TIME FOR ACTION: DECREASING THE IMPACT OF PREECLAMPSIA IN GEORGIA

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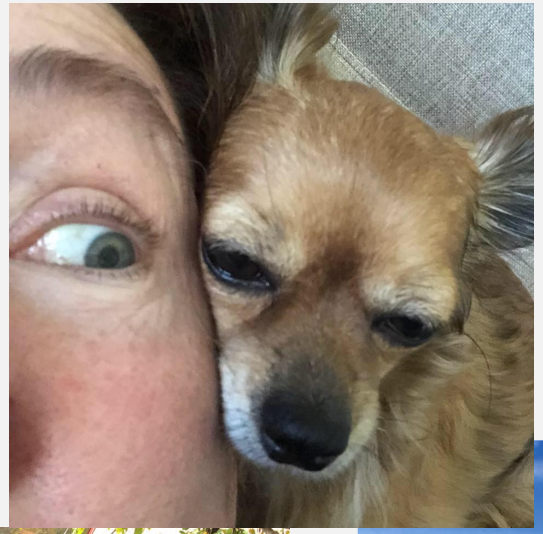
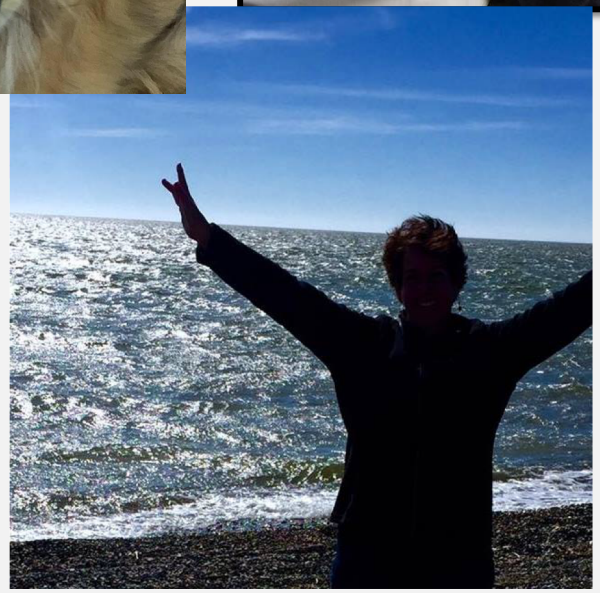
Georgia Perinatal Association
32nd Annual Conference





OBJECTIVES

Following this presentation, participants will be able to:

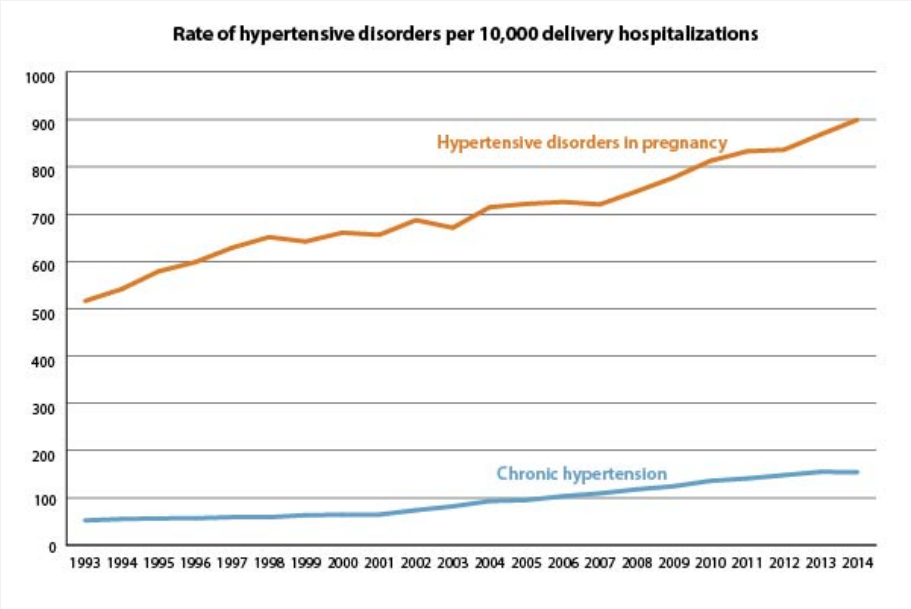
- Summarize perinatal **morbidity and mortality** related to preeclampsia
- Define preeclampsia **diagnosis** criteria
- Describe evidence-based preeclampsia **prevention**
- Describe **management strategies** for perinatal hypertensive disorders and crises
- Describe strategies to **decrease the impact** of preeclampsia in Georgia

PREECLAMPSIA: WHY DO WE CARE?

- Hypertensive disorders occur in **12-22% of pregnancies**
- **Seventeen percent of maternal deaths** in the United States
- **50,000 – 60,000 maternal deaths worldwide**
- Major contributor to **prematurity**
- **Etiology** remains unclear
- Perinatal injury and deaths may be **avoidable**

(California Department of Public Health [CDPH], 2013)

RATE OF HYPERTENSIVE DISORDERS



(Centers for Disease Control and Prevention[CDC], 2017)

MATERNAL MORTALITY AND SEVERE MATERNAL MORBIDITY

Cause	Mortality (1-2 per 10,000)	ICU Admission (1-2 per 1,000)	Severe Morbidity (1-2 per 100)
VTE/AFE	15%	5%	2%
Infection	10%	5%	5%
Hemorrhage	15%	30%	45%
Preeclampsia	15%	30%	30%
Cardiac disease	25%	20%	10%

(Council on Patient Safety in Women's Health Care, 2018)

DELAYED RESPONSE

Missed triggers and risk factors . Underutilization
Difficulties getting physician to bedside . Location of care issues

Present in >95% of cases

Failure to identify high-risk status
Incomplete or inappropriate management

Present in >90% of cases

(CDPH, 2013; Geller et al., 2004)

