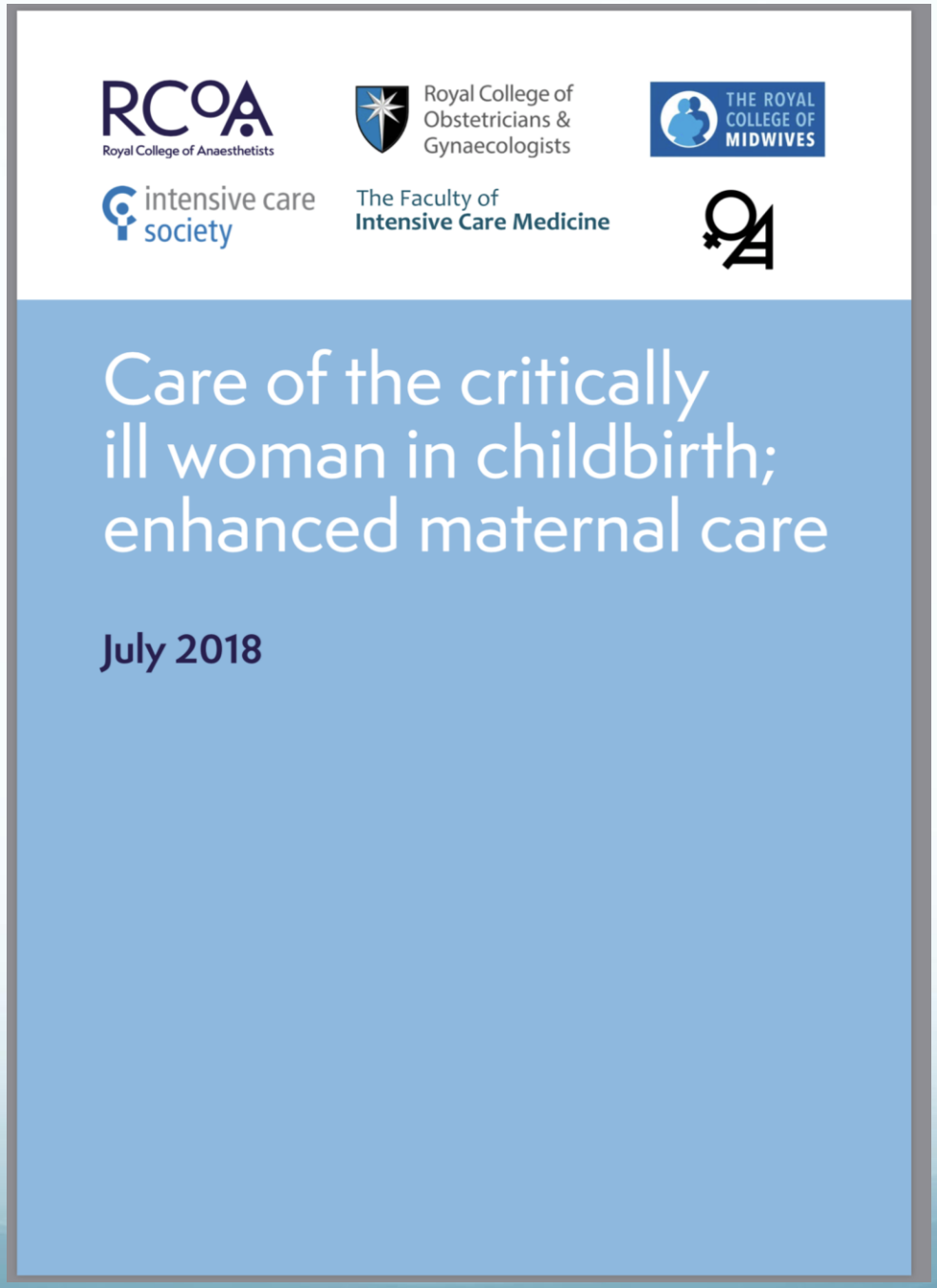
Critical care and outreach team/Obstetric physicians

UK Maternal Critical Care team

"One Born every Minute, Channel 4"

Critical care and outreach team/Obstetric physicians


BREXIT PRIMAVERA...
MORLAND AFTER BOTTICELLI
24·9·17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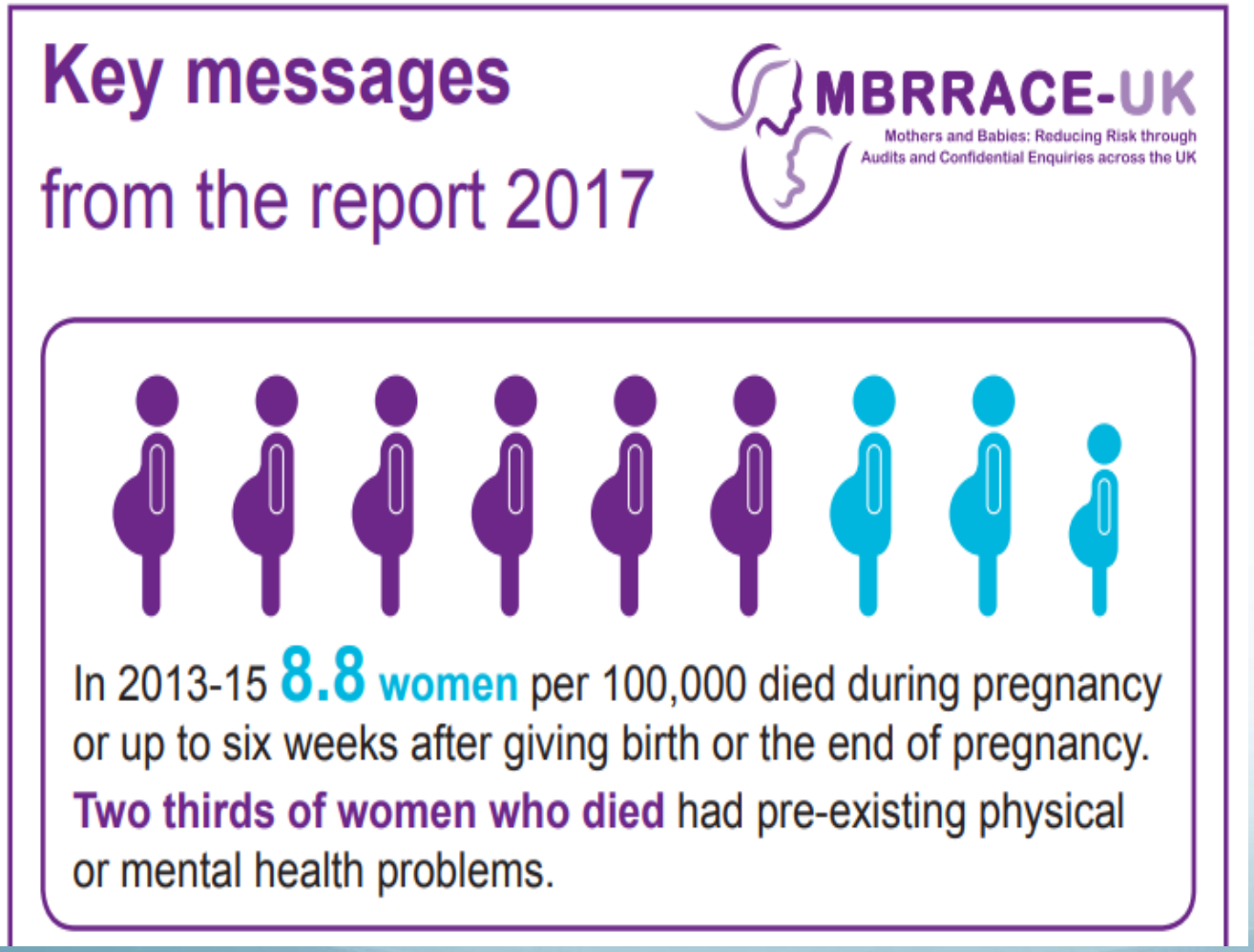
Care of the critically ill woman in childbirth; enhanced maternal care
July 2018

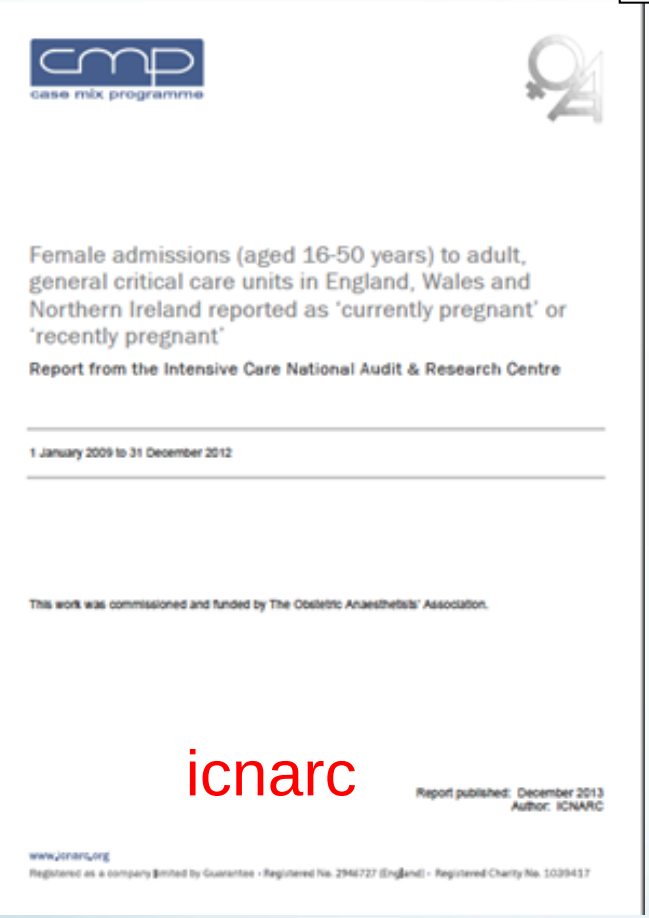
- Background
- MCC guidelines
- Relevance for obstetric anaesthetists & intensivists
- Making it happen:
    - Practical suggestions
    - Examples of good practice

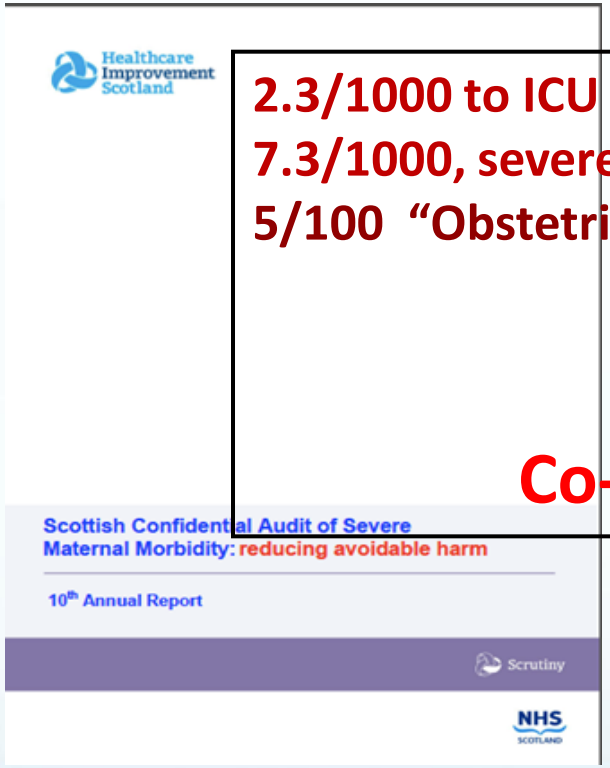
Static UK Mortality 8.5/100,000



PROVISION OF ADEQUATE CRITICAL CARE SUPPORT”
One of Key Recommendations

Rising Morbidity in UK





2.3/1000 to ICU Obs ICNARC 2012

7.3/1000, severe morbidity SCASMM 2012

5/100 "Obstetric HDU" care 2007-9. Rising:

