Maternal Mortality: What Primary Care Providers Can Do

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Objectives

- Understand the current national and state data on maternal mortality.
- Understand current data to action efforts, and how they are informed by Maternal Mortality Review Committee recommendations.
- Understand what providers, especially primary care, can do to impact maternal mortality.

Maternal Mortality Data Sources

There is often confusion regarding the various sources of maternal mortality data that exist. Maternal mortality rates are reported by two national data sources, the National Center for Health Statistics (NCHS) and the Pregnancy Mortality Surveillance System (PMSS), as well as state maternal mortality review committees (MMRCs). The differences between those data sources are outlined below.

National Center for Health Statistics (NCHS)

- Administered by the Centers for Disease Control and Prevention (CDC).
- Uses death certificate information to assign ICD-10 codes that are used to identify maternal deaths and produce a national estimate of maternal mortality.
- Data source:
  - Vital statistics data.
- Who reviews the deaths?
  - Medical epidemiologists at the CDC conduct a high-level review of vital statistics data.

Pregnancy Mortality Surveillance System (PMSS)

- Administered by the Centers for Disease Control and Prevention (CDC).
- Uses death certificates that show a relationship to pregnancy identified by either a checkbox on the death certificate or by a linked birth or fetal death certificate registered in the year preceding death to produce a national estimate of maternal mortality.
- Data source:
  - Vital statistics data.
- Who reviews the deaths?
  - Medical epidemiologists at the CDC conduct a high-level review of vital statistics data.

MMRCs

- Administered by states.
- Produces comprehensive summary of state maternal mortality.
- Data sources:
  - Vital statistics data, prenatal care records, hospital records, outpatient clinic records, autopsy reports, police/investigative reports, social service records, social media posts, etc.
- Who reviews the deaths?
  - A committee of clinical and public health experts in maternal health located within the state that the deaths occur.

"A reliance on vital statistics alone to measure maternal mortality makes it challenging to determine whether changes observed are the result of improved identification of maternal deaths or changes in the risk.[1,2] While surveillance using vital statistics can tell us about trends and disparities, state- and local-based MMRCs are best positioned to comprehensively assess maternal deaths and identify opportunities for prevention.[3,4]"

What is the Ohio Pregnancy-Associated Mortality Review (PAMR) Committee?

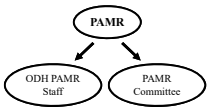
What is the Ohio Pregnancy-Associated Mortality Review (PAMR) Committee?

- The PAMR Committee is Ohio's Maternal Mortality Review Committee (MMRC).
  - MMRCs:
    - Use a comprehensive process to identify, review, and analyze deaths during pregnancy, childbirth, and the year postpartum; disseminate findings; and act on results.
    - Are a group of experts and stakeholders in maternal health that convene regularly to review deaths and identify key learnings and opportunities to prevent future deaths.
    - Are the gold standard. MMRCs are the only way we can understand why women are dying from pregnancy-related causes during pregnancy, childbirth, and in the postpartum period.

Gold Standard

- PAMR began operating at the Ohio Department of Health (ODH) in 2010 but was not codified in state law until the passage of legislation by the 133rd Ohio General Assembly that in October 2019 became Ohio Revised Code Chapter 3738: Pregnancy-Associated Mortality Review Board.

What is the Ohio Pregnancy-Associated Mortality Review (PAMR) Committee?



PAMR consists of two arms:

- ODH PAMR Staff
  - Nurse abstractors, data analysts, program consultants, administrators employed by ODH.
- PAMR Committee
  - Multidisciplinary team from all areas of Ohio.
  - Disciplines include but are not limited to: Midwifery, family medicine, nursing, forensic pathology, psychology, psychiatry, anesthesiology, maternal-fetal medicine, obstetrics and gynecology, doula services, patient advocacy, social work, health systems, state and local public health, epidemiology, addiction treatment, home visiting, and violence prevention.

Together, ODH PAMR Staff and the PAMR Committee work to identify and review all pregnancy-associated deaths in Ohio and promote systems change to reduce preventable maternal deaths.

