Centers for Disease Control and Prevention

Reproductive Health

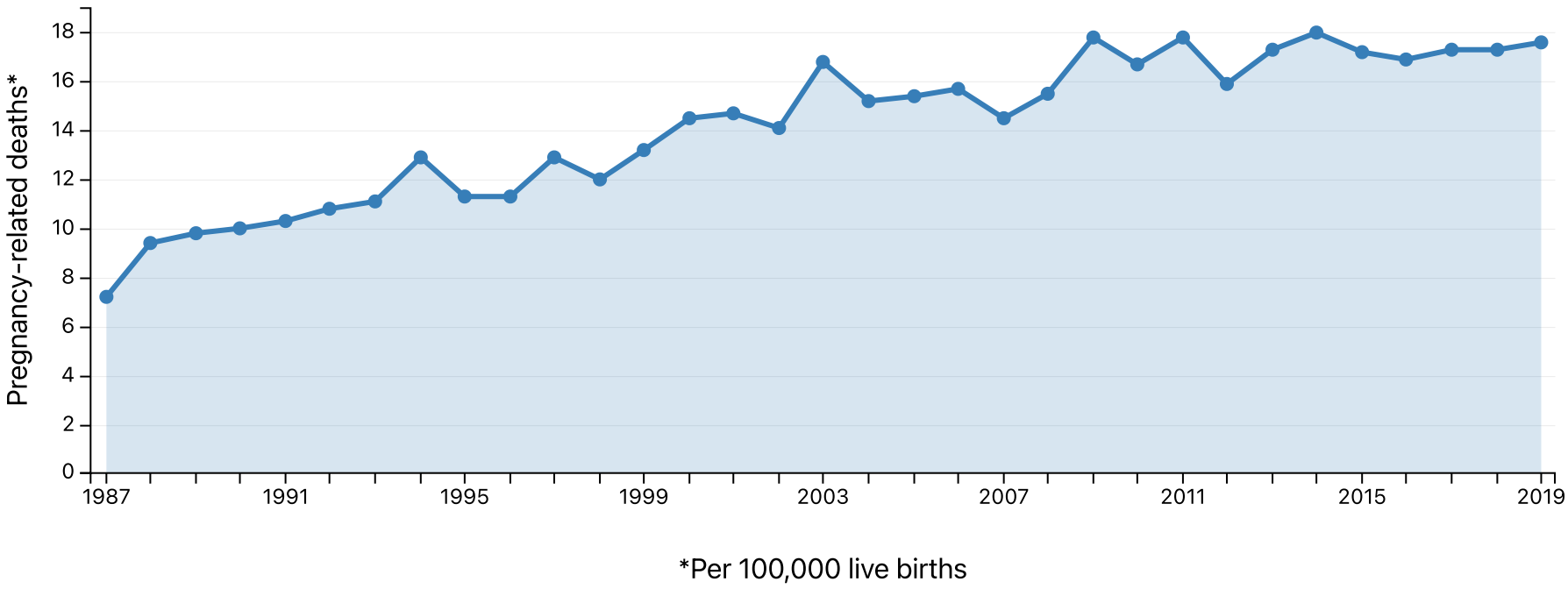
Pregnancy Mortality Surveillance System

About the Pregnancy Mortality Surveillance System (PMSS)

CDC conducts national pregnancy-related mortality surveillance to better understand the risk factors for and causes of pregnancy-related deaths in the United States. The Pregnancy Mortality Surveillance System (PMSS) defines a pregnancy-related death as a death while pregnant or within 1 year of the end of pregnancy from any cause related to or aggravated by the pregnancy. Medical epidemiologists review and analyze death records, linked birth records and fetal death records if applicable, and additional available data from all 50 states, New York City, and Washington, DC. PMSS is used to calculate the pregnancy-related mortality ratio, an estimate of the number of pregnancy-related deaths for every 100,000 live births. The birth data used to calculate pregnancy-related mortality ratios were obtained from the National Vital Statistics System (NVSS) via the Centers for Disease Control and Prevention, Wide-ranging Online Data for Epidemiologic Research (CDC WONDER).

