ECLAMPSIA AND SEVERE PRE-ECLAMPSIA - CLINICAL GUIDELINE

1. Aim/Purpose of this Guideline

1.1. This document gives guidance to Obstetricians, Anaesthetists, Midwives and Delivery Suite Nurses on the recognition and management of Eclampsia and Severe Pre-eclampsia.

2. The Guidance

2.1. Hypertensive disorders during pregnancy occur in women with pre-existing primary or secondary chronic hypertension, and in women who develop new-onset hypertension in the second half of pregnancy. Hypertensive disorders complicate up to 7% of all pregnancies and continue to be major cause of maternal death in the UK.

- **Pre-eclampsia** is new hypertension presenting after 20 weeks of pregnancy with significant proteinuria
- **Severe Pre-eclampsia** is pre-eclampsia with severe hypertension and/or with symptoms, and/or biochemical and/or haematological impairment
- **Eclampsia** is a convulsive condition associated with pre-eclampsia

2.2. Indications for transfer to DELIVERY SUITE:

- Uncontrollable blood pressure (BP)
- Eclampsia
- Severe maternal symptoms
- Fetal compromise
- Renal failure

2.3. Treatment for Severe Pre-eclampsia/Eclampsia on Delivery Suite

The following clinicians should be informed, by the Delivery Suite Coordinator

- Obstetric Registrar
- Obstetric Consultant on call
- Anaesthetist on call for Delivery Suite

The decision for and mode of delivery will depend on the severity of the condition. The initial aim is to stabilise the woman. Involve the obstetric anaesthetic team at the earliest opportunity and consider elective placement of an epidural catheter.

2.4. Maternal and Fetal Monitoring/assessment

2.4.1. Midwifery

- A MEOWS/High Dependency Chart (HDU) chart must be used.
- Half hourly blood pressure, pulse, respiratory rate and pulse oximetry
- 4 hourly temperature
- Strict fluid balance, with hourly urine output
- All women should have electronic fetal monitoring once the maternal condition is stabilised and should be continually monitored unless a decision made by a senior obstetrician to discontinue
2.4.2. Obstetric
The Obstetric Registrar will review the woman on admission to Delivery Suite and will document a management plan including the timing of the next review. Initially the review should be at least hourly and once stabilised review should be at least every four hourly. At each review the following should be undertaken and documented in the health records.

- Change in symptoms, especially confusion and persistent visual disturbance
- Observations – blood pressure, maternal heart rate, respiratory rate and Oxygen saturation
- Full chest examination, including jugular venous pressure (JVP) assessment
- Level of consciousness, reflexes and clonus
- Fluid balance
- Six-hourly blood investigations (full blood count, platelets, clotting, urea and electrolytes, liver function tests and uric acid) unless otherwise indicated
- Fetal condition as based on the electronic fetal monitoring
- If conservative management is planned then further assessment of the fetus with ultrasound measurements of fetal size, Umbilical Artery Doppler and liquor volume should be undertaken.

2.5. Blood Pressure Control
Aim to keep BP <150/100 mmHg. Oral antihypertensives should be used in the initial treatment however intravenous antihypertensives will be needed as well if BP doesn’t respond to oral therapy or if there is severe hypertension e.g. BP>170/110.

Oral preparations
Recommended oral preparations for the acute management of hypertension

1. Nifedipine: This acts as a direct smooth muscle dilator.

   Two nifedipine preparations are useful in this situation.

   (i) Nifedipine Capsules (5mg). Acts within 10-15 minutes. Treatment should commence with this preparation.


NOTE: Never use sublingual ‘crush’ to lower BP. The sudden fall can cause severe fetal compromise.

Nifedipine Regimen
- Nifedipine 5mg orally stat
- Repeat at 20 minute intervals until BP controlled, to a maximum of 4 doses
- Start Adalat Retard once target BP reached
- If non-responsive, consider Hydralazine

OR

Labetalol 200mg orally stat (caution in Asthma)
- Check BP every 5 minutes for 15 minutes
- If BP <150/100 mm Hg commence maintenance oral therapy
• If BP >150/100 mm Hg commence intravenous treatment

2.6. Intravenous Treatment
If BP control requires intravenous treatment then the level of care should be increased to 
Level 2 care and a high dependency chart (HDU) chart commenced.

