

Maternal Mortality in the United States: A Primer

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In 2017, at a time when maternal mortality was declining worldwide, the [World Health Organization \(WHO\)](#) reported that the U.S. was one of only two countries (along with the Dominican Republic) to report a significant increase in its maternal mortality ratio (the proportion of pregnancies that result in death of the mother) since 2000. While U.S. maternal deaths have [leveled in recent years](#), the ratio is still higher than in comparable countries, and significant racial disparities remain.

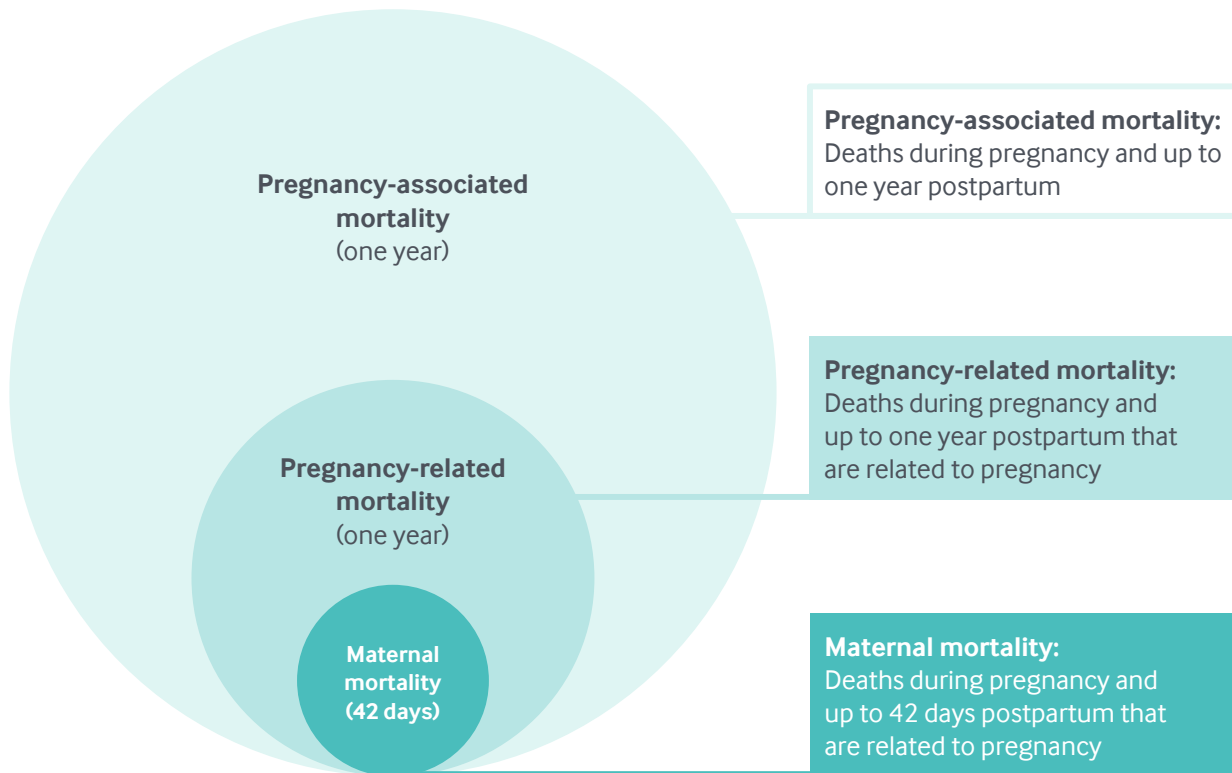
Understanding the evidence on maternal mortality and its causes is a key step in crafting health care delivery and policy solutions at the state or federal level. This data brief draws on a range of recent and historical data sets to present the state of maternal health in the United States today.

HIGHLIGHTS

- ▶ The most recent U.S. maternal mortality ratio, or rate, of 17.4 per 100,000 pregnancies represented approximately 660 maternal deaths in 2018. This ranks [last overall among industrialized countries](#).
- ▶ More than half of recorded maternal deaths occur after the day of birth.
- ▶ The maternal death ratio for Black women (37.1 per 100,000 pregnancies) is 2.5 times the ratio for white women (14.7) and three times the ratio for Hispanic women (11.8).
- ▶ A Black mother with a college education is at 60 percent greater risk for a maternal death than a white or Hispanic woman with less than a high school education.
- ▶ Causes of death vary widely, with death from hemorrhage most likely during pregnancy and at the time of birth and deaths from heart conditions and mental health-related conditions (including substance use and suicide) most common in the postpartum period.
- ▶ State ratios vary widely: in 2018, some states reported more than 30 maternal deaths per 100,000 births, while others reported fewer than 15.



What do we mean by maternal mortality?



A NOTE ON TERMINOLOGY: For consistency, we use the term “maternal mortality ratio,” which is used in international comparisons of maternal deaths. Official U.S. reporting uses “rate.” However, in epidemiological terms, the figure reported is a ratio, since the numerator (maternal deaths) can include deaths that do not involve a live birth (e.g., in early pregnancy), while the denominator is only live births. The worldwide standard is used because of inadequate reporting on miscarriages and fetal deaths internationally.

In addition, we refer to “women” and “mothers” throughout to describe pregnant and postpartum individuals. However, we recognize that people of various gender identities, including transgender, nonbinary, and cisgender individuals, give birth and receive maternity care.