Trends in Pregnancy-Related Deaths

Trends in pregnancy-related mortality ratios in the United States: 1987-2019



Data Table

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Pregnancy-related mortality ratio	7.2	9.4	9.8	10	10.3	10.8	11.1	12.9	11.3	11.3	12.9

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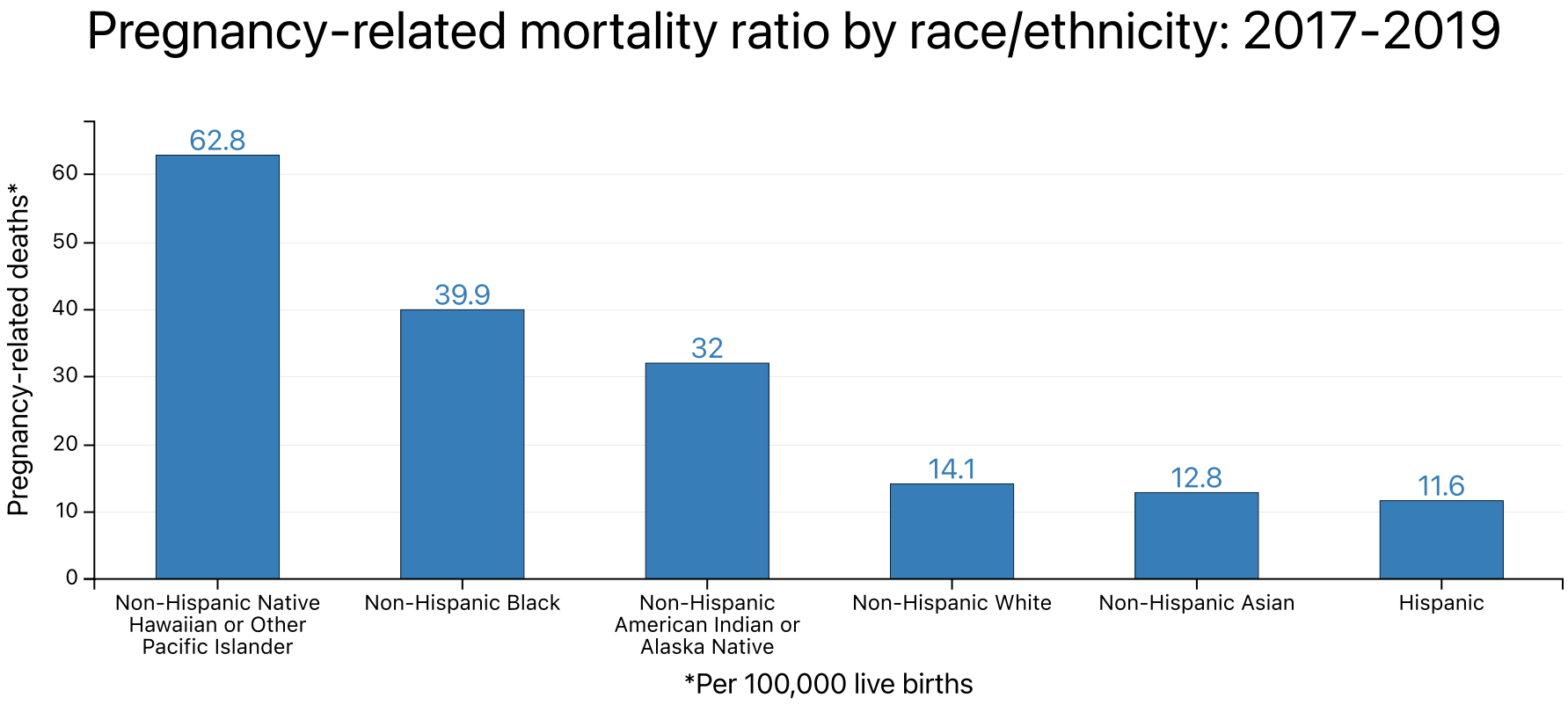
Download Table Data (csv)

Since the Pregnancy Mortality Surveillance System 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 17.6 deaths per 100,000 live births in 2019. The graph above shows trends in pregnancy-related mortality ratios between 1987 and 2019 (the latest available year of data).