2.6.1. Hydralazine IV treatment for BP control:
This acts as a vasodilator, expanding intravascular volume.
In an undelivered patient, Volume expansion of up to 500ml Hartmann’s should be considered prior to administration of Hydralazine.

• Hydralazine Bolus
5 mgs over a period of 10 minutes slow intravenous administration, recheck BP every 5 minutes for 20 minutes
If BP not controlled after 20 minutes, can repeat 5mg bolus at 20 minute intervals to a maximum of 4 doses

• Hydralazine Infusion: Hydralazine is incompatible with Dextrose. It should be infused via a syringe driver as follows:
  Mix 50 mg of Hydralazine with Normal Saline to make up to 50 ml, i.e. 1 mg/ml.
  • START infusion at 5 mg/hr
  • The rate can be doubled every 30 minutes, titrate according to response
  • Maximum rate is 40 mg/hr
  • The BP should be taken manually every 5 minutes
  • Aim for systolic BP ≤ 160 & diastolic BP 90 - 100 mmHg
  • Thereafter the BP recordings should be repeated every 30 minutes if stable
  • The blood pressure should be lowered slowly as rapid alterations of the blood pressure can cause cerebral hypoxia
  • The fetal heart rate should be continuously monitored as Hydralazine can cause fetal distress

2.6.2. Labetalol IV Treatment for BP control (caution in Asthma)
• Labetalol Bolus
  20 mg over a period of 5 minutes slow intravenous administration, recheck BP every 5 minutes for 20 minutes
  If BP not controlled after 20 minutes, give 40 mg, 40 mg, 80 mg at 10 minute intervals up to a maximum dose of 180 mg

• Labetalol Infusion
  • Draw up 40mls Labetalol (5mg/ml)
  • Start infusion at 20mg/hr (i.e. 4 ml/hr)
  • Double every 30 minutes until a satisfactory response, (BP <150/100 mmHg) or to a maximum infusion rate of 160mg/hour
2.6.3. Fluid Balance

**It is essential that fluid balance is closely monitored**
- Total fluid input of 80 mls/hr, except for acute replacement of blood loss
- Infused drugs should be administered in concentrated solutions
- Insert Foley catheter and assess fluid output hourly
- If urine output <20 mls/hour request review by experienced obstetrician and assessment of fluid balance
- If after 4 hours urine output <80 mls inform experienced obstetrician to review woman. Manage as per flow chart on page 5
- If anuria (no urine output over 1 hour) at any point request review by experienced obstetrician and assessment of fluid balance
- Management plan should be documented in the woman’s notes

2.6.4. Fluid Management Regimen for Severe Pre-Eclampsia/Eclampsia

1. **Intravascular volume expansion** Initial volume expansion should be given only after discussion at consultant level and in the following situations:

**Indications:**
- In conjunction with vasodilator therapy for acute blood pressure control
- Acute symptomatic liver involvement
- Oliguria
- Fetal distress (without delaying delivery if mother sufficiently stable)

**Contraindications:**
- IV fluids have already been administered
- Cardiac disease
- Any signs of pulmonary oedema / fluid overload

Colloids should NOT be used for intravascular volume expansion. Use Hartmann’s 500ml over 1 hour with continuous oxygen saturation monitoring. Any further fluid administration should be very cautious because the Pre-eclamptic patient is very readily overloaded. Pulmonary Oedema kills - oliguria and renal tubular acidosis does not.

Fluid should be given according to the protocol flow chart below.
2.7. Maintenance Fluids

80 ml Hartmann's / hour
NB. Reduce if other infusions e.g. Mg SO₄
(80 ml TOTAL fluid / hour = ‘maintenance’)

**Urine output**
- **≥80ml / 4 hrs**
  - Continue maintenance fluids

- **<80 ml / 4 hrs**
  - 250 ml Hartman’s over 15 mins (if O₂ sats and chest exam are OK)

  - **Urine output**
    - **>20 ml over next hour**
      - Repeat 250 ml Hartman’s over 15 mins (ONLY if O₂ sats and chest exam are OK)
      - If <20ml/hr to discuss with consultant anaesthetist. To consider CVP to guide further fluid management
      - If oliguria persists to repeat U &E’s and consider Nephrology
2.8. Magnesium Sulphate

Magnesium Sulphate should be used for women with Eclampsia and considered in Severe Pre-eclampsia.

Discuss all cases with the on-call Obstetric Consultant.

