

# **Enhanced Maternal Care Units:** Guidance on Development and Implementation

## Endorsing Organisations

British Maternal and Fetal Medicine Society

UK Critical Care Nursing Alliance:

- Royal College of Nursing
- British Association of Critical Care Nurses
- Critical Care National Network Nurse Lead Forum
- Intensive Care Society
- National Outreach Forum
- Paediatric Critical Care Society

## Supporting Organisations

Joint Committee for Obstetric Medicine:

- MacDonald Obstetric Medicine Society
- Royal College of Physicians

Obstetric Anaesthetists Association

Royal College of Obstetrics and Gynaecology

Royal College of Midwives

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## Background

Care of the critically ill woman in childbirth; enhanced maternal care was published by the Royal College of Anaesthetists in August 2018. This has led to the introduction of Enhanced Maternal Care (EMC) in some maternity units nationally, but uptake has not been universal. More recently there has been increased focus on maternal enhanced and critical care, in part because of the numbers of pregnant women who became unwell with COVID-19 and the challenges this presented to the multidisciplinary teams caring for them and their babies.

The aim of this document is to build on existing EMC guidance and give more specific guidance on how to establish Enhanced Maternal Care, including practical advice on the development of the EMC team; who should be involved and how the team should be developed including training, governance, quality improvement and data collection. It is increasingly recognised that a 'one size fits all' model of EMC presents a significant challenge to smaller units who are likely to care for fewer sick women. The guidance gives specific examples of how EMC can be provided successfully in units of all sizes working collaboratively with critical care services.

### Audience and scope:

This guidance should be read by all healthcare professionals caring for pregnant or recently pregnant women in a hospital setting.

This guidance considers the clinical needs of sick, pregnant, or recently pregnant women cared for in a non-critical care environment. It is not intended to describe the service or care standards for patients who require critical care (level 2 or 3 care).

### Methodology:

This document aims to update national EMC guidance in light of changes to the national definition of enhanced care. It also suggests examples of different models of EMC, including those that can be adopted in smaller units. The production of this document has been overseen by the Intensive Care Society Maternal Critical Care Steering group and reviewed by colleagues from obstetrics, midwifery, maternal medicine, obstetric anaesthesia, critical care nursing and critical care outreach. The document has been shared with colleges and societies for review. The content of this document will be reviewed 3 years after publication or earlier if appropriate.

### Existing models of EMC:

EMC uptake has been slow in UK maternity units, with a recent OAA survey<sup>6</sup> reporting only 27% of smaller units training midwives in EMC versus 47% in larger units. Benchmarking of units across Yorkshire and the Humber suggested that midwives in smaller units were finding it difficult to maintain competence in caring for invasive monitoring given the infrequency of its use and were keen that any national guidance was flexible so that workable solutions could be found for all sizes of unit<sup>7</sup>.

Examples of EMC models can be found in Appendix 1. They give an indication of the various models of EMC that are currently in place across the country. The examples are not meant to be exhaustive but highlight how units have developed EMC models tailored to their unit size, case complexity and estate challenges to provide safe care for sick women.