The reasons for the overall increase in pregnancy-related mortality are unclear. Identification of pregnancy-related deaths has improved over time due to the use of computerized data linkages between death records and birth and fetal death records by states, changes in the way causes of death are coded, and the addition of a pregnancy checkbox to death records. However, errors in reported pregnancy status on death records have been described, potentially leading to overestimation of the number of pregnancy-related deaths.[1]

Pregnancy-Related Deaths by Race/Ethnicity



Data Table

	Non-Hispanic Native Hawaiian or Other Pacific Islander	Non-Hispanic Black	Non-Hispanic American Indian or Alaska Na
Pregnancy-related mortality ratio	62.8	39.9	
Count	18	663	

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Download Table Data (csv)

Considerable racial/ethnic disparities in pregnancy-related mortality exist.[2,3] During 2017–2019, the pregnancy-related mortality ratios (PRMRs) were:

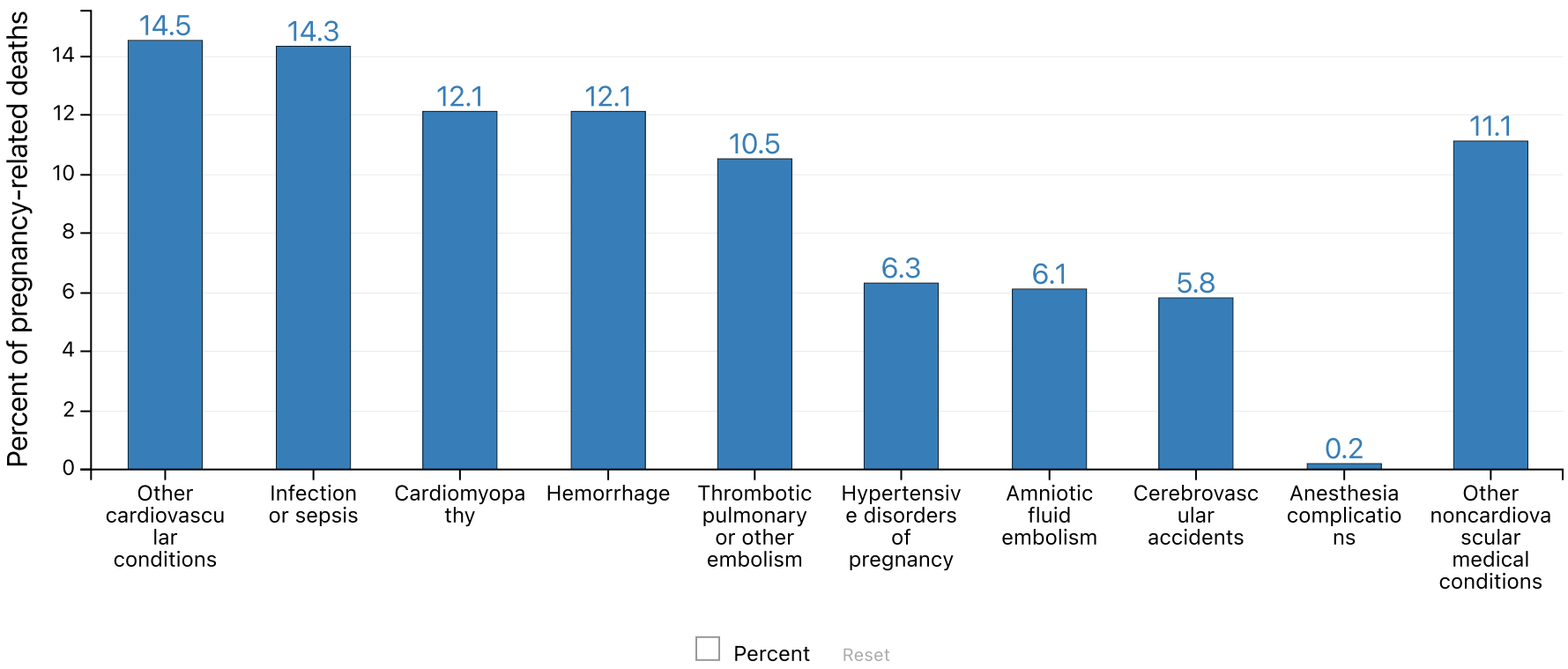
- 62.8 deaths per 100,000 live births among non-Hispanic Native Hawaiian or Other Pacific Islander persons.
- 39.9 deaths per 100,000 live births among non-Hispanic Black persons.
- 32.0 deaths per 100,000 live births among non-Hispanic American Indian or Alaska Native persons.
- 14.1 deaths per 100,000 live births among non-Hispanic White persons.
- 12.8 deaths per 100,000 live births among non-Hispanic Asian persons.
- 11.6 deaths per 100,000 live births among Hispanic persons.

