

# Helping Mothers and Babies Survive **Pre-Eclampsia & Eclampsia**

*Provider's Guide*



**Helping Mothers Survive**



January 2017



# Acknowledgments

*Helping Mothers Survive Pre-Eclampsia & Eclampsia was conceived and designed by a team in the Global Learning Office of Jhpiego led by Laura Fitzgerald and Cherrie Evans.*

*We express our sincere gratitude to our partners and colleagues around the world who work with us to reduce the needless deaths of women and their newborn infants. We would like to give special thanks to those who provided guidance in the development of these materials, the International Confederation of Midwives (ICM), the United Nations Population Fund (UNFPA), the World Health Organization (WHO), American College of Nurse-Midwives (ACNM), American College of Obstetricians and Gynecologists (ACOG), USAID, Maternal Child Survival Program (MCSP) and the American Academy of Pediatrics (AAP).*

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The American College of  
Obstetricians and Gynecologists  
WOMEN'S HEALTH CARE PHYSICIANS



*This work was made possible through Jhpiego, an affiliate of Johns Hopkins University, and Laerdal Global Health.*



*Jhpiego is an international, nonprofit health organization affiliated with Johns Hopkins University. For more than 40 years, Jhpiego has empowered frontline health workers by designing and implementing effective, low-cost, hands-on solutions to strengthen health care services for women and their families. By putting evidence-based health innovations into everyday practice, Jhpiego works to break down barriers to high-quality health care for the world's most vulnerable populations.*

## Saving Lives at Birth

*Helping Mothers Survive (HMS) and Helping Babies Survive (HBS) are suites of training modules to address the leading causes of death for women and newborns. By building capacity of the health workforce that provides care before, during, and after birth, needless deaths can be prevented. Targeting providers at all levels who attend births or who are called upon to manage complications, HMS and HBS equip frontline health workers to provide evidence-based, high-quality care and to promptly identify and manage life-threatening complications.*

*Understanding that care for the woman and baby must be integrated for the best possible outcomes, HMS and HBS use a similar approach with hands-on, interactive learning. This includes team-based learning, skills practice, and simulation with immediate practice and feedback. Each module utilizes low-dose, high-frequency (LDHF) interactive learning followed by repeated, team-based practice at the worksite to strengthen and maintain skills. Integrating HMS and HBS into existing training programs will extend the reach of inservice training and ensure providers can address the critical needs of both women and babies.*

**The HMS Pre-Eclampsia & Eclampsia (PE&E) training package is designed for teams of frontline health workers who care for women around the time of pregnancy and birth. The team includes skilled birth attendants such as midwives and doctors, and other team members, such as nurses and support staff.**

**HMS PE&E helps learners master the competencies needed to safely and effectively detect, classify, and manage PE&E.**

**The materials for this training include:**

1. **Action Plan 1 and Action Plan 2** are graphic job aids that help providers identify and manage PE&E. Action Plan 1 includes initial assessment, diagnosis, and initiation of treatment and is targeted to those who may be the first to see women experiencing PE&E, whether at a primary care facility or in the antenatal clinic or outpatient department. Action Plan 2 provides guidance for ongoing care and treatment of women with severe PE&E and

is intended for use in referral facilities that provide advanced, ongoing management.

2. **The Flip Chart** is used for instruction and can be a reference for ongoing practice after initial training.
3. **This Provider's Guide** is for both facilitators and learners. It contains information for ongoing practice and more in-depth information.

The PE&E module is designed as a 1- or 2-day onsite training, depending on whether the facility can provide ongoing care for women with severe PE&E. After training, learners will continue to practice new or refreshed skills, led by onsite peer coordinators. Recognizing that any learner can potentially coordinate practice after initial training, this Provider's Guide contains material for everyone.



## Contents

Saving lives at birth .....	4
Provide respectful care to women and their families.....	6
Communicate effectively with the health care team .....	7
Hypertensive disorders of pregnancy.....	8
Assess blood pressure .....	10
Assess urine for protein.....	12
Assess for Danger Signs.....	14
Assess for convulsions.....	16
Classify .....	18
Reassess.....	19
Do laboratory tests .....	20
Increase follow up.....	21
Confirm gestational age .....	22
Deliver at 37 weeks.....	24
Provide essential maternal and newborn care.....	26
Mobilize team, Give loading dose of MgSO <sub>4</sub> .....	28
Mobilize team, Give loading dose of MgSO <sub>4</sub> Zuspan.....	30
Monitor woman after administration of MgSO <sub>4</sub> .....	32
Give medication to reduce severe BP .....	34
Seek advanced care.....	36
Receive referral and reassess or Continue care .....	38

Begin or Continue MgSO <sub>4</sub> , Begin or continue medication to reduce severe BP .....	40
Continue close monitoring of woman and fetus .....	42
Confirm gestational age .....	44
End pregnancy .....	46
Give Dexamethasone .....	48
Admit woman and monitor closely .....	50
Deliver .....	52
Provide essential maternal & newborn care and continue to monitor after birth .....	54
Abbreviations.....	56
References .....	57
LDHF Activities .....	58
Session answers .....	64
Action poster 1 .....	66
Action poster 2 -Advanced Care .....	67

# Provide respectful care to women and their families

## Performance Expectation

Communicate professionally and respectfully with women and their families.

## Key points

- Every woman deserves respectful care.
- Respectful care saves lives.
- Women have a right to privacy and confidentiality.



## Key Knowledge

- Every woman is worthy of respect.
- All women should be treated equally regardless of ethnic background, culture, social standing, religion, educational level, age, and marital or economic status.
- Respectful care is lifesaving; women may not seek care from facilities where providers do not treat them well.
- Women have a right to privacy and confidentiality during counseling, physical exam, and clinical procedures, and in handling of records.
- Respect a woman's right to a companion when receiving care. The presence of a birth companion improves outcomes and can shorten labor.
- Women have the right to refuse care or to seek care elsewhere.

## Key Actions

- Always explain what is happening and why.
- Be gentle when giving care.
- Never leave a woman with severe PE&E alone. If you must leave, have someone stay with her and tell that person how to get help if needed.

## Counseling Note

### How to demonstrate respect:

1. Introduce yourself by name and smile.
2. Look at women when speaking to them.
3. Use simple, clear language.
4. Speak calmly.
5. Pay attention when women speak.
6. Include women and families in discussions about their care.
7. Always explain any procedure and get her permission before you begin.

Adapted from job aid by USAID/MCHIP/ACNM:

"I treat patients and their families in the way I would like to be treated!" <https://www.k4health.org/sites/default/files/RMC%20Patient%20Care.pdf>

# Communicate effectively with the health care team

## Performance Expectation

Communicate effectively with team members during an emergency.

## Key points

- Good communication saves lives.
- Know whom to call for help.
- Assign a role to each team member.
- Have an emergency plan in place.



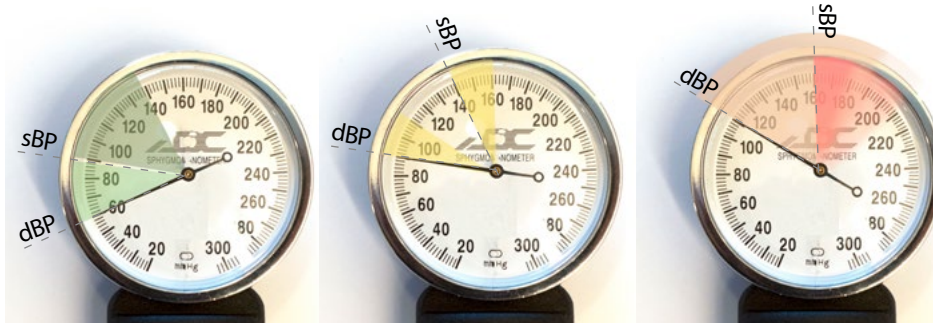
## Key Knowledge

- Team members include people who work at your facility, those at the referral facility, and the woman and her family.
- Poor communication can result in bad outcomes for women and babies.
- Know who to call and how in case of an emergency.
- Anxiety and fear are normal in emergencies (such as when a woman is convulsing), but these responses can block good communication. Providers must stay calm and talk to other providers, the woman, and the family in clear but reassuring tones.
- Having a plan before an emergency, and simulating what to do during an emergency through practice drills, builds confidence and makes communication during emergencies easier. Drills give providers the opportunity to practice problem-solving, teamwork, and decision-making.

## Key Actions

- Quickly alert others on your team to an emergency so they can rapidly respond.
- Communicate confidently and clearly—do not assume that others know what you are thinking.
- Speak loudly to be sure that all actions have been heard and are being done.
- Clearly establish roles for each person. Address people by name and clarify who will do what. Have each team member repeat the task he or she has been delegated to do—for example, “I will start an IV of normal saline”—to show that the instruction was understood.

# Hypertensive disorders of pregnancy



## Normal

sBP 90 – 140 mmHg  
AND  
dBP 60 – 90 mmHg

## Pre-eclampsia (PE)

sBP  $\geq 140$  mmHg  
OR  
dBP  $\geq 90$  mmHg

## Severe pre-eclampsia (SPE)

sBP  $\geq 160$  mmHg  
OR  
dBP  $\geq 110$  mmHg

## Performance Expectation

1. Describe the significance of pre-eclampsia/eclampsia (PE&E).
2. Define PE, severe PE (SPE), and E.

## Key points

- PE&E are on a continuum of blood pressure (BP) disorders including chronic and gestational hypertension, PE, and E. This module focuses on PE&E.
- PE&E are leading causes of death; **all** pregnant, laboring, and postpartum women are at risk.
- Progression to severe disease can occur quickly. SPE&E are life-threatening emergencies!
- BP should be checked at each antenatal visit, on admission for labor, during labor, after birth, at postpartum visits, and any time a pregnant/postpartum woman presents with a problem.

## Classification

(See also table on pg. 18)

PE&E are diagnosed only after 20 weeks' gestational age (GA).

### Pre-eclampsia (PE)

- New-onset elevated BP at 2 readings at least 4 hours apart:
  - Systolic BP (sBP)  $\geq$  140 mmHg OR
  - Diastolic BP (dBP)  $\geq$  90 mmHg at 2 readings at least 4 hours apart, PLUS
- Proteinuria  $\geq$  300 mg of protein in a 24-hour urine collection or 2+ on dipstick in a woman without history of proteinuria

### Severe pre-eclampsia (SPE)

1. New-onset elevated BP:
    - sBP  $\geq$  160 mmHg OR
    - dBP  $\geq$  110 mmHg WITH proteinuria as above
- OR
2. PE as defined above PLUS any one of the following **danger signs** reported by the woman:
    - Severe headache unrelieved by analgesics
    - Visual changes
    - Right upper quadrant pain

- Pulmonary edema
- OR **danger signs** that can be measured:
- Oliguria, defined as  $<$  400 mL of urine passed in 24 hrs
  - Low platelets, elevated creatinine, or elevated liver enzymes.

### Eclampsia (E)

- PE as defined above PLUS
- Convulsions (fits) or unconsciousness

## Key Knowledge

- PE&E is a leading cause of maternal and perinatal death. Skilled providers working in teams save lives through rapid detection, good management, and appropriate referral.
- PE is characterized by high BP and protein in the urine (proteinuria) after 20 weeks of pregnancy.
- To detect PE&E early, regular and accurate monitoring of BP, detection of proteinuria, and screening for danger signs are essential during ANC, intrapartum, and postpartum.
- Women with PE may develop life-

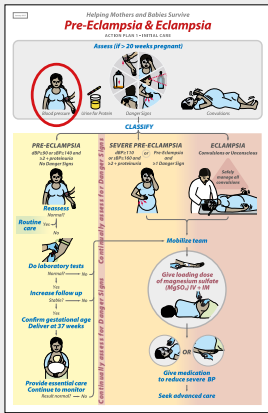
threatening complications including kidney and liver failure, clotting disorders, cardiac problems, respiratory problems, and stroke.

- Educate all women and families about the danger signs of PE&E. Some women develop E in the absence of hypertension or proteinuria.
- PE can progress rapidly without warning to E, the most dangerous hypertensive disorder in pregnancy.

## Key Actions

- **Screen all women who present after 20 weeks' pregnancy for PE&E:**
  - Take and record BP for all women.
  - If BP is elevated, check urine for protein.
  - Assess all women for danger signs and, where feasible, do laboratory investigations when high BP is found.
- **If SPE is suspected, you should not wait 4 hours to repeat BP. Begin treatment now!**

# Assess blood pressure



## Performance Expectation

- Check BP accurately.
- Distinguish normal from abnormal findings.

## Key points

- Accurate BP measurements are key for diagnosis!

## Key Knowledge

- **Normal BP:** sBP 90–139 mmHg and dBP 60–89 mmHg
- **PE:** sBP  $\geq$  140 mmHg but  $<$  160 mmHg OR dBP  $\geq$  90 mmHg but  $<$  110 mmHg at 2 readings at least 4 hours apart
- **SPE:** sBP  $\geq$  160 mmHg OR dBP  $\geq$  110 mmHg
- BP readings can be incorrect due to poor technique, a broken device, chemical factors (tobacco or caffeine), or emotional factors (fear or stress).
- BP can vary due to physical changes of pregnancy. BP often decreases through mid-pregnancy, but returns to pre-pregnancy values by term.

- When pre-pregnancy BP is unknown, BP taken before 20 weeks is considered the baseline BP.
  - Diagnosis of PE is made if BP is high on two consecutive readings taken at least

4 hours apart with the woman at rest and with no prior history of high BP.  
**However, sBP  $\geq$  160 mmHg OR dBP  $\geq$  110 mmHg is an emergency!**  
**Take immediate action!**

## “Do’s” of BP Measurement

- Remove all tight clothes from around her arm.
- Ensure she is sitting with her back and arm supported, both legs flat on the floor, with her arm at the level of her heart.
- Make sure she is as relaxed and comfortable.
- Speak to her in a kind and respectful manner to help her feel at ease.
- Use appropriate cuff size if multiple sizes are available. The cuff should encircle at least three-fourths of the circumference of her arm 2 cm above her elbow .
- Ensure that needle is at zero at the start and end of measurement.
- Use calibration key if needed to get needle to zero.
- Put earpieces of stethoscope so they are pointing toward your nose.
- Rapidly inflate cuff to 180mmHg, then

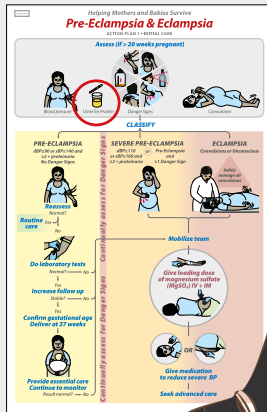
release air at approximately 3mmHg/sec.

- sBP is noted when the first beat is heard; dBP is noted when beats stop.
- It is important to use what you hear and not **what you see to note each measurement.**

## “Don’ts” of BP Measurement

- **DON’T take the woman’s BP if she has smoked, taken alcohol or coffee, exercised vigorously, or had a painful procedure within the last 30 minutes.**
- **Don’t** measure BP with the woman lying on her back; the pregnant uterus exerts pressure on blood vessels, causing a drop in BP. If she cannot sit, take her BP with her lying on her left side.
- **Don’t** talk to the woman or ask her to talk to you while checking her BP.
- Do not round the number up or down but give the precise number. Note each bar on a manual BP machine is 2 mmHg.

# Assess urine for protein



## Performance Expectation

- Assess urine for protein.
- Distinguish normal from abnormal findings.

