



Severe Maternal Morbidity and Racial Disparities in Ohio, 2016-2019

Ohio Department of Health 2020



Department
of Health

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Introduction

Severe maternal morbidities (SMM) are unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman’s health (Kilpatrick 2016). SMM is measured by identifying women with at least 1 of 19 medical conditions while hospitalized for a delivery (see Appendix for details on methodology). Maternal mortality rates receive significant public attention in discussions of maternal health, yet SMM occurs nearly 100 times more frequently than maternal deaths (Callaghan 2012), and represents a “near miss”, or an unplanned event that doesn’t result in death, but could have. Because SMM is closely related to maternal death and occurs much more frequently, examination of SMM provides important data on pregnancy-related risk and population health.

SMM increased 75% in the United States over the past decade and is estimated to affect 163 of every 10,000 deliveries, or more than 52,000 women annually. According to research by the Centers for Disease Control and Prevention (CDC), SMM has been steadily increasing in recent years and affected more than 50,000 women in the United States in 2014 (CDC 2020).

Reducing SMM is one of the six priorities of Ohio’s 2020-2022 State Health Improvement Plan (SHIP). The SHIP is a roadmap to address the challenges identified in the [2019 State Health Assessment \(SHA\)](#). This report functions to monitor the SMM priority in the SHIP, which includes reducing SMM by 6% by 2022. Improving SMM is also a key priority of the state Title V Maternal Child Health Block Grant, which has the goal of reducing SMM by 12% by 2025.

Severe Maternal Morbidity in Ohio

Between 2016-2019, there were more than half a million births to Ohio residents and an average of 916 SMM events per year, excluding transfusions (Table 1). The SMM rate in Ohio was relatively stable from 2016-2019; the rate for all four years combined was 71.1 per 10,000 deliveries.

Women who received blood transfusions (a procedure in which a patient is given donated blood, generally in response to excessive bleeding) account for the greatest fraction of women with SMM (CDC: <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html>). For Ohio deliveries, transfusions occurred in approximately 40% of deliveries. However, the ICD-10-CM codes for blood transfusions do not specify the amount of blood transfused and are not accurate measures for hemorrhage (≥ 4 units of blood products). Per methodological definitions provided by the CDC, transfusions are excluded from the calculation of SMM rates in the remainder of this report.

Table 1. Number of Deliveries and Severe Maternal Morbidities in Ohio, 2016-2019

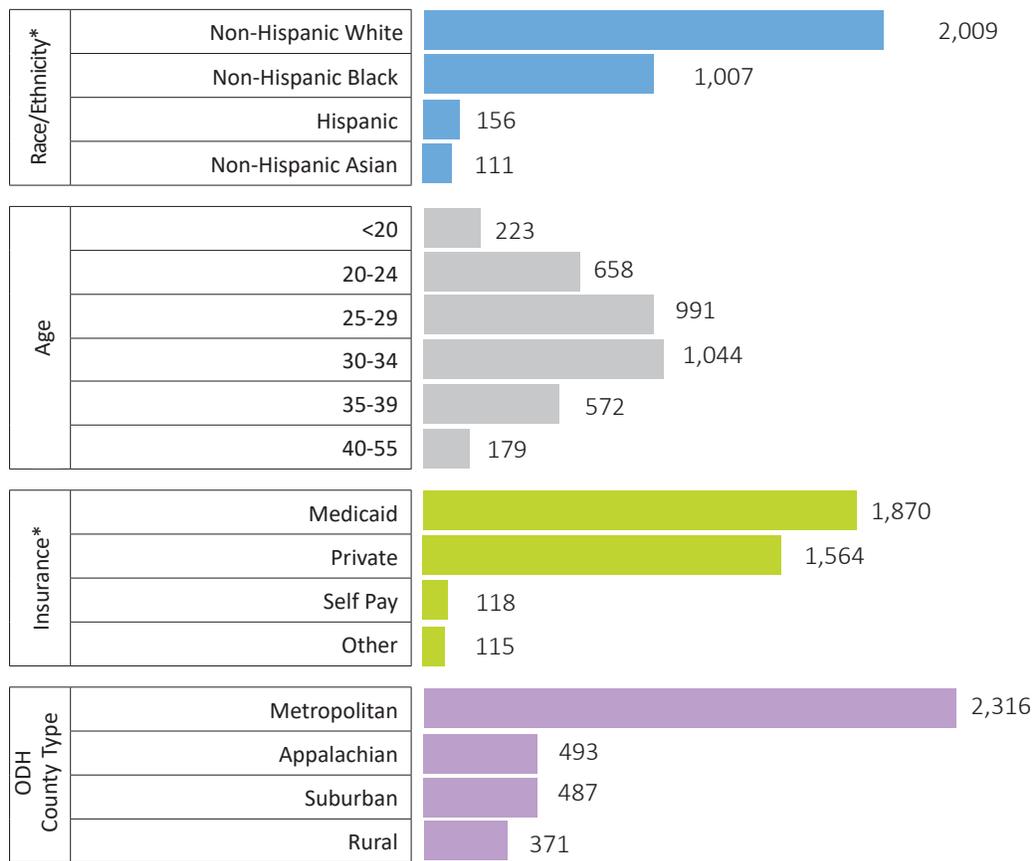
Year	2016	2017	2018	2019	Total 2016-2019
Number of Deliveries	131,874	130,515	128,801	128,281	519,471
Number of Severe Maternal Morbidities (including transfusion)	1,631	1,510	1,546	1,500	6,187
Number of Severe Maternal Morbidities (excluding transfusion)	936	888	927	916	3,667
SMM Rate (without transfusion, calculated per 10,000 deliveries)	71.5	68.5	72.5	71.9	71.1