Race or ethnicity was missing for 1.4% of pregnancy-related deaths in 2017-2019.

In 2018-2019, the PRMR was 7.1 deaths per 100,000 live births among non-Hispanic multiple race persons.

PRMRs were not calculated for persons who identified as non-Hispanic Other Race, because PRMRs based on counts less than 8 are considered not reliable for reporting. Variability in the risk of death by race/ethnicity may be due to several factors including access to care, quality of care, prevalence of chronic diseases, structural racism, and implicit biases.[4-6]

Causes of Pregnancy-Related Deaths



Data Table

	Other cardiovascular conditions	Infection or sepsis	Cardiomyopathy	Hemorrhage	Thrombotic pulmonary or other embolism	
Percent	14.5	14.3	12.1	12.1	10.5	
Count	287	283	240	240	208	

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Download Table Data (csv)

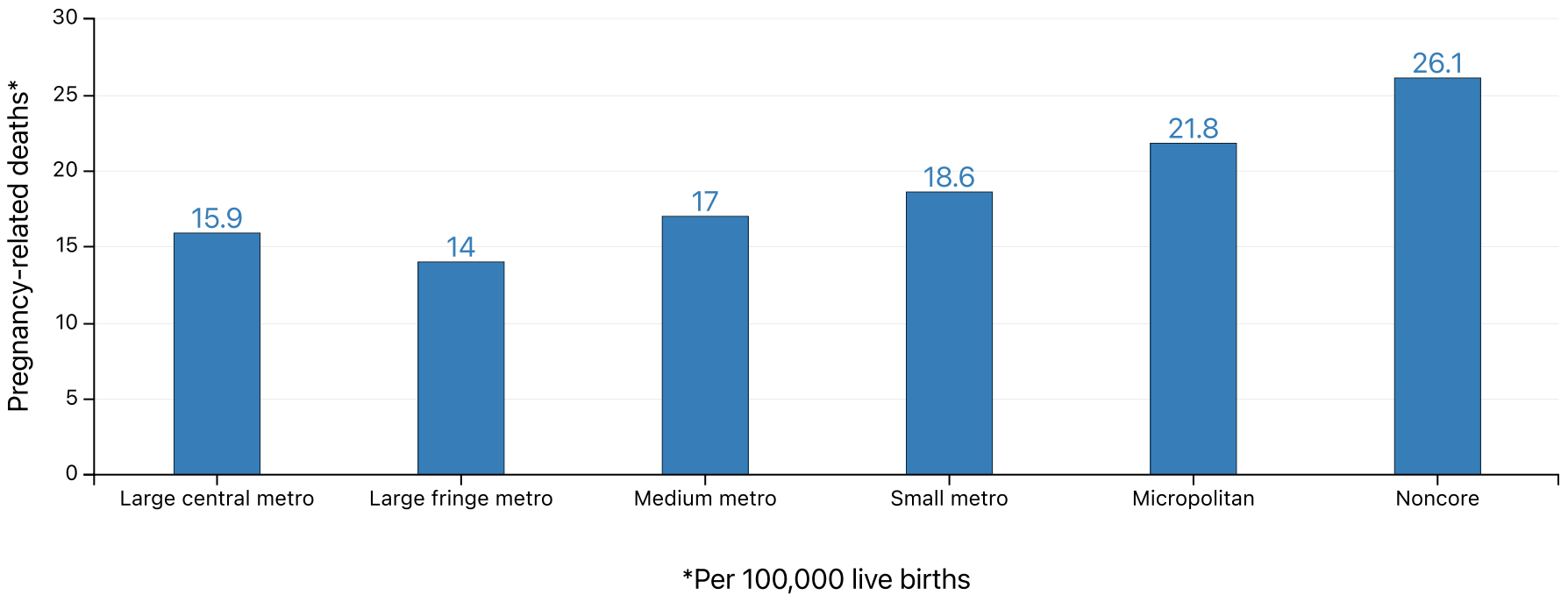
The graph above shows percentages of pregnancy-related deaths in the United States during 2017–2019 caused by:

- Other cardiovascular conditions, 14.5%.
- Infection or sepsis, 14.3%.
- Cardiomyopathy, 12.1%.
- Hemorrhage, 12.1%.
- Thrombotic pulmonary or other embolism, 10.5%.
- Hypertensive disorders of pregnancy, 6.3%.
- Amniotic fluid embolism, 6.1%.
- Cerebrovascular accidents, 5.8%.
- Anesthesia complications, 0.2%.
- Other noncardiovascular medical conditions, 11.1%.

The cause of death is unknown for 7.0% of all 2017-2019 pregnancy-related deaths.

Studies show that an increasing number of pregnant persons 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 person at higher risk of complications during pregnancy or in the year postpartum.

