Hypertensive Disorders in Pregnancy Guideline

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Summary of document:

This guideline covers diagnosing and managing hypertension including chronic, gestational, pre-eclampsia and eclampsia, during the antenatal, intrapartum and postnatal periods

Scope: The guideline is for all healthcare professionals caring for women during the antenatal, intrapartum, and postnatal periods.

The guidance below uses the term 'woman' (pronouns she or her) to describe individuals whose sex assigned at birth was female, whether they identify as female, male or non-binary. It is important to acknowledge it is not only people who identify as women for whom it is necessary to access women's health and reproductive services. Therefore, this should include people who do not identify themselves as women but who are pregnant or have recently given birth. Obstetric and Midwifery services and delivery of care must therefore be appropriate, inclusive and sensitive to the needs of those individuals whose gender identity does not align with the sex that they were assigned at birth

To be read in conjunction with:
1189 Low dose Aspirin in Pregnancy Guideline –open in new tab
665 - Maternity Escalation of Clinical Concerns / Escalation of Conflict of Clinical Opinion Guideline- open in new tab
839 - Antenatal Electronic Fetal Monitoring Guideline
813 - Continuous Intrapartum Electronic Fetal Monitoring Guideline- open in new tab
662 - Magnesium Sulphate for Neonatal Neuro-Protection Guideline –open in new tab
620 - Thromboprophylaxis in the Antenatal and Postpartum Period Guideline- open in new tab
664 - Maternal Collapse Guideline –open in new tab
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2.1 - Extended – 23.02.2023
2.2 – Extended – 22.08.2023
3.0 – Updated 21/12/2023

Glossary of terms
PCR – Protein Creatinine Ratio
HELLP Haemolysis, Elevated Liver enzymes and Low Platelets
DIC Disseminated intravascular Coagulation
BP Blood Pressure
FBC Full blood count
U&E Urea and electrolytes
G&S Group and save

Contents

Scope

The guideline is for all healthcare professionals caring for women during the antenatal, intrapartum, and postnatal periods.

Aim

The aim of this guideline is to give guidance to all midwives and obstetricians on the diagnosing and managing hypertension including chronic, gestational, pre-eclampsia and eclampsia, during the antenatal, intrapartum and postnatal periods

Objectives

- Staff be able to understand the diagnosis, classification and management of the hypertensive disorders of pregnancy and postpartum.

Introduction

Hypertension disease in pregnancy (HDP) is the most frequent medical complication of pregnancy, occurring in up to 10% of pregnancies. 20% of HDP is pre-existing (chronic) and 80% develops in the pregnancy (gestational, pre-eclampsia).

Transient gestational hypertension, particularly if noted before 33 weeks' gestation, is associated with up to **40%** risk of developing true gestational hypertension or pre-eclampsia. Twenty-five percent of women with true gestational hypertension or chronic hypertension will develop pre-eclampsia

Pre-eclampsia remains a leading cause of maternal and perinatal mortality and morbidity. It is an important cause of iatrogenic preterm birth accounting for 8-10% of all preterm deliveries and fetal growth restriction (FGR).

Pre-eclampsia rarely happens before 20 weeks' gestation and, although less common, can develop for first time up to 4 weeks after birth.

In view of the seriousness of the disease and the impact on women and their families, clinical teams have a high degree of suspicion for preeclampsia and a low threshold to admit pregnant women with suspected preeclampsia, although only a relatively small proportion go on to develop the disease.

All forms of pregnancy hypertension, but particularly preterm pre-eclampsia, are associated with an increased risk of long-term hypertension and cardiovascular disease in later life.

Definitions/ Terms used in this guideline

Hypertension	Blood pressure of 140mmHg systolic or higher, or 90mmHg diastolic or higher on at least 2 readings at least 30 minutes apart
Chronic hypertension	Hypertension present at booking or before 20 weeks OR if already taking antihypertensive medication at booking.
Gestational hypertension (previously known as Pregnancy Induced Hypertension, PIH)	Hypertension that develops after 20 weeks **without significant** proteinuria. Classified in pregnancy either as ➢ Hypertension BP 140-159 mmHg systolic, or 90-109 mmHg diastolic ➢ Severe hypertension BP, equal to or over (≥): 160 mmHg diastolic or 110mmHg diastolic
Pre-eclampsia:	New hypertension presenting after 20 weeks with **one or more** of the following. ➢ Significant proteinuria (≥30mg/mmol PCR/ 2+ on urinalysis). ➢ New onset Renal dysfunction (creatinine ≥90micromol/litre) ➢ New onset Liver involvement (ALT or AST ≥40IU/litre) ➢ New onset Haematological abnormalities (thrombocytopenia- Platelets<150 and includes DIC, HELP etc.) ➢ Evidence of fetal growth restriction, abnormal umbilical Doppler, or stillbirth.
Severe pre-eclampsia	Pre-eclampsia with severe hypertension that does not respond to treatment or is associated with ongoing or recurring severe headaches, visual scotomata (visual disturbances), nausea or vomiting, epigastric pain, oliguria and severe hypertension, as well as progressive deterioration in laboratory blood tests such as rising creatinine or liver transaminases or falling platelet count, or failure of fetal growth or abnormal Doppler findings
Note: Proteinuria is not mandatory for a diagnosis of pre-eclampsia	
Eclampsia	The occurrence of one or more convulsions. Fitting in pregnancy in a woman not known to have background of seizures should be assumed to be eclampsia in the first instance. The woman may NOT have a diagnosis of pre-eclampsia prior to the seizure. **Note.** 40% of eclampsia seizures happen in the postnatal period.
It is essential to remember that eclampsia may appear unexpectedly in a patient with minimally elevated blood pressure and no proteinuria.	
HELLP syndrome	Haemolysis, elevated liver enzymes and low platelet count. It is a manifestation of pre-eclampsia occurring in ~20% of severe cases. HELLP can occur without evidence of haemolysis
DIC: Disseminated Intravascular Coagulation	DIC is the endpoint of uncontrolled systemic activation of the haemostatic system, leading to a simultaneous widespread microvascular thrombosis and subsequent depletion of clotting factors. It can lead to potential bleeding, compromising the blood supply to different organs and may lead to organ failure.

Proteinuria	In pregnancy a urinary Protein/Creatinine ratio >30mg/mmol is significant. PCR is now the main urinary test. This is at least 2+ protein on urinalysis. **Note:** A PCR > 300mg/mmol is considered “severe" and such levels can be seen in nephrotic syndrome. Always seek senior review in such cases.

Initial Assessment

Blood pressure

- Use cuff of appropriate size if patient overweight (large cuff if arm circumference >35cm).
- Use Korotkoff phase V (i.e. point at which all sounds disappear) for the diastolic recording
- On Triage, when measuring BP ≥140/90, a minimum of three BP readings 15-30 minutes apart.
- In community setting, when measuring BP ≥140/90, a minimum of 2 BP readings 15 minutes apart are required before referring for review.
- Manual sphygmomanometer to be used for assessment for hypertension.

Reducing the risk of hypertensive disorders of pregnancy at booking

- Measure baseline blood pressure, perform urinalysis and document results.
- Complete the “Pre-eclampsia Risk Assessment for Aspirin” to identify those who at risk in pregnancy complications related to placental dysfunction, particularly pre-eclampsia and offer aspirin as appropriate.

Pre-eclampsia Risk Assessment for Aspirin.

Assess woman's risk status for needing Aspirin 150mh/day) from 12 weeks to 36 weeks gestation
If **two or more moderate risk factors OR** one **high risk factor** Aspirin should be offered.

High Risk
Hypertensive disease during a previous pregnancy
Chronic Kidney disease
Autoimmune disease i.e. systemic lupus erythematosus, antiphospholipid syndrome
Type 1 or Type 2 diabetes
Chronic hypertension

→ If **one high** risk factor for pre-eclampsia advise to take:

Aspirin 150mg/day from 12 weeks until 36 weeks

Moderate Risk
Nulliparous
Age equal to or greater than 40 at time of booking
Pregnancy interval of more than 10 years
BMI≥35kg/m^2 at first visit
Multiple pregnancy
Family history of pre-eclampsia

→ If **two moderate** risk factors for pre-eclampsia advise to take:

Aspirin 150mg/day from 12 weeks until 36 weeks

Signs and Symptoms of pre-eclampsia

Advise all pregnant women to see a healthcare professional immediately if they experience signs or symptoms of pre-eclampsia.

Symptoms include:

- Severe headache i.e. new onset headache, unresponsive to medication and not accounted for by alternative diagnoses
- Vision disturbances e.g. blurring or flashing before the eyes, light sensitivity.
- Epigastric and/or right upper quadrant pain i.e. abdomen or severe pain below the ribs, shoulder pain.
- Nausea or vomiting particularly if onset is sudden and after mid-pregnancy.
- Oedema, sudden swelling of the face, hands and feet.

Communication in Pregnancy

Effective communication is essential to promoting safe and effective care.

- Adopt a Multidisciplinary team approach.
- "Call it what it is" –be clear with facts
  - If woman has chronic hypertension and then develops proteinuria or clinical signs/ symptoms then she is pre-eclamptic NOT "chronic hypertension with proteinuria"
- Understand how to clearly escalate concerns.

Antenatal Management

Chronic Hypertension

- Refer to antenatal clinic for consultant lead care.
- Advise stopping ACE inhibitors, Angiotensin II Receptor Blockers and diuretics on notification of pregnancy if these have not been stopped pre-pregnancy **and offer alternatives.**
- In first instance use Labetalol to treat chronic hypertension in pregnant women. Consider nifedipine for women in whom labetalol is not suitable, or methyldopa if both labetalol and nifedipine are not suitable. (See Appendix 1 for antihypertensive drugs, antenatally and in the postnatal period))
- In women of African or Caribbean family origin it is advised that a calcium channel blocker is first line treatment throughout pregnancy
- Offer hypertensive treatment if not already on treatment, if they have a sustained systolic BP of 140mmHg or higher OR a sustained diastolic BP of 90 mmHg or higher
- Offer serial growth scan surveillance
- Antenatal visits/ appointments based on individual needs and BP control
- If the hypertension is due to underlying renal disease refer to Nephrology team.
- Encourage women to participate in existing ongoing research trials

- Continue treatment, if safe to do so unless blood pressure is <110/70 or the woman has symptomatic hypotension
- Educate women as to the signs and symptoms of preeclampsia and advise that they seek medical advice if have any concerns.

