1. **Aim/Purpose of this Guideline**

1.1. This document guides obstetricians, obstetric anaesthetists, midwives, nurses and maternity support workers (MSW) on the recognition and management of maternal collapse in both the acute and community settings.

2. **The Guidance**

2.1 **Incidence**
The rate of maternal collapse lies between 0.14 and 6/1000 (14 and 600/100 000) births.
As it is such a rare event, with potentially devastating consequences, it is essential that caregivers are skilled in initial effective resuscitation techniques and are able to investigate and diagnose the cause of the collapse to allow appropriate, directed continuing management.
It should be noted that vasovagal attacks and the post-ictal state following an epileptic seizure are the most common causes of ‘maternal collapse’ and are not covered by this guideline.

2.2 **Identification**
A Maternity Early Obstetric Warning Scoring system (MEOWS) should be used for all women; this includes ante natal, intrapartum and postpartum observations. This is to allow early recognition of the woman who is deteriorating and becoming critically ill.
In some cases maternal collapse occurs with no prior warning, although there may be existing risk factors that make this more likely. Antenatal care for women with significant medical conditions at risk of maternal collapse should include multidisciplinary team input with a pregnancy and delivery management plan in place.

2.3 **Causes**
The common reversible causes of collapse in any woman can be remembered using the well known ‘aide memoire’ employed by the Resuscitation Council (UK) of the 4 T’s and the 4 H’s.

- Thromboembolism (include Amniotic fluid embolism/Anaphylactoid Syndrome of pregnancy)
- Toxicity *(remember spinal and local anaesthetics; magnesium)* *(new 2017)*
- Tension pneumothorax
- Tamponade (cardiac)
- Hypovolaemia,
- Hypoxia
- Hypo/hyperkalaemia and other electrolyte disturbances
- Hypothermia

- Eclampsia, intracranial haemorrhage *and sepsis* *(New 2017)* should be added to above list.
Although consideration should be given to the cause of the collapse throughout the resuscitation process, this should never delay the initiation or continuation of resuscitation.

Hypovolaemia due to bleeding is the most common cause of a maternal collapse, but hypovolaemia can also occur secondary to a high spinal block and septic shock (see guideline “The management and early recognition of the severely ill pregnant woman”).

Other causes more commonly occurring in the maternity setting include

- Magnesium toxicity- antidote is 10mls of 10% calcium gluconate given by slow IV injection
- Local anaesthetic toxicity (Bupivicaine). Consider use of Intralipid 20% 1.5ml/kg over 1min (100ml for 70kg woman) followed by an IV infusion of 0.25ml/kg/min (400ml over 20mins). The bolus injection can be repeated twice at 5 minute intervals. See AAGBI guideline. Advanced life support and CPR should be continued throughout administration of intralipid until an adequate circulation is restored. All cases of lipid rescue should be reported to the Lipid rescue site (www.lipidrescue.org)

2.4 Identification
In the event of a collapsed woman, a Maternal Emergency Response Team (MERT) call should be made via a call to 2222 stating MATERNAL EMERGENCY and the location.
(The team responding will include Obstetric registrar, anaesthetist and resus officer).

2.5 Resuscitation
Initiate immediate Basic life support according to the Resuscitation Council (UK) guidelines with the inclusion of the following www.resus.org.uk

2.6 Left uterine displacement
Aortocaval compression significantly reduces cardiac output from 20 weeks of gestation onwards. In the supine position the gravid uterus can compress the inferior vena cava and aorta (to a much lesser extent), thus reducing venous return and, as a consequence, cardiac output by up to 30–40%, causing what is known as supine hypotension. Supine hypotension itself can precipitate maternal collapse, which is usually reversed by turning the woman into the left lateral position. During cardiac arrest, the uterus should be displaced manually (if adequate personnel are available) rather than by lateral tilt so that efficiency of cardiac compressions can be maintained. 15-30 degree tilt of an operating table is an acceptable alternative. (New 2017)

2.7 Maternal cardiac arrest
To achieve a perimortem caesarean section within 5 minutes it is essential the obstetric registrar is included in the cardiac arrest call team. Stating maternal cardiac arrest will ensure the obstetrician is included in the emergency call.

