

# Under Pressure

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HOW TO RECOGNIZE, TREAT, AND MONITOR  
SEVERE HYPERTENSION IN PREGNANCY





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**Disclaimer:** The following material is based on data from the Safe Motherhood Initiative’s Maternal Safety Bundle, New York State Department of Health (NYSDH), and the American College of Obstetricians and Gynecologists (ACOG) practice bulletins on managing severe hypertension in pregnancy.

Dr. Gregory Root has no financial relationships to disclose. This presentation is for educational purposes only.



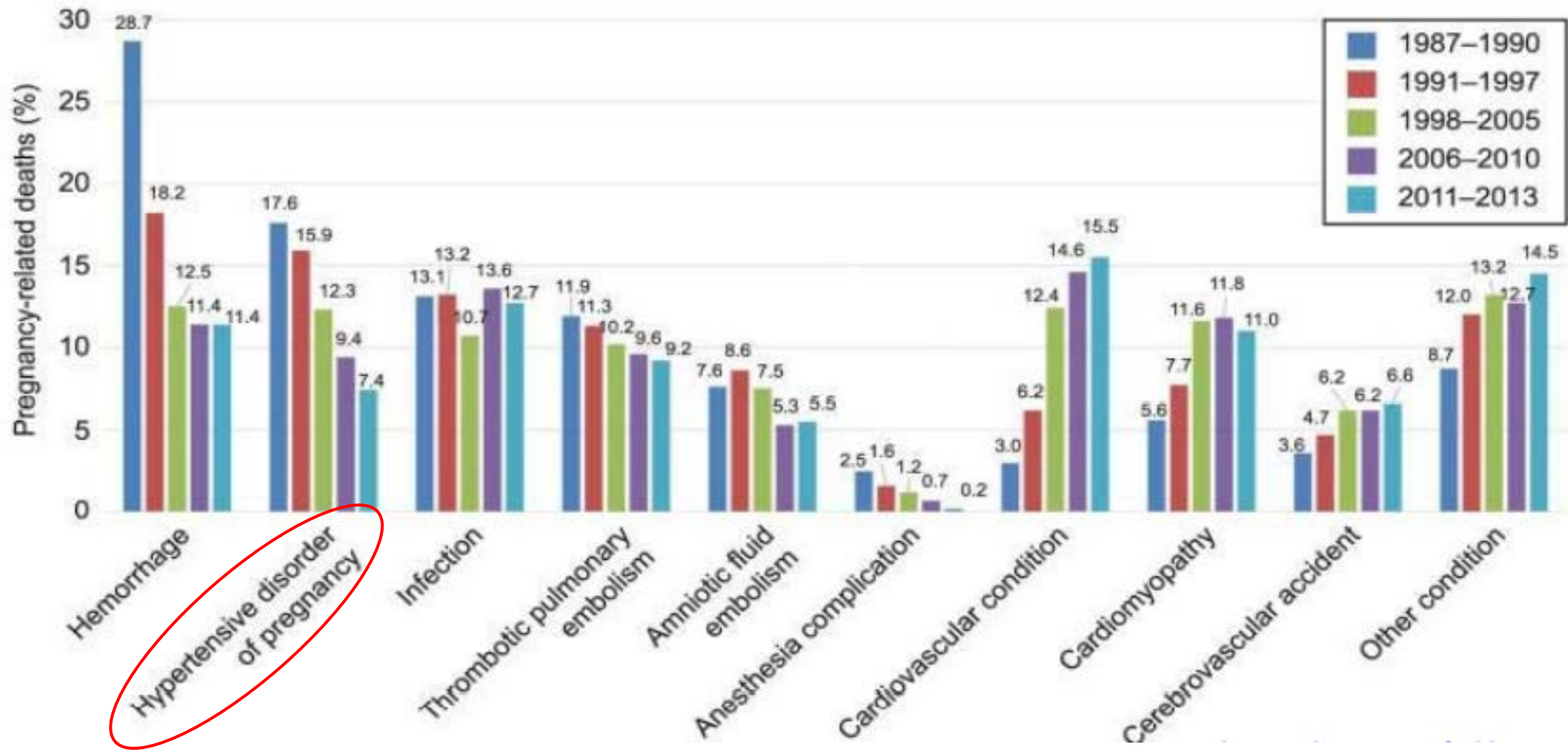
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Readiness and responsiveness to severe hypertension in pregnancy can be the difference between maternal/fetal life and death.

