Management of Preeclampsia, Eclampsia, and Severe Gestational Hypertension
See Antenatal Fetal Surveillance Guidelines

1) Preeclampsia
   a) Preeclampsia without severe features:
      • Diagnosis:
        o Systolic blood pressure (sBP) ≥ 140 or diastolic dBP ≥ 90 (either or) mm/Hg on two occasions taken at least 4 hours apart
          ▪ BPs are taken in the upright seated position (unless medically contraindicated) with an appropriate sized BP cuff.
        And 1 of the following:
        o Proteinuria:
          ▪ ≥ 300 milligrams (mg)/24 hours (hrs)
        o Protein to creatinine ratio (P/C ratio):
          ▪ ≥ 300 mg/gm
      Note: Though uric acid can be used to assist in the initial evaluation of a patient with preeclampsia, measurement is not recommended once a diagnosis is established.

      • Management:
        o Initial Diagnosis ≤ 35 0/7 weeks intrapartum
          ▪ Admission at MLC 4 facility for evaluation and plan.
          Or
          ▪ MFM consult and ultrasound within 72 hours
        o Initial diagnosis 35 0/7 - 36 6/7 weeks:
          ▪ Evaluate for the presence of severe features
            ❖ See Section 1b) below for preeclampsia with severe features
          ▪ If severe features are not present
            ❖ Labwork: CBC, ALT, AST, LDH, Serum Creatinine
            ❖ See Antennal Testing Guideline, weekly visit and testing
            ❖ Deliver at 37 weeks
        o Initial diagnosis ≥ 37 0/7 weeks:
          ▪ Deliver upon diagnosis
          ▪ Labwork:
            ❖ CBC, ALT, AST, LDH, serum Creatinine on admission to hospital
            ❖ Repeat as clinically indicated.
            ❖ Monitor urine output (Foley catheter if necessary)
              ❖ Minimum: 0.5 mL/kilogram(kg)/hr

b) Preeclampsia with severe features:
   • Diagnosis:
     Meets criteria for preeclampsia diagnosis as above, and any one of the following features:
     o sBP ≥ 160 mm/Hg or dBP ≥ 110 mm/Hg on at least two occasions 4 hrs apart
       ▪ BP taken in upright seated position with appropriately sized BP cuff
     o Oliguria of less than 500 milliliters (mL) in 24 hrs
o Cerebral or visual disturbances (includes new onset headache not responsive to non-narcotic pain medication)

o Pulmonary edema

o Impaired liver function:
  ▪ Severe right upper quadrant (RUQ)/epigastric pain not responsive to medications
  ▪ LFTs at or > than 2X normal

o Thrombocytopenia (platelet count < 100,000/mm³)

Note: The degree of proteinuria and fetal growth restriction are no longer criteria for the diagnosis of preeclampsia with severe features.

**Management:**
- Transfer to MLC 4 facility at any gestational age.
- If patient not stable for transfer, call MFM for plan of care.

**c) Chronic Hypertension with Superimposed Preeclampsia:**

**Diagnosis:**
- Hypertension without proteinuria in the first 20 weeks gestation, followed by continued hypertension with the development of proteinuria after 20 weeks gestation.
- Diagnosis is likely in women with proteinuria the first 20 weeks gestation who:
  ▪ Experience a sudden exacerbation of hypertension
  ▪ Have a need to escalate antihypertensive drug dose when previously well controlled on drug
  ▪ Suddenly manifest other signs (e.g. abnormal LFTs)
  ▪ Present with decrease in platelet levels < 100,000
  ▪ Manifest symptoms (e.g. right upper quadrant pain or severe headaches)

- Develop:
  - Renal insufficiency
  - Sudden and sustained increase in protein excretion

**Management:**
- Transfer to MLC 4 facility at any gestation.
- If patient not stable for transfer, call MFM for plan of care.

2) Eclampsia

**Diagnosis:**
- New onset of tonic-clonic seizures, coma, or both in a woman with signs and symptoms of preeclampsia after other causes of seizures are excluded.
- Can occur at any time during or following pregnancy.

**Management:**
- At any gestation transfer to MLC 4 facility.
- If patient not stable for transfer, call MFM for plan of immediate care and transfer when stable.

- **Initial seizure control:**
  - If not currently receiving magnesium sulfate, administer 6 gm bolus followed by 2 gm/hr.
• If patient already received bolus and is currently on continuous magnesium sulfate infusion when they have their first seizure, add an additional 2 gm bolus over 3-5 minutes and obtain a serum magnesium level to determine if the patient was therapeutic at the time of the seizure.
• If no IV access: magnesium sulfate 5 gm intramuscular (IM) x 2 doses, one in each buttck and establish IV access.
  o **Recurrent seizure control:**
    ▪ First line – additional 2 gm bolus and then draw magnesium level.
    ▪ Second line – lorazepam (Ativan) 2-4 mg IV every 10-15 minutes (maximum 8 mg in 24 hrs)
    ▪ Airway management per anesthesia
  o **Delivery:**
    ▪ Eclampsia is not in and of itself an indication for Cesarean delivery (CD). Often the seizure can be followed by magnesium infusion and labor induction.
    ▪ If CD is determined the optimal mode of delivery after an eclamptic seizure (breech, prior CD, remote from delivery with unfavorable cervix, etc.), it should be performed after the seizure has resolved and the patient is stable.

