

What Are Maternal Morbidity and Mortality?


Approximately 700 women die in the U.S. each year because of pregnancy or delivery complications, but an estimated 50% of these are preventable. [1] Despite spending more than any other country on maternity care, **the U.S. has one of the highest maternal mortality rates in the developed world. In addition, there are extreme racial and ethnic disparities in rates of pregnancy-related death**—defined as the death of a woman while pregnant or within 1 year of the end of pregnancy from any cause related to or aggravated by the pregnancy. [2] Research shows that between 2007 and 2016, Black and American Indian/Alaskan Native women had higher pregnancy-related mortality ratios (PRMRs) than White and Hispanic women. [3] Moreover, Black women have the highest PRMR, regardless of factors such as age, level of education, geographic location, income or higher socioeconomic status. In addition to this alarming finding, overall pregnancy-related mortality is increasing, and the scientific community is still unclear as to why this is occurring.

The World Health Organization defines **maternal morbidity as any health condition attributed to and/or aggravated by pregnancy and childbirth that has negative outcomes to the woman's well-being.** [4] As with maternal mortality, maternal morbidity has also seen increasing numbers. Excluding blood transfusions, the rate of severe maternal morbidity (SMM) increased by approximately 20% from 1993-2014 in the U.S. [5] Incorporating frameworks such as the social-ecological model [6] and the multidimensional framework of the health of women across the life course [7] in maternal health research may help us to better understand the factors affecting women from preconception to pregnancy to postpartum periods.

The Life Course Perspective

The 2019–2023 Trans-NIH Strategic Plan for Women’s Health Research is grounded in three guiding principles that emphasize the importance of (1) considering the complex interactions of multiple factors that influence the health of women, (2) including different NIH-designated U.S. health disparity populations (i.e., Blacks/African Americans, Hispanics/Latinos, American Indians/Alaska Natives, Asian Americans, Native Hawaiians and other Pacific Islanders, socioeconomically disadvantaged populations, underserved rural populations, and sexual and gender minorities) in research, and (3) engaging diverse perspectives in the biomedical research enterprise. These guiding principles are based on the idea that the health of women extends *beyond reproductive health* to encompass a broad spectrum of diseases and conditions experienced by women and recognize that these diseases and conditions are influenced by such factors as sex, race, ethnicity, and age. Those factors interact with social determinants—such as gender, behavior, environment, and policies—across a woman’s life course to influence her health. All of these factors further interact with a woman’s unique biological characteristics at the genetic, molecular, cellular, and physiological levels to determine her health, longevity, and disease and disability outcomes.

The aim of this web portal is to be a hub that provides resources that serve as an educational foundation for researchers, clinicians and the public, to address the critical maternal morbidity and mortality public health issue. For a comprehensive overview of recent scientific research and evidence-based practices relating to MMM, please click the links below to access the ORWH-developed MMM fact sheet and video.



THE NATIONAL INSTITUTES OF HEALTH OFFICE OF RESEARCH ON WOMEN'S HEALTH

Maternal Morbidity and Mortality: What Do We Know? How Are We Addressing It?

Maternal health is defined as the health of women in the pregnancy and postpartum periods and can be influenced by pre-pregnancy health. The physical, emotional, and social changes that occur before, during, and just after the 40 weeks of gestation and the first year after childbirth can be exciting and joyful. But the physical demands of pregnancy are also intense, and complications during this period can result in the development of chronic disease in later life. For example, women with early-onset hypertension disorder of pregnancy have more than twice the risk of developing chronic hypertension. During pregnancy and over the life course, the health of women can be understood using a multidimensional framework that recognizes the interaction of multiple biological factors (e.g., hormones and genetics) in the context of a woman's life (e.g., environment and policies). This approach is critical to improving maternal health outcomes, such as maternal morbidity and mortality (MMM), and addressing disparities.

The Health of Women Across the Life Course

Women's health is shaped by a complex interplay of factors across the life course, from preconception to postpartum. This framework highlights the interaction of biological, psychosocial, and environmental factors that influence maternal health outcomes.

Definitions

The Centers for Disease Control and Prevention (CDC) defines "pregnancy-associated death" as a death during or within one year of pregnancy, regardless of the cause. These deaths make up the universe of maternal mortality, rather than women who experience related deaths and pregnancy-associated, but not related deaths.

The CDC Pregnancy Mortality Surveillance System uses the term "pregnancy-related death" and defines it as "The death of a woman while pregnant or within 1 year of the end of a pregnancy—regardless of the outcome, duration, or site of the pregnancy—from any cause related to or aggravated by the pregnancy or its management," but not from an accidental or incidental cause.