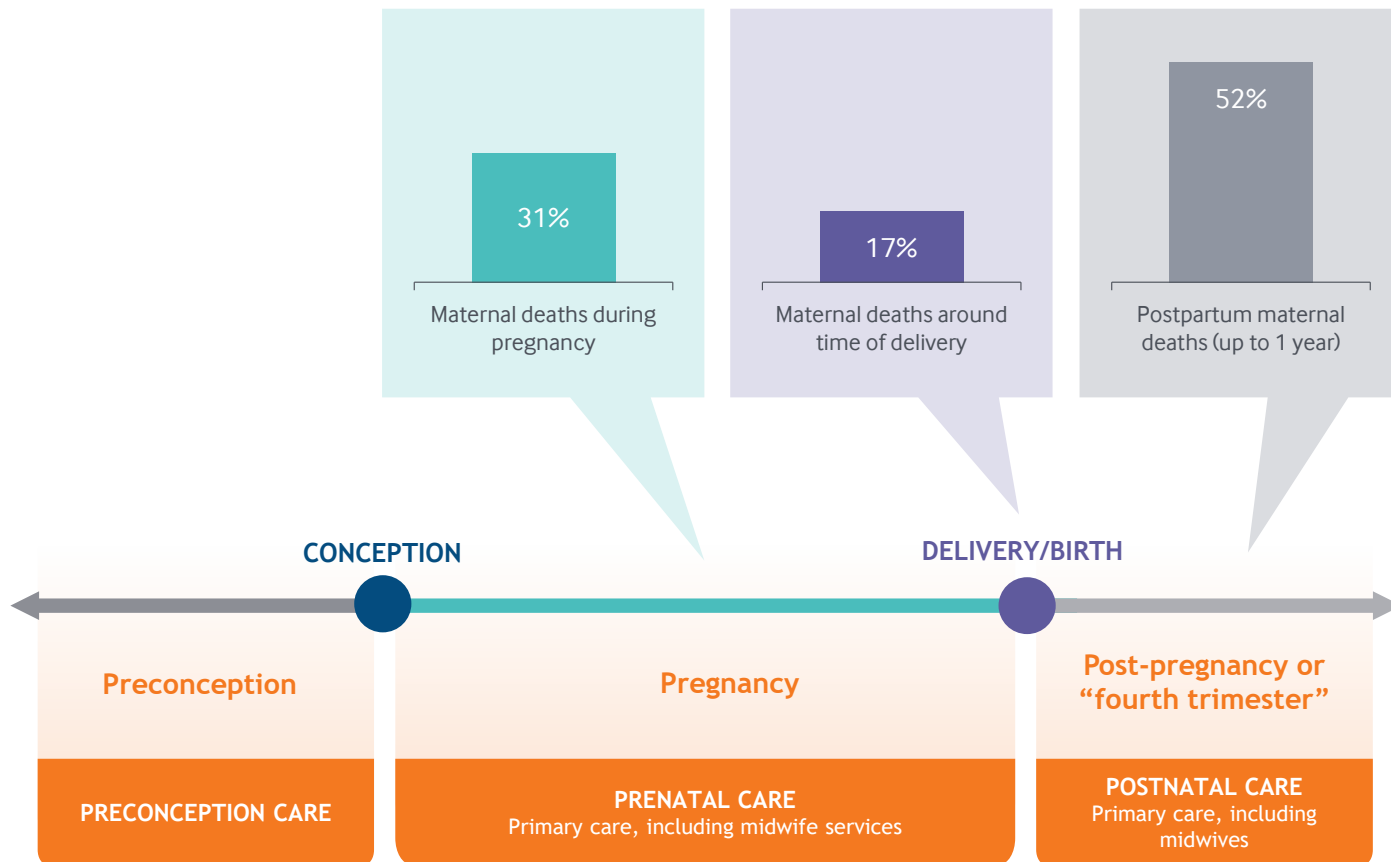
There are three commonly used measures of maternal deaths in the United States. It is important to note that, while they all capture some aspect of maternal deaths, they are not equivalent.

Pregnancy-associated mortality: Death while pregnant or within one year of the end of the pregnancy, irrespective of cause. This is the starting point for analyses of maternal deaths.

Pregnancy-related mortality: Death during pregnancy or within one year of the end of pregnancy from: a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. Used by the Centers for Disease Control and Prevention (CDC) to report U.S. trends, this measure is typically reported as a ratio per 100,000 live births. In this brief, when we discuss causes of maternal deaths and current rates, we will generally be using pregnancy-related mortality as our index.

Maternal mortality ratio: Death while pregnant or within 42 days of the end of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Used by the World Health Organization in international comparisons, this measure is reported as a ratio per 100,000 live births. When we examine historical trends, we will be using maternal mortality as our index.

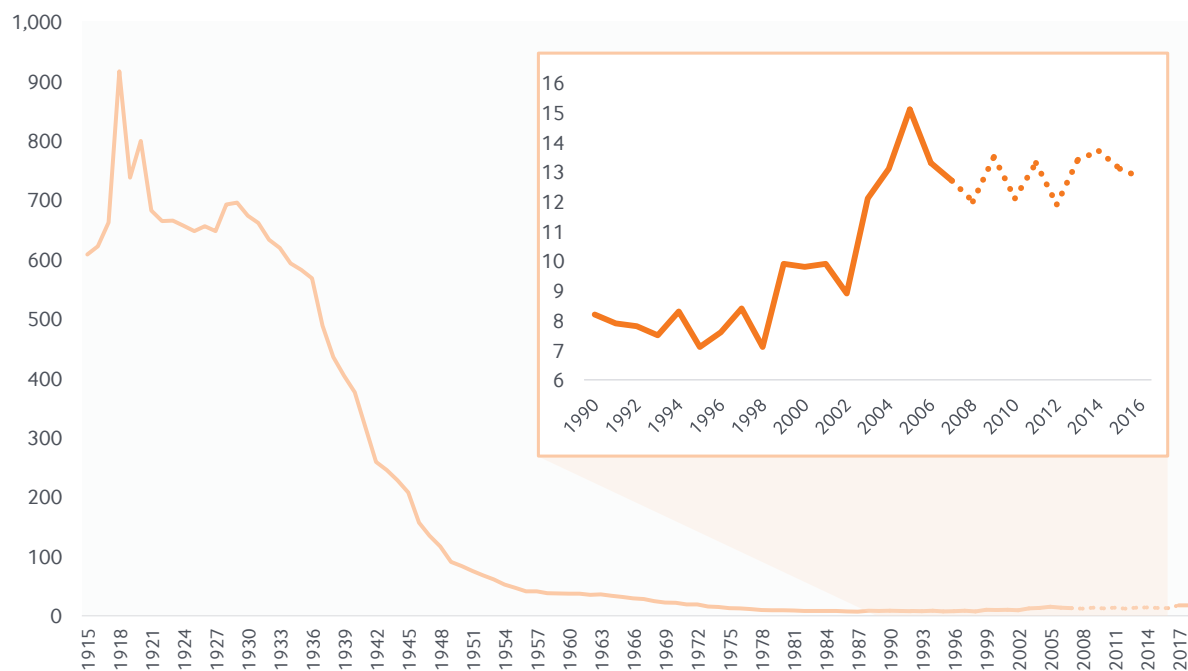
Half of pregnancy-related deaths occur after the day of birth.



