

The [Recognition and Prevention](#) section includes documents that address a standard protocol for the measurement and assessment of BP and urine protein for all pregnancy and postpartum women. It establishes a standard response to maternal early warning signs, including listening to, and investigating patient symptoms and labs. This section provides facility wide standards for educating prenatal and postpartum women on signs and symptoms of hypertension.

- Inpatient
 - Differential Diagnosis
<https://www.in.gov/health/laboroflove/files/Differential-Diagnosis-Chart.pdf>
- Emergency
 - HELLP Syndrome Chart
<https://www.in.gov/health/laboroflove/files/HELLP-Syndrome-Chart.pdf>
 - Management of Pregnant/Postpartum Patients in the ED
<https://www.in.gov/health/laboroflove/files/Management-of-Pregnant-Patient-in-ED.pdf>
- Ambulatory
 - Ambulatory Preeclampsia Checklist
<https://www.in.gov/health/laboroflove/files/Ambulatory-Preeclampsia-Checklist.pdf>
 - Preeclampsia Patient Education Checklist
<https://www.in.gov/health/laboroflove/files/Preeclampsia-Patient-Education-Tool.pdf>

DIFFERENTIAL DIAGNOSIS CHART

On-set of hypertension or worsening of chronic blood pressure in pregnancy can generally be safely assumed to be preeclampsia alone or superimposed even if the clinical picture shows unfulfilled diagnostic criteria since preeclampsia may progress quickly. However, because several other disorders can manifest some or many of the signs and symptoms of preeclampsia, it is essential to consider common differential diagnoses. Additional causes of hypertension that are unrelated to pregnancy include chronic hypertension, chronic renal disease, pheochromocytoma, neurologic disorders, some endocrine disorders (i.e., hyperthyroidism), and use/withdrawal of some drugs.

Diagnosis	Clinical Presentation	Lab Values	Key Differentials
HELLP syndrome - preeclampsia subtype or variant	Hemolysis, elevated liver enzymes, and low platelets with or without hypertension or proteinuria	↑RBC destruction ↑LDH (>600 IU/L) ↑Bilirubin (>1.2 mg/dl) Burr cells and schistocytes ↑ LFTs (AST > 70IU/L) ↓Platelets (< 150 K)	
Acute fatty liver of pregnancy (AFLP) - hepatic microvesicular fat deposition	Nausea, vomiting, anorexia, abdominal pain, malaise, CNS disturbances (confusion, restlessness, disorientation, seizures), edema, headache, hypertension with or without proteinuria, hemolysis, liver failure jaundice, ascites, disseminated intravascular coagulopathy (over 50% of all cases), and hypoglycemia.	↑ WBCs (20-30K) Anemia ↓Clotting factors & fibrinogen ↑PT, PTT, FSP ↑BUN & creatinine ↓ Creatinine clearance ↓ Albumin Schistocytes ↑ Liver enzymes ↑Alkaline phosphatase ↑ Bilirubin ↑Amylase, Lipase, Ammonia levels ↓Serum glucose	DIC due to liver dysfunction and failure; renal failure; profound hypoglycemia; sepsis; pancreatitis

DIFFERENTIAL DIAGNOSIS CHART

Diagnosis	Clinical Presentation	Lab Values	Key Differentials
Thrombotic microangiopathies (TMA) - Thrombotic thrombocytopenic purpura (TTP) and Hemolytic-Uremic syndrome (HUS)	Pathologic abnormalities in the vessel walls of arterioles and capillaries that lead to microvascular thrombosis and thrombocytopenia due to platelet destruction, peripheral blood smears with fragmented red blood cells (schistocytes), polychromasia, and anemia.	TTP - ↓ ADAMTS-13 activity levels (<10%) HUS - TMA +renal injury that is caused by either shiga toxin from an <i>Escherichia coli</i> infection or from a defective regulation of the alternative complement pathway triggered by pregnancy.	Thrombocytopenia. Microangiopathic hemolytic anemia, renal dysfunction
Systemic lupus erythematosus (SLE)	Malar rash, Discoid rash, photosensitivity, oral ulcers, serositis, CNS (seizures, psychosis), anemia, thrombocytopenia, hypertension, swelling (joints), flushing, and renal impairment (proteinuria and RBCs in urine)	↓ RBCs +Antinuclear antibody (ANA) test + aPLs (antiphospholipid antibodies - lupus anticoagulant, IgG and IgM anticardiolipin antibodies, IgG and IgM anti-beta2-glycoprotein 1 antibodies +Anti-Ro/SSA and anti-La/SSB antibodies	Positive antibodies
Antiphospholipid syndrome (APS)	Arterial and venous thrombosis, autoimmune thrombocytopenia, hx pregnancy loss	+ aPLs (antiphospholipid antibodies - lupus anticoagulant, and IgG & IgM anticardiolipin antibodies, IgG and IgM anti-beta2-glycoprotein 1 antibodies)	Hx of pregnancy losses/ IUFD Thrombosis, IUGR, Preterm delivery due to preeclampsia/ eclampsia or uteroplacental insufficiency