Graphic: Georgia Leads U.S. In Maternal Death Rates, Report Shows

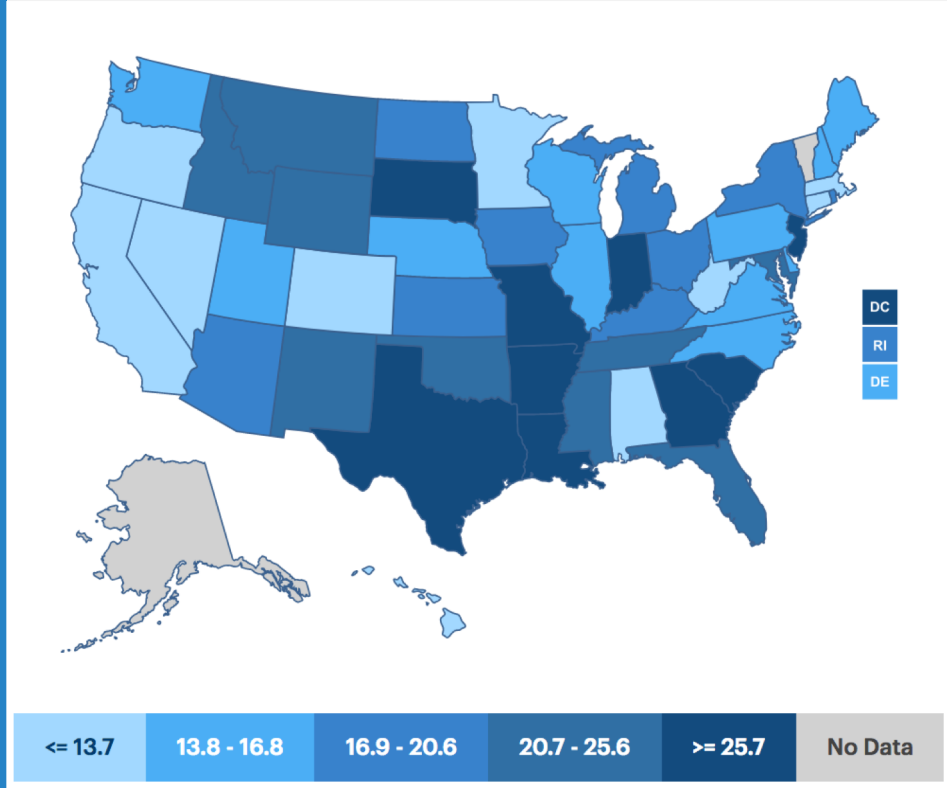
KAITLYN LEWIS • FEB 26, 2018

(WABA, 2018)

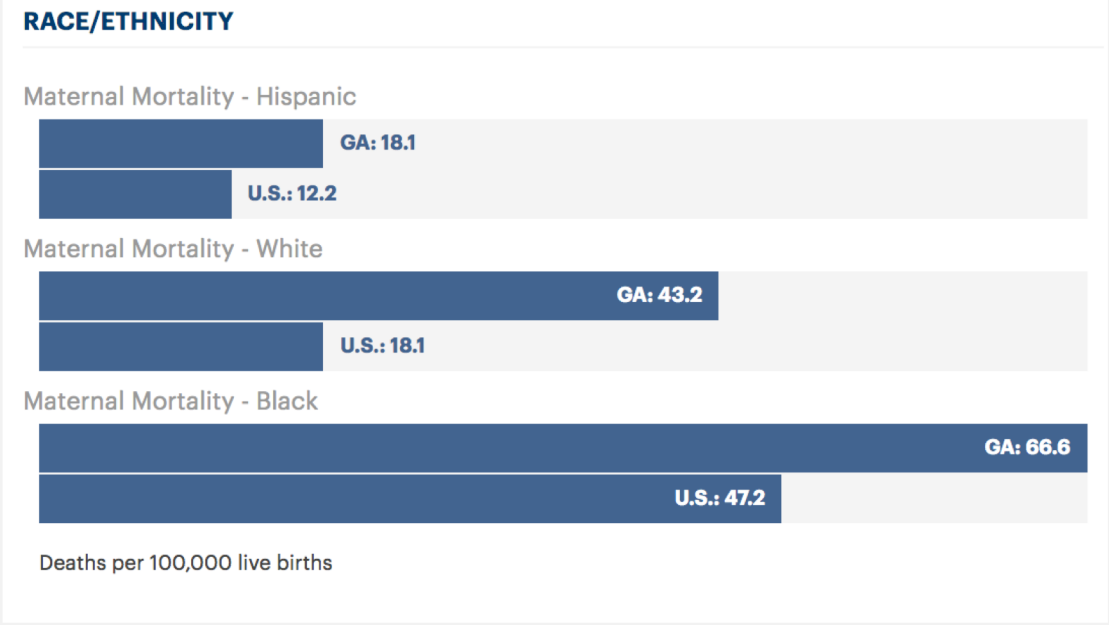
MATERNAL MORTALITY

Least healthy state 2018: Georgia

(CDC, 2018)



GEORGIA MATERNAL MORTALITY



(CDC, 2018)

GEORGIA: CAUSES OF MATERNAL DEATHS

1. Hemorrhage
2. Hypertension
3. Cardiac causes
4. Embolism

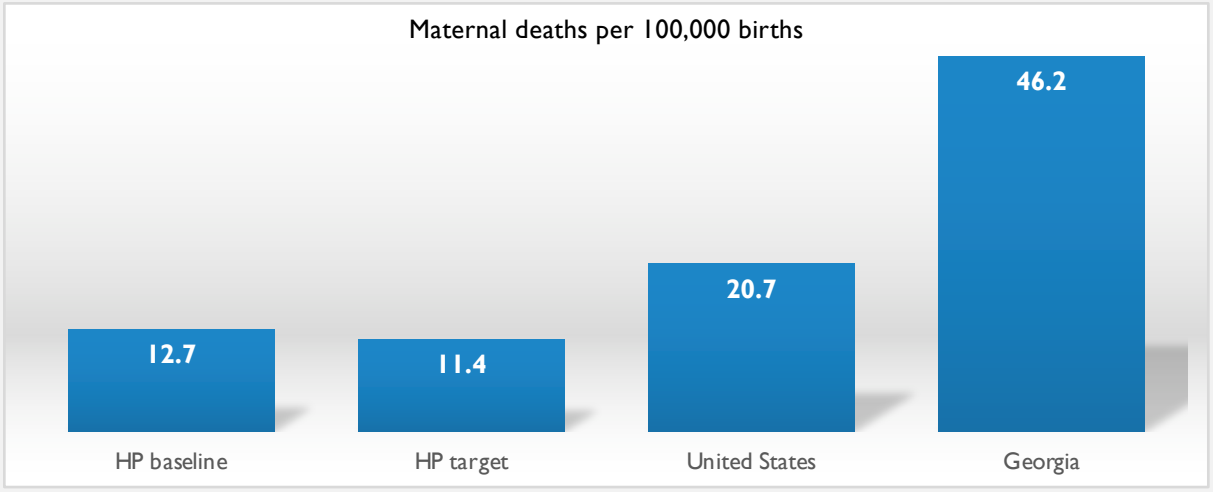
(Georgia Department of Public Health [GDPH], 2018)

MILLENNIUM DEVELOPMENT GOAL 5 – IMPROVE MATERNAL HEALTH

Target 5.A
Reduce the maternal mortality ratio by three-quarters between 1990 and 2015

(United Nations, n.d.)