BMI

Age

Co-morbidities

UKNeS
The National Maternal Near-miss Surveillance Programme

UKOSS
UK Obstetric Surveillance System

Severe sepsis, AFE, Cardiac arrest, Cardiac disease

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

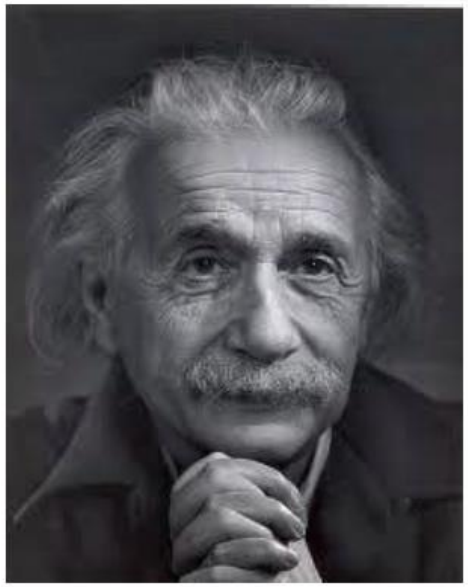
Enhanced Maternity Care

Designated Critical Care

MULTIDISCIPLINARY TEAM

responding to patient's needs as required

Insanity

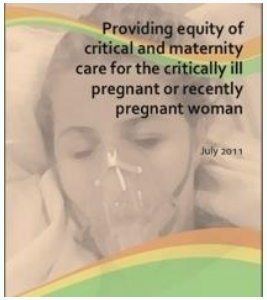


Einstein

“Doing the same thing each time and expecting different results”

Intercollegiate MCC group 2014

MCC Guidelines



Royal College of Obstetricians and Gynaecologists
Bringing to life the best in women's health care

NMC Nursing & Midwifery Council

intensive care society
care when it matters

British Maternal and Fetal Medicine Society

The Royal College of Midwives

UK Critical Care Nursing Alliance

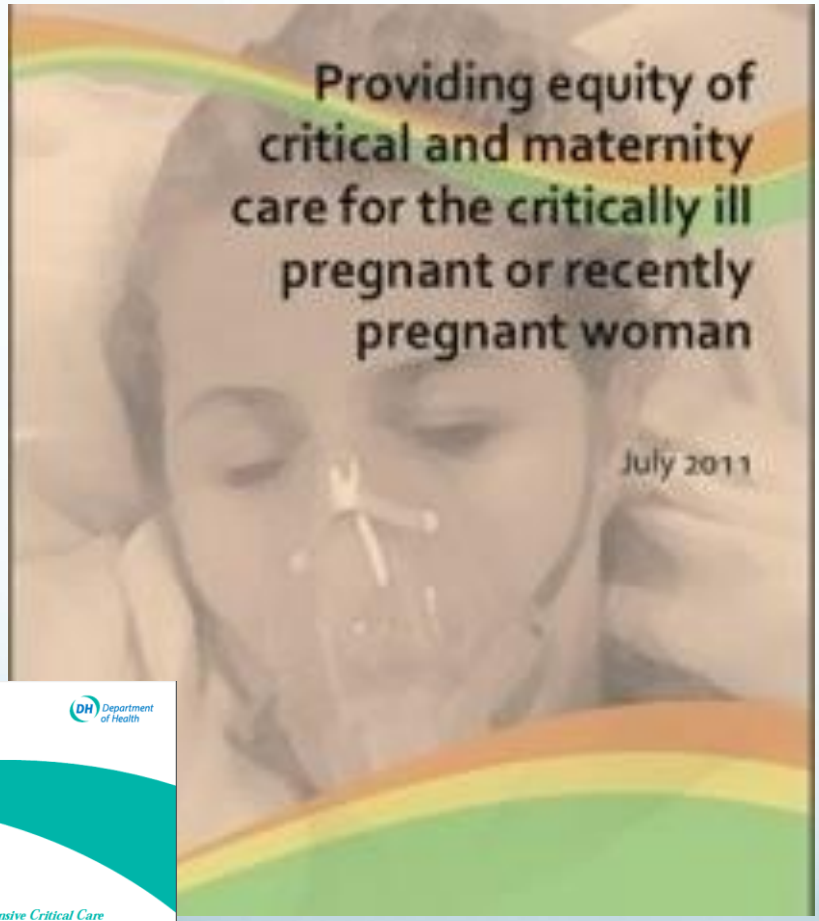
Royal College of Physicians

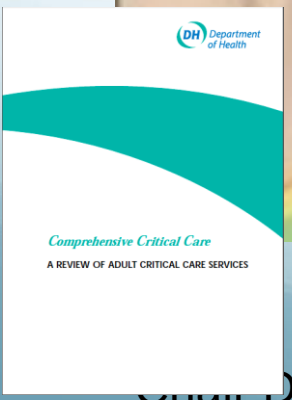
sam
THE SOCIETY FOR ACUTE MEDICINE

The Faculty of Intensive Care Medicine

RCPE

Maternal Critical Care 2011
Care to be delivered by professionals with the same level of competencies irrespective of setting

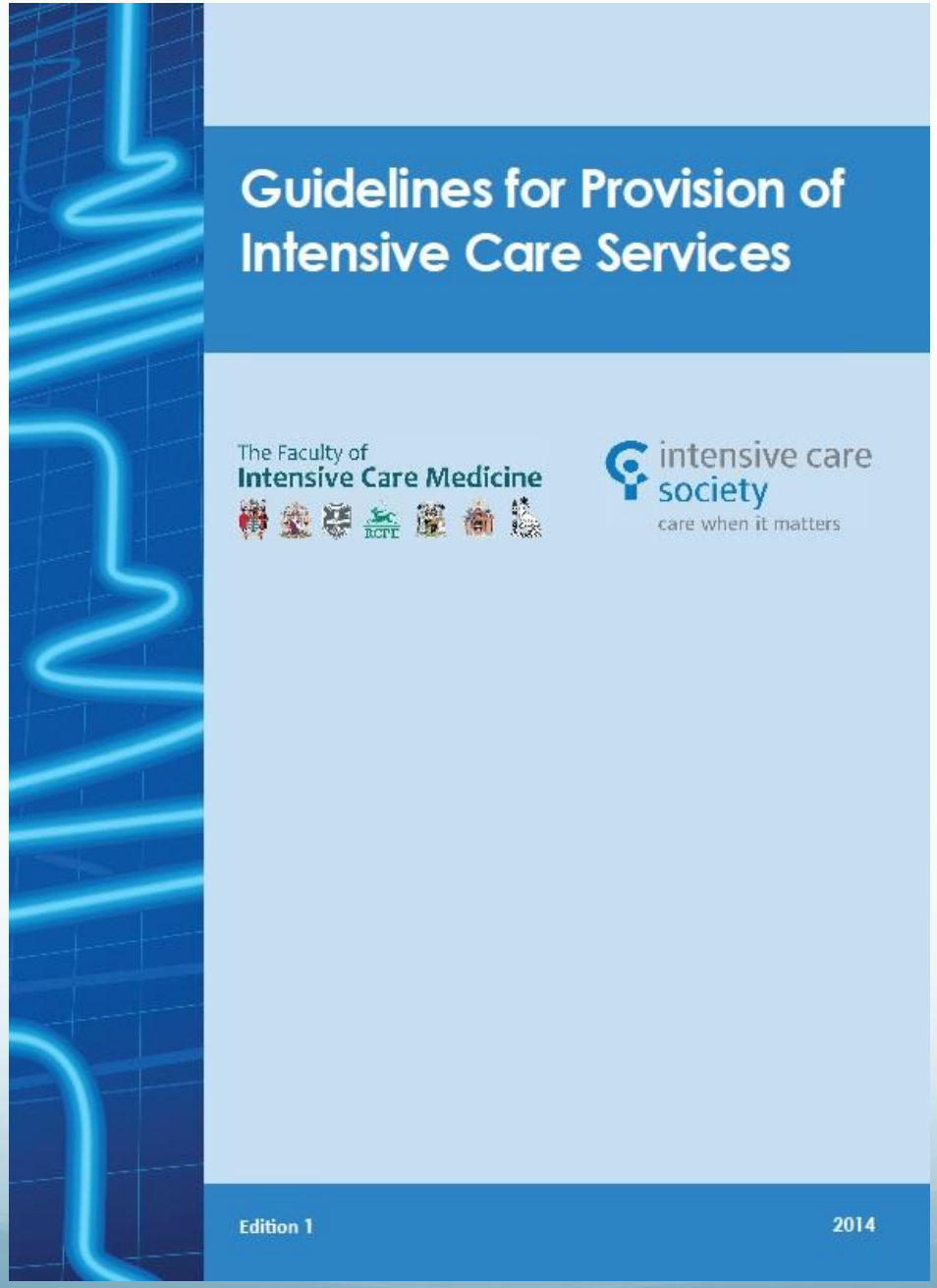




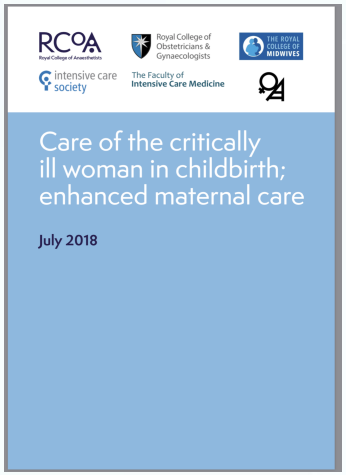
ICS/OAA survey 2014:

- <7% assess critical care competencies for midwives
- 3% provide training in transfer of critically ill mothers
- 70% of 'MCC' areas managed <5 critically ill patients/month
- 50% of 'MCC Units' have no critical care training
- 35% of all units provide 'local' critical care training
- Only 6% 'MCC' units funded
- 72% consultants: often/occas concerned about MCC service

Chair Dr Helen Scholefield, former Joint Standing Committee


Guidelines for Provision of Intensive Care Services
The Faculty of Intensive Care Medicine
intensive care society
care when it matters
Edition 1
2014

Level 2 Criteria	Examples
Patients needing pre-operative optimisation	▪ Cardiovascular, renal or respiratory optimisation required prior to surgery. (Invasive monitoring inserted to assist optimisation (arterial line, and CVP as a minimum)).
Patients needing extended postoperative care	▪ Immediate care following major elective surgery. ▪ Emergency surgery in unstable or high risk patients. ▪ Where there is a risk of postoperative complications or a need for enhanced interventions and monitoring.
Patients stepping down to Level 2 care from Level 3	▪ Requiring a minimum of hourly observations. ▪ At risk of deterioration and requiring level 3 care again.
Patients receiving single organ support ***(exceptions: Basic Respiratory and Basic Cardiovascular Support occurring simultaneously without any other organ support should be considered as Level 2 and Advanced Respiratory Support alone is Level 3).***	
Patients receiving Basic	Indicated by one or more of the following: ▪ Mask / hood CPAP or mask / hood Bi



Contents

Key messages

Working in teams

Women who become acutely unwell during pregnancy, labour and the postnatal period should have immediate access to critical care, of the same standard as other sick patients, irrespective of location. There are different models to deliver this care. These depend upon adequate numbers of staff being available with the knowledge and skills to detect deterioration, escalate care, and deliver appropriate care to a woman who becomes critically ill in any setting. We have attempted to define this knowledge and skill set as enhanced maternity care (EMC).

Our aim is to promote the development of these competencies and encourage closer working between maternity and critical care teams to optimise care for critically ill women, irrespective of where it is delivered.

Enhanced maternity care

EMC is driven by a set of competencies required to care for women with medical, surgical or obstetric problems during pregnancy – peri- and post-partum – but without the severity of illness that requires admission to a critical care unit. This care can be provided by any practitioner with the necessary skills.

Education and training

Education and training in the care of women who are acutely deteriorating/critically ill is essential for all teams involved in maternity care. This includes obstetricians, midwives, obstetric anaesthetists, physicians, intensivists, and critical care nurses. This can be achieved using existing teaching, training and organisational resources, as well as appropriate changes to the existing curricula. It will require collaboration between critical care and maternity services within local settings, as well as regional networks.

An early warning system modified for obstetrics

An early warning system modified for obstetrics is fundamental and should be used for all women presenting to acute care services who are pregnant, or who are within 42 days of delivery. We recommend key components for an obstetric early warning system, with the aim of developing a national obstetric early warning system.