## Summary of key guidance

- Enhanced Maternal Care can be defined as, “**An intermediate level of care for pregnant or recently pregnant women where a higher level of observation, monitoring and interventions can be provided than on a ward but not requiring high dependency care/organ support.**”
- Uptake of Enhanced Maternal Care has been slow nationally. The reasons for this are multifactorial but feedback from individual units suggests that a ‘one size fits all’ model isn’t practical, particularly for smaller units
- Enhanced maternal care units (EMCUs) allow sick women or those at risk of deterioration to be co-located with maternity services to facilitate the concentration of multi-professional skills including the neonatal team and rapid access to maternity theatres
- Women who are most likely to benefit from EMC include those identified as being acutely unwell requiring more frequent than 4 hourly observation for reasons other than labour. In some units this might also include use of invasive monitoring or other elements of level 2 care. EMC is also appropriate for those recently stepped down from Critical Care (level 2 or 3 care) and for any woman about whom there is concern regarding clinical condition and risk of deterioration who might benefit from closer observation
- EMC would not usually encompass women requiring any form of non-invasive ventilation e.g. CPAP, BiPAP or cardiovascular support e.g. vasopressor infusions unless staff specifically trained in this competence are directly caring for the woman 24/7 with local policies in place ratified by the multidisciplinary team, including critical care. Should this be the case then consideration should be given to whether level 2 (high dependency) care is being provided, in which case all other GPCIS level 2 standards will also apply
- There are a variety of different models of EMC that have been implemented across the country, with smaller units tending to opt for a lower threshold for transfer to critical care if the critical care unit is in close proximity to the maternity unit. Where units aren’t co-located, others have either elected to train their EMC midwives to have competence in caring for invasive monitoring or working alongside nursing colleagues with the required competencies in the maternity unit
- There should be designated operational management, obstetric, midwifery, anaesthetic and critical care (medical and outreach nursing) leads as a minimum in every EMCU. Governance of the EMCU should align to that of the maternity and critical care services in the hospital
- Local outcomes should be continuously monitored. National data collection is important for outcome evaluation, mortality prediction and research and should be established for EMC
- EMC may begin in other areas of the hospital than the EMCU. Where this is the case, appropriately trained staff should be available to assess women, initiate and deliver treatments and remain with patients during delivery of care. Transfer to a designated EMCU should occur within 4 hours of initial review. This may involve the critical care outreach team and highlights the importance of close liaison between EMC and critical care
- There should be consideration for the provision of EMC during labour with an area available meeting requirements for both. Any enhanced care unit caring for women who are still pregnant, including those that are not maternity specific, must have protocols in place to facilitate rapid review by the obstetric MDT and transfer to a theatre equipped to perform emergency obstetric interventions
- A competent senior decision-maker should review each woman receiving EMC at least twice a day. At least one of these reviews must be by a consultant or equivalent and multidisciplinary team
- The midwifery and/or nursing staff requirement of an EMCU will be dependent on the number of beds within the unit and the complexity of each patient. The minimum ratio recommended for enhanced care in any area is 1:4 but increased acuity/unit layout and labouring women will require additional staff as per existing national guidance
- All midwifery and/or nursing staff caring for women who could become unwell should be competent in the use of a maternal early warning score to identify deterioration, performing a basic ABC assessment and appropriate escalation

- Pregnant or recently pregnant women should have access at all times to a healthcare professional who has EMC competencies
- Each member of midwifery and/or nursing staff providing EMC should have sufficient funded and protected time to ensure they develop and can demonstrate competence in the delivery of the different types of treatment and monitoring provided in their EMCU
- Critical care staff with appropriate competency should be available to transfer patients where required from an EMCU to a critical care area
- The route and appropriate point of escalation to critical care services should be clearly defined for each unit and include multidisciplinary discussion. Any transfer to critical care should include consultant to consultant discussion. Critical care outreach teams should work collaboratively with the critical care unit and maternity unit to ensure seamless transition of care between units
- Although EMCUs will largely be run by the obstetric multidisciplinary team, there is an important role for critical care. Access to critical care consultation, either via outreach teams and/or direct support from critical care senior decision makers should be available 24/7/365. There should be at least daily updates between the EMC and critical care clinical teams focusing on patients who might require escalation or de-escalation in each setting

## Enhanced maternal care units

### Purpose

The EMC Unit or Area (EMCU) should:

- Provide a safe and effective environment to manage sick women or those at risk of deterioration during or shortly after pregnancy
- Allow sick women or those at risk of deterioration to be co-located with maternity services to facilitate the concentration of multi-professional skills including the neonatal team and rapid access to maternity theatres
- Bring multi-professional skills and experience together to bridge the gap between ward level care and critical care
- Facilitate the early recognition and treatment of adverse changes in the clinical condition of acutely unwell women, including stabilisation and timely transfer to critical care when required
- Facilitate robust governance processes for such women, with the overarching aim that improved infrastructure, staffing and monitoring may result in improved patient outcomes

### Patient cohort

The women who are most likely to benefit from EMC include:

- Women where medical review has been triggered on a maternity specific early warning score
- Women requiring more frequent than 4 hourly observation for reasons other than labour or special monitoring e.g. continuous ECG monitoring or invasive arterial blood pressure monitoring
- Those recently stepped down from Critical Care (level 2 or 3 care)
- Any woman about whom there is concern regarding clinical condition and risk of deterioration who would benefit from closer observation for acute or chronic pre-existing disease

### Exclusions

The population not covered by this guidance includes:

- Women requiring any form of non-invasive ventilation i.e. CPAP, BiPAP\*
- Women receiving cardiovascular support e.g. vasopressor infusions\*
- Women receiving acute renal replacement therapy
- Women requiring level 3 care e.g. advanced respiratory support

These women should be managed in a critical care or other appropriate setting within the hospital.

\*unless staff specifically trained in this competence are directly caring for the woman 24/7 with a local SOP in place that has been ratified by the multidisciplinary team including critical care. Should this be the case then consideration should be given to whether the unit is better described as a level 2 (high dependency) unit, in which case all other GPICS standards will also apply<sup>8</sup>.