Understanding diagnostic criteria, when to treat, how to treat, and how to monitor hypertension in pregnancy is critical in optimizing care and ensuring beneficial outcomes.

Knowing when to act makes all the difference.

# PREGNANCY-RELATED MORTALITY IN THE U.S. (1987 – 2013)



Source: Creanga et al., 2017

## The Scoop on Preeclampsia

- ❑ Preeclampsia complicates 2-8% of pregnancies globally
- ❑ In Latin American and the Caribbean, hypertensive disorders are implicated in 26% of maternal deaths
- ❑ In the United States, the rate of preeclampsia increased by 25% between 1987 and 2004
- ❑ Most cases of preeclampsia occur in healthy nulliparous women with no obvious risk factors
- ❑ With diabetes mellitus, obesity, and CVD on the rise, knowing when to recognize, screen, and monitor for signs of preeclampsia is crucial for maternal and fetal well-being

# Hypertension Defined



Chronic Hypertension	<ul style="list-style-type: none"><li>○ SBP <math>\geq</math> 140 <b>or</b> DBP <math>\geq</math> 90</li><li>○ Pre-pregnancy or &lt;20 weeks</li></ul>
Gestational Hypertension	<ul style="list-style-type: none"><li>○ SBP <math>\geq</math> 140 <b>or</b> DBP <math>\geq</math> 90 on at least two occasions at least 4 hrs apart after 20 weeks gestation in women with previously normal BP</li><li>○ Absence of proteinuria or systemic signs/symptoms</li></ul>
Preeclampsia – Eclampsia	<ul style="list-style-type: none"><li>○ SBP <math>\geq</math> 140 <b>or</b> DBP <math>\geq</math> 90</li><li>○ Proteinuria with or without signs/symptoms</li><li>○ Presentation of signs/symptoms/lab abnormalities but no proteinuria</li></ul> <p><i>*Proteinuria not required for diagnosis eclampsia seizure in setting of preeclampsia</i></p>
Chronic Hypertension with Superimposed Preeclampsia	<ul style="list-style-type: none"><li>○ Preeclampsia in a woman with a history of hypertension before pregnancy or before 20 weeks of gestation</li></ul>

Source: Safe Motherhood Initiative, ACOG

# Hypertension Defined



## Preeclampsia with severe features

*(ACOG Practice Bulletin #202, Gestational Hypertension and Preeclampsia, & ACOG Practice Bulletin #203, Chronic Hypertension in Pregnancy)*

- SBP  $\geq$  160 or DBP  $\geq$  110 (can be confirmed within a short interval to facilitate timely antihypertensive therapy)
- Thrombocytopenia (platelet count less than 100,000/microliter)
- Impaired liver function that is not accounted for by alternative diagnoses and as indicated by abnormally elevated blood concentrations of liver enzymes (to more than twice the upper limit normal concentrations), or by severe persistent right upper quadrant or epigastric pain unresponsive to medications.
- Renal insufficiency (serum creatinine concentration more than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease)
- Pulmonary edema
- New-onset headache unresponsive to medication and not accounted for by alternative diagnoses
- Visual disturbances

How do we differentiate severe hypertension from a hypertensive emergency?