Pregnancy-Related Deaths by Urban-Rural Classifications



Data Table

	Large central metro	Large fringe metro	Medium metro	Small metro	Micropolitan	Noncore
Pregnancy-related mortality ratio	15.9	14	17	18.6	21.8	26.1
Count	592	382	406	190	202	160

Scroll for additional info

Download Table Data (csv)

The graph above shows the pregnancy-related mortality ratios (PRMRs) by urban-rural classifications using the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties [PDF – 3 MB]. Data were geocoded using the Texas A&M Geoservices' Batch Geocoding . Metropolitan counties (i.e., large central, large fringe, medium, and small) can be considered urban, and micropolitan and noncore counties as rural. During 2017-2019, the PRMRs were:

- 15.9 deaths per 100,000 live births for persons living in large central metro counties.
- 14.0 deaths per 100,000 live births for persons living in large fringe metro counties.
- 17.0 deaths per 100,000 live births for persons living in medium metro counties.
- 18.6 deaths per 100,000 live births for persons living in small metro counties.
- 21.8 deaths per 100,000 live births for persons living in micropolitan counties.
- 26.1 deaths per 100,000 live births for persons living in noncore counties.

Urban-rural classification was missing or unknown for 2.4% of pregnancy-related deaths in 2017-2019.

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 (e.g., rural residents may face challenges such as distance from and lack of access to obstetric services and providers) including risk-appropriate care.[12-13]

Frequently Asked Questions

When did CDC start conducting national surveillance of pregnancy-related deaths?