### 3) Gestational Hypertension

**a) Gestational hypertension without severe features:**

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<th>Diagnosis:</th>
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<tr>
<td>sBP ≥ 140 or dBP ≥ 90 without proteinuria, abnormal LFTs, or thrombocytopenia taken on at least 2 occasions at least 4 hours apart</td>
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<th>Management:</th>
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<td>Weekly office visits with BP and proteinuria assessments and one other weekly BP evaluation either at home or in the office.</td>
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<td>In the absence of another indication antihypertensive medications are not used for blood pressures &lt;160/110.</td>
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<td>Plan for delivery in the 37th week gestation.</td>
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**b) Severe gestational hypertension:**

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<tr>
<td>Systolic blood pressure (sBP) ≥160 millimeters/mercury (mm/Hg) or diastolic blood pressure (dBP) ≥110 mm/Hg without proteinuria, abnormal liver function tests (LFTs) or thrombocytopenia</td>
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<td>Transfer to MLC 4 facility</td>
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### 4) Seizure Prophylaxis

*For cases in which transfer and magnesium sulfate therapy are clinically indicated; consider initiating magnesium sulfate therapy prior to transfer.*

**a) Magnesium sulfate is not given to patients with preeclampsia unless one of the following are present:**

| Development of severe features |
Recommendation by MFM consultation.

b) **Magnesium sulfate is administered for severe preeclampsia.**
   - 6 gm loading dose over 15 - 20 minutes, followed by 2 gm/hr continuous IV infusion

c) **Routine serum magnesium levels are not necessary in patients with BMI < 30, normal renal function, and no evidence of magnesium toxicity.**
   - Patient with BMI > 30 kg/m2 are at increased risk of sub-therapeutic magnesium levels.
   - Therapeutic magnesium level: 4.8-8.4 mg/deciliter (dL)
     - If sub-therapeutic the rate should be increased to 3 gm/hr and re-checked in 6 hours.
   - If RR <12 breaths/minute (bpm), crackles, or absent deep tendon reflexes (DTRs)-
     - Obtain magnesium level
     - Consider discontinuation of magnesium sulfate until serum level obtained

d) **If magnesium sulfate is medically contraindicated in a patient with severe pre-eclampsia, consider alternative seizure prophylaxis:**
   - Phenytoin (Dilantin) is the most frequently reported alternative to magnesium sulfate in use:
     - 1000 mg loading dose over 1 hour, followed ten hours later by 500 mg PO delayed release capsule
   - IV fosphenytoin (Cerebyx) is substituted at UHCMC
     - 1 mg fosphenytoin = 1 mg phenytoin equivalents
     - Follow “non-emergent loading dosing” protocol in Guidelines for Adult Intravenous Medications.
     - Serum levels should be monitored if fosphenytoin administration continues beyond 48 hours.
     - The UH “Nursing Unit Specifications” is “All” (does not require ICU or cardiac monitoring).
   - Dosing for renal insufficiency:
     - Cr < 1.0 mg/dL: Normal dosing
     - Cr 1-2.5 mg/dL: Normal bolus followed by 1 gm/hr (instead of 2). Check level at 6 hours.
     - Cr >2.5 mg/dL: Normal bolus followed by no maintenance. Check level at 6 hours.

e) **Nursing Responsibilities with IV magnesium sulfate:**
   - **Patient Education**
     - Educate patient and family about common transient side effects:
       - Respiratory depression, maternal flushing, diaphoresis, blurred vision, lethargy, headache, muscle weakness, nausea/vomiting, and neonatal hypotonia
       - Reinforce safety measures used to avoid potentially serious adverse drug reactions.
• **Pre-administration assessment:**
  - Perform baseline magnesium sulfate assessment and document prior to administration including:
    - Vital signs (including blood pressure, respirations, temperature, pulse, and pulse oximeter reading)
    - Deep tendon reflexes (DTRs)
    - Presence/absence of clonus
    - Neurologic Status
    - Lung auscultation
    - Urinary Output
    - Fetal heart rate
    - Uterine activity

