

# Maternal Mortality Part 3

## *The Pregnancy Related Mortality Surveillance System & The Role of Autopsies*

# Pregnancy Mortality Surveillance System



Maternal Mortality Prevention



## 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 is included in PMSS.

### How are PMSS data collected and coded?

CDC requests the 53 reporting areas (50 states, Puerto Rico, New York City, Washington, DC) voluntarily send copies of death records for all women who died during or within 1 year of the end 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 medical 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 support the interpretation and uptake of information among clinicians and public health practitioners.



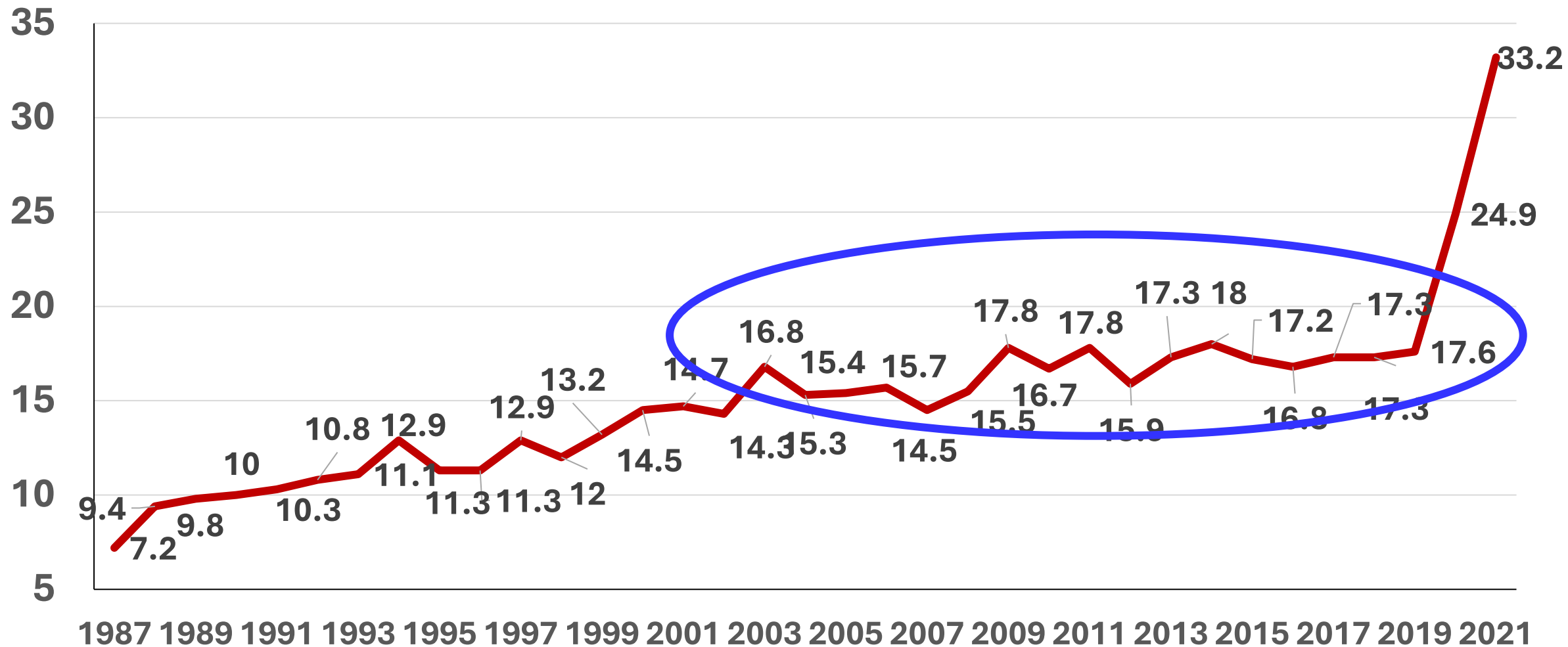
# Data for CDCs Pregnancy Related Mortality System