Aim for a BP 135/85 mmHg or less once treatment commenced.

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Women presenting with hypertension in pregnancy

Community Antenatal Referral Guidance

Community Monitoring of Blood pressure		
Description	Definition	Action by practitioner
Consider transfer into hospital by ambulance if significantly raised BP or symptomatic. This should be based on an individual assessment. If there is uncertainty discuss with a Community Team Lead or the referring hospital.		
Hypertension **with or without** proteinuria	Diastolic≥90	*Ensure minimum of 2 BP readings performed 15 minutes apart before referral.* Refer to Triage for assessment
	Systolic ≥140	Refer to Triage for assessment
Maternal symptoms or fetal signs and Symptoms **<u>without</u> hypertension or proteinuria**	Symptoms e.g. Headache (not relieved by analgesia), visual disturbances, or both along with normal diastolic blood pressure <90 mm Hg and trace or no protein and no history of raised blood pressure:	If **NO** risk factors for Pre-eclampsia (see section 3.1) advise to see GP if concerned. Consider reducing interval before next assessment
		If risk factors for preeclampsia **are present (or already on antihypertensive medication)** refer to Triage for review.
	Epigastric pain	Refer to Triage
	Reduced movements or Small for gestational age infant	Refer to local guidelines and refer to triage /DAU as appropriate

Antenatal management of gestational hypertension

Hypertension Diastolic≥90 and or Systolic ≥140	
History	• Full medical and obstetric history • Review notes • Ask signs and symptoms of preeclampsia
	• Dipstick positive for proteinuria- MSU • +PCR

Urine	
BP Profile	• Minimum of 3 BP 15 minutes apart • Immediate review if BP ≥160/100,
Bloods	• PET: FBC, U&E, and LFT
Fetal Surveillance	• CTG on admission • Growth and doppler scan at diagnosis, if not performed in previous 14 days. Plan if growth normal repeat 2- 4 weekly or as clinically indicated.
Obstetric Review	• Care plan and symptom discussion • Outpatient/ inpatient management
Medication	• Start medication if BP is persistently >140/90 to aim to control at **135/85** • Admit for 24 hours to monitor BP if medication is commenced or altered.

First Line	Second line	Third Line
Labetalol	**Nifedipine MR**	**Methyldopa**
▪Starting dose 100mg BD ▪Max dose 2.4g /24hrs ▪Avoid if type 1 diabetic or asthmatic	▪Starting dose 10mg BD ▪Max dose 40mg BD	▪Starting Dose 250mgs TDS ▪Max dose 1g TDS (max 3g/24 hrs)

- A trial of a combination of Labetalol or Nifedipine should occur before progressing to third line option
- In women of African or Caribbean family origin it is advised that a calcium channel blocker is first line treatment throughout pregnancy

Caution when using antihypertensive medication

- Be mindful that all three drugs have cumulative effect and interact with magnesium sulphate. Nifedipine increases the muscular blockade of magnesium sulphate.
- In Type 1 DM, labetalol may reduce hypoglycaemia awareness and block the adrenergic response to hypoglycaemia.

Medicine management for women who have undergone Bariatric surgery (excluding gastric band)

Bariatric surgery includes a range of different procedures i.e. Roux-en-Y, sleeve gastrectomy or duodenal switch, which introduce anatomical and physiological changes in the gastrointestinal tract which may affect drug pharmacokinetics. Absorption of drugs is predominantly affected, but tissue distribution, drug metabolism and elimination may also be affected.

Clinicians need to be aware of the theoretical pharmacokinetic effects of bariatric surgery which include:

- Reduced surface area for absorption
- Quicker transit through gastric pouch
- Reduced enterohepatic cycling.
- Reduced mixing of stomach contents leading to reduced disintegration and dissolution.
- Reduced bioavailability of those drugs which rely on food for their absorption e.g. carbamazepine.

Women requiring medications that are enteric-coated (gastro-resistant) or modified-release oral preparations should be switched to immediate-release preparations, or alternative drugs where possible with **<u>one exception</u>**: **AVOID Immediate Release Nifedipine.**

NOTE. Gastric bands do not have an impact on absorption so drug pharmacokinetics in these women should not be an issue.

Ongoing management of gestational hypertension

If outpatient management is considered, explain signs and symptoms of pre-eclampsia and low threshold to present to hospital if concerns

Outpatient	• BP twice weekly (CMW x 1 and DAU x1) • Weekly bloods on DAU
Inpatient	• BP every 15 mins until BP<160/110, then 4 hourly until stable • 4 hourly BP until discharged • Weekly bloods • Arrange follow-up as an outpatient.

Antenatal management of suspected pre-eclampsia

Suspected Pre-eclampsia	
History	• Full medical and obstetric history • Review notes • Ask signs and symptoms
Urine	• MSU and PCR if dipstick for PCR • Consider use of accurate fluid balance chart
BP Profile	• Minimum of 3 BP 15 minutes apart • Immediate obstetric review if BP ≥160/100,
Bloods	• PET: FBC, U&E, and LFT • Clotting screen if platelets <100
Fetal Surveillance	• CTG on admission • Urgent request for Fetal growth scan (if not performed in previous 14 days) and then 2-4 weekly
Obstetric Review	• Admission for observation for minimum of 24 hours • Consultant review within time of admission.
Medication	• Start medication if BP is persistently >140/90 to aim to control at 135/85 • Aim to increase antihypertensives after 24 hours if uncontrolled BP unless BP>160/110 (see severe hypertension management) • If there has been a response to current antihypertensive, then increase current medication to maximum dose, before adding second agent
Neurological	• Deep tendon reflexes daily when inpatient.

First Line	Second line	Third Line
Labetalol	**Nifedipine MR**	**Methyldopa**
▪Starting dose 100mg BD ▪Max dose 2.4g /24hrs ▪Avoid if type 1 diabetic or asthmatic	▪Starting dose10mg BD ▪Max dose 40mg BD ▪First line for black or Afro-Caribbean women	▪Starting Dose 250mgs TDS ▪Max dose 1g TDS (max 3g/24 hrs)

- A trial of a combination of Labetalol or Nifedipine should occur before progressing to third line option
- In women of African or Caribbean family origin it is advised that a calcium channel blocker is first line treatment throughout pregnancy

Ongoing management of pre-eclampsia

Following admission, the decision for ongoing management of a patient with a diagnosis of PET as outpatient or inpatient is based on clinical circumstances and should be discussed with a consultant obstetrician. Plans must be clearly documented in maternal notes.

Outpatient management of pre-eclampsia

Outpatient Management for confirmed PET	
DAU/ community midwife	• Review 3 times per week: • See DAU twice weekly for FBC, LFT, U&E and BP • CMW review BP check • Auscultate FH (CTG only if clinically indicated) • Ask signs and symptoms
Urine	• Urinalysis dipstick only repeat if clinically indicated e.g. new symptoms or signs or uncertainty over diagnosis • Consider PCR
BP Profile	• BP profile If referred to triage, ensure 3 readings (minimum 15 mins apart) are performed.
Bloods	• PET bloods up to 2 times weekly: FBC, renal and liver profile.
Fetal Surveillance	• CTG for fetal wellbeing when review on triage or if any clinical concerns e.g. RFM • Fetal growth and doppler scan (if not performed in previous 14 days) and then 2-4 weekly
Obstetric Review	• Consultant or senior registrar review • Planning time for birth
Neurological	• Deep tendon reflexes when medically reviewed.

In-patient management pre-eclampsia

If criteria for outpatient management not met, then woman should be admitted for in-patient management.

In-patient management pre-eclampsia	
Urine	• Urinalysis only repeat if clinically indicated e.g. new symptoms or signs or uncertainty over diagnosis • If proteinuria increases, consider PCR • Maintain accurate fluid balance chart.
BP Profile	• 4 hourly (including at night) • If BP labile every 15- 30 mins until stable
Bloods	• PET bloods up to 2-3 times weekly: • Clinical situation dependent
Fetal Surveillance	• CTG daily and repeat if any clinical concerns e.g. RFM • Fetal growth and doppler scan 2 weekly until birth
Neurological	• Deep tendon reflexes daily

Timing of Birth

Chronic /Gestational Hypertension

- Do not offer planned early birth **before 37 weeks** to women with gestational hypertension whose blood pressure is lower than 160/110 mmHg, unless there are other clinical indications.
- For women with gestational hypertension whose blood pressure is lower than 160/110 **mmHg after 37 weeks**, timing of birth, and maternal and fetal indications for birth should be agreed between the woman and the senior obstetrician.
- If planned early birth is necessary, offer a course of antenatal corticosteroids and magnesium sulphate, if indicated, in line with the local guidelines.

PET diagnosis below 37 weeks

- Iatrogenic preterm birth can be required for treatment of pre-eclampsia for either maternal or fetal concerns.
- Decisions around birth in women with pre-eclampsia should be made once the patient is stabilised and should involve MDT involvement: senior obstetrician, Labour ward coordinator, anaesthetic team and neonatal team.
- The mode of birth should consider the presentation of the fetus and the fetal condition, together with the likelihood of success of induction of labour after assessment of the cervix and patient choice.

- Offer intravenous magnesium sulphate and antenatal corticosteroids, if clinically indicated. Refer to the Health Board guideline *'Magnesium Sulphate for Neuroprotection of Preterm Babies'*. Note: The indication for magnesium sulphate in this context is neuroprotection, not for the prevention or treatment of seizures.

Consider planned early birth (before 37 weeks) with the following:

- Inability to control maternal blood pressure despite using 3 or more classes of antihypertensive in appropriate doses
- Maternal pulse oximetry less than 90%
- Progressive deterioration in liver function, renal function, haemolysis, or platelet count
- Ongoing neurological features, such as severe intractable headache, repeated visual scotomata, or eclampsia
- Placental abruption
- Reversed end-diastolic flow in the umbilical artery Doppler velocimetry, abnormal CTG, or stillbirth.

PET diagnosis after 37 weeks

Offer birth within as soon as possible after 37 weeks.

Antenatal management of severe hypertension ≥160/110 with or without pre-eclampsia diagnosis

Blood pressure of ≥ 160/110 is potentially life threatening and needs immediate review. Should the woman be in the community, she needs transferring into the hospital by ambulance service if needed.