## Governance of enhanced maternal care units

EMCUs should have a clear place within the overall management structure of an organisation. There should be designated operational management, obstetric, midwifery, anaesthetic and critical care (medical and outreach nursing) leads. Time should be allocated for staff to undertake these roles. Regular meetings should take place between the EMC leads. There should be clear lines of reporting within the management structure of the healthcare provider.

Obstetric units providing EMC should consider membership of a regional maternal EMC network, the local critical care operational delivery network and maternal medicine network. A service specification covering the provision of maternal medicine networks, which provide pre-pregnancy, antenatal and postnatal care for women who have significant medical problems that pre-date or arise in pregnancy or the puerperium, has also recently been developed<sup>9</sup>.

Commissioning arrangements for EMC are beyond the scope of this document. It is imperative that agreement on funding for enhanced care units is reached nationally. However, in the absence of national funding arrangements, it is envisaged that local business plans be developed informed by the guidance in this document.

Governance of the EMCU should align to that of the maternity and critical care services in the hospital.

### Research and Quality Improvement

EMCUs should engage in national quality improvement and safety projects. Examples might include patient deterioration, sepsis, use of the national Maternal Early Warning Score, breastfeeding uptake and maternal contact with neonate. National care quality indicators for EMCUs that align to the NHS Outcomes framework<sup>10</sup> should be developed and form part of the reported outcomes of EMCUs.

### Morbidity and mortality review

A robust monthly morbidity and mortality (M&M) process should be in place including rapid case note review, with input from the EMC MDT, of maternal or neonatal deaths and adverse outcomes. Incidents should be reported via established local and national reporting systems.

Rapid case note reviews should report back to obstetric MDT M&M meetings but also into obstetric anaesthetic, critical care, emergency department and specialty/obstetric medicine M&M where appropriate to enable shared learning. All units should also contribute to national maternity systems such as UKOSS and MBRRACE-UK.

### Data collection

Local outcomes should be continuously monitored. National data collection will be important for outcome evaluation, mortality prediction and research. National data collection and local/regional clinical audit tools for EMCUs should be encouraged and job plans should be developed to ensure that there is time for this.

### Administrative support

Appropriate administrative support is essential to maximise patient contact for clinical staff. Duties will depend on the size and location of the EMCU but may include reception, admission and discharge documentation and data collection.

### Physical infrastructure

The number of EMC beds required will depend upon local requirements. Local modelling should determine actual capacity to ensure all women requiring EMC can be managed in the EMCU. Modelling should also be undertaken at a national level to determine the number of EMCU beds required once EMC data is available.



The physical facilities and clinical equipment required by an EMCU will depend on the level of care being provided in that unit. National guidance on the provision of level 2 services and non-maternity enhanced care should be considered when designing an EMCU<sup>2,3,8</sup>.

There should be consideration for the provision of EMC during labour with an area available meeting requirements for both. Any enhanced care unit caring for women who are still pregnant, including those that are not maternity specific, must have protocols in place to facilitate rapid review by the obstetric MDT and transfer to a theatre equipped to perform emergency obstetric interventions e.g. Category 1 Caesarean delivery.

## Workforce

A service lead should be identified for obstetrics, obstetric anaesthesia, midwifery, critical care and critical care outreach as a minimum. It may be appropriate in some units to have service leads in additional specialties e.g. maternal medicine as per network arrangements. Administrative time should be available within job plans for service development, quality improvement and regular meetings between service leads.

### Medical

A competent senior decision-maker should review each woman receiving EMC at least twice a day. At least one of these reviews must be by a consultant or equivalent and multidisciplinary team to include as a minimum an obstetrician, senior midwife and obstetric anaesthetist.

A clinician (ST3 equivalent and above) with the required competencies should be available to assess patients when commencing EMC or following deterioration in accordance with maternity specific early warning score protocols.

For the last decade, advanced care practitioners (ACPs) have been a valuable part of the critical care workforce, as have physician/anaesthesia associates (PAs/AAs) in medicine and anaesthesia. Depending upon staffing availability and rotas, ACPs or PAs may have a similar role on EMCUs.

### Midwifery/Nursing

The midwifery and/or nursing staff requirement of an EMCU will be dependent on the number of beds within the unit and the complexity of each patient. Ensuring that the competencies and skill mix of ward staff (including midwives, nurses, allied health professionals and healthcare support workers) on every shift is tailored to the needs and acuity of patients on the unit is more important than specific nurse: patient staffing ratios. The minimum ratio recommended for enhanced care in any area is 1:4<sup>3</sup> but increased acuity/unit layout and labouring women will require additional staff as per existing national guidance. Safe staffing ratios must be maintained at night and during weekends.

