

GOAL 1

Action 1.7

WHITE HOUSE
BLUEPRINT
EVIDENCE TO
ACTION BRIEFS



Improve quality of care provided to pregnant and postpartum women with or at risk for Hypertensive Disorders of Pregnancy



Maternal Health
Learning & Innovation Center™
MaternalHealthLearning.org

**THE WHITE HOUSE BLUEPRINT
FOR ADDRESSING THE
MATERNAL HEALTH CRISIS**

The [White House Blueprint for Addressing the Maternal Health Crisis](#) (White House Blueprint) has identified goals and actions to reduce the rates of maternal mortality and morbidity, eliminate disparities in maternal health outcomes, and improve the experience of pregnancy, birth, and the postpartum period for people across the United States.

The following Evidence to Action Brief highlights Action 1.7 in the White House Blueprint in an effort to increase access to and coverage of comprehensive high-quality maternal health services, including behavioral health services (Goal 1).

Maternal Health Action 1.7

Improve quality of care provided to pregnant and postpartum women with or at risk for hypertensive disorders of pregnancy (HDP) by disseminating self-measured blood pressure monitoring tools and resources for obstetrical providers, primary care professionals, and the pregnant and postpartum women they serve.

Contribution to Quality of Life

The [White House Blueprint](#) is a “whole-of-government approach to combating maternal mortality and morbidity” so that all people in the United States who are capable of becoming pregnant and giving birth are healthy and safe.

Birthing people experience health and safety issues during the pregnancy and postpartum periods, including severe maternal morbidity and mortality. Hypertensive disorders of pregnancy (HDP) are common pregnancy complications that are associated with heart attacks and stroke and are a leading cause of pregnancy-related deaths in the US.^{1,2} Complications and mortality as a result of HDP can be reduced with equitable implementation of initiatives that increase awareness of urgent maternal warning signs and promptly diagnose and treat HDP. Disseminating self-measured blood pressure monitoring tools to pregnant people and resources to obstetrical providers and primary care professionals can help to improve detection of these complications.

Basic Facts

Hypertensive disorders of pregnancy result from high blood pressure during and after pregnancy and are among the leading causes of maternal disease and death in the US.³ High blood pressure is found in 1 of every 12 to 17 pregnancies among women ages 20 to 44.⁴ These disorders include chronic hypertension, gestational hypertension, preeclampsia/eclampsia, and preeclampsia superimposed on chronic hypertension.⁴ The US is seeing an increase in the prevalence of HDP: From 2017 to 2019, the prevalence rose from 13% to 16% among hospitalization deliveries; rates for pregnancy-associated hypertension rose from 11% to 13%.¹

Blood pressure screenings are a critical part of prenatal care to prevent HDP, which can lead to severe maternal injury or death, and are recommended throughout pregnancy and during the postpartum period. The American College of Obstetricians and Gynecologists (ACOG) recommends that blood pressure be checked at each prenatal appointment for women without elevated levels.⁵ Pregnant and birthing people with chronic or gestational hypertension should consider more frequent blood pressure monitoring. Among pregnant people with gestational hypertension, ACOG recommends weekly monitoring.⁵ Women with HDP should be closely monitored for the first 72 hours after delivery and again at 7 to 10 days postpartum.⁶ Nearly 50% of all maternal deaths occur in the first week after delivery.⁷ Providing pregnant people with tools to measure their own blood pressure is a promising practice that was adopted more widely at the start of the COVID-19 pandemic, when in-clinic visits increased risks to pregnant people.

Researchers continue to build the evidence base supporting this recent innovation. A 2023 cohort study conducted in the US among 1,700 patients participating in a text-based remote monitoring



program showed that enrollment in the program was associated with a significant reduction in postnatal adverse events in the first 6 months after delivery.⁸ There also was an increase in cardiology visits in the 6 months after delivery, persisting for 12 months, suggesting that remote monitoring as part of a larger postpartum hypertension bundle could facilitate another point of care to decrease associated morbidity in the longer term (given the association between preeclampsia and long-term cardiovascular health).