Uncontrolled high blood pressure can lead to severe complications of pre-eclampsia (eclampsia, pulmonary oedema, liver rupture) and even without a diagnosis of pre-eclampsia severely high systolic blood pressure can lead to haemorrhagic stroke and placental abruption.

These women are high risk and require an obstetric and anaesthetic review within 30 minutes of arrival on labour ward and this must be documented in the notes. If the obstetric team are unavailable, it must be clearly documented in the notes why and when a review is expected. The co-ordinator should review the patient to assess the urgency.

If a doctor is required urgently, immediate escalation to the Obstetric Consultant on call should take place. Until the review happens the co-ordinator should be kept up to date with any changes.

All women who are assessed as high risk must be reviewed by an obstetrician/ member of the MDT, a minimum of 6 hourly and this must be documented by them in the notes using the Maternal Critical Care Structured review form (see appendix 8). If this time frame is exceeded, then the reason must be documented in the notes and the coordinator informed. Refer to the Maternity Escalation of Clinical Concerns guideline.

- **One to One care must be given.**

Severe Hypertension with or without Preeclampsia Systolic ≥ 160 and or Diastolic≥110	
History	• Medical and obstetric history • Review notes • Ask signs and symptoms
Urine	• MSU • +PCR • Limit maintenance fluids to 1ml/kg/hour or 80 ml/hour unless there are other ongoing fluid losses e.g. haemorrhage. • Monitor Urine output /urinary catheter hourly urinometer measurements. • Maintain accurate fluid balance chart.
BP Profile / Vital Signs	• When BP is equal to or above 160/110 on 2 separate readings (15mins apart) treat as medical emergency • BP 15 minutes apart during acute treatment • Aim to keep BP ≤135/85 once on treatment HOWEVER beware any sudden drop in BP. • Use MEWS /HDU chart • Continuous pulse oximetry • Neurological status
Bloods	• IV access x2, large bore (Grey or green) • PET bloods, G&S and clotting
Fetal Surveillance	• Continuous CTG during acute treatment as sudden drop in BP may cause fetal compromise. • When clinically appropriate, fetal growth scan (if not performed in previous 14 days) and then 2 weekly.
Obstetric Review	• Treat as medical emergency: urgent escalation and senior medical review • Transfer to Labour ward • One-to-one care. Do not leave patient alone.
Medication	• Start medication if BP is persistently ≥160/110 on 2 separate readings to aim to lower BP to systolic between 140-150 and diastolic between 90-100 initially Follow Prompt • Note If labetalol and/or nifedipine have not been effective or are contraindicated, seek / escalate for, senior help and give IV hydralazine • If eclampsia concerns start Magnesium sulphate

Follow:

PROMPT "**Severe Hypertension –Urgent Treatment Algorithm**" (table 1 below)

PROMPT "**Severe hypertension treatment regimen"** (table 2 below),

PROMPT "**Outline of Severe Pre-eclampsia"** (table 3 below)

Magnesium Sulphate Regime (table 4 below)

See: **Appendix 2**: Magnesium Sulphate information.

Appendix 3: Staff guidance for IV Hydralazine preparation.

Appendix 4: Staff guidance for IV Labetalol preparation.

Appendix 5: Eclampsia proforma

Appendix 6: Community eclampsia Proforma

Appendix 9: Hywel Dda Maternity Fluid Balance Chart

Table 1. Severe Hypertension- Urgent treatment algorithm.

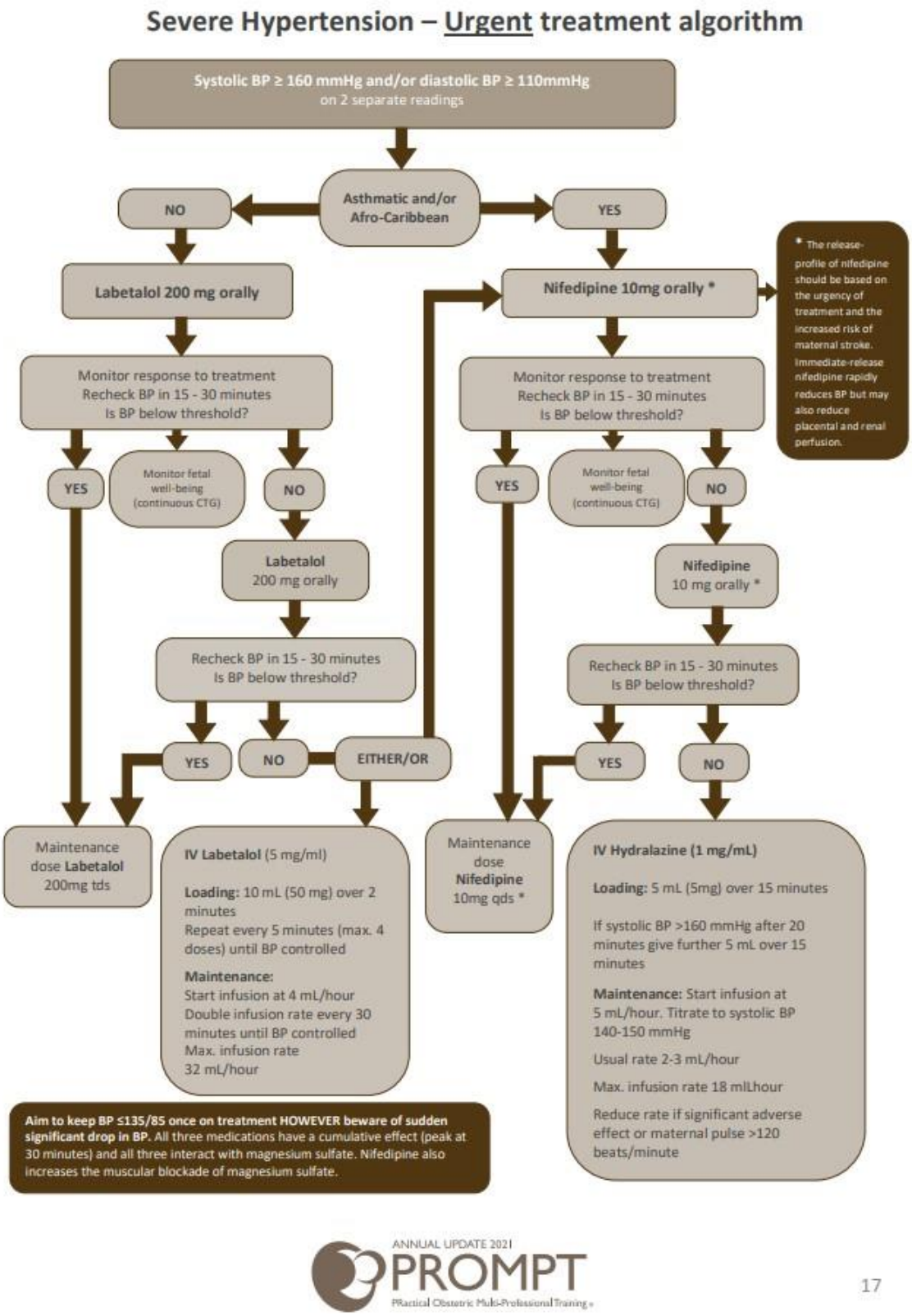


Table 2. Severe hypertension treatment regime

Severe hypertension treatment regimen

Treatment of severe hypertension

- A blood pressure of over 160 mmHg systolic or 110 mmHg diastolic must be treated as a medical emergency
- The aim is to lower the blood pressure to a systolic BP between 140 and 150 and a diastolic between 90 and 100 mmHg. Further reductions do not help the mother and can compromise the fetus
- The maternal blood pressure should be monitored at least every 15 minutes during acute treatment
- The fetal heart should be continually monitored during acute treatment as a sudden drop in blood pressure may cause fetal compromise

Labetalol

- Ensure the woman is not asthmatic and give 200 mg labatelol orally
- Recheck the BP at 15 and 30 minutes
- If the BP has not settled to the target by 30 minutes give a second dose of 200 mg labetalol orally
- Recheck the BP at 45 and 60 minutes
- Seek senior advice, if following the second dose of labetalol, the BP still has not settled to the target within 30 minutes. The options for treatment include additional oral nifedipine or IV regimens (labetalol or hydralazine)

Nifedipine

- If the woman is asthmatic, labetalol is not available and/or has not been effective, give 10 mg nifedipine orally. It is not necessary to give it sublingually, and sublingual administration may cause sudden hypotension and associated fetal compromise
- Recheck the BP at 15 and 30 minutes
- If the BP has not settled to the target after 30 minutes, give a second dose of 10 mg nifedipine orally
- Recheck the BP at 45 and 60 minutes
- If the BP still has not settled to the target by 30 minutes after the second dose of nifedipine, seek senior advice and change to the IV labetalol or IV hydralazine regimen, dependent on contraindications

Hydralazine

- If labetalol and/or nifedipine have not been effective or are contraindicated, seek senior help and give IV hydralazine
- Give 5 mL of 1 mg/mL hydralazine (5 mg) IV over 15 minutes
- Check the BP at 20 minutes
  - If the systolic is still above 160 mmHg, give a further 5 mL of 1 mg/mL hydralazine (5 mg) IV over 15 minutes
- If the systolic is below 160 mmHg, start an infusion of 1 mg/mL hydralazine at 5 mL/hr:
  - Titrate the infusion to control the BP
  - The maximum infusion rate is 18 mL/hr
  - The usual infusion rate required is between 2 and 3 mL/hr
  - **Reduce/STOP** the infusion if the maternal heart rate is above 120 bpm and/or there are any adverse effects