What is the Ohio Pregnancy-Associated Mortality Review (PAMR) Committee?

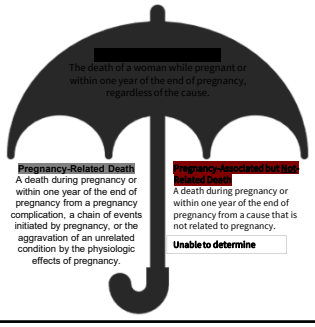
ODH PAMR staff analyzes data collected during the PAMR Committee reviews and disseminates it via reports, presentations, etc. ODH PAMR staff also use this data to inform and guide the implementation of various public health programs.

PAMR Committee reviews every maternal death and determines the following:
- Was the death related to pregnancy?
- What was the cause of death?
- Was the death preventable?
- What were the factors that contributed to the death?
- What are recommendations to prevent future maternal deaths?
- What is the anticipated impact of these recommendations, if implemented?

ODH PAMR staff identify all pregnancy-associated deaths that occurred to Ohio residents by:
- Linking maternal death certificates with live birth and fetal death certificates.
- Identifying death certificates in which pregnancy checkbox was marked and/or were assigned an ICD-10 O-code.

ODH PAMR staff request and obtain records from any facilities, providers, or offices the decedent received care or services from prior to their death. This includes but is not limited to: prenatal records, hospital records, autopsy reports, police/investigative reports, and medical transport records. This information is used to create de-identified case summaries that describe the events that led to the decedent's death.

First, let's start with some maternal mortality definitions.

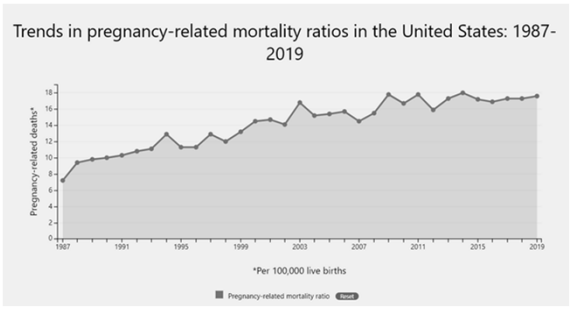


These definitions help the Pregnancy-Associated Mortality Review (PAMR) committee answer the question,

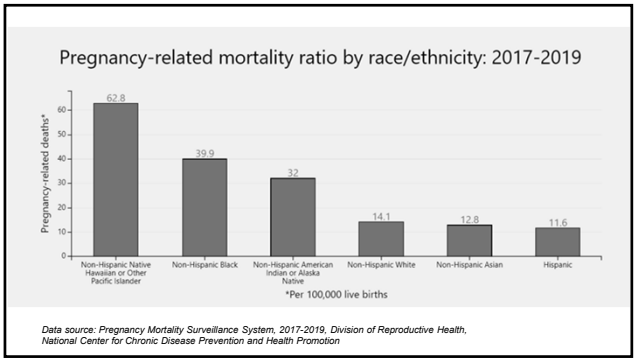
"If the woman had not been pregnant, would she have still died?"

If the answer is no, then that death is considered pregnancy-related.

National Data



Data source: Pregnancy Mortality Surveillance System, 2017-2019, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion



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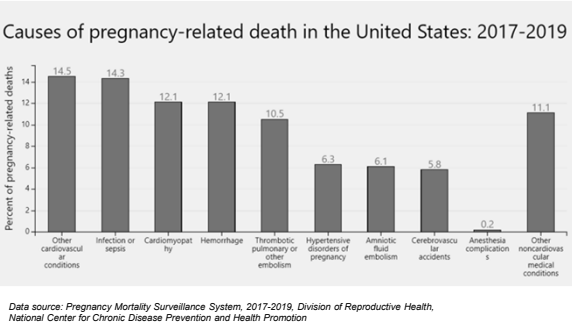


Data source: Pregnancy Mortality Surveillance System, 2017-2019, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion

Circumstances Contributing to Pregnancy-Related Deaths

- Committees determined that the presence of:
  - Obesity contributed to 27% of deaths.
  - Discrimination contributed to 30% of deaths.
  - A mental health condition contributed to 28% of deaths.
  - A substance use disorder contributed to 25% of deaths.