2.8 Perimortem section
As soon as it is clear that resuscitation efforts have been deemed unsuccessful delivery should be undertaken to assist maternal resuscitation. Recent evidence suggests that collapse-to-birth times of < 3 minutes are associated with better outcomes so the procedure should not await 4 minutes with a view to delivery by 5
minutes as traditional teaching has taught (PROMPT 3rd edition 2017). Preparations for birth are therefore required the moment that a cardiac arrest is declared. The perimortem section should be performed where resuscitation is taking place and not delayed by moving the woman. The gravid uterus of more than 20 weeks gestation impairs venous return and reduces cardiac output secondary to aortocaval compression. Delivery of the fetus and placenta reduces oxygen consumption, improves venous return and helps both chest compressions and ventilation. It is not performed for the benefit of the baby but it may survive and so a paediatrician should be called at viable gestations. CPR should be continued throughout the procedure (New 2017).

If resuscitation is successful, the abdomen should be packed and the mother moved to an operating theatre for closure. (New 2017).

2.9 Maternal Collapse in the community setting (New 2017)

On commencement of intrapartum care a risk assessment should be completed by the attending midwife and any risk factors identified. For women with risk factors identified the findings should be discussed with the women and a plan of care documented in the woman’s notes with, advice/arrangements for transfer to hospital for medical opinion made. A full set of maternal observations (Temperature, Pulse, Blood pressure, Respiratory Rate) will be completed in this risk assessment. These observations must be plotted on a MEOWS chart.

In the community oxygen saturations will not be recorded. In the event of the MEOWS triggering ≥ 5 or 3 in one parameter, the woman must be transferred into the acute unit.

Initiate immediate Basic life support according to the Resuscitation Council (UK) guidelines ensuring that the uterus is displaced manually (if adequate personnel are available) rather than by lateral tilt so that venous return can be maintained (New 2017).

2.10 Local arrangements for Ambulance Transfer (New 2017)

- The midwife should phone 999 or give instructions for someone else to phone 999 for an ambulance; request a Paramedic and state ‘Emergency’ maternity transfer. Please refer to SWASFT maternal ambulance transfer (Appendix 3)
- This Is a Purple category call
- Ask for confirmation that the call has been made and the estimated time of arrival (ETA) taking a reference number
- If calling from the Isles of Scilly, the midwife should phone 999 and request transfer by the Search and Rescue Helicopter (The Isles of Scilly GP should also be informed)
- The Isles of Scilly Midwife or GP will transfer the patient to the mainland and stay with the patient until she has handed over the care to a member of staff on Delivery Suite.

Continue to follow the Maternal transfer by ambulance clinical guidance. (Appendix 3).
2.11 Training
All midwives, obstetricians and obstetric anaesthetists will attend the annual training at a Practical Obstetric Multi-professional Training (PROMPT) course, which includes maternal collapse and maternal resuscitation.

2.12 Incident reporting
Any incident of maternal collapse, whatever the outcome, will be reviewed through the Maternity Risk Management meeting.

2.13 Compliance monitoring
Attendance at the PROMPT training will be monitored every 3 months by the Maternity Risk Management Forum and an action plan developed and monitored if any deficiencies are identified (New 2017).
3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Monitoring of maternal collapse through risk management.</th>
</tr>
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<tbody>
<tr>
<td>Lead</td>
<td>Maternity Forum.</td>
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<tr>
<td>Tool</td>
<td>Documentation Audit</td>
</tr>
<tr>
<td>Frequency</td>
<td>1% of notes during three year period or more frequent if need identified in risk management</td>
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<td>Reporting arrangements</td>
<td>Report back to maternity forum</td>
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<tr>
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<td>Action plan will be developed and leads appointment, monitoring of action plan at the forum</td>
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<tr>
<td>Change in practice and lessons to be shared</td>
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4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement.