A randomized control trial in the United Kingdom among 850 pregnant individuals with chronic or gestational hypertension found that blood pressure self-monitoring during prenatal care and up to 8 weeks postpartum with telemonitoring via an app did not lead to improved clinic-based blood pressure control.⁹ Similarly, a systematic review (conducted in 2022) of remote monitoring during prenatal care on maternal and neonatal outcomes found no difference in the risk for most of the outcomes for which data was available when comparing remote monitoring with clinic monitoring; however, there were psychosocial benefits and satisfaction among users.¹⁰ Most patients and providers supported remote monitoring, citing ease of use, convenience, self-empowerment, and reduced anxiety. Women with a history of preeclampsia found that “self-monitoring allowed them to have more accurate and up-to-date information on their own health.”¹⁰ Studies included in the review demonstrated a decrease in overall stress during pregnancy and an increase in healthy habits and behaviors due to remote blood pressure monitoring. Participants reported that despite the decrease in the number of prenatal visits, they continued to feel able to fully communicate with their health care provider.¹⁰ In addition, patients and providers found a self-monitoring blood pressure device and app easy to use.

There is evidence supporting remote monitoring as a tool to reduce disparities in the US setting. Several studies have provided evidence that a postpartum text-based, remote blood pressure monitoring intervention could reduce racial disparity in postpartum blood pressure ascertainment, decrease postpartum readmissions, and increase postpartum visit attendance.¹¹ In one study in the US, non-Black women attended in-office postpartum blood pressure checks twice as often as Black women (70% and 33%, respectively). When given the option to participate in a text-based monitoring system for remote blood pressure monitoring, however, both non-Black and Black women had a greater than 90% compliance rate.⁶ Even with the increased knowledge and tools to self-monitor HDP, hypertensive risks vary among pregnant and postpartum people, making it vital that patients be aware of the signs that indicate their condition requires follow-up care from a provider. Providers should ensure adequate and sufficient training for their patients so that they know when to call their health care provider or 911.

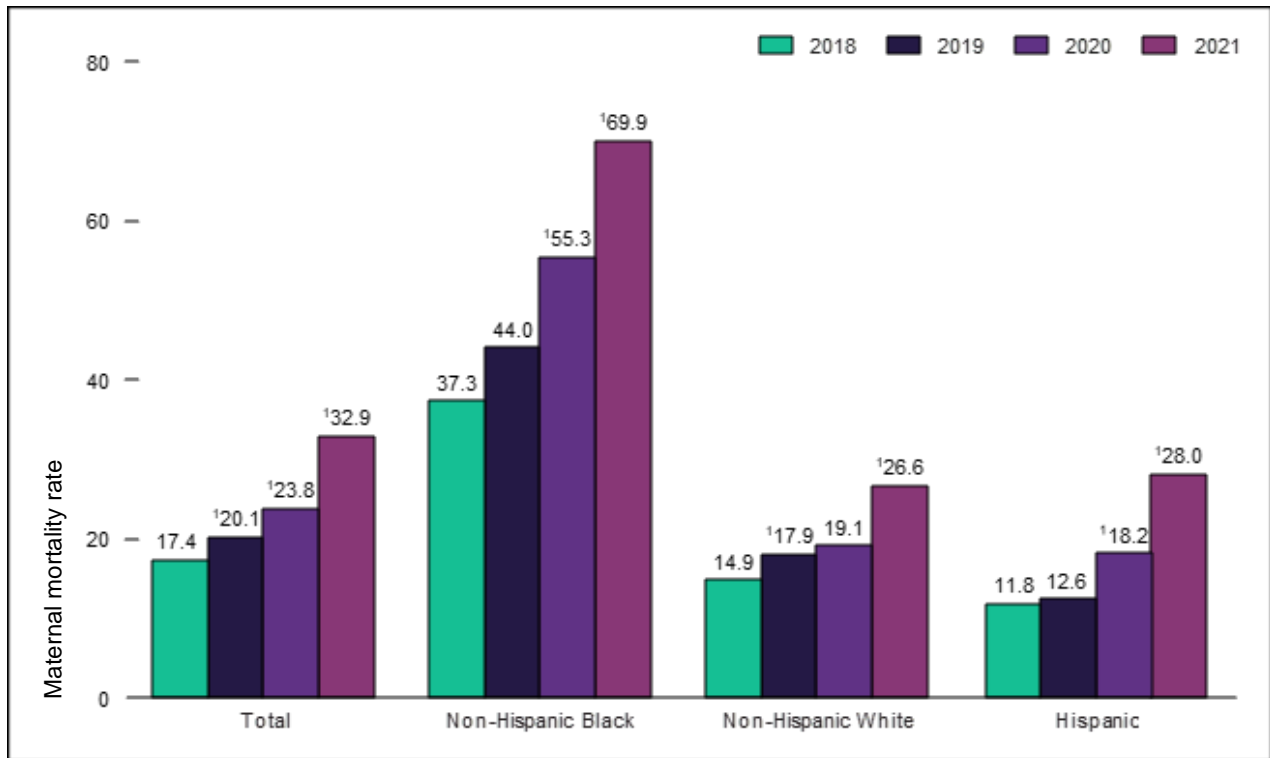
Early detection and management before the development of severe maternal and neonatal morbidity is key. There is limited research around prevention of HDP. However, to improve quality of care provided to pregnant and postpartum women with or at risk for hypertensive disorders, the [White House Blueprint](#) identifies a national collaborative between the Department of Health and Human Services and the Centers for Disease Control and Prevention’s Division of Heart Disease and Stroke Prevention/Million Hearts®, the Division of Reproductive Health, and other maternal health partners.^{12, pg.26} This national collaboration seeks to lead efforts to develop and disseminate self-measured blood pressure monitoring tools and resources to improve capacity to prevent and manage hypertensive disorders during and after pregnancy.^{12, pg.26}