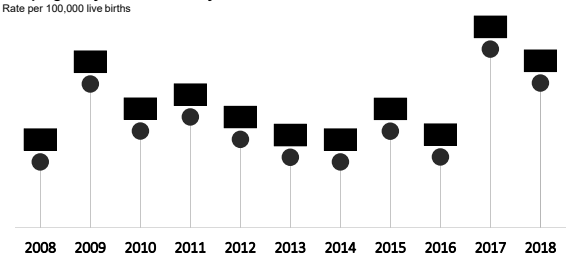
Data from CDC: MMRC in 36 US States, 2017-2019

Ohio Data

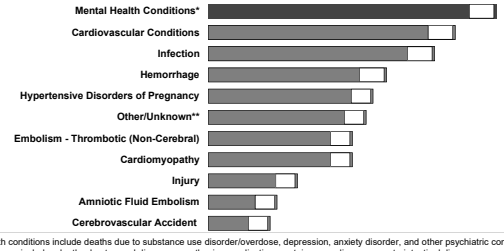
Maternal Deaths in Ohio are Increasing

The pregnancy-related mortality ratio has increased from 2008 to 2018 in Ohio.

Rate per 100,000 live births



Mental health conditions were the leading cause of pregnancy-related deaths in Ohio from 2008 to 2018.



*Mental health conditions include deaths due to substance use disorder/overdose, depression, anxiety disorder, and other psychiatric conditions.
**Other/Unknown includes deaths due to renal disease, anesthesia complications, autoimmune diseases, gastrointestinal diseases, metabolic/endocrine, neurologic conditions, pulmonary conditions, hematologic conditions, cancer, and unknown causes.

What Populations are Disparately Impacted by Maternal Mortality in Ohio?

From 2008-2018, non-Hispanic Black women were almost 2 times more likely to die from pregnancy-related causes than non-Hispanic white women.

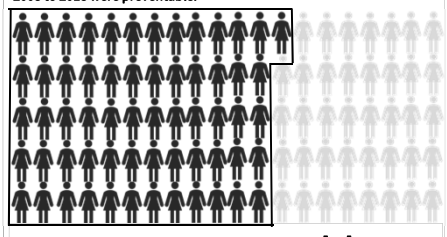
When Are Maternal Deaths in Ohio Occurring?

Most pregnancy-related deaths in Ohio from 2008 to 2018 occurred during the postpartum period.

33% of pregnancy-related deaths in Ohio from 2008-2018 occurred during pregnancy.	67% of pregnancy-related deaths in Ohio from 2008-2018 occurred 1-365 days after the end of pregnancy.

Are Maternal Deaths in Ohio Preventable?

Most pregnancy-related deaths that occurred in Ohio from 2008 to 2018 were preventable.



61% preventable

Data to Action: PAMR Funding of Recommendations

- To address recommendations, in 2019 ODH successfully applied for two federal grants totaling over $12 million to improve maternal health in Ohio

What is the Department of Children and Youth Doing to Prevent Maternal Mortality in Ohio?

OHIO COUNCIL TO ADVANCE MATERNAL HEALTH	QUALITY IMPROVEMENT	WORKFORCE DEVELOPMENT	PROGRAM IMPLEMENTATION

• Ohio's Statewide Maternal Health Task Force (OH-CAMH).	• Compassionate, Accountable, Respectful, Equitable (CARE) Project.
	• AIM Patient Safety Bundles.
	  • Hemorrhage.
	  • Hypertension.
	  • Substance Use.
	  • Sepsis.
	• Healthy Mom, Healthy Family Interconception Care.
	• Urgent Maternal Warning Signs (UMWS).
		• Obstetric Emergencies Virtual Simulation Trainings.
		• Implicit Bias Trainings.*
		• Telehealth Trainings for Women's Health Providers.*
			• Disparities in Maternal Health Community Grant Program.
			• Group Prenatal Care Initiatives Grant.
			• Medical-Legal Partnerships.