4.2. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 2.
Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Maternal Collapse In Pregnancy And Puerperium, Clinical Guideline</th>
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<tr>
<td>Date Issued/Approved:</td>
<td>5th September 2017</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>5th September 2017</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>5th September 2020</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Obs &amp; Gynae Directorate</td>
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<tr>
<td>Contact details:</td>
<td>01872 252270</td>
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<td>Brief summary of contents</td>
<td>Guideline for the care of maternal collapse in pregnancy.</td>
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<tr>
<td>Suggested Keywords:</td>
<td>Maternal, collapse,</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>5th September 2017</td>
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<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Maternal collapse in Pregnancy and the Puerperium-Clinical Guideline</td>
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<tr>
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<td>Midwifery Guidelines Group</td>
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<td>Divisional Manager confirming approval processes</td>
<td>Head of Midwifery</td>
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<td>Name and Post Title of additional signatories</td>
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<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
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<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
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<td>Clinical / Midwifery and Obstetrics</td>
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<td>CNST 2.8 &amp; 2.9</td>
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<td>Related documents:</td>
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UKOSS 2017

PROMPT 2017

Training Need Identified? None

Version Control Table

<table>
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<th>Date</th>
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<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<td>1.0</td>
<td>See additions (new 2017) in text</td>
<td>Rob Holmes Consultant Obs and Gynae</td>
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<tr>
<td>5th September 2017</td>
<td>1.1</td>
<td>Addition of collapse in the community setting.</td>
<td>Trudie Roberts Maternity Matron Community</td>
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<td>Ambulance transfer agreement</td>
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All or part of this document can be released under the Freedom of Information Act 2000

This document is to be retained for 10 years from the date of expiry.

This document is only valid on the day of printing

Controlled Document

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Appendix 2. Initial Equality Impact Assessment Form

This assessment will need to be completed in stages to allow for adequate consultation with the relevant groups.

| Name of strategy / policy / proposal / service function to be assessed |
|-----------------|-----------------|
| MATERNAL COLLAPSE IN PREGNANCY AND PUERPERIUM – CLINICAL GUIDELINE |
| Directorate and service area: Obs & Gynaec Directorate |
| Is this a new or existing Policy? Existing |
| Name of individual completing assessment: Rob Holmes |
| Telephone: 01872 250000 |

1. **Policy Aim***
   - To provide guidance to obstetricians and midwives on the management of maternal collapse in pregnancy.

2. **Policy Objectives***
   - To ensure evidence based advice and management of a pregnant woman declining blood products.

3. **Policy – intended Outcomes***
   - Safe outcome for women and baby

4. How will you measure the outcome?
   - Compliance monitoring

5. Who is intended to benefit from the policy?
   - Women and new-born

6a Who did you consult with

   - Workforce
   - Patients
   - Local groups
   - External organisations
   - Other

   - x

   - Clinical Guidelines Group
   - Obstetric and Gynaecology Directorate

b). Please identify the groups who have been consulted about this procedure.

What was the outcome of the consultation?

- Guideline approved
7. The Impact
Please complete the following table. If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.

<table>
<thead>
<tr>
<th>Are there concerns that the policy <strong>could</strong> have differential impact on:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
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<tr>
<td><strong>Equality Strands:</strong></td>
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<tr>
<td><strong>Age</strong></td>
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<tr>
<td><strong>Sex</strong> (male, female, trans-gender / gender reassignment)</td>
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<td><strong>Race / Ethnic communities /groups</strong></td>
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<td><strong>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</strong></td>
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<td><strong>Religion / other beliefs</strong></td>
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<td><strong>Marriage and Civil partnership</strong></td>
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<td><strong>Pregnancy and maternity</strong></td>
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<td><strong>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</strong></td>
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<td>X</td>
<td></td>
<td></td>
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</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this **excludes** any *policies* which have been identified as not requiring consultation. **or**
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended. | Yes | No | X |
9. If you are **not** recommending a Full Impact assessment please explain why.