HEALTHY PEOPLE 2020:
MICH-5: REDUCE THE RATE OF MATERNAL MORTALITY



(CDC, 2018; U.S. Department of Health and Human Services, 2018)

DIAGNOSIS CRITERIA

HYPERTENSION IN PREGNANCY

- Preeclampsia (PEC)/eclampsia
- Chronic hypertension
- Chronic hypertension with superimposed PEC
- Gestational hypertension

(American College of Obstetricians and Gynecologists [ACOG], 2013)

PREECLAMPSIA/ECLAMPSIA

- Pregnancy-specific hypertensive disease
- Multisystem involvement
- New-onset hypertension after 20 weeks gestation WITH:
  - Proteinuria with or without signs/symptoms
  - Signs/symptoms but no proteinuria
- **Eclampsia:** Seizures in a setting of preeclampsia

(ACOG, 2013)

DIAGNOSING PREECLAMPSIA

- Persistent SBP >/= 140 mmHg OR DBP >/=90 mmHg (two readings at least 4 hours apart and previously normotensive)

AND

- Proteinuria (>/= 300 mg per 24-hr urine OR protein/creatinine ratio >/= .3 OR dipstick of 1+)

OR

- In the absence of proteinuria, thrombocytopenia, renal insufficiency, impaired liver function, pulmonary edema, or cerebral or visual symptoms

(ACOG, 2013)

PREECLAMPSIA WITH SEVERE FEATURES

- Two severe blood pressure values
  - SBP >/= 160 OR DBP >/= 110 obtained 15-60 minutes apart
- Progressive renal insufficiency/persistent oliguria (<500 ml/24h)
- Unremitting headache/visual disturbances
- Pulmonary edema
- Liver function tests > two times normal
- Platelets < 100,000/HELLP syndrome

(ACOG, 2013)

CHRONIC HYPERTENSION

- Predates conception
- Identified before 20 weeks gestation
- May normalize postpartum
  - Avoid *transient hypertension of pregnancy*

(ACOG, 2013)

CHRONIC HYPERTENSION WITH SUPERIMPOSED PREECLAMPSIA

- Four – five times morel likely than in nonhypertensive women
- Worse prognosis
- Proteinuria before or after 20 weeks gestation
- Without severe features: Elevation in BP <160/110
- With severe features: Presence of organ dysfunction

(ACOG, 2013)

GESTATIONAL HYPERTENSION

- Often transient
- After 20 weeks gestation
- Absence of accompanying proteinuria and other PEC signs/symptoms
- If no normalization postpartum, may need to change diagnosis to chronic hypertension
- May warn of future diagnosis of hypertension

(ACOG, 2013)

PREECLAMPSIA PREVENTION

SCREENING

- A large proportion of preeclampsia-related deaths are preventable (California Department of Public Health, 2013)
  - Delay in diagnosis
  - Incomplete or inappropriate management
- First trimester risk assessment (ACOG, 2013, 2014/2017, 2018)
  - No screening to predict preeclampsia
  - Appropriate medical history to identify risk factors
  - Not recommended for other indications

(ACOG, 2013, 2018; U.S. Preventive Services Task Force [USPTF], 2014)