Table 3. Management of Severe Pre-Eclampsia Management

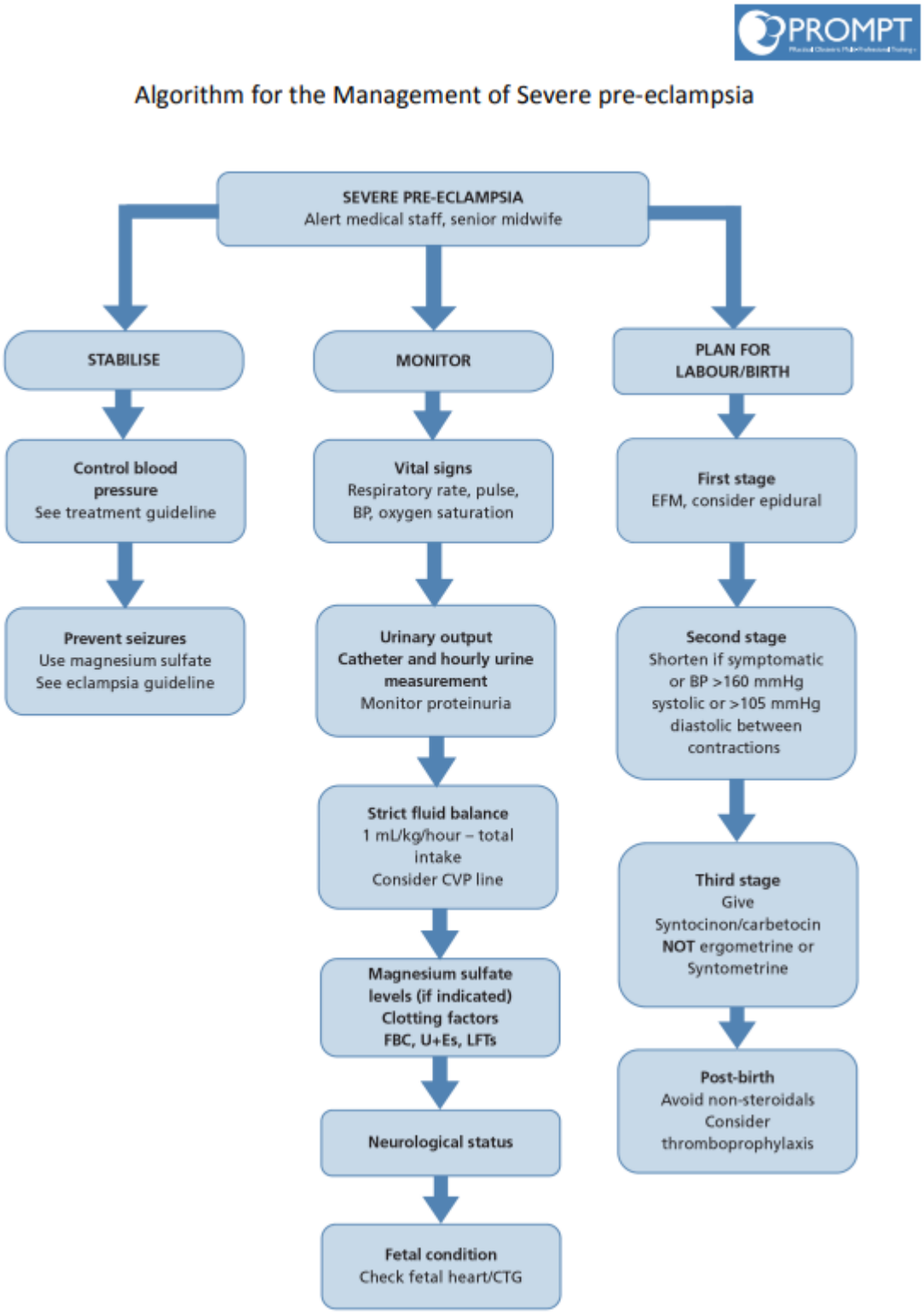


Table 4. Magnesium Sulphate Regime

Magnesium sulphate 50% w/v (10mL) ampoule contains
5g in 10mL equivalent to magnesium **20mmol in 10mL**
Magnesium sulphate 50% must ALWAYS be diluted before use

LOADING DOSE: 4g magnesium sulphate (16mmol) over 5 minutes

- Draw up 4g (8mL) of magnesium sulphate 50% solution followed by 12mL of sodium chloride 0.9% into a 20mL syringe. This will give a total volume of 20mL
- Give as an IV bolus over 5 minutes

MAINTENANCE DOSE: 1g/hour (4mmol/hour) for 24 hours

- Draw up 10g (20mL) of magnesium sulphate 50% solution followed by 30mL of sodium chloride 0.9% into a 50mL syringe. This will give a total volume of 50mL
- Place the 50mL syringe into a syringe driver and set the pump to run intravenously at 5 mL/hour.
- Continue infusion for 24 hours following birth or the last seizure, whichever is the most recent event

RECURRENT SEIZURES: 2 - 4 g magnesium sulphate given over 5 - 15 minutes:

- Seek immediate senior help
- Draw up 2g (4 mL) of magnesium sulphate 50% solution followed by 6 mL of sodium chloride 0.9% into a 10 mL syringe. This will give a total volume of 10mL
- Administer manually as an intravenous bolus over 5 minutes (2 mL/minute), or it can be given via an infusion pump over 15 minutes
- If possible, take blood for magnesium levels prior to giving the bolus dose

The maternal condition <u>must</u> be stabilised prior to making plans for birth (if antenatal)

9.0. Eclampsia Emergency Management

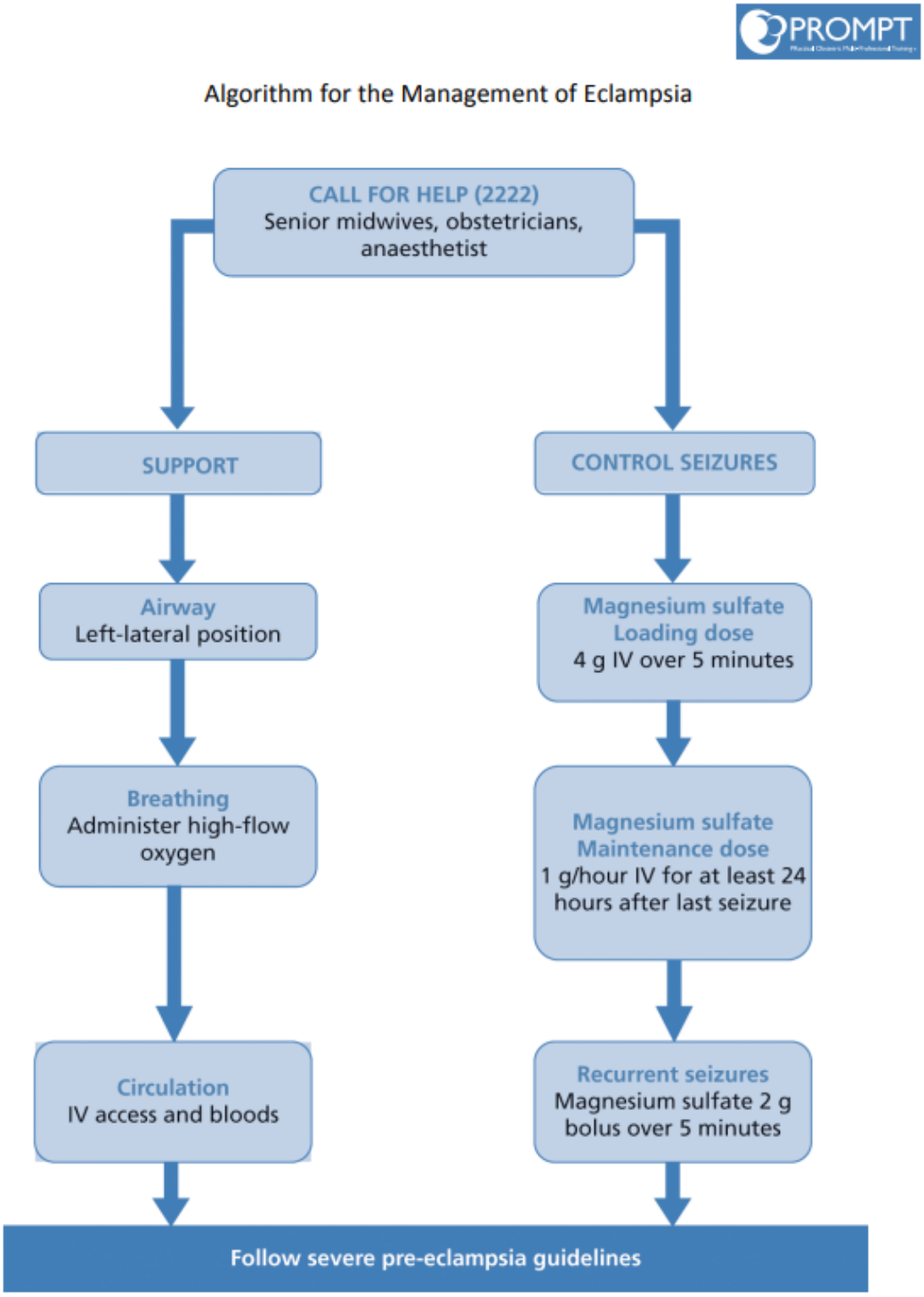
9.1 Inpatient Management

Follow: PROMPT 2 **Algorithm for the Management of Eclampsia"** (table 5 below)

Eclampsia Emergency Management	
Safety	**•Do not leave the woman alone** Ensure safety, lower bed, flat
HELP	•Call for help. Ring 2222 ask for OBSTETRIC Emergency location and room. •Senior Midwives, obstetricians and midwives
Equipment	•Eclampsia tray •Cardiac arrest trolley
Airway	•Left lateral position, assess, maintain patency and protect airway
Breathing	•Assess, apply high flow oxygen 15 litres. Ventilate if required. •Manually displace uterus. •Attach pulse oxygen saturation and monitor oxygen saturations continuously.
Circulation	•IV access as soon as safely possible. Take and send bloods for FBC, G&S, LFT, U&E and clotting. •Insert urinary catheter and measure output hourly. Urinalysis for protein. •Monitor pulse and BP continuously Maintain strict fluid balance chart
Control Seizures	•Magnesium sulphate loading dose 4g over 5 minutes followed by maintenance dose 1g/1hr •If seizures continue or recur additional 2g bolus of magnesium over 5 mins
Control Hypertension	•Treat with IV antihypertensive as per Severe hypertension treatment regime (table 2) if BP constantly>160/110.
Fetal Assessment	•Once woman is stabilised. •Commence CTG monitoring if ≥ 26 weeks' gestation, intermittent monitoring for ≤ 25+6, unless instructed otherwise by a consultant obstetrician.
Birth Planning	The woman must be stabilised before birth.
Unresponsive	•Initiate CPR if woman unresponsive **Ext 2222 Maternal Cardiac Arrest location and room**

*Complete the Prompt" **Eclampsia documentation proforma**" (see **appendix 5**)

Table 5. Algorithm for the Management of Eclampsia



Eclampsia in the Community setting.

