NATIONAL PERINATAL EPIDEMIOLOGY CENTRE

SEVERE MATERNAL MORBIDITY in Ireland

Severe Maternal Morbidity Audit Clinical Reference Manual

Queries to:

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Please return all completed forms to the above addressee at:

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Overview

Background

- Severe maternal morbidity (SMM) has been acknowledged internationally as an important indicator of quality of maternal care and welfare, particularly in developed countries where maternal death rates are relatively low.
- For each woman who loses her life due to causes related to pregnancy, many more experience life-threatening complications or long-term morbidities.
- In this context, the NPEC in collaboration with the NPEC Severe Maternal Morbidity Advisory Group has collected and analysed data on SMM from Irish maternity units since 2011.

Methodology

- To allow for international comparison, the NPEC adapted the validated methodology of the Scottish Confidential Audit of Severe Maternal Morbidity (SCASMM) to evaluate severe maternal morbidity (SMM) in Ireland. This methodology utilises organ dysfunction criteria described by Mantel et al,[1] with modifications used by SCASMM to include intervention-based criteria.[2]

Objective

- The fundamental aim of the audit is to provide a national review of clearly defined SMMs, to identify quality improvement initiatives and make recommendations for the improvement of maternity care for women in Ireland.

Inclusion criteria and reportable morbidities

Inclusion criteria for the SMM audit

All pregnant or recently pregnant women (up to and including 42 days following delivery, miscarriage, ectopic pregnancy or termination of pregnancy) who experienced a SMM as defined in this audit.

Reportable severe maternal morbidities

In this audit there are fourteen, clearly defined, organ dysfunction morbidities and two management proxies for maternal morbidity (ICU/CCU admission and interventional radiology). Definitions for all reportable SMM events are detailed in Table 1 on the next slide.

- Please indicate all SMM events experienced by the woman in the current / most recent pregnancy
- Please note more than one SMM in the pregnancy may apply to a woman and should be reported on one SMM notification form.

- **In the event of an eclampsia case, the NPEC kindly request you complete the detailed Eclampsia Audit dataset.**

Table 1: SMM Definitions

1	Major obstetric haemorrhage	Estimated blood loss ≥ 2500ml and/or transfused 5 or more units of blood. **Also includes miscarriage, ectopic pregnancy or termination of pregnancy meeting these criteria.** (Please record as well whether treatment for coagulopathy was received).
2	Uterine rupture	A complete separation of the wall of the pregnant uterus, with or without expulsion of the fetus, involving rupture of membranes at the site of the uterine rupture or extension into uterine muscle separate from any previous scar, and endangering the life of the mother or fetus. Excluded: any asymptomatic palpable or visualised defect (e.g. dehiscence noted incidentally at caesarean delivery)
3	Peripartum hysterectomy	Peripartum hysterectomy
4	Eclampsia	Seizure associated with antepartum, intrapartum or postpartum symptoms and signs of pre-eclampsia
5	Renal or liver dysfunction	Acute onset of biochemical disturbance, urea >15mmol/l, creatinine>400mmol/l, AST/ALT >200u/l
6	Pulmonary oedema	Clinically diagnosed pulmonary oedema associated with acute breathlessness and O2 saturation <95%, requiring O2, diuretics or ventilation
7	Acute respiratory dysfunction	Requiring intubation or ventilation for >60 minutes (not including duration of general anaesthetic)
8	Pulmonary embolism	Increased respiratory rate (>20/min), tachycardia, hypotension. Diagnosed as "high" probability on V/Q scan or positive spiral chest CT scan. Treated by heparin, thrombolysis or embolectomy
9	Cardiac arrest	No detectable major pulse
10	Coma	Including diabetic coma. Unconscious for >12 hours
11	Cerebro-vascular event	Stroke, cerebral/cerebellar haemorrhage or infarction, subarachnoid haemorrhage, dural venous sinus thrombosis
12	Status epilepticus	Constant or near constant state of having seizures that last 30mins or more
13	Septicaemic shock	Sepsis induced tissue hypoperfusion or hypotension persisting after resuscitation with 30mls/kg intravenous isotonic crystalloid fluid as evidenced by: – Systolic blood pressure < 90 mmHg or MAP < 65 mmHg – Decrease in systolic blood pressure by 40mmHg from baseline and/or – Lactate > 4 mmol/l.
14	Anaesthetic problem	Aspiration, failed intubation, high spinal or epidural anaesthetic
15	ICU/CCU admission	Unit equipped to ventilate adults. Admission for one of the above problems or for any other reason. Includes CCU admissions
16	Interventional radiology	Received planned (a) or unplanned (b) interventional radiology