Source: Ohio Hospital Association

Severe Maternal Morbidity in Ohio

SMM in Ohio varied by demographic characteristics (Figure 1). From 2016-2019, the number of SMM events were greatest for non-Hispanic white women (n=2009), and non-Hispanic white women also had the most deliveries (n=359,546). During this period, SMM events were highest for deliveries to women between the ages of 30-34 (n=1,044). However, the highest number of deliveries were to women aged 24-29, with 18,165 more deliveries to women aged 24-29 than to women aged 30-34. Similarly, SMM events were highest for deliveries to women with Medicaid (n=1,870), but there were 46,567 more deliveries to women with private insurance than to women with Medicaid. Women in metropolitan areas had the highest number of SMM events (n=2,316), and the highest number of deliveries (n=296,315).

Figure 1. Number of Severe Maternal Morbidity Events by Maternal Demographics, Ohio 2016-2019



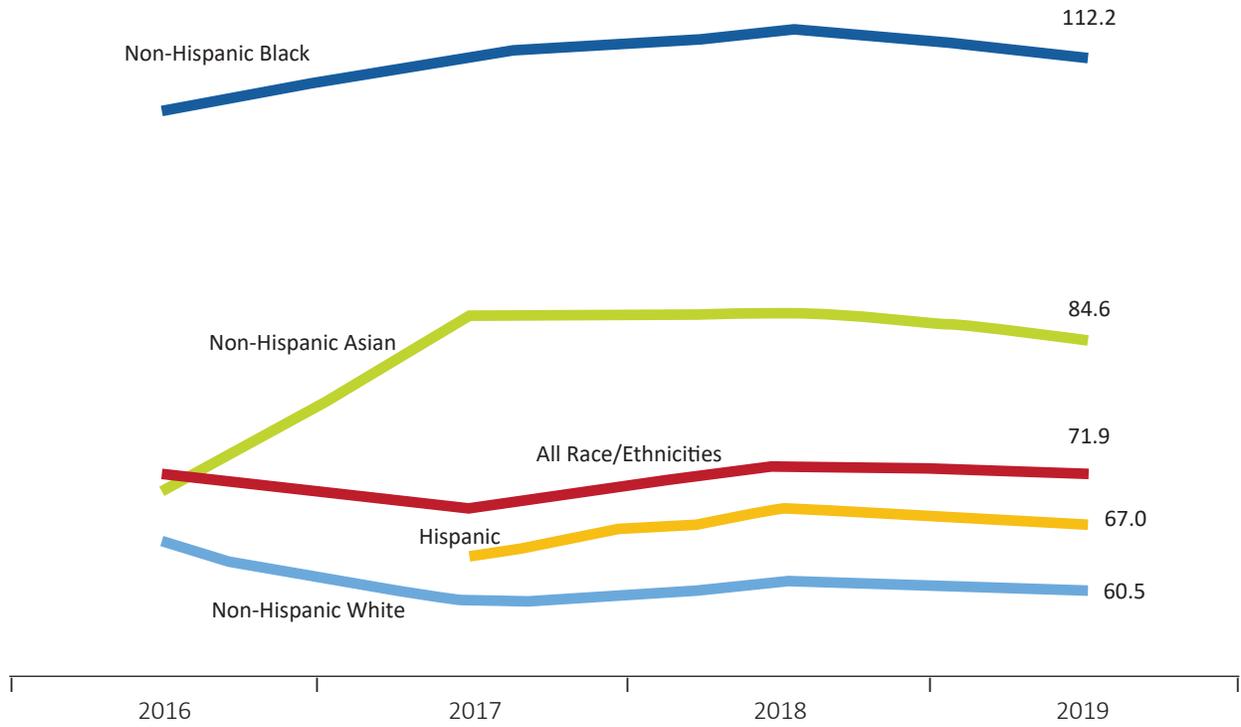
Source: Ohio Hospital Association

Notes: N=3,667. Ethnicity was not a required data point in 2016, which could impact rates during that year.

*SMM not shown for racial/ethnic groups with fewer than 10 SMM, cases with unknown race/ethnicity, and for unknown insurance type.

Nationally, risk factors for SMM are highest for women ages 35–44, Black women, women without insurance, and women in southern states (Robbins 2018). Ohio trends are comparable to the United States in SMM rates by race/ethnicity, age, type of health insurance, and region.