How are we doing?

Below we highlight data related to Action 1.7. Racial, ethnic, geographic, and socioeconomic disparities emphasize where efforts should be focused to improve health outcomes related to Action 1.7.



Figure 1: The United States Maternal Mortality Data by Race and Ethnicity, 2018 - 2021



¹Statistically significant increase from previous year ($p < 0.05$).

Note: Race groups are single race.

Source: Hoyert DL. [Maternal Mortality Rates in the United States, 2021](#). National Center for Health Statistics. 16 March 2023. Accessed: September 5, 2023.

CALL TO ACTION

Remote blood pressure monitoring is a promising practice for reducing morbidity associated with hypertensive disorders that lead to maternal morbidity and mortality and for addressing disparities in outcomes. All pregnant people should have access to high-quality, appropriately fitted home blood pressure monitors, which requires payer coverage, distribution, and appropriately designed cuffs for all. All pregnant people should be trained to appropriately use their blood pressure monitor, to understand normal values, and to know what to do if their blood pressure is elevated. Finally, all pregnant people should have access to follow-up care for abnormal blood pressure values.



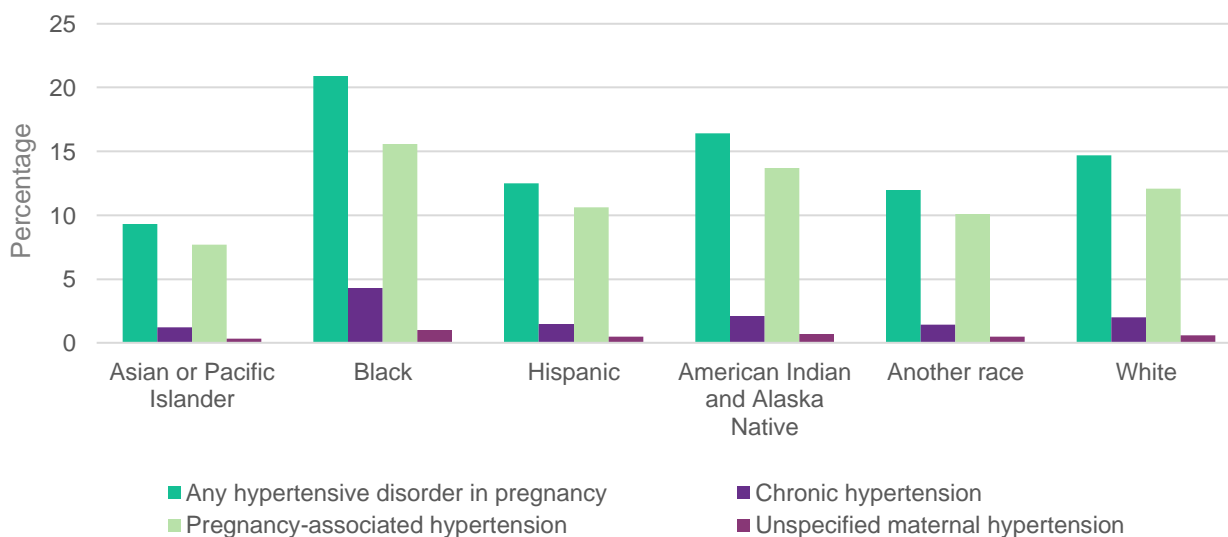
Figure 2: Hypertension-Related Maternal Mortality Rate (MMR) per 100,000 Live Births for Selected Maternal Race and Age, 1979–2018