• **Administration**
  - Verify the provider orders and double check order with another registered nurse. ((See CP-30 High alert, Look Alike/Sound Alike Medications).
  - Verify the absence of contraindications to magnesium sulfate administration including hypocalcemia, myasthenia gravis, renal failure, heart block, or myocardial damage.
  - Ketorolac with magnesium may decrease the therapeutic affect of anticonvulsant.
  - IV drugs incompatible with magnesium sulfate requiring a separate IV site:
    - Calcium channel blockers
    - Fat emulsions
    - Sodium bicarbonate
    - Hydrocortisone
    - Nafcillin
    - Clindamycin
  - Assure the availability of calcium gluconate on the division.
  - Initiate seizure precautions:
    - Maintain calm, quiet, darkened environment. This may include limitation of visitors and stimuli in room.
    - Maintain bedrest.
  - RN remains at the bedside throughout administration of magnesium sulfate bolus.
  - Continuous electronic fetal monitoring maintained
  - Continuous pulse oximetry maintained throughout bolus administration.
  - Blood pressure, pulse, respirations and pulse oximetry every 15 minutes for the first hour of administration, then hourly thereafter.
  - Infusion pump:
    - Obtain pre-mixed 20 gram magnesium sulfate in 500 mL normal saline concentration from pharmacy.
    - Magnesium sulfate intravenous (IV) bolus is connected at the most distal port of the primary IV tubing for maintenance IV fluids (e.g., Lactated Ringers, Normal Saline) to reduce patient experience of burning at infusion site with medication.
- Program infusion pump to run the bolus and maintenance dose as ordered.
  - The dosing regimen for magnesium sulfate is:
    - Bolus 6 gm loading dose administered over 20 minutes
    - Continuous maintenance infusion of 2 gm/hr IV until delivery
- Collect laboratory specimen for serum magnesium level as ordered. The therapeutic level range is 4.8-8.4 mEq/L.

**Ongoing Assessment and Documentation**
- Perform ongoing magnesium sulfate assessment and document hourly unless otherwise noted; LIP may order assessments every 2 hrs if postpartum patient is stable.
  - Blood pressure, pulse, respirations, and pulse oximetry
  - Level of consciousness
  - Auscultation of lung sounds
  - Deep tendon reflexes and clonus
  - Intake and output

- Notify provider for assessment changes including:
  - Diminished or absent deep tendon reflexes.
  - Decreased urine output (less than 0.5mL/kg/hrs)
  - Decreased respiratory rate or respiratory rate less than 12 per minute
  - Oxygen saturation < 96%
  - Hypotension
  - Extreme muscle relaxation
  - Lethargy/change in level of consciousness

- Signs of magnesium toxicity include:
  - CNS depression/lethargy
  - Severe respiratory depression
  - Decrease in level of consciousness
  - Absence of deep tendon reflexes
  - Hypotension
  - Chest pain
  - Pulmonary edema
  - Amnesia
  - Respiratory arrest
  - Cardiac arrest

- If signs of magnesium toxicity are present:
  - Notify physician immediately
  - Discontinue magnesium sulfate
  - Draw a stat serum magnesium level.
  - Obtain order for calcium gluconate (1 gram of 10% solution given over a period of three minutes) for immediate administration.
5) Blood Pressure Control
   a) Mild-range BP elevations (<160/110 mm/Hg) do not require pharmacologic normalization under routine circumstances
      • More aggressive BP control may be needed for patients with preexisting cardiac or renal disease.
      • These guidelines are intended for the treatment of preeclampsia or severe gestational hypertension and not necessarily chronic hypertension or preeclampsia superimposed upon chronic hypertension.

   b) First line treatment with labetalol or hydralazine is acceptable.

      • First Line Labetalol:
        o If sBP >160 mm/Hg or if dBP >110 mm/Hg give labetalol 20 mg IV over 2 minutes.
        o Repeat BP in 10 minutes. If sBP and dBP are under threshold serially, follow BP as outlined below.
        o If either BP threshold is exceeded, give labetalol 40 mg IV over 2 minutes and repeat BP in 10 minutes.
        o If either BP threshold is exceeded, give labetalol 80 mg IV over 2 minutes and repeat BP in 10 minutes.
        o If either BP threshold is still exceeded, administer hydralazine 10 mg IV over 2 minutes and re-check BP in 20 minutes. If either BP threshold is still exceeded obtain emergent MFM, anesthesia or internal medicine consultation. Phone MFM consultation is acceptable. Give additional anti-hypertensives per specific order.

      • First Line Hydralazine:
        o If sBP >160 mm/Hg or if dBP >110 mm/Hg give hydralazine 5 mg IV over 2 minutes.
        o Repeat BP in 20 minutes. If sBP and dBP are under threshold serially follow BP as outlined below.
        o If either BP threshold still exceeded, give hydralazine 10 mg IV over 2 minutes and repeat BP in 20 minutes.
        o If either BP threshold is still exceeded, give labetalol 20 mg over 2 minutes and repeat BP in 10 minutes.
        o If either BP threshold is still exceeded, give labetalol 40 mg over 2 minutes, obtain emergent MFM, anesthesia or internal medicine consult. Phone MFM consultation is acceptable. Give additional anti-hypertensives per specific order.

      • Once BP thresholds under sBP 160 mm/Hg and dBP 110 mm/Hg; repeat BP:
        o Every 10 minutes for 1 hour, then
        o Every 15 minutes for 1 hour, then
        o Every 30 minutes for 1 hour, then
        o Every 60 minutes for 4 hours

      • If the BP remains severe despite repetitive boluses, continuous IV infusion may be needed in conjunction with consideration for immediate delivery:
        o For labetalol, continuous IV infusion administration for obstetric patients is available within UHCMC Guidelines for Adult Intravenous Medications.
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