NOVEMBER 14, 2024

CDC's website is being modified to comply with President Trump's Executive Orders.

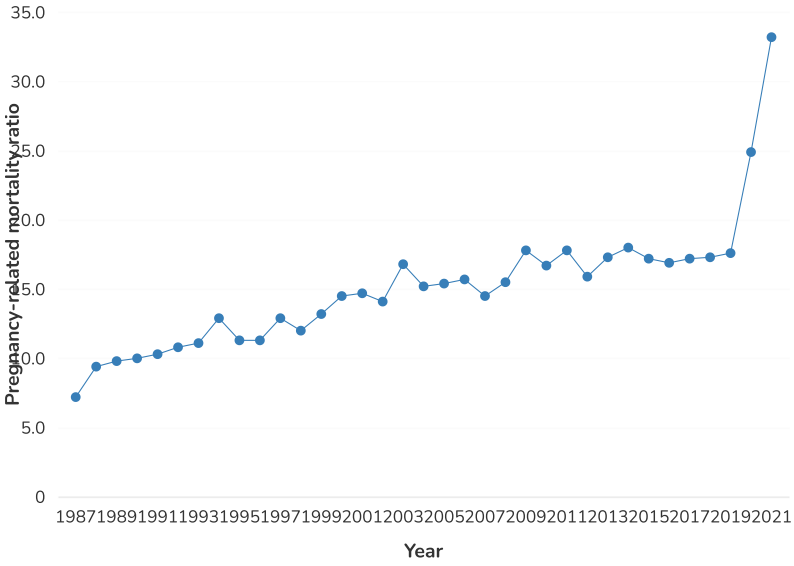
Pregnancy Mortality Surveillance System

WHAT TO KNOW

The Centers for Disease Control and Prevention (CDC) conducts national surveillance to better understand the causes of pregnancy-related deaths. The Pregnancy Mortality Surveillance System (PMSS) defines a pregnancy-related death as a death during or within 1 year of the end of pregnancy from any cause related to or aggravated by the pregnancy. Medical epidemiologists review and analyze applicable vital records, and additional available data from all 50 states, New York City, and Washington, DC. Beginning in 2020, data from Puerto Rico are included, and in 2021, data from Northern Mariana Islands are included in PMSS.

Pregnancy-related deaths data

Figure 1. Pregnancy-related mortality ratio in the United States: 1987-2021



Data Table +

Download Data (CSV)

Data from PMSS and birth records from the National Vital Statistics System (NVSS) via CDC Wide-Ranging Online Data for Epidemiologic Research (WONDER) are used to calculate the pregnancy-related mortality ratio (PRMR), an estimate of the number of pregnancy-related deaths for every 100,000 live births.

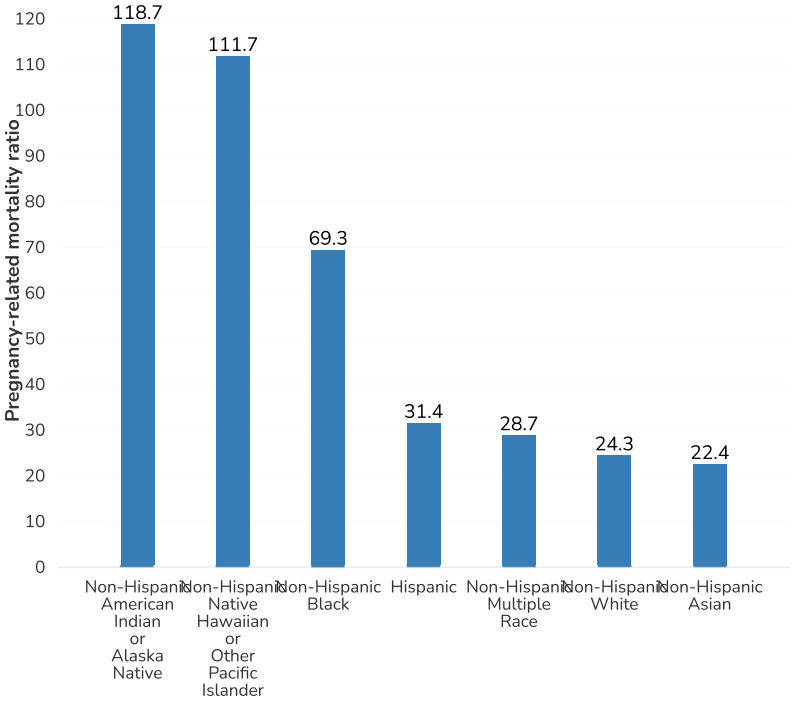
Since PMSS was implemented, the number of reported pregnancy-related deaths in the United States increased from 7.2 deaths per 100,000 live births in 1987 to 33.2 deaths per 100,000 live births in 2021. The graph above shows PRMRs between 1987 and 2021 (the latest available year of data). The addition of Puerto Rico and Northern Mariana Islands to PMSS does not explain the increase in the PRMR from 2019 to 2021.