Figure 2. Racial/Ethnic Disparities in Severe Maternal Morbidity, Ohio 2016-2019

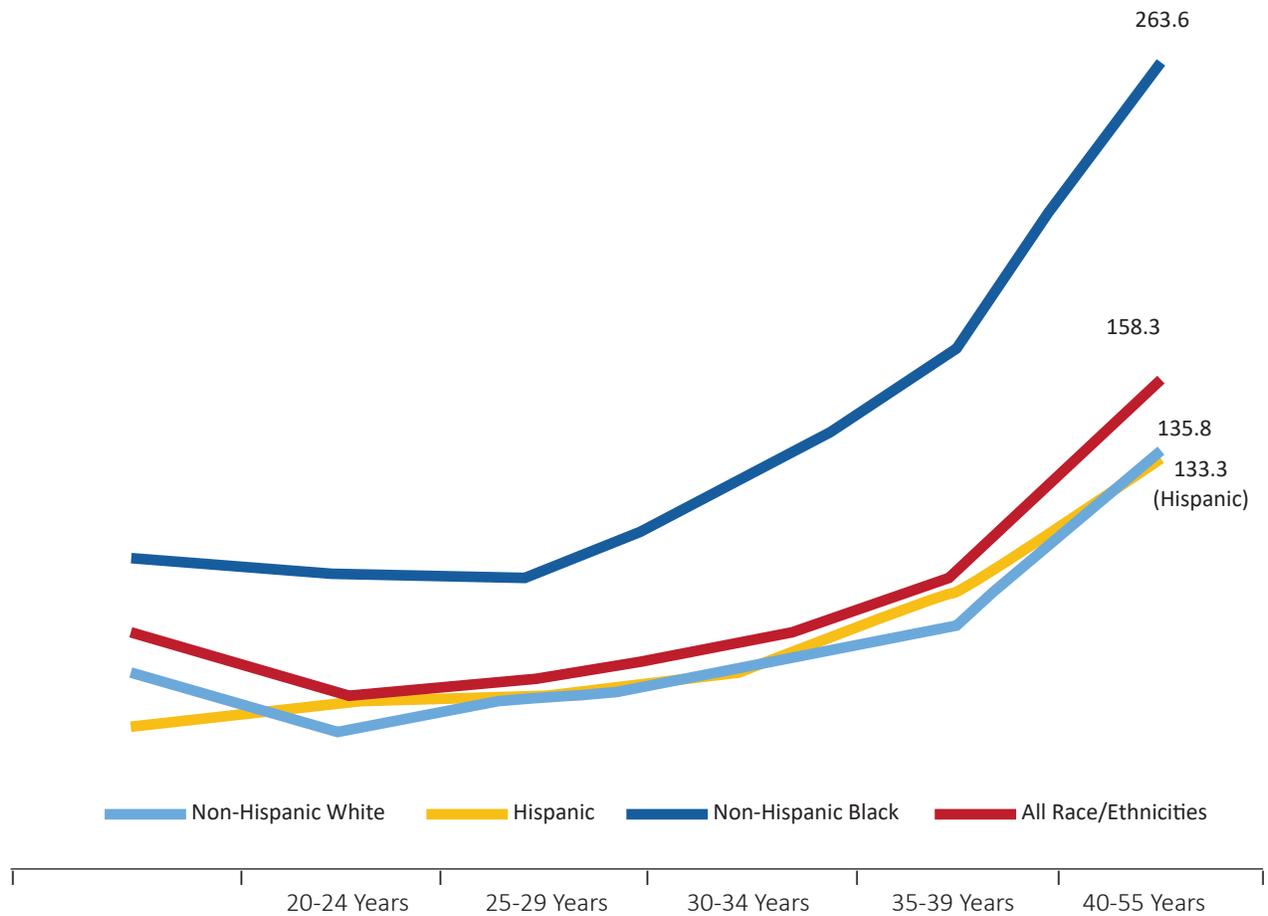


Source: Ohio Hospital Association

Notes: Ethnicity was not a required data point in 2016, which could impact rates during that year. Estimates for race/ethnic groups with fewer than 10 severe maternal morbidities are not shown.

Similar to national trends (Creanga 2014), rates of SMM were much higher among non-Hispanic Black women in Ohio, compared to the SMM rates for white women (Figure 2). Black women had the highest rates, and experienced SMM at more than twice the rate