Where care is delivered

It is anticipated that the large majority of acutely unwell maternity patients can have care safely provided by appropriately trained staff on the maternity unit. Transfer to a critical care unit may be required occasionally if the patient's condition warrants that level of care. This model will generally allow the woman and her baby to be together if care is required in the postpartum period, and will facilitate step-down care when, as is often the case, the woman's condition improves. In some cases, the skill mix on the maternity unit can be enhanced, if needed, by the critical care outreach team.

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

Critical care units should have a named lead for maternal critical care to act as the liaison between critical care and obstetric services. Shared care principles (ie effective, consultant-led teamwork) are essential to deliver appropriate obstetric and critical care. The obstetric team (usually consisting of a consultant obstetrician, consultant obstetric anaesthetist and a midwife) should review any obstetric patients admitted to the general critical care unit at least once every 24 hours. All units should have established follow-up/rehabilitation services as recommended by the National Institute for Health and Care Excellence (NICE) and in the Guidelines for the provision of intensive care services, 2015. Midwives should be involved in follow-up where there are ongoing issues due to the birth.

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Care of the critically ill woman in childbirth; enhanced maternal care

July 2018

1 Delivering care to the critically ill peri-partum woman and working in teams

Enhanced maternity care – recognising a standard of care for sick women

A small number of women become so acutely unwell during pregnancy or childbirth that they require critical care support.[15] In a small number of labour wards, the maternity team staff have the necessary Level 2 critical care competencies to care for these women, however for many units this remains aspirational. Such patients require timely access to critical care services. Depending on available resources, the patient may require transfer to a critical care unit. If this is not possible, then the critical care support should come to the patient, irrespective of location. An overriding principle is that when caring for sick postpartum women, the aim should be to keep the woman and her baby together if at all possible.

A much larger number of women, however, have an episode of illness that requires a short period of enhanced care. In most cases this can be provided by midwifery staff trained in a set of competencies brought together here as enhanced maternity care.[11] EMC competencies overlap with those required for what is termed Level 2 care.[2,15] Many women will require close support and monitoring but will not require admission to a critical care unit. Decisions about where, how, and by whom the sick woman will be managed will depend on local facilities and competencies whilst upholding the principles of providing the right care for the right patient at the right time.

EMC will commonly be delivered by midwives; however, in large centres, there may be scope for critical care nurses to provide EMC competencies in tandem with midwives. Consultant obstetrician-led maternity units should be able to provide EMC 24 hours per day, although currently only a small number of maternity units can offer Level 2 critical care. It is anticipated that, especially during the early period of implementation of this guidance, not all units will be able to deliver all the competencies required for full EMC. Such individual units should identify which aspects of EMC they can deliver, depending on local resources, what gaps they have in providing EMC, and how these gaps can be managed in collaboration with the local critical care units.

1.1 All obstetric units should have a lead clinician for the care of critically ill women.

1.2 Maternity service providers should establish training resources to enable staff to achieve and maintain skills in EMC.

1.3 Pregnant or recently pregnant women should have access at all times to a healthcare professional who has EMC competencies.

1.4 The individual competence of support and care required for each woman should be recorded by the maternity team and reported in ward rounds and handovers.

1.5 The lead clinician for the care of critically ill women should participate in the hospital's critical care delivery group or its equivalent.

1.6 The route of escalation to critical care services should be clearly defined, and include multidisciplinary discussion.

1.7 Critical care outreach or an equivalent service should be available to ill women, and provide support and education to healthcare professionals delivering EMC.

1.8 Obstetric units should consider membership of a regional maternal critical care network and the local critical care operational delivery network.

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Care of the critically ill woman in childbirth; enhanced maternal care

July 2018

Delivery of Care

Gary Masterson President ICS

- At least one health professional per shift in the maternity unit will hold EMC competencies
- All obstetric units have lead clinician EMC/MCC
- Maternity service providers should establish EMC training
- The obstetric lead consider participation in the hospital's Critical Care Delivery Group
- The route of escalation to critical care services should be clearly defined
- Critical care outreach CCOT or an equivalent service should be available
- Obstetric units should consider membership of a regional MCC network and/or local critical care ODN

2 An early warning system modified for obstetrics

Failure to identify early signs of illness in obstetric patients has been a recurrent feature of cases of maternal death and serious morbidity. In 2007, the report on the confidential enquiry into maternal mortality included the development of a national obstetric early warning score as one of its top ten key recommendations.[9] Ten years on, UK maternity units are using a variety of early warning systems.[16] To date, there has been no progress towards developing a single 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. Women who become unwell during pregnancy and birth often deteriorate abruptly after a period of physiological compensation. This narrows the window for early detection of developing illness. A three-stage graded response, recommended for general patients, may not be appropriate for the obstetric population. Instead, we recommend only one intermediate step before review by an experienced senior clinician.

An increasing number of hospitals in the UK have introduced electronic early warning systems and it is time to extend these systems to the obstetric population. We recommend the urgent development of electronic rather than paper-based systems.

The recommendations that follow can be applied to both electronic and paper systems. They aim to establish common ground between current obstetric early warning systems and facilitate the development of a single national early warning system modified for obstetrics.

2.1 An early warning system modified for obstetrics should be used in the care of all women presenting to acute care services who are pregnant or within 42 days of having given birth.[9,16]

2.2 The early warning systems modified for maternity patients should include:

- respiratory rate
- oxygen saturation
- heart rate
- systolic blood pressure
- diastolic blood pressure
- temperature
- urine output.

2.3 Additional supplementary observations (such as lochia) should be recorded separately from the early warning observations.

2.4 Clinical concern about a woman's condition should remain an important criterion for summoning help, independent of the early warning score.

2.5 Reduced/altered level of consciousness should be treated as a marker of established critical illness requiring urgent senior clinical attention.[17]

2.6 Where an aggregate score is calculated, the value assigned to abnormal observations should be adjusted to align with the numerical values used by the Royal College of Physicians of London's national early warning chart (ie a score of 5 to 6 = medium risk; a score of 7 or more = high risk), to reduce the risk of error by staff who work with both systems.

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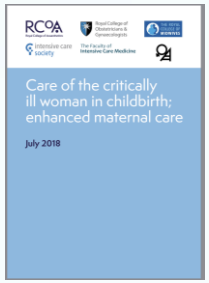


2. Obstetric EWS

Rupert Gauntlett

- ObsEWS for all areas that receive acute admissions.
- The early warning system for maternity should include
  - respiratory rate
  - oxygen saturation
  - heart rate
  - systolic blood pressure
  - diastolic blood pressure
  - Temperature
  - Urine output

Oxford 4Ps physiology study

P Watkinson L McKillop

Evidence based physiol thresholds

n=1000 woman

Electronic Patient Monitoring for the Oxford University NHS Trust linking with CCOT

How Useful are Obs EWS?

Am J Obstet Gynecol2015;212:536.e1-8.

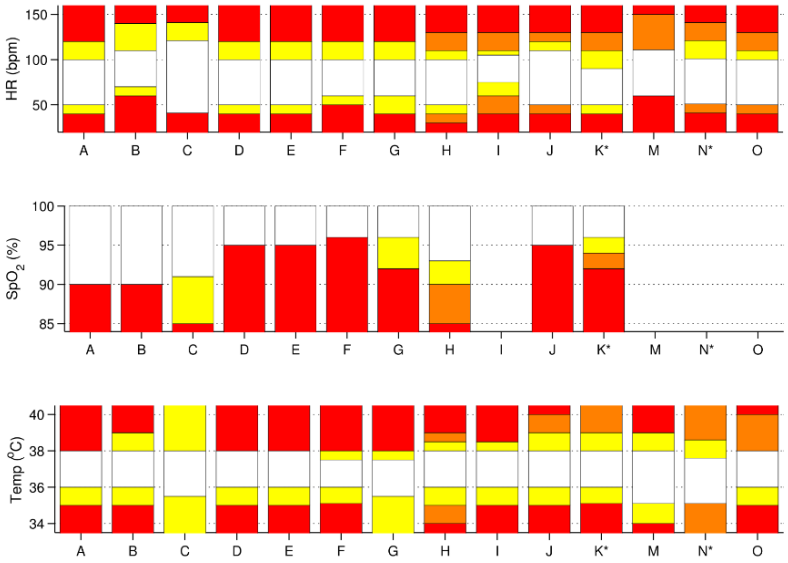
OBSTETRICS

Modified obstetric early warning scoring systems (MOEWS): validating the diagnostic performance for severe sepsis in women with chorioamnionitis

Sian E. Edwards, MBChB; William A. Grobman, MD, MBA; Justin R. Lappen, MD; Cathy Winter, RM; Robert Fox, MD; Erik Lenguerrand, PhD; Timothy Draycott, MD

National Obs EWS? - UK survey 2014

Current MEOWS charts



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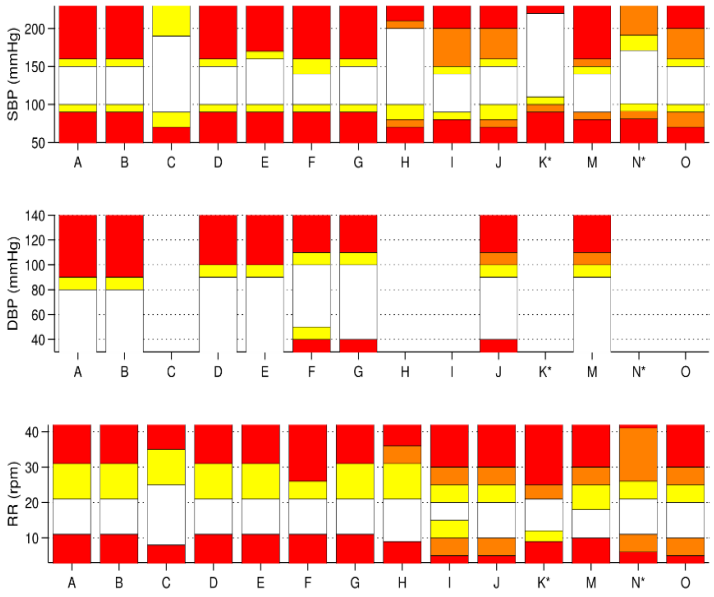


July 2018

The Irish Maternity Early Warning System (IMEWS)

National Clinical Effectiveness Committee

V2 August 2017

Notes:

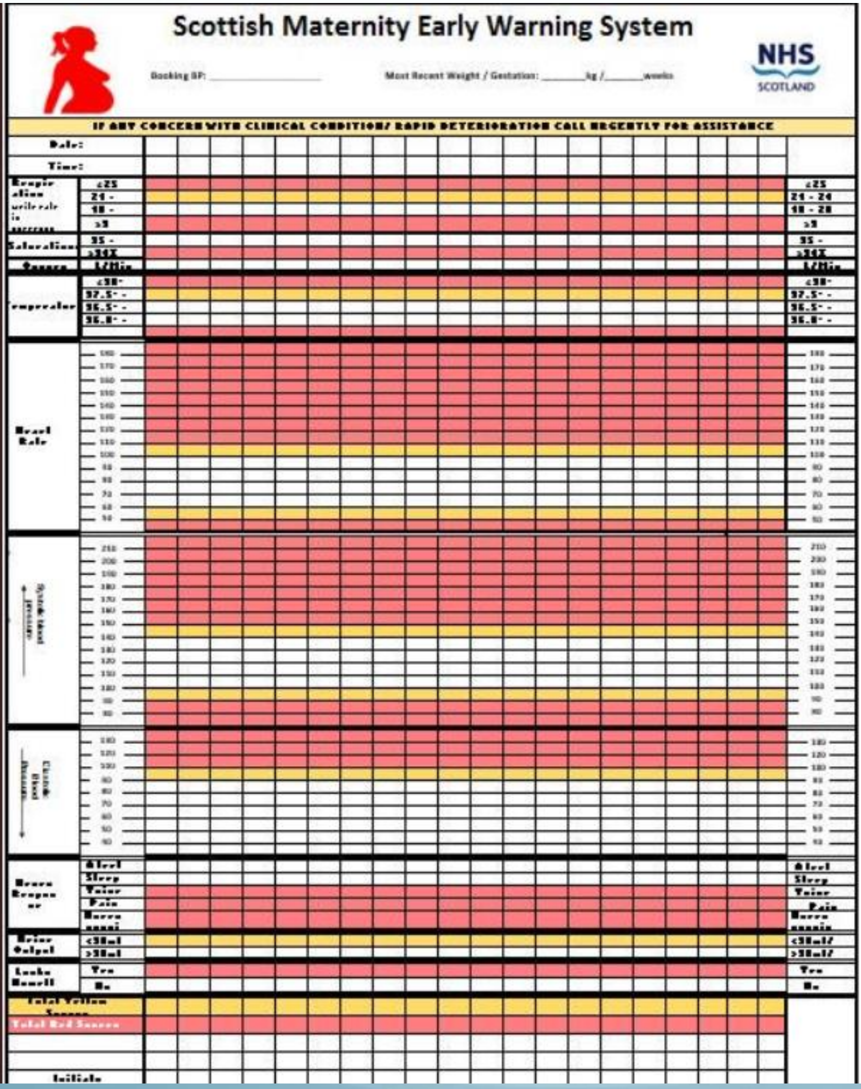
CEU actions are marked in red.