Please ensure reported SMM events meet the defined criteria as outlined in the Table,
e.g:
1. Eclampsia is defined as: ''Seizure associated with antepartum, intrapartum or postpartum symptoms and signs of pre-eclampsia''. This definition does NOT include cases of severe PET without seizures or epileptic seizures.
2. Acute respiratory Dysfunction: is defined as acute respiratory dysfunction ''Requiring intubation or ventilation for >60 minutes (not including duration of general anaesthetic)''. This definition does NOT include cases of respiratory dysfunction which does not require mechanical ventilation in the management of the woman e.g. Pneumonia treated with oxygen therapy via facial mask.

Data Submission

- It is recommended that cases be submitted to the NPEC on a monthly basis, if at all possible. An annual submission date for complete data will be within five months of the reporting year end.
- Audit data can be submitted online via the NPEC secure database or alternatively in paper format.
- An operational manual and training video for the NPEC online database is available on the NPEC website

Manual and training video

Calculating SMM rates

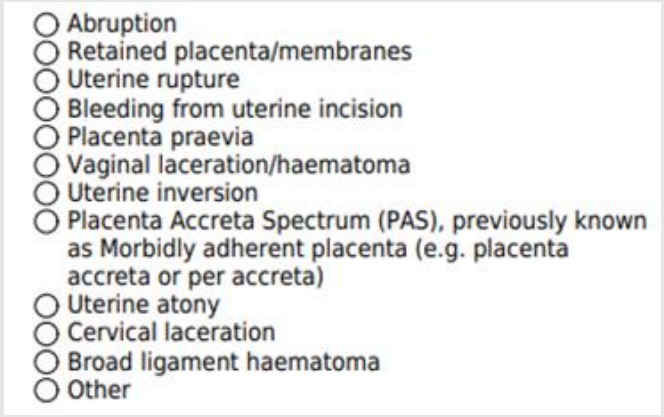
Severe Maternal Morbidity cases are included in a maternity unit's rate if the woman was delivered in that maternity unit. If a woman experiencing a SMM is transferred to another unit following delivery, (or is admitted during the postnatal period to another maternity unit), the SMM should be reported by the maternity unit where the delivery took place.

The NPEC can assist in communications between unit co-ordinators if required/requested. This will help validate complete case ascertainment at national level.

Guidance for completion of SMM audit dataset

Most questions should be self-explanatory, but the following notes give guidance to specific questions within the sections of the data collection form. Of note, the online form has been developed to show questions that are relevant to the reported SMM category. For example, if MOH is selected, you will then be asked a series of MOH specific questions. See examples below:

- <u>In the event of a Major Obstetric Haemorrhage (MOH), please indicate:</u>
  - How the criteria was met (i.e. EBL ≥ 2,500mls and/or transfused with ≥ 5 units of blood)
  - What was the primary cause of the MOH. The following list will be available for you to select from:



Guidance for completion of SMM audit dataset

- <u>In the event of Peripartum hysterectomy (PH), please indicate:</u>
    - The indication for the PH. A list will be available for you to choose from including: Placenta accreta spectrum (PAS), placenta praevia, major obstetric haemorrhage, uterine atony, uterine or cervical cancer, or other
    - Was the PH a planned elective surgery (i.e. planned PH prior to delivery)
    - Place of surgery (maternity unit or general hospital)

Please specify indication for PH	○ Placenta Accreta Spectrum (PAS), e.g. placenta percreta, and placenta accreta ○ Placenta praevia ○ Major obstetric haemorrhage ○ Uterine or cervical cancer ○ Other
Was this a planned elective PH surgery?	○ Yes ○ No
Place of surgery	○ Maternity hospital ○ General hospital