N/A
Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead
c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

This EIA will not be uploaded to the Trust website without the signature of the Human Rights, Equality & Inclusion Lead.

A summary of the results will be published on the Trust’s web site.

Signed: Sarah-Jane Pedler
Date: 5th September 2017
SWASFT AMBULANCE TRANSFER: MATERNAL and NEONATAL

The ambulance service provides a purple (category 1) emergency response that will not be diverted to other incidents for patients who are in cardiac arrest or an immediately life threatening situation. Examples of situations requiring a purple response are:

- Active seizure/eclamptic fit
- PPH - significant uncontrolled bleeding with maternal compromise
- Delayed first and second stage labour with confirmed fetal compromise
- APH – significant blood loss/signs of abruption with confirmed maternal compromise
- Fetal bradycardia and birth not imminent
- Thick meconium with confirmed fetal compromise
- Cord prolapse
- Shoulder dystocia in which the baby has been unable to be delivered
- Neonatal resuscitation

In exceptional circumstances a woman may not meet the definition for a purple response but you may feel that a purple response is required e.g. PPH where immediate transfer from a birth centre/home is required. In these circumstances please apply the following procedure:

- Dial 999
- When asked what is wrong with the patient state that they are in peri-arrest; this will initially trigger a red response
- When triage commences, advise the call taker that you require a purple response and you wish to speak immediately to a clinical supervisor
- Once transferred to the Clinical Supervisor explain the situation. Where it is agreed to be appropriate, the Clinical Supervisor will over-ride the system and confirm a response

The call sequence above is only to be used for those patients deemed to be suffering an immediate threat to life.

For all other emergencies, a red (category 2) level ‘lights and sirens’ response will still be provided but may be diverted to more serious purple calls. Red calls will not be diverted to lower level categories. Examples of situations given by SWAST requiring a red response are:

- PPH – minimal bleeding and no patient compromise
- Thin meconium – no suspected fetal compromise
- Delayed first and second stage labour with suspected fetal compromise
- Uncomplicated fetal tachycardia
- APH – small amount of blood loss but no maternal compromise
- Retained placenta
You can also request an urgent ambulance response within 1, 2 or 4 hours for incidents not deemed **purple** or **red**.

The following examples provided by RCHT may be considered as urgent but not **purple** or **red**:

- Delay in progress of labour
- Maternal observations deviating from normal but woman asymptomatic and MEOWs score is 4 or less
- Meconium Liquor and birth not imminent
- Request for further analgesia
- Perineal repair requiring obstetric intervention where bleeding is no concern
- Small APH with no maternal compromise
- Retained placenta without significant blood loss
- Baby born in the community who did not meet the criteria for community birth*
- Baby born with minor abnormality not causing compromise but requiring paediatric assessment*
- Baby born IUGR requiring paediatric assessment*

*These babies can be managed appropriately in the community while you await the ambulance, making sure the baby is kept warm, infant feeding has commenced and the parents are advised appropriately.*
Appendix 4 Maternal Resuscitation.

1. Collapsed / showing no signs of life or respiratory arrest
   - Shout for HELP and assess patient
   - Request cardiac arrest trolley with AED and perimortum C/S pack

2. Signs of life?
   - NO
     - Left lateral tilt
     - Call 2222 and state “Maternal cardiac arrest” and request the arrest team, Obstetric registrar and an obstetric anaesthetist.

3. CPR 30:2 at a rate of 100-120 compressions a minute
   - With oxygen and airway
   - Apply ECG pads /monitor

4. Advanced Life Support
   - When Resuscitation Team arrives
   - Deliver baby as soon as it is clear there is no response to CPR

5. Successful
   - Stabilise
   - Transfer – Delivery Suite or ITU

6. Continue life support until successful or decision to discontinue

Community 999