Source: Safe Motherhood Initiative, ACOG

## Severe Hypertension

- Systolic BP  $\geq$  160mmHg **and/or** Diastolic BP  $\geq$  110mmHg
- Measured on two separate occasions at least 4 hours apart

## Hypertensive Emergency

Severe and persistent hypertension that can occur antepartum, intrapartum, or postpartum that involves

- Two severe BP values ( $\geq$  160/110) taken 15-60 minutes apart (severe values do not need to be consecutive)

When do we intervene and initiate treatment?

Source: Safe Motherhood Initiative, ACOG





# When is it time to treat?

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## Severe Hypertension

In cases where Systolic BP  $\geq$  160mmHg **and/or** Diastolic BP  $\geq$  110mmHg:

→ Repeat BP measurements every 5 minutes for 15 minutes and notify physician immediately after one severe BP is identified

## Hypertensive Emergency

In cases where severe and persistent hypertension occurs antepartum, intrapartum, or postpartum that involves:

Two severe BP values ( $\geq$  160/110) taken 15-60 minutes apart (severe values do not need to be consecutive)

→ If BP elevations remain severe after 15 minutes or if clinically indicated, begin treatment immediately

Source: Safe Motherhood Initiative, ACOG

# Treatment

## First-Line Antihypertensive Therapies include

- IV Labetalol
- IV Hydralazine
- Immediate-release oral Procardia



## Magnesium sulfate is indicated for seizure prophylaxis in eclampsia

- IV bolus of 4-6g in 100mL over 20 minutes followed by IV infusion of 1-2g/hr  
→ **continue for 24 hours postpartum**
- If no IV access is available, 10g of 50% Mag sulfate solution IM with 5g given in each buttock
- Magnesium sulfate is contraindicated in patients with myasthenia gravis, pulmonary edema, or renal failure  
→ If CI, consider Lorazepam, Diazepam, Phenytoin, or Keppra

Source: Safe Motherhood Initiative, ACOG

# Labetalol Algorithm

## EXAMPLE

Trigger: If severe elevations (SBP  $\geq 160$  or DBP  $\geq 110$ ) persist\* for 15 min or more OR if two severe elevations are obtained within 15 min and tx is clinically indicated



- Notify provider after one severe BP value is obtained
- Institute fetal surveillance if viable
- Hold IV labetalol for maternal pulse under 60
- Maximum cumulative IV-administered dose of labetalol should not exceed 300 mg in 24 hours
- There may be adverse effects and contraindications. Clinical judgement should prevail.

\* Two severe readings more than 15 minutes and less than 60 minutes apart

<sup>†</sup> Avoid parenteral labetalol with active<sup>‡</sup> asthma, heart disease, or congestive heart failure; use with caution with history of asthma. May cause neonatal bradycardia.

<sup>‡</sup> "Active asthma" is defined as:

- Ⓐ symptoms at least once a week, or
- Ⓑ use of an inhaler, corticosteroids for asthma during the pregnancy, or
- Ⓒ any history of intubation or hospitalization for asthma.

<sup>‡</sup> Hydralazine may increase risk of maternal hypotension.

Source: Safe Motherhood Initiative, ACOG

# Hydralazine Algorithm

EXAMPLE

Trigger: If severe elevations (SBP  $\geq 160$  or DBP  $\geq 110$ ) persist\* for 15 min or more OR If two severe elevations are obtained within 15 min and tx is clinically indicated



- Notify provider after one severe BP value is obtained
- Institute fetal surveillance if viable
- Hold IV labetalol for maternal pulse under 60
- There may be adverse effects and contraindications.
- Clinical judgement should prevail.

\* Two severe readings more than 15 minutes and less than 60 minutes apart

<sup>†</sup> Avoid parenteral labetalol with active<sup>‡</sup> asthma, heart disease, or congestive heart failure; use with caution with history of asthma. May cause neonatal bradycardia.