HELLP SYNDROME

Definition: It is a syndrome described as **Hemolysis, Elevated Liver Enzymes and Low Platelets**. It can be seen as a variant of preeclampsia, but it can also be seen as a separate entity. It is believed to be due to abnormal vascular tone. There is believed to be an insult leading to microvascular endothelial damage and intravascular platelet activation. The purpose of this chart is to help nursing staff recognize patient and fetal risk factors, recognize signs and symptoms and to understand treatment and management.

Risk Factors	<ul style="list-style-type: none"> • Multiparous, • Age greater than 25, • White race, • History of poor - pregnancy outcome • Prior pregnancy with HELLP • Presence of eclampsia/preeclampsia 		
Clinical Presentation	<ul style="list-style-type: none"> • Typically occurs in the third trimester or sometimes after childbirth • Malaise • Epigastric pain • Right upper quadrant abdominal tenderness • Hypertension- Defined as greater than 140> or equal to 140/90 • Proteinuria- can be mild • Nausea/vomiting 	<p style="text-align: center;"><u>Least common symptoms:</u></p> <ul style="list-style-type: none"> • Headache • Visual changes • Jaundice • Ascites 	<p style="text-align: center;"><u>Maternal Complications:</u></p> <ul style="list-style-type: none"> • Abruptio placenta • Disseminated intravascular coagulation (DIC) • Severe postpartum bleeding • Stroke, cerebral hemorrhage • Renal failure • Increased risk of HELLP in future pregnancies • Maternal Death <p style="text-align: center;"><u>Fetal Complications:</u></p> <ul style="list-style-type: none"> • Prematurity • Placental insufficiency • Intrauterine growth restriction • Neonatal intraventricular hemorrhage • Fetal demise