	All Women	White Women	Black Women
Maternal Age	MMR (95% CI) per 100,00 live births		
15	1.5 (1.1–1.9)	1.1 (0.8–1.6)	2.1 (1.4–3.1)
25	1.3 (1.1–1.5)	0.9 (0.7–1.1)	3.4 (2.6–4.5)
35	2.3 (2.0–2.8)	1.7 (1.3–2.1)	8.1 (6.1–10.9)
45	22.7 (17.9–28.9)	17.4 (12.6–24.0)	69.3 (47.8–100.4)

The overall hypertension-related maternal mortality rate (MMR) from 1979 to 2018 was 2.1 per 100,000 live births. However, Black women have a fourfold greater risk of dying from hypertension compared with White women (5.4 vs. 1.4 per 100,000).

Source: Ananth CV, et al. [Historical and Recent Changes in Maternal Mortality Due to Hypertensive Disorders in the United States, 1979 to 2018. *Hypertension*. 2022;78\(5\):1414-1422.](#)

Figure 3: Prevalence of Hypertensive Disorders of Pregnancy among Delivery Hospitals By Race and Ethnicity—From a National Inpatient Sample, 2017–2019

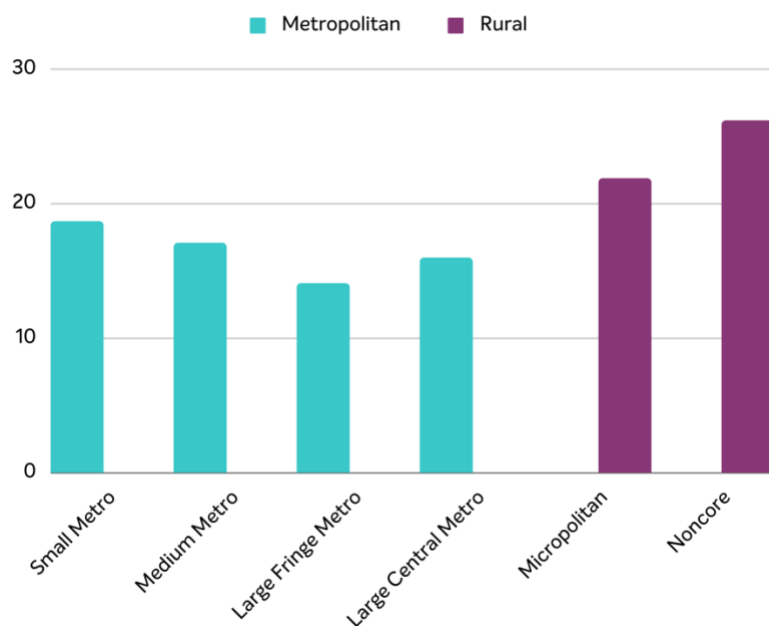


Black women (15.6) had the highest prevalence of pregnancy-associated hypertension compared with American Indian/Alaska Native (13.7), White (12.1), and Hispanic women (10.6). Similarly, non-Hispanic Black women had the highest rates of chronic hypertension and unspecified maternal hypertension compared with all other races/ethnicities.