Pregnant or recently pregnant women should have access to a healthcare professional who has EMC competencies at all times. Each member of midwifery and/or nursing staff providing EMC should have sufficient funded and protected time to ensure they develop and can demonstrate competence in the delivery of the different types of treatment and monitoring provided in their EMCU.

All midwifery and/or nursing staff caring for women who could become unwell should be competent in the use of a maternal specific early warning score to identify deterioration, perform a basic ABC assessment and escalate appropriately.

Whilst the critical care and anaesthetic teams should provide support for midwifery and/or nursing staff who are providing EMC, once a woman is not under the direct care of the obstetric anaesthetist, ODP or critical care team then it is the responsibility of the midwife and/or nurse directly caring for a woman to have the required competence to do so e.g. management of invasive monitoring if this is provided in the EMCU. A national competency framework for EMC should be developed, building on the competencies outlined in Care of the critically ill woman in childbirth; enhanced maternal care<sup>1</sup>.

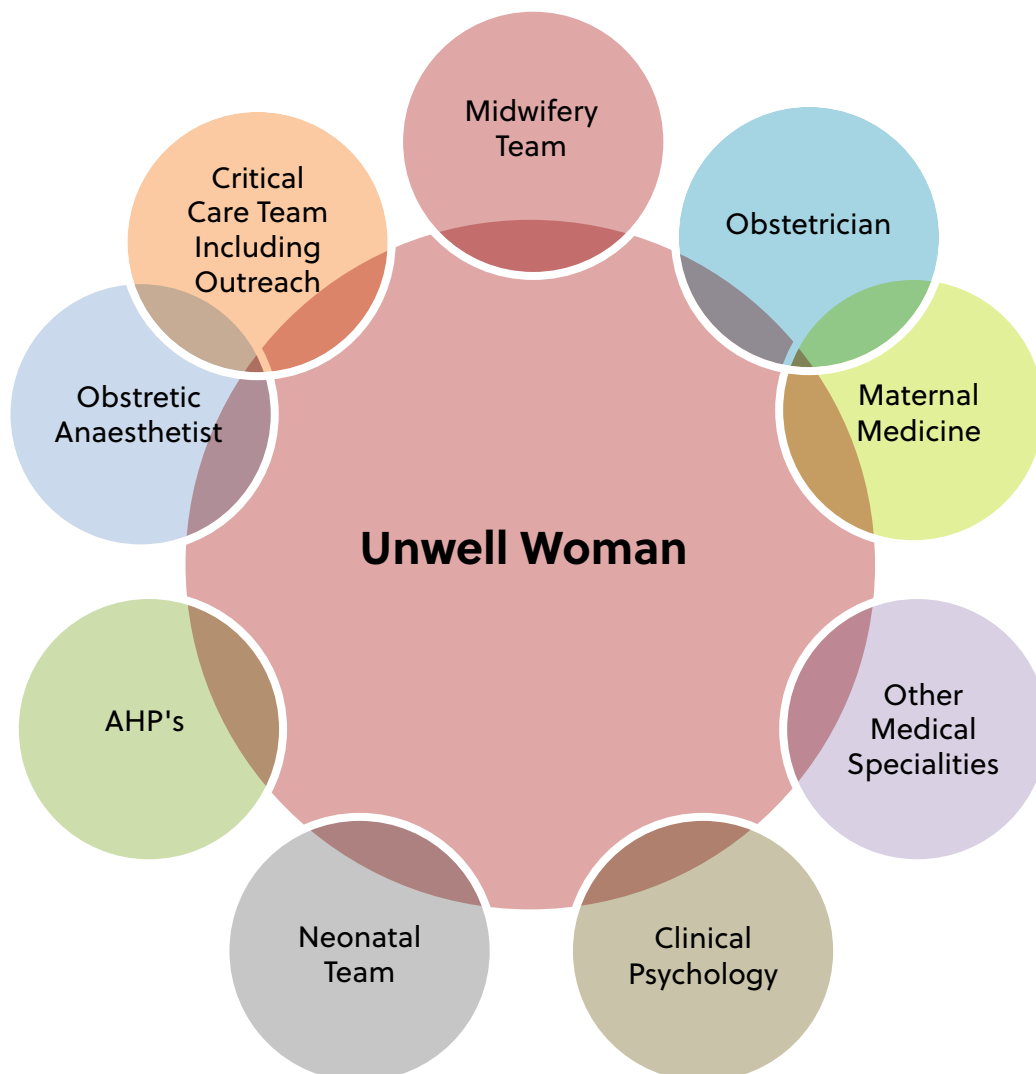
In addition to staff required for direct patient care, there should also be a senior member (band 7 or above) of trained staff present on each shift to provide leadership and coordination. Where an EMCU is co-located within another ward environment this role could be shared e.g. delivery suite coordinator. This individual, alongside the duty consultant, will also be responsible for liaison with other services (e.g. ward, emergency department, critical care, bed management) and for overseeing day to day data management for governance and audit purposes. Dedicated time should be made available for this.