of white women. SMM rates for Asian and Hispanic women were lower than for Black women, but still higher than SMM rates for white women. These disparities did not change from 2016-2019.

Figure 3. Severe Maternal Morbidity Rates by Race/Ethnicity and Age, Ohio 2016-2019

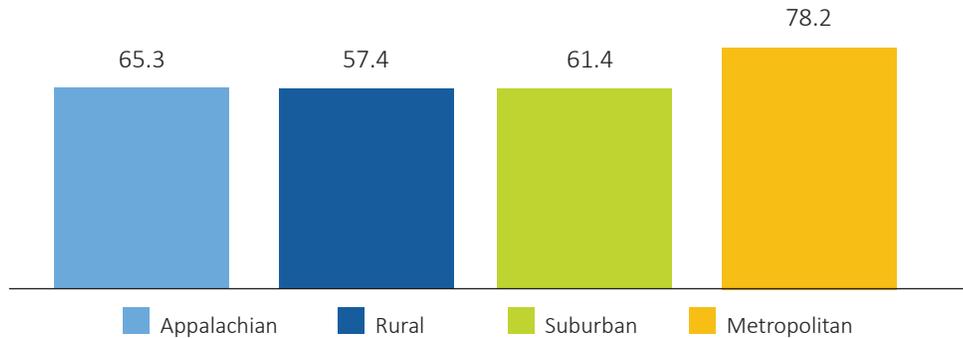


Source: Ohio Hospital Association

Note: Ethnicity was not a required data point in 2016, which could impact rates during that year. Estimates for SMM rates for deliveries to Asian women are not shown because there were fewer than 10 births in the 12-19, 20-24, and 40-55 age categories.