Source: Ford ND, et al. [Hypertensive Disorders in Pregnant and Mortality at Delivery Hospitalization – United States, 2017 – 2019. *Morbidity and Mortality Weekly Report*. 29 April 2022;71\(17\).](#)



Figure 4: Prevalence of Hypertensive Disorders of Pregnancy among Delivery Hospitals By Geographic Area, 2017–2019



Birthing people living in rural areas within the United States have the highest rate of HDPs compared with those living in more urban areas. “Variability in the risk of death by geographic location groups might reflect chronic health conditions and access to care (e.g., rural residents may face challenges such as distance from and lack of access to obstetric services and providers) including risk-appropriate care.”

Source: Ford ND, et al. [Hypertensive Disorders in Pregnant and Mortality at Delivery Hospitalization – United States, 2017 – 2019. Morbidity and Mortality Weekly Report](https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf). 29 April 2022;71(17).

Note: For specific information defining geographic locations, visit https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf

Story Behind the Data: Factors Affecting Progress

Maternal mortality disproportionately affects non-White populations. As seen in the Pregnancy Mortality Surveillance System data for 2017 to 2019, overall pregnancy-related mortality was highest for non-Hispanic Native Hawaiian or Other Pacific Islanders, at 62.8 deaths per 100,000 live births, followed by 39.9 for non-Hispanic Black and 32.0 for American Indian/Alaska Native women (see Figure 1).² Pregnancy-related mortality was lowest among Hispanic women (11.6 deaths per 100,000 live births).¹

There are significant disparities among populations affected by HDP when assessed by race. A recent analysis evaluated the contributions of maternal age, year of death, and year of birth on trends in hypertension-related maternal deaths in the US from 1979 to 2018. Researchers found that non-Hispanic Black women had a fourfold increased risk of hypertension-related maternal mortality rate (MMR) compared to White women (5.4 vs. 1.4 per 100,000).¹³ At each age, non-Hispanic Black women had an increased risk of MMR compared with White women (see Figure 2).¹³

In a national sample of women who gave birth in a hospital in the period 2017 to 2019, non-Hispanic Black women had the highest prevalence of any HDP (20.9) compared with American Indian/Alaskan Native (16.4), non-Hispanic-White women (14.7), and Hispanic women (12.5).¹ The prevalence of HDP by geography identifies women in rural areas at greater risk (15.5) compared with those living in micro- (14.8) and metropolitan (14.6) areas (see Figure 3).¹ Those with the highest median household-level income, by national quartile for patient zip code, have the lowest prevalence of HDP compared with those with the lowest (16.4) and middle incomes (14.4–14.7)¹ (data not shown.)

Populations that experience disproportionate hardships around cardiovascular health include birthing people who are eligible for or enrolled in Medicaid or are uninsured; live in a maternity care desert; are affected by a mental or behavioral issue before, during, or after pregnancy; and those who identify as Black or Indigenous.⁶ There are significant disparities in office visits during the postpartum



period for women of color, indicating that remote monitoring may be a particularly valuable strategy among this population.⁶

A potential barrier to remote monitoring could be health care providers themselves. While most report being supportive of remote blood pressure monitoring, in various studies they expressed concern that some birthing and postpartum people will be unable to accurately take and read their blood pressure due to technical problems (with the app and/or device or literacy issues) or the lack of availability of device(s), thus resulting in inaccurate medical information.^{9,14} Providers also reported the concern that self-monitoring might have the potential to shift responsibility for health care to individuals, which could lead to delays in care during emergencies.¹⁴

What can be done to address the issue?

The [White House Blueprint](#) identifies actionable steps to address Action 1.7. In addition, experts from the maternal and child health field have identified innovative, evidence-informed strategies from several databases and national repositories.

Maternal & Child Health (MCH) Innovations

MCH experts selected the following resources for action after a review that included: the [MCHbest Database](#), a database developed to aggregate evidence-based strategies that can be used as is or adapted to fit local and state-level contexts; the [Association of Maternal & Child Health Program's Innovation Hub \(AMCHP\)](#), a searchable repository of local and state practices, policies, and community-based innovations considered to be “what’s working” in the MCH field; the [Robert Wood Johnson Foundation's What Works for Health \(RWJ\)](#) database, a tool that helps local communities to identify policies and programs that fit within their context and match their priorities; the [Maternal Health Learning & Innovation Center](#), a national resource for improving maternal health inequities; and a search of leading organizations and agencies working in this field.