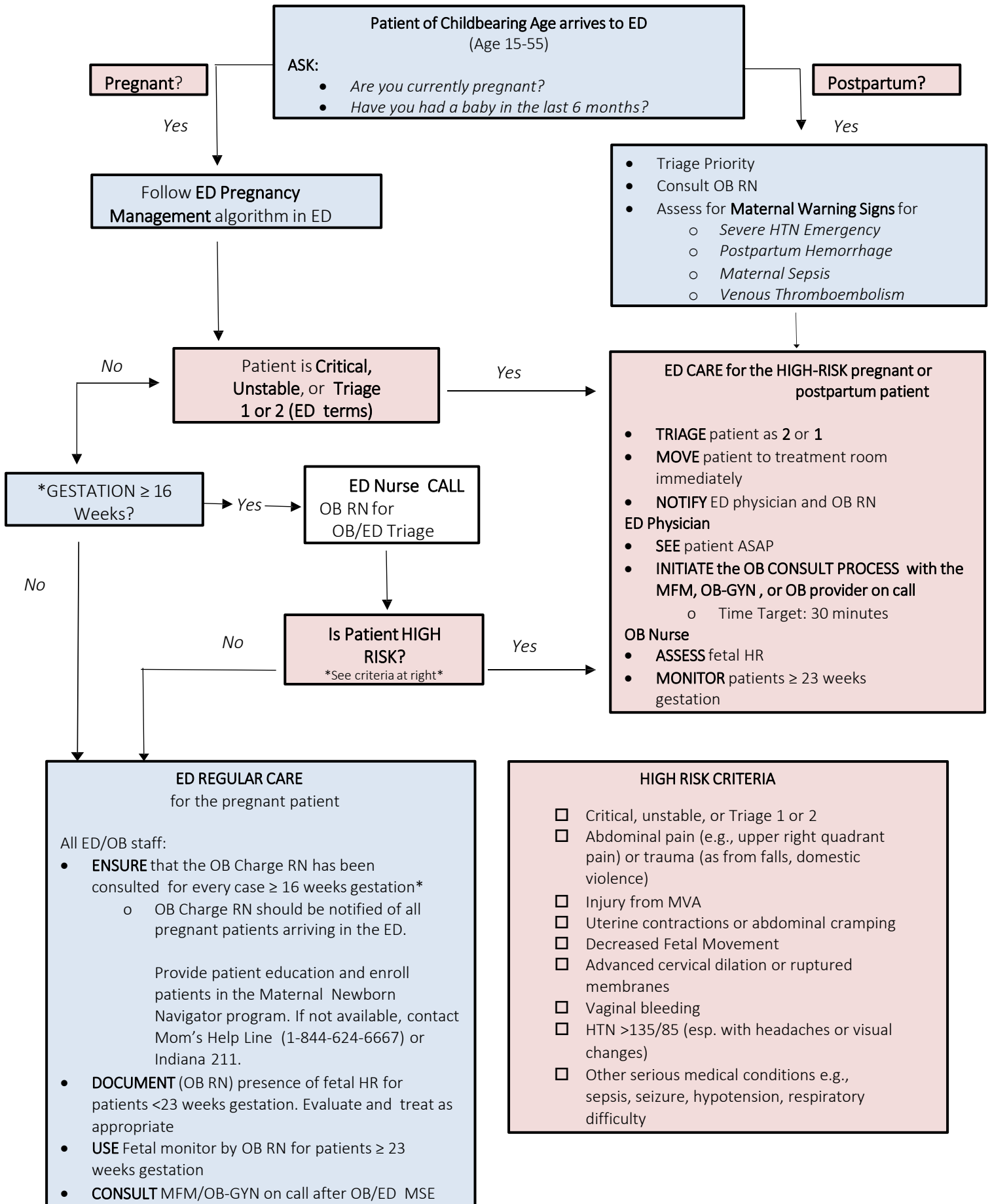
HELLP SYNDROME

<p>Diagnosis/Lab Values: Think HELLP</p>	<p>↑RBC destruction ↑LDH (>600 IU/L) ↑Bilirubin (>1.2 mg/dl) Burr cells and schistocytes ↑ LFTs (AST > 70IU/L) ↓Platelets (< 150 K)</p>	<p><u>Thrombocytopenia Classifications:</u></p> <p>Class I: Platelet count ≤50,000 cells/microL plus LDH >600 IU/L and AST or ALT ≥70 IU/L</p> <p>Class II: Platelet count >50,000 but ≤100,000 cells/microL plus LDH >600 IU/L and AST or ALT ≥70 IU/L</p> <p>Class III: Platelet count >100,000 but ≤150,000 cells/microL plus LDH >600 IU/L and AST or ALT ≥40 IU/L</p>	
<p>Differential Diagnosis</p>	<ul style="list-style-type: none"> • Acute fatty liver of pregnancy • Thrombotic thrombocytopenic • Hemolytic uremic anemia • Gestational Thrombocytopenia • Systemic lupus erythematosus (SLE) 		
<p>Treatment Need 3ml, 10ml, and 20ml syringes, appropriate needles and tubing sets</p>	<ul style="list-style-type: none"> • Stabilize mom • Consult MFM for pregnancies ≤ 34 weeks gestation • May start anti-hypertensive agent • Initiate Magnesium Sulfate for convulsions • Have Calcium Gluconate at the bedside 	<p style="text-align: center;"><u>Medications: Oral</u></p> <p>Labetalol: 200mg po and repeated in 30 minutes, if needed</p> <p>Nifedipine: 10 mg PO and repeated in 30 minutes, if needed</p> <p>Calcium gluconate 1000 mg/10ml vial: 1000 mg/10 ml IV over 2-5 minutes</p>	<p style="text-align: center;"><u>Medications: Intravenous</u></p> <p>Labetalol (120mg/20ml):</p> <ul style="list-style-type: none"> • First dose-20 mg (4 ml) IV • Second dose- 40 mg (8 ml) if not effective within 10 minutes • Then 80 mg (16 ml) every 10 minutes <p style="text-align: center;">(Maximum total dose of 300 mg/60ml)</p>

HELLP SYNDROME

			<p>Hydralazine (20mg/ml vial): Initial: Draw 0.25 ml from the vial. 5-10 mg (0.25-0.5 ml) doses IV every 15-20 minutes</p> <p>Magnesium 20 grams/500 ml bag: IV (<i>Use Magnesium Sulfate Continuous Infusion under L&D protocol in Alaris Pump Library</i>):</p> <ul style="list-style-type: none"> • Initial (Loading Dose): 4-6 g (100 ml – 150 ml) over 20 minutes • Maintenance Dose: 1-2 g/hour (25 ml/hr – 50 ml/hr) continuous infusion <p><u>IV MEDICATIONS USED BY ANESTHESIOLOGY PROFESSIONALS ONLY:</u></p> <p>Esmolol 100mg/10ml vial-1-2 mg/kg (0.1-0.2 ml/kg) IV over 1 minute</p> <p>Propofol 10mg/ml, 20ml vial-30-40 mg (3-4 ml) IV bolus</p>
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Management of Pregnant/Postpartum Patients in the ED