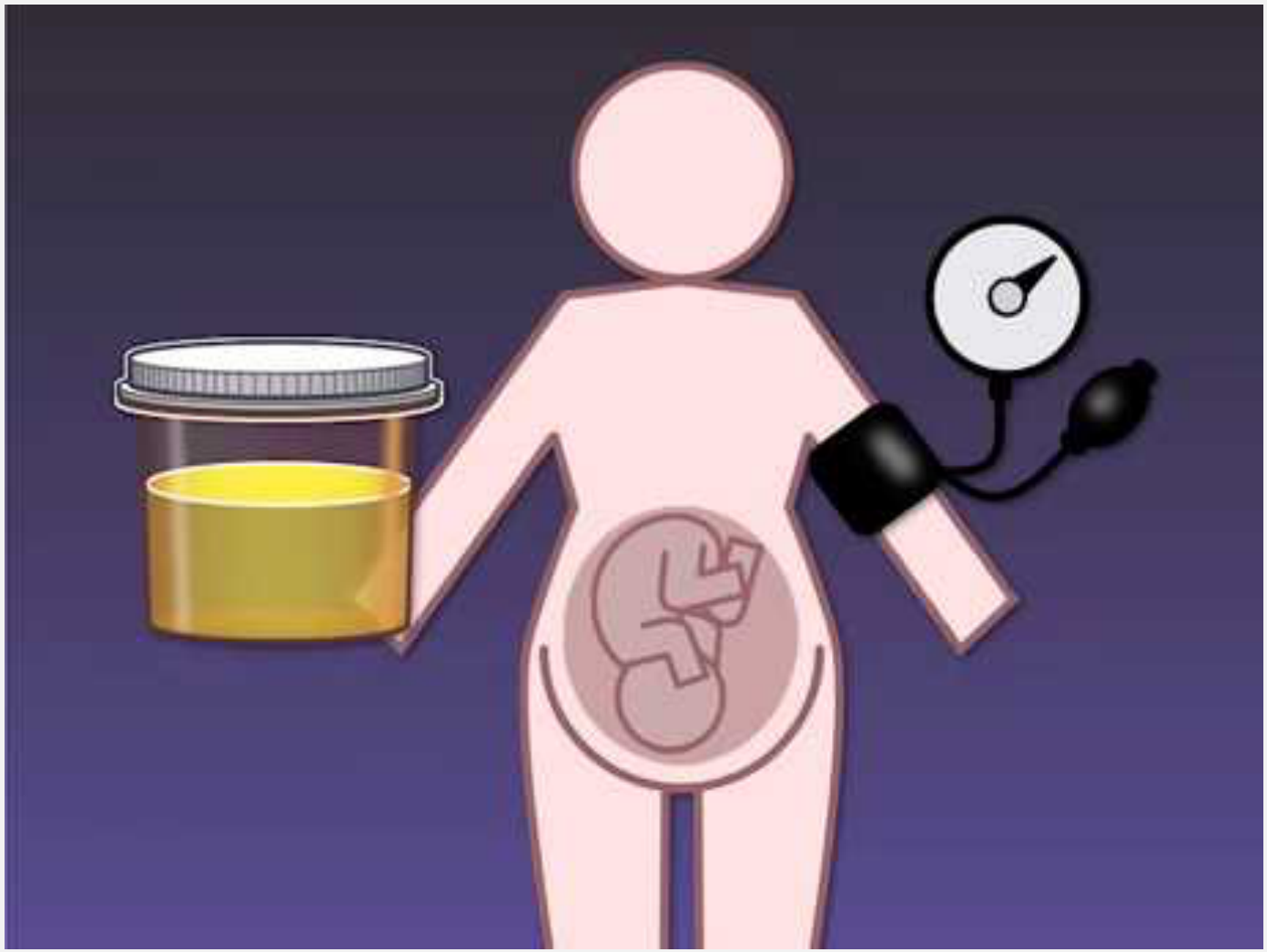
LOW-DOSE ASPIRIN FOR THE PREVENTION OF PREECLAMPSIA

- Low-dose (81 mg) daily
- Reduced platelet aggregation and improved early placental perfusion
- Considered safe; low likelihood of serious maternal, fetal, or neonatal complications
- Late first or second trimester through delivery
- Low-dose ASA is not recommended for other indications

(ACOG, 2013, 2018; USPTF, 2014)

Risk Level	Risk Factors	Discussion and Recommendation for low-dose ASA
High	History of preeclampsia, especially when accompanied by an adverse outcome Multifetal gestation Chronic hypertension Type 1 or 2 diabetes Renal disease Autoimmune disease (systemic lupus erythematosus, antiphospholipid syndrome	Single high risk factors are consistently associated with a risk for PEC. If a pregnant woman has more than one of these risk factors, there is an 8% risk for PEC. Recommend low-dose ASA with one or more high risk factors
Moderate	Nulliparity Obesity (BMA > 30) Family history PEC (mother or sister) Age 35 or older Personal history factors (e.g., low birthweight or small for gestational age, previous adverse pregnancy outcome, more than 10-year pregnancy interval)	These risk factors are independently associated with a risk for PEC, some more consistently than others. A combination of the risk factors may be used to identify the woman as high-risk for PEC. Consider low-dose ASA with more than one moderate risk factors
Low	Previous uncomplicated full-term birth	Do not recommend

(ACOG, 2013, 2018; USPTF, 2014)



MANAGEMENT

INCREASED SURVEILLANCE

- Maternal symptoms - even in the absence of preeclampsia diagnosis:
  - New onset headache or visual disturbances
  - Abdominal pain
  - Fetal growth restriction
  - New onset proteinuria after 20 weeks gestation
  - BP elevations > 30 mm Hg systolic or 15 mm Hg diastolic

(ACOG, 2013)

BLOOD PRESSURE MEASUREMENT

- Severe values do not need to be consecutive
- Consult after one severe BP is obtained
- If severe-range BPs persist for 15 minutes or more, treatment should begin within 60 minutes of second elevated value
- Institute fetal surveillance if viable

(ACOG, 2013)

MONITORING

- Baseline labs: CBC w/ platelets, LDH, liver function tests, electrolytes, BUN and creatinine, and urine protein
- Fetal surveillance as appropriate for gestational age
- Until BP is controlled obtain BP at least every 10 min
- Once BP is controlled (<160/110) obtain BP:
  - Q10 min for one hour; q15 min for one hour; q30 min for one hour; q hour for 4 hours

(ACOG, 2013)

FIRST LINE THERAPY: INTRAVENOUS LABETALOL

- Hold for maternal pulse < 60 bpm
- Not to exceed 220 mg IV/24 hours
- Avoid parenteral labetalol with active asthma, heart disease, or congestive heart failure
- May cause neonatal bradycardia

(ACOG, 2013)

FIRST-LINE THERAPY: INTRAVENOUS HYDRALAZINE

- Hold for maternal pulse < 60 bpm
- Not to exceed 25 mg IV/24 hours
- Hydralazine may increase risk of maternal hypotension

(ACOG, 2017b)

FIRST-LINE THERAPY: ORAL NIFEDIPINE

- May use as first-line treatment or in the absence of IV access
- May increase maternal heart rate

(ACOG, 2017b)

NO INTRAVENOUS ACCESS

- Initiate algorithm for oral nifedipine
- Labetalol 200 mg po
  - Repeat BP in 30 min; if >/= 160/110, labetalol 200 mg po if IV access still unavailable

(ACOG, 2017b)

ADDITIONAL THERAPIES

- If patient fails to respond to first-line therapies:
  - Emergency consult with maternal fetal medicine, internal medicine, anesthesiology, critical care, emergency medicine
- Consider:
  - Labetalol or nicardipine via infusion pump
  - Sodium nitroprusside for extreme emergencies – use for shortest amount of time due to cyanide/thiocyanate toxicity

(ACOG, 2017b)

WHAT ABOUT MAGNESIUM SULFATE?

- Eclamptic seizure prophylaxis or to control eclamptic seizures
- **Loading dose:** IV bolus 4-6 gm in 100 ml over 20 minutes
- **Maintenance:** 1-2 gm/hr IV until 24 hours after delivery
- If no IV access, 10 gm of 50% solution IM - 5 gm/buttock
- **Contraindications:** pulmonary edema, renal failure, myasthenia gravis

(ACOG, 2017b)

ANTICONVULSANTS

- For recurrent seizures or if magnesium sulfate is contraindicated
  - **Lorazepam**: 2-4 mg IV x 1, may repeat x 1 after 10-15 min.
  - **Diazepam**: 5-10 mg IV every 5-10 min to max dose 30 mg.
  - **Phenytoin**: 15-20 mg/kg IV x 1, may repeat 10 mg/kg IV after 20 min if no response. Avoid with hypotension, may cause cardiac arrhythmias.
  - **Keppra**: 500 mg IV or orally, may repeat in 12 hours. Dose adjustment needed if renal impairment.