- [Alliance for Innovation on Maternal Health \(AIM\)](#). The AIM Severe Hypertension in Pregnancy Safety Bundle is an evidence-based innovation. The [safety bundle](#) is a quality improvement initiative to support best practices that make birth safer, improve maternal health outcomes, and save lives.
- [Healthy Women Healthy Futures](#). Based on the Life Course Perspective, this promising practice seeks to improve the health of women and future generations with interconception screenings, including blood pressure screenings (AMCHP).
- [Preeclampsia Foundation](#). To address high blood pressure and other HDP, the organization highlights the best practices of educating patients and providers, providing low-dose aspirin, and obtaining accurate blood pressure readings.
 - [The Cuff Kit](#). This program distributes blood pressure devices and associated patient education materials to health care providers and community health workers who care for high-risk patients in a telehealth environment to help monitor their blood pressure during the prenatal and postpartum periods.
- [Remote Patient Monitoring](#). This virtual care option uses an electronic device to monitor and record a patient’s health.
- [Screening for Preeclampsia: US Preventive Services Task Force \(USPSTF\) Recommendation Statement](#). This USPSTF statement recommends screening for preeclampsia in pregnant women with blood pressure measurements throughout pregnancy.

State Maternal Health Innovations from the Health Resources & Services Administration (HRSA) Maternal and Child Health Bureau (MCHB) Grantees

The [State Maternal Health Innovations \(MHI\)](#) initiative, funded by [HRSA's MCHB](#), currently provides funding to 18 states to develop, implement, and evaluate state-level equity-centered innovations. Below we highlight innovations that address Action 1.7 from the MHI cohorts (2019–2024):



- [Arizona](#). The Arizona Maternal Health Innovation initiative is implementing the AIM Severe Hypertension in Pregnancy Safety Bundle. The AIM Collaborative provides pre-developed materials and tools specifically designed for birthing centers to implement quality improvement strategies related to HDP. Any Arizona birthing facility can join the growing Arizona AIM Collaborative; participation is free and includes ongoing technical assistance from Arizona Hospital and Healthcare Association staff.
- [Illinois](#). Illinois's I-PROMOTE-IL Perinatal Quality Collaborative's Severe Maternal Hypertension Initiative strives to increase the proportion of: patients with severe maternal hypertension treated within 60 minutes; patients who receive appropriate discharge education and follow-up appointments within 7-10 days post-discharge; and severe maternal hypertension cases with a debrief. Additionally, birthing facilities in the state have an annual training requirement to provide continuing education for managing obstetric hemorrhage and maternal hypertension. There are several ways for birthing facilities to fulfill this requirement, including e-modules, simulations, or drills from AIM, ACOG, and other leading national groups.
- [Ohio](#). AIM Hypertension Quality Improvement Project is implementing the Maternal Safety Quality Improvement initiative to improve maternal hypertension during and after pregnancy. The project established [practice guidelines](#) for maternity hospitals that incorporate evidence-based interventions centered on the "four Rs" domains established in AIM patient safety bundles, including: readiness, recognition, response, and reporting.

Evidence-based Strategy Measures from the [MCH Evidence Center](#) Related to Action 1.7
Throughout the country, state level [Title V MCH](#) agencies develop measures to help track their efforts around improving the health and well-being of women, children, and families. Below are selected measures related to improving equitable maternal and child outcomes that can support Action 1.7.

- Percentage of birthing hospitals implementing the AIM hypertension model ([OH](#) and [AZ](#)).
- Percentage of birthing hospitals participating in perinatal quality collaborative projects ([TN](#) and [IL](#)).
- Number of participants in the Women's Community Health Initiative for Preventing Cardiovascular Disease ([NE](#)).

New Studies with Promising Results

- [Patient and provider perspectives of a new prenatal care model introduced in response to the coronavirus disease 2019 pandemic](#). 2021.
- [Postpartum remote hypertension monitoring protocol implemented at the hospital level](#). 2019.