Indications
1. Eclampsia- Magnesium Sulphate rarely required to stop fit – usually self-limiting

2. Any woman with severe pre-eclampsia where the decision to deliver has been made and where there is one other of the following criteria:
   - Hypertension with diastolic BP ≥ 110 mm Hg or systolic BP 170 mm Hg on two occasions and proteinuria ≥ 3+
   - Hypertension with diastolic BP ≥ 100 mg Hg or systolic BP ≥ 150 mm Hg on two occasions and proteinuria ≥ 2+ (0.3 g/day) and at least two of the following:
     - Epigastric pain, vomiting, liver tenderness, Headache, visual disturbance, Clonus (> 3 beats)
     - Haematological or biochemical evidence of developing HELLP Syndrome: platelet count < 100, ALT (Alanine Aminotransferase) > 50 iu/l
     - Creatinine > 100 or Creatinine Clearance < 80

Clinical discretion should be used to include women who present with atypical symptoms.

Magnesium Sulphate Regimen: Magnesium Sulphate (MgSO₄) is the treatment of choice for the first fit.

Loading dose: Magnesium Sulphate 4 grams
- 8mls of MgSO₄ (50%) diluted with 12mls Normal Saline (0.9%) = Total 20mls
- Give IV over 20 minutes using syringe driver rate of 60 mls/hour

Maintenance dose: Magnesium Sulphate 1 gram per hour
- 20mls MgSO₄ (10 gms) diluted with 30mls Normal Saline (0.9%) = Total 50mls
- Give IV using syringe driver at rate of 5mls/hour

Recurrent seizures whilst on Magnesium Sulphate
- Further bolus of 4mls MgSO₄ (2 gms) diluted with 6mls Normal Saline (0.9%) Give IV over 5 minutes
- If possible take blood for Magnesium levels before bolus
- Notify Obstetric and Anaesthetic Consultants

If further seizures occur
- Inform Consultants
- Consider other causes of fits including intracranial haemorrhage
- Consider using other drugs, including general anaesthesia

Management of a woman receiving Magnesium Sulphate
- Experience from the Collaborative Eclampsia and Magpie Trials indicates that Magnesium Sulphate (according to the above regime) can be used safely without the need to monitor any levels
- Magnesium toxicity causes loss of tendon reflexes, followed by respiratory depression and ultimately, respiratory arrest
- Toxic levels are unlikely to be reached with a maintenance dose of 1 gram per hour and urine output of > 100mls/4 hours

Monitoring of a woman receiving Magnesium Sulphate (MgSO₄)
1. Deep tendon reflexes hourly (Biceps tendon if epidural in situ)
   - If loss of reflexes - STOP infusion and send levels
   - Recomence infusion if level < 4mmol/l or reflexes return at 0.5gms per hour

2. Hourly Urine Measurements
   - If oliguria (urine output <20 mls for >4 hrs) or urea > 10, Magnesium levels should be taken hourly (therapeutic range 2-4 mmol/l).
   - Magnesium levels > 4mmol/l - STOP infusion and seek consultant opinion

3. Continuous Pulse Oximetry
   - Oxygen saturation < 95% in air should raise concern regarding Magnesium toxicity or pulmonary oedema

Cardiopulmonary Arrest
- Stop Magnesium Infusion
- Start basic life support
- Give 1 gram Calcium Gluconate IV (10mls 10% solution) over 10 minutes
- Intubate early and ventilate until respirations resume

2.9. Management of Blood Clotting
- If the platelet count is less than 50 x 10⁹ /l a platelet transfusion should be considered and if for caesarean section this should be in consultation with the consultant haematologist
- A platelet count less than 100 x 10⁹ /l (or rapidly falling count) warrants a baseline clotting screen
- Consult Haematologist early where there is clinical or haematological evidence of coagulopathy
- If a platelet transfusion is indicated as above, one adult dose of platelets should be administered prior to incision, plus a further adult dose at uterine closure
- If the woman is bleeding, check fibrinogen as a low fibrinogen is an important indicator of Disseminated Intravascular Coagulation (DIC)
- Cryoprecipitate should be given if bleeding and fibrinogen is less than 1.0g/l.
- Fresh frozen plasma should be used to correct a prolonged prothrombin time (PT) or activated partial thromboplastin time (APTT) if bleeding is not controlled