Guidance for completion of SMM audit dataset

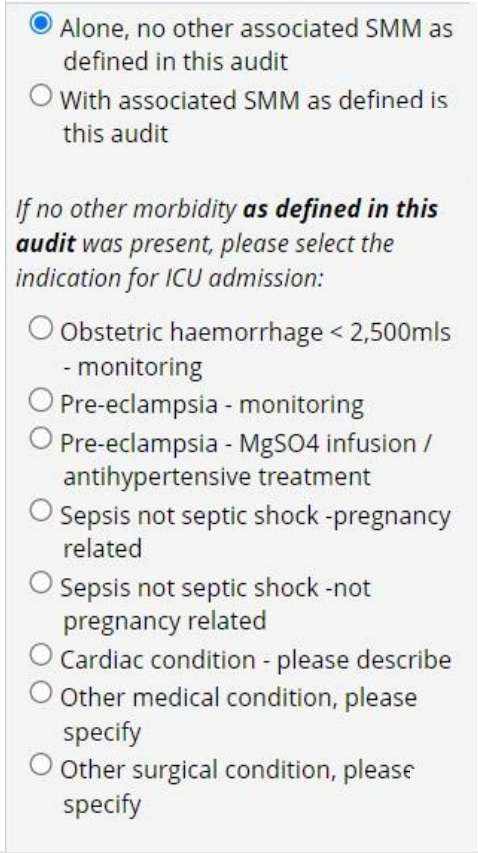
- <u>In the event of Septic Shock, please indicate the underlying cause of infection, e.g:</u>
    - If the cause was pregnancy-related, e.g. chorioamnionitis, wound infection following caesarean section etc.
      Or non-pregnancy related, e.g. pneumonia, COVID-19 infection etc..

Septicaemic shock	Sepsis induced tissue hypoperfusion or hypotension persisting after resuscitation with 30mls/kg intravenous isotonic crystalloid fluid as evidenced by: • Systolic blood pressure < 90 mmHg or MAP < 65 mmHg • Decrease in systolic blood pressure by 40mmHg from baseline and/or • Lactate > 4 mmol/l.	*Please select type of septicaemic shock* ○ Pregnancy-related ○ Non-Pregnancy related ○ Unknown if pregnancy related

Guidance for completion of SMM audit dataset

- <u>In the event of an ICU/CCU admission</u>
  - In cases where ICU admission was the **ONLY** reportable event, and the woman did not experience another SMM as defined by this audit, you will be asked to report the indication for admission to ICU/CCU. A list of clinical events (not exhaustive) to choose from is available:
  - Later in the form you will be asked how long the woman's ICU stay was in days.

  Please enter a number only, e.g. 1.5



- <u>In the event of Interventional Radiology (IR), please indicate:</u>
  - If it was IR was planned or unplanned

Guidance for completion of SMM audit dataset

- <u>Woman's details:</u>

  - Q. Place of delivery

Please indicate the hospital the woman gave birth in, or in relevant cases if the women gave birth in a general hospital, had a homebirth or was a BBA.

  - Q. What was the antenatal care pathway assigned to this woman **PRIOR** to the SMM event?

This refers to the pathway of care based on the National Maternity Strategy Model of Care as outlined below and in Appendix A.

- Supported Care Pathway; Midwifery led and delivered care.
- Assisted Care Pathway; Obstetric led, Midwifery and Obstetric delivered care.
- Specialised Care Pathway; Obstetric led, Obstetric and Midwifery delivered care

Please note once a woman experiences one or more SMM, her pathway of care will be escalated to medium or high risk.

Guidance for completion of SMM audit dataset

- Woman's details:

Booking: Some data sought by the NPEC relate to the time of booking. Booking in this regard relates to the mother's first antenatal visit at the maternity unit.

Parity: The NPEC refer to parity prior to the current pregnancy or most recent pregnancy if delivered.
The number of completed pregnancies, whether live birth or stillbirth, of at least 24 weeks gestation or with a birthweight ≥500g.
Number of pregnancy losses (less than 24 weeks of gestation)

Hospital transfer:
If the woman was transferred FROM or TO another hospital, please indicate the hospital and the timing of pregnancy in relation to the pregnancy status:

- Woman transferred with fetus in utero.
- Woman transferred following delivery of baby.

Guidance for completion of SMM audit dataset

- Obstetric history, pregnancy and delivery details: *Definitions of baby outcome:*

Alive. to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life - e.g. beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles - whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live born.[3]

Early miscarriage. The spontaneous expulsion of a fetus from the womb before 13 weeks gestation.