Strategy Development Criteria to Consider for State and Local Implementation

To select impactful strategies for local implementation, an organization may consider using the following criteria, based on the Results-Based Accountability framework outlined in the book *Trying Hard Is Not Good Enough* by Mark Friedman.

- **Specificity:** Ensure strategies are clearly defined, including responsible parties and timelines.
- **Leverage:** Evaluate how strategies can improve data quality and reliability.
- **Values:** Assess alignment with community and organizational values.
- **Reach:** Consider feasibility and affordability at the required scale.

Using these criteria can aid in developing feasible and impactful strategies. Visit maternalhealthlearning.org/Blueprint for more details.



References

1. Ford ND, et al. [Hypertensive Disorders in Pregnant and Mortality at Delivery Hospitalization—United States, 2017–2019](#). *Morbidity and Mortality Weekly Report*. Centers for Disease Control and Prevention. 2022;71(17):585-591.
2. Centers for Disease Control and Prevention. [Pregnancy Mortality Surveillance System \(PRAMS\)](#). Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion. Last updated March 23, 2023. Accessed July 20, 2023.
3. Prabhu M, et al. [Self-monitoring of Blood Pressure During Pregnancy](#). *JAMA*. 2022;327(17):1651-1652.
4. Garovic VD, et al. [Hypertension in Pregnancy: Diagnosis, Blood Pressure Goals, and Pharmacotherapy: A Scientific Statement from the American Heart Association](#). *Hypertension*. 2022;79.
5. The American College of Obstetricians and Gynecologists. [Preeclampsia and High Blood Pressure in Pregnancy](#). Last reviewed April 2023. Accessed July 20, 2023.
6. Hirshberg A, et al. [Text Message Remote Monitoring Reduced Racial Disparities in Postpartum Blood Pressure Ascertainment](#). *AJOG*. 2019;221(3):283-385.
7. Creanga AA, et al. [Pregnancy-Related Mortality in the United States, 2011–2013](#). *Obstetrics & Gynecology*. 2017;130(2):366-373.
8. Hirshberg A, et al. [Association of a Remote Blood Pressure Monitoring Program With Postpartum Adverse Outcomes](#). *Obstetrics & Gynecology*. 2023;141(6):1163-1170.
9. Tucker KL, et al. [Effect of Self-monitoring of Blood Pressure on Diagnosis of Hypertension During Higher-Risk Pregnancy: The BUMP 1 Randomized Clinical Trial](#). *JAMA*. 2022;327(17):1656-1665.
10. Yeh PT, et al. [Self-monitoring of Blood Pressure among Women with Hypertensive Disorders of Pregnancy: A Systematic Review](#). *BMC Pregnancy Childbirth*. 2022;22(454).
11. Hirshberg A, et al. [Comparing Standard Office-based Follow-up with Text-based Remote Monitoring in the Management of Postpartum Hypertension: A Randomised Clinical Trial](#). *BMJ Quality & Safety*. 2018;27(11):871-877.
12. The White House. [White House Blueprint for Addressing the Maternal Health Crisis](#). June 2022.
13. Ananth CV, et al. [Historical and Recent Changes in Maternal Mortality Due to Hypertensive Disorders in the United States, 1979–2018](#). *Hypertension*. 2021;78(5):1414-1422.
14. Peahl AF, et al. [Patient and Provider Perspectives of a New Prenatal Care Model Introduced in Response to the Coronavirus Disease 2019 Pandemic](#). *AJOG*. 2021;224(4):384.e1–384.e11.





The MHLIC is available for consultation, coaching, and technical assistance to support your implementation of any innovations to improve maternal mortality and morbidity. For more information, visit <https://maternalhealthlearning.org/connect>.

DEVELOPED, EDITED, & DESIGNED BY

Leslie deRosset

Alexsandra Monge

Christine Bixiones

Alex F. Peahl

Kathryn (Kate) Menard

Dorothy Cilenti

Deitre Epps

Kelli Sheppard

Follow / Listen / Visit



Spotify



iHeartRADIO

MaternalHealthLearning.org