GDG actions are highlighted in yellow and content write up is flagged in *blue italics*. Font style is Calibri 12 and justified.

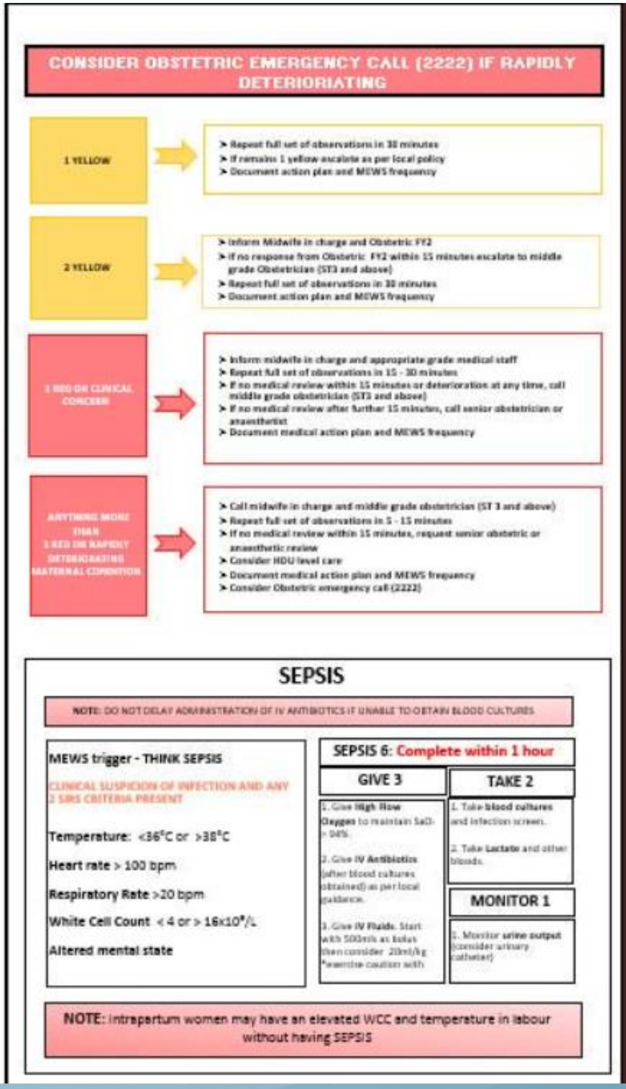
Version History

Date	Version	Details
Nov 2014	1	New
Nov 2018	2	Updated literature review, recommendations and format

This National Clinical Guideline has been updated by the Childbirth Guideline Development Group (GDG), established under the auspices of the HSE National Clinical Programme for Obstetrics and Gynaecology.



Scottish Maternity Early Warning System
Booking BP:
Most Recent Weight / Gestation: kg / weeks
NHS
SCOTLAND
IF ANY CONCERN WITH CLINICAL CONDITION/ RAPID DETERIORATION CALL URGENTLY FOR ASSISTANCE
Date:
Time:
Saturation
Temperature
Heart Rate
Initials



CONSIDER OBSTETRIC EMERGENCY CALL (2222) IF RAPIDLY DETERIORIATING
1 YELLOW
➤ Repeat full set of observations in 30 minutes
➤ If remains 1 yellow escalate as per local policy
➤ Document action plan and MEWS frequency
2 YELLOW
➤ Inform Midwife in charge and Obstetric FY2
➤ If no response from Obstetric FY2 within 15 minutes escalate to middle grade Obstetrician (ST3 and above)
➤ Repeat full set of observations in 30 minutes
➤ Document action plan and MEWS frequency
1 RED OR CLINICAL CONCERN
➤ Inform midwife in charge and appropriate grade medical staff
➤ Repeat full set of observations in 15 - 30 minutes
➤ If no medical review within 15 minutes or deterioration at any time, call middle grade obstetrician (ST3 and above)
➤ If no medical review after further 15 minutes, call senior obstetrician or anaesthetist
➤ Document medical action plan and MEWS frequency
ANYTHING MORE THAN 1 RED OR RAPIDLY DETERIORATING MATERNAL CONDITION
➤ Call midwife in charge and middle grade obstetrician (ST 3 and above)
➤ Repeat full set of observations in 5 - 15 minutes
➤ If no medical review within 15 minutes, request senior obstetric or anaesthetic review
➤ Consider HDU level care
➤ Document medical action plan and MEWS frequency
➤ Consider Obstetric emergency call (2222)
SEPSIS
NOTE: DO NOT DELAY ADMINISTRATION OF IV ANTIBIOTICS IF UNABLE TO OBTAIN BLOOD CULTURES
MEWS trigger - THINK SEPSIS
CLINICAL SUSPICION OF INFECTION AND ANY 2 SIRS CRITERIA PRESENT
Temperature: <36°C or >38°C
Heart rate > 100 bpm
Respiratory Rate >20 bpm
White Cell Count < 4 or > 16x10⁹/L
Altered mental state
SEPSIS 6: Complete within 1 hour
GIVE 3
1. Give High Flow Oxygen to maintain SaO2 > 94%
2. Give IV Antibiotics (after blood cultures obtained) as per local guidance.
3. Give IV Fluids. Start with 500mls as bolus then consider 20ml/kg
TAKE 2
1. Take blood cultures and infection screen.
2. Take Lactate and other bloods.
MONITOR 1
1. Monitor urine output (consider urinary catheter)
NOTE: Intrapartum women may have an elevated WCC and temperature in labour without having SEPSIS

3 The acutely ill pregnant woman in the general ICU

Because only a very few pregnancies are complicated by illness severe enough to warrant admission to a critical care unit, such admissions are currently spread thinly across a large number of units, and so the ability to develop and maintain expertise in care of the critically ill peri-partum woman is limited. This lack of expertise may become a greater issue as an increasing number of ICU clinicians do not have an anaesthetic background and may therefore not have encountered maternity patients since medical school. The most common reason for a critically ill peri-partum woman to be admitted to intensive care is massive haemorrhage.[3] All critical care units that provide support to labour wards should be able to provide high quality post-partum care to women who have suffered major blood loss.

As any woman can become critically ill when pregnant, intensive care doctors, as well as obstetric anaesthetists, should be skilled in the resuscitation and stabilisation of sick pregnant women. There is good evidence across a wide range of rare conditions and specialist services that outcomes can be improved by centralisation.[19] It is time to rethink where we provide some elements of obstetric critical care to ensure that critically ill women receive the best possible care.

After childbirth, admission to a critical care unit should not automatically mean the separation of a mother from her baby. If the baby is well, then critical care units should do all they can to facilitate contact between the mother and her baby.

3.1 Any critical care unit that admits women over 20 weeks of gestation should have rapid access to obstetric and neonatal/paediatric services able to attend in an emergency.

3.2 There should be a clear plan and equipment available for performing a peri-mortem caesarean section in the event of maternal cardiac arrest (in accordance with Resuscitation guidelines from the Resuscitation Council UK).[20]

3.3 Appropriate specialist equipment (eg for neonatal resuscitation) should be present in the critical unit for the duration of the critically ill peri-partum woman's admission.

3.4 An obstetric team (which will usually consist of a consultant obstetrician, consultant obstetric anaesthetist and a midwife) should review all women admitted to critical care at least once in every 24-hour period.

3.5 Critical care units that accept antenatal admissions should have a healthcare professional trained in neonatal resuscitation available within ten minutes, due to the risk of premature labour and unplanned birth. A senior neonatologist or paediatrician should be able to attend within 30 minutes when required.

3.6 Critical care operational delivery networks could consider nominating specific units as the nominated regional or supra-regional unit for maternal critical care.

3.7 Any woman requiring Level 3 care for more than 48 hours should be considered for transfer to a nominated regional or supra-regional critical care unit with appropriate facilities, support and experience.

3.8 All critical care units that admit pregnant or recently pregnant women should have a named lead ICM consultant 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).

3.9 Contact between a mother and her baby and the routine aspects of neonatal care, eg breastfeeding, should be supported within the ICU.

3.10 All women admitted to critical care units should be offered a postnatal review that includes input from a clinician with experience in critical care follow-up, supported by midwives and other specialities, such as a clinical psychologist, as determined by the needs of the patient.

ICU Chapter R Gauntlett

and her baby.

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5 Education

Early recognition of critical illnesses is a challenge for all maternity healthcare professionals as training in acute general medicine and critical care has decreased over recent years, due to increasing specialisation. There is now a pressing need for dedicated educational leads in each profession and subspecialty involvement in the care of maternity patients to collaborate in the delivery of training in critical care. In 2015, the General Medical Council (GMC) recommended broad-based training,[22] and this approach is of particular relevance to the multispecialty area of obstetrics. The *National Maternity Review*, also published in 2015,[14] and a recent report on maternal mortality,[1] recommended that those who work together should learn together in multiprofessional training.

The Royal College of Midwives has recently published the *Enhanced maternity care competencies framework for midwives*, and we fully support the rollout of this framework to ensure that more midwives have the appropriate skills to care for sick women. In conjunction with the evolution of these guidelines, UK Critical Care Nursing Alliance UK and the National Outreach Forum incorporated maternal critical care sections and recommendations into their standards/competencies in 2016.[23] We welcome this as an important step to improving care for sick pregnant or recently pregnant women.

For doctors, postgraduate training programmes should be reviewed for their content relating to maternal critical care. These sections may need to be developed in light of this guidance.

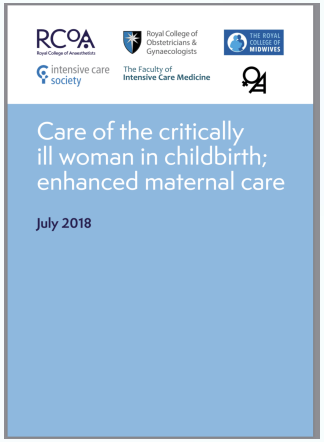
We believe that cross-specialty training in a variety of healthcare environments is an effective, practical, and economical way to improve standards in maternal critical care. For example, midwives might acquire and maintain enhanced maternity care skills from short attachments to theatre recovery and critical care units. By spending time on labour wards, critical care outreach nurses could become familiar with routine maternity care and the different physiology and response to illness in the maternity population. This peer-to-peer, cross-specialty training also helps to generate mutual understanding and personal connections, which are often identified as key factors when things go well in caring for critically ill women.

At a local level, an important educational tool is multidisciplinary skills training in the workplace, often in the form of simulated scenarios. Through feedback/debriefing, lessons learnt can be rapidly adopted into clinical practice.

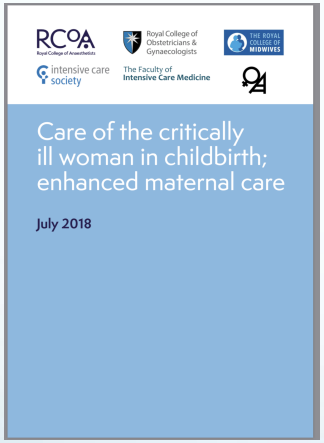
5.1 Multidisciplinary teams that work together should train together.[1] Teams should undergo regular, multidisciplinary training that promotes teamwork, with a focus on human factors, effective communication and openness.

5.2 Simulation-based learning techniques should be considered to assist healthcare professionals to develop the necessary technical and non-technical skills for enhanced maternity care.

5.3 Joint multidisciplinary education relating to recognition of acute illness should be considered to encourage sharing of knowledge and skills.