2.10. Delivery Planning
- The decision to deliver should not be made until the woman is stable, blood pressure control is achieved and appropriate senior personnel are present, even for fetal concerns
- If there are fetal concerns ensure that the neonatal unit have been informed to enable them to prepare for the baby
- If the fetus is less than 35+0 weeks of gestation and delivery can be deferred, corticosteroids should be given, although after 24 hours the benefits of conservative management should be reassessed
- Conservative management at very early gestations may improve perinatal outcome but must be carefully balanced with maternal wellbeing
- The mode of delivery should be determined after considering the presentation of the fetus and the fetal condition, together with the likelihood of success of induction of labour after assessment of the cervix
- The third stage should be managed with Syntocinon/Carbetocin
- Syntometrine/Ergometrine should not be given, as this can further increase the blood pressure

2.11. Management Post Delivery
- After delivery the woman must remain on DELIVERY SUITE for a minimum of eight hours
- The decision to transfer to the wards must be made by a Senior Obstetrician
- If Magnesium Sulphate given, this needs to continue for at least 24 hours post-delivery and the woman will remain on delivery suite during this time
- Avoid NSAIDs

2.12. Post Natal Management
- All the patients who had severe Pre-eclampsia/Eclampsia should be reviewed by a doctor within 24 hours of transfer to Wheal Fortune
- To stay in the Wheal Fortune for at least 3 days unless discharged earlier by Senior Obstetrician. All women with severe pre eclampsia or Eclampsia should be given an appointment for the Consultant Antenatal Clinic (ANC) appointment in 4 weeks. It is the responsibility of the discharging doctor to ensure this appointment is arranged. ANC is not appropriate if pregnancy resulted in an intrauterine death (IUD), in this case individualized followed up will be arranged by the named consultant.
- BP must have been <140/90 for at least 24 hours prior to discharge unless decision for discharge made by a senior obstetrician. Most women should continue on their antihypertensive therapy particularly if needed pre delivery. They should be advised to continue this until reviewed in the consultant clinic. Women in whom serum biochemistry is still deranged on discharge should be given a form and instructions to have the bloods repeated prior to the consultant appointment.
- Community Midwife to be informed of discharge and to monitor BP daily for the first week
Women will be seen in the consultant clinic in 6 weeks to debrief clinical events and discuss implications for future pregnancies. If on antihypertensives then these should be reviewed as to the need to continue. The blood results should also be reviewed. A letter should be written to the GP at this appointment with clear instructions regarding the antihypertensive therapy and BP monitoring +/- investigation of proteinuria/deranged biochemistry if persistent.

- Consideration of preconceptual counseling for the next pregnancy

### 3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>The audit will take into account record keeping by Obstetric, Anaesthetic and Neonatal doctors, Midwives, Nurse, Students and Maternity Support Workers</th>
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<tbody>
<tr>
<td></td>
<td>The results will be inputted onto an Excel spreadsheet</td>
</tr>
<tr>
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<td>The audit will be registered with the Trust’s audit department</td>
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<tr>
<td><strong>Lead</strong></td>
<td>Maternity Risk Management Midwife</td>
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<tr>
<td><strong>Tool</strong></td>
<td>The following will be monitored for women with a diagnosis of Severe Pre-eclampsia and Eclampsia:</td>
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<tr>
<td></td>
<td>Was a plan for blood pressure control written in the woman’s notes</td>
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<td></td>
<td>Was fluid balance monitored hourly</td>
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<td></td>
<td>Was an indwelling Foley’s catheter inserted</td>
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<td></td>
<td>If urine output &lt; 80 mls in 4 hours, was an obstetrician informed and a management plan documented in the woman’s notes</td>
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<tr>
<td></td>
<td>If an Eclamptic fit occurred was Magnesium Sulphate used</td>
</tr>
<tr>
<td></td>
<td>If Severe Pre-eclampsia was Magnesium Sulphate considered</td>
</tr>
<tr>
<td></td>
<td>Was a CTG performed on admission to Delivery Suite and discontinued appropriately</td>
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<tr>
<td></td>
<td>If conservation management planned, was an ultrasound assessment performed for fetal size, Umbilical Artery Dopplers and liquor volume</td>
</tr>
<tr>
<td></td>
<td>Was blood pressure control achieved prior to delivery</td>
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<tr>
<td></td>
<td>If there were fetal concerns, was the neonatal team informed prior to delivery</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>To be audited over the lifetime of the guideline or earlier if indicated</td>
</tr>
<tr>
<td><strong>Reporting arrangements</strong></td>
<td>A formal report of the results will be received annually at the Maternity Risk Management Forum or clinical Audit Forum, as per the audit plan</td>
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<td></td>
<td>During the process of the audit if compliance is below 75% or other deficiencies identified, this will be highlighted at the next Maternity Risk Management Forum or Clinical Audit Forum and an action plan agreed</td>
</tr>
<tr>
<td><strong>Acting on recommendations and Lead(s)</strong></td>
<td>Any deficiencies identified on the annual report will be discussed at the Maternity Risk Management Forum and an action plan developed</td>
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<tr>
<td></td>
<td>Action leads will be identified and a time frame for the action to be completed</td>
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<tr>
<td>Change in practice and lessons to be shared</td>
<td>The action plan will be monitored by the Maternity Risk Management Midwife until all actions complete</td>
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<td>-------------------------------------------</td>
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<tr>
<td></td>
<td>• Required changes to practice will be identified and actioned within a time frame agreed on the action plan</td>
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<tr>
<td></td>
<td>• A lead member of the forum will be identified to take each change forward where appropriate</td>
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<tr>
<td></td>
<td>• The results of the audits will be distributed to all staff through the Risk Management Newsletter / Clinical Audit Forum as per the action plan</td>
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### 4. Equality and Diversity