## Key points

- Healthy pregnant women should not have more than 1+ protein in their urine.
- Proteinuria associated with PE:
  - $\geq 300$  mg of protein in a 24-hour urine collection, OR
  - urine protein: creatinine ratio  $\geq 0.3$  OR  $\geq 2+$  on urine dipstick.
- **If you cannot check for protein, begin treatment immediately for women who meet the other requirements of SPE. Act now!**



## Key Knowledge

- Excessive proteinuria is defined as  $\geq 300$  mg of protein in urine collected over 24 hours or 2+ on urine dipstick. Detection of proteinuria is essential for diagnosis of PE and can save a woman's life.
- Urine dipstick should be used only if more reliable testing methods are not available (such as 24hr urine collection or urine protein: creatinine ratio). Using a dipstick requires a clean-catch sample.

- Proteinuria can indicate other conditions (severe anemia, kidney disease, urinary tract infections) as well as contamination by vaginal discharge, blood, or amniotic fluid. However, PE&E is the most common cause of proteinuria in pregnancy.
- Women may have PE&E AND other conditions that cause proteinuria.
- Once proteinuria is detected in a woman with hypertension and diagnosis of PE&E is made, urine does not need to be retested.

## Key Actions

- Check urine for protein any time a pregnant woman over 20 weeks has SBP  $\geq 140$  mmHg OR dBP  $\geq 90$  mmHg.
- **If you cannot measure protein OR if you use dipsticks to measure protein, and protein is < 2+ but the woman has danger signs or severe BP, begin treatment immediately!**
- To collect a clean-catch urine sample, tell women to clean vulva with water, pass a small amount of urine into the toilet, and then place a clean, dry cup under the stream.

### Urinalysis with visual reagent strip, "dipstick"

Use only in the absence of more reliable methods. To test for protein with a dipstick:

1. Collect a clean-catch urine sample.
2. Dip the end of the dipstick into the urine. Shake off excess urine by tapping the dipstick on the side of the cup.
3. Compare dipstick pad with the color chart on the dipstick container after time noted on dipstick instructions has passed.

### Quantify with timed urine collection

*Timed urine collection to quantify protein is the gold standard.*

*To assess proteinuria with a timed urine collection:*

1. Collect all urine passed over 24 hours in a large container.
2. Label container with name, start and end time for collection, and test ordered.
3. Deliver container to laboratory for testing within an hour of completing the collection or refrigerate until test is performed.

### Urine protein: creatinine ratio

*This can be used instead of a timed urine collection. It can be used to "rule out" proteinuria.*

1. Collect a clean-catch urine sample.
2. Cover tightly, label, and send sample to laboratory for testing within an hour or refrigerate until test is performed.

Helping Mothers and Babies Survive  
**Pre-Eclampsia & Eclampsia**  
 WHO/UNICEF/WHOCC/UNFPA/UNEP/UNEP/WHO

Assess (if you are pregnant)

**CLASSIFY**

**PRE-ECLAMPSIA**  
 BP ≥140/90 or ≥160/110 with proteinuria

**SEVERE PRE-ECLAMPSIA**  
 BP ≥160/110 with proteinuria

**ECLAMPSIA**  
 Convulsions or fits

**Routine care**  
 Rest  
 Hydration  
 Dehydration tests  
 Increase follow up  
 Confirm gestational age  
 Provide essential care  
 Continue to monitor

**Mobilize team**  
 Give loading dose of magnesium sulfate (MgSO<sub>4</sub> IV x III)

**Give medication to reduce severe BP**  
 Seek advanced care

Continually assess for Danger Signs

# Assess for *Danger Signs*



## Performance Expectation

- Screen for signs and symptoms of worsening PE.

## Key points

- Women presenting with high BP should always be screened for danger signs.
- New-onset high BP plus any danger sign indicates SPE. This is an emergency!
- BP in the severe category is NOT required to diagnose SPE. A woman may have BP in the less severe category but if she has at least one danger sign, she has SPE!
- **Diagnose and treat SPE if the BP is slightly elevated (sBP  $\geq$  140 mmHg or dBP  $\geq$  90 mmHg) if the woman has a danger sign!**

## Key Knowledge

- **All pregnant, laboring and postpartum women should be assessed for these danger signs:**
  - BP in the “severe” category (sBP  $\geq$  160 mmHg OR dBP  $\geq$  110 mmHg).
  - Severe headache not relieved by analgesics.
  - **Visual changes** such as blurred vision or seeing bright lights or spots.

- **Right upper quadrant pain.**
- **Pulmonary edema**, defined as difficulty breathing and/or rales heard when listening to lungs.
- **Oliguria**, defined as less than 400 mL urine passed in 24 hours.
- In the past, edema of the feet and legs was considered a sign of PE. This is no longer diagnostic because lower-extremity edema is common in late pregnancy. Significant swelling of the hands and face has a stronger association with PE.
- Oliguria must be measured objectively to be diagnostic for SPE. Frequent passage of small amounts of urine is common in late pregnancy. Women may think this is decreased urine output if asked. Providers should be aware of this important diagnostic sign, but should not ask about it during counseling and screening.
- Additional tests may be required to confirm SPE diagnosis. **Presume SPE and begin treatment until it can be ruled out!**
- Low platelets, elevated serum creatinine, and elevated liver enzymes are also danger signs.

## Key Actions

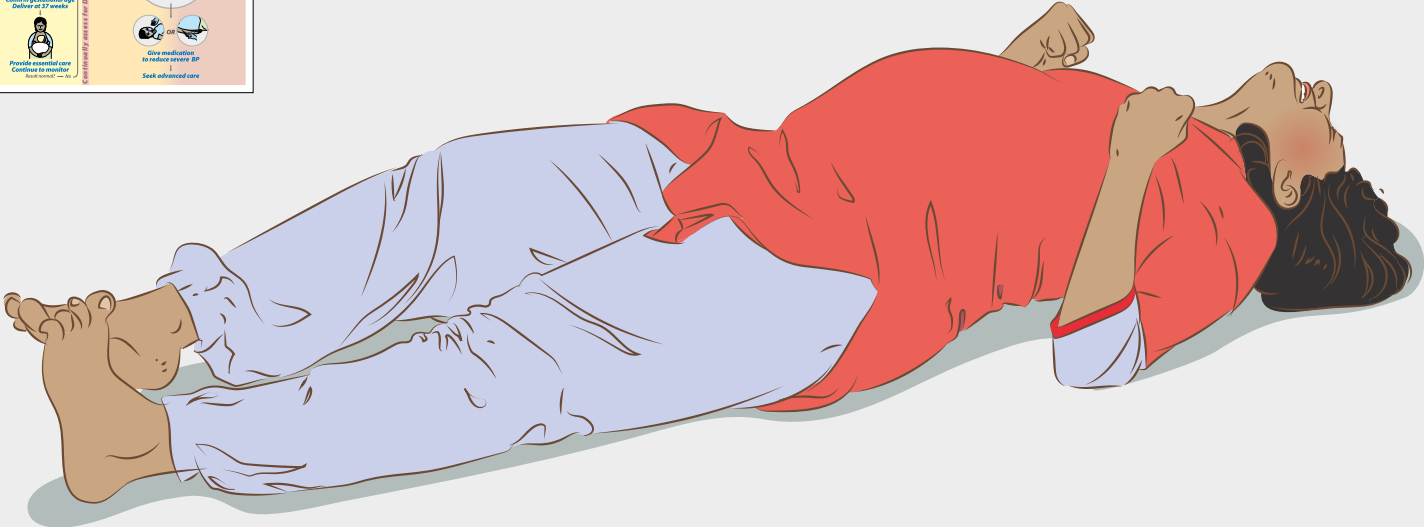
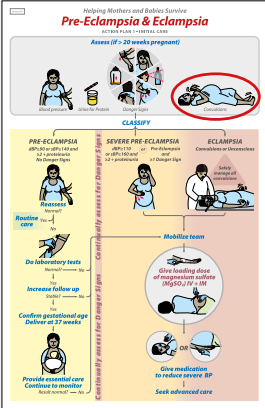
- Screen women with high BP for danger signs. Ask about each one.
- Counsel all pregnant and postpartum women and their families about the danger signs of SPE&E.

## Advanced Care Note

### If available at the facility, do the following:

- Monitor fluid input and urine output, and collect 24-hour urine to check for oliguria and total protein.
- Assess amniotic fluid volume (normal value for amniotic fluid index is  $>5$  cm and  $<24$  cm) and fetal growth with ultrasound.
- Check the following blood tests (values in table on pg. 20):
  - Complete Blood Count with platelets.
  - Liver function tests (LFTs).
  - Serum creatinine.

# Assess for convulsions



## Performance Expectation

- Screen for history of convulsions.
- Identify convulsions in pregnant or newly postpartum women.

## Key points

- *Convulsions are a life-threatening emergency! Mobilize your team now!*

## Key Knowledge

- If a pregnant, laboring, or recently postpartum woman is unconscious, experiencing a convulsion or fit, or reports a recent history of convulsions, eclampsia should be suspected and immediately treated!
- **This is a life-threatening emergency!**
- The following are often seen during an eclamptic convulsion:
  - Rolling and bulging eyes
  - Twitching of face and hand muscles
  - Clenching of the fists and teeth
  - Violent contractions of the muscles
  - Foaming at the mouth
  - Noisy breathing
- Women may lose consciousness after convulsions.

- Conditions other than E may result in convulsions. These include: epilepsy, meningitis, cerebral malaria, electrolyte imbalance, hypertensive stroke, head trauma, and drug overdose.
- Convulsions associated with eclampsia:
  - Can occur regardless of the severity of hypertension (and may occur when a woman has normal BP).
  - Are difficult to predict.
  - Often occur without headache or visual changes.
  - May recur in rapid sequence and can end in death.

## Key Actions

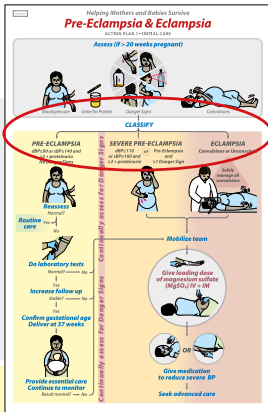
### When a client experiences a convulsion, immediately:

1. Shout for help to mobilize the team and call for emergency equipment. If you are alone, the family may be your team.
2. Airway: Turn woman onto her side to prevent aspiration. Ensure her airway is open.
3. If available, give oxygen at 4–6 L per minute by mask or cannula.
4. Breathing: If the woman is not breathing, begin ventilation with a bag and mask.
5. Circulation: If pulse is absent, begin cardiac massage.

6. Protect from injury, but do not actively restrain her.
7. Do not put anything in her mouth.
8. Do not leave her alone.
9. While giving care, ask the family about her medical history and recent signs of illness including fever, chills, headache, and neck stiffness.

### Care after the convulsion:

- Continue to check airway and breathing; suction secretions if needed.
- Observe her color to assess the need to continue oxygen at 4–6 L per minute.
- Always listen to lungs after convulsions to check for aspiration.
- Encourage the woman to lie on her side to reduce the risk of aspiration.
- Check vital signs and FHR if baby is not yet born.
- Begin treatment for eclampsia while confirming diagnosis. Treat as eclampsia until proven otherwise.
- To confirm diagnosis, conduct additional investigations including targeted medical history, full vital signs, urinalysis, kidney and liver function tests, rapid diagnostic test or blood smear microscopy for malaria, and other tests as indicated.



# CLASSIFY



Blood pressure



Urine for Protein



Convulsions?

## Pre-eclampsia (PE)

sBP  $\geq$  140 mmHg  
OR  
dBP  $\geq$  90 mmHg

(At 2 readings at least  
4 hours apart)

2+ on urine dipstick  
OR  
300 mg protein in a  
24-hour urine collection  
OR  
Urine protein: creatinine  
ratio of at least 0.3

NONE

NONE

## Severe pre-eclampsia (SPE)

BP as above PLUS at least  
one danger sign  
OR  
sBP  $\geq$  160 mmHg  
OR  
dBP  $\geq$  110 mmHg

Usually has:  
Proteinuria associated  
with PE (above)

At least one of the following:

1. Right upper quadrant pain
2. Severe headache
3. Blurred vision
4. Pulmonary edema
5. Oliguria
6. Abnormal platelets, serum creatinine, or liver enzymes

NONE

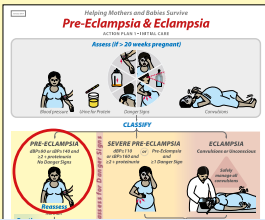
## Eclampsia (E)

Usually has:  
sBP  $\geq$  140 OR  
dBP  $\geq$  90

Usually has:  
Proteinuria associated  
with PE (above)

May have at least one of the  
above danger signs, or may  
not have any

Has had at least one  
convulsion OR  
is unconscious



## Performance Expectation

Confirm or rule out PE diagnoses based on reassessment.

## Key points

When you reassess the women in 4 hours after initial elevated BP, OR when you receive a woman with suspected PE, you should:

- Repeat BP
- Test urine for protein if not done or done elsewhere
- Screen for danger signs and convulsions

If SPE is suspected, you should not wait 4 hours to repeat BP. Begin treatment now!

## Key Knowledge

- Women may be referred to you with unreliable information (e.g., a single or inaccurate BP reading or contaminated urine samples). Danger sign questions may not have been asked. Gather your own information to confirm the diagnosis.

# Management of Pre-eclampsia

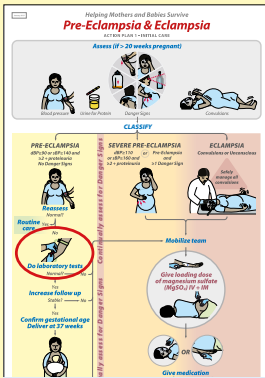
## Reassess

### Key Actions

- If a woman with suspected PE is referred to you, quickly ensure she is stable and conduct routine assessment: check BP, test for proteinuria, assess for danger signs and convulsions.
- If she DOES NOT meet diagnostic criteria for PE, rule out other problems, teach her about pregnancy danger signs and signs of labor, reinforce birth preparedness and complication readiness planning, and confirm next ANC visit.
- If the woman DOES meet diagnostic criteria for PE
  - Conduct laboratory tests
  - Increase the frequency of her ANC visits
  - Teach her the danger signs of SPE&E, other pregnancy danger signs and signs of labor
  - Ensure that she has a birth preparedness and complication readiness plan in place.

### Counseling note

1. If you diagnose PE, explain what it is and that she will need closer follow-up for the rest of her pregnancy.
2. Advise her to report for care immediately for:
  - Severe headache
  - Visual changes
  - Severe right upper quadrant pain
  - Difficulty breathing
  - Convulsions
  - Decreased fetal movement
  - Ruptured membranes
3. Ensure that the woman has contact numbers and a way to reach help if she has problems.
4. Ensure that she has transportation and funds for an emergency.
5. Ensure that partners and family also know the danger signs, the need for immediate follow-up, and where to go for care.



# Management of Pre-eclampsia

## Do laboratory tests

### Performance Expectation

In facilities with laboratories, order the following lab tests for clients with PE: CBC with platelet count, serum creatinine, and liver enzymes.

### Key points

- Normal laboratory values in the absence of danger signs are reassuring and indicate it is safe to monitor a woman with PE outside a facility.
- Laboratory results that are not normal require advanced care.
- If you are an advanced care facility, your protocol for managing PE may have you do laboratory tests when PE or SPE is first suspected instead of waiting 4 hours.

### Key Knowledge

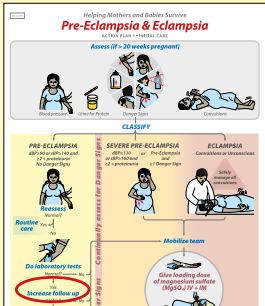
- Where available, laboratory tests help:
  - diagnose and detect worsening illness.
  - support decision-making and referral.
- For women with suspected PE&E, perform laboratory tests in the table below if laboratory capacity is available.
- Worsening values suggest PE is becoming more severe, even if the woman doesn't have any danger signs of SPE.
- Laboratory testing is recommended weekly, although providers may increase frequency based on clinical judgement.