### Wider multi-professional team

Other members of the multi-professional team may include:

- Obstetric physicians
- Critical care consultants with an interest in maternal critical care
- Critical care outreach nurses
- Physiotherapists
- Microbiologists
- Pharmacists and Medicine Management Technicians
- Perinatal mental health team
- Clinical Psychologists
- Dietitians

This list is not exhaustive. Each unit should determine the makeup of the MDT depending on local requirements.



**Fig 2. Example of an EMC multiprofessional team. Each unit should determine the makeup of their team based on local requirements**

## Training

There are a number of courses already available nationally that provide the required training in standard and enhanced competences related to EMC.

Standard competency training should focus on initial recognition of deterioration including use of maternity specific early warning scores, basic ABC assessment and appropriate escalation. All midwives who care for women who may become unwell should be trained to and maintain this level of competence.

Enhanced competency training should focus on a deeper understanding of why women become unwell, use of EMC/ critical care charts, identifying when critical care transfer is required and the EMC competencies specific to that unit. In order to embed and maintain competence, units should consider whether time spent with the critical care team is required to embed and subsequently refresh competence.

Multidisciplinary teams that work together should train together<sup>11</sup>. Teams should undergo regular, multidisciplinary training that promotes teamwork, with a focus on human factors, effective communication and openness. Dedicated time should be made available for those undertaking EMC education roles.

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

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

# Patient Pathways

## Admission

Admission to the EMCU should be agreed between the obstetric senior decision maker, labour ward coordinator and obstetric anaesthetist as a minimum as per local protocol. Women at risk of deterioration requiring critical care should be discussed with the critical care and critical care outreach teams.

At the time of admission to an EMCU, all women should have an assessment by a clinician (ST3 equivalent or above), including an ABC assessment and review of treatment goals and priorities.

There are advantages to the co-location of women requiring EMC in an EMCU on delivery suite in terms of staff expertise, monitoring and equipment. However, it is recognised that EMC may begin in other parts of the hospital, for example the Accident and Emergency department, a medical or surgical ward. In all cases, appropriately trained staff should be available to assess women, initiate and deliver treatments and remain with patients during delivery of care wherever this is. The same standard of care as that available on an EMCU should be provided. Transfer to a designated EMCU should occur within 4 hours of initial review. This may involve the critical care outreach team and highlights the importance of close liaison between EMC and critical care teams.

There may also be circumstances where a pregnant woman requires enhanced care in a non-maternity setting e.g. for non-invasive ventilation on a respiratory ECU. Where this situation arises, close collaboration between specialist teams is essential to ensure women continue to receive the same standard of maternity care as in an EMCU.

Critical care staff with appropriate competency should be available to transfer patients, where required, from an EMCU to a critical care area. Critically ill pregnant or recently pregnant patients who undergo intra- or inter-facility transfer should be transferred in accordance with standards equivalent to the Intensive Care Society's Guidelines for the transport of the critically ill adult.<sup>12</sup> Development of national guidance for transfer of critically ill pregnant and recently pregnant women and their babies is in progress. In the meantime, units should be aware of the specific issues related to transferring pregnant or recently pregnant women and put plans in place to mitigate risks e.g. emergent delivery during transfer, positioning, implications of separating mother and baby to facilitate care etc.

The route and appropriate point of escalation to critical care services should be clearly defined for each unit and include multidisciplinary discussion. Any transfer to critical care should include consultant to consultant discussion. Critical care outreach teams should work collaboratively with the critical care unit and maternity unit to ensure seamless transition of care.

If there are delays in transfer, ongoing critical care should be provided regardless of the setting in line with GPICS standards<sup>8</sup>.

## Treatment and monitoring

Local protocols should be in place for conditions and treatments managed in the EMCU.

Effective care for sick women starts with early recognition of deterioration and appropriate timely escalation to the multidisciplinary team. Management of any deteriorating patient should follow protocols described in the local maternity specific early warning score. Equipment for monitoring (saturations, blood pressure, ECG, temperature etc) should be available at each bedspace.