Pregnancy-related deaths by race-ethnicity

Considerable racial-ethnic disparities in pregnancy-related mortality exist,[1] [2] and these disparities increased during 2020 and 2021.

Figure 2. Pregnancy-related mortality ratio by race-ethnicity: 2017–2019, 2020, and 2021[a,b]

2021



Data Table +

Download Data (CSV)

[a] PRMRs were not calculated among non-Hispanic multiple race women in 2017–2019 because data for non-Hispanic multiple race women was unavailable for 2017. PRMRs were not calculated among non-Hispanic other race women from 2017–2021 and among non-Hispanic Native Hawaiian or other Pacific Islander women in 2020, because PRMRs based on counts fewer than 8 are considered not reliable for reporting.

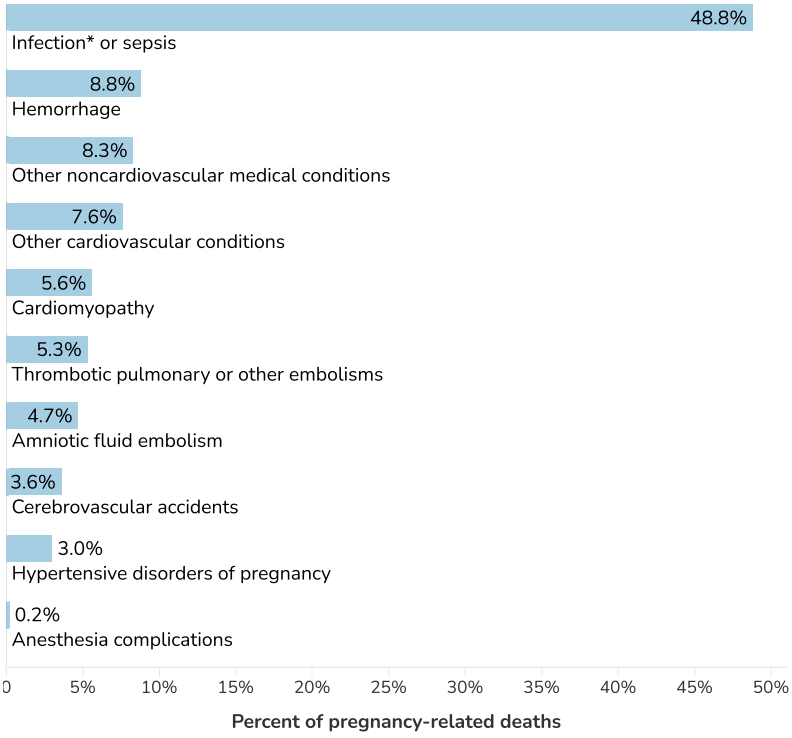
[b] Race or ethnicity was missing for 1.4% of pregnancy-related deaths in 2017–2019 and 0.3% in 2020 and in 2021.

In 2017–2019, the highest PRMR was among non-Hispanic Native Hawaiian or Other Pacific Islander women. In 2020 and 2021, the highest PRMR was among non-Hispanic American Indian or Alaska Native women. Non-Hispanic Black women are also disproportionately impacted by pregnancy-related deaths. Variability in the risk of death by race-ethnicity may be due to several factors including differences in access to care, quality of care, prevalence of chronic diseases, and other factors that impact health.[3] [4]

Causes of pregnancy-related deaths

Figure 3. Causes of pregnancy-related deaths in the United States: 2017–2019, 2020, and 2021[a]

2021



Data Table +

Download Data (CSV)

* In 2020 and 2021, infection category includes deaths with an underlying cause of COVID-19.

[a] The cause of death is unknown for 7.0% of all 2017–2019 pregnancy-related deaths, for 4.7% of deaths in 2020, and for 4.2% of deaths in 2021.