*Projects that have been completed.

Quality Improvement

CARE Project	AIM Patient Safety Bundles	Urgent Maternal Warning Signs	Healthy Mom, Healthy Baby
Purpose: To implement a project that increases compassionate, accountable, respectful and equitable care among maternal healthcare providers. **Status** • Launched Learning Community to develop toolkit for future implementation. **Future** • Pilot implementation of CARE toolkit.	**Purpose:** To implement the AIM patient safety bundles throughout delivery hospitals in Ohio to reduce preventable maternal deaths. **Status** • Hypertension: 82 hospitals participated across three Waves. • Hemorrhage: 24 hospitals completed Wave 1 this fall. 27 hospitals recruited for Wave 2. **Future** • Care for Pregnant and Postpartum People with Substance Use Disorder • Sepsis in Obstetrical Care	**Purpose:** To increase knowledge of and improve health outcomes among women at risk for an adverse event related to urgent maternal warning signs. **Status:** • Waves 1 & 2 implemented in 72/74 WIC sites. • Wave 3 implemented in 21 Home Visiting sites. **Future** • Expand to additional community health providers.	**Purpose:** Ensure moms receive screenings for smoking/tobacco use, folic acid, family planning and depression during their child's pediatric well-visit. **Status** • 9 sites in Wave 1, 17 sites in Wave 2, 21 sites in Wave 3. **Future** • Project implementation will be completed in February 2024; evaluation will be completed by September 2024.

AIM's Primary Objective

Reduce preventable maternal deaths and severe maternal morbidity (SMM) in the United States by:

- Promoting safe care for every U.S. birth.
- Engaging multidisciplinary partners at the national, state and hospital levels.
- Developing and providing tools for implementation of evidence-based patient safety bundles.
- Utilizing data-driven quality improvement strategies.
- Aligning existing efforts and disseminating evidence-based resources.
- Equity.

AIM Patient Safety Bundles

PAMR Recommendation: Encourage the adoption of the corresponding patient safety bundles through the Patient Safety Council on Women's Healthcare, the Alliance for Innovation on Maternal Health (AIM), Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN), and the California Maternal Quality Care Collaborative.

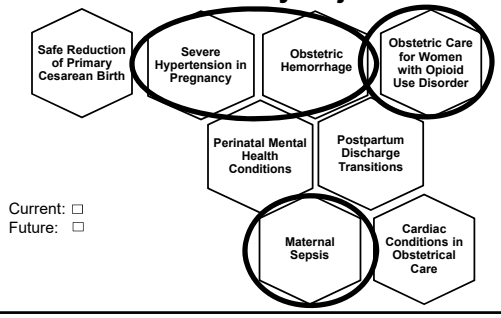
Initiative: Implementation of the AIM Hypertension & Hemorrhage Patient Safety Bundles throughout all delivery hospitals.

Hypertensive disorders of pregnancy were the 5th leading cause of pregnancy-related deaths in Ohio. 89% of these deaths were deemed preventable by PAMR.	**AIM Hypertension Bundle**	**To reduce preventable maternal deaths related to hypertension.**
Hemorrhage was the 4th leading cause of pregnancy-related deaths in Ohio. 63% of these deaths were deemed preventable by PAMR.	**AIM Hemorrhage Bundle**	**To reduce preventable maternal deaths related to hemorrhage.**

Waves 1-3 Ohio AIM Hypertension Sites

Wave 1 Ohio AIM Hemorrhage Sites

AIM's Primary Objective



Current: ☐
Future: ☐

Urgent Maternal Warning Signs

PAMR Recommendation: Educate providers and patients on recognition, treatment, and prevention of obstetric complications.

Initiative: Implementation of the Urgent Maternal Warning Signs education in public health settings.

33% occurred during pregnancy.