Ectopic pregnancy. An extra uterine pregnancy which occurs when a fertilized egg implants and grows outside the main cavity of the uterus, most commonly in the fallopian tube.

Late miscarriage. The spontaneous expulsion of a fetus from the womb between 13 weeks to 24 weeks of gestation.

Termination of pregnancy. The medical or surgical termination of pregnancy with the expected outcome of fetal or early neonatal death. (See further detail below)

Stillbirth. Baby delivered without signs of life from 24 weeks gestation or with a birthweight ≥500g. 4

Early neonatal death. Death of a live born baby occurring within 7 completed days of birth.

Late neonatal death. Death of a live born infant occurring after the 7th day and within 28 days of birth.

Guidance for completion of SMM audit dataset

- Obstetric history, pregnancy and delivery details:

If the case is associated with a termination of pregnancy (TOP), please select under which Section of the Health (Regulation of Termination of Pregnancy) Act 2018 the TOP was carried out:

- *Section 9. Risk to life or health*
  There is a risk to the life, or of serious harm to the health, of the pregnant woman and the foetus has not reached viability

- *Section 10. Risk to life or health in emergency*
  There is an immediate risk to the life, or of serious harm to the health, of the pregnant woman

- *Section 11. Condition likely to lead to death of foetus*
  There is present a condition affecting the foetus that is likely to lead to the death of the foetus either before, or within 28 days of, birth

- *Section 12. Early pregnancy*
  Whereby the pregnancy concerned has not exceeded 12 weeks of pregnancy

Guidance for completion of SMM audit dataset

- Obstetric history, pregnancy and delivery details:

If Caesarean section (CS) is indicated as the mode of birth, please indicate:

The category of CS, as per the NICE[5] classification or urgency,

- Category 1. Immediate threat to the life of the woman or fetus (for example, suspected uterine rupture, major placental abruption, cord prolapse, fetal hypoxia or persistent fetal bradycardia).
- Category 2. Maternal or fetal compromise which is not immediately life-threatening.
- Category 3. No maternal or fetal compromise but needs early birth.
- Category 4. Birth timed to suit woman or healthcare provider.

In the case that CS was selected with MOH, you will be asked the following:

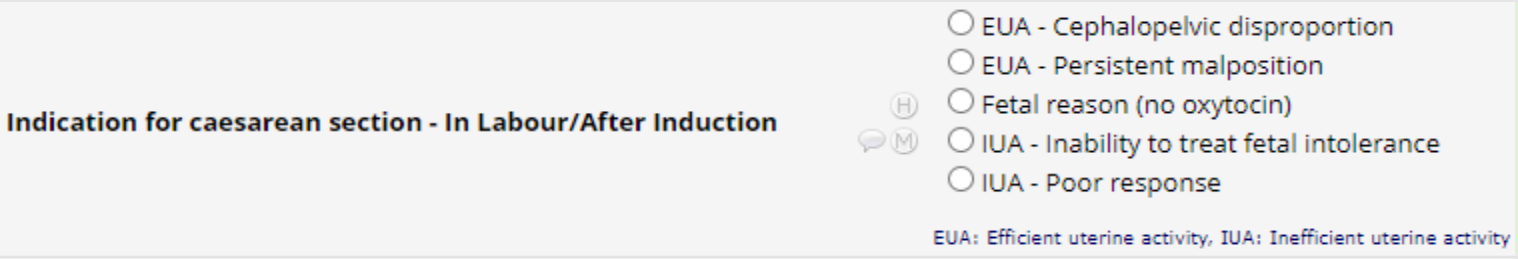
- If the woman was fully dilated before the CS
- If it was a failed instrumental delivery

Cont…

Guidance for completion of SMM audit dataset

- <u>Obstetric history, pregnancy and delivery details:</u>

If Caesarean section (CS) is indicated as the mode of birth, following a spontaneous or induced onset of labour, please select the relevant indication from the list below:



Examples*:
EUA - Cephalopelvic disproportion: Failure to progress
EUA - Persistent malposition: Occipito-posterior position
Fetal reason (no oxytocin)
IUA - Inability to treat fetal intolerance: Non-reassuring CTG
IUA - Poor response: Failed induction/ poor response to augmentation

*EUA: Efficient uterine activity, IUA: Inefficient uterine activity

If Caesarean section (CS) is indicated as the mode of birth, where the woman was never in labour, please select the relevant indication from the list below:

Guidance for completion of SMM audit dataset

- Location of Care:

Please indicate the location of care DURING the SMM event, please tick all that apply.