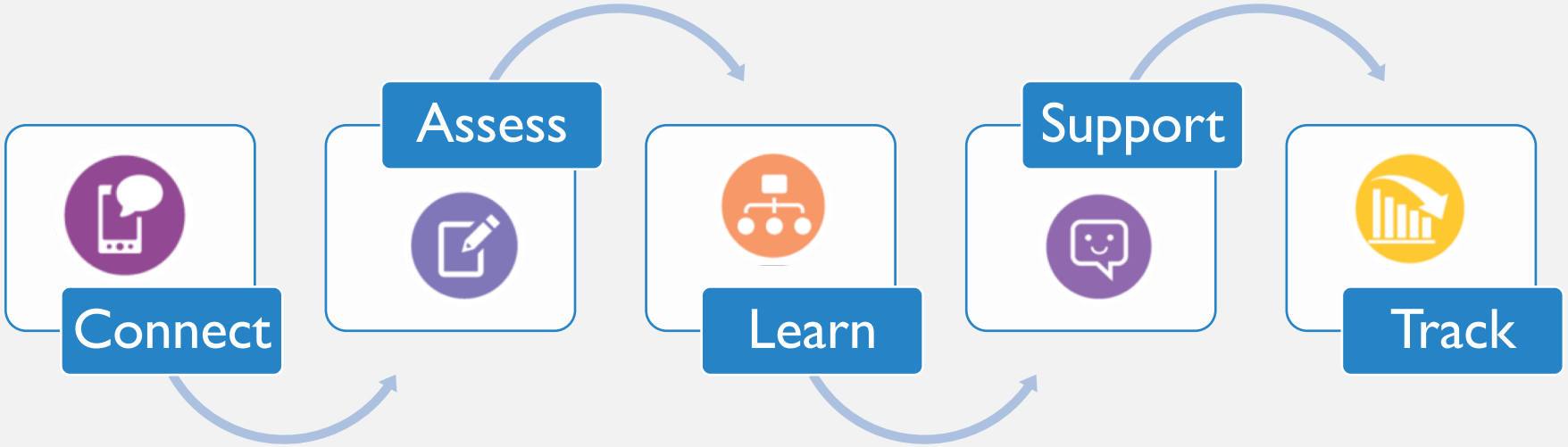
(ACOG, 2013)

STRATEGIES TO DECREASE THE IMPACT OF PREECLAMPSIA

- National quality improvement initiative
- Reduce maternal mortality and severe maternal morbidity
- **Alliance for Innovation on Maternal Health (AIM)**

(Bernstein et al., 2017; Council on Patient Safety in Women's Health Care, 2018)

THE AIM PROCESS



(Council on Patient Safety in Women's Health Care, 2018)

GEORGIA PERINATAL QUALITY COLLABORATIVE (GAPQC)

Mission: To establish and maintain a robust statewide perinatal data and quality improvement system that engages stakeholders in evidence-based practices to improve health outcomes for mothers and babies throughout Georgia.

- Maternal quality initiatives
  - AIM Safety Bundles (Severe HTN/PEC; OB Hemorrhage)
  - Postpartum long-active reversible contraception (LARC)

(GDPH, 2018)

AIM SAFETY PATIENT SAFETY BUNDLES

- Standardization of healthcare process to improve outcomes
- Systematic and comprehensive framework
- Readiness – Every unit
- Recognition & Prevention – Every patient
- Response – Every case of severe hypertension and preeclampsia
- Reporting/Systems Learning – Every unit

(Bernstein et al., 2017; Council on Patient Safety in Women's Health Care, 2018)

PATIENT SAFETY BUNDLE

Hypertension

READINESS

Improve **readiness** to severe hypertension in pregnancy by identifying standard protocols on every unit.

(Council on Patient Safety in Women's Health Care, 2018)

READINESS: EVERY UNIT

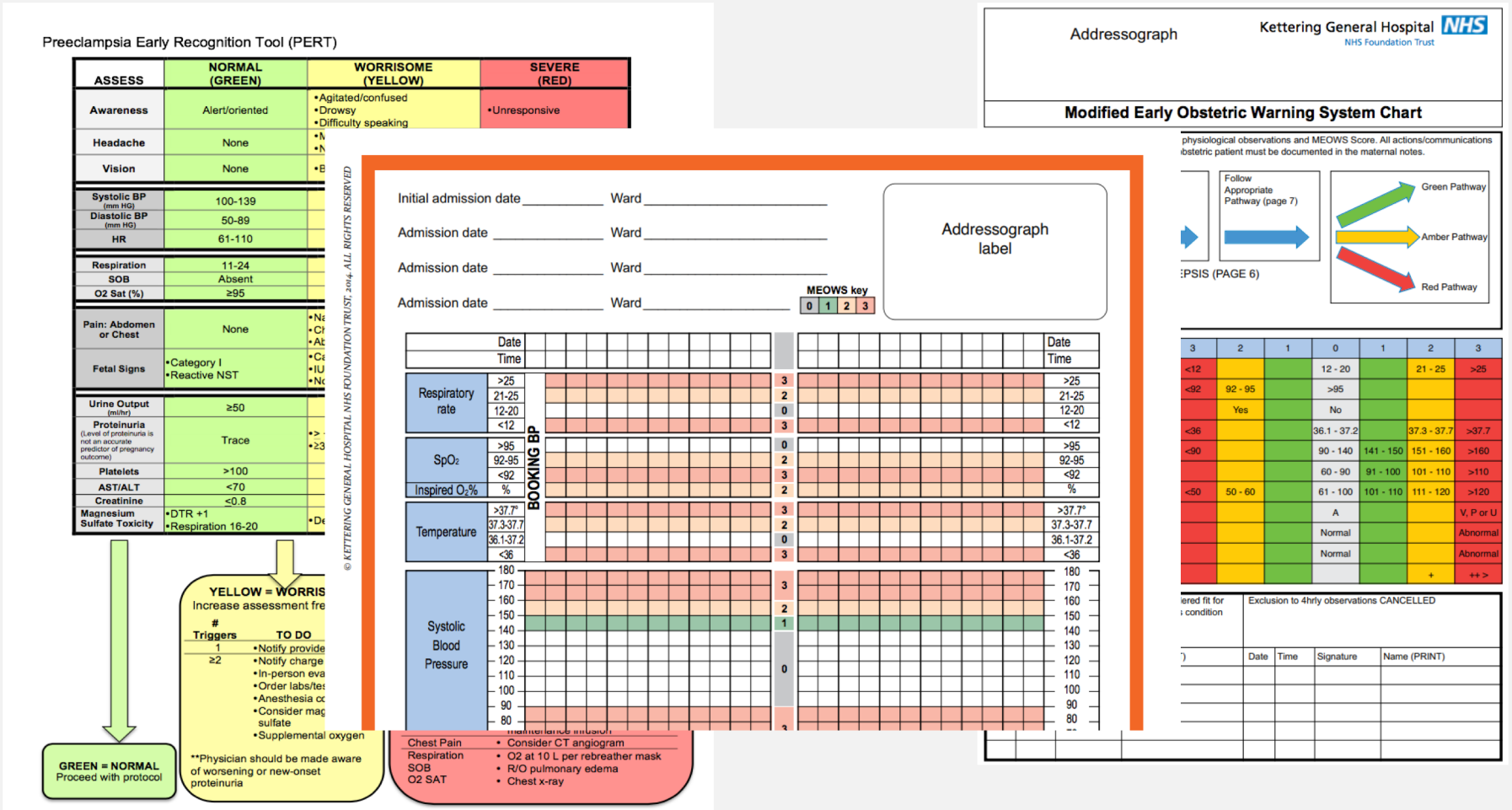
- Standards
- Unit education
- Processes for timely triage and evaluation
- Rapid access to medications
- System plan