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# Our best existing measure

## Pregnancy Related Mortality, U.S., 1987-2021

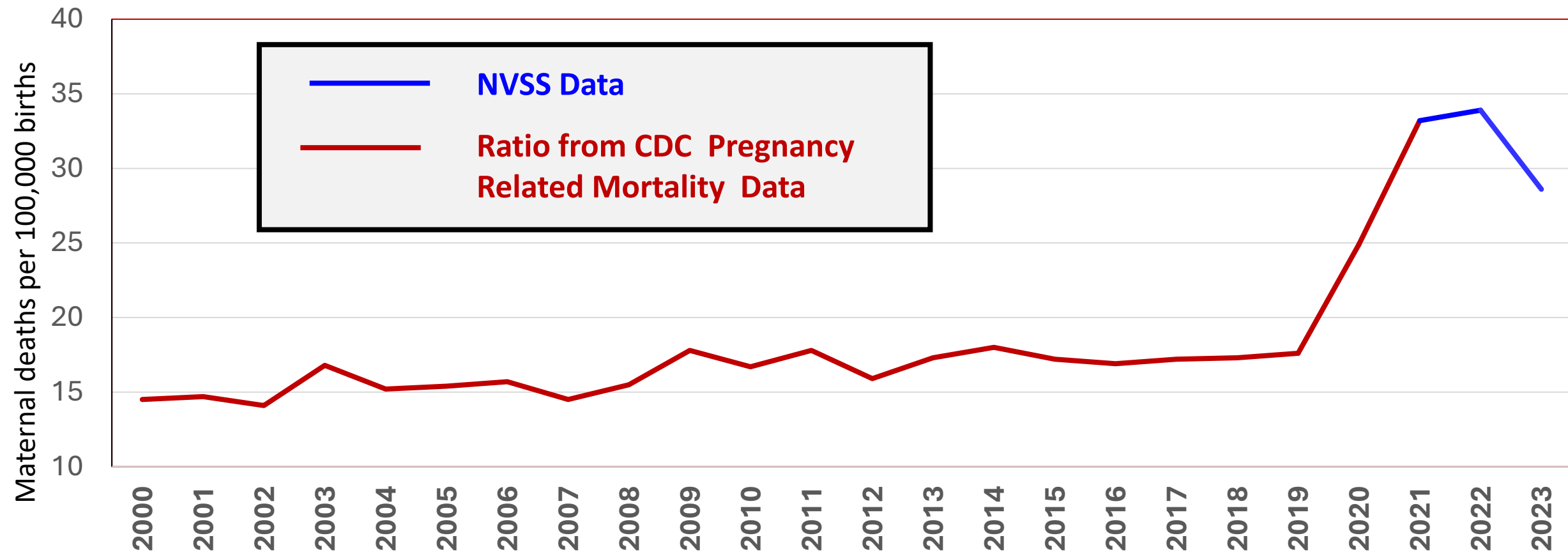
Pregnancy Related Mortality Ratio (per 100,000 births)



Source: CDC. <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm>



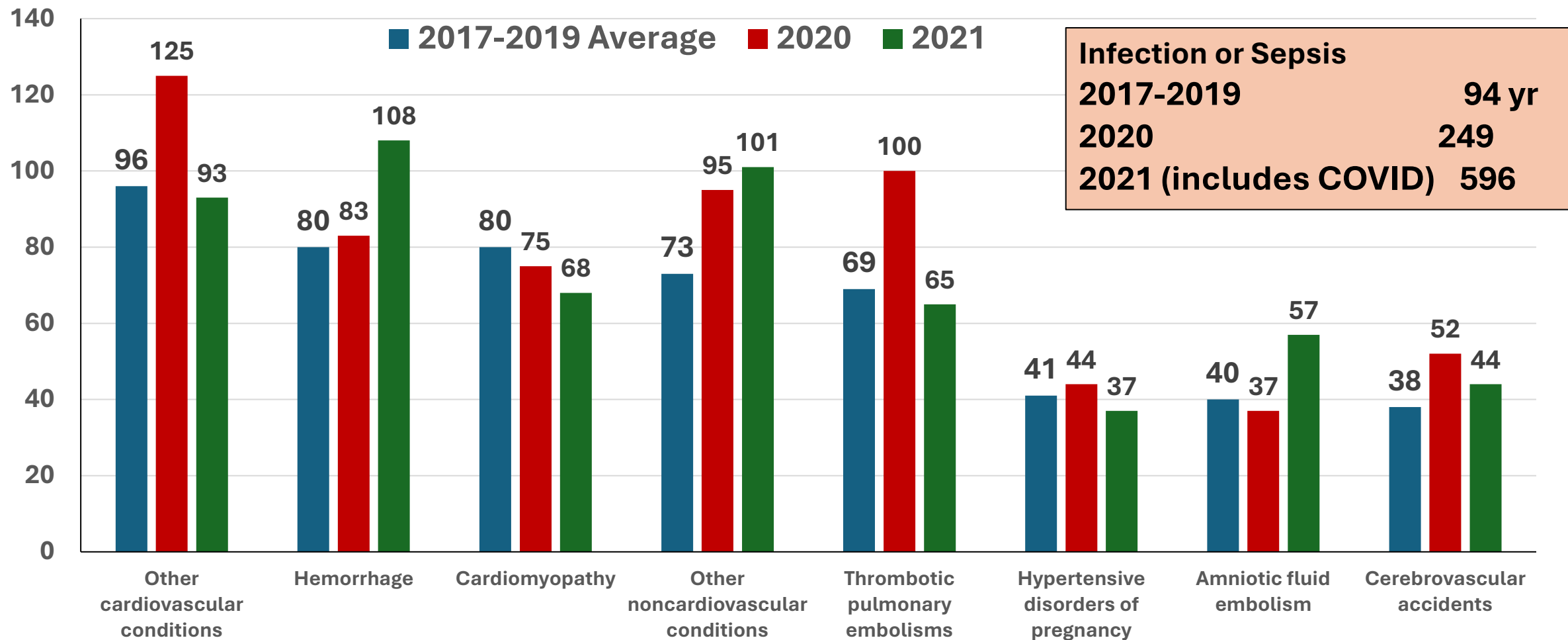
# ***U.S. Pregnancy Related Mortality Ratio (per 100K births), 2000-2023***