### Key Actions

- Order tests to assess and monitor maternal condition.
- If the woman has worsening test results and is not already at an advanced care facility, refer her promptly.
- Follow universal precautions when drawing blood, transporting samples, and disposing of waste.
- Explain why these tests are important; share the results and what they mean.

Lab test	Purpose	Expected value with worsening PE&E	Frequency of testing for stable women with PE
Complete blood count (CBC) with platelets	Check for thrombocytopenia	Platelet count of less than 100,000	Weekly (or more often according to the woman's condition per providers' clinical judgement)
Serum creatinine	Check renal function	≥ 1.1 mg/dL or 2 x baseline	Weekly
Liver enzymes	Check hepatic function	AST/ALT 2x normal	Weekly





# Management of Pre-eclampsia

## Increase follow-up

### Performance Expectation

Monitor women diagnosed with PE safely and appropriately.

### Key points

- Women with PE—meaning no danger signs—should be seen twice a week until 37 weeks when they should deliver.
- At each visit: check BP, monitor the fetus, listen to lungs, check reflexes, assess for SPE danger signs
- Check laboratory tests weekly
- Any woman with PE who cannot return for visits twice a week must be admitted or transferred for advanced care.

### Key Knowledge

- Women diagnosed with PE in ANC without any danger signs or abnormal lab tests do not need to be admitted as long as they can:

- Attend ANC twice weekly for monitoring.
- Access care immediately should they have any danger signs.

### Key Actions

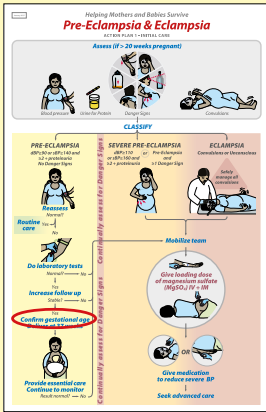
For women diagnosed before labor:

- Continue to provide quality ANC. At each visit:
  - Measure BP.
  - Check reflexes to establish a baseline prior to treatment with magnesium sulfate (see box for how to test reflexes).
  - Listen to lungs.
  - Monitor fetal condition: fetal growth, fetal movement, and fetal heart rate. If there is evidence of fetal compromise, refer to a facility capable of providing appropriate care to women with SPE&E.
  - Assess for danger signs of SPE at EVERY VISIT, and ensure a woman can get care immediately if she has any danger signs. She should be admitted to an advanced care facility if she has any signs of SPE&E.
  - Continue laboratory tests once weekly, if possible.

- For women diagnosed during labor, monitor them closely using the partograph. Regularly assess for signs of worsening PE.
- Manage women diagnosed with PE in the postpartum period according to disease severity. Monitor closely, preferably in a facility, until 72 hours postpartum and again a week later, until BP is normal.
- **If a woman develops any danger sign OR her BP falls into the severe category, diagnose SPE and initiate treatment immediately.**

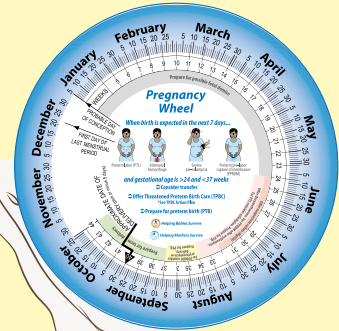
### Testing Reflexes

- Ask the woman to sit with legs hanging freely.
- Feel for tendon just below kneecap.
- Bring the wide edge of a reflex hammer, the edge of a stethoscope, or the side of your hand down onto the tendon in a rapid, smooth movement.
- Tapping the tendon should make the lower leg jerk. Watch for how fast you see a response. It is the speed of the response, not how far the limb moves, that tells you if her reflexes are normal.



# Management of Pre-eclampsia

## Confirm gestational age



## Performance Expectation

Confirm or calculate GA at any visit during pregnancy.

- Estimate GA based on available information.

## Key points

- Accurate GA is important to decide:
  - If a pregnancy is >20 weeks for diagnosis.
  - If fetal growth is acceptable.
  - If fetus is preterm and needs special care.
  - If it is time for delivery.

## Key Knowledge

- Suspect PE in all women with no known history of hypertension who develop elevated BP after 20 weeks' gestation.
- Suspect PE in women with chronic hypertension who develop worsening BP, proteinuria, or signs of severe PE&E after 20 weeks' gestation.
- Accurate GA helps us decide if we can monitor a woman with PE or if it is time for her to deliver.
- With PE, accurate GA calculation helps us schedule birth at 37 weeks.

- With SPE&E, accurate GA lets us decide if corticosteroids are needed to help fetal lungs and blood vessels mature.
- It is best to use several methods when calculating the GA.

## Key Actions

When a woman comes for care, check her records for an expected date of delivery (EDD). Note the method used:

1. Last menstrual period (LMP),
2. Size of uterus before 20 weeks OR measurement of fundal height from top of symphysis pubis to top of fundus, and/or
3. Ultrasonography—review the GA from the scan.

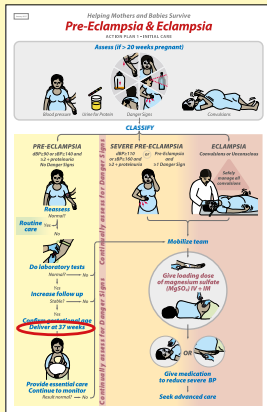
- If no EDD is documented, calculate GA based on first day of LMP and current fundal height. Remember, LMP may not be reliable if preceded by use of oral contraceptive pills or hormonal injections within 3 months or if the woman was breastfeeding at the time of conception.
- Use a pregnancy wheel or the calendar method and the following formula to calculate the EDD:

- (First day of LMP + 7 days) – (3 months), or
- (First day of LMP + 7 days) + (9 months)

- To calculate GA you need to know the number of weeks between the EDD and today's date.  $GA = 40 - (\# \text{ of weeks between today's date and the EDD})$
- To confirm GA with fundal height:
  - At 20 weeks, the fundus should be around the umbilicus.
  - After 20 weeks, measure from the top of the pubic bone to the top of the fundus. Centimeters = weeks' gestation.

## Advanced Care Note

Where the fundal height and LMP differ by more than 3 weeks, or if the LMP is unknown or unreliable, confirm GA by ultrasound. However, pregnancy dating by ultrasound becomes less reliable later in pregnancy: the date by ultrasound may be off by as much as 3 to 4 weeks in either direction when used during the third trimester.



# Management of Pre-eclampsia

## Deliver at 37 weeks

## Monitor labor and facilitate a clean and safe birth



## Performance Expectation

- Confirm GA for women with PE and refer for induction and birth at 37 weeks, 0 days if GA is reliable.
- Provide appropriate labor monitoring and conduct clean and safe birth.

## Key points

- The cure for PE is delivery!
- Women with PE and **reliable** GA should deliver within 24–48 hours after 37 weeks and 0 days. But if women cannot recall LMP, providers do not have a reliable first-trimester ultrasound, and maternal and fetal status are reassuring, labor should not be induced.
- If labor must be induced, transfer woman to advanced care.
- Women with PE are at risk for progressing to SPE or E during labor, birth, and postpartum. Continue close monitoring!
- Follow guidelines for labor monitoring and best practices for clean and safe birth.

## Key Knowledge

- For women with PE, continuing pregnancy after 37 weeks puts both woman and fetus at risk.
- If you do not have reliable dating:
  - See if further questioning helps to establish LMP.
  - Refer woman for dating ultrasound.
  - If no other information is available, use fundal height for best clinical estimate.
- Women and families should be counseled early about the recommendation for birth at 37 weeks so that they can be prepared.
- Between 13% and 36% of eclampsia cases occur during labor and birth. Monitor closely during this period to diagnose PE, detect worsening disease, and prevent convulsions.

## Key Actions

- Labor induction and birth should take place at advanced care facilities in case women require assisted vaginal delivery, cesarean birth or other interventions.
- Monitor women diagnosed with PE according to WHO guidelines using the partograph for decision making.
- Check BP as often as hourly (but at least every 4 hours), depending on severity of hypertension and findings. If BP increases

to sBP  $\geq$  160 mmHg OR dBP  $\geq$  110 mmHg, initiate treatment for SPE immediately!

- Continue to listen to lungs for evidence of pulmonary edema.
- Continue to assess regularly for danger signs.
- Perform Active Management of the Third Stage of Labor. Give all women a uterotonic (10 IU oxytocin IM or 600 mcg misoprostol by mouth) within one minute of birth.

### **Do not give ergometrine!**

- If PE is diagnosed during labor, and if feasible, draw blood for initial laboratory tests (CBC with platelet count, serum creatinine, and LFTs).
- If during labor or birth, women develop danger signs, call for help and initiate anticonvulsant therapy with MgSO<sub>4</sub>.

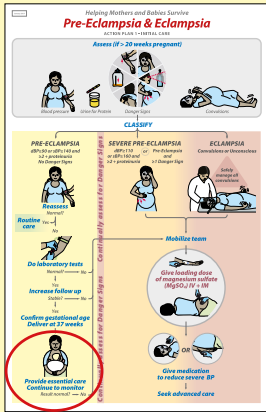
## Advanced Care Note

Vaginal birth should be the first choice for women with PE unless cesarean delivery is needed for obstetric reasons.

- Assess the cervix and expedite birth by induction using method based on favorability of the cervix and local availability.
- Deliver by cesarean if cervical ripening or induction fails.

## Management of pre-eclampsia

# Provide essential maternal and newborn care



## Performance Expectation

- Give quality, supportive care to women with PE and their babies after birth.
- Identify worsening illness.

## Key points

- Women with PE are at risk for worsening illness after birth and should be monitored for at least 72 hours. 40% of E begins in the postpartum period.
- All women should receive essential postpartum care.
- All babies should receive essential newborn care.
- Follow up in 1 week to check BP, assess for danger signs, and provide routine care for both mother and newborn.

## Key Knowledge and Actions

### For women:

- Provide respectful care and privacy.
- Monitor closely for at least 72 hours after birth, preferably in facilities.
- Continue to listen to lungs daily for evidence of pulmonary edema.
- Continue to check for danger signs and teach women how to respond if they have any.
- Monitor closely for hemorrhage.

- Provide routine postpartum care and monitoring guidelines.
- Counsel women that they are at risk for PE&E in future pregnancies and for developing hypertension later in life.
- Ensure women leave with a contraceptive method of their choosing.

### For newborns:

- Encourage skin-to-skin care for at least an hour after birth and initiate breastfeeding within the first hour. Monitor the baby's ability to latch and suckle.
- Monitor breathing.
- Monitor the baby's temperature and keep warm.
- Monitor for danger signs in the newborn: poor feeding, convulsions, rapid breathing, severe chest in-drawing, no spontaneous movement, low or high body temperature, and yellowing of skin or eyes in the first 24 hours of life.

Babies born before 38 weeks may require additional care.

Within the first 90 minutes after birth:

- **Provide eye care** to prevent serious infection and blindness.
- **Provide cord care.** Put nothing on

the cord (unless chlorhexidine is recommended).

- **Give Vitamin K** to protect babies from serious bleeding.
- **Examine the baby:** Breathing, skin color, movements, activity, cord appearance, and other physical features.
- **Measure baby's temperature.** 36.5° C–37.5° C is normal.
- **Weigh the baby.**
  - Babies under 2500 grams may require special care to prevent low body temperature.
  - Babies under 2000 grams should receive prolonged skin-to-skin care.
  - Babies under 1500 grams should receive advanced care.

Women with PE and SPE are at increased risk for preterm birth and are more likely to have babies that are small for gestational age. Be prepared to provide additional care for early and/or small babies.

Helping Mothers and Babies Survive  
**Pre-Eclampsia & Eclampsia**  
WHO PART 1 - CARE FOR

Assess (IP > 20 weeks pregnant)

**CLASSIFY**

**PRE-ECLAMPSIA**  
 defined as either elevated blood pressure or proteinuria

**SEVERE PRE-ECLAMPSIA**  
 defined as either:  
 - BP  $\geq 160/110$  mmHg  
 -  $\geq 2+$  proteinuria

**ECLAMPSIA**  
 characterized by convulsions

**Resolute care**  
 - Give MgSO<sub>4</sub>

**Do laboratory tests**  
 - Hb, Urea, Creatinine, Liver enzymes

**Increase fluids up**  
 - 2-3 L/day

**Confirm gestational age**  
 - Outside of 37 weeks

**Provide essential care**  
 - Continue to monitor blood pressure

**Seek advanced care**

**Mobilize team**  
 - Give loading dose of magnesium sulfate (MgSO<sub>4</sub>) IV 4-6g

**Give medication to reduce severe BP**

**Classify by severity for change of plan**  
 - Continue to monitor for change of plan

# Management of Severe Pre-eclampsia and Eclampsia

## Mobilize team

## Give loading dose of MgSO<sub>4</sub>





## Performance Expectation

- When SPE&E is diagnosed, quickly alert your team and initiate a coordinated response.
- Rapidly administer the correct loading dose of magnesium sulfate ( $MgSO_4$ ).

## Key points

- Respond to SPE&E as an emergency and move quickly to work as a team. Act fast!
- $MgSO_4$  is the best anti-convulsant for SPE&E. The preferred loading dose includes both:
  - 4 g  $MgSO_4$  20% solution IV **AND**
  - 10 g  $MgSO_4$  50% solution IM (5g in each buttock).
- Prepare and maintain an emergency kit with  $MgSO_4$  and all supplies for SPE&E.

## Key Knowledge

- The diagnosis of SPE or E should trigger a rapid, well-coordinated response.
- A woman with SPE or E may convulse at any time; teams need to act quickly to provide life-saving care.
- One provider should lead the team; other team members should respond quickly.
- The team should know their roles BEFORE an emergency.

- $MgSO_4$  is a safe, life-saving medication. If administered properly, serious side effects are very rare.
- There are many preparations of  $MgSO_4$ . It is essential that the correct solutions (20% IV and 50% IM) are administered to ensure effectiveness and reduce risk of toxicity.
- WHO prefers the IV and IM (Pritchard) regimen in low-resource settings because it is difficult to precisely monitor IV flow rates.
- $MgSO_4$  causes sweating, flushing, and warmth. Rare side effects include nausea, vomiting, muscle weakness, and palpitations. Tell the woman what to expect and offer reassurance.

## Key Actions

Prepare a PE&E emergency kit (contents on pg. 31). Be sure everyone knows where the kit is stored and has access to it at all times.

### To administer the $MgSO_4$ loading dose using $MgSO_4$ 50% (1 g in 2 mL):

1. Give  $MgSO_4$  20% solution, 4 g IV over 5–20 minutes:
  - Take one 20 mL sterile syringe
  - Draw 8 mL (4 g) of  $MgSO_4$  50% into syringe.
  - Add 12 mL of sterile water for injection to make a 20% solution.

### Note: if multiuse dilution is used, draw up dilution first.

2. Follow immediately with 10 g of  $MgSO_4$  50% solution, 5 g in the upper, outer quadrant of each buttock:
  - Take two 20 mL sterile syringes. Draw 10 mL (5 g) of  $MgSO_4$  50% into each syringe.
  - Add 1 mL of 2% lignocaine in each syringe.
  - Give deep IM injection in each buttock.
3. If convulsions occur after 15 min., give 2 g  $MgSO_4$  (20% solution) IV over 5 minutes.
  - Take one 10-mL sterile syringe.
  - Draw 4 mL (2 g) of  $MgSO_4$  50% into syringe.
  - Add 6 mL of sterile water for injection to make a 20% solution.
  - Give IV slowly over 5 minutes.
4. Record all doses on the  $MgSO_4$  Monitoring Sheet (see pg. 65 for resources).