- ☐ On the ward
- ☐ Delivery Suite
- ☐ Theatre
- ☐ High Dependency Unit
- ☐ ICU/CCU

- Level of Care:

Within the term 'critical care', care is subdivided into four levels, dependent on organ support and the level of monitoring required independent of clinical diagnosis. [6] Please indicate the HIGHEST level of care during the SMM clinical event. . Examples of Level of Care are outlined in Appendix B.

Level of care	Definition	Please tick one box
Level 0: **Normal ward care**	Care of low risk pregnant women	
Level 1: **Additional monitoring or intervention, or step down from higher level of care**	Patients at risk of their condition deteriorating and needing a higher level of observation or those recently relocated from higher levels of care	
Level 2: **Single Organ Support****	Patients requiring invasive monitoring/ intervention* including support for a single failing organ system (excluding advanced respiratory support).	
Level 3: **Advanced respiratory support alone, or support of two or more organ systems****	Patients requiring advanced respiratory support (mechanical ventilation) alone or basic respiratory support along with support of at least one additional organ.	

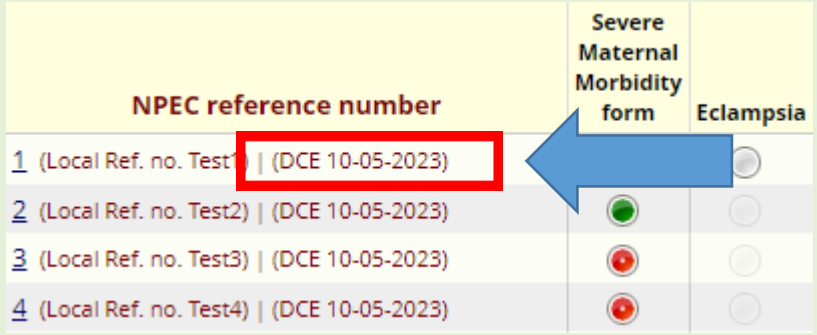
*** invasive monitoring/intervention includes the use of arterial and CVP lines**

Redcap specific detail on SMM form

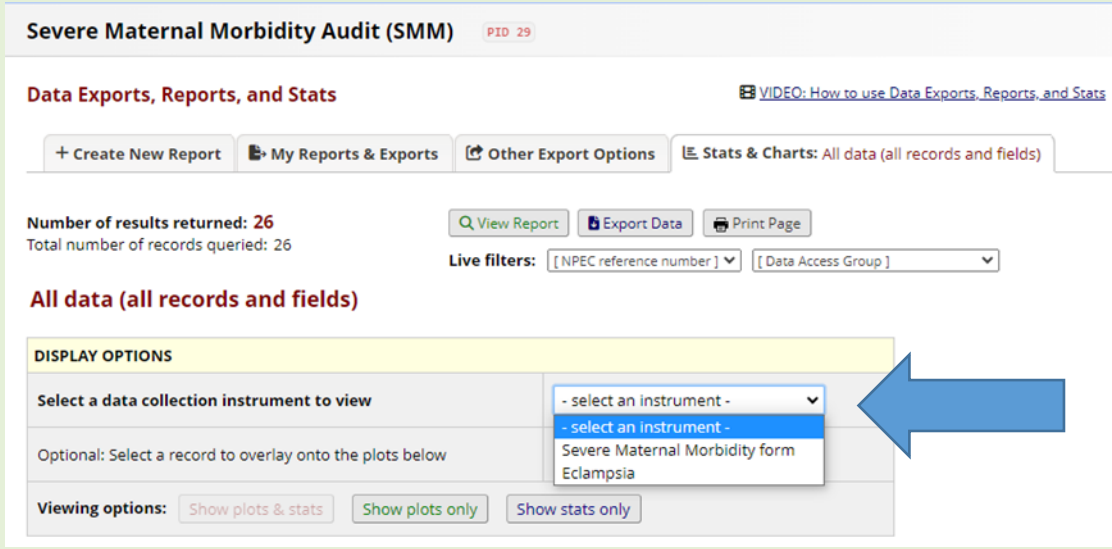
- Please note: **Redcap** is the secure online platform used to collect data for this audit. More detail regarding how to get set up and use Redcap will be available from our website or by contacting a member of the NPEC staff.