There are various causes of maternal mortality; deaths during delivery are significant but only a part of the problem. Slightly more than half (52%) of all deaths occur **after the day of delivery**, while almost a third occur during pregnancy. There have been considerable efforts to **improve clinical care**, but efforts that focus on the birth hospitalization will only solve a portion of the problem. To improve outcomes, it will also be critical to address causes of maternal mortality that arise during pregnancy (such as hypertension, or high blood pressure) and in the postpartum period (such as cardiomyopathy, or weakened heart muscle), through **upgrades to women's health care** before, during, and after pregnancy.

Maternal mortality had been gradually declining before recently rising.

Deaths per 100,000 births



Note: Shifts in measurement (e.g., not all states were part of registration system prior to 1933; infant race was based on race of the child until 1980 and on race of the mother post-1980) account for some of the variation over time. Years 2007–2016 based on two-year estimates of the pregnancy-related mortality rate: Emily E. Petersen et al., “Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016,” *Morbidity and Mortality Weekly Report* 68, no. 35 (Sept. 6, 2019): 762–65. Data for 2017 unavailable; data for 2018 based on official NVSS rate.

Data: National Center for Health Statistics (NCHS), “Maternal Mortality and Related Concepts,” *Vital and Health Statistics*, series 33, no. 3 (Feb. 2007); and NCHS annual data reports. Data for 1915–1960 from NCHS, *Vital Statistics Rates in the United States* 1940–1960.

For decades in the U.S. and around the world, maternal mortality dropped as women gained healthier living conditions, better maternity services, safer surgical procedures, and access to antibiotics. Then, 20 years ago, the U.S. maternal mortality ratio began to rise.

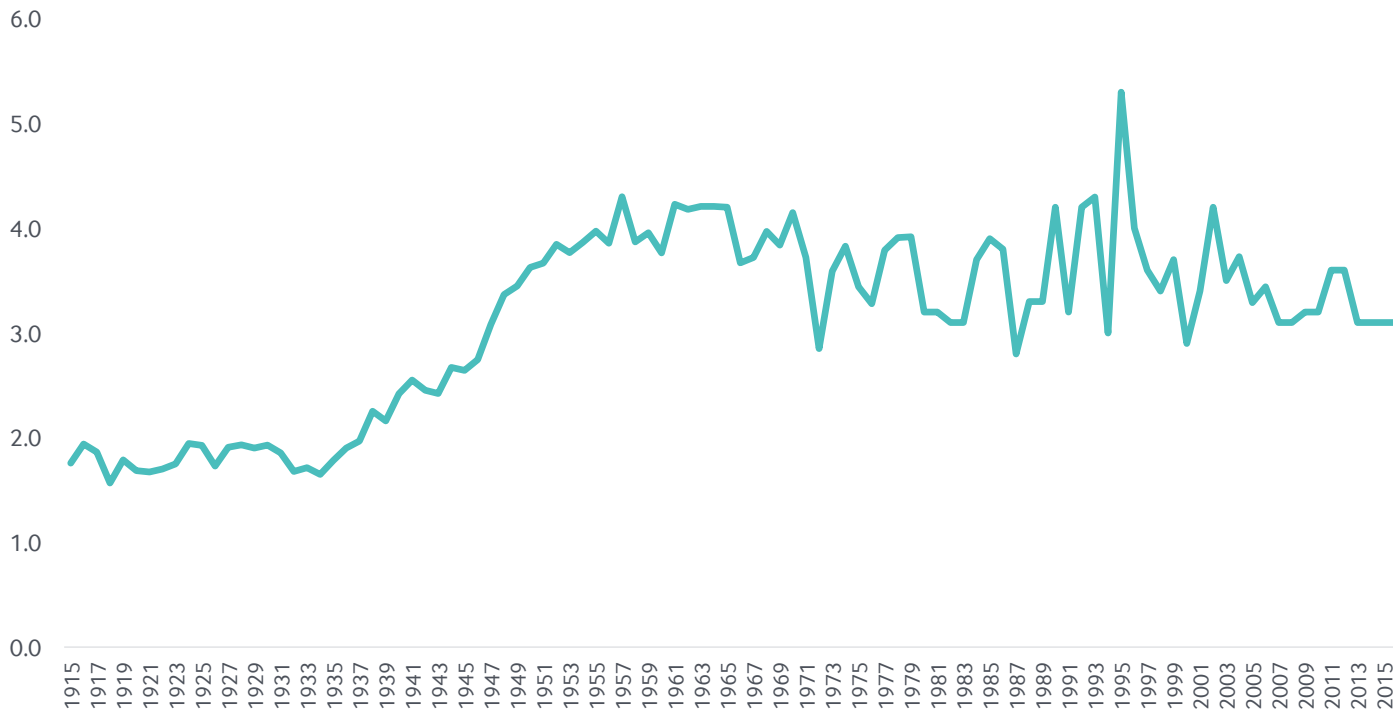
Systematic, comprehensive collection of data on maternal mortality in the U.S. began in the early 20th century in individual states. In 1915, the state data began to be compiled into a national estimate; by 1933, all states were participating and the nationally reported ratio was 619 deaths per 100,000 live births. By way of contrast, the ratio in 1927 for England and Wales was 411 per 100,000 and for Italy was 264 per 100,000.