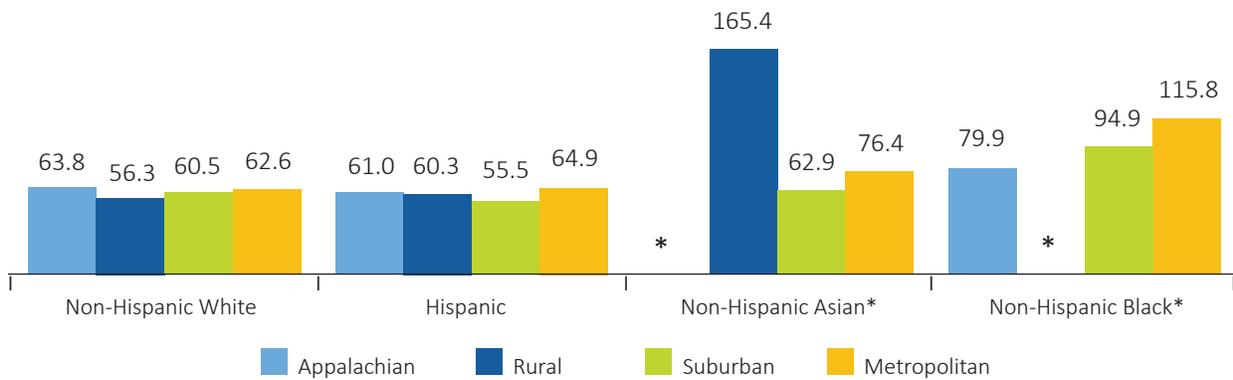
Inequities in SMM rates increased by age, regardless of race/ethnicity; however, disparities by race/ethnicity persisted (Figure 3). The SMM rates for deliveries to Black women older than 30 years was two times the SMM rate of white and Hispanic women in the same age group. For example, the disparity ratio for Black women compared to white women ranged from 1.6 among the less than 20 years age group to 2.1 for the 35–39 years age group.

Figure 4. Severe Maternal Morbidity Rates by County Type, Ohio 2016-2019



Source: Ohio Hospital Association

Figure 5. Severe Maternal Morbidity Rates by County Type and Race/Ethnicity, Ohio 2016-2019



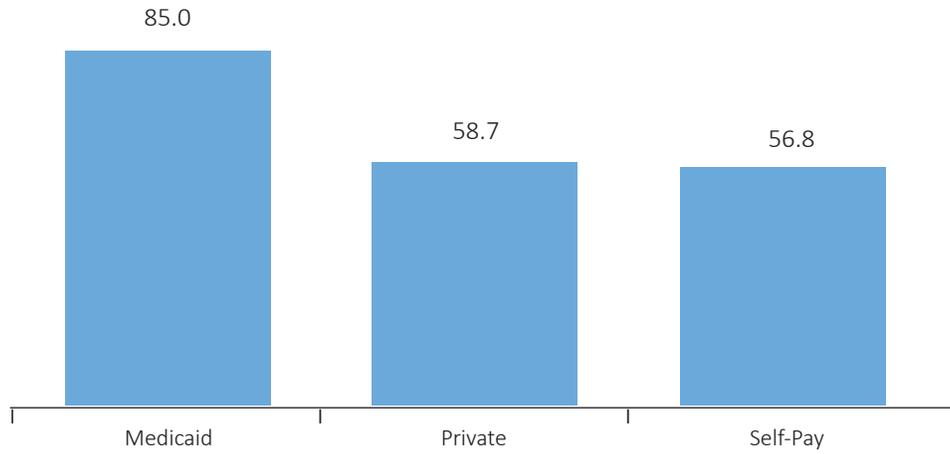
Source: Ohio Hospital Association

Notes: Ethnicity was not a required data point in 2016, which could impact rates during that year.

*SMM rates for non-Hispanic Asian deliveries in Appalachian counties and rates for non-Hispanic Black deliveries in rural counties are not shown because there were fewer than 10 morbidities in these categories.

Ohio’s SMM rates varied by county type (Figure 4) and by race/ethnicity with county-type (Figure 5). SMM rates were stable for white women across county types, with a low of 56.3 in rural counties and a high of 63.8 in metropolitan counties. Hispanic women had similarly stable SMM rates across county-types. In comparison, the SMM rate for deliveries to Asian women was 2.6 times greater in rural counties, compared with the SMM rates for deliveries to non-Hispanic Asian women in suburban counties. The SMM rate for Black women was 1.4 times greater in metropolitan counties than the SMM rate in Appalachian counties.