- There are some features to be aware of that are specific to the SMM audit, as follows:

  - On your unit's list of cases under "Record status dashboard", "DCE" refers to the Date of Clinical Event, i.e. the date the morbidity occurred.



  - If you wish to review your data using the "Stats & Charts" function, you will be asked to select an 'instrument', this is referring to which data collection form you would like to review in this format.

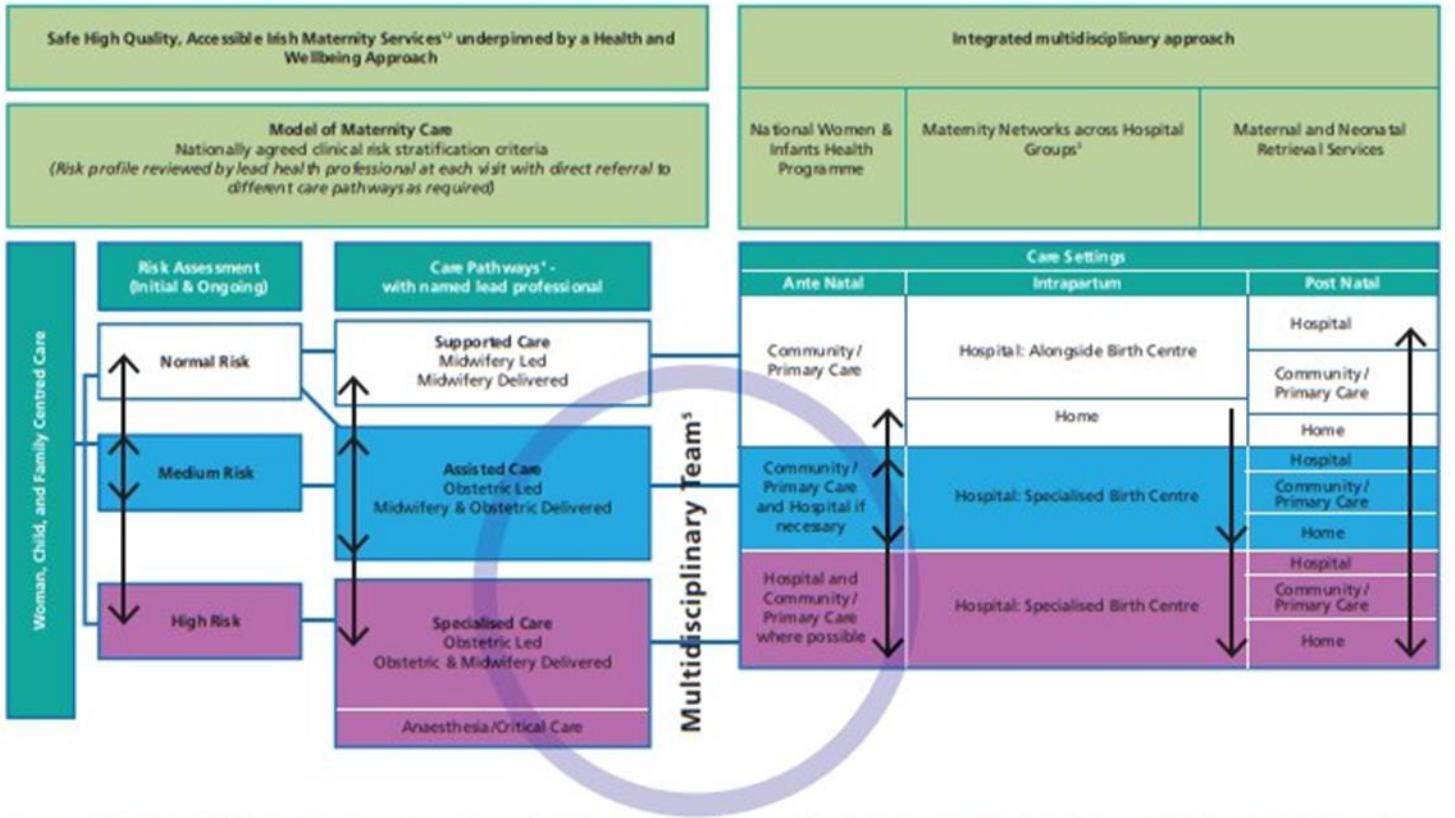


Thank you!