CDC initiated national surveillance of pregnancy-related deaths in 1986 because more clinical information was needed to fill data gaps about causes of maternal death. The first year of data reporting was 1987.

How does PMSS define pregnancy-related deaths?

In PMSS, a pregnancy-related death is defined as the death of a woman while pregnant or within 1 year of the end of pregnancy regardless of the outcome, duration, or site of the pregnancy — from any cause related to or aggravated by the pregnancy or its management. Pregnancy-related deaths as defined in PMSS generally do not include deaths due to injury.

How do PMSS data differ from National Vital Statistics System (NVSS) data?

CDC's National Center for Health Statistics' National Vital Statistics System (NVSS) reports the national maternal mortality rate: the number of maternal deaths per 100,000 live births. A maternal death is defined as a death while pregnant or within 42 days of the end of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. This definition and timeframe are consistent with that used by the World Health Organization for reporting on maternal mortality rates. NVSS uses two pieces of information on the death record to identify maternal deaths — the pregnancy checkbox and the certified recording of the cause of death to assign maternal mortality ICD-10 codes. Identification of maternal deaths using automated processing of death records alone relies upon the death certifier accurately reporting causes of death related to pregnancy and pregnancy status. More information on NVSS maternal mortality coding is available.

Like NVSS, PMSS uses vital records for identification of deaths, including descriptions of causes of death and pregnancy status information on death records. Different from NVSS, PMSS further uses linkages of death records of women of reproductive age to birth and fetal death records within 1 year of the death, media searches, and reporting from public health agencies, health care providers and the public in the identification process. PMSS uses a time frame that includes deaths during pregnancy through 1 year after the end of pregnancy; this timeline allows evaluation of all deaths which might be pregnancy-related. In PMSS, deaths are reviewed by medical epidemiologists who perform an in-depth review of vital records and other data as available (e.g., medical records, autopsy reports) for each death to determine the pregnancy-related mortality ratio. These linkage and review processes by PMSS result in slower reporting than NVSS, but a more rigorous identification of deaths related to pregnancy.

How do PMSS data differ from Maternal Mortality Review Committee (MMRC) data?

Maternal Mortality Review is a process by which a multidisciplinary committee at the state or local-level identifies and reviews deaths that occur during or within 1 year of pregnancy. MMRCs have access to multiple sources of information that can provide a deeper understanding of the circumstances surrounding a death than PMSS is able. State and local MMRCs perform comprehensive reviews of deaths using information beyond what is available in vital records, including medical and non-medical data sources. MMRCs have the potential to get the most detailed, complete data on maternal mortality that then supports their ability to make specific recommendations for prevention. This also allows MMRCs to make determinations of pregnancy-relatedness on a broader set of deaths than is possible for PMSS, such as deaths due to injury.

How are PMSS data collected and coded?

Each year, CDC requests the 52 reporting areas (50 states, New York City, and Washington, DC) voluntarily send copies of death records for all women who died during pregnancy or within 1 year of pregnancy, linked live birth or fetal death records if applicable, and any additional data when available. All of the information obtained is summarized, and

medically-trained epidemiologists determine the cause of death and whether the death was pregnancy-related. Causes of death are coded based on a system first established in 1986 by the American College of Obstetricians and Gynecologists and the CDC Maternal Mortality Study Group.

How are PMSS data used?

Data are analyzed by CDC scientists. Information about causes of pregnancy-related deaths and risk factors associated with these deaths is released periodically through peer-reviewed literature, CDC's *Morbidity and Mortality Weekly Reports*, and the CDC website. These reports help clinicians and public health professionals to better understand the national trends and clinical causes of pregnancy-related deaths that can inform actions to prevent them.

How is PMSS data confidentiality protected?

Pregnancy Mortality Surveillance System data, including data received from reporting areas, are protected under 308(d) Assurance of Confidentiality. Because of this Assurance, all data and documents are considered confidential materials and are safeguarded to the greatest extent possible.

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