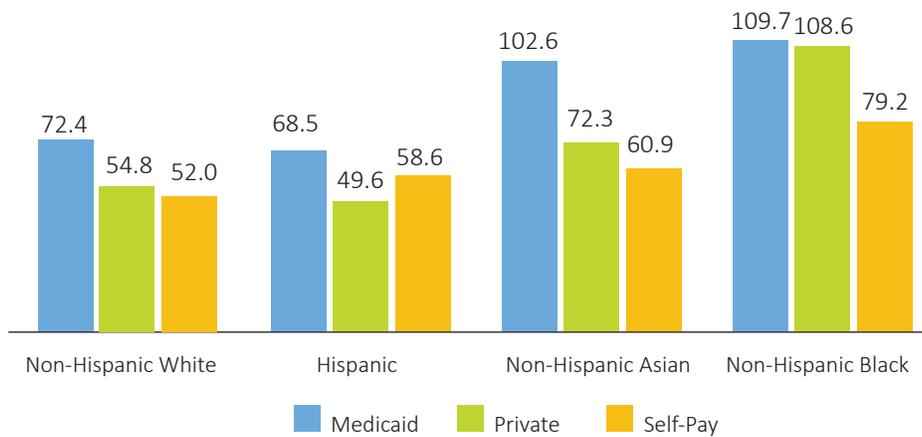
Figure 6. Severe Maternal Mortality Rates by Payor Type, Ohio 2016-2019



Source: Ohio Hospital Association

The SMM rates were highest for deliveries covered by Medicaid, and lowest for deliveries that were paid out-of-pocket and with private insurance (Figure 6).

Figure 7. Severe Maternal Morbidity Rates by Payor Type and Race/Ethnicity, Ohio 2016-2019



Source: Ohio Hospital Association

Note: Ethnicity was not a required data point in 2016, which could impact rates during that year.

Regardless of insurance type, deliveries to Black women had the highest rates of severe maternal morbidity (Figure 7). The highest SMM rate for deliveries to white women was 72.4, for deliveries with Medicaid. This was still lower than the lowest SMM rate for deliveries to Black women who paid out-of-pocket.

How is the Ohio Department of Health Addressing Severe Maternal Morbidity?

Understanding the incidence of severe maternal morbidity enhances Ohio's ability to implement programs that improve maternal health and prevent maternal deaths. This report shows how SMM rates in Ohio vary by race/ethnicity, age, type of health insurance, and region.

The data presented here, along with data from the Ohio Pregnancy-Associated Mortality Review (PAMR) program, informs ODH's statewide efforts to address maternal health and helps track the impact of ODH and PAMR programs ([A Report on Pregnancy-Associated Deaths in Ohio 2008-2016](#)).

According to data from PAMR, the leading causes of pregnancy-related death were cardiovascular and coronary conditions, infections, hemorrhage, pre-eclampsia and eclampsia (conditions related to severe hypertension), and cardiomyopathy, respectively. While more than half of these deaths were deemed preventable through review, preventability varies by cause of death. PAMR data indicates that 85% of deaths caused by conditions related to severe hypertension were preventable, highlighting a key area for improvement.

At the provider and system levels, the most common contributing factors to pregnancy-related deaths include:

- Delay in or lack of diagnosis, treatment or follow-up
- Failure to screen, inadequate assessment for risk, use of ineffective treatment
- Lack of case coordination/management
- Inadequately trained/unavailable personnel

To address these issues, the Ohio Department of Health (ODH) has started several statewide initiatives:

1. The Ohio Hospital Association (OHA) and the Ohio Department of Health are leading the integration of a national quality improvement program organized by [The Alliance for Innovation on Maternal Health](#) (AIM) to advance effective practices and outcomes for maternal health in Ohio.

AIM is led by the Council on [Patient Safety in Women's Health Care](#), whose vision is to ensure "safe and equitable health care for every woman." The first initiative Ohio will undertake as a part of AIM is to improve readiness, recognition and response to severe hypertension in pregnancy. All 100 hospitals with licensed maternity services will be invited to participate in the initiative. Participating hospitals will have access to national experts and resources, as well as statewide and national data benchmarking.