Monitoring standards and frequency should follow those mandated by the maternity specific early warning score in use in that unit.

Once implemented, the national Maternity Early Warning Score (MEWS) should replace all other

maternity specific early warning scores and be used for all women who are pregnant or up to 6 weeks postpartum, regardless of their reason for admission or location in the hospital.

### Equipment

An EMC equipment list should be determined for each EMCU depending on the interventions provided. Equipment should be maintained and replenished, and daily checks carried out to confirm the area is appropriately stocked.

### Discharge

As part of each patient review, clinicians should consider whether a woman can be stepped down to ward level care. This decision should be recorded in the patient record to enable duration of EMC care to be accurately audited.

### Collaborative working with critical care

Although EMCUs will largely be run by the obstetric multidisciplinary team, there is an important role for critical care. Access to critical care consultation, either via outreach teams and/or direct support from critical care senior decision makers should be available 24/7/365. Consideration should also be given to whether advice should be sought from the regional maternal medicine service if maternal medicine physicians are not available locally. There should be at least daily updates between the EMC and critical care clinical teams focusing on patients who might require escalation or de-escalation in each setting. EMCUs should have access to the personnel and equipment required for intubation, ventilation and stabilisation if a patient is not stable enough for transfer to critical care without this.

Depending on local service design and consultant job plans, there may be a role for routine Consultant Intensivist input to facilitate joint decision making.

Finally, critical care input is important in the governance structure of EMCUs. This may include advice on equipment, protocols and a shared governance structure including joint mortality and morbidity meetings.

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## Appendix 1: Examples of enhanced maternal care models

The following examples aim to demonstrate how EMC can be provided in units of different sizes and logistics. It is not exhaustive and there are many other units nationally providing excellent collaborative EMC care in innovative ways suited to their particular unit.

### Enhanced Maternal Care: A regional approach

Collaboration and support between maternity units of differing sizes and complexity within regions is well established in Scotland and pre-dates the 2018 guidance. The Yorkshire and the Humber Maternity network adapted the existing national EMC document, to produce Maternal Enhanced and Critical Care (MEaCC) recommendations and a competency training framework in 2018<sup>7</sup>. The documents are very similar to the national document but there are key differences in the definition and flexibility of interpretation. The enhanced care definition is similar to that described by FICM and ICS, and is the original ICS definition of level 1 care. All units are actively engaged in MEaCC and are training their midwives in standard competencies. Most have chosen to train a small group in bespoke enhanced competencies, whilst Sheffield has chosen to continue having nurses with enhanced competencies working alongside midwives to provide the enhanced care. All 17 units in the region contribute data to a regional MEaCC database which has helped to support local business cases for training and staffing as well as inform regional quality improvement programmes. The database is now being updated to include regional maternal medicine data and incorporate data from maternity units wishing to contribute from outside the region.

One of the key reasons that the project has been successful is because the recommendations acknowledge the differences between small units and large tertiary centres and allow each unit to adapt the guidance to provide the best care for a woman in that unit rather than adhering to a 'one size fits all' model.

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## Scottish Collaboration and data collection

The Scottish Maternal Critical Care (SMaCC) network was founded in 2014 by a group of likeminded obstetric anaesthetists who came together to develop a Scottish Obstetric HDU education course for midwives under the auspices of the Scottish Multi-professional Maternal Development Programme (SMMDP), part of NHS Education Scotland. Initial aims were to collect data on obstetric patients receiving/requiring a higher level of care and use that data to make the case, locally and nationally, for improved education and staffing.

The Scottish Intensive Care Society Audit Group (SICSAG) was already well established, collecting and publishing data from Scotland's critical care units in an annual report. SICSAG were interested in extending their reach into high dependency units, surgical, medical and in our case, obstetric. Individual maternity units joined the audit as SICSAG and local conditions allowed, the earliest being Ninewells Hospital in Tayside in 2013 and the most recent unit, Ayrshire Maternity Unit, in 2019. However, national comparative audit is only one aspect of SICSAG membership; adhering to predefined minimal standards and quality indicators are also included, as detailed below:

- Daily review and written management plans
- Twice daily ward rounds
- Appropriate staffing and skills in critical care
- Pharmacist
- Physiotherapist
- Night time discharges
- Care bundles
- Regular patient and family surveys
- Clinical governance processes

Currently, the 7 largest maternity units in Scotland are participating in the audit. Data is published in the annual SICSAG report and has evolved from a sole entry by the first unit in 2015 to a separate section for obstetrics in the 2019 report. We have now introduced obstetric specific indicators including whether baby is with mum in obstetric HDU and whether baby requires extra care. This information has been used to inform staffing conversations both locally and nationally.