(Council on Patient Safety in Women's Health Care, 2018)

MEWS IMPLEMENTATION PRINCIPLES

- A warning system not THE warning system
- Plan; plan; plan
- Multi-disciplinary team
- Simplicity

(Council on Patient Safety in Women's Health Care, 2018)



(CDPH, 2013; Cole, 2014)

RECOGNITION AND PREVENTION

Improve **recognition** of severe hypertension in pregnancy by prompt response to early maternal warning signs.

(Council on Patient Safety in Women's Health Care, 2018)

RECOGNITION AND PREVENTION: EVERY PATIENT

- Standard protocols
- Standard response
- Standard patient education

(Council on Patient Safety in Women's Health Care, 2018)

RESPONSE

Improve **response** to severe hypertension in pregnancy with facility wide standards for management and treatment of severe hypertension and eclampsia.

(Council on Patient Safety in Women's Health Care, 2018)

RESPONSE: EVERY CASE OF SEVERE HYPERTENSION AND PREECLAMPSIA

- Facility-wide standards
  - Protocols
  - Checklists
  - Escalation policies
- Minimum protocol requirements

(Council on Patient Safety in Women's Health Care, 2018)

REPORTING/ SYSTEMS LEARNING

Improve **reporting/systems learning** of severe hypertension in pregnancy by establishing a culture of huddles and debriefs.

(Council on Patient Safety in Women's Health Care, 2018)

REPORTING: EVERY UNIT

- Huddle
- Review
- Monitor
  - Review: What, Who, When, How

(Council on Patient Safety in Women's Health Care, 2018)

IMPLEMENTING A PATIENT SAFETY BUNDLE

- Select a bundle that fits your needs
- See the implementation guide
- Free educational sessions
- Motivate your team!
- Stay involved with the Council community
- Share your experiences

(Council on Patient Safety in Women's Health Care, 2018)

You are STILL AT RISK after your baby is born!

Postpartum Preeclampsia

What is it?

Postpartum preeclampsia is a serious disease related to high blood pressure. It can happen to any woman who has just had a baby **up to 6 weeks after the baby is born.**

Risks to You

- Seizures
- Stroke
- Organ damage
- Death

Warning Signs


Stomach pain


Feeling nauseous or throwing up


Swelling in your hands and face


Severe headaches


Seeing spots (or other vision changes)


Shortness of breath

What can you do?

- Ask if you should follow up with your doctor within one week of discharge.
- Keep all follow-up appointments.
- Watch for warning signs. If you notice any, call your doctor. (If you can't reach your doctor, call 911 or go directly to an emergency room and report you have been pregnant.)
- Trust your instincts.

For more information, go to www.stillatrisk.org

PREECLAMPSIA foundation

MAKE THE LINK BETWEEN PREECLAMPSIA and HEART DISEASE

Any Woman. Any Pregnancy.

PREECLAMPSIA foundation

What women need to know:

5%–8% of all pregnancies are impacted by preeclampsia - that's 1 in every 12 pregnancies

2 out of 3 women who experience preeclampsia will die from heart disease

A history of preeclampsia means an ↑ risk for developing diabetes

Multiple pregnancies with preeclampsia ↑ risk for **heart disease**

Women who have had preeclampsia have **3-4 x** the risk of high blood pressure and double the risk for heart disease and stroke.

You are at increased risk for heart disease and stroke if:

- ✓ your baby was delivered pre-term
- ✓ your baby weighed less than 5 1/2 pounds
- ✓ you suffered from severe preeclampsia more than once
- ✓ you are African American or Hispanic

Talk to your healthcare provider and let them know:

- ✓ if you experienced preeclampsia in any of your pregnancies
- ✓ if you experienced gestational diabetes in any of your pregnancies
- ✓ if any of your babies were born more than three weeks before the due date
- ✓ if any of your babies weighed less than 5 1/2 pounds at birth

www.preeclampsia.org

EXAMPLE

Hypertensive Emergency Checklist

HYPERTENSIVE EMERGENCY:

- Two severe BP values (≥160/110) taken 15-60 minutes apart. Values do not need to be consecutive.
- May treat within 15 minutes if clinically indicated

- ☐ Call for Assistance
- ☐ Designate:
  - ○ Team leader
  - ○ Checklist reader/recorder
  - ○ Primary RN
- ☐ Ensure side rails up
- ☐ Ensure medications appropriate given patient history
- ☐ Administer seizure prophylaxis (magnesium sulfate first line agent, unless contraindicated)
- ☐ Antihypertensive therapy within 1 hour for persistent severe range BP
- ☐ Place IV; Draw preeclampsia labs
- ☐ Antenatal corticosteroids (if <34 weeks of gestation)
- ☐ Re-address VTE prophylaxis requirement
- ☐ Place indwelling urinary catheter
- ☐ Brain imaging if unremitting headache or neurological symptoms
- ☐ Debrief patient, family, and obstetric team

† "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.