2.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Diversity & Human Rights Policy' or the Equality and Diversity website.

**2.2. 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>ECLAMPSIA AND SEVERE PRE-ECLAMPSIA - CLINICAL GUIDELINE</th>
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<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>20th October 2015</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>31st October 2015</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>31st October 2018</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Karen Watkins</td>
</tr>
<tr>
<td></td>
<td>Obs and Gynae Directorate</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 25 2729</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>This document gives guidance to Obstetricians, Anaesthetists, Midwives and Delivery Suite Nurses on the recognition and management of Eclampsia and Severe Pre-eclampsia</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>Eclampsia, Severe, Pre-eclampsia, PET, hypertension, pregnancy, blood, pressure</td>
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<tr>
<td>Target Audience</td>
<td>RCHT</td>
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<tr>
<td></td>
<td>✗</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>20th October 2015</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Clinical guideline for the management of a woman with eclampsia and/or severe pre-eclampsia.</td>
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<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Maternity Guidelines Group Obs and Gynae Directorate Divisional Board for noting</td>
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<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Head of Midwifery</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
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</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>Original Copy Signed</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet ✗ Intranet Only</td>
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<tr>
<td>Links to key external standards</td>
<td>CNST 3.1 &amp; 3.2</td>
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Related Documents/ References.

Training Need Identified? Yes. Included in the TOME Mandatory Training

Version Control Table

<table>
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<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<td>August 2007</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Rob Holmes Consultant obstetrician</td>
</tr>
<tr>
<td>June 2009</td>
<td>V1.1</td>
<td>Updated guideline.</td>
<td>Karen Watkins Consultant obstetrician</td>
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<tr>
<td>May 2012</td>
<td>V1.2</td>
<td>Updated and compliance monitoring included</td>
<td>Karen Watkins Consultant Obstetrician</td>
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<tr>
<td>August 12</td>
<td>V1.3</td>
<td>Changes to compliance monitoring only</td>
<td>Karen Watkins Consultant Obstetrician</td>
</tr>
<tr>
<td>20th October 2015</td>
<td>V1.4</td>
<td>Reviewed no major changes</td>
<td>Karen Watkins Consultant Obstetrician</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

<table>
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<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Rationale for Assessment / Existing Evidence</th>
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<tr>
<td>Age</td>
<td>X</td>
<td></td>
<td>All pregnant women</td>
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</table>

This document gives guidance to Obstetricians, Anaesthetists, Midwives and Delivery Suite Nurses on the recognition and management of Eclampsia and Severe Pre-eclampsia.
### 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 service redesign or development

8. Please indicate if a full equality analysis is recommended.  

<table>
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<tr>
<th></th>
<th>Yes</th>
<th>No</th>
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9. If you are not recommending a Full Impact assessment please explain why.

N/A

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**Signature of policy developer / lead manager / director**  
Karen Watkins  
**Date of completion and submission**  
20th October 2015

**Names and signatures of members carrying out the Screening Assessment**  
1. Elizabeth Anderson  
2. 

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**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**

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

Signed: **Elizabeth Anderson**

Date: **20th October 2015**