In [partnership with organizations](#) like the American College of Obstetricians and Gynecologists, American Hospital Association, Association of Women's Health for Obstetric and Neonatal Nurses, AIM involves a broad multidisciplinary partnership working within state teams. AIM participation expands access to evidence-driven approaches to improve maternal safety and outcomes, with the goal of eliminating preventable maternal mortality and severe morbidity nationwide. This program works through state teams and health systems to align national, state, and hospital level quality improvement efforts to improve overall maternal health outcomes.

How is the ODH Addressing Severe Maternal Morbidity?

To support Ohio hospital efforts in improving maternal health outcomes, OHA currently provides complementary quarterly SMM reports to all maternity hospitals. These reports include benchmark data that allow hospitals to compare their rates to hospitals similar in size and patient-mix. These reports also include data presented by race to assist hospitals in identifying potential disparities in outcomes. These reports and the data included will align with the AIM work, and allow hospitals to monitor improvement in outcomes as initiatives such as AIM are implemented.

2. As noted earlier, of all pregnancy-related deaths, deaths caused by conditions related to severe hypertension were the most preventable. Thus, ODH is using federal funding to implement the **AIM Severe Hypertension in Pregnancy Bundle** to establish interventions in maternity care hospitals in Ohio. The goal of this initiative is to reduce preventable maternal mortality and severe maternal morbidity associated with severe hypertension.

The initial 34 participating sites will implement facility-wide standards and policies for the management and treatment of severe hypertension, preeclampsia, and eclampsia in pregnant and postpartum women. Sites will also work to address racial disparities in outcomes for severe hypertension. It is expected the sites will achieve:

- a. Improved identification, acute treatment, and clinical follow-up of women with hypertension/preeclampsia with the goal to reduce associated adverse events.
- b. Improved tracking of institutional/health system outcomes related to maternal hypertension.
- c. Observe decreases in maternal morbidity, mortality and disparities in severe hypertension.
The goal is to roll out this project to all Ohio's delivery hospitals with licensed maternity services by 2024.

3. Maternal safety initiatives typically focus on clinical quality improvement. But when we think about maternal health as a whole, there are many other areas that need focus. **The Ohio Council to Advance Maternal Health or OH-CAMH** is a statewide membership organization that aims to develop and implement a statewide strategic plan to uplift patients and families through a lens of equity to create a better environment for maternal health in Ohio. In 2020, ODH convened the first two OH-CAMH meetings. More than 80 stakeholder organizations across Ohio have joined OH-CAMH to collaborate, develop, and implement a statewide strategic plan to reduce maternal morbidity and mortality in Ohio and eliminate maternal health disparities. OH-CAMH membership includes local, state, and national organizations to encompass the continuity in clinical and community-level care for women before, during, and beyond the perinatal window. The goal is to develop a statewide strategic plan by September 2021, and implement the first set of identified activities between 2021–2024.
4. It is well-known that there is a drop-off in service intensity after delivery, which can lead to missed diagnoses and/or symptoms that result in death that could have been prevented. In Ohio from 2008-2016, postpartum deaths comprised 65% of all pregnancy-related deaths. Additionally, 23% of pregnancy-related deaths in Ohio from 2008-2016 occurred in an emergency department or in an outpatient setting. Therefore, emergency medicine staff and first responders are often the experts women turn to when they are experiencing acute distress during and after pregnancy. Simulation training is one valuable method commonly used to train medical professionals to recognize, treat, and manage many different medical conditions, including obstetric emergencies. But despite the utility of simulation training, a survey of Ohio's delivery hospitals found that only 30% of obstetric emergency simulations involved emergency department

staff. Because a significant proportion of maternal mortalities occur after discharge, many patients with postpartum obstetric emergencies present to an emergency department rather than an obstetric provider, and the majority of facilities conducting drills for obstetric emergencies do not include emergency department staff, ODH and The Ohio State University Clinical Skills Assessment and Education Center CSAEC have developed **educational opportunities to increase knowledge and preparedness for obstetric emergencies**. The ultimate goal of these trainings is to reduce preventable maternal morbidity and mortality in Ohio. As mentioned previously in this brief, the following contributing factors were identified most frequently at the provider and system levels:

- Delay in or lack of diagnosis, treatment or follow-up.
- Failure to screen, inadequate assessment for risk, use of ineffective treatment.
- Inadequately trained/unavailable personnel.