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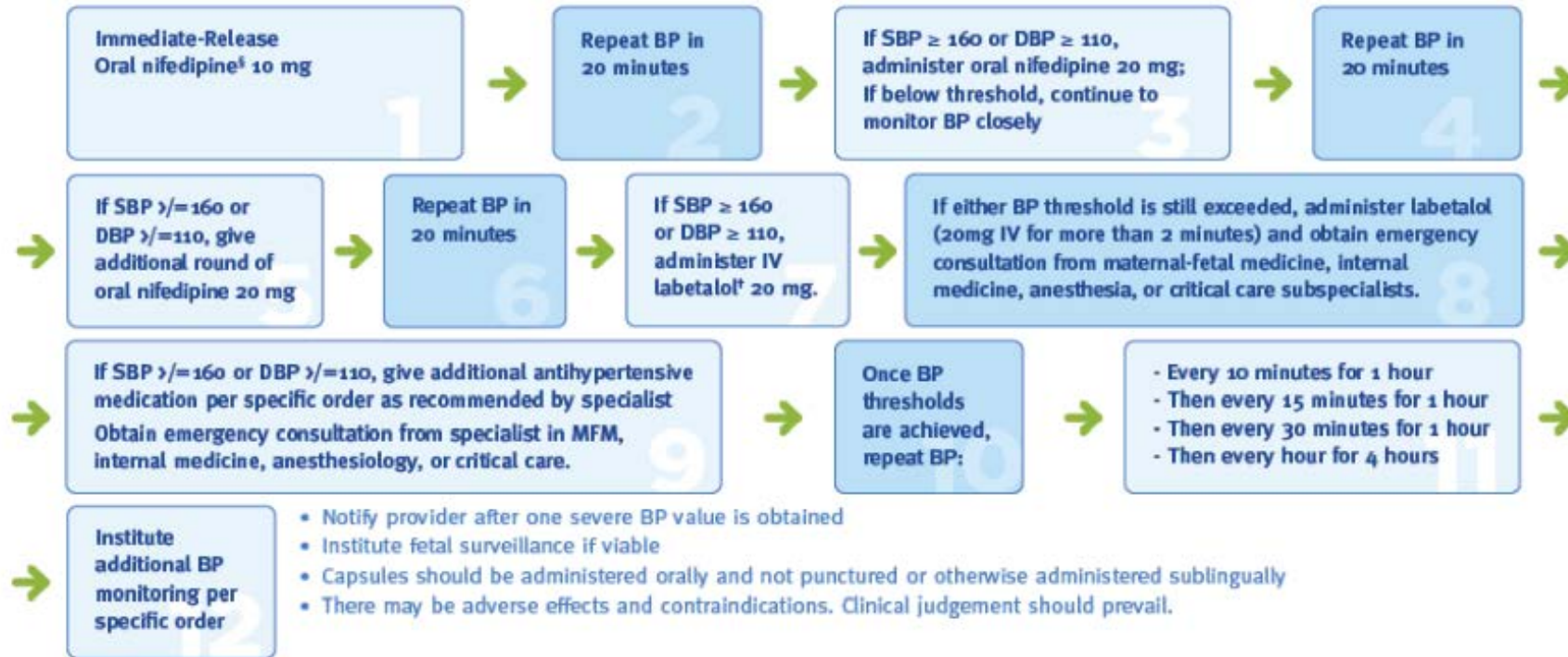
<sup>§</sup> Hydralazine may increase risk of maternal hypotension.

Source: Safe Motherhood Initiative, ACOG

If no IV access available

## Immediate-Release Oral Nifedipine Algorithm EXAMPLE

Trigger: If severe elevations (SBP  $\geq 160$  or DBP  $\geq 110$ ) persist\* for 15 min or more OR if two severe elevations are obtained within 15 min and tx is clinically indicated



\* Two severe readings more than 15 minutes and less than 60 minutes apart

<sup>§</sup> Immediate-release oral nifedipine has been associated with an increase in maternal heart rate and may overshoot hypotension.