The collaboration with SICSAG is very much a work in progress. Data on the number of obstetric patients requiring critical care and the makeup of those patients (antenatal/postnatal, levels of care and levels of organ support) have been included and published since 2020, providing invaluable information through the covid pandemic about usage of critical care beds and interventions in this population. Discussion is ongoing around the relevance of some critical care quality indicators, for example night time discharges in a busy obstetric unit where maternity patients improve rapidly with correct and timely treatment. SICSAG data has been included in several publications; Scottish element of the NMPA MCC sprint audit and Severe maternal morbidity in Scotland, *Anaesthesia* 2022, promoting academic collaboration between the maternity and critical care communities.

SMaCC continues to drive the EMC/MCC message forward locally. We have focused on embedding data collection into our maternity units, adhering to SICSAG quality indicators and minimum standards as well as ensuring our midwives are appropriately trained. Nationally, we have run educational multidisciplinary symposia aimed at the whole multidisciplinary team involved in the care of the critically ill pregnant and recently pregnant patient, showcasing Scottish expertise, bringing in outside experts and promoting collaboration between the specialities.

The network also allowed a coordinated obstetric anaesthetic response to the covid pandemic in Scottish maternity units, facilitating seamless communication between the obstetric and critical care communities.

**Dr Arlene Wise**, Consultant Anaesthetist, NHS Lothian. On behalf of The Scottish Maternal Critical Care (SMaCC) network.

[www.sicsag.scot.nhs.uk](http://www.sicsag.scot.nhs.uk)

## EMC Model - St Mary's Hospital, Manchester

**Driver for change:** St Mary's Hospital is a tertiary obstetric hospital with a delivery rate in excess of 9500 births per year. A significant number of women either present with or develop conditions that require critical care in the peripartum period. We have therefore had to address the challenge of providing both critical and maternity care simultaneously on our delivery suite.

**Intervention:** Since 2012, critical care nurses have been integrated into the team providing care to critically ill parturients on delivery suite with the aspiration to deliver the same standard of care as that provided in our adult general critical care unit. Four rooms have been configured as Obstetric High Dependency (HDU) rooms, with multidisciplinary bedside care provided jointly by a critical care nurse and a midwife. Women are reviewed by the obstetric MDT, including obstetric anaesthetists, several times a day with joint decisions made regarding further management, discharge from HDU or escalation to critical care for further treatment. An escalation policy describes the limits of care that can be provided on delivery suite and when escalation to adult critical care is required. Discharge back to obstetrics from critical care is also determined by MDT discussion with the aim of preventing discharge out-of-hours.

The critical nurses are all band 6+ and rotate through the delivery unit on a 6-monthly basis, with one critical care nurse per shift on the delivery unit. During the rotation, the new critical care nurses have a comprehensive 3-day induction programme relating to illnesses relating to obstetrics delivered by obstetricians and anaesthetists.

The Covid pandemic resulted in the Critical Care nurses being recalled back to the general Critical Care units during surge periods. They were reinstated when the pandemic critical care numbers eased but losing this facility illustrated how integral they had become to the care of maternal women with critical illness in our facility.

A more recent development has been the appointment of Obstetric Physicians to support the complex maternity MDT and support patients with significant maternal disease.

**Outcome:** The Critical Care Minimum Data Set (CCMDS) is regularly collected for patients in our Obstetric HDU unit on the Delivery Unit. The admission rate for the Obstetric HDU is consistently between 7 to 8.5 % of patients booked for deliveries. Due to the reconfiguration of maternal services in Manchester the overall numbers rose from 582 in 2012 to 760 in 2017. Admissions have continued to increase subsequently and may reflect an increase in Caesarean deliveries seen locally and nationally.

The transfer rate to adult critical care has decreased from 1.6% to 0.9% with the main reason for escalation being cardiac rather than obstetric. There is midwife input for matters relating to fetal loss and fetal bereavement as the critical care nurses have little experience of these issues and many have found it emotionally challenging. An additional benefit of our programme is that we now have a pool of nurses who have rotated through obstetrics and are comfortable caring for obstetric patients on our general critical care unit.

**Dr Pavan Kochhar**, Consultant Anaesthetist at Manchester University Hospitals NHS Foundation Trust.

## EMC Model - Bradford Teaching Hospitals NHS Foundation Trust

**Driver for change:** Bradford is a teaching hospital providing secondary and some tertiary services, excluding neuro and cardiac surgery.