When eclampsia occurs in the community setting follow: PROMPT **Community Algorithm for management of eclampsia** (see table 6 below)

Community Eclampsia Emergency Management ABC approach

Community Eclampsia Emergency Management ABC approach	
Safety	**•Do not leave the woman alone** Try to preserve safety, safe environment etc.
HELP	• Call for help. • Ring 999 or give instructions to someone else to phone 999 for an ambulance: Request a Paramedic and state ““Maternal eclampsia. It is an obstetric emergency and requires an immediate emergency transfer to nearest hospital with attached obstetric led unit” • Inform Obstetric unit of situation.
Airway	• Left lateral position or recovery position, assess, maintain patency and protect airway.
Breathing	• Apply high flow oxygen 15 litres if available. • Attach pulse oxygen saturation if available.
Circulation	• Monitor vital signs with respirations, pulse, BP, Oxygen saturation (if available) minimum every 15 minutes. Record on MEWS chart • Consider IV access and insertion of urinary catheter **if possible**. • If woman is pregnant, if it is possible and safe to do so, manually displace the uterus to the left using one or two hands to reduce aortocaval obstruction.
Fetal Assessment	• Consider fetal assessment if able to do so

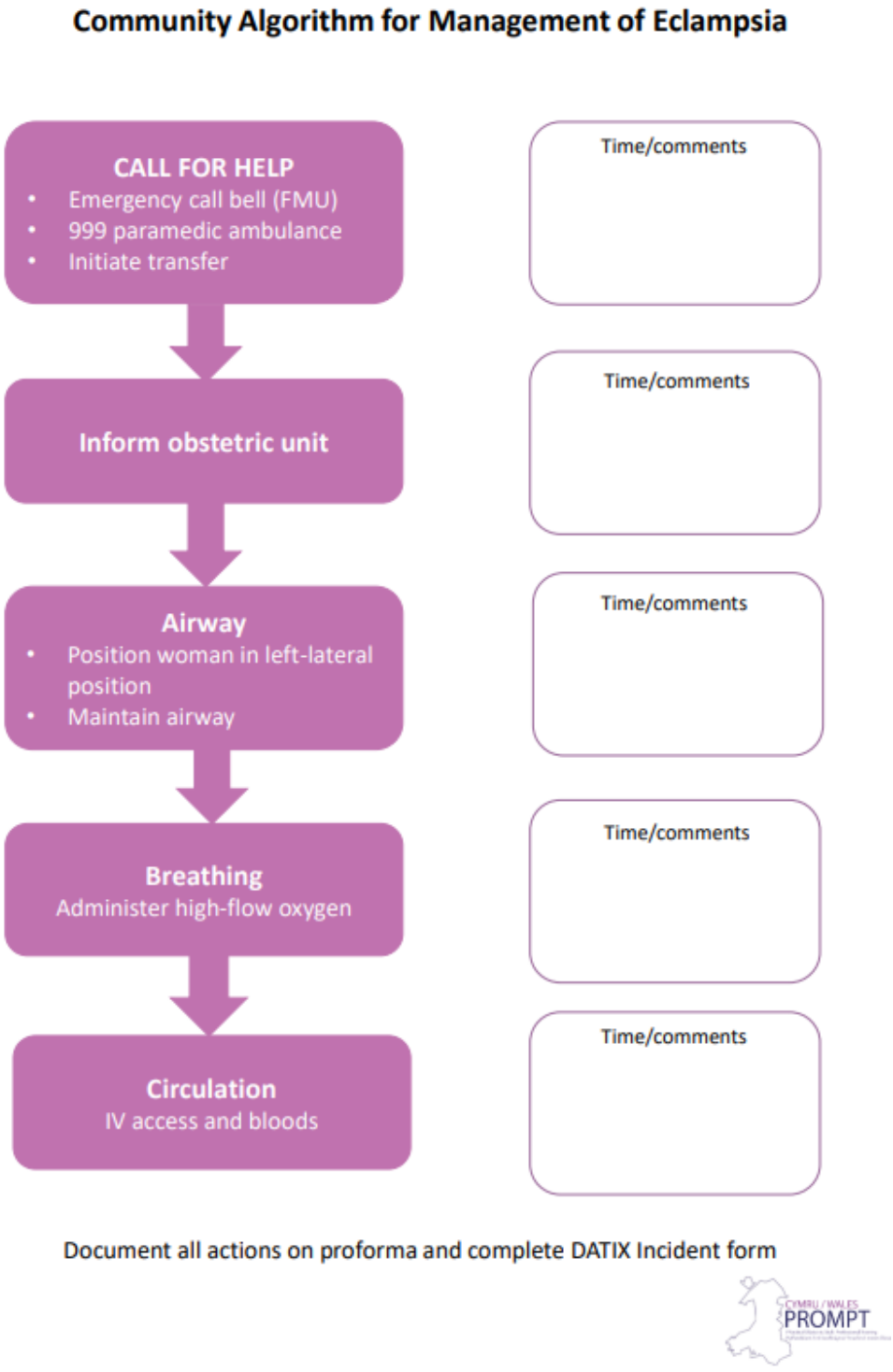
On arrival of Paramedic at scene,

Declare the emergency (eclamptic fit), give SBAR and consider administration of Magnesium Sulphate (in accordance with WAST JRCALC algorithms)

Transfer to nearest obstetric unit as soon as it is safe to do so

Complete the Community Eclampsia proforma (see **appendix 6)**

Table 6. Community Eclampsia Algorithm



Intrapartum Management

Intrapartum management for chronic hypertension or gestational hypertension.

In absence of other obstetric concerns, women with chronic or gestational hypertension can be offered a vaginal birth.

Discuss mode and timing of birth with woman and an Obstetric consultant.

During labour, monitor for developing pre-eclampsia, ensure BP controlled, fluid balance charted and adequate fetal surveillance.

Intrapartum management for chronic hypertension or gestational hypertension	
Fetal Surveillance	• Continuous FHR monitoring
Bloods	• If proteinuria found on dipstick send urgent UPCR with urgent bloods
Fluid Balance	• Fluid balance chart
Obstetric review	• Obstetric review on arrival to labour ward
BP	• Hourly observation. • If BP≥160/110mmHg see severe hypertension management (table 1 and 2)
Medication Management	• Continue antenatal medications • Caution with NSAIDs if any renal concerns (rising creatinine, reduced urine output).
Second Stage	• No need to limit second stage, unless BP uncontrolled
Third Stage	• Avoid ergometrine

Intrapartum of women with pre-eclampsia

The multi-disciplinary team (obstetric, midwifery, anaesthetic and paediatricians /neonatal) should be made aware of any woman with a diagnosis having an induction of labour. Minimum of daily review by the Obstetric team.

Once on Labour ward the principles of management are:

Intrapartum management for chronic hypertension or gestational hypertension	
Fetal Surveillance	• Continuous FHR monitoring
Bloods	• IV access with PET bloods repeated if clinically indicated
Analgesia	• Epidural analgesia in labour is recommended but is not essential
Fluid Balance	• Strict Fluid balance chart (consider if catheter is required for hourly urine output)
Obstetric review	• Obstetric and anaesthetic review on arrival to labour ward • 12 hourly obstetric review in labour, including abdominal palpation and auscultation of lung bases.
BP	• Hourly observation. • If BP≥160/110mmHg see treatment and management of severe hypertension management (table 1 and 2).
Medication Management	• Continue and adjust hypertensive medications • Caution with non-steroidal anti-inflammatory drugs if concern (reduced urine output <30ml/hr, creatinine>90, platelets<50)
Second Stage	• No need to limit second stage, unless BP uncontrolled
Third Stage	• Oxytocin 10units IM should be administered for third stage • Avoid ergometrine

Intrapartum of women with Severe pre-eclampsia

The management of an eclamptic fit in labour is the same as section 9.0 Eclampsia Emergency Management and table 5.

Women with severe pre-eclampsia, particularly if requiring IV antihypertensive medications or Magnesium Sulphate infusion.

- **Fluid restriction**: 80ml/hr or 1ml/kg/hr until post-partum diuresis - aim to ensure urine output > 25 ml/hr (see below)
- **Oxytocin use**- consider concentrated form of oxytocin (**See appendix 7)**
  - **Labour induction/enhancement**: 10units diluted to 50mL with sodium chloride 0.9% (0.2units in 1mL)
  - **Postpartum use** : 40units diluted to 40mL with sodium chloride 0.9% (1unit in 1mL)

Management of reduced urine output <25ml/hr

Ensure Foley catheter not blocked/ flush or change if required.
Examination of abdomen (check bleeding) chest bases (pulmonary oedema) Consider full clinical picture e.g. infection, sepsis.
Consider other fluid loss (vomiting, blood loss, intra-abdominal drain) can be replaced as 250ml Sodium Chloride 0.9% bolus once abdominal or vaginal bleeding excluded.
Check trend of creatinine, acute kidney injury is a complication of pre-eclampsia
If concerns of pulmonary oedema consider need for mobile chest Xray.
If concerning woman becoming anuric, contact renal team or ITU after discussion with anaesthetist.

Postpartum Management for women with pre-eclampsia.

Immediate postpartum management (first 24 hours)

Immediate postpartum management (first 24 hours)	
Fluids	• Continue strict fluid balance +/- fluid restriction until diuresis occurs
MTD Review	• Regular MTD review (obstetrics, anaesthetists and midwife) at least every 12 hours, or 6 hourly if severely pre-eclamptic
Bloods	• 6hourly until diuresis occurs
VTE	• Ensure adequate VTE prophylaxis – either with TEDS and LMWH or flowtrons (or TEDS) if platelets<50*. • Re-commence LMWH as soon as possible
Medication	• Continue treatment for seizures with magnesium sulphate for 24 hours after birth or for 24 hours after the last seizure
NSAIDS	• Avoid NSAIDs if oliguria, creatinine>90mmol/l or platelets <50 until at least 24 hours post-partum and biochemical resolution
Neonatal	Inform paediatricians if woman taking antihypertensives (particularly labetalol antenatally) or is started on medication post birth and is breastfeeding

Note *In the presence of significant bleeding, significant liver function abnormalities or coagulation screening contact Consultant Haematologist for advice regarding LMWH use. Where is no significant blood loss, no significant Liver function abnormalities/ coagulation screen results then stop prophylactic LMWH if platelets< 30. Women on therapeutic (treatment) must stop LMWH if platelets <50.