<sup>†</sup> Avoid parenteral labetalol with active<sup>‡</sup> asthma, heart disease, or congestive heart failure; use with caution with history of asthma.

May cause neonatal bradycardia.

<sup>‡</sup> "Active asthma" is defined as:

- (A) symptoms at least once a week, or
- (B) use of an inhaler, corticosteroids for asthma during the pregnancy, or
- (C) any history of intubation or hospitalization for asthma.

Source: Safe Motherhood Initiative, ACOG

# Potential Obstacles

## Maternal Complications

- Continual seizures, headaches, or visual difficulties (i.e., scotomas, blurriness, etc.)
- Pulmonary edema or cyanosis
- RUQ or epigastric tenderness
- Increased LFTs
- Thrombocytopenia
- Hemolysis
- Coagulopathy
- Oliguria

## Fetal Complications

- Nonreassuring fetal heart tones
- Intrauterine growth restriction



Source: Safe Motherhood Initiative, ACOG



# After Stabilization

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Once BP is  $<160/110$  and stabilized, ensure serial BP measurements

- Every 10 minutes for the 1<sup>st</sup> hour, then
- Every 15 minutes for the 2<sup>nd</sup> hour, followed by
- Every 30 minutes for the 3<sup>rd</sup> hour, and finally
- Repeat BP measurements q4h as needed

Obtain baseline CBC, LDH, LFTs, Electrolytes, BUN, Creatinine, Urine protein, and Platelet labs.

Continue monitoring fetal status via appropriate gestational age measures (i.e., tocodynamometry, etc.)

Source: Safe Motherhood Initiative, ACOG

# Monitoring Status

*Once patient is stabilized, consider:*

## SEIZURE PROPHYLAXIS

- Magnesium sulfate (if not already initiated)

## TIMING & ROUTE OF DELIVERY

- **Eclampsia** → Delivery after stabilization
- **HELLP/Severe preeclampsia/Chronic hypertension + superimposed preeclampsia** → Vaginal delivery, if attainable in reasonable amount of time
- **≥ 34 weeks** → Deliver

## MATERNAL BP

- Continue control with oral agents
- Target range of 140-150/90-100

## IF PRETERM (<34 WKS) & EXPECTANT MGMT PLANNED

- Antenatal corticosteroids
- Subsequent pharmacotherapy
- **HELLP (Gestational age of fetal viability to 33 6/7 wks)**
- ✓ Delay delivery for 24-48 hours if maternal and fetal condition remains stable
- ✓ Contraindications to delay in delivery for fetal benefit of corticosteroids:
  - Uncontrolled hypertension
  - Eclampsia
  - Pulmonary edema
  - Suspected abruption placenta
  - Disseminated intravascular coagulation,
  - Nonreassuring fetal status
  - Intrauterine fetal demise

Source: Safe Motherhood Initiative, ACOG



# Postpartum Monitoring

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## Inpatient Admissions

- Measure BP q4h after delivery
- Do not use NSAIDs for women with elevated BP
- Do NOT d/c patient until BP is stabilized for at least 24 hours