Enhanced Maternal Care



Appendix

Enhanced Maternal Care: a competency framework for midwives caring for ill and acutely ill women

The Royal College of Midwives in association with the Obstetric Anaesthetists Association

July 2018

Introduction

This competency framework has been developed by a multidisciplinary working group in association with the Obstetric Anaesthetists Association.

The purpose of this document is to identify the competencies required by a midwife on entry to the Nursing and Midwifery Council (NMC) register, and for midwives who care for women who are ill, and are at risk of deterioration in their condition but do not need a critical care midwife or nurse, and can be looked after in a labour ward/recovery area.

This competency framework is to be used in conjunction with the NMC Standards for competence for registered midwives (2009),* the NMC Code of professional standards of practice and behaviour for nurses and midwives (2015), as well as local continuing professional development and preceptorship arrangements. These skills are to be undertaken with reference to appropriate underpinning theory and with evidenced-based decision making. All competencies marked 'R' are required at the point of entry to the midwives' part of the NMC register.

Please note that this framework identifies the competencies but not the accompanying underpinning theory that is additionally required.

Enhanced maternal care

Enhanced maternal care is driven by a set of competencies required to care for women with medical, surgical or obstetric problems during pregnancy, peri- and post-partum but without the severity of illness that requires admission to a critical care unit. This care can be provided by any practitioner with the necessary skills.†

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 labour ward on a continuous basis.

Level 3 **Enhanced Maternal Care (EMC)** = enhanced specialist skills required by healthcare professionals in an area designated to provide enhanced maternal 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).

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 women 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 woman **(R)**
- referral to and working with physiotherapists **(R)**
- obtaining and processing samples **(R)**
- assisting with deep breathing and expectoration **(C)**
- reporting results of ABG sampling from arterial lines to appropriate team member **(C)**
- offer basic interpretation **(C)**
- suggest actions following interpretation **(C)**.

Oxygen therapy

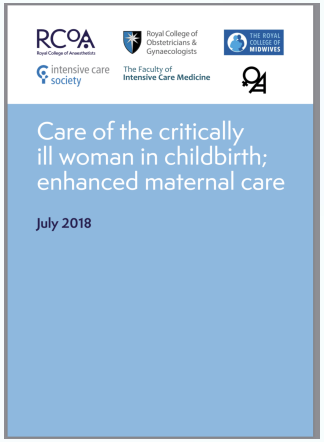
Assemble relevant equipment and administer oxygen therapy via:

- a simple face mask **(R)**
- a variable flow 02 delivery system **(R)**
- nasal cannula **(R)**
- reservoir mask **(R)**
- set-up and use humidification methods **(R)**.

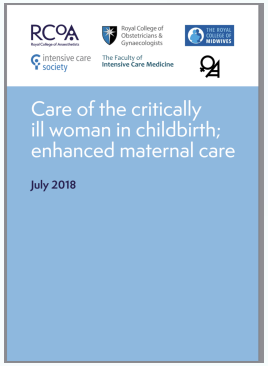
Pulse oximetry

Set-up, use, read and interpret pulse oximetry:

- select appropriate probe site **(R)**
- set alarms appropriately **(R)**
- understand limitations of pulse oximetry **(R)**.



5 Education A Quinn



Critical care nursing/Outreach

- Post reg CC nurse/CCOT education includes MCC

  CC3N education group

- Overview of common reasons for admission

  Maternal Emergencies/ obstetric haemorrhage, obs physiology, psychological support and care of mother & baby

CCOT Educators Partnership with EMC educators

BACCN
British Association of Critical Care Nurses

Education & the Doctors
What is Maternal Critical Care?

- **Intensivist's View based on FICM Curriculum**

(not all intensivists trained in anaesthesia)

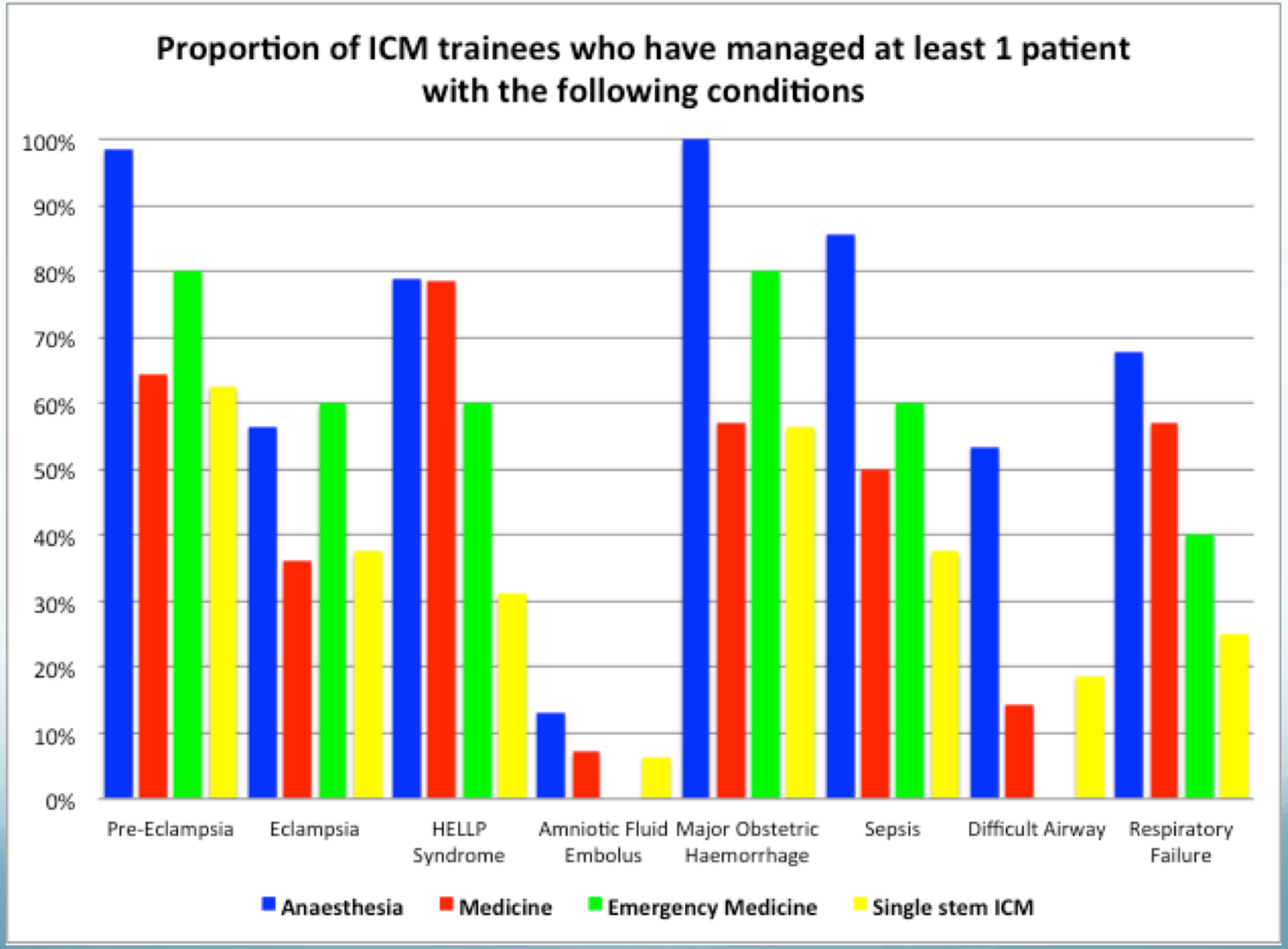
FICM Syllabus

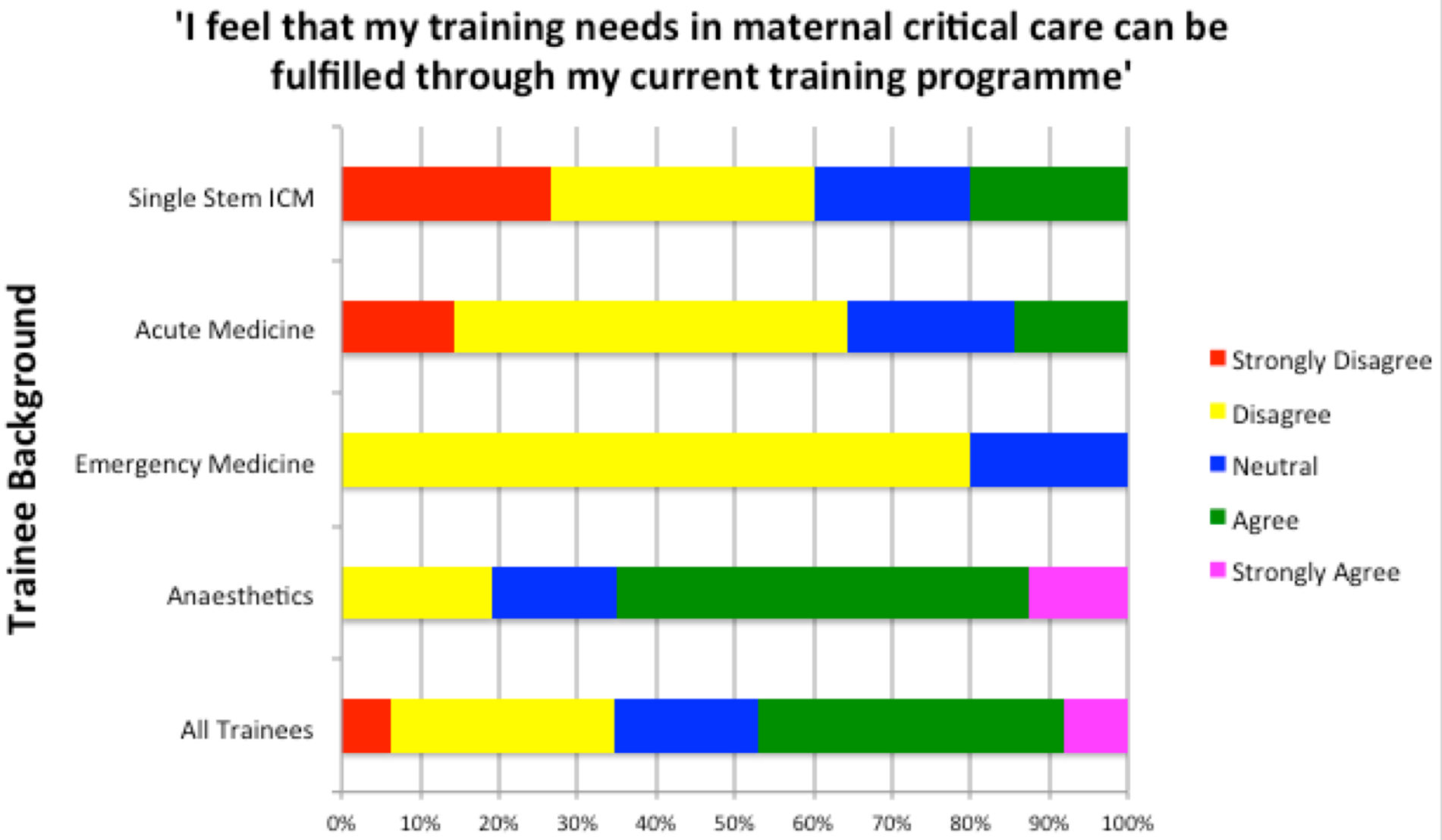
3.11 Recognises life-threatening maternal peripartum complications and manages care under supervision
Knowledge
Physiological changes associated with a normal pregnancy and delivery
Cardiopulmonary resuscitation of the pregnant patient
Pathophysiology, identification and management of peripartum complications: pre-eclampsia and eclampsia; HELLP syndrome; amniotic fluid embolism; ante-partum and post-partum haemorrhage; ectopic pregnancy; septic abortion; peripartum cardiomyopathy.
Risks and avoidance of pulmonary aspiration in pregnant patients
Risk factors, identification and management of venous thromboembolism in the pregnant patient
Methods of avoiding aorto-caval compression
Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
Causes, recognition and management of associated disorders:
Cardiovascular disorders: peripartum cardiomyopathy; pulmonary hypertension
Haematological disorders: coagulation and fibrinolytic pathways and their associated disorders; disseminated intravascular coagulation (DIC); hemolytic syndromes, acute anaemia; complications of massive blood transfusion, principles of sell salvage
Metabolic disorders: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders
Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
Management of critical illness in woman with concurrent pregnancy
Awareness of the psychological impact of separation on the family
Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
Skills
Liaise with obstetric, midwifery and neonatal services
Manage pregnancy induced hypertension
Identify and manage coagulopathies
Establish a management plan based on clinical and laboratory information
Consider potential interactions when prescribing drugs and therapies
Seek appropriate support and supervision in order to provide optimal patient care