Prior to transfer to postnatal ward:

Ensure there is a plan for

- Thromboprophylaxis – all in-patients require LMWH (PET adds score 1 to VTE risk)
- Blood pressure medication
- Obstetric follow up (with registrar/ consultant if severe PET)

Postpartum management (after 24 hours)

Post-Partum management after 24 hours	
Blood Pressure management principles	Aim for BP 135/85
	Reduce antihypertensive medication if BP <130/80 In women who are not on antihypertensive medication start hypertensive treatment if BP≥150/100
	Change any antihypertensive to once a day if possible
	For those on antihypertensive pre-pregnancy, restart the original medication if compatible with breast feeding.
	If a woman has taken methyldopa in pregnancy, stop within 2 days after the birth and change to an alternative treatment if necessary
Post natal Blood Pressure frequency	**In Hospital:** BP at least 4 times a day. In women who had severe hypertension monitor 4 hourly.
	See appendix 10 for Guidance for management of postnatal blood pressure and follow up in the community
Blood Testing	No need to repeat bloods if results are normal at 48- 72 hours post-birth
	If bloods results are abnormal at day 3 post birth repeat as clinically indicated
	If abnormalities of blood results persist once discharged request that GP repeat bloods at 2 weeks and again at 6 weeks post birth
Patient information	At all BP check ask about severe headaches, epigastric pain etc.
	Discuss and advise to report any PET symptoms
	Discuss frequency of visits and BP at home and to book a GP appointment at 2 weeks post birth (if appropriate)
	Discuss contraception
	Discuss long term management and increased health risks

HELLP Syndrome

- This is one of the potential crises that may develop in pre-eclampsia. Other features of pre-eclampsia including hypertension and proteinuria may be only mild.
- The key features of HELLP are:
  - Haemolysis,
  - Elevated bilirubin reflecting the extent of haemolysis,
  - Elevated transaminases,
  - Low or falling platelet count (<100x109/L).

- The clinical course of HELLP syndrome often is characterised by progressive and sometimes sudden deterioration in maternal and fetal condition.
- The typical features are right upper quadrant pain, abnormal liver function, low platelets and mild haemolysis.
- There is a risk of DIC, abruption, liver haematoma and liver rupture.
- The consultant obstetrician and on-call anaesthetist should always be involved in the management of the patients with HELLP.
- Women with HELLP syndrome should be delivered as soon as safely possible regardless of their gestational age.
- If platelet count is less than 80x109/L the consultant haematologist should be Involved.
- Very close monitoring is required in HELLP syndrome until birth and in the postpartum period, with laboratory testing at least at 12-hour intervals.
- The disease may achieve peak intensity during the first 2 days after birth, including a downward trend in haematocrit.
- With supportive care alone, 90% of women with HELLP syndrome will have platelet count more than 100 x10 9/L and reversed trend (decrease) in liver enzymes values within 7 days after birth.
- If the platelet count continues to drop and liver enzymes increase after 4 days postpartum, the validity of the initial diagnosis of HELLP syndrome should be reassessed and other diagnosis considered e.g. Acute fatty liver of pregnancy. Consider discussion/ referral to physicians.

Disseminated Intravascular Coagulation (DIC)

DIC is often secondary to underlying maternal and/or fetal complications including acute placental abruption, amniotic fluid embolism, eclampsia /pre-eclampsia/ HELLP syndrome, sepsis, retained stillbirth and acute fatty liver of pregnancy.

In cases of suspected or confirmed disseminated intravascular coagulation (DIC) during pregnancy, the primary goal is to stabilize the mother and deliver the baby as quickly as possible, while simultaneously managing the DIC

Early diagnosis is crucial however it can be challenging due to the physiological changes in pregnancy.

Antihypertensive Medication

(See appendix 1)

- **NOTE** Do not stop medication, before discharge home, without adequate monitoring of blood pressure. Approximately a third of women with PET and gestational hypertension will continue to have hypertension after the birth **or** have a recurrence of hypertension within a week of birth
- Resolution of pre-eclampsia will occur post birth however this may take a number of weeks.
- Aim to start or continue anti-hypertensive medication if required (see appendix 10)
- Ideally use a once-a-day preparation which is compatible with breastfeeding.
- Some women will have resistant BP and will require multiple agents. e.g. Nifedipine MR should be BD, Labetalol multiple times a day
- Some women may need anti-hypertensive medication postnatally only.
- Women should be advised that some of the complications of PET may only occur after birth (e.g. eclampsia, acute fatty liver) and so should be advised to inform their midwife or seek medical help should they experience symptoms of headache, new nausea/vomiting or epigastric pain.

Information for women breast feeding

Advise women that their treatment can be adapted to accommodate breastfeeding, and that the need to take antihypertensive medication does not prevent them from breastfeeding.

Explain that:

Antihypertensive medicines can pass into breast milk but only lead to very low levels and would be unlikely to have any clinical effect.

- Most medicines are not tested in pregnant or breastfeeding women, so disclaimers in the manufacturer's information are not because of any specific safety concerns or evidence of harm.

Note. If the neonate is premature, further guidance for pharmacy should be sought to assess suitability in breast-feeding.

Information for the woman and GP on discharge

- Ensure discharge letter to the GP on DALS includes clear instructions for follow up care if required.
- If blood test required at 2 weeks give blood test request form and advise woman that she will be required to contact surgery herself to schedule appointment
- Women with chronic hypertension, gestational/ preeclampsia (on medication) should be offered a medical review at 6-8 weeks post birth with their GP (or specialist as appropriate) Advise woman that she will be required to contact GP surgery herself to schedule appointment.
- Those women who have had pre-eclampsia and still have proteinuria (1+ or more) at 6-8 weeks should be offered a further review with GP (or specialist) at 3 months after birth to assess kidney function. If the woman has abnormal kidney function at 3 months postpartum consider referral for specialist kidney assessment in line with the NICE guideline on chronic kidney disease
- Advise the woman, that having pre-eclampsia or blood pressure problems during pregnancy increases the chance of having:
  - Recurrence of BP problems in future pregnancy (1 in 5 chances, more if severe or early onset).
  - An increased chance of having cardiovascular disease including high blood pressure and chronic kidney disease in later life.

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Appendix 1. Anti-hypertensive drugs pre-pregnancy, antenatally and in the postnatal period

Base the choice of treatment on any pre-existing treatment, side-effect profiles, risks (including fetal effects) and the woman's preference.
Many of the drugs listed do not have a product license for use in pregnancy and / or breastfeeding, but considered opinion has deemed them appropriate to use. Oral anti-hypertensive are used to control blood pressure less than 160/110 mmHg whilst severe hypertension (>160/110 mmHg) is usually managed with IV antihypertensives.

Pre-pregnancy

Carefully consider the reason for using ACE inhibitors, ARBs or diuretics, as they will need to be stopped as soon as pregnancy is confirmed. Women taking these drugs should be told to seek medical advice about changing to a different drug as soon as pregnancy is confirmed. (The use of these drugs in the 1st trimester may elevate teratogenic risk.) Consider other drugs in women actively seeking a pregnancy, such as nifedipine MR 10mg or beta blockers (such as labetalol).

Antenatal care

Recommended therapies and initial dosing regimens for chronic and gestational hypertension

First line	• Labetalol 100mg TWICE a day (Maximum 2.4g / day)
Second line	• Nifedipine MR 10mg TWICE a day (Maximum 40mg TWICE a day)
Third line *	• Methyldopa 250mg TWICE or THREE times a day (Maximum 3g / day)

A trial of a combination of labetalol or nifedpine should occur before progressing to third line options.

Post natal care

If methyldopa was used during pregnancy, stop within 2 days of birth and change to an alternative treatment if necessary.

Breast-feeding
Advise women that their treatment can be adapted to accommodate breastfeeding, and that the need to take antihypertensive medication does not prevent them from breastfeeding.
Explain that:

- Antihypertensive medicines can pass into breast milk, but only lead to very low levels and would unlikely to have any clinical effect.
- Most medicines are not tested in pregnant or breastfeeding women, so disclaimers in the manufacturer's information are not because of any specific safety concerns or evidence of harm.

Not planning to breastfeed
Treat in line with the NICE guideline on "Hypertension in adults

Recommended therapies and initial dosing regimens if patient's breast feeding

First line	• Enalapril 5mg ONCE a day (monitor U&Es) (Some caution is recommended using in mothers with premature infants due to possible renal toxicity). (Maximum 40mg / day) • Nifedipine MR 10mg TWICE a day (if African or Caribbean family origin) (Maximum 40mg TWICE a day) • Some women may prefer to remain on the same medication they have been taking in the antenatal period e.g. Labetalol.
Second line	• Atenolol 25mg ONCE a day (Maximum 50mg ONCE a day) • Amlodipine 5mg ONCE a day (Maximum 10mg ONCE a day) • Labetalol 100mg TWICE a day (Maximum 2.4g / day)

Avoid Diuretics, ARBs and methyldopa.
If BP is not controlled with a single medicine, consider a combination of nifedipine (or amlodipine) with enalapril. If this combination is not tolerated or is ineffective, consider either:

- Adding atenolol or labetalol to the combination treatment **or**
- Swapping one of the medicines already being used for atenolol or labetalol.

Appendix 2. Magnesium Sulphate monitoring and side effects.

Repeated doses of Magnesium Sulphate.

If prolonged or repeated use of magnesium sulphate occurs during pregnancy (e.g. Multiple/ repeat or use for more than 24 hours) ensure neonatal / paediatric team are informed to allow consideration of whether monitoring of the neonate for abnormal calcium and magnesium levels and skeletal adverse effects is required.

Monitoring and Side effects

The frequency of observations may be dictated by other aspects of care, particularly whether the mother is in active labour or being prepared for elective birth.

Fetal Monitoring

- Continuous CTG of women who are equal to, or over 26 weeks' gestation. If ≤25+6 auscultate as per individualised plan (gestation dependent).
- Interpretation of the CTG should take into account the reduced variability that is often seen with magnesium infusions.

Maternal Monitoring

- Maternal reading base line including oxygen saturation and patellar reflexes prior to administration
- Observations, including tendon reflexes and urine output, should be closely monitored.
- NOTE: Beware of the cardiac effects of magnesium sulphate, which may include hypotension and arrhythmias. If concerned, consider ECG.