An IM-only dose of  $MgSO_4$  10 g is to be used only where IV treatment is not available, and only until a woman can be referred to advanced care.

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Assess (if > 20 weeks pregnant)

**CLASSIFY**

PRE-ECLAMPSIA	SEVERE PRE-ECLAMPSIA	ECLAMPSIA
BP 160/110 or higher OR 140/90 with proteinuria	BP 170/120 or higher OR 160/110 with proteinuria OR any organ damage	Convulsions or unconscious
<b>Routine care</b> Hospital	<b>Mobilize team</b>	<b>Give loading dose of magnesium sulfate (MgSO<sub>4</sub> IV or IM)</b>
<b>De laboratory tests</b> Urea, Creatinine, ALT, AST, Platelets		
<b>Increase follow up</b> Daily		
<b>Confirm gestational age</b> Outside of 37 weeks		
<b>Provide essential care</b> Continue to monitor Blood pressure		<b>Give medication to reduce severe BP</b> <b>Seek advanced care</b>

Continually assess for Danger Signs. Continually assess for Danger Signs.

# Management of Severe Pre-eclampsia and Eclampsia

## Mobilize team

### Give loading dose of MgSO<sub>4</sub> Zuspan



## Performance Expectation

- *Rapidly administer correct loading dose of MgSO<sub>4</sub> by IV only if IV infusion criteria are met.*

## Key points

- *Both the IV-only (Zuspan) and IV plus IM (Pritchard) regimens effectively prevent convulsions in women with SPE.*
- *The Zuspan regimen should only be considered if precise monitoring of IV flow rates is feasible. Infusion pumps are the best method. Where there is extensive experience and adequate nursing staff, gravity-fed infusion can be used.*
- *The Zuspan regimen should never be used in facilities that can only initiate treatment for SPE&E before transferring for ongoing management.*

## Key Knowledge

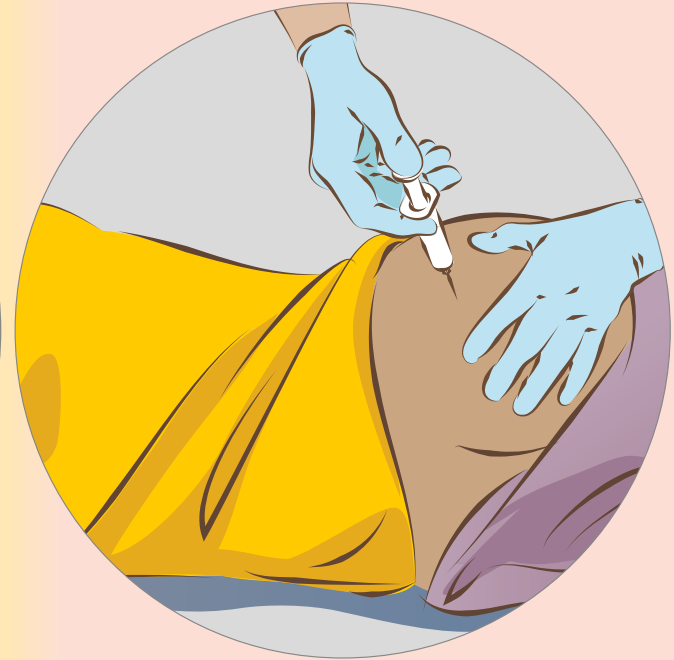
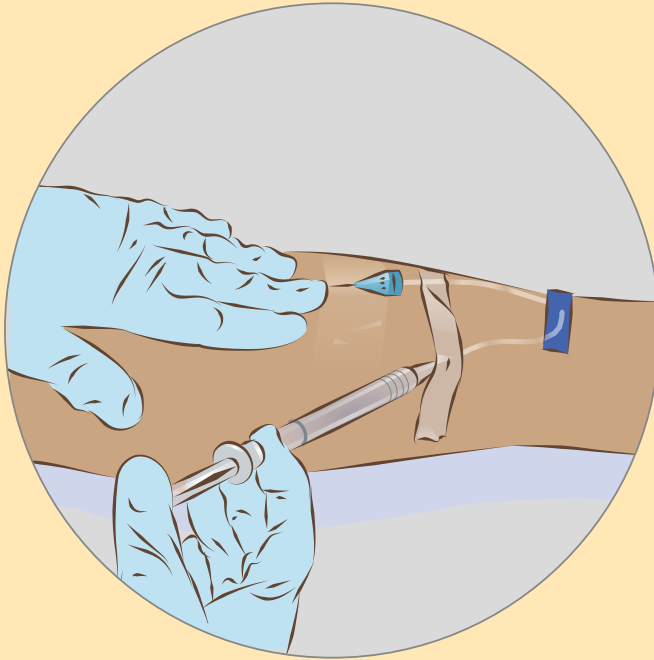
- There is no evidence that one regimen (Pritchard or Zuspan) is more clinically effective than the other.
- Benefits of the IV-only Zuspan regimen include:
  - A faster onset of therapeutic effect.
  - No need for IM injections, which can be painful and cause inflammation at the injection site.
- The loading dose for the Zuspan regimen is 4 g MgSO<sub>4</sub> in 20 mL (20% solution) administered by IV infusion over 5–20 minutes.
- The continuation dose is 1 g MgSO<sub>4</sub> per hour by IV infusion. Prepare:
  - 500 mL IV bag or bottle of saline or lactated Ringer solution and 10 g 50% MgSO<sub>4</sub> and infuse at 50 mL/hour **by gravity infusion or infusion pump.**
  - OR**
  - 1000 mL IV bag or bottle of saline or lactated Ringer solution and 20 g 50% MgSO<sub>4</sub> and infuse at 50 mL/hour **by infusion pump only.**

## Key Actions

- Only provide the Zuspan regimen in settings where:
  - Women do not need to be transferred between facilities.
  - There are enough staff to continuously monitor the woman and the IV infusion.
  - Providers use automated infusion pumps or are very skilled in calculating drip rate and using gravity infusion.
- Always check hourly to ensure that there are no signs of toxicity (see pg. 33). If signs of toxicity are present, discontinue IV infusion.

*Management of Severe Pre-eclampsia and Eclampsia*

# **Monitor woman after administration of $MgSO_4$**



## Performance Expectation

Continue administration of  $MgSO_4$  confidently, competently, and safely.

### Key points

- Monitor for  $MgSO_4$  toxicity consistently when continuing anticonvulsant therapy.
- Always ensure that there are no signs of toxicity before giving the next dose.
- Give the maintenance dose every 4 hours until 24 hours after birth or 24 hours after the last convulsion, whichever occurs last.
- Calcium gluconate is the antidote for  $MgSO_4$ . Keep it ready in case of respiratory arrest.

### To administer $MgSO_4$ maintenance dose:

- Take one 20 mL sterile syringe.
- Draw 10 mL (5 g) of  $MgSO_4$  50% into syringe.
- Add 1 mL of 2% lignocaine to the syringe.
- Verify in which buttock the last  $MgSO_4$  injection was given and give deep IM injection in alternate buttock.

### Key Knowledge

- Women should be monitored closely for toxicity. Signs of  $MgSO_4$  toxicity include:

- Respiratory rate less than 16 breaths per minute.
- No patellar reflexes.
- Urinary output less than 30 mL per hour averaged over preceding 4 hours.
- If you are giving only the loading dose before referring the woman to advanced care, monitor the woman until referral is complete.
- If a woman will not reach advanced care within 4 hours, you should be sure there are no signs of toxicity and then give the first maintenance dose of 5 g  $MgSO_4$  in 10 mL (50% solution) IM in one buttock.

### Key Actions

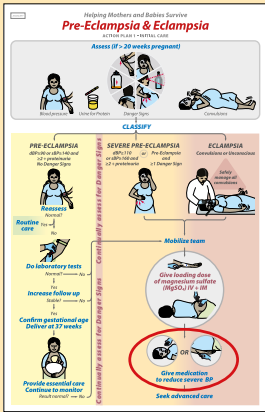
- Monitor the woman closely for signs of  $MgSO_4$  toxicity hourly and record findings:
  - Count respirations for 1 minute.
  - Check patellar reflexes.
  - Insert an indwelling urinary catheter and measure urinary output.
- Before repeat administration of  $MgSO_4$  (after 4 hours), check that:
  - Respiratory rate is  $\geq 16$  breaths/min
  - Patellar reflexes are present.
  - Urinary output is  $\geq 30$  mL per hour over the preceding 4 hours.
- Withhold or delay  $MgSO_4$  with any signs of toxicity. If administering continuous IV

solution, decide hourly to continue or hold  $MgSO_4$  based on signs of toxicity.

- In case of respiratory arrest:
  - Assist ventilation with bag and mask
  - Give calcium gluconate 1 g (10 mL of 10% solution) IV slowly over 3 minutes until respiration begins.
- Record information on  $MgSO_4$  Monitoring Sheet.

### Contents of PE&E emergency kit:

1.  $MgSO_4$  50%—at least 16 g as supplied locally
  2. Lignocaine 2%—at least 1 ampule
  3. Sterile water or normal saline for dilution
  4. One tourniquet
  5. Three 20-mL syringes with IM needles
  6. Alcohol prep pads
  7. Gloves—at least 2 pairs
  8. IV needle and tubing
  9. 500 mL IV bag normal saline
  10. Calcium gluconate—at least 1 g
- Always check expiration dates before using any medications in the kit
  - Replenish the kit immediately after using and store in the designated area.



## Management of Severe Pre-eclampsia and Eclampsia

# Give medication to reduce severe BP



## Performance Expectation

Identify which women require antihypertensive medication and provide proper medication and dose.

## Key points

- All women with severe hypertension should be treated with antihypertensive medication.
- Selection of medication should be based on local availability, provider experience, adverse effects and contraindications.

## Key Knowledge

- A woman with sBP  $\geq$  160 mmHg OR dBP  $\geq$  110 mmHg urgently needs antihypertensive medication to control BP.
- **Nifedipine (immediate-release formulation), hydralazine, and labetalol** are recommended for acute management of severe hypertensive disorders in pregnancy. Selection should be based on facility guidelines.
- Angiotensin-converting enzyme inhibitors (such as captopril) are contraindicated for antihypertensive treatment during

pregnancy. Hydrochlorothiazide is also not recommended.

- MgSO<sub>4</sub> may lower BP slightly, but it should never be used to treat hypertension.  
**Use diagnostic BP to determine need for antihypertensive.**
- **Target BP: 140–155 mmHg/90–100 mmHg; Achieve within 1–2 hours.**
  - Lower than this may decrease blood to the fetus, causing distress.
  - Greater than this may cause a stroke.

- MgSO<sub>4</sub> can be safely used with antihypertensives.

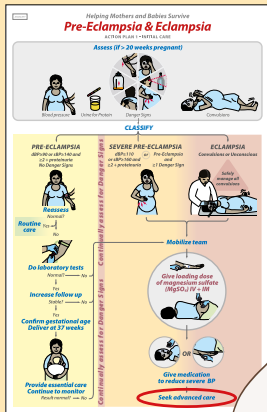
## Key Actions

- Administer antihypertensive treatment according to the table below.
- Record all medications provided in the woman's record.

### The most commonly used agents for treatment of blood pressure $\geq$ 160/110 mmHg

Agent	Dose & Route	Continuation	Max Dose	Comments
<b>Nifedipine immediate-release caps PO</b>	5–10 mg PO	If inadequate response after 30 min, repeat dose until target BP is reached.	30 mg	Consider other agents if BP not lowered within 90 min
<b>Hydralazine IV</b>	5 mg IV, slowly	Repeat q 5 min, until target BP reached. Repeat hourly as needed, or give 12.5 mg IM q 2 hrs as needed	20 mg/24 hours	
<b>Labetalol PO</b>	200 mg PO	Repeat after 1 hour until target BP reached.	1200 mg/24 hours IV	Do not give to women with congestive heart failure, hypovolemic shock, or asthma.
<b>Labetalol IV</b>	10 mg IV	If inadequate response after 10 min, give 20 mg IV. Can double dose to 40 mg, then 80 mg (wait 10 min between doses) until target BP is reached.	300 mg, then switch to oral	Do not give to women with congestive heart failure, hypovolemic shock, or asthma.
<b>Alpha methyl dopa PO</b>	750 mg PO	Repeat after 3 hrs until target BP is reached.	3 g/24 hours	

IV: intravenous, IM: intramuscular, PO: oral



# Management of Severe Pre-eclampsia and Eclampsia

## Seek advanced care





## Performance Expectation

- Give initial treatment to women with SPE&E.
- Refer women who need care beyond what you and your facility can do.
- Manage transfer when needed.

## Key points

- Women with SPE&E should be managed at facilities where they can be closely monitored.
- **Provide rapid initial loading dose of MgSO<sub>4</sub> before referral!**
- **Provide rapid initial dose of antihypertensive, if appropriate, before referral.**
- After initial stabilization and treatment, coordinate referral using:
  - Teamwork
  - Timely mobilization
  - Accurate decision-making
  - Advanced preparation
  - Effective communication
  - Referral form stating diagnosis, vital signs, and treatment given.

## Key Knowledge

- A woman with SPE or E should be managed at a facility that can provide high-quality services to women with complications.

- If SPE or E is diagnosed in a facility not capable of providing advanced care, the woman should be transferred as soon as possible after receiving MgSO<sub>4</sub> loading dose.
- Antihypertensives should be given first if needed.

## Key Actions

- Provide appropriate initial care to women with SPE&E including administration of MgSO<sub>4</sub> loading dose and antihypertensive, if appropriate.
- If the woman is conscious, explain to her and her family the need for higher-level care.

### If the woman needs transfer:

1. Organize reliable transportation.
2. Notify the referral facility to:
  - Explain the woman's condition/diagnosis.
  - Describe care already provided.
  - Give estimated time of arrival.
3. Ensure that the woman is accompanied by a companion.
4. If possible, assign a skilled care provider to go with the woman. This provider will:
  - Monitor the woman and the fetus/newborn during transfer. Always keep mother and newborn together.