Spotlight

Infection was the most frequent underlying cause of pregnancy-related deaths in 2020 and 2021, driven by pregnancy-related COVID-19 deaths.

A new cause of death code specific for COVID-19, within the infection category, was used during PMSS review of deaths occurring in 2020. In 2021, infection was the most frequent underlying cause of death (48.8%) and COVID-19 accounted for 40.5% of all pregnancy-related deaths.

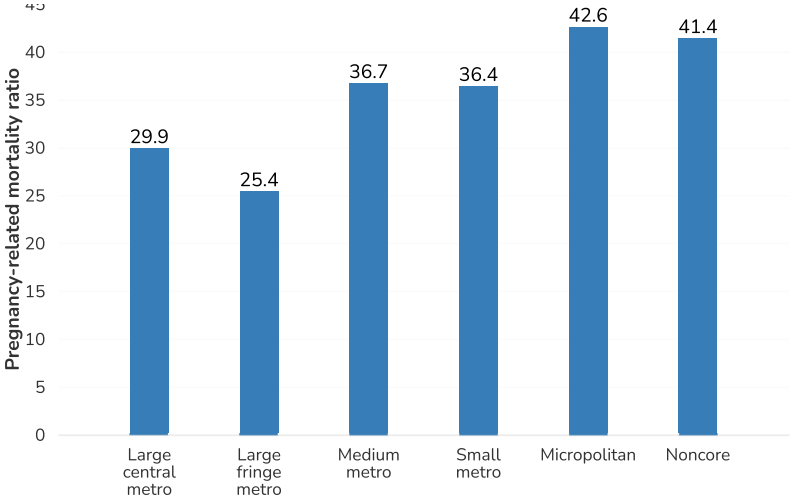
The number of pregnancy-related deaths with an underlying cause of COVID-19 in 2021 (N=495) was nearly four times higher than in 2020 (N=133).

Pregnant and postpartum women are more likely to get very sick from COVID-19 compared to those who are not pregnant.[5] [6] In addition, studies show that an increasing number of pregnant women in the United States have chronic health conditions such as hypertension,[7] [8] diabetes,[8] [9] and chronic heart disease.[10] These conditions may put a woman at higher risk of complications during or within 1 year of the end of pregnancy.

Pregnancy-related deaths by urban-rural classifications

Figure 4. Pregnancy-related mortality ratio by urban-rural classifications[a]: 2017–2019, 2020, and 2021

2021



Data Table +

Download Data (CSV)

[a] Urban-rural classification was missing, or unknown, or unassigned for 2.4% of pregnancy-related deaths in 2017–2019, and for 4.0% in 2020, and for 2.7% in 2021.

Spotlight

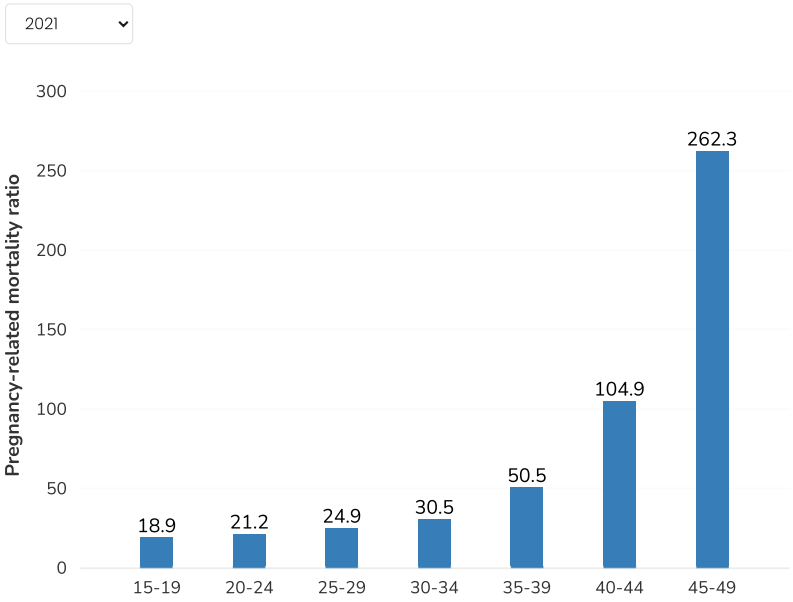
In 2021, the highest pregnancy-related mortality ratios were found among women residing in the most rural classifications.