For most of the 20th century, maternal mortality ratios dropped rapidly around the world with the introduction of healthier living conditions, improved maternity services, safer surgical procedures, and antibiotics. By 1960 the U.S. ratio was 37 per 100,000 live births. During the 1980s and into the 1990s, clinical interventions as well as public health efforts further reduced maternal mortality; it declined until the late 1990s, when it leveled off at about nine deaths per 100,000. After 1997, the U.S. ratio began rising again until 2008, when it plateaued at around 14 deaths per 100,000 births.

The focus on improving maternity care in hospitals has had consequences, for example by diminishing the importance of community-based care and overlooking persistent racial and ethnic disparities.

Black mothers have been more likely to die than white mothers for the last 100 years.

Ratio of Black to white maternal mortality



Black–white disparities in maternal mortality have existed since the beginning of the collection of such data. In 1915, the [maternal mortality ratio for Black mothers](#) (1,065 per 100,000 births) was 1.8 times that of white mothers (601).

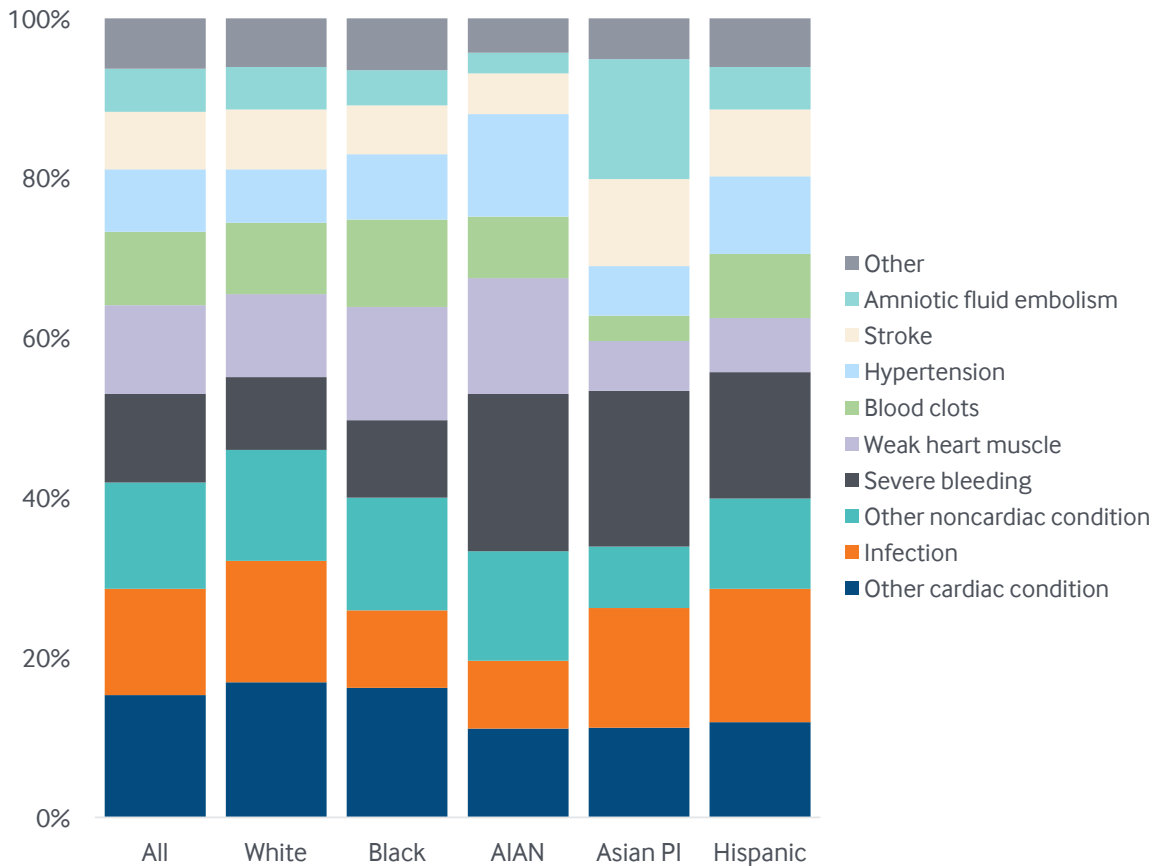
As white maternal mortality ratios declined more rapidly than those for Black mothers after World War II, the disparity increased until the maternal mortality ratio for Black mothers was four times that of white mothers. Since the early 1970s, Black mothers have been three to four times more likely to die than white mothers. In the recently reported 2018 maternal mortality data, the Black–white disparity was 2.5 (37.1 for Black mothers vs 14.7 for whites) — the same as the disparity seen in the 1940s.

Notes: Shifts in measurement account for some of the variation over time. For example, not all states were part of registration system prior to 1933, and infant race was based on race of the child until 1980 and on race of the mother thereafter.

Data: National Center for Health Statistics (NCHS), “Maternal Mortality and Related Concepts,” *Vital and Health Statistics*, series 33, no. 3 (Feb. 2007); and NCHS annual data reports. Data for 1915–1960 from NCHS, *Vital Statistics Rates in the United States 1940–1960*. Data for 2007–2016 based on two-year estimates of the pregnancy-related mortality rate, from Emily E. Petersen et al., “[Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016](#),” *Morbidity and Mortality Weekly Report* 68, no. 35 (Sept. 6, 2019): 762–65.

Race and ethnicity are tied to different causes of pregnancy-related death in the U.S.

Cause-specific pregnancy-related mortality in the U.S. by race/ethnicity, 2007–2016 (%)



This figure, drawing on a decade (2007–16) of data on causes of maternal deaths broken down by race/ethnicity, illustrates the diversity of factors that contribute to maternal deaths in different groups. The percentages represent the distribution of causes of deaths within each group.