43% were pregnant 42 days prior to the date of death.

24% were pregnant between 43 and 365 days prior to the date of death.

Urgent Maternal Warning Signs

To reduce preventable, postpartum maternal deaths.

Healthy Mom, Healthy Family Interconception Care Project

PAMR Recommendation: Promote preconception health and prevention of chronic conditions during reproductive aged years.

Initiative: Implement the **IMPLICIT Network (I**nterventions to **M**inimize **P**reterm and **L**ow birth weight **I**nfants using **C**ontinuous quality **I**mprovement **T**echniques Network) throughout pediatric and family medicine practices.

- **Published literature on IMPLICIT Network outcomes cont'd:**
  - ~> 60% of women screened positive for at least one risk factor (Srinivasan et al., 2018).
  - More likely to report taking a multivitamin at the subsequent visit (DeMarco et al., 2021).
  - More likely to report discussions with their child's doctor about family planning, depression screening, smoking cessation, and taking a folic acid supplement (Frayne et al, 2021).

Healthy Mom, Healthy Family Interconception Care Project

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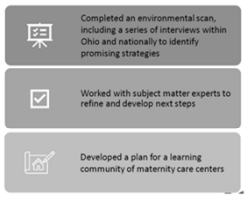
Outcomes from IMPLICIT:

- **Wave 1:**
  - Nine sites participated.
  - Eighty-eight percent of birth mothers agreed to participate in the project during the well child visits for their infants (870 unique birth mothers).
- **Wave 2**
  - Nineteen sites participated.
  - Sites increased screening across all health behaviors and referrals for mothers with at risk screens.

Compassionate, Accountable, Respectful, and Equitable (CARE) Project

OH-CAMH Cap: Develop the Compassionate Care Collaborative to facilitate conversations with care providers/community-based organizations to inform the development of a processor system to improve communication between providers and community-based/public health service organizations.

Initiative: Compassionate, Accountable, Respectful, and Equitable (CARE) Project



Stratified Data
• Self-Report Patient Demographics. • Outcomes Stratified by Race and Ethnicity.
Patient Community Partnerships
• Patient Feedback. • Community Partnerships. • Co-produced Actions Plans.
Health-Related Social Needs (HRSN)
• HRSN Screening. • Referral Pathways for HRSN.

Workforce Development

Obstetric Emergencies Virtual Simulation Trainings

Goal: To provide educational opportunities to emergency medicine physicians, physician assistants, nurse practitioners, nurses, and first responders to increase their knowledge and preparedness for obstetric emergencies.

Accomplishments:

-Developed direct training & train the trainer formats.

-27 trainings.

-Over 316 participants trained.

-Significant increases in knowledge and self-efficacy related to identification, treatment, and management of various obstetric emergencies.

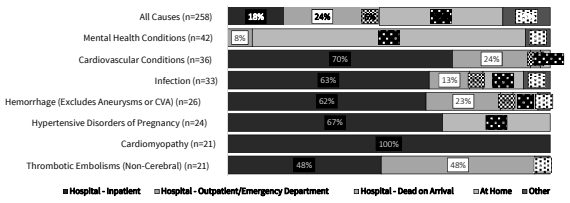
Ohio Department of Children & Youth

Obstetric Simulation Training for Emergency Medicine Providers

PAMR Recommendation: Educate providers and patients on recognition, treatment, and prevention of obstetric complications.

Initiative: Obstetric Emergency Simulation Trainings for Emergency Medicine Providers.

Outpatient/Emergency Department was the location of more than 20% of all pregnancy-related deaths from 2008-2018 in Ohio.
The leading location of death varied by cause of death.



Obstetric Simulation Training for Emergency Medicine Providers

PAMR Recommendation: Educate providers and patients on recognition, treatment, and prevention of obstetric complications.

Initiative: Obstetric Emergency Simulation Trainings for Emergency Medicine Providers.

Leading causes of pregnancy-related deaths in Ohio from 2008 to 2018 differed by race/ethnicity.