Figure 4 shows PRMRs per 100,000 live births by urban-rural classifications using the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties (PDF). Data were geocoded using the Texas A&M Geoservices' Batch Geocoding. Metropolitan counties, such as large central, large fringe, medium, and small, can be considered urban. Micropolitan and noncore counties can be considered rural.

A prior study found that PRMRs were higher in noncore (the most rural categorization) counties when compared to metropolitan counties. [11] Variability in the risk of death by geographic location groups might reflect chronic health conditions and access to care, including risk-appropriate care. [12] [13] For example, residents of rural areas may face challenges such as distance from and lack of access to obstetric services and providers.

Pregnancy-related deaths by age

Figure 5. Pregnancy-related mortality ratio by maternal age[a]: 2017–2019, 2020, and 2021[b]



Data Table +

Download Data (CSV)

[a] PRMRs were not calculated among women under 15 years and over 50 years of age for 2017-2021 because PRMRs based on counts fewer than 8 are considered not reliable for reporting.

Spotlight

In 2021, pregnancy-related mortality ratios were higher among older age groups.

Figure 5 shows PRMRs per 100,000 live births by maternal age group. Variability in the risk of death by maternal age may be due to several factors including a higher risk of pregnancy complications and prevalence of chronic diseases. [14]

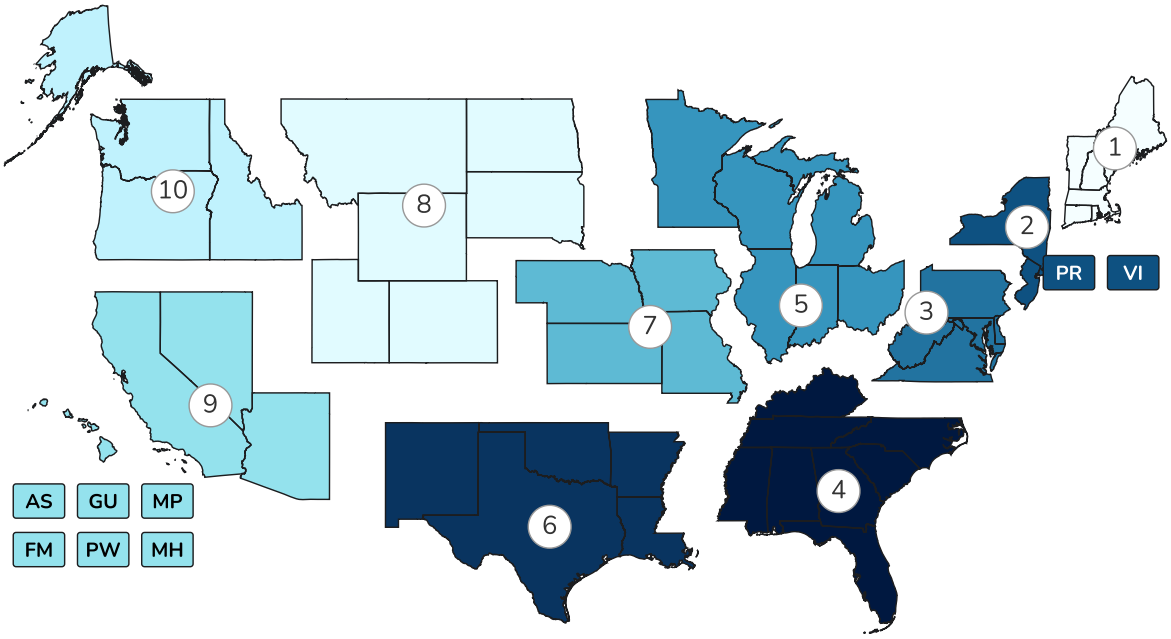
Pregnancy-related deaths by HHS Region

Figure 6. Pregnancy-related mortality ratio by HHS Region[a]: 2017–2019, 2020, and 2021[b]

2021

Pregnancy-related mortality ratio (PRMR)

15.1 20.2 23.0 23.5 23.6 26.9 27.3 29.9 45.5 48.7



Data Table +

Download Data (CSV)

[a] HHS regions are based on residence. Data from all 50 states, New York City, and Washington, DC are included. Beginning in 2020, data from Puerto Rico are included, and in 2021, data from Northern Mariana Islands are included in PMSS.