WHO defines **maternal morbidity** as "any health condition attributed to and/or aggravated by pregnancy and childbirth that has a negative impact on the woman's well-being."

CDC defines **severe maternal morbidity (SMM)** as including "Severe outcomes of labor and delivery that result in significant short- or long-term consequences to a woman's health."

Maternal Mortality in the United States

Maternal mortality in 11 High Income Countries

Maternal mortality rate (deaths per 100,000 live births, 2018 or the latest year for which data were available)

Source: Hovers, 2020

Maternal mortality in the United States

Maternal mortality rate (deaths per 100,000 live births, 2018 or the latest year for which data were available)

Source: Hovers, 2020

Maternal Deaths, 2019

Deaths per 100,000 live births

Source: Hovers, 2020

Severe Maternal Morbidity in the United States

SMM is an important risk factor for maternal death. Indicators of SMM include acute myocardial infarction, adult respiratory distress syndrome, cardiac arrest, ectopic, heart attack, uterine rupture, fallopian tube rupture, severe blood transfusion, and many more. Research shows that 73.5% of SMM cases occur in the first 5 weeks after discharge from the hospital. In 2016, SMM affected more than 80,000 women in the United States. In the past decade, rates of SMM have nearly doubled.

Does SMM Affect Hospital Readmission?

Among women who gave birth in 2016–2017, women who experienced any indicator of SMM were 37% more likely to be readmitted within 7 days and 40% more likely to be readmitted to 42 days after delivery. For women with and without SMM, the most common reasons for readmissions were obstetric complications and infections.

Who Is Most Affected by SMM?

From 2012 to 2016, compared with White women, the incidence of SMM was:

- 168% higher for Black women
- 168% higher for American Indian/Alaska Native women
- 122% higher for Hispanic women
- 177% higher for Asian/Pacific Islander women

What Factors Influence MMM?

Pre-pregnancy health. The prevalence of pre-existing health conditions prior to pregnancy increased between 2013 and 2016, according to an analysis of data from commercially insured women ages 18–44. Increases occurred in the prevalence of depression (by 20%), and the combination of hypertension and Type 2 diabetes (by 20% and 30%, respectively). The rate of obesity doubled.

Maternal Mental Health. Perinatal depression can affect women during pregnancy and after childbirth—with 1 in 8 women experiencing symptoms after delivery. It is treatable with talk therapy, medications, or a combination of the two.

Optimal Use, Oversight, and Support. The number of women with special-related diagnoses documented at delivery increased by 33% between 2010 and 2017. Maternal health conditions—including deaths by suicide, overdose, and unintentional deaths related to these conditions—were the leading cause of pregnancy-related deaths among White women. About 50% of pregnancy-related deaths among White women were caused by mental health conditions.

Perinatal Care. In 2016, 76.7% of pregnant women received early and adequate prenatal care. However, women who do not receive prenatal care are three to four times more likely to die from pregnancy-related complications.

The Right Level of Care. Regional variation of care—ranging from States, regional facilities, and providers—can impact maternal morbidity and mortality.

Are Pregnancy-Related Deaths Preventable?

An estimated 40% of maternal deaths are preventable. Understanding the complex social and economic determinants of health that contribute to maternal death is key to reducing poor maternal health outcomes.

Download Fact Sheet

https://orwh.od.nih.gov/mmm-portal/what-mmm

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Maternal Morbidity and Mortality: What Do We Know? How Are We...

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[1] Centers for Disease Control and Prevention. (2019). *Pregnancy-related deaths*.

<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-relatedmortality.htm>

[2] Centers for Disease Control and Prevention. (2020). *Pregnancy mortality surveillance system*. <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm>

[3] Centers for Disease Control and Prevention. (2020). *Infographic: racial/ethnic disparities in pregnancy-related deaths – United States, 2007–2016*.

<https://www.cdc.gov/reproductivehealth/maternal-mortality/disparities-pregnancy-related-deaths/infographic.html>

[4] Firoz, T. et al. (2013). *Bulletin of the World Health Organization*. PMID: 24115804.

[5] Centers for Disease Control and Prevention. (2021). *Severe Maternal Morbidity in the United States*.

<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html>

[6] Centers for Disease Control and Prevention. (2021). *The social-ecological model: a framework for prevention*.

<https://www.cdc.gov/violenceprevention/about/social-ecologicalmodel.html>

[7] Schweinhart, A., & Clayton, J. A. (2018). *International Journal of Environmental Research and Public Health*. PMID: 30134570.

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