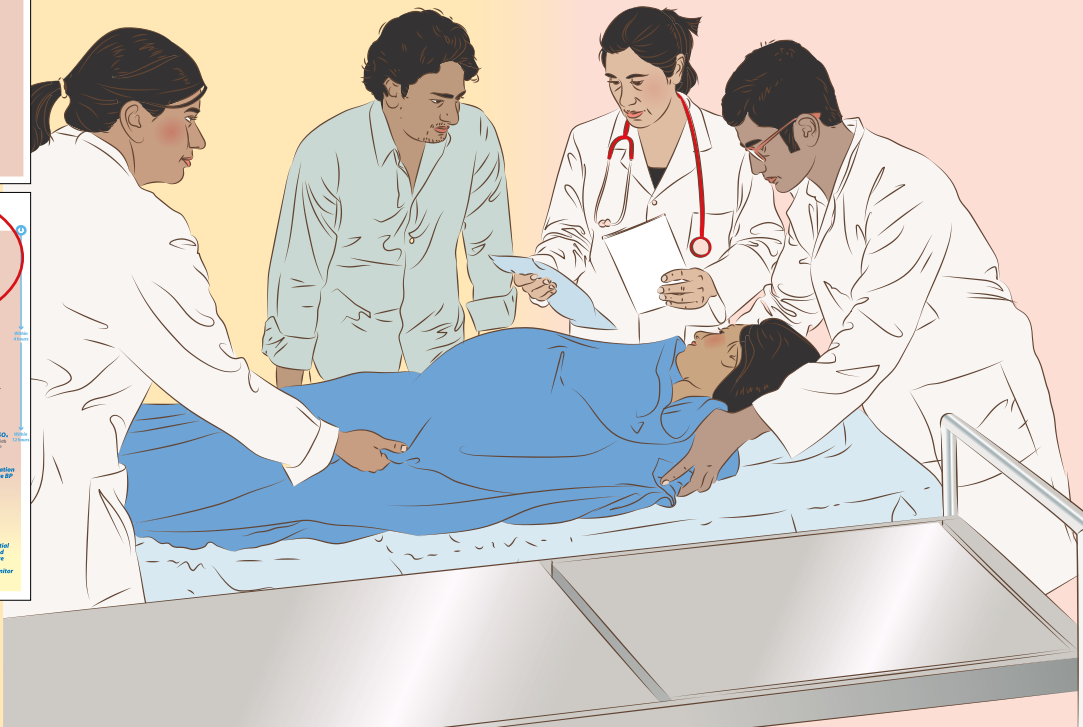
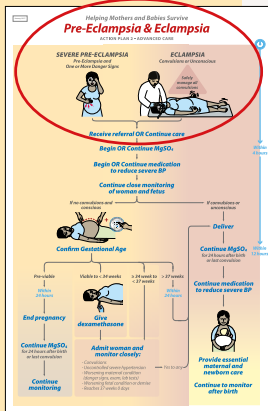
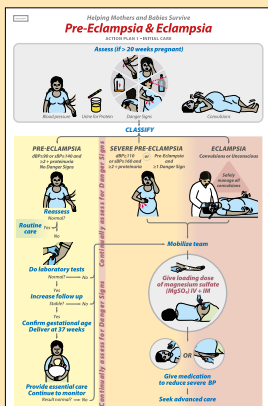
5. Provide first maintenance dose of MgSO<sub>4</sub> if the woman does not arrive within 4 hours. The provider should have all supplies necessary to administer ongoing MgSO<sub>4</sub> and to conduct birth if she is in labor.
6. Transfer with IV in place, but infuse IV fluids carefully as she is at risk for fluid overload.
7. Complete the referral record and send with her. Include:
  - Name of referring and referral facility
  - General patient information
  - Obstetric history (parity, gestational age, complications in ANC)
  - Relevant post-obstetric complications (e.g., previous C/S, PPH)
  - Diagnosis: SPE or E and any others
  - Treatment initiated: what, when, results
  - Name and signature of provider
8. Record referral in appropriate register.
9. Obtain feedback from the referral center and ensure that the woman has a plan for follow-up.

## Invite Discussion

- What is "Advanced Care" in your facility?
- Is your facility capable of providing higher-level care? If not, where is your nearest appropriate referral facility?

## Management of Severe Pre-eclampsia and Eclampsia

# Receive referral and reassess or Continue care



## Performance Expectation

Receive, reassess, and appropriately manage a woman with SPE or E.

### Key points

- A woman may be referred to you from another facility OR she may have been diagnosed at your hospital.
- If you did not make the initial diagnosis, conduct a rapid initial assessment and review information from the referring facility or unit of your hospital.

## Key Actions

- **Rapidly assess**
  - Respirations, pulse, BP, reflexes, and consciousness.
  - Listen to the lungs.
  - Assess fetal heart rate and check for fetal movement.
  - Confirm GA.
  - Assess for labor/ruptured membranes.
- **Provide immediate emergency care if required.** Ensure the woman is stable.

- **Review referral slip, or speak directly with referring provider to review the diagnosis and understand what treatment was provided:**
- **Anticonvulsant?**
  - Assess if the woman experienced any convulsions or other danger signs.
  - Investigate if MgSO<sub>4</sub> loading dose was given. If so, how much, what route, and when?
  - Calculate when the woman is due for the next dose of MgSO<sub>4</sub>.
  - Confirm that the woman is not experiencing signs of MgSO<sub>4</sub> toxicity.
  - Review MgSO<sub>4</sub> Monitoring Sheet if provided or start a new one.
- **Antihypertensive?**
  - Review diagnostic BP.
  - Assess the woman's current BP: Is the sBP  $\geq 160$  or the dBP  $\geq 110$ ?
  - Check if antihypertensive medication was given. If so, determine which drug, dosage, route and time.
  - Continue antihypertensive treatment, if needed.

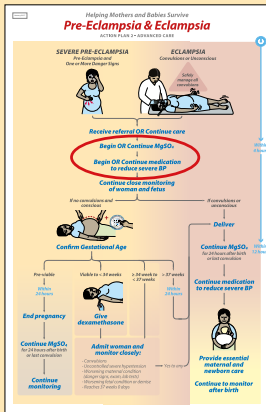
- **Fluid balance**

- Check if the woman is receiving IV fluids.
- Assess for signs of pulmonary edema.
- If no signs of pulmonary edema, start or continue IV fluids.
- Limit fluid intake to 1 L 12-hourly (2 liters in 24 hours).
- Check if the woman has a urinary catheter in place to monitor output. If not, insert one and start a strict fluid balance chart.

- **Repeat laboratory investigations**

### Counseling Note

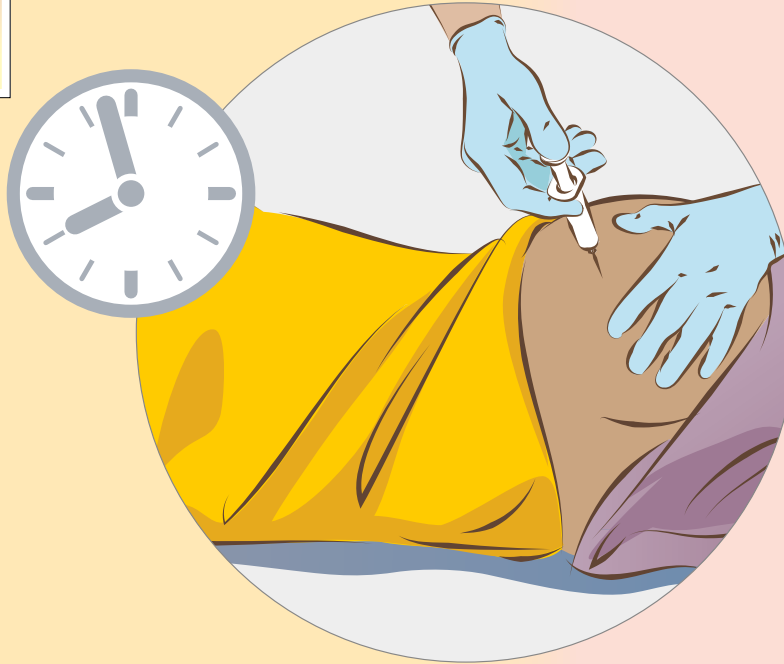
Referral to an advanced care facility can be upsetting for the woman and her family. Remember to continually inform them about what you are doing and why. Regularly update her on her condition and that of her fetus or newborn. Speak to her in a professional, respectful tone, and take the time to answer her questions.



# Management of Severe Pre-eclampsia and Eclampsia

## Begin or continue MgSO<sub>4</sub>

## Begin or continue medication to reduce severe BP



## Performance Expectation

- Begin OR continue administration of  $MgSO_4$  confidently, competently, and safely.
- Begin OR continue antihypertensive medication if needed.

## Key points

- If using IM  $MgSO_4$  for maintenance, always ensure that there are no signs of toxicity before giving the next dose.
- If using IV-only  $MgSO_4$  (Zuspan), use gravity infusion or pump and monitor for  $MgSO_4$  toxicity hourly.
- Monitor all women for  $MgSO_4$  toxicity hourly.
- **$MgSO_4$  must be continued for 24 hours after birth. BUT if she has a convulsion after birth,  $MgSO_4$  must continue for 24 hours after last convulsion.**
- Calcium gluconate is the antidote for  $MgSO_4$ . Keep it nearby and use if breathing stops.
- Use antihypertensives to maintain sBP between 140 and 155 mmHg and dBP between 90 and 100 mmHg.

## Key Knowledge

- For ongoing treatment, give  $MgSO_4$  every 4 hours (or continuously, if  $MgSO_4$  treatment is given only by IV).
- Continue treatment with  $MgSO_4$  for 24 hours after birth or 24 hours after the last

convulsion, whichever occurs last.

- Never leave a woman with SPE or E alone!
- For women with severe high BP, maintain sBP between 140 and 155 mmHg and dBP between 90 and 100 mmHg.

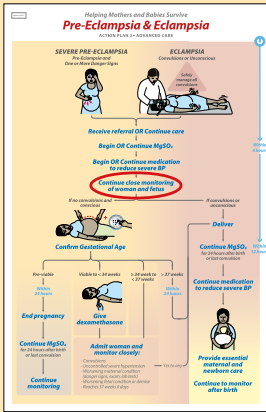
## Key Actions

- Monitor respiratory rate, reflexes, and urine output hourly, and document all details in the  $MgSO_4$  Monitoring Sheet.
- Before repeating  $MgSO_4$ , check for the 3 signs of toxicity and ensure that:
  - Respirations:  $\geq 16$  breaths per min
  - Patellar reflexes: present
  - Urinary output:  $\geq 30$  mL per hour averaged over the last 4 hours
- If there are no signs of toxicity, give 5 g  $MgSO_4$  (50% solution) + 1 mL lignocaine 2% IM every 4 hours in alternate buttocks.
- Withhold  $MgSO_4$  if any sign of toxicity; continue to check hourly and document on the  $MgSO_4$  Monitoring Sheet.

Restart when there are no signs of toxicity.

- Limit fluid intake to 1L/ 12 hr (2L in 24 hr).
- If urine output is less than 30 mL/hour: Administer IV fluids (normal saline or lactated Ringer solution) at 1 L in 8 hours and monitor for pulmonary edema.
- If rales are heard, withhold fluids and give furosemide 40 mg IV once.
- In case of respiratory arrest:
  - Shout for help!
  - Ventilate with bag and mask.
  - Give calcium gluconate 1 g (10 mL of 10% solution) IV slowly over 3 minutes.
- If the dBP drops below 90 mmHg, reduce the frequency or dose of antihypertensive medication. Reducing dBP too dramatically can harm the fetus.
- If the dBP is higher than 100 mmHg, increase the dose or frequency of antihypertensive medication or change the antihypertensive medication.

	<i>Pritchard (IV and IM)</i>	<i>Zuspan (IV only)</i>	<i>IM only (not recommended, use only when IV capacity unavailable!)</i>
MgSO <sub>4</sub> Loading dose	4 g in 20 mL (20% solution) administered IV over 5–20 minutes, followed by 5 g in 10 mL (50% solution) IM injection in each buttock	4 g in 20 mL (20% solution) administered IV over 5–20 minutes	5 g in 10 mL (50% solution) IM injection in each buttock
MgSO <sub>4</sub> Maintenance doses	5 g in 10 mL (50% solution) IM injection every 4 hours in alternate buttocks. (If convulsions recur after 15 minutes, give 2 g [50% solution] IV over 5 minutes)	1 g/ hour IV infusion	5 g in 10 mL (50% solution) IM injection every 4 hours in alternate buttocks



# Management of Severe Pre-eclampsia and Eclampsia

## Continue close monitoring of woman and fetus



## Performance Expectation

Provide continuous, close monitoring for women with SPE or E. Remember that she may get worse quickly and without warning.

### Key points

- Remember, the cure for SPE or E is delivery. While awaiting the birth, the woman and fetus must be closely monitored. Monitor at least hourly.
- Women with E must be delivered as soon as they are stable, but within 12 hours. Usually, women with SPE must be delivered in 24 hours.
- In some cases of SPE, if the fetus is between viability and 37 weeks and the woman is stable, delivery may be postponed. **This can only happen if she and her fetus can be closely monitored!**

### Key Knowledge

- Women with SPE&E are at risk for convulsions, worsening disease, stroke, and death.
- Close monitoring includes continuous assessment and rapid, appropriate response if she gets worse.

### Key Actions

- Keep strict fluid balance to monitor fluid intake and urinary output to prevent fluid overload. Document intake and output.
- Regularly assess the fetus. Consider ultrasound testing for fetal growth and amniotic fluid volume if birth is delayed.
- Regularly assess for danger signs of severe disease.

#### Check hourly or more often if needed:

- Ask the woman how she is feeling: Is the baby moving? Is she having contractions, leaking of fluid, or vaginal bleeding?
- BP to decide if maintenance dose of antihypertensive medications is needed
- Respiration and pulse
- Skin color
- Reflexes
- Fluid input and urine output. If the urine output is < 30 mL per hour, withhold MgSO<sub>4</sub> and give IV fluids at 1 L in 8 hours. Monitor for pulmonary edema and increase in urine output. If urine output does not increase with IV fluids, it may be a sign of kidney failure.
- Listen to the lungs for rales which indicate pulmonary edema. If heard, withhold fluids and give furosemide 40 mg IV once.

- Feel her abdomen for liver tenderness.
- Check fetal heart rate.
- If the woman is in labor, use the partograph and check fetal heart rate every 30 minutes and her temperature every 4 hours.

### Advanced Care Note

#### HELLP Syndrome

HELLP syndrome is a dangerous condition associated with SPE, but does not always meet PE/SPE criteria. HELLP syndrome is a group of signs that occur in pregnant women who have:

H – Hemolysis

EL – Elevated Liver enzymes

LP – Low Platelet count

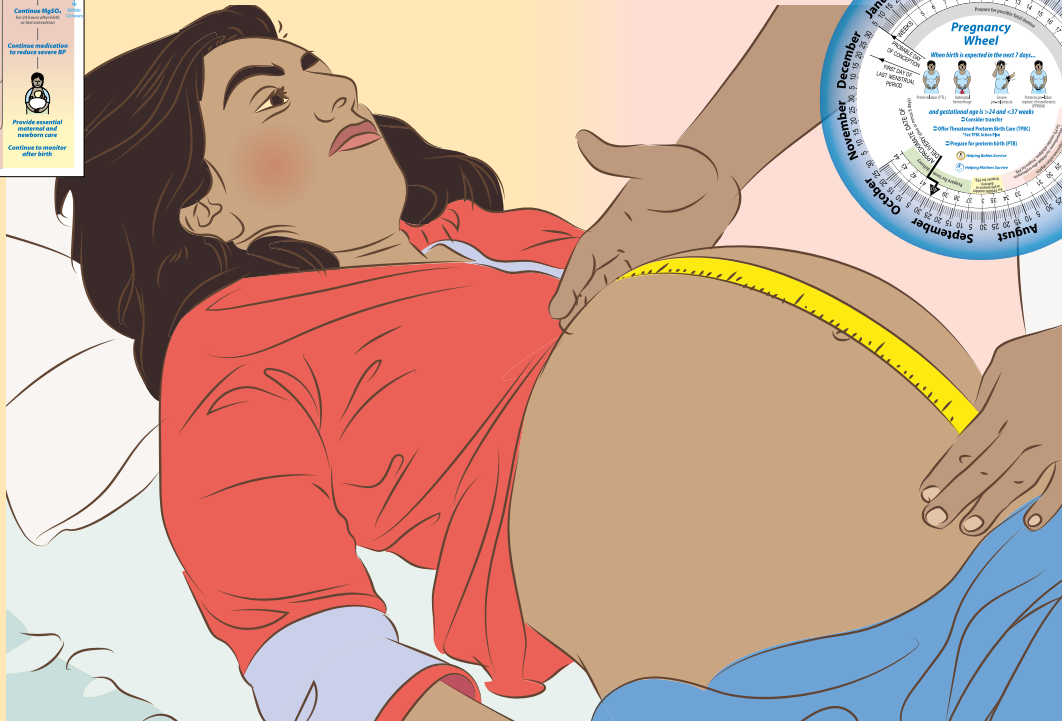
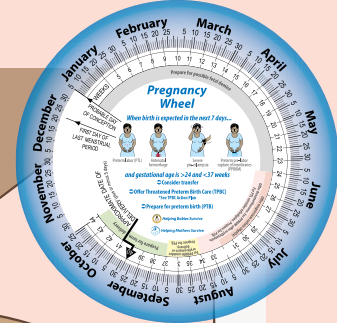
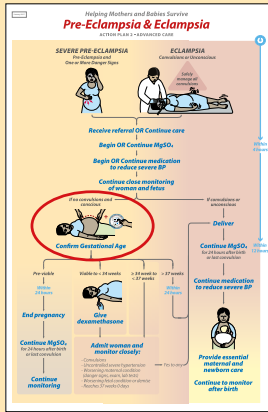
This syndrome occurs in about 10% of pregnant women with PE&E.