Top 6 leading causes of pregnancy-related deaths among non-Hispanic Black women:

1. Cardiovascular Conditions (15%)
2. Infection (15%)
3. Hypertensive Disorders of Pregnancy (13%)
4. Hemorrhage (Excludes Aneurysm or CVA) (11%)
5. Embolism - Thrombotic (non-cerebral) (11%)
6. Injury (8%)

Top 6 leading causes of pregnancy-related deaths among non-Hispanic White women:

1. Mental Health Conditions (24%)
2. Infection (15%)
3. Cardiovascular Conditions (13%)
4. Hemorrhage (Excludes Aneurysm or CVA) (9%)
5. Cardiomyopathy (9%)
6. Embolism - Thrombotic (non-cerebral) (8%)

Emergency medicine providers who attend this training are educated about how to recognize, treat, and manage the leading causes of maternal death, with an emphasis on those that impact non-Hispanic Black women.

Program Implementation

Disparities in Maternal Health Community Grant

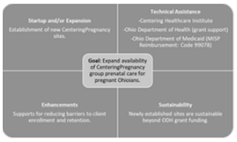
Grant purpose: To improve maternal health outcomes by funding equity driven interventions focused on addressing maternal health disparities.

Currently Funded Projects (Year 4)

- **Birthing Beautiful Communities** is utilizing grant funds for behavioral health services and to increase outreach and marketing efforts for those services to address the health-related social needs of moms in northeast Ohio.
- **Hospital Council of Northwest Ohio** is utilizing grant funds to provide comprehensive care coordination and increased access to doula care to medically underserved and socially vulnerable women in Lucas County, Ohio.
- **Summit County Public Health** is utilizing grant funds to implement a pilot program that focuses on improving early detection of hypertensive disorders within pregnant (HDP) and postpartum individuals in Akron.

Group Prenatal Care Initiatives Grant

Grant purpose: Expand availability of CenteringPregnancy group prenatal care for pregnant Ohioans. Funding will support the establishment of new CenteringPregnancy sites and reducing barriers to client enrollment and retention.



Maternal Health Task Force: Ohio Council to Advance Maternal Health (OH-CAMH)

PAMR Recommendation: Convene a Maternal Health Task Force, comprised of stakeholders representing individuals and organizations from across the state in order to identify Ohio-specific gaps and assist in the development of an Ohio-focused strategic plan informed by PAMR data.

Initiative: Establish the Ohio Council to Advance Maternal Health (OH-CAMH).

Major Successes

- Built trust in collaboration with 196 individuals from 84 organizations.
- Drafted Ohio's Maternal Health Strategic Plan with 11 key strategies.
  - Some strategies include:
    - Implementing provider education and accountability.
    - Redesigning and prioritizing funding for community-based organizations.
    - Diversifying the racial/ethnic and professional makeup of the perinatal workforce.
- Created 11 implementation teams working on activities to address each strategy.

Completed Projects

- Implicit Bias Trainings.
  - Trained 939 women's health professionals and providers.
  - Provided 33 trainings.
- Telehealth Trainings for Women's Health Providers.
  - Create tailored trainings for specific audiences:
    - OB/GYN Residents.
    - Family Medicine Residents.
    - WIC providers.
    - Reproductive Health and Wellness providers.
  - Trained a total of 425 participants through 24 trainings.

Figure 1 Telehealth Project learners across Ohio

What Can You Do as a Health Care Provider?

What can you do as a health care provider?

In addition to promoting healthy behaviors, primary care providers may be the **only** medical professional a mother or mother-to-be talks to about their health.

Every healthcare provider can play a role in preventing maternal mortality. Ask every reproductive-aged woman 2 questions:
Are you pregnant now or have you been pregnant in the past year?
Do you want to become pregnant in the next year

How can primary care providers impact maternal health outcomes?