The same study also reported widely disparate pregnancy-related mortality ratios for each group, specifically: white (12.7), Black (40.8), American Indian/Alaska Native (29.7), Asian Pacific Islander (13.5), and Hispanic (11.5). For example, hemorrhage (severe bleeding) is a cause of death most frequently seen in pregnancy and at the time of birth. It was the leading cause of death among American Indians and Alaska Natives (AIANs) and Asian Pacific Islanders (APIs), accounting for twice the proportion of deaths as seen among white or Black people. Cardiomyopathy, most commonly seen in the postpartum period, accounts for one of seven deaths among Black and AIAN people, but less than half that proportion among Hispanic and API people.

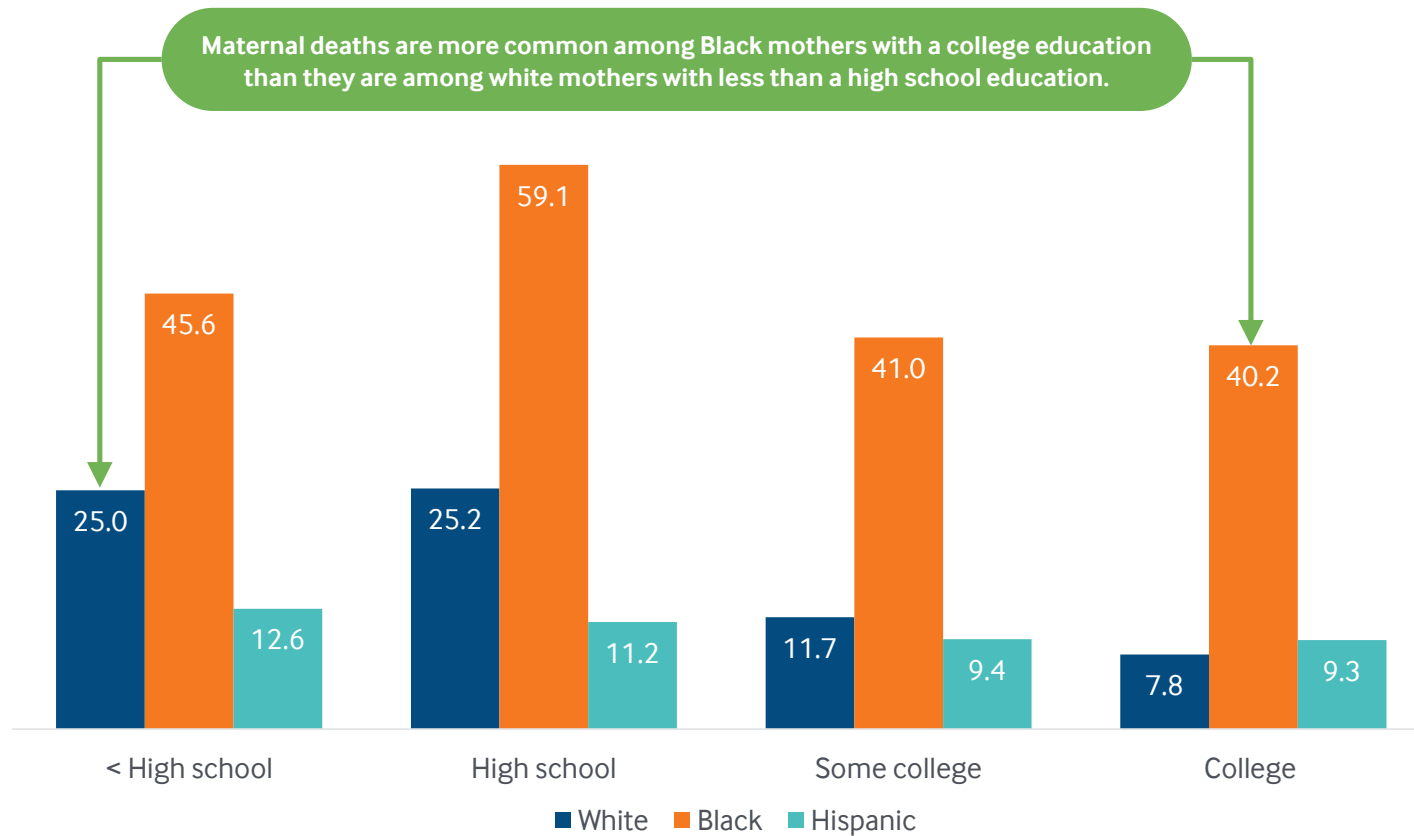
To reduce such disparities, it is critical to understand the particular risks that women face and then address all relevant factors, including access to treatment before and after birth, the quality of clinical care, the effects of structural racism, and social determinants of health.

Note: AIAN = American Indian and Alaska Native. Asian PI = Asian Pacific Islander.

Data: Emily E. Petersen et al., "Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016," *Morbidity and Mortality Weekly Report* 68, no. 35 (Sept. 6, 2019): 762–65.

Even higher education does not protect Black mothers from pregnancy-related death.