Symptoms of HELLP include:

- Headache
- Nausea and vomiting that get worse
- Visual problems
- Epigastric pain or right upper quadrant pain on palpation

If no convulsions and conscious

# Confirm gestational age





## Performance Expectation

Confirm or calculate GA for women with PE&E.

### Key points

- Once you have begun MgSO<sub>4</sub> for a woman with SPE, you must confirm GA to know when to deliver and to decide if she needs antenatal corticosteroids to help the fetus mature.
- Depending on GA, the woman will be in one of three groups:
  - pre-viable,
  - viable to 37 weeks, OR
  - 37 weeks or more

Each group requires different care so GA must be confirmed.

## Key Knowledge

It is important to time delivery in order to prevent severe complications and death for the mother and to provide the best chance of survival for the newborn.

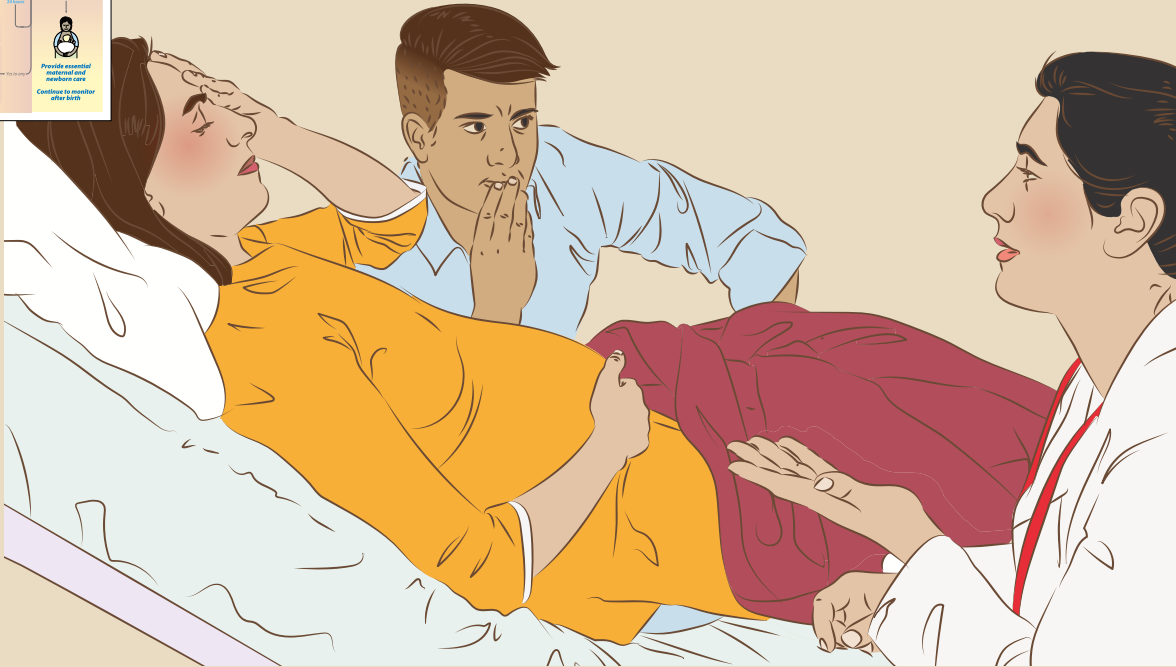
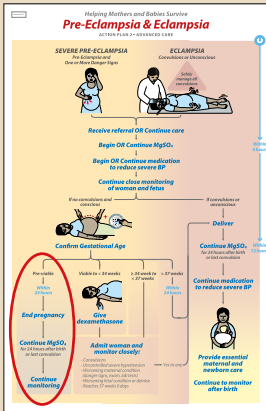
- The cure for SPE&E for the woman is delivery.
- Both SPE&E and premature birth increase the risk to the newborn.
- Steps can be taken to increase lung maturity for a fetus less than 34 weeks.
- A woman with eclampsia must be delivered within 12 hours regardless of GA.

Because the interventions are based on GA, and because interventions can be harmful if not done at the right time, it is important to confirm GA.

Where the EDD is not clear, it is advisable to review the information you have with experienced members of your maternity ward team to make the best possible decision about what interventions are needed.

If pre-viable

# End pregnancy



## Performance Expectation

- *Determine viability based on accurate GA assessment and individual and contextual factors.*
- *If the fetus is not yet viable, recommend and perform pregnancy termination.*
- *Communicate with compassion and honesty with women and families.*

## Key points

- *If a woman develops SPE when the fetus is too premature to survive, ending the pregnancy within 24 hours can save the woman's life.*
- *Respectful, compassionate care is essential. Provide grief counseling for the woman and her family.*
- *Continue MgSO<sub>4</sub> for 24 hours after delivery or the last convulsion and continue to monitor.*
- *Counsel the woman that she is at increased risk for SPE&E in future pregnancies and that she is at risk for high BP later in life.*
- *Counsel her on the importance of pregnancy spacing and ensure that she leaves the facility with the contraceptive method she chooses.*

## Key Knowledge

- Accurate GA assessment is essential in order to ensure that a fetus is pre-viable.
- A pre-viable fetus is too premature to survive. The age at viability depends on facility and country resources.
- If a woman develops SPE prior to the age of fetal viability, pregnancy termination reduces her risk of developing life-threatening complications.
- If the fetus is not viable, expectant management increases the risk of poor outcomes including stillbirth and maternal death.
- Delaying birth to increase fetal maturity may risk the woman's life and is not likely to result in improved newborn outcomes.
- Since SPE is progressive and delivery is the cure, ending the pregnancy can save the woman's life.
- The decision to end the pregnancy should be made in consultation with obstetric and pediatric or neonatology specialists where available. Each case is unique and should be considered individually.
- Professional, respectful, and appropriate communication with women and families about the clinical indication for termination is critical.

## Key Actions

- The method to end a pregnancy depends on fetal age, local standards, and provider knowledge and experience.

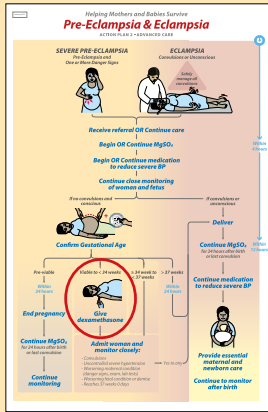
## Counseling Note

### Helping families cope with pregnancy loss:

1. Most women experience grief and sadness following a pregnancy loss. If the pregnancy was ended to save their lives, they may feel guilt.
2. Parents will always remember how they were treated by those who cared for them during this hard time.
3. Deliver difficult news in a timely and unhurried manner, and in a private area. Answer questions honestly.
4. Women may blame themselves (or others may blame them) for the illness and the loss. Remind women, partners, and families that PE&E was not their fault.
5. Encourage the presence of a support person of the woman's choosing.

If viable, but less than 34 weeks

# Give Dexamethasone



## Performance Expectation

Give antenatal corticosteroids to all women < 34 weeks who may deliver in the next 7 days.

## Key points

- Give dexamethasone to improve newborn health for women with a viable fetus but < 34 weeks GA. Maximum benefit occurs 48 hours after the first dose.
- Do NOT give if you cannot confirm the GA is > 24 weeks but < 34 weeks.
- Do NOT give if you think that the woman may have an infection or the preterm newborn cannot receive adequate care if needed.

## Key Knowledge

- **Dexamethasone is an antenatal corticosteroid (ACS). ACS reduces death in preterm babies by 31%**, by speeding maturity of fetal lungs and by protecting the intestines and blood vessels in the brain.
- **Only give dexamethasone if:**
  - High confidence that GA is < 34 weeks
  - High confidence that she will deliver within the next 7 days
  - There is no suspicion of maternal infection (chorioamnionitis or sepsis)
  - Adequate care is available, including the ability to:
    - recognize and safely manage preterm labor and birth
    - provide resuscitation, thermal care, feeding support, infection treatment, and safe oxygen use
- Maximum benefit is seen 48 hours after the first dose but delivery even a few hours after one dose may increase the chance of survival.
- Do not delay birth in order to give the second dose if quick delivery is needed to protect the woman or fetus.

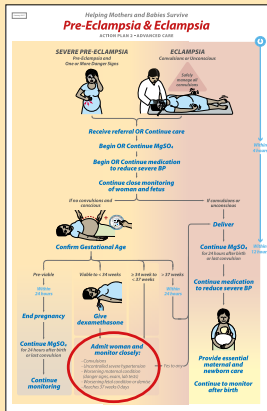
- **Dexamethasone may increase the risk of maternal sepsis and neonatal mortality in infants  $\geq$  37 weeks GA.**
- ACS should never be given if maternal infection is suspected.

## Key Actions

- For women with accurate dating and GA < 34 weeks, give dexamethasone
- 24 mg IM in divided doses.  
**Give 12 mg dexamethasone IM as soon as possible, followed by another 12 mg IM 24 hours later.**
- Give a single, repeat course if preterm
- birth does not occur 7 days after ACS and the risk of preterm birth persists.  
**Do not give more than two courses as this can be harmful.**

### Note:

*Betamethasone can also be used to mature fetal lungs but is less available and more expensive than dexamethasone. Dosing for betamethasone is also 12 mg IM as soon as possible, followed by 12 mg 24 hours later. Other steroids do not cross the placenta and therefore are not effective.*



*If viable, but < 37 weeks,  
 where close monitoring is available*

**Admit woman  
 and monitor closely**



## Performance Expectation

*Make appropriate clinical decisions about eligibility for expectant management for women less than 34 weeks GA based on lab and clinical findings.*

### Key points

- **Expectant management for women with SPE is an option only if a woman and her fetus are stable and less than 37 weeks AND if continuous monitoring is available.**
- *If at any time a woman experiences a contraindication to expectant management, the baby should deliver within 24 hours.*

### Key Knowledge

- SPE can rapidly progress and put both woman and fetus in danger. To consider delaying birth, the facility must be able to:
  - Safely and quickly induce labor if needed.
  - Provide safe surgical and post-op care.
  - Care for premature or sick newborns.
- Between viability and 37 weeks, it may be possible to prolong the pregnancy

to decrease neonatal mortality if:

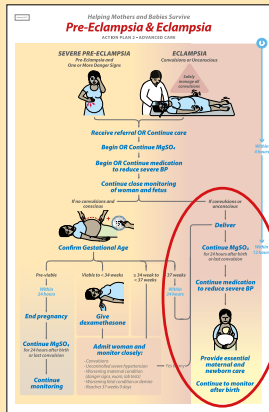
- The woman and fetus are stable.
- The woman can receive close monitoring and care in an advanced care hospital.
- **You cannot provide expectant management if any of the following are present:**
  - Eclampsia
  - Pulmonary edema
  - Uncontrolled severe hypertension
  - Persistent symptoms (headache, visual disturbances, or RUQ pain).
  - Abnormal laboratory values
  - HELLP
  - DIC
  - Placental abruption
  - Maternal shock
  - Nonreassuring fetal assessment
  - Fetal death
  - Preterm labor or preterm rupture of membranes
- **MgSO<sub>4</sub> decreases the incidence and severity of cerebral palsy. If GA is less than 32 weeks, and there is a risk of birth in the next 24 hours, IV-only MgSO<sub>4</sub> (the Zuspan regimen) offers fetal neuroprotection if IV infusion pumps or gravity drips are available.**

### Key Actions

- Hospitalize woman until delivery.
- Assess maternal status frequently.
  - Vital signs, fluid balance, labor and abdominal assessment every 8 hours, with laboratory testing daily. Testing may be every other day if the woman is stable and without symptoms.
- Regularly assess fetal well-being.
  - Daily fetal movement check and non-stress testing, amniotic fluid index twice weekly, fetal growth check by ultrasound every 2–3 weeks.
- Administer ACS if the likelihood of birth in the next 7 days is high. Delay delivery for 48 hours to complete a full course of ACS only if the woman and fetus are stable.
- Give MgSO<sub>4</sub> and antihypertensives as needed. If the woman is a candidate for expectant management, MgSO<sub>4</sub> is given for 24–48 hours and then discontinued. It is restarted with onset of labor or worsening disease.

### Important Note:

If you and your facility cannot closely monitor a woman with stable SPE, she should be immediately transferred to a facility capable of continuous monitoring as described here, or delivered within 24 hours.



*If unstable SPE,  
Stable SPE ≥ 37 weeks 0 days, OR  
Any GA with Eclampsia*

# Deliver





## Performance Expectation

- *Deliver all women with SPE over 37 weeks GA.*
- *Deliver women with E as soon as they are stable, regardless of GA*

## Key points

- *A woman with SPE >37 weeks should deliver within 24 hours.*
- *A woman with SPE of any GA who is not stable should deliver within 24 hours.*
- *A woman with SPE of any GA who cannot be closely monitored should deliver within 24 hours.*
- *A woman with E regardless of GA should be delivered within 12 hours.*
- *Vaginal birth is preferred if possible.*

## Key Knowledge

- Delivery is the cure for SPE&E.
- Women with SPE who are either < 37 weeks GA with a contraindication to expectant management or ≥ 37 weeks GA, should deliver within 24 hours. Vaginal birth is preferred if possible.
- Decision about delivery method should be based on: GA (the higher the GA,

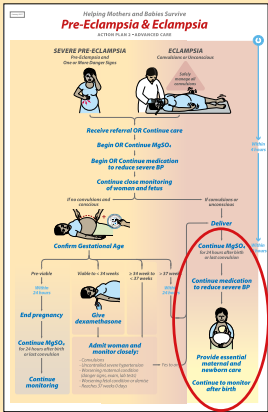
the greater likelihood of a successful induction), cervical favorability, whether the patient is already in labor, and the fetal condition and position.

- A vaginal birth is preferred unless cesarean delivery is required:
  - for obstetric indications
  - for non-reassuring fetal heart rate or if the fetus is unstable
  - if a vaginal birth is not expected within 24 hours
- In facilities with newborn intensive care units, alert neonatal/pediatric specialist of expected birth. Ideally, a neonatal provider should be present or accessible in the case of complications.
- The definitive treatment for E is delivery as soon as a woman is stable, regardless of GA. Delivery should happen within 12 hours.

## Key Actions

- Give MgSO<sub>4</sub> throughout the intrapartum period and give antihypertensive as needed, regardless of mode of childbirth.