## Outpatient Management

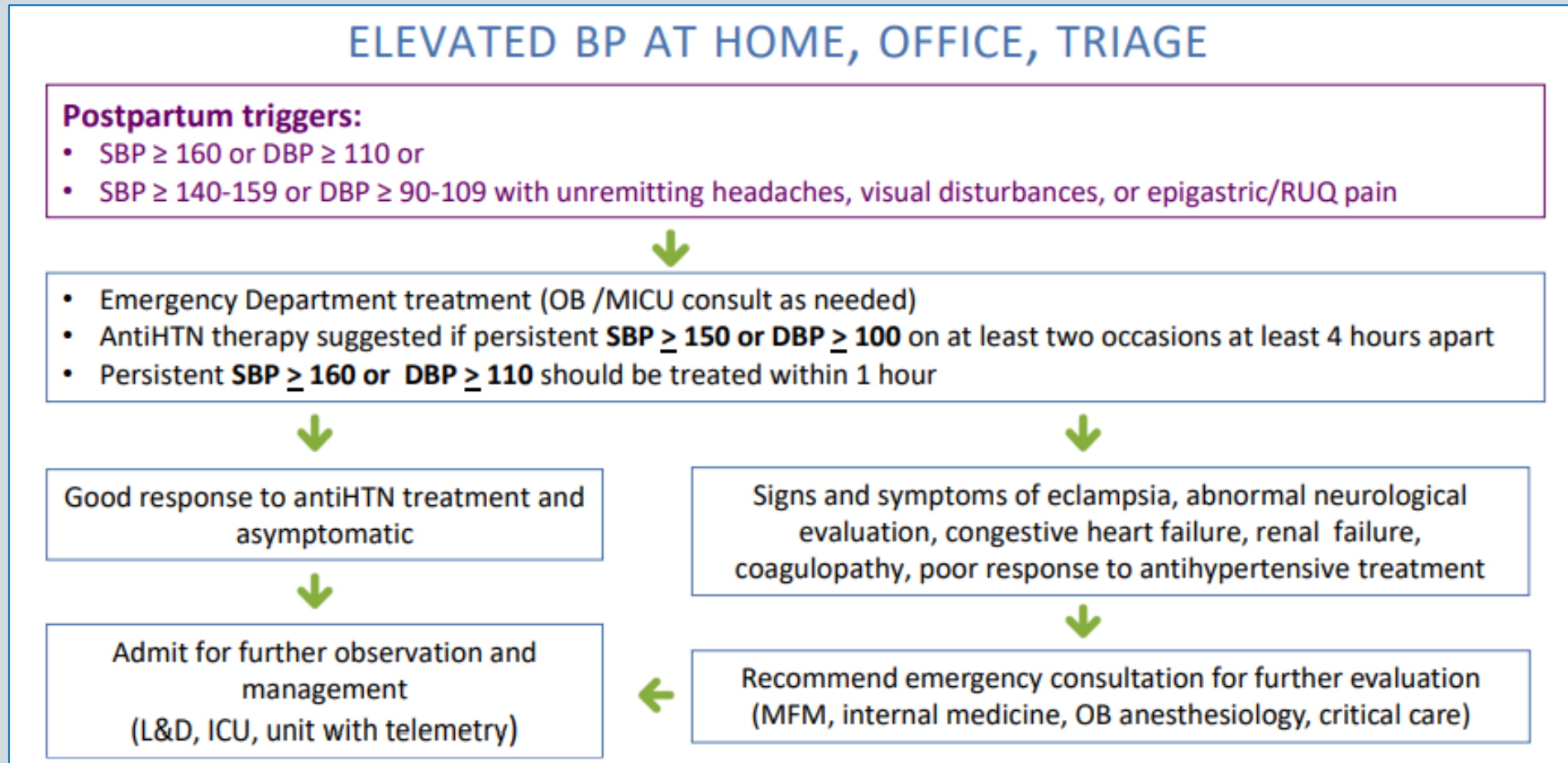
Preeclamptic patients should return within 3-5 days for evaluation and again in 7-10 days



Source: Safe Motherhood Initiative, ACOG

# Disposition and Education

Educate your patients on the signs and symptoms of preeclampsia and the importance of presenting to an ED if preeclamptic symptoms return.



Source: Safe Motherhood Initiative, ACOG



# When in doubt

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What warrants an **immediate** bedside evaluation?

- Systolic BP  $\geq$  160mmHg or Diastolic BP  $\geq$  100mmHg
- Proper intervention can reduce maternal M&M

Early screening for chronic and gestational hypertension allows for more efficient medical decision making as pregnancy progresses, allowing us to be better prepared in the setting of preeclamptic symptoms.

Attentive intervention and monitoring of hypertension in pregnancy improves patient outcomes.

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