Pregnancy-related mortality ratios per 100,000 births in the U.S., 2007–2016

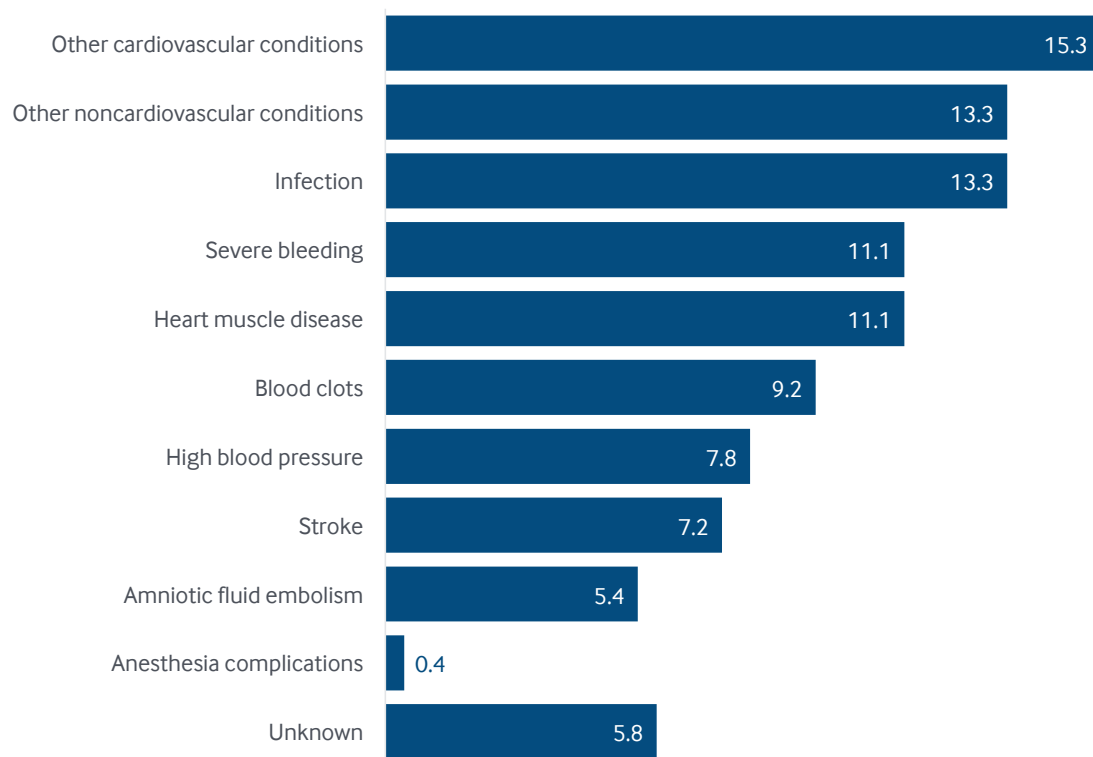


While educational advancement is typically seen as protective in terms of health, that’s not the case for Black mothers. Education exacerbates rather than mitigates Black–white differences in maternal deaths. Five times as many Black mothers with a college education die as white mothers with a college education. Mortality ratios for white mothers decrease with higher education, but the difference in mortality risk for a Black mother with less than a high school education and one with a college degree is minimal. This leads to the startling finding that maternal deaths are more common among Black mothers with a college education than they are among white mothers with less than a high school education (40.2 vs. 25.0). Mortality ratios for Hispanic mothers decrease slightly with education but are generally lower at each level.

Data: Emily E. Petersen et al., “Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016,” *Morbidity and Mortality Weekly Report* 68, no. 35 (Sept. 6, 2019): 762–65.

Pregnancy-related deaths are a clinical and a public health challenge.

Leading clinical causes of pregnancy-related mortality up to one year post-birth, U.S., 2007–2016 (%)



It is important to understand the clinical causes of pregnancy-related mortality. According to a recent CDC report, the majority [relate to cardiovascular conditions](#) such as heart muscle disease (cardiomyopathy) (11%), blood clots (9%), high blood pressure (8%), stroke (7%), and a category combining other cardiac conditions (15%). Infection (13%) and severe postpartum bleeding (11%) are also leading causes. When many of these conditions are identified early, there are clinical interventions that can save lives. And a number of these conditions, particularly cardiomyopathy, occur up to a year after childbirth.

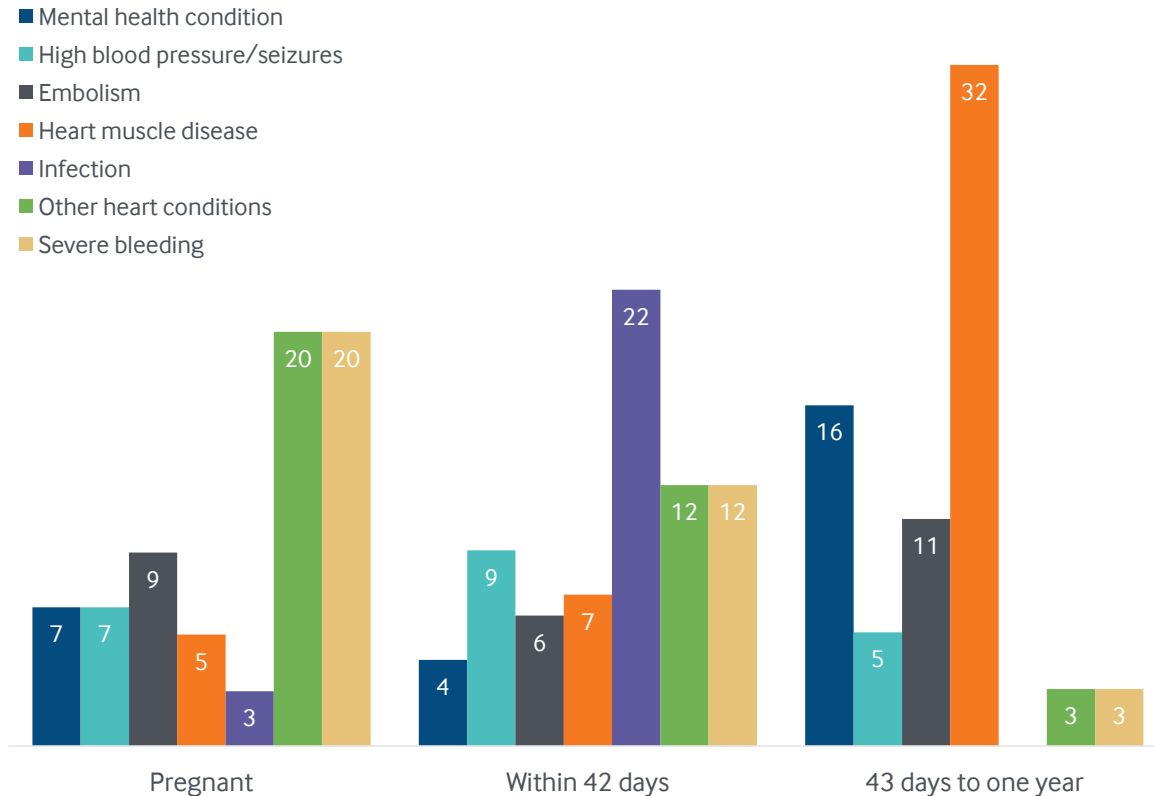
[Improvements in hospital care](#) have, according to a recent study, decreased the number of maternal deaths occurring at the time of birth hospitalization. [Pregnancy-related mortality ratios](#) associated with hospital care (such as hemorrhage, eclampsia, and infection) have declined in recent years.