MAGNESIUM SULFATE

Contraindications: Myasthenia gravis; avoid with pulmonary edema, use caution with renal failure

IV access:

- ☐ Load 4-6 grams 10% magnesium sulfate in 100 mL solution over 20 min
- ☐ Label magnesium sulfate; Connect to labeled infusion pump
- ☐ Magnesium sulfate maintenance 1-2 grams/hour

No IV access:

- ☐ 10 grams of 50% solution IM (5 g in each buttock)

ANTIHYP

For SBP ≥ 160 (See SMI algorit to move to anot

- ☐ Labetalol (alol with a heart failu
- ☐ Hydralazin risk of ma
- ☐ Oral Nifedi administer istered subl

* Maximum cun ceed 220 mg lat

Note: If first lin specialist (MFM, care) is recomm

ANTICON

For recurrent sei

- ☐ Lorazepam after 10-15
- ☐ Diazepam dose 30 mg

Labetalol Algorithm

Trigger: If severe elevations (SBP ≥160 or DBP ≥ 110) persist* for 15 min or more **OR** If two severe elevations are obtained

Labetalol 20 mg† IV over 2 minutes (1)	→ Repeat BP in 10 minutes (2)	→ If SBP ≥ 160 or DBP ≥ 110, adm **labetalol 40 mg** IV over 2 min If BP below threshold, continu monitor BP closely
If SBP ≥ 160 or DBP ≥ 110, administer **labetalol 80 mg** IV over 2 minutes; If BP below threshold, continue to monitor BP closely (5)	→ Repeat BP in 10 minutes (6)	→ If SBP ≥ 160 or DBP ≥ 110, adm **hydralazine‡ 10 mg** IV over 2 m utes; If below threshold, conti monitor BP closely
If SBP ≥ 160 or DBP ≥ 110 at 20 minutes, obtain emergency consultation from specialist in MFM, internal medicine, anesthesiology, or critical care (9)	→	→ Give additional antihypertens medication per specific order recommended by specialist (10)
- Every 10 minutes for 1 hour - Then every 15 minutes for 1 hour - Then every 30 minutes for 1 hour - Then every hour for 4 hours (12)	→ Institute additional BP monitoring per specific order (13)	

- 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 220 mg in 24 hours
- There may be adverse effects and contraindications. Clinical judgement should prevail.

* Two severe readings more than 1
† **Avoid parenteral labetalol wi congestive heart failure; use May cause neonatal bradycar**
‡ "Active asthma" is defined as:
Ⓐ symptoms at least once a we
Ⓑ use of an inhaler, corticosterc pregnancy, or
Ⓒ any history of intubation or h
§ Hydralazine may increase risk of maternal hypotension.

Sample Order Set for Severe Intrapartum or Postpartum Hypertension, Initial First-line Management With Labetalol*

- Notify physician if systolic blood pressure (BP) measurement is greater than or equal to 160 mm Hg or if diastolic BP measurement is greater than or equal to 110 mm Hg.
- Institute fetal surveillance if undelivered and fetus is viable.
- If severe BP elevations persist for 15 minutes or more, administer labetalol (20 mg intravenously [IV] for more than 2 minutes).
- Repeat BP measurement in 10 minutes and record results.
- If either BP threshold is still exceeded, administer labetalol (40 mg IV for more than 2 minutes). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 10 minutes and record results.
- If either BP threshold is still exceeded, administer labetalol (80 mg IV for more than 2 minutes). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 10 minutes and record results.
- If either BP threshold is still exceeded, administer hydralazine (10 mg IV for more than 2 minutes). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 20 minutes and record results.
- If either BP threshold is still exceeded, obtain emergency consultation from maternal–fetal medicine, internal medicine, anesthesia, or critical care subspecialists.
- Give additional antihypertensive medication per specific order.
- Once the aforementioned BP thresholds are achieved, repeat BP measurement every 10 minutes for 1 hour, then every 15 minutes for 1 hour, then every 30 minutes for 1 hour, and then every hour for 4 hours.
- Institute additional BP timing per specific order.

*Please note there may be adverse effects and contraindications.

Data from the National Heart, Lung, and Blood Institute. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230. Bethesda (MD): NHLBI; 2004. Available at: http://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf. Retrieved December 5, 2016.

TAKEAWAYS

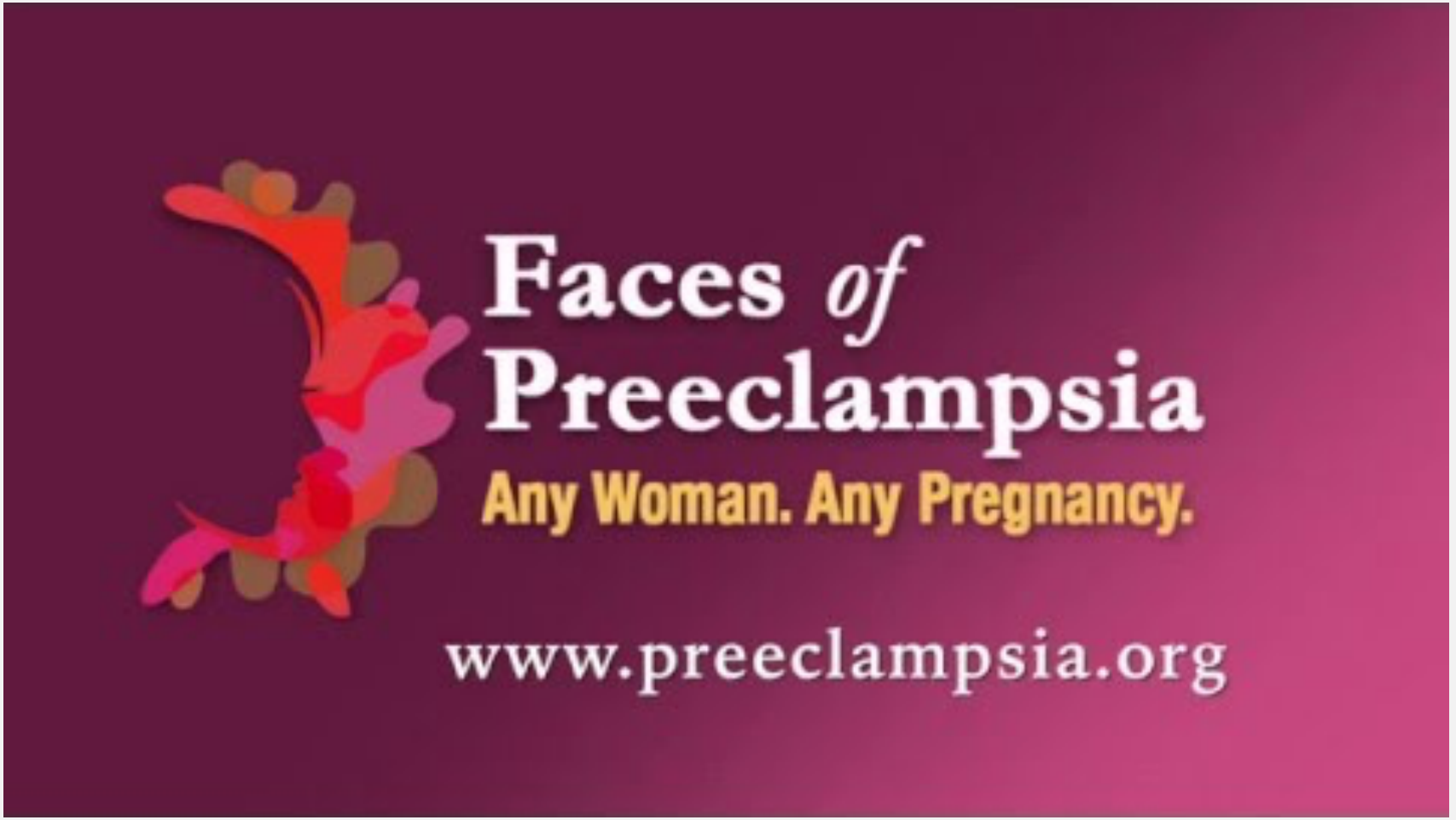
- Incidence has increased by 25% in two decades
- Leading cause of maternal and perinatal morbidity and mortality worldwide
- Less-than-optimal care with challenges to identification