[b] HHS region was not assigned for 1.2% of the deaths in 2021 because residence information was missing.

Spotlight

In 2021, there was wide variation in pregnancy-related mortality by HHS regions.

Figure 6 presents PRMRs per 100,000 live births by regions defined by U.S Department of Health and Human Services (HHS). The highest pregnancy-related mortality ratios are in Regions 4 and 6.

SOURCES

CONTENT SOURCE:
National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP); Division of Reproductive Health

REFERENCES

1. Petersen EE, Davis NL, Goodman D, et al. Racial/ethnic disparities in pregnancy-related deaths — United States, 2007–2016. *MMWR Morb Mortal Wkly Rep.* 2019;68:762–765.
2. Petersen EE, Davis NL, Goodman D, et al. Vital signs: pregnancy-related deaths, United States, 2011–2015, and strategies for prevention, 13 states, 2013–2017. *MMWR Morb Mortal Wkly Rep.* 2019;68:423–429.
3. Bailey ZD, Krieger N, Agénor M, Graves J, Linos N, Bassett MT. Structural racism and health inequities in the USA: evidence and interventions. *Lancet.* 2017;389(10077):1453–1463. doi:10.1016/S0140-6736(17)30569-X.
4. Howell EA. Reducing disparities in severe maternal morbidity and mortality. *Clin Obstet Gynecol.* 2018;61:387–399. https://doi.org/10.1097/GRF.0000000000000349
5. Allotey J, Stallings E, Bonet M, et al; for PregCOV-19 Living Systematic Review Consortium. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. *BMJ.* 2020;370:m3320. doi: 10.1136/bmj.m3320. Update in: *BMJ.* 2022;377:o1205.
6. Zambrano LD, Ellington S, Strid P, et al. Update: Characteristics of Symptomatic Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status — United States, January 22–October 3, 2020. *MMWR Morb Mortal Wkly Rep.* 2020;69:1641–1647. doi: http://dx.doi.org/10.15585/mmwr.mm6944e3
7. Ford ND, Cox S, Ko JY, et al. Hypertensive disorders in pregnancy and mortality at delivery hospitalization – United States, 2017. *MMWR Morb Mortal Wkly Rep.* 2022;71:585–591. doi:10.15585/mmwr.mm7117a1
8. Admon LK, Winkelman TNA, Moniz MH, Davis MM, Heisler M, Dalton VK. Disparities in chronic conditions among women hospitalized for delivery in the United States, 2005–2014. *Obstet Gynecol.* 2017;130(6):1319–1326.
9. Gorsch LP, Wen T. Lonier JY, Zork N, Mourad M, D'Alton ME, Friedman AM. Trends in delivery hospitalizations with pregestational and gestational diabetes and associated outcomes: 2000-2019. *Am J Obstet Gynecol.* 2023;229(1):63.e14.
10. Majmundar M. Doshi R. Patel KN, Zale H. Kumar A, Kalra A. Prevalence, trends, and outcomes of cardiovascular diseases in pregnant patients in the USA: 2010-2019. *Eur Heart J.* 2023;44(9):726-737
11. Merkt PT, Kramer MR, Goodman DA, et al. Urban-rural differences in pregnancy-related deaths, United States, 2011–2016. *Am J Obstet Gynecol.* 2021;225:183.e1–e16.
12. Kozhimannil KB, Interrante JD, Tuttle MKS, Henning-Smith C. Changes in hospital-based obstetric services in rural US counties, 2014–2018. *JAMA.* 2020;324(2):197–199.
13. Xierali IM, Nivet MA, Rayburn WF. Relocation of obstetrician-gynecologists in the United States, 2005–2015. *Obstet Gynecol.* 2017;129(3):543–550.
14. Bornstein E, Eliner Y, Chervenak, FA, Grünebam A. Concerning trends in maternal risk factors in the United States: 1998—2018. *The Lancet.* 2020;29(100657).

SOURCES

- Hall WJ, Chapman MV, Lee KM, et al. Implicit racial/ethnic bias among health care professionals and its influence on health care outcomes: a systematic review. *Am J Public Health.* 2015;105:e60–e76. https://doi.org/10.2105/AJPH.2015.302903
- Centers for Disease Control and Prevention. Pregnancy Mortality Surveillance System. https://www.cdc.gov/maternal-mortality/php/pregnancy-mortality-surveillance/index.html