FICM Core Competencies

4.17 Medical Problems in Pregnancy			
The trainee will be competent in the assessment, investigation and management of the common and serious medical complications of pregnancy. Critically ill obstetric patients either within an ICU or an obstetric High Dependency Unit make up an increasing workload in ICM.			
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*
Knowledge			
Demonstrate awareness of the possibility of pregnancy in women of reproductive years	E, C, I	1	2.1
Outline the normal physiological changes occurring during pregnancy	C, I	1	Basic Sciences
Demonstrate awareness of the impact of long term conditions in relation to maternal and foetal health e.g. diabetes	E, C, I	1	3.2
List the common medical problems occurring in pregnancy	E, C, I	1	3.11
Identify the unique challenges of diagnosing medical problems in pregnancy	E, C, I	1	3.11
Recall safe prescribing practices in pregnancy	E, C, I	1, 2	4.1
Demonstrate awareness of pregnancy related illness, e.g. eclampsia	E, C, I	1	3.11
Skills			
Recognise the critically ill pregnant patient	E, C, I	1	1.1 3.11
Initiate resuscitation measures and liaise promptly with senior colleagues and obstetrician	C, I	1	1.1 3.11
Take a valid history from a pregnant patient	E, C, I	1	2.1
Examine a pregnant patient competently	C, I	1	2.1
Produce a valid list of differential diagnoses	E, C, I	1	2.8
Initiate treatment if appropriate	C, I	1	3.11
Behaviours			
Recognise interrelationships between maternal and foetal health	C, I	2	Basic Sciences 3.11
Communicate with obstetric team throughout the diagnostic and management process	C, I	3	12.7
Discuss case with senior promptly	C, I	3	12.7
Seek timely specialist opinion in cases of new presentations in pregnancy e.g. jaundice, diabetes	C, I	2	12.7
Recognise the importance of thrombo-embolic complication of pregnancy	E, C, I	1	3.11

A national survey of UK Intensive Care Medicine (ICM) trainee experience of critically ill obstetric patients 2016


Proportion of ICM trainees who have managed at least 1 patient with the following conditions
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Pre-Eclampsia
Eclampsia
HELLP Syndrome
Amniotic Fluid Embolus
Major Obstetric Haemorrhage
Sepsis
Difficult Airway
Respiratory Failure
Anaesthesia
Medicine
Emergency Medicine
Single stem ICM


'I feel that my training needs in maternal critical care can be fulfilled through my current training programme'
Trainee Background
Single Stem ICM
Acute Medicine
Emergency Medicine
Anaesthetics
All Trainees
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

What is Maternal Critical Care?

- **Obstetric Anaesthetist's View based on RCoA Training Curriculum**

- **Obstetric Anaesthesia V's Maternal Critical Care**

(reduced exposure to critical care during/after training)

Annex D – Higher Level Training

Competence	*Description*	*Assessment Methods*	*GMP*
OB_HK_01	Discusses the limitations of a non specialised maternity unit and appropriate referral to a tertiary unit	C	1
OB_HK_02	Discusses current advances and controversies in obstetrics	C	1, 2

Skills			
Competence	*Description*	*Assessment method*	*GMP*
OB_HS_01	Demonstrates the ability to assess women with factors complicating pregnancy	A,C	1,2,3,4
OB_HS_02	Demonstrates the ability to construct a safe and effective plan for the management of a women with factors complicating pregnancy	C	1,2,3,4
OB_HS_03	Demonstrates the ability to be an effective part of a multidisciplinary team	A,M	1,2,3,4
OB_HS_04	Demonstrates the ability to manage an elective caesarean section list effectively, to the benefit of patients and the organisation	A,M	1,2,3,4
OB_HS_05	Demonstrates the ability to manage an elective or emergency caesarean section for placenta praevia	A,D	1,2
OB_HS_06	Demonstrates skill in managing emergencies including pre-eclampsia, eclampsia, major haemorrhage	A,C,D,M	1,2,3,4

Skills			
Competence	*Description*	*Assessment method*	*GMP*
OB_HS_07	Demonstrates the skills required to provide safe and effective regional anaesthesia using a variety of techniques including spinal, epidural, combined spinal-epidural and rectus sheath blocks in both normal and 'difficult' backs	A,D	1,2
OB_HS_08	Demonstrates the ability to deliver safe and effective general anaesthesia to the obstetric patient, both in elective and emergency settings, including the ability to anticipate, recognise and manage the expected and unexpected difficult airway	A,M	1,2,3,4
OB_HS_09	Demonstrates skill in allaying anxiety and helping mothers deal with disappointment	A,M	1,2,3,4
OB_HS_10	Demonstrates effective communication with patients and relatives/partners, including when things have not gone well	A,M	1,2,3,4
OB_HS_11	Demonstrates skill in providing information about analgesia and anaesthesia to pregnant women, with or without complicating factors, to midwives and other professional groups	A,D,M	1,2,3,4
OB_HS_12	Demonstrate ability to supervise and teach less experienced trainees in all aspects of obstetric anaesthesia	A,D,M	1,2

Annex E – Advanced Level Training

Knowledge			
Competence	*Description*	*Assessment Methods*	*GMP*
OB_AK_01	In-depth understanding of the principles and practices of the use of local infiltration for Caesarean section and caudal	C	1,2

Knowledge			
Competence	*Description*	*Assessment Methods*	*GMP*
	anaesthesia in obstetrics		
OB_AK_02	In-depth knowledge of obstetric practice, particularly intra-partum management, and related midwifery and paediatric issues	A,C	1,2,3,4
OB_AK_03	In-depth understanding of general ultrasound and Doppler study estimations of fetal well-being	A,C	1
OB_AK_04	In-depth understanding of the specific risk management issues related to obstetric practice and the potential medico-legal consequences	A,C	1,2,3,4

Annex F- Intensive Care Medicine

Domain and Competencies	Entry Level	INT Target Level	Level Achieved	Assessment Tools	Anaesthesia CCT Competency	Trainee Evidence	ICM Educational Supervisor	
							Sign-off	Date
Domain 1: Resuscitation and management of the acutely ill patient								
1.2 Manages cardiopulmonary resuscitation – ALS recommended	3	3		I, M, T, S	RC_IS_05			
1.3 Manages the patient post resuscitation	1	2		I, M, T, S	RC_BK_21			
1.6 Assesses and provides initial management of the patient with burns	0	1		D, I, M, T, C	PL_IS_03 MT_IK_05			
1.7 Describes the management of mass casualties	0	1		C				
Domain 2: Diagnosis, Assessment, Investigation, Monitoring and Data Interpretation								
2.3 Performs electrocardiography (ECG / EKG) and interprets the results	2	3		D, I, C	OA_BS_03			
2.5 Obtains and interprets the results from blood gas samples	2	2		D, C	OA_BS_04			
2.7 Monitors and responds to trends in physiological variables	2	2		I, T, S	MT_IS_04			
Domain 3: Disease Management								
3.5 Recognises and manages the patient with, or at risk of, acute liver failure	0	1		I, C, T	PB_IK_16 PB_IK_17			
3.7 Recognises and manages the patient with acute gastrointestinal failure	1	2		I, C, T	PB_IK_31 PB_IK_32			
3.10 Recognises and manages the patient following intoxication with drugs or environmental toxins	1	2		I, C, S	RC_IS_02 PR_IK_17			
3.11 Recognises life-threatening maternal peripartum complications and manages care	1	2		I, C, S	OB_IK_04 OB_IK_05 OB_IK_06 OB_IK_07 OB_IK_08 OB_IS_11			
Domain 4: Therapeutic interventions / Organ support in single or multiple organ failure								

What is Maternal Critical Care?

- **Obstetric Anaesthetist's View based Guidelines for Provision of Anaesthetic Services (GPAS)**

2.36 All units should have facilities and equipment to provide high dependency care (Level 2) for high risk obstetric patients with appropriately trained staff or, if this is unavailable, women should be transferred to an HDU in the same hospital.[8]

Guidance on the provision of obstetric anaesthesia services 2014

2.37 All patients must be able to access Level 3 critical care if required; units without such provision on site must 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.[1,8] Portable monitoring with facility for invasive monitoring must be available to facilitate safe transfer of obstetric patients to the ICU.[38]

What is Maternal Critical Care?

- The Obstetrician View?
- Does it matter?
- They know what it shouldn't be!
- RCOG Training Curriculum

Core Module 10 – Management of Labour

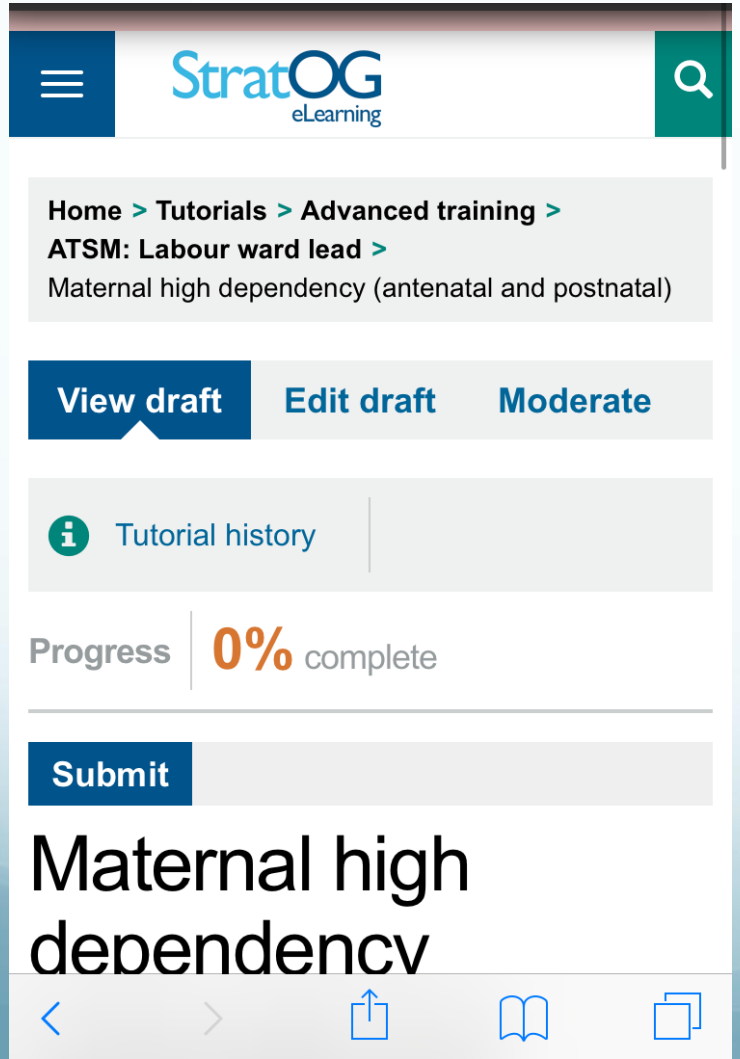
Core Module 10 Logbook	Competence level: Basic level ☐ Intermediate level ▯ Advanced level ▯ Not required ■					
	Level 1		Level 2		Level 3	
	Date	Signature	Date	Signature	Date	Signature
Manage severe pre-eclampsia in labour						
Manage eclampsia in labour OM						
Manage HELLP in labour OM						
Manage obstetric antepartum haemorrhage						
Safe use of blood products						
Manage obstetrical collapse OM						
Manage intrauterine infection						
Prioritise labour ward problems						
Evaluate clinical risk						
Coordinate and run labour ward						
Liaise with other staff						
Manage in utero transfer						
Manage in utero fetal death						