In addition to hospital-focused interventions, key efforts involve identifying higher-risk women earlier, enrolling women in insurance, and keeping them in care after childbirth. Additionally, [many new mothers feel torn](#) between the economic pressure to return to work and the need to focus primarily on their infant's health, perhaps at the cost of their own care.

Data: Emily E. Petersen et al., "Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016," *Morbidity and Mortality Weekly Report* 68, no. 35 (Sept. 6, 2019): 762–65.

The underlying causes of pregnancy-related maternal deaths vary according to when mothers die.

Causes of pregnancy-related mortality during pregnancy and the postpartum period, U.S., 2007–2016 (%)



The causes of maternal death vary considerably and depend on when mothers die. These data are based on a report from [maternal mortality review committees](#).

During pregnancy, hemorrhage and cardiovascular conditions are the leading causes of death. At birth and shortly after, infection is the leading cause. In the postpartum period, often during the time when new parents are out of the hospital and beyond the traditional six- or eight-week post-pregnancy visit, cardiomyopathy (weakened heart muscle) and mental health conditions (including substance use and suicide) are identified as leading causes.

The diversity of causes at different times throughout pregnancy until one year postpartum can best be addressed through integrated care delivery models. Those that leverage telehealth, midwives, and doulas can improve access to care. Since almost 7 percent of non-Hispanic Black women in 2018 did not start prenatal care until their third trimester, and an additional 3 percent report [no prenatal care at all](#), efforts to enroll women into insurance early in pregnancy would be an appropriate place to begin. The large proportion of deaths occurring after birth also suggests too many mothers are lost to care after they've given birth, a problem exacerbated by [current Medicaid policies](#) that drop expanded coverage for pregnant women 60 days after birth.

Given that large-scale policy changes may take longer to implement, there are also more immediate practice changes that can reduce disparities and save lives in the short term; these include increasing support for programs like community-based doulas and wraparound services, which have been found to [act as effective buffers](#) against larger social determinants of health.

The varying conditions require different approaches to treatment. Therefore, providing women with optimal care, including mental health care, throughout the 21 months from conception through the year after they have given birth is essential.

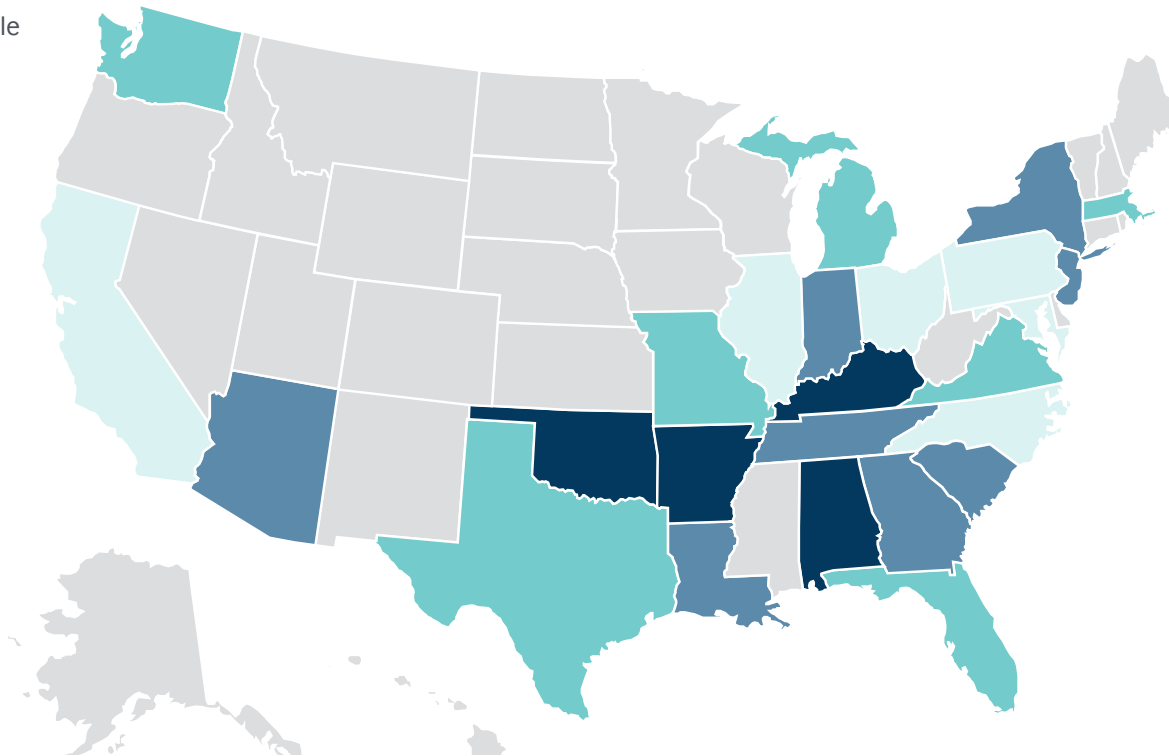
Data: Centers for Disease Control and Prevention, [Report from Nine Maternal Mortality Review Committees](#) (CDC, 2018).

A woman's chance of dying in childbirth is twice as high in some states as in others.

Variation in state maternal mortality rates, 2018

**Maternal mortality ratio
(per 100,000 births)**

- Not available
- <15
- 15.0–19.9
- 20.0–29.9
- 30.0+



State maternal mortality ratios vary widely. The recent report on maternal deaths in 2018 included ratios for the 25 states reporting at least 10 maternal deaths. A cluster of states in the South (Alabama, Arkansas, Kentucky, and Oklahoma) reported ratios of greater than 30 per 100,000 live births, while California, Illinois, Ohio, and Pennsylvania all reported ratios less than half the figures in those states.