- Assess the cervix to consider induction
  - If the cervix is favorable (soft, thin, partly dilated), proceed with labor induction per facility protocol.
  - If the cervix is unfavorable (firm, thick, closed), ripen the cervix using misoprostol, prostaglandins, or a catheter balloon.
  - If the cervix remains unfavorable after ripening or induction fails, deliver by cesarean.
- Before cesarean delivery is performed, ensure that:
  - Coagulopathy has been ruled out
  - Safe anesthesia is available—consult with anesthesiologist about the best method
- If GA is < 34 weeks, give the first dose of dexamethasone to optimize fetal outcomes if it will not delay delivery.
- Continue close maternal and fetal monitoring throughout labor and birth.
- Monitor labor with the partograph.
- Maintain the MgSO<sub>4</sub> Monitoring Sheet throughout labor, birth, and postpartum period.



# Provide essential maternal and newborn care and continue to monitor after birth



## Performance Expectation

- Give MgSO<sub>4</sub> to women with SPE&E for 24 hours after birth or 24 hours after the last convulsion, whichever occurs last.
- Provide recommended care to women and babies after birth.
- Distinguish between normal and abnormal findings.

## Key points

- Women are still at risk for SPE&E after birth.
- MgSO<sub>4</sub> should be continued for 24 hours after birth or the last convulsion, whichever occurs last.
- Antihypertensive treatment is needed as long as a woman has severe BP.
- All women should receive essential postpartum care.
- All babies should receive essential newborn care.

## Key Knowledge

- Remember, a woman with SPE or E is still at risk for convulsions in the immediate postpartum period.
- As long as a woman has severe hypertension, she should be treated with appropriate antihypertensive medication.

- **SPE can worsen or turn into E after birth! Monitor closely for at least 72 hours postpartum.**

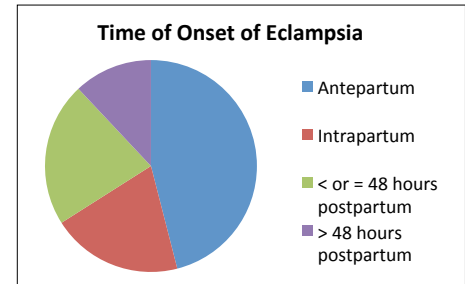
## Key Actions

- Continue anticonvulsive treatment with MgSO<sub>4</sub> for 24 hours after birth or 24 hours after the last convulsion, whichever occurs last. Remember MgSO<sub>4</sub> maintenance dosage according to route of administration:
  - MgSO<sub>4</sub> maintenance dose IM: 5 g in 10 mL (50% solution) IM injection every 4 hours in alternate buttocks
  - MgSO<sub>4</sub> maintenance dose IV (Zuspan regimen): 1 g / hour IV infusion
- **Continue antihypertensive medication** to keep dBp between 90 and 100 mmHg.
- **Continue MgSO<sub>4</sub>** for 24 hours after birth or 24 hours after last seizure, whichever happens later. Carefully look for signs of toxicity and document on MgSO<sub>4</sub> monitoring sheet.
- **Continue to listen to lungs** for pulmonary edema.
- **Continue to monitor fluid input and urine output.**
- **Continue to assess for danger signs.**
- Do not provide nonsteroidal anti-

inflammatory drugs (NSAIDs) to women with poorly controlled hypertension, oliguria, renal insufficiency, or thrombocytopenia.

- Provide routine postpartum care and monitoring per national guidelines.
- Ensure that the woman understands the danger signs and can seek care if she has any of these.
- Ensure she has a contraceptive method prior to discharge.
- Tell her that she is at risk for PE&E in future pregnancies and high blood pressure later in life.

**Provide routine essential newborn care as described on page 25.**



Source: Sibai BM, *Diagnosis, prevention, and management of eclampsia. Obstet Gynecol.* 2005;105(2):402

## **Abbreviations**

ACS	antenatal corticosteroids
AMTSL	active management of third stage of labor
ANC	antenatal care
BAB	Bleeding after Birth
BP	blood pressure
BPP	biophysical profile
BUN	blood urea nitrogen
CBC	complete blood count
C/S	cesarean section
dBp	diastolic blood pressure
E	eclampsia
EDD	expected delivery date
EL	elevated liver enzymes
GA	gestational age
HELLP	hemolysis, elevated liver enzymes, low platelets
HMS	Helping Mothers Survive
HBB	Helping Babies Breathe
IM	intramuscular
IV	intravenous
LDHF	low-dose, high-frequency
LFT	liver function test
LMP	last menstrual period
LP	low platelets
MgSO <sub>4</sub>	magnesium sulfate
NST	non-stress test
PE	pre-eclampsia
PE&E	pre-eclampsia and eclampsia
PPH	postpartum hemorrhage
SBA	skilled birth attendant
sBP	systolic blood pressure
SPE	severe pre-eclampsia
WHO	World Health Organization

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## LDHF ACTIVITIES

### What is “continued practice” and why is it important?

Training alone is not enough to improve care. Regular practice and other activities are needed to reinforce new knowledge and skills. Practice also improves teamwork and clinical decision-making.

### Who helps you practice?

One or two people from your facility will be asked to coordinate practice sessions. The coordinator will remind you to practice and will guide the sessions. She/he is a colleague who has learned how to support these activities. **Remember, though, you and your peers can practice without a coordinator if you don’t have one or they are not available!**

### Session objectives

The objectives of each session link to key learning objectives. Skills practice will help you refine your skills, especially skills you may not use often. For all sessions, be sure to demonstrate respectful care, good teamwork, and communication.

### Session preparation

Each session plan includes a list of items

you need how you should prepare. Practice coordinators are responsible for making sure everything is ready. Session plans also include instruction for coordinators and providers about how to run the session. You will need this Provider’s Guide (PG) for reference. Coordinators will give friendly coaching as needed.

### Simulating care with role plays

To help us practice skills and clinical decision making, we will use role plays as we did during training. When conducting a role play, coordinators will:

- Establish a safe learning environment
- Run the role play
- Conduct organized debrief
- Support discussion to improve learning
- Identify and explore gaps
- Help providers transfer what they learned into clinical practice

### Debrief

During debrief, coordinators guide providers to analyze their own performance and performance of the team. This gives everyone the chance to learn by carefully reviewing what happened. Coordinators and providers should be constructive and avoid embarrassing each other. The goal is self-reflection and team improvement.

## Session 1: Creating a PE&E emergency kit and referral plan

15 – 30 minutes

### Read objectives aloud:

- Assemble a PE&E emergency kit or ensure correct PE&E supplies are in a general emergency kit
- Establish protocol to maintain kit
- Review and update OR establish and post a referral plan

### NOTE:

If you already have a PE&E emergency kit, confirm it is complete and someone is responsible for checking it, then skip to referral planning.

### Preparation:

- If the facility has a referral plan, have it ready to review with the team.
- Open another PG to page 33.

### Materials:

- Leak-proof box with lid—to keep contents dry and clean
- Watch, clock, or other timer
- Marker/pens/paper
- Referral plan

**Activity:**

The coordinator is the time-keeper. All labor ward staff participate. The coordinator tells providers, *"When I say 'Go!' gather each item on the PE&E kit list and place it in the container."* When the coordinator says "Go!" he or she should start the timer to see how long it takes the team to gather all items. If items are still missing after 10 minutes, stop the activity. As a group, discuss each question and do each task:

- "This exercise took (x) minutes, with (y) people. What happens when it takes this much time to gather what we need?"
- "Did we find everything? If not, how can we get what is missing?"
- Label filled container "PE&E Emergency Kit" and tape checklist of supplies to the top. Add kit to emergency trolley or put it in a safe place where everyone can access it.
- **Decide who will check the kit weekly to be sure it is complete and nothing is expired.**

**Referral planning:**

- For facilities that refer for any reason, review the referral plan. Be sure to post it for all to see with contact numbers for the referral hospital and transportation. Consider programming contact numbers into staff mobile phones.

**Session 2****Blood pressure (BP) measurement and testing reflexes**

10 minutes

**Read objectives aloud:**

- Ensure BP machine is calibrated.
- Accurately measure BP.
- Properly assess whether reflexes are present or absent.
- Understand that reflex testing is needed for hourly monitoring for MgSO<sub>4</sub> toxicity.
- Understand MgSO<sub>4</sub> dose should be withheld if reflexes are absent.

**Materials:**

- Recalibration key
- BP machines, stethoscopes, and reflex hammers

**Preparation:** Your practice coordinator will help you individually or in pairs (up to 3 pairs) OR you can practice on your own. If reflex hammers are not available, use stethoscopes or the side of your hand.

**Activity - BP measurement:**

Providers do these steps together:

- Assess BP equipment. If the needle is not at "0" or pointing straight down, use the calibration key (comes with the BP

machine) to get the needle to "0."

- For most machines, the calibration slot is underneath the dial. Gently pull off the tubing to insert the key into the slot. Turn gently until needle is straight down or at "0." Store key in central location and note location. Calibrate all machines every 6 months.

Divide into pairs to practice taking BPs and testing reflexes. Open another PG to page 9 and give supportive feedback to each other as you ensure:

- Proper position of "client"
- Proper position of cuff and stethoscope.
- Inflation to 180mmHg then release at about 3mm/sec.

It is important to use what you hear and not what you see for each value. Remember, each bar is 2mmHg.

- After first providers have taken BPs, ask what they got.
- Remind each other not to round up or down but give precise numbers.
- Switch roles and repeat.

**Activity—reflexes**

Ensure a private, safe learning space.

Providers need to touch each other's knees and "clients" must be relaxed. The "client"

should either lie on a bed with legs relaxed or sit with legs hanging freely. Feet should not rest on the ground. The provider should:

- Feel for the deep tendon just below the kneecap.
- Bring the wide edge of a reflex hammer, edge of a stethoscope, or side of the hand down onto the tendon in a rapid, smooth movement. This should make the lower leg jerk.

Once providers successfully elicit reflexes a few times, switch roles. If someone cannot elicit reflexes, they should try using different methods (hammer, hand, stethoscope) or partners.

### Session 3

## Labor Role Play

30 minutes

#### Read objectives aloud:

- Correctly assess for PE&E
- Correctly classify PE&E based on assessment
- Provide correct initial management of PE&E

#### Materials:

- PE&E emergency kit
- Action Plan/Provider's Guide
- BP machine and stethoscope
- Urine dipsticks

- Pregnancy wheel or calendar
- Tape measure and fetoscope
- MgSO<sub>4</sub> Monitoring Sheet

#### Preparation:

- You need at least 3 people: 1 "client" (coordinator), 1 provider, 1 assistant
- For this session, only "clients"/coordinators should have their PGs open. Set out materials in advance.

#### Activity:

"Client" should know the information below but not share until "provider" conducts related assessment during simulation.

- History of PE in previous pregnancy
- BP: 142/84
- Urine: 1+ protein
- Fundal height: 36 cm
- Fetal heart rate: 154
- Cervix: 6 cm dilated
- Contractions: every 4 min x 40 sec
- Danger signs: **bad headache with no relief with medication, blurry vision**, no right upper quadrant pain, no difficulty breathing, no rales, and no history of convulsions.

If other items are assessed, give normal values. Coordinator acting as "client" reads below and proceeds with the role play,

treating the scenario as if a real clinical situation: *"Sara is 35 years old and is pregnant with her 5th child. She just came to the labor ward in active labor. Her record shows a confirmed LMP giving her a GA of 37 wks 0 days today. Interview her and proceed to give care to Sara. **If you are taking any measurement except vaginal exam, do so.** For all measurements, your client will give the answer. For vaginal exam, simply ask."*

Coordinator/client should stop role play upon completion of loading dose. Team should debrief and discuss questions below using Action Plan and Flip Chart where appropriate. Note the answers are on page 64. Ask:

1. How do you think it went?  
How do you feel?
2. Regarding assessment, what information did you gather and what else might you ask/assess?
3. What was your diagnosis?  
(Refer to classification table on pg. 18)
4. What did you do for Sara and why?
5. What is something you learned that you might use with a real client? What could you improve for next time?



## Session 4

### Gestational age (GA) assessment by LMP

15 minutes

#### Read objective aloud:

- Assess GA by LMP

#### Materials:

- Pregnancy wheels or calendars, paper and pencils

#### Preparation:

- Practice in pairs
- Go to page 23 for reminders on EDD and GA calculations.

#### Discuss:

If women cannot remember the 1st day of their LMP, help them by associating their LMP with holidays or other events. Use gestational age wheel or a calendar. If these are new to providers, take time to review how to use.

#### Practice GA calculation:

Providers should work on calculations on their own first. **Use 10th April as today's date.** Note the answers are on page 64. Compare answers and discuss after each case.

**Case 1:** A woman arrives for her first ANC visit and is sure her LMP was 28th September, her birthday.

1. What is her expected due date and GA today (10 April) based on LMP?
2. If her fundus measures 27 cm, do you have high or low confidence in this GA estimation?

**Case 2:** A woman says her LMP finished just before Election Day, or 15th August, and her menses usually last between 5 and 7 days.

1. What would you guess is her LMP?
2. What is her EDD and GA today (10 April) based on LMP?
3. If she measures 36 cm, do you have high or low confidence in this GA estimate?

**Case 3:** A woman says the first day of her LMP was around the last day of July.

1. What would you use for her LMP?
2. What is her EDD and GA today (10 April) based on LMP?
3. If her fundal height is 32 cm, do you have high or low confidence in this GA estimate?

## Session 5

### GA assessment by fundal height measurement

10 minutes

#### Read objectives aloud:

- Assess GA and fetal growth by fundal height (FH) measurement.

#### Materials:

- Tape measure

#### Preparation:

The coordinator will coach each provider during 1–2 ANC exams (women should be > 24 weeks GA). The coordinator and provider should review steps for FH measurement on page 21 before seeing the client.

#### Activity:

Provider should:

- Greet client, introduce yourself.
- Review EDD, LMP and expected GA for today.
- Tell the client what you are doing and why.
- Place the “0” on the tape measure at the top of pubic bone. Stretch the tape over the belly. Place second hand around top of fundus, holding the tape. FH and GA = cm on tape at the top of fundus.

- Compare findings with GA from LMP to decide if they match.
- Explain findings

Away from the client, discuss if both coordinator and provider agreed on measurement. Coordinator will provide supportive feedback on technique and communication. Provider can repeat measurement if needed. If more practice is needed, the coordinator can support the provider during more exams.

## Session 6

### ANC Role Play 1

30 minutes

#### Read objectives aloud:

- Correctly assess for PE&E in ANC.
- Correctly classify PE&E based on assessment.
- Provide initial correct management in ANC setting.

#### Materials:

- Action Plan / Provider's Guide
- BP machine
- Stethoscope
- Urine dipsticks
- Pregnancy wheel, if available
- Tape measure and fetoscope

#### Preparation:

- You need at least 2 people: one provider and the coordinator to act as "client."
- For this session, only "clients"/coordinators should have their PGs open. Find a private, available space and set out materials in advance.

#### Activity:

"Client" should have information below but not share until "provider" conducts related assessment during role play.

- Known LMP 16th August
- Fundal height 33cm
- BP is 148/88
- Urine is 2+ protein
- Danger signs: None at any time
- FHTs present 150

**If other items are assessed, give normal values.**

"Client" reads below and proceeds with the role play, treating the scenario as if a real clinical case:

*"Mrs. N is 21 years old, G3P2 presenting to you for her fourth ANC visit today which is 10 April. Interview her and proceed normally for a routine ANC visit. **If you are taking any measurement, do so.** Your client will tell you the measurement."*

Coordinator/client should interrupt role play at the end of the visit and say, "It's been 4 hours and her BP is 150/86. What will you do now?"

"Providers" should debrief and discuss questions below using Action Plan and Flip Chart where appropriate. Note the answers are on page 65. Ask:

1. How do you think it went? How did you feel?
2. Regarding assessment, what information did you gather and what else might you ask/assess?
3. What is her EDD and GA?
4. What is the most likely diagnosis?
5. What did you do for Mrs. N? Why?
6. What is something you learned that you might use with a real client? What could be improved?