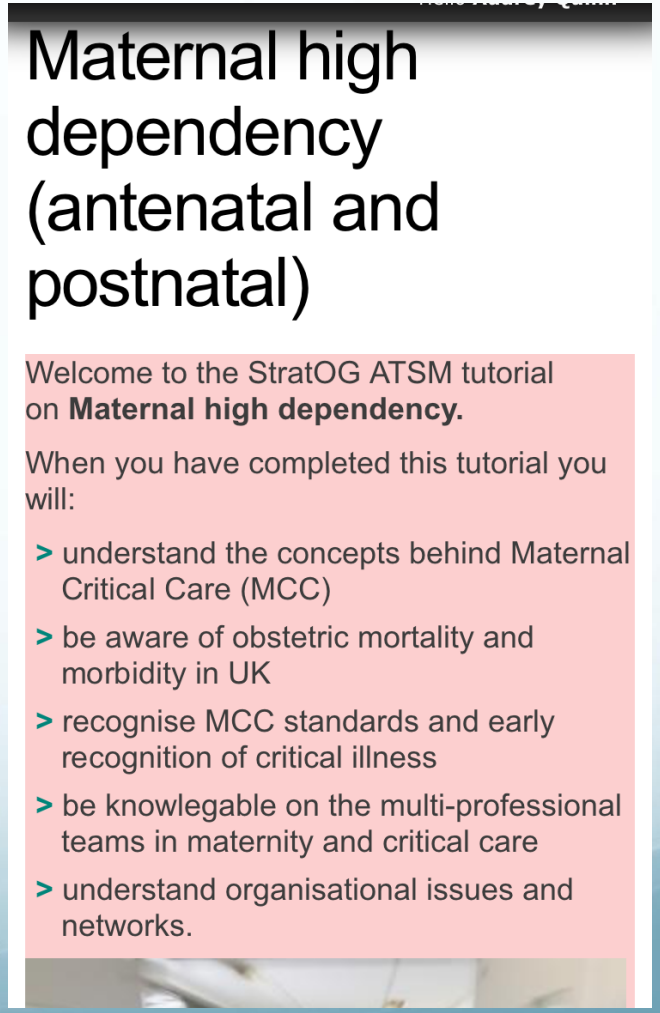
Core Module 12 – Post Partum Problems

Key:
Common competency framework competencies Medical leadership framework competencies Health inequality framework competencies

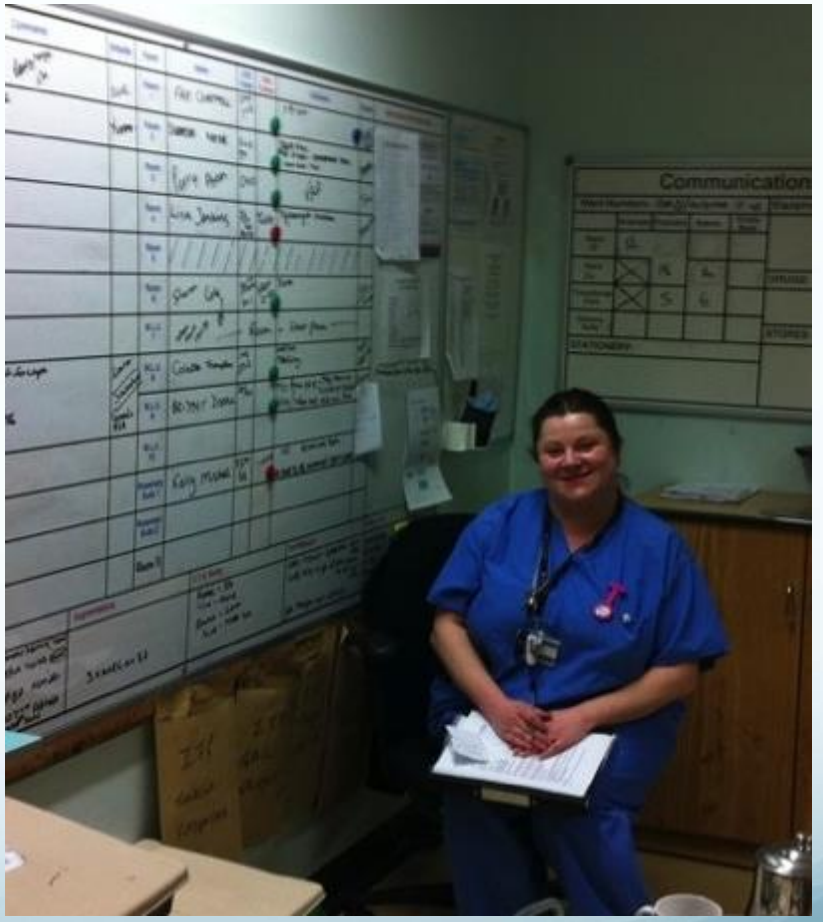
Core Module 12 Logbook	Competence level Basic level □ Intermediate level ▢ Advanced level ▢ Not required ■					
	Level 1		Level 2		Level 3	
	Date	Signature	Date	Signature	Date	Signature
Conduct a postnatal consultation						
Bladder dysfunction					▢	▢
Bowel dysfunction					▢	▢
Primary postpartum haemorrhage			▢	▢	▢	▢
Secondary postpartum haemorrhage			▢	▢	▢	▢
Intra-abdominal haemorrhage OM (a) Obstetric (eg broad ligament haematoma, post CS)			▢	▢	▢	▢
(b) Non-obstetric (e.g. liver capsule rupture, splenic artery aneurysm) OM			▢	▢	■	■
Management of Massive Obstetric Haemorrhage			▢	▢	▢	▢
Acute maternal collapse OM					▢	▢
Perineal and vaginal tears						
Damage to rectum and to anal sphincters (a) Repair 3rd degree tears					▢	▢
(b) Repair 4th degree tears OM			▢	▢	▢	▢

Labour Ward Lead ATSM RCOG pilot project

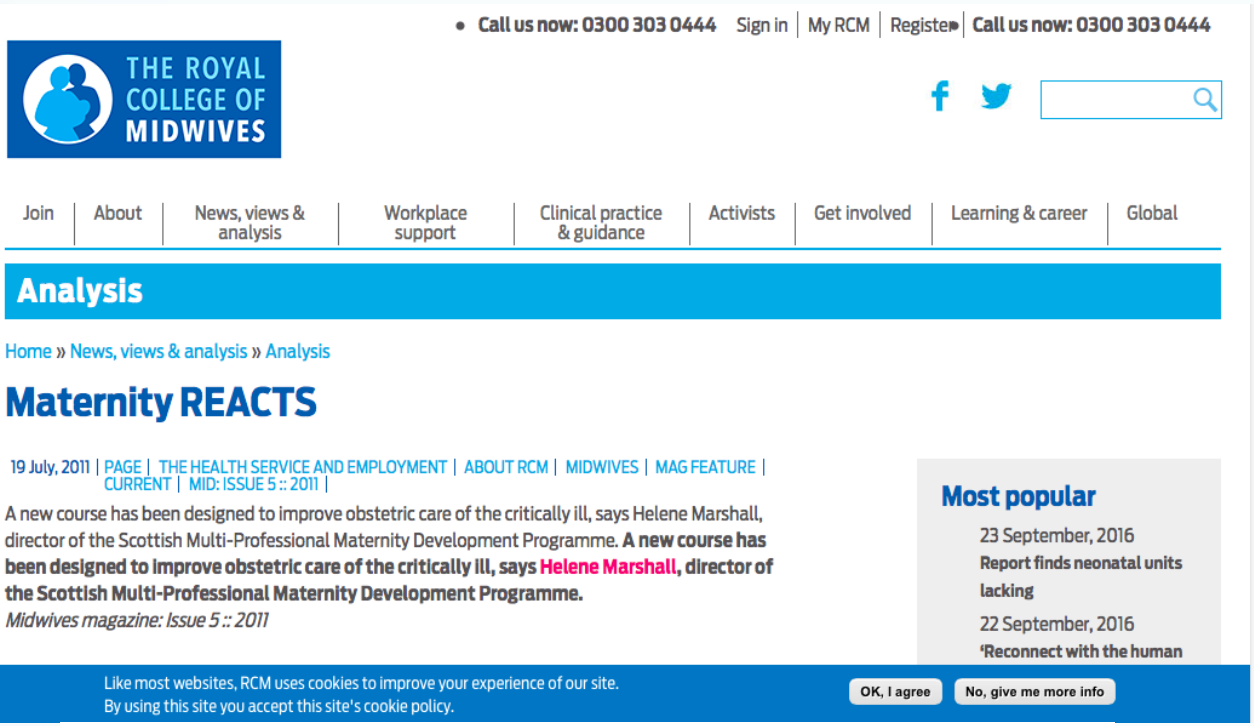


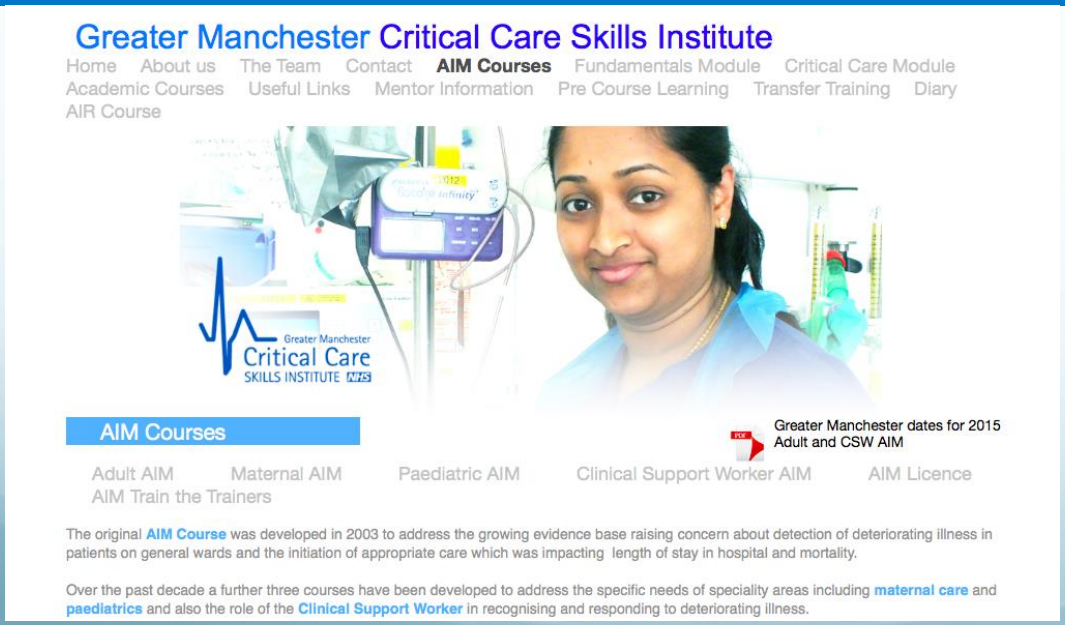


Training the Team the midwives



Direct Entry Midwife undergoing EMC





NEED INTENSIVIST/ CRITIAL CARE/OUTREACH NURSE INVOLVEMENT

James Cook Hospital MCC course

Maternal Critical Care and Enhanced Care

27th November 2015 (Podcast release)
& 3rd February 2016 (practical/simulation day)

Academic Centre, The James Cook University Hospital, Middlesbrough, TS4 3BW

Course fee: £200

This course is aimed at midwives and O&G speciality trainees and includes twelve hours of video podcasts and a practical training day to compliment the theory. The video podcasts are released for streaming two months before the practical day and can be viewed at your convenience on PC, and mobile devices. The course is delivered by various specialities: intensive care, cardiology, respiratory, rheumatology, haematology and renal medicine. The final practical day includes case based discussions, simulation and resuscitation training.
CPD application made to RCOG & RCM.