Side effects

Maternal

Serious side effects are **rare** and include hypotension, respiratory depression and tachycardia

Less serious side effects include:

- Headaches,
- Nausea and vomiting
- feeling of warmth
- Sweating
- Flushing,
- Pain at infusion site.

Fetal

Serious side effects are **very** rare but babies with hypermagnesemia can experience hypotonia/ hyporeflexia and apnoea leading to poor sucking and rarely respiratory depression. This effect lasts for up to 24 hours following birth.

The neonatal team should be made aware the mother has had Magnesium Sulphate and whether treatment has been prolonged or repeated.

Potential Interactions

There is a potential theoretical interaction between magnesium sulphate and **Nifedipine** of hypotension and neuromuscular blockade effects, although this is seldom reported in clinical practice. Regular monitoring of the woman is recommended.

If hypotension occurs, Nifedipine and magnesium sulphate should cease, and the woman reviewed by a medical practitioner.

Stop the infusion and get prompt review (call obstetrician, Anaesthetist and senior midwife) if:

- Respiratory rate decreases more than 4 breaths per minute below baseline, or is less than 12 breaths per minute
- Patellar reflexes are absent (remember to check elbow reflexes in patients with epidural anaesthesia)
- Cardiac Arrhythmia
- Urine output is less than 100mls in 4 hours
- Oxygen saturations fall below 90% (start oxygen therapy)

Magnesium Toxicity

Magnesium Toxicity is unlikely with this regime and serum Magnesium levels do not need to be **routinely** measured as long as woman has normal urine output/normal renal function.
In women with renal compromise, serum magnesium monitoring is recommended.

With magnesium overdose, vital functions are lost in the following sequence:
•Loss of tendon reflexes
• Somnolence (state of drowsiness, strong desire to fall asleep, cognitively impaired, lack of ability to pay attention)
• Respiratory depression
• Paralysis
• Cardiac arrest

Overdose/ Toxicity

If Toxicity is suspected, immediately stop the Magnesium Sulphate Infusion and take bloods for serum Magnesium levels.

Symptoms	Mg level (mmol/L)
Therapeutic range	2-4
Loss of tendon reflexes, weakness, feeling of warmth, flushing, drowsiness, double vision, slurred speech.	5
Muscle Paralysis, respiratory arrest	6-7.5
Cardiac Arrest	>12

Overdose is treated with 10 ml of 10% Calcium Gluconate IV over 10 minutes via a syringe driver pump.

Appendix 3. Guide for preparation of IV Hydralazine

Guide for Preparation of IV Hydralazine

For the Control of Severe Hypertension

- See PROMPT **Severe Hypertension-Urgent treatment algorithm** in PROMPT folders

Each Ampoule contains 20mg of Hydralazine (dry powder)

Reconstitute each ampoule with 2ml water for injection (20mg in 2mls) and then dilute with 18ml of Sodium Chloride 0.9%.

20mg in 20mls=1mg in 1ml

LOADING DOSE:

5ml (5mg) over 15 minutes

If systolic BP is greater than 160 mmHg after 20 minutes give further 5ml over 15 minutes

MAINTENANCE DOSE.

Via IV infusion

Use 3x20mg ampoules of Hydralazine

Reconstitute each 20mg vial with 2ml water for injection. Add 54 ml of sodium chloride 0.9% to give final volume of 60ml

60mg in 60mls (1mg in 1ml)

Start Infusion at 5ml/hr. Titrate to systolic BP 140-150mmHg
NOTE: Usual infusion rate required: 2 to 3ml/hr.

Reduce rate if significant adverse effect or maternal pulse greater than 120 BPM

Observe maternal observations very closely throughout

Appendix 4. Guide for preparation of IV Labetalol.

Guide for Preparation of IV 50mg in 10ml Labetalol

For the Control of Severe Hypertension

- See PROMPT **Severe hypertension-Urgent treatment algorithm** in PROMPT folders
- Contraindicated in Women with Asthma
- Be aware- potential reduced effectiveness in women of Afro-Caribbean origin

There is 50mg of Labetalol in each 10ml Ampoule- Use Undiluted

LOADING DOSE

Bolus SLOW IV:

10mls (50mg) over 2 minutes

REPEAT every 5 minutes (Max 5 doses) until BP Controlled

MAINTENANCE DOSE

Via Syringe Pump;

Place the contents of 6x10ml (50mg) ampoules (=300mg) into a 60ml syringe = 5mg/1ml

Start Infusion at 4ml/hr (=20mg/hr)

Double infusion rate every 30 mins until BP controlled

MAXIMUM infusion rate: 32 ml/hr (=160 mg/hr)

Observe maternal observations very closely throughout

Appendix 5. Eclampsia Documentation Proforma

Attach Patient ID:

PROMPT

ECLAMPSIA DOCUMENTATION PRO FORMA

DATE: ..... TIME OF SEIZURE: ..... DURATION OF SEIZURE: .....

PERSONS PRESENT AT ONSET OF SEIZURE.....

.....

EMERGENCY BELL ACTIVATED YES / NO TIME.....

If emergency bell not activated, please give reason.....

	NAME	ALREADY PRESENT (✓)	TIME INFORMED	TIME ARRIVED
EXPERIENCED OBSTETRICIAN				
MIDWIFE COORDINATOR				
ANAESTHETIST				
JUNIOR OBSTETRICIAN				
MATERNITY HEALTH CARE ASSISTANT				
OTHER PERSONS ASSISTING				

CONSULTANT OBSTETRICIAN INFORMED YES / NO Name.....

If no, give reason.....

Time attended (if attended).....

TREATMENT

LEFT LATERAL POSITION YES / NO TIME..... If no, other position.....

HIGH FLOW 0_2 YES / NO TIME..... If no, give reason.....

IV ACCESS YES / NO TIME..... If no, give reason.....

BLOODS – GROUP + SAVE
FBC, CLOTTING, U+E's, LFT's
URATE YES / NO TIME..... If no, give reason.....

MAGNESIUM SULFATE INFUSION (see laminated regimen for dosages)	TIME COMMENCED
LOADING DOSE	
MAINTENANCE DOSE	

INITIAL POST SEIZURE OBSERVATIONS TIME.....

RESP RATE..... PULSE RATE..... BP.....mm/Hg 02 sats.....% TEMP.....°C

URINARY CATHETER INSERTED YES / NO TIME..... If no, give reason.....

(Commence Maternity Critical Care Chart)

HYPERTENSIVE TREATMENT ADMINISTERED YES/NO TIME.....

If yes, please document medication given and dosage .....

.....

FETAL WELLBEING (if appropriate) FETAL HEART RATE.....bpm TIME.....

POST SEIZURE CTG PERFORMED YES / NO NORMAL / SUSPICIOUS / PATHOLOGICAL

If CTG not performed, give reason.....

Please complete Risk Management Reporting Form and attach copy of this pro forma – Thank you.

Appendix 6. Community Eclampsia Documentation Proforma

Attach Patient ID:

ECLAMPSIA PROFORMA (COMMUNITY)

DATE: ..... TIME OF SEIZURE: ..... DURATION .....

EMERGENCY BELL ACTIVATED (FMU) YES / NO TIME.....

AMBULANCE CALLED YES / NO TIME.....

OBSTETRIC UNIT INFORMED YES / NO TIME.....

NAME OF STAFF PRESENT	ALREADY PRESENT (✓)	TIME INFORMED	TIME ARRIVED

TREATMENT

LEFT LATERAL POSITION YES / NO TIME..... If no, other position .....

HIGH FLOW O_2 YES / NO TIME..... If no, give reason .....

IV ACCESS YES / NO TIME..... If no, give reason .....

BLOODS – GROUP + SAVE
FBC, CLOTTING, U+E's, LFT's
URATE YES / NO TIME..... If no, give reason .....

INITIAL POST SEIZURE OBSERVATIONS TIME.....

RESP RATE ..... PULSE RATE ..... BP .....mm/Hg TEMP .....°C

FH.....

URINARY CATHETER INSERTED YES / NO TIME.....

TIME PARAMEDIC ARRIVED AT .....

TIME ARRIVED AT LABOUR WARD ..... OBSTETRIC UNIT .....

Completed by .....

Appendix 7. Concentration regime of oxytocin for use in fluid restricted patients.

1. Oxytocin augmentation

10 international units (IU) oxytocin to be made up to 50ml with 0.9% sodium chloride (normal saline) (0.2units in 1ml)

A new infusion must be set up if continued treatment is required beyond 12 hours

ENSURE that the ***RATE*** is recorded on the partogram and fluid balance chart

Time after starting (mins)	Oxytocin dose (mu/min) **DOSE**	Volume infused (ml/hr) **RATE**
0	1	0.3
30	2	0.6
60	4	1.2
90	8	2.4
120	12	3.6
150	16	4.8
180	20	6
210 Discuss with Reg/ Consultant	*24*	*7.2*
240	*28*	*8.4*
270	*32*	*9.6*

Unlicensed use

2. Post-natal use

40 international units (IU) Oxytocin in 40mls Sodium Chloride (0.9%) (1 unit in 1ml)

Time **(mins)**	40IU in 40ml Normal Saline **(ml/hr) RATE**
60	10
120	10
180	10
249	10

ENSURE that the ***RATE*** is recorded on the partogram and fluid balance chart

Example drug chart

DATE & START TIME	INFUSION FLUID		ROUTE	MEDICINE ADDED		INFUSION RATE OR DURATION	PRESCRIBER'S SIGNATURE
	TYPE/STRENGTH	VOLUME		APPROVED NAME	DOSE		
1/1/25	Sodium Chloride 0.9%	**50mL**	IV	Oxytocin	10 units	As per protocol	*A Doctor* Beep No. 007

Appendix 8. Maternal Critical Care Structured Review.