Every unit

Every patient

Every severe case

(ACOG, 2017b)


Faces of
Preeclampsia
Any Woman. Any Pregnancy.
www.preeclampsia.org

REFERENCES

REFERENCES

- American College of Obstetricians and Gynecologists, Task Force on Hypertension in Pregnancy. (2013). *Hypertension in pregnancy.* Washington, DC: Author. Retrieved from https://www.acog.org/~/media/Task%20Force%20and%20Work%20Group%20Reports/public/HypertensioninPregnancy.pdf
- American College of Obstetricians and Gynecologists, Committee on Obstetric Practice. (2015, September/2017). *First trimester risk assessment for early-onset preeclampsia* (Number 638). Retrieved from https://www.acog.org/-/media/Committee-Opinions/Committee-on-Obstetric-Practice/co638.pdf?dmc=1&ts=20170214T0513489845
- American College of Obstetricians and Gynecologists, Committee on Obstetric Practice. (2017a, April). *Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period* (Number 692). Retrieved from https://www.acog.org/-/media/Committee-Opinions/Committee-on-Obstetric-Practice/co692.pdf?dmc=1&ts=20180902T0026130206
- American College of Obstetricians and Gynecologists, Safe Motherhood Initiative. (2017b, July). *Maternal safety bundle for severe hypertension in pregnancy* [File]. Retrieved from https://www.acog.org/-/media/Districts/District-II/Public/SMI/v2/HTNSlideSetJuly2017.pdf?dmc=1&ts=20180202T2259075111

REFERENCES

- American College of Obstetricians and Gynecologists, Committee on Obstetric Practice, Society for Maternal-Fetal Medicine. (2018, July). *Low-dose aspirin use during pregnancy* (Number 743). Retrieved from https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Low-Dose-Aspirin-Use-During-Pregnancy
- Bernstein, P. S., Martin, J. N., Barton, J. R., Shields, L. E., Druzin, M. L., Scavone, E. M.,..Jaffer, S. (2017). Severe hypertension in pregnancy. *Journal of Midwifery and Women's Health, 62*(4), 493-501. https://doi.org/10.1111/jmwh.12647
- California Department of Public Health, California Maternal Quality Care Collaborative, The Preeclampsia Task Force. (2013, November). *Improving health care response to preeclampsia: A California quality improvement toolkit.* Sacramento, CA: Author. Retrieved from https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit
- Centers for Disease Control and Prevention, National Vital Statistics System, America's Health Rankings. (2018). Health of women and children. Retrieved from https://www.americashealthrankings.org/explore/health-of-women-and-children/measure/maternal_mortality/state/GA?edition-year=2018
- Centers for Disease Control and Prevention. (2017). Data on selected pregnancy complications in the United States. Retrieved from https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-complications-data.htm

REFERENCES

- Cole, M. F. (2014). A modified early obstetric warning system. *British Journal of Midwifery, 22*(12), 862-8. Retrieved from http://perigen.com/wp-content/uploads/2017/05/2014-BJM-Meows.pdf
- Geller, S. E., Rosenberg, D., Cox, S. M., Brown, M. L., Simonson, L., Driscoll, C. A., & Kilpatrick, S. J. (2004). The continuum of maternal morbidity and mortality – Factors associated with severity. *American Journal of Obstetrics and Gynecology, 191*(3), 939-44. doi:10.1016/j.ajog.2004.05.099
- Georgia Department of Public Health. (2018). Georgia Perinatal Quality Collaborative (GaPQC). Retrieved from https://dph.georgia.gov/gapqc
- Georgia Department of Public Health. (2017, November). *Reducing maternal mortality in Georgia: 2017 case review update*. Atlanta, GA: Author. Retrieved from Maternal Mortality - Georgia Department of Public Health - Georgia.gov
- Rolnik, D. L., Wright, D., Poon, L. C., O'Gorman, N., Syngelaki, A., de Paco Matallana, C. … Nicolaides, K. H. (2017). Aspirin versus placebo in pregnancies at high risk for preterm preeclampsia. *The New England Journal of Medicine, 377*(7), 613-622. Retrieved from https://www.nejm.org/doi/pdf/10.1056/NEJMoa1704559

REFERENCES

- United Nations. (n.d.). Goal 5: Improve maternal health. Retrieved from http://www.un.org/millenniumgoals/maternal.shtml
- U.S. Department of Health and Human Services. (2018). Maternal, infant, and child health. Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health/objectives
- U.S. Preventive Services Task Force. (2014, September 9). *Low-dose aspirin use for the prevention of morbidity and mortality from preeclampsia: Prevention medication* (Final position statement). Retrieved from https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/low-dose-aspirin-use-for-the-prevention-of-morbidity-and-mortality-from-preeclampsia-preventive-medication
- WABA. (2018, February 26). Graphic: Georgia leads U.S. In maternal death rates, report shows. Retrieved from https://www.wabe.org/maternal-mortality-georgia/

QUESTIONS?