If you are interested in attending please complete and return the booking form overleaf or apply online:

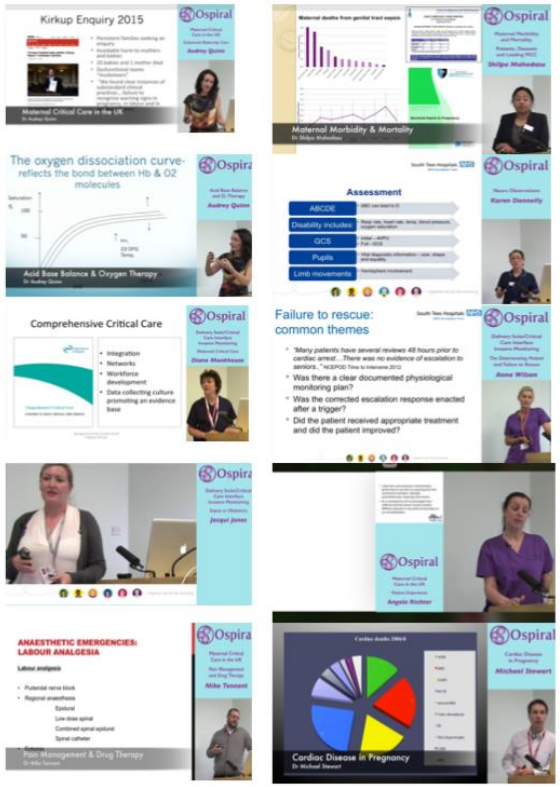
@ www.conferencessouthtees.co.uk

Places are strictly limited so please book early to avoid disappointment.

Course Organisers:

Dr Audrey Quinn (Consultant anaesthetist)
Dr Shilpa Mahadasu (Consultant obstetrician)

2015 Vodcasts https://www.youtube.com/watch?v=WhbKfYqo9bA



Course Sample

https://youtu.be/WhbKfYqo9bA

6 Quality improvement

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 should be used to drive improvement.

Quality indicators should be developed that are specific for EMC and maternal critical care. Data about women who are admitted to critical care units providing Level 2 and/or Level 3 care will be captured by the critical care minimum dataset, and currently reported through the ICNARC case mix programme in England and Wales[24] and through the Scottish intensive care society audit group (SICSAG) in Scotland.[25] 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.

6.1 We suggest that a dataset of care given to critically ill women in the obstetric unit should be collected to support quality improvement. The following is a suggested dataset. Much of the data will already be collected through systems that are currently in place. Some data will be collected for each critically ill peri-partum woman and other data can be collected annually.*

Structure

Evidence of unit participation in audit of practice.*
Evidence of daily review and documented plan.*
Record of appropriate staffing levels and skills training.*
Evidence of access to support services (pharmacists, physiotherapist, dietician, microbiologist).*

Process

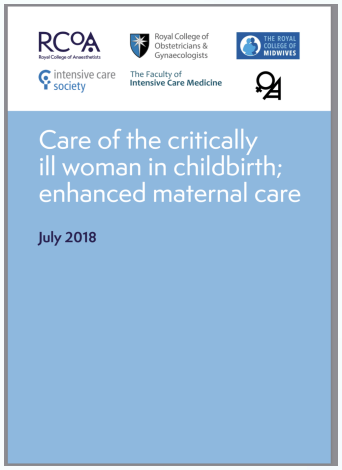
Care bundles in place for central venous catheter, arterial and peripheral venous catheter insertion and maintenance.*
Record of assessment for post discharge review and follow-up.*

Outcome

Record of critically ill peri-partum woman and baby contact.
Record improvement, deterioration, transfer, death.
Record outcomes of significant events (morbidity and mortality) discussed at regular multidisciplinary meetings.*
Record of regular critically ill peri-partum woman and family experience surveys.*

A paper or electronic dataset may include the following for collection on each critically ill peri-partum woman cared for:

- identifiers and demographics (hospital number or unique identifier, age, postcode, body mass index, ethnicity and relevant social factors, pregnancy status; including parity, gestation, multiple pregnancy)
- time and date of admission
- diagnosis on admission
- surgical status (non-surgical, elective, non-elective)
- mode of delivery
- highest level of care during admission**[26]
- time and date ready for discharge or transfer



Regional Maternity Networks

MCC Network 2012 Y& H

Obstetric Anaesthetist

Intensivist, Midwife,

Obstetrician, Critical care/outreach

University, Educators, Management,

Maternal critical care

Care worthy of the name?

Do you manage critically ill mothers during pregnancy and labour? Are you frustrated with deficiencies in the quality of care? Are we compromising our standards of care by allowing sick mothers to stay on the maternity unit (compared with the care given on a critical care unit with appropriately trained staff and facilities)? In this article we address the scope of the problem, the current evidence and areas for improvement emphasizing the key role of anaesthetists in implementing changes.

Dr A C Quinn
Consultant Anaesthetist, The General Infirmary, Leeds

Increasing numbers of sick mothers with more complex problems are being seen on isolated maternal critical care units (MCC). These units operate outside the standards and guidelines of the critical care environment and manage a wide spectrum of critically ill obstetric patients, and mothers who may or may not have had a 'high risk pregnancy'. The obstetric anaesthetist is the key player in developing a model of care that works in individual hospitals linking into and organising the necessary groups.

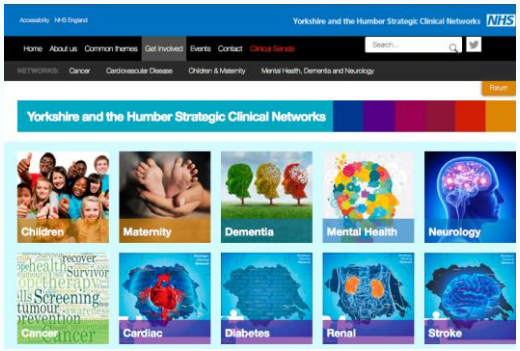
Scope of the problem

Increasing numbers

The latest confidential enquiry[1] shows a significant number of deaths associated with suboptimal care of the critically ill mother and in particular, an increase in deaths from sepsis and genital tract infection. Between 2006–08 there were 29 deaths from sepsis, including 13 direct deaths from Streptococcus (SSC), developed by the European Society of Critical Care Medicine, the International Sepsis Forum, and the Society of Critical Care Medicine, has identified the problem to be more common than acute coronary syndrome and more deadly than stroke. These groups are working to meet the challenges of sepsis and to improve its management, diagnosis, and treatment in all patients including obstetrics.

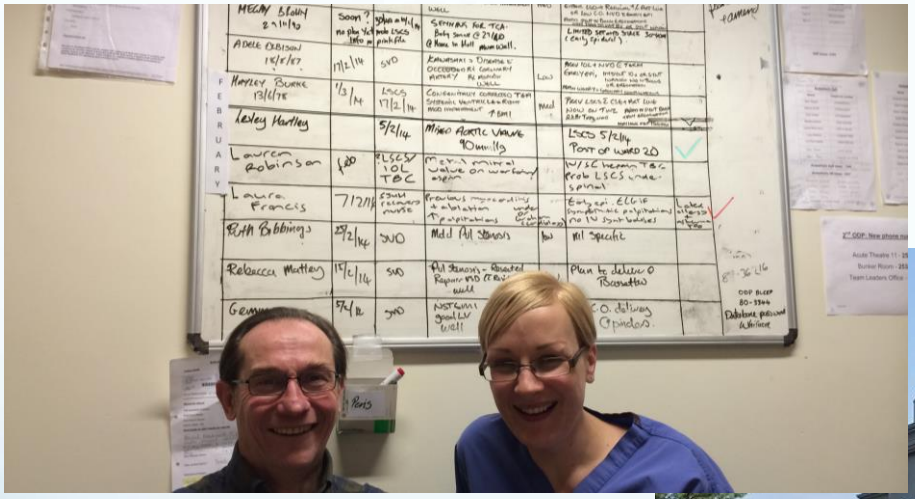
More complex cases

Clinicians are now facing increasingly complex medical and obstetric problems. For every death there are at least nine women who develop severe maternal morbidity. The intensive care national audit and research centre (ICNARC) has been collecting data on critical care admissions of pregnant women since 2006. The latest report[1] shows that 11.4% (513) women aged 16–50 years admitted to ICU in the UK were



MCC Network

Yorks & Humber CCN & women and Children SCN



Holiday Inn Wakefield,
Radisson Blue Leeds

Y&H MCC benchmark 2018

Approved by maternity Commissioners
Clinical Expert& strategy group

Yorkshire and the Humber Maternity Clinical Network

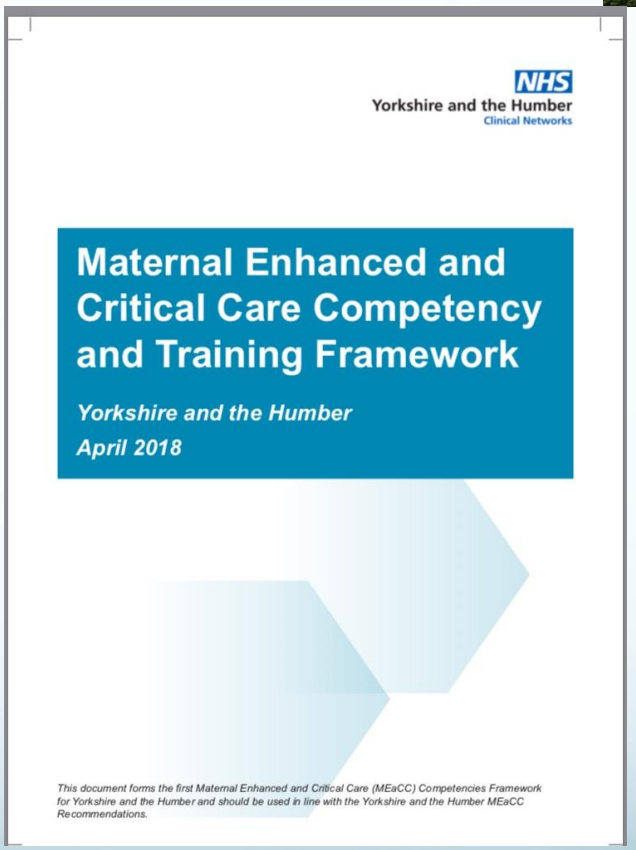
NHS Yorkshire and the Humber Clinical Networks

Maternal Enhanced and Critical Care Event

10.00 - 15.00hrs (Registration from 09.30hrs)
Refreshments and Lunch provided

Raddison Blu, 1 The Light, The Headrow, Leeds, LS1 8TL

Time	Title	Lead
9.30	**Registration and Coffee**	
10:00	**Welcome**	Sarah Winfield
10:10	**Caring for the Sick Mother, Guidelines in Maternal Critical Care**	Audrey Quinn
10:25	**Service User Story**	Bronnach Pemberton
10:45	**Obstetric Early Warning Score, ObsEWS**	Peter Watkinson
11:00	**Break – please return to your allocated table**	
11:20	**MEaCC T&FG – Work to date and workshop introduction**	Debbie Horner Emm Irving
11:30	**Workshop 1: General Critical Care** ▪ Case Studie	Facilitators
12.15	**Workshop 2: Y&H MEaCC Recommendations** ▪ Challenges/Opportunities ▪ Gaps/amendments ▪ Including feedback	Facilitators
13.00	**Lunch – please return to your allocated table**	
13:45	**Workshop 3: Y&H MEaCC Competencies Framework** ▪ Challenges/Opportunities ▪ Gaps/ amendments ▪ Including feedback	Facilitators
	Refreshments will be available during workshops	
14:30	**Workshop 4: Y&H MEaCC Training Framework** ▪ Challenges/Opportunities ▪ Gaps/ amendments ▪ Including feedback	Facilitators
	Workshop 4: Outcome Based Commissioning MEaCC	
14:50	**Next steps, evaluation and close**	Sarah Winfield



Chair Dr Debbie Horner, Anaesthetic consultant

DAILY-NEWS 29 June 2018

Biggest study of vaginas shows there's no such thing as 'normal'

The artwork "The Great Wall Of Vagina" in Brighton, created by artist Jamie McCartney

Andrew Hasson/Camera Press

- Background
- MCC guidelines
- Relevance for obstetric anaesthetists & intensivists
- Making it happen:
    - Practical suggestions
    - Examples of good practice

Caring for the critically ill childbearing mother Guidelines in Enhanced Maternity Care

Local

Models of Care for local teams (ICU+CCOT),

Ensuring standards Team training

Regional

MCC networks, Organisational within & between Trusts

Education partnerships

National

National Obs EWS & digital systems

Central MCC organisation platform?

Acknowledgements

c.uk

@audreycquinn

MCC session
Monday Dec 10th 2018

- Latest progress
- Evidence base for Obs EWS
- Rehabilitation for sick women
- Managing and organising MCC @maternity SCN