## Session 7

### Postpartum Role Play

30 minutes

#### Read objectives aloud:

- Correctly assess for MgSO<sub>4</sub> toxicity
- Correctly administer maintenance dose.
- Correctly administer antihypertensive
- Provide correct ongoing management of PE&E

#### Materials and Preparation:

Same as session 6

#### Activity:

“Client” should have information below but not share until “provider” conducts related assessment during role play.

- BP: 160/108
- Reflexes: present
- Urine output: 150mL over 4 hours
- RR: 18, lungs clear

**If other items are assessed, give normal values.**

Client or coordinator reads the note below and then proceeds with the simulation, treating the scenario as if a real clinical situation:  
*“Mrs. S delivered a healthy baby girl last night. She developed SPE with a BP of 170/114 within*

*2 hours after birth and was given a loading dose of MgSO<sub>4</sub> 4gm IV and 10 gm IM and also nifedipine 20mg PO at 5 this morning. It is now 9:00am and you come to check on her. Proceed to care for her as you would normally. If you are taking any measurement, do so. Your client will tell you the measurement.”*

Coordinator/client should stop role play upon completion of interaction.

“Providers” should debrief and discuss questions below using Action Plan and Flip Chart where appropriate. Note the answers are on page 65. Ask:

1. How do you think it went? How did you feel?
2. Regarding assessment, what information did you gather and what else might you ask/assess?
3. What did you do for Mrs. S? Why?
4. When will you stop her MgSO<sub>4</sub>?
5. When can Mrs. S and her baby be discharged home?
6. What is something you learned that you might use with a real client? What could be improved?

## Session 8

### ANC Role Play 2

30 minutes

#### Session Objectives:

- Correctly manage a convulsion.
- Correctly classify PE&E.
- Provide correct initial management of PE&E.

**Materials and Preparation:** Same as session 6 and add oxygen mask

#### Activity:

Client or coordinator reads the note below and then proceeds with the role play, treating the scenario as if a real clinical case: *“Lindi is pregnant with her 1st baby. She came to you today with a severe headache. You greet her, bring her into the examination area, and take her BP which is 152/108. As you remove the BP cuff, Lindi starts convulsing.” Proceed to care for her. If you are taking any measurement, do so. Your client will tell you the measurement.”*

Manage Lindi as if a true emergency. After role play is over and the “client” is stable, review convulsion management steps on page 15 together and discuss. Note the answers are on page 65. Ask:

1. How do you think it went?  
How did you feel?
2. What was Lindi's diagnosis?
3. Regarding assessment, what information did you gather and what else might you assess?
4. What did you do for Lindi? Why?
5. What is something you learned that you might use with a real client? What could be improved?

## **SESSION ANSWERS**

### **Session 3** **Labor Role Play**

1. Allow discussion—Consider communication with the team and the client, amount of time to initiate treatment, and other observations.
2. Did they assess: history, GA, abdominal exam, contractions, vaginal exam, FHTs, BP, protein, danger signs? If they did not, discuss why.
3. SPE (elevated BP plus danger sign)
4. Did they:
  - Mobilize team and get PE&E emergency kit.
  - Give correct loading dose of MgSO<sub>4</sub> and start MgSO<sub>4</sub> Monitoring Sheet.
  - Conduct laboratory tests (if possible).
  - Arrange for urgent referral (if this is not advanced care facility) once Sara has delivered.
  - Inform Sara about what is happening and why.
5. Guide providers to identify a specific behavior or skill change. Consider teamwork, communication, preparing treatment, etc.

### **Session 4** **GA Assessment by LMP**

Case 1:

1. EDD: July 5; GA today: 27 wks 5 d
2. High confidence

Case 2:

1. Aug 8th
2. EDD: May 15; GA today: 35wks 0 d
3. Fairly confident

NOTE: Providers should account for 5 – 7 days for length of menses and subtract to get 1st day of her LMP

Case 3:

1. July 31st
2. EDD: 7th May; GA today: 36 wks 2 d
3. Low > 3 wks off

NOTE: The woman is measuring small for dates. Her LMP may be incorrect OR the fetus may be growing poorly. Discuss how measuring small or large for dates is managed at this site.

## Session 6

### ANC Role Play 1

1. Allow discussion—Consider communication with the client.
2. Did they assess: history, GA, abdominal exam, FHTs, BP, protein, danger signs? If they did not, discuss why. Did they have her return in 4 hr?
3. EDD = 23rd May, GA (today 10 April) = 34wk 0 days
4. Dx = PE (elevated BP plus proteinuria)
5. Repeated BP in 4 hours, if she could wait. Asked Mrs. N again if she has any of the danger signs. Told Mrs. N that she has PE. Drew labs if possible. Increased visits to twice weekly. Counseled her about PE&E danger signs and advised her to come back immediately if she has these. Provided routine ANC counseling, including birth preparedness and complication readiness.
6. Guide providers to identify a specific behavior or skill change. Consider assessment, communication, risk counseling, etc.

## Session 7

### Postpartum Role Play

1. Allow discussion—Consider communication with the client, amount of time to assess and give treatment.
2. Did they assess: BP, reflexes, respirations, urine output? If they did not, discuss why.
3. Did they: Prepare MgSO<sub>4</sub> 50% 5gm with 1mL of 2% lignocaine and give IM. Give antihypertensive (per context). Document assessment and medications on MgSO<sub>4</sub> monitoring sheet. Inform Mrs. S about what is happening and why.
4. MgSO<sub>4</sub> will be stopped if Mrs. S shows signs of toxicity. Otherwise it will be discontinued at 5 the next morning IF she does not have any seizures.
5. Mrs. S and her baby can go home when Mrs. S is stable—meaning her BP is within normal range, she has no danger signs, and her laboratory tests are reassuring. This is according to provider's clinical judgment. Careful follow-up and counseling should be provided. This should include telling her about danger signs, risk of PE or E in a future pregnancy, and risk of high blood pressure later in life.
6. Guide providers to identify a specific behavior or skill change. Consider teamwork, communication, preparing treatment, etc.

## Session 8

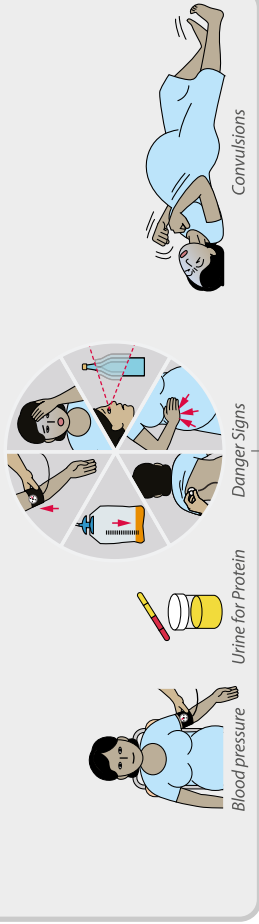
### ANC Role Play 2

1. Allow discussion—Consider clear communication of team roles.
2. Eclampsia
3. Did they:  
Shout for help, ensure airway is open and turn her on her side, give oxygen 4–6L if available, use bag/mask if not breathing, assess circulation, protect her from injury without restraining, not put anything in her mouth, initiate the loading dose of MgSO<sub>4</sub> and antihypertensive.
4. Same information as for 3 above
5. Guide providers to identify a specific behavior or skill change. Consider teamwork during an emergency, communication, preparing treatment, etc.

# Helping Mothers and Babies Survive Pre-Eclampsia & Eclampsia

## ACTION PLAN 1 - INITIAL CARE

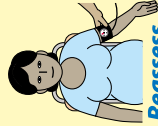
Assess (if > 20 weeks pregnant)



### CLASSIFY

Continually assess for Danger Signs

**PRE-ECLAMPSIA**  
 dBP  $\geq 90$  or sBP  $\geq 140$  and  
 $\geq 2$  + proteinuria  
 No Danger Signs



Reassess

Normal?

Yes →

No

**Routine care**



**Do laboratory tests**

Normal?

Yes

Stable?

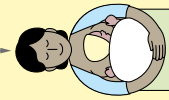
Yes

**Increase follow up**

Yes

No

**Confirm gestational age  
 Deliver at 37 weeks**



**Provide essential care  
 Continue to monitor**

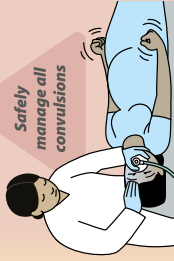
Result normal? → No

**SEVERE PRE-ECLAMPSIA**  
 dBP  $\geq 110$  or  
 sBP  $\geq 160$  and  
 $\geq 2$  + proteinuria  
 or  
 Pre-Eclampsia and  
 $\geq 1$  Danger Sign



**Mobilize team**

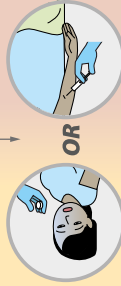
**ECLAMPSIA**  
 Convulsions or Unconscious



Safely manage all convulsions



Give loading dose of magnesium sulfate (MgSO<sub>4</sub>) IV + IM

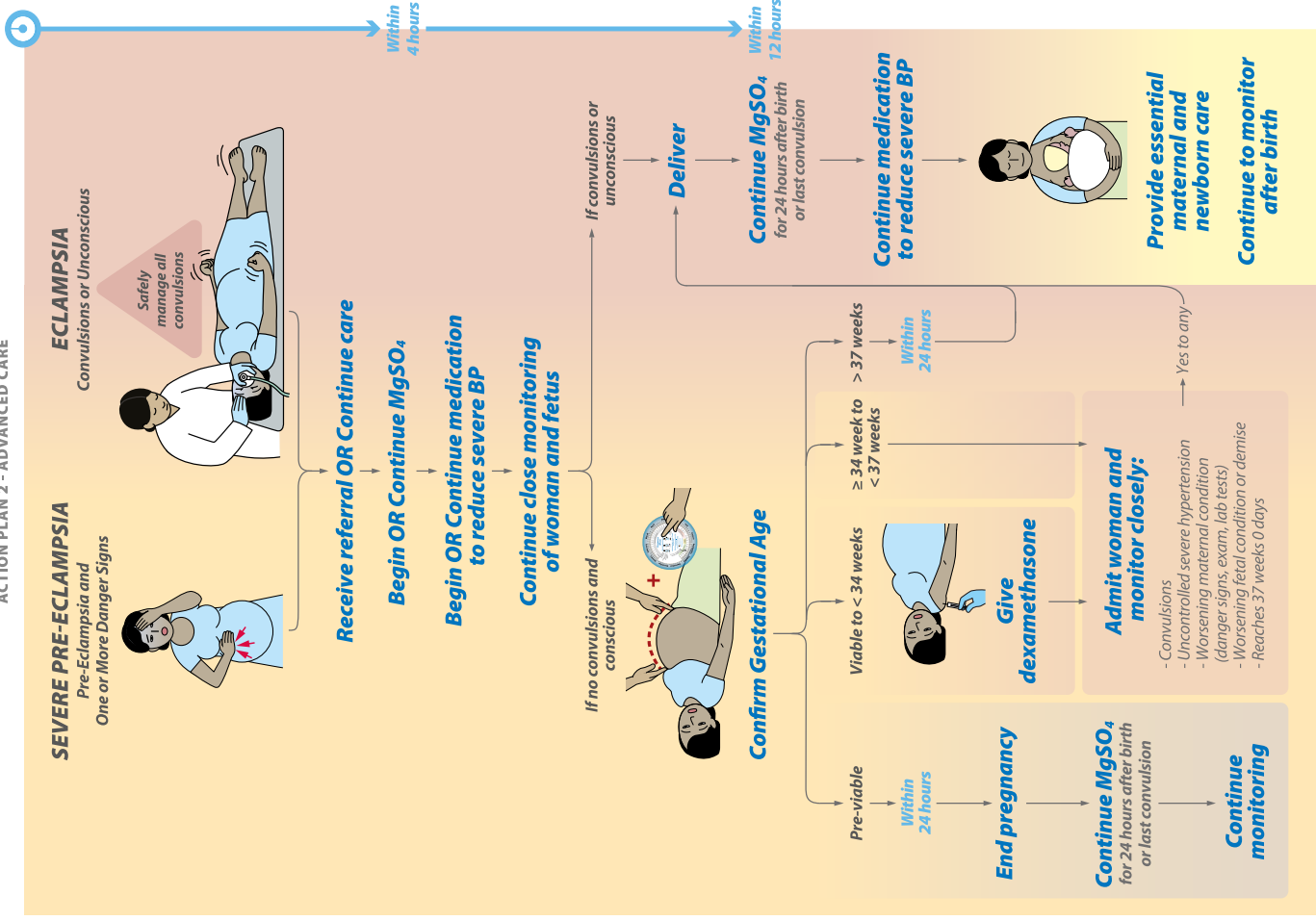


Give medication to reduce severe BP

Seek advanced care

# Helping Mothers and Babies Survive Pre-Eclampsia & Eclampsia

ACTION PLAN 2 - ADVANCED CARE



Helping Mothers and Babies Survive  
**Pre-Eclampsia & Eclampsia**

ACTION PLAN 1 - INITIAL CARE

Assess (if > 20 weeks pregnant)



CLASSIFY

**PRE-ECLAMPSIA**  
 dBp $\geq$ 90 or sBP $\geq$ 140 and  
 $\geq$ 2 + proteinuria  
 No Danger Signs



Reassess  
 Normal?

Routine care

Yes

No



Do laboratory tests

Normal? → No

Yes

Increase follow up

Stable? → No

Yes

Confirm gestational age  
 Deliver at 37 weeks



Provide essential care  
 Continue to monitor

Result normal? → No

**SEVERE PRE-ECLAMPSIA**  
 dBp $\geq$ 110 or sBP $\geq$ 160 and  
 $\geq$ 2 + proteinuria



Reassess  
 Normal?

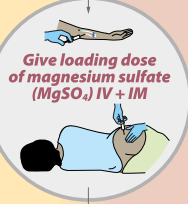
Continually assess for Danger Signs

**ECLAMPSIA**  
 Convulsions or Unconscious



Safely manage all convulsions

Mobilize team



Give loading dose of magnesium sulfate (MgSO<sub>4</sub>) IV + IM



Give medication to reduce severe BP

Seek advanced care

Helping Mothers and Babies Survive  
**Pre-Eclampsia & Eclampsia**

ACTION PLAN 2 - ADVANCED CARE

**SEVERE PRE-ECLAMPSIA**  
 Pre-Eclampsia and One or More Danger Signs

**ECLAMPSIA**  
 Convulsions or Unconscious



Safely manage all convulsions

Receive referral OR Continue care

Begin OR Continue MgSO<sub>4</sub>

Begin OR Continue medication to reduce severe BP

Continue close monitoring of woman and fetus

If no convulsions and conscious



Confirm Gestational Age

Pre-viable

Within 24 hours

End pregnancy

Continue MgSO<sub>4</sub> for 24 hours after birth or last convulsion

Continue monitoring

Viable to < 34 weeks

Give dexamethasone

Admit woman and monitor closely:

- Convulsions
- Uncontrolled severe hypertension
- Worsening maternal condition (danger signs, exam, lab tests)
- Worsening fetal condition or demise
- Reaches 37 weeks 0 days

$\geq$  34 week to < 37 weeks

Within 24 hours

Yes to any

If convulsions or unconscious

Deliver

Continue MgSO<sub>4</sub> for 24 hours after birth or last convulsion

Continue medication to reduce severe BP



Provide essential maternal and newborn care

Continue to monitor after birth

Within 4 hours

Within 12 hours