THANK YOU FOR COMPLETING THIS SMM AUDIT DATASET.

YOUR CONTRIBUTION IS GREATLY APPRECIATED AND VALUED.

Appendix A: National Maternity Strategy Model of Care



1 In line with the overriding safety principle, a risk based approach will be utilised. Practice will be evidence-based using national clinical guidelines and audit, and quality improvement approaches will be adopted.
2 Each birth centre should have access to an immediate emergency team response for clinical deterioration.
3 For high risk and complex women or babies specialist services outside the network may be required.
4 Within each of these care pathways, women can also avail of a shared model of care with the GP, as provided for by the Maternity and Infant Care Scheme.
5 Spanning the acute, primary and community sectors, modern maternity services are multi-disciplinary in nature, and as such require the involvement of a range of health professionals. The input of the wider multidisciplinary team will be co-ordinated by the lead healthcare professional.

Appendix B: Defining Level of Care

Levels of care

National and International guidelines have recommended that the terms high dependency and intensive care be replaced by the term critical care. Within the term critical care, care is subdivided into four levels, dependent on organ support and the level of monitoring required independent of clinical diagnosis.

Level of care	Definition	Please tick one box
Level 0: Normal ward care	Care of low risk pregnant women	
Level 1: Additional monitoring or intervention, or step down from higher level of care	Patients at risk of their condition deteriorating and needing a higher level of observation or those recently relocated from higher levels of care	
Level 2: Single Organ Support**	Patients requiring invasive monitoring/ intervention* including support for a single failing organ system (excluding advanced respiratory support).	
Level 3: Advanced respiratory support alone, or support of two or more organ systems**	Patients requiring advanced respiratory support (mechanical ventilation) alone or basic respiratory support along with support of at least one additional organ.	

*** invasive monitoring/intervention includes the use of arterial and CVP lines**

****Examples of level 2 and 3 care in the critically ill pregnant or recently pregnant woman are outlined below**

Level 2 examples

Basic Respiratory Support (BRS): 50% or more oxygen via face-mask to maintain oxygen saturation; Continuous Positive Airway Pressure (CPAP), Bi- Level Positive Airway Pressure (BIPAP)

Basic Cardiovascular Support (BCVS): Intravenous anti-hypertensive, to control blood pressure in pre-eclampsia; Arterial line used for pressure monitoring or sampling; CVP line used for fluid management and CVP monitoring to guide therapy

Advanced Cardiovascular Support (ACVS): Simultaneous use of at least two intravenous, anti-arrhythmic/anti-hypertensive/vasoactive drugs, one of which must be a vasoactive drug; Need to measure and treat cardiac output

Neurological Support: Magnesium infusion to control seizures / prophylaxis of eclampsia in severe PET

Hepatic Support: Management of acute fulminant hepatic failure, e.g. from HELLP syndrome or acute fatty liver, such that transplantation is being considered

Level 3 examples

Advanced Respiratory Support: Invasive mechanical ventilation

Support of two or more organ systems: Renal support and BRS; BRS/BCVS and an additional organ supported; Intracranial pressure monitoring

Reference: Saravanakumar K, Davies L, Lewis M, Cooper GM.. High dependency care in an obstetric setting in the UK. Anaesthesia 2008:63, 1081–6.

References

1. Mantel G et al. Severe Acute maternal morbidity: a pilot study of a definition for a near-miss. BJOG 1998; 105: 985-90
2. Scottish Confidential Audit of Severe Maternal Morbidity: 10th Annual Report (2014). Available from:http://www.healthcareimprovementscotland.org/our_work/reproductive,_maternal child/programme_resources/scasmm.aspx
3. World Health Organisation. Available at: http://www.who.int/healthinfo/statistics/indmaternalmortality/en/
4. Stillbirths Registration Act, 1994
5. National Institute for Health and Care Excellence (2021) Caesarean birth. NICE Guidelines.
6. Clinical Practice Guideline No 30 (2014). Guideline for the Critically ill Woman in Obstetrics: Institute of Obstetricians and Gynaecologists, Royal College of Physicians of Ireland and Directorate of Strategy and Clinical Programmes, Health Service Executive

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