It is striking that the data are missing for approximately half of all U.S. states and territories. It is expected that with subsequent annual reports, multiple years can be combined to enable the comparison of all states.

Data: National Center for Health Statistics, [Maternal Mortality by State, 2018](#).

Black women are more likely than white women to report that their concerns and preferences regarding birth were disregarded; women with Medicaid coverage reported inadequate postpartum care and support.

Listening to Mothers is a series of national surveys fielded by the nonprofit National Partnership for Women and Families. Below is a summary of some of the key findings from the Listening to Mothers [2011–12 survey](#), as well as a [California survey](#) conducted in 2016, about the experiences of mothers who had hospital births in the United States.

Compared with white women, non-Hispanic Black women were more likely to report:

- Being treated unfairly and with disrespect by providers because of their race
- Not having decision autonomy during labor and delivery
- Feeling pressured to have a cesarean section
- Not exclusively breastfeeding at one week and six months.

Compared with women with private health insurance, women with Medicaid coverage were more likely to report:

- No postpartum visit
- Returning to work within two months of birth
- Less postpartum emotional and practical support at home
- Not having decision autonomy during labor and delivery
- Being treated unfairly and with disrespect by providers because of their insurance status
- Not exclusively breastfeeding at one week and six months.

As these findings illustrate, different women have different experiences with maternity care, childbirth, and parenting. For example, both Black women and those with Medicaid coverage were less likely than white women and those with private health coverage to say they had autonomy about childbirth decisions and were treated with respect by their providers.

When we consider causes of racial and other disparities in maternal mortality, it is essential to consider women's interactions with the maternity care system and understand how bias and racism manifest in these experiences. Because experiences of pregnancy and parenthood differ by race and insurance coverage, our health care systems need to address structural factors — including racism and bias — that affect treatment while meeting the full needs of all pregnant and birthing people.

DISCUSSION

As these charts show, relatively high maternal mortality ratios in the U.S. as compared with other countries, and disparities between Black and white women, are not new problems, nor are they improving. Even if you looked just at non-Hispanic white women in cross-national comparisons of maternal mortality, the U.S. would [still be in last place](#). Even with varying ways to measure maternal mortality, the U.S. does not perform well on any analysis of this sentinel measure of a society's health.

Preventing maternal mortality is complicated by the multifactorial nature of the problem. The causes vary across racial and ethnic groups as well as timing — whether during pregnancy, at birth, or postpartum. And a woman's chance of dying in childbirth is more than twice as high in some states.

The fact that the U.S. has the highest maternal mortality ratio among wealthy countries even when we limit the U.S. data only to white women suggests that our maternal health care system needs dramatic change. The U.S. has to intentionally focus on disparities between Black and white women, in particular by naming and seeking to reduce the impacts of structural racism.

Structural racism leads to disparities in income, housing, safety, education, and other circumstances that are associated with poorer health and increased rates of chronic disease. These, in turn, place Black women at greater risk than white women of pregnancy-related deaths from cardiomyopathy and hypertension, among other causes.

Racism in the health care sector compounds the issue, with Black women less likely to have access to treatment and receive good-quality care. And the intersection of sexism and racism can mean women of color are not listened to or respected by their providers, contributing to preventable morbidity and mortality due to delayed diagnosis or care. This has been reported by women in multiple surveys and illustrated by the high-profile cases of [Serena Williams](#), [Shalon Irving](#), and [Kira Johnson](#).

Moreover, although recent efforts to improve **hospital maternity care** have been valuable, only a third of pregnancy-related deaths occur at the time of birth. We need to improve women's health services before and after pregnancy — not just at the time of birth.

Policies are also needed to promote continuous health insurance coverage before and after pregnancy. In particular, the large proportion of maternal deaths that occur after childbirth suggests that too many women are losing connections to health care after giving birth.

High maternal mortality in the U.S. is not the result of any single factor, and reducing it will require an integrated effort involving policy and practice changes to improve hospital and community care for all women while advancing racial equity.

HOW WE CONDUCTED THIS STUDY

The figures cited in this study are based on data from a wide range of contemporary and historical sources. The historical data are drawn from early national vital statistics reports. The current breakdowns of maternal death by timing of deaths and causes of death are from the Pregnancy Mortality Surveillance System and the [Maternal Mortality Review Information Application](#), both developed by CDC. The 2018 state ratios were published by the CDC's [National Vital Statistics System](#). The Listening to Mothers survey methods and results are all available from the [National Partnership for Women and Families](#) website.

The National Vital Statistics System (NVSS) provides the official reports of maternal mortality, and in 2020, after a decade-long hiatus, reported a national ratio (17.4 deaths per 100,000 births) for 2018. Meanwhile, the CDC has been publishing a pregnancy-related mortality ratio for more than two decades. However, the CDC data cannot be used to make international comparisons because the CDC reports deaths up to one year postpartum, while other countries report deaths that occur up to 42 days postpartum. While the CDC data could be truncated at 42 days for comparison, the CDC is not allowed to report those rates, because the NVSS is the only governmental body allowed to report an official maternal mortality ratio. Finally, CDC has developed the Maternal Mortality Review Information Application system, for which data from states' maternal mortality review committees are gathered to produce multistate reports on maternal deaths.

The major limitation in examining maternal mortality is that there is no single national system in the U.S. for collecting maternal mortality data. Rather, there is a federal system wherein deaths are reported at the local and state levels and those reports conveyed to federal officials. Therefore, the system relies on the quality of data collected locally and the quality-control processes for converting those reports into national data. Documentation and analysis of maternal mortality over time have been hampered by limited funding, changing definitions, and inconsistent reporting by states. These shortcomings have resulted in notable gaps in our understanding of the problem, including the degree of difference in maternal mortality between urban and rural areas, though there is considerable evidence reporting the growing problem of gaps in [maternal health services in rural areas](#).

ABOUT THE AUTHORS

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