Obstetric Emergency Simulation Training for Emergency Medicine Providers directly addresses each of these factors and will help to better prepare Ohio's healthcare workforce to respond to obstetric emergencies.

Differences in the incidence and prevalence of health conditions and health status between groups are commonly referred to as health disparities. Unconscious beliefs can impact health and contribute to these health disparities. The PAMR program at ODH oversees **implicit bias training**, which teaches healthcare and public health professionals to:

- a. Define and understand implicit bias.
- b. Recognize sources of implicit bias.
- c. Identify bias in the workplace and how it impacts the way ODH and community stakeholders serve clients and impact maternal and health outcomes.
- d. Share ways to practice culturally intelligent strategies to disrupt bias to ensure equitable development and implementation of policies and programs that impact the women, children, and families we serve.

Twenty-six implicit bias trainings will be held between May 2020 and June 2022, providing continuing education credit for women's health providers.

For more information about any of these initiatives or the ODH PAMR program, please contact PAMR@odh.ohio.gov.

Appendix

The Ohio Department of Health's (ODH) Pregnancy Associated Mortality Review (PAMR) uses de-identified hospital discharge records from the Ohio Hospital Association (OHA) to analyze Severe Maternal Morbidity (SMM) incidence in Ohio. These data represent approximately 98% of hospital-based births in Ohio, and exclude non-hospital births and births occurring in military facilities or other states. Births to out-of-state residents are also excluded from the SMM estimates.

In October 2015, the United States transitioned to the 10th Revision of the International Statistical Classification of Diseases and Related Health Problems (ICD) to code diagnoses and procedures. ODH, in collaboration with the Centers for Disease Control and Prevention (CDC), updated the SMM indicators, taking into account results from validation studies. This report uses an updated list of 21 indicators and corresponding ICD-10 codes used to identify delivery hospitalizations with SMM (i.e., acute renal failure; cardiac arrest or ventricular fibrillation; heart failure during procedure or surgery; shock; sepsis; disseminated intravascular coagulation; amniotic fluid embolism; thrombotic embolism; puerperal cerebrovascular disorders; severe anesthesia complications; pulmonary edema; adult respiratory distress syndrome; acute myocardial infarction; eclampsia; blood transfusion; ventilation; hysterectomy; sickle cell anemia with crisis; intracranial injuries; internal injuries of thorax, abdomen, and pelvis; aneurysm; operations on the heart and pericardium; cardio monitoring; temporary tracheostomy; conversion of cardiac rhythm). Hospitalizations with implausibly short length of stay for the delivery type are excluded (Callaghan et al. 2012). Per CDC guidance, indicators for 1) acute myocardial infarction and aneurysm; 2) cardiac arrest/ventricular fibrillation and conversion of cardiac rhythm; and 3) temporary tracheostomy and ventilation are combined for reporting purposes due to rare prevalences (<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm>). Estimates are calculated without ICD-10-CM blood transfusion codes because a study by Elliott K. Main and colleagues (2016) suggests that these codes had low specificity for hemorrhage (≥ 4 units of blood products), the concept that the transfusion codes were intended to capture.

SMM rates are calculated per 10,000 delivery hospitalizations. Race and ethnicity were available for 2016-2019, but ethnicity was not consistently collected for 2016. Identification of ethnicity was missing for 14 % of cases in 2016; in 2017, identification of ethnicity was missing for .14% cases, and identification of ethnicity was missing for only one case in 2018 and one case in 2019. Maternal race/ethnicity as reported was determined by creating a composite variable that incorporated ethnicity and race as identified in the OHA dataset. All cases where ethnicity was reported as Hispanic are categorized as Hispanic, regardless of race. Cases where ethnicity is reported as non-Hispanic are combined with the additional race identifier and categorized as non-Hispanic white; non-Hispanic Black; non-Hispanic American Indian or Alaskan Native; non-Hispanic Asian; non-Hispanic Native Hawaiian or Other Pacific Islander; or non-Hispanic other. Cases where race is reported, but ethnicity is not, are included in the non-Hispanic respective race category.

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