The maternity unit has between 5500 and 6000 deliveries a year. The population has high levels of poverty and comorbidity, which has led to an average of one woman per day requiring additional support due to complexity or acute deterioration. Arterial lines are frequently required for monitoring purposes on the unit and historically these were cared for by the resident ODP and anaesthetist.

**Intervention:** In 2018 it was recognised that the midwives caring for sick women on labour ward would benefit from enhanced knowledge and skills to provide the best care. Given the frequency of use of invasive monitoring it was also acknowledged that the midwives should be competent in the use and care of arterial lines rather than relying on intermittent input from the anaesthetic team.

The Yorkshire and Humber Maternity Network established a regional Maternal Enhanced and Critical Care (MEaCC) programme which developed regional EMC recommendations and a training framework. Bradford was an early adopter of MEaCC and implemented standard training for all midwives in the recognition, ABC assessment and escalation of the deteriorating woman using the maternal AIMS course. A small group of band 6 midwives and the band 7 coordinators also received additional enhanced training, including lectures and small group teaching using the PROMPT CiPP course, to provide an introduction to EMC and competencies including the use and care of arterial lines. This training was reinforced by one to one sessions with the anaesthetic team on labour ward, sessions on critical care with formal assessment of EMC competencies and critical care outreach shadowing. The midwifery rota was redesigned to provide at least one EMC qualified band 6 midwife allocated to every shift. The critical care outreach team provide support and liaise closely with the critical care team if a woman requires transfer to the adult intensive care unit. There is a clear SOP that describes which interventions and conditions can be managed on labour ward and which require transfer to critical care.

**Outcome:** Bradford contributes EMC and critical care data to the regional MEaCC database. In Bradford, approximately 7% women require enhanced maternal care whilst only 0.2% require critical care. The main reasons for critical care transfer are non-invasive or invasive ventilation and inotropic support. In recent years the number of pregnant women requiring critical care has been slightly higher due to the requirement for non-invasive and invasive ventilation for the treatment of COVID-19.

**Dr Deborah Horner**, Consultant in Anaesthesia and Critical Care at Bradford Teaching Hospitals NHS Foundation Trust.

## EMC Model - Harrogate and District NHS Foundation Trust

**Driver for change:** Harrogate is District General Hospital with a full range of secondary services. The Maternity Unit has around 2000 births per year. Harrogate has an older maternal population which results in complex maternal cases but the proportion of women requiring critical care or invasive monitoring is low. As a result, it was challenging for midwives to maintain the skills needed to recognise a sick woman and looking after invasive lines was challenging.

**Intervention:** Harrogate was an early adopter of the regional Maternal Enhanced and Critical Care (MEaCC) programme. Using the regional Enhanced Maternity Care (EMC) recommendations and training framework, we identified which enhanced competencies were appropriate for our midwives. All women at risk of deterioration or needing close observation are placed on an EMC chart which is also used for the Level 2 patients on the Critical Care Unit (CCU). These women are reviewed a minimum of twice daily by a multidisciplinary team including; an obstetrician, an anaesthetist and a senior midwife.

We have clear guidance on the levels of care that can be safely provided on the delivery suite and which patients need to be transferred to the CCU. The need for invasive monitoring is also a trigger for transfer to the CCU. The geography of our hospital is such that the CCU is close to Delivery Suite and so there is easy access to the obstetric and neonatal teams.

We have developed close relationships between Critical Care and Obstetric services. The midwives provide regular support on the CCU. This support includes postnatal care and maintaining contact with baby and partners. Similarly, the Critical Care Outreach Team (CCOT) review any patient requiring EMC on the delivery suite. The CCOT will also provide support on Delivery Suite for patients with complex nursing needs. All women who required a stay on the CCU are offered outpatient follow up by a specialist team including a psychologist.

Harrogate has implemented standard training in the recognition, ABC assessment and escalation of the deteriorating woman for all midwives. We are in the process of setting up further training to a select group of band 6 midwives and the band 7 coordinators. This will include sessions on the CCU and CCOT, with formal competencies to be signed off.

**Outcome:** Harrogate contributes EMC and Critical Care data to the regional MEaCC database. 21 women received EMC in 4 months. In that time only 1 patient was admitted to critical care. Postpartum haemorrhage, sepsis and pre-eclampsia were the most common conditions requiring EMC. The median age was 31. All patients were reviewed by a Consultant led multidisciplinary team, at least daily. Good liaison with CCOT was seen.

**Dr Hayley Kemp**, Consultant in Anaesthesia and Critical Care, Harrogate and District NHS Foundation Trust.





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