- **Talk with your pregnant or postpartum patients or parents of your patients that are currently or may have recently been pregnant about their health and potential warning signs:**
  - Educate them about symptoms during or after pregnancy that should never be ignored.
  - Instruct them when they should contact their health care provider and when to seek help right away.
  - Urgent Maternal Warning Signs Education and Patient Handouts.
- **Continuously educate pregnant patients on the importance of vaccinations.**

***Recommendation based on 2017-2018 PAMR data.**

How can primary care providers impact maternal health outcomes?

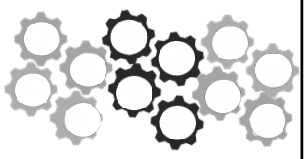
- Screen your pregnant or postpartum patients or parents of your patients for barriers to health, such as:
  - Transportation.
  - Food insecurity.
  - Mental health conditions.
  - Substance use disorders.
  - Domestic violence or human trafficking.
  - Adverse Childhood Events (ACEs).
  - Chronic disease.

…and refer them to services to address these barriers.

*Recommendation based on 2017-2018 PAMR data.

How can primary care providers impact maternal health outcomes?

- Ensure complete care coordination and referrals (when appropriate).
  - When making referrals to other specialties or services, follow-up with patients to make sure they were successfully connected.
    - If they were not, assess why and address barriers (if applicable).
  - Utilize case managers, patient navigators, and other care coordination partners to help get patients the care you refer them to.



*Recommendation based on 2017-2018 PAMR data.

If You Are A Hospital System…

- Know your institutional data, including by race and ethnicity, for maternal and infant health metrics.
- Review all adverse events.
  - Shortly thereafter and include debriefing.
  - If sentinel event, perform root cause analysis .
- Use quality improvement techniques (i.e. AIM) to improve delivery of prenatal and postpartum care.
- Standardize coordination of care and response to emergencies.
- Institute implicit bias training and compassionate care measures in the health system.

If You are a Birthing Person or Their Support Person…

- Know the urgent maternal warning signs of obstetric complications.
- Advocate for treatment, if necessary.
- Inform providers of pregnancy history any time medical care is received in the year after delivery.
- Know your community supports (doula services, patient navigators, lactation consultants, etc.).

At the Federal Level – Blueprint for Addressing the Maternal Health Crisis:

- Goal is to improve collection and research efforts related to rural and maternal obstetric care data.
- Authorizes $3M for each of FY22-26 for HHS to establish rural obstetric networks for quality improvement and innovation.
- HRSA grants to identify, develop and disseminate best practices to improve maternal health care quality and outcomes.
- Training for health care providers to improve prenatal, labor, birthing, and postpartum care for racial and ethnic minority populations.
- Funding for Telehealth Network and Telehealth Resource Centers Grant Programs to include providers of prenatal, labor care, birthing, and postpartum care services.
- The Momnibus is a comprehensive legislative package composed of 12 individual bills that address every dimension of this U.S. maternal health crisis and tackle long-standing health care disparities.

PAMR Recommendations Surrounding Chronic Diseases

- Providers should educate pregnant patients with hypertension about the long-term consequences of sub-optimal management. Together, the provider and patient should develop a care plan.
- Providers should provide counseling to pregnant patients on appropriate weight gain and nutrition during pregnancy.
- OBGYN providers should ensure transition to primary care providers for chronic medical conditions in the postpartum period.
- Patients with multiple chronic diseases and frequent ER visits should be provided with care coordination when presenting for healthcare.

Case

28 yo G3P3 was found down at home—pulseless/apneic in asystole—on PPD 4. Time of death estimated > 20 minutes.

- Body mass index—54, Smoker—1/2 ppd, History of gestational diabetes, History of cesarean delivery.

Autopsy: hypertensive arteriosclerotic CV disease, cardiomegaly, concentric hypertrophy of the LV wall.

Case

40 yo G4P4 who delivered vaginally after an induction of labor at 37w due to uncontrolled chronic hypertension. Discharged to home on labetalol 200 mg bid with a home blood pressure cuff. She woke up on PPD9 with a severe headache, unrelieved by acetaminophen. Her blood pressure on arrival to the ED was 181/122. Shortly after that, she had a stroke and ultimately died of related complications.