* Gestational Age may differ based on facility

AMBULATORY PREECLAMPSIA CHECKLIST

IF ANTEPARTUM PATIENT > 20 WEEKS GESTATION

- SBP \geq 140 OR DBP \geq 90
- Proteinuria (dip, random protein \geq +1 dip/creatinine ratio \geq 0.3 gm/24-hour urine $>$ 0.3 gm) with/without symptoms
- Presentation of signs/symptoms/lab abnormalities but no proteinuria
- New onset of headache unresponsive to medication, visual disturbances, epigastric pain, swelling, shortness of breath

- Call for OB Consult
- Repeat blood pressure SBP \geq 140 OR DBP \geq 90
- Perform DTR's and clonus check
- Draw preeclampsia stat labs if not symptomatic *to triage if stat labs not available
 - CBC w/ Platelets
 - Uric Acid
 - CMP
 - LDH
- Symptomatic with Repeat blood pressure SBP \geq 140 OR DBP \geq 90 transfer to L&D for evaluation
- Call charge nurse if suspect pre-eclampsia symptoms, vital signs, any pertinent prenatal and past history
- OB to call L&D for bed request
- Call for MFM consult if appropriate

Expectant Management Pre-eclampsia Without severe features

- Weekly platelet count, serum creatinine, liver enzyme levels
- Fetal growth ultrasound every 3-4 weeks
- Twice weekly NST's with one weekly AFI

OR

- BPP once weekly
- Prenatal visit with Blood pressure monitoring weekly
- No medications are indicated for treatment
- Delivery timing 37.0 weeks

Telephone Triage Pre-eclampsia Checklist

- New onset of headache unresponsive to medication, visual disturbances, epigastric pain, swelling
- SBP \geq 140 OR DBP \geq 90
- Review risk factors for increased risk for Pre-eclampsia
- Decreased fetal movement
- Send to triage for evaluation

Or

- New onset of headache unresponsive to medication, visual disturbances, epigastric pain, swelling
- SBP \geq 140 OR DBP \geq 90
- Review risk factors for increased risk for Pre-eclampsia
- No decreased fetal movement

- To clinic for BP check, urine dip and possible labs.

Risk Factor for Pre-eclampsia

- Nulliparity
- Multifetal gestations
- Pre-eclampsia in a previous pregnancy
- Chronic Hypertension
- Pre-gestational diabetes
- Thrombophilia
- Systemic lupus erythematosus
- Pre-pregnancy body mass index $>$ 30
- Antiphospholipid antibody syndrome
- Maternal age 35 years and older
- Kidney Disease
- Assisted reproductive technology
- Obstructive sleep apnea
- Teen pregnancy $<$ 19 years
- Family history of Pre-eclampsia (mom/siblings)

CHRONIC HYPERTENSION MANAGEMENT

Initial Visit Management: Baseline labs

- CBC, CMP, Urine or protein/creatinine clearance or 24-hour urine collection for total protein and creatinine
- 24-hour urine is recommended for a protein/creatinine of \geq 0.3
- Order baseline EKG
- Echocardiogram to assess left ventricular function if poorly controlled HTN $>$ 4 years or history of abnormal EKG
- Initiate ASA 81 mg at 12 weeks

PREECLAMPSIA



Preeclampsia is a serious disease related to high blood pressure that can affect women during pregnancy and up to six weeks after delivery. Finding preeclampsia early is important for you and your baby.

Who gets Preeclampsia?

Preeclampsia and other hypertensive disorders of pregnancy occur in five to eight percent of all pregnancies of women who have no known risk factors (see below).

The most significant risk factors for preeclampsia are:

Previous history of preeclampsia

Multiple gestation (i.e., pregnant with more than one baby)

History of chronic high blood pressure, diabetes, kidney disease or organ transplant

First pregnancy

Obesity, particularly with Body Mass Index (BMI) of 30 or greater. [Calculate your BMI here.](#)

Over 40 or under 18 years of age

Family history of preeclampsia (i.e., a mother, sister, grandmother or aunt had the disorder)

Polycystic ovarian syndrome

Lupus or other autoimmune disorders, including rheumatoid arthritis, sarcoidosis and multiple sclerosis

In-vitro fertilization

Sickle cell disease

Signs of Preeclampsia



Stomach pain



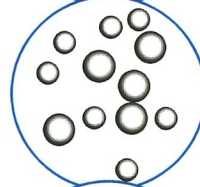
Feeling nauseous; throwing up



Swelling in your hands and face



Headaches



Seeing spots



Gaining more than 5 pounds in a week

Risks to you

- Seizures
- Stroke
- Organ damage
- Death

Risks to your baby

- Premature birth
- Death

What should you do if these signs are present?

Call your doctor right away.