Maternal Critical Care Structured review		
This is designed to be used during the multi-professional review of a critically ill pregnant or postpartum woman. ***It does not replace, nor should repeat the observations and information recorded on the Maternal Critical Care chart.*** Relevant notes can be made as each item is considered either directly into the woman's notes or by annotating the work sheet which should be dated, signed and filed in the woman's maternity notes at the end of the review.		Patient ID (addressograph) Date..... Time.....
	Items to be considered	**Notes:**
A	**Airway**	
B	**Breathing** (Respiratory Rate, SpO_2, FiO_2, chest examination findings)	
C	**Circulation** (Heart rate, BP, capillary refill time, vasopressors)	
D	**Disability** (level of consciousness, pain, epidural or spinal block)	
E	**Electrolytes** (Mg^{2+}, Na^+, K^+ levels and eGFR/creatinine)	
F	**Fluids** – Review of fluid balance (input, output, blood loss, drains)	
G	**GI & glucose control** (bowel function and gastro-protection measures)	
H	**Haematology** (FBC, clotting profile, VTE prophylaxis)	
I	**Infection** (temperature, Sepsis Six, inflammatory markers, cultures, antibiotics)	
L	**Lines** (cannulae, arterial line, central line, urinary catheter, wound drains)	
M	**Maternal Co-Morbidities** (diabetes, hypertension, asthma, epilepsy)	
N	**Neonatal considerations**	
O	**Obstetric**: antenatal, intrapartum/postpartum related	
P	**Pharmacology** (review drug chart)	
Q	**Questions**	
R	**Recommendations**	
S	**Summary**	
	Signature..... **Print**..... **Date**.....	

Appendix 9.Hywel Dda Maternity Fluid Balance Chart

Maternity Fluid Balance Chart Date & time chart commence: _____ Date & time chart completed: _____	**ADDRESSOGRAPH**
WARD	

Indication for completion of chart:

INSTRUCTIONS FOR 24 HOURS: All intravenous fluid therapy & drugs must be administered as prescribed on the ALL WALES PRESCRIPTION CHART. The 'Type' heading below refers to the fluid prescribed.

	INPUT						**OUTPUT**						
TIME	Intravenous Fluids			Oral Fluids			Urine		Gastric		Wound Drainage	Measured Blood Loss	Fluid Balance
	Type	Vol. Set up	Vol. Given	Type	Vol.	Running Total	Vol.	Running Total	Vol.	Running Total	Vol.	Vol.	
Carried Forward													
4hr Total													=
8hr Total													=
12hr Total													=

Total input:	mls	Fluid Balance +/-	mls TOTAL
Total output:	mls	Escalation for obstetric review required:	Yes / No
Signature & print of practitioner discontinuing the chart:		Indication to continue fluid balance chart:	Yes / No

Peripartum Sodium Monitoring Pathway

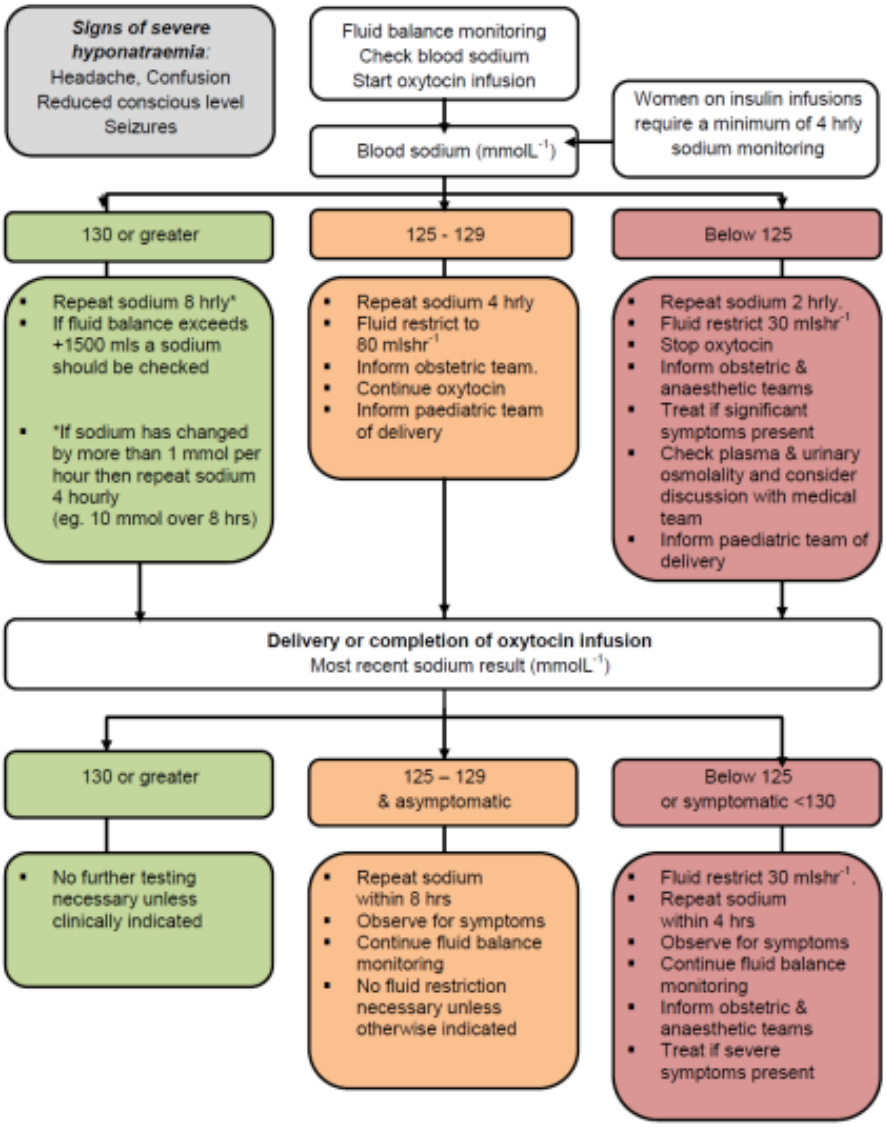
Women require sodium monitoring if they are:

a. On an oxytocin infusion (includes induction and augmentation of labour, treatment of postpartum haemorrhage)

b. In labour and require IV insulin and dextrose.

c. Noted to have a blood sodium below 130 mmolL-1 for any reason.

d. Greater than 1500 mls positive on their fluid balance.



In a woman/birthing person with significant clinical symptoms believed to be due to hyponatraemia (for instance, seizures or loss of consciousness), 200 mls of 2.7% sodium chloride should be given immediately as an IV bolus over 30 minutes.

For routine bloods (e.g., commencing Oxytocin infusion) please send Urea and Electrolytes – Serum laboratory test

For urgent bloods (e.g., signs of severe hyponatraemia) please take a Point of Care Testing (POCT) sample

Appendix 10. Postnatal monitoring and management in the community.

Post-natal monitoring and management of hypertension in community setting

If a woman has taken methyldopa to treat hypertension during pregnancy, stop within 2 days after the birth and change to an alternative antihypertensive treatment (see appendix 1).

NOTE Do not stop medication, before discharge home, without adequate monitoring of blood pressure. Approximately a third of women with PET and gestational hypertension will continue to have hypertension after the birth **or** have a recurrence of hypertension within a week of birth,

Resolution of pre-eclampsia will occur post birth however this may take a number of weeks.

Chronic hypertension	Gestational hypertension	Preeclampsia ON Hypertensive medication	Pre-eclampsia NOT on medication
Continue antihypertensive treatment if required	Continue antihypertensive treatment if required	Continue antihypertensive treatment if required	N/A
Important – Ask **all women** who have/had hypertension in pregnancy whether they have severe headache / epigastric pain each time BP is measured**.** **Remember**. 5-6% of women who develop pre-eclampsia will develop it in the postnatal period for the first time. Preeclampsia can occur for up to 4 weeks after birth			
Aim to keep BP<140/90	**Reduce** antihypertensive treatment if their blood pressure falls below 130/80 mmHg.	Aim to keep BP <140/90	Aim to keep BP <140/90
	In gestational hypertension who did not take antihypertensive treatment: start antihypertensive treatment if their blood pressure is 150/100 mmHg or higher . **Note** if develops signs and symptoms of PET a**nd** BP≥140/90 refer to triage for review	**Consider** reducing antihypertensive treatment if their blood pressure falls below 140/90 mmHg **Reduce** antihypertensive treatment if their blood pressure falls below 130/80 mmHg.	In women with pre-eclampsia who **did not take antihypertensive treatment**, **start** antihypertensive treatment if blood pressure is ≥140/90 mmHg or higher
Frequency of BP assessments			
BP daily for the first 2 days after birth • at least once between day 3 and day 5 after birth	BP daily for the first 2 days after birth • at least once between day 3 and day 5 after birth	In women with pre-eclampsia **who took antihypertensive treatment** and have	In women with pre-eclampsia who **did not take antihypertensive treatment** and

• as clinically indicated if antihypertensive treatment is changed after birth.	• as clinically indicated if antihypertensive treatment is changed after birth.	given birth, measure blood pressure: • at least 4 times a day while the woman is an inpatient • every 1 to 2 days for up to 2 weeks after transfer to community care until the woman is off treatment and has no hypertension.	have given birth, measure blood pressure: • at least 4 times a day while the woman is an inpatient • at least once between day 3 and day 5 after birth **NOTE** If blood pressure abnormal at any stage before discharge from community care refer to Triage for review.
When to offer discharge to community setting			
Offer women with **chronic hypertension** transfer to community care if all of the following criteria have been met: • No clinical signs or symptoms of pre-eclampsia i.e. headache, altered bloods. •Blood pressure, is 140/90 mmHg or less	Offer women with **gestational hypertension** transfer to community care if all of the following criteria have been met: • No clinical signs or symptoms of pre-eclampsia i.e. headache, altered bloods. •If on medication Blood pressure, 140/90 mmHg or less If not on medication BP is≤150/100	Offer women with **pre-eclampsia, with or without** medication, transfer to community care if all of the following criteria have been met: • No signs or symptoms of pre-eclampsia i.e. headache • Blood pressure, **with or without treatment**, is 140/90 mmHg or less • Blood test results are stable or improving.	
Care plan on discharge to community			
Write a care plan for women with pre-eclampsia who have given birth and are being transferred to community care that includes all of the following: • who will provide follow-up care, including medical review if needed • frequency of blood pressure monitoring • thresholds for reducing or stopping treatment • indications for referral to primary care/triage for blood pressure review • self-monitoring for symptoms.			
Post birth Reviews/ follow ups			
Offer women who have had hypertension and **who remain on antihypertensive treatment**, a medical review with their GP or specialist 2 weeks after transfer to community care. .			Follow up after discharge from community care is not required if not medicated
Offer all women who have had chronic hypertension a medical review with their GP or specialist 6 to 8 weeks after the birth.	Offer all women who have had gestational hypertension a medical review with their GP or specialist 6 to 8 weeks after the birth.	Offer all women who have had pre-eclampsia a medical review with their GP or specialist 6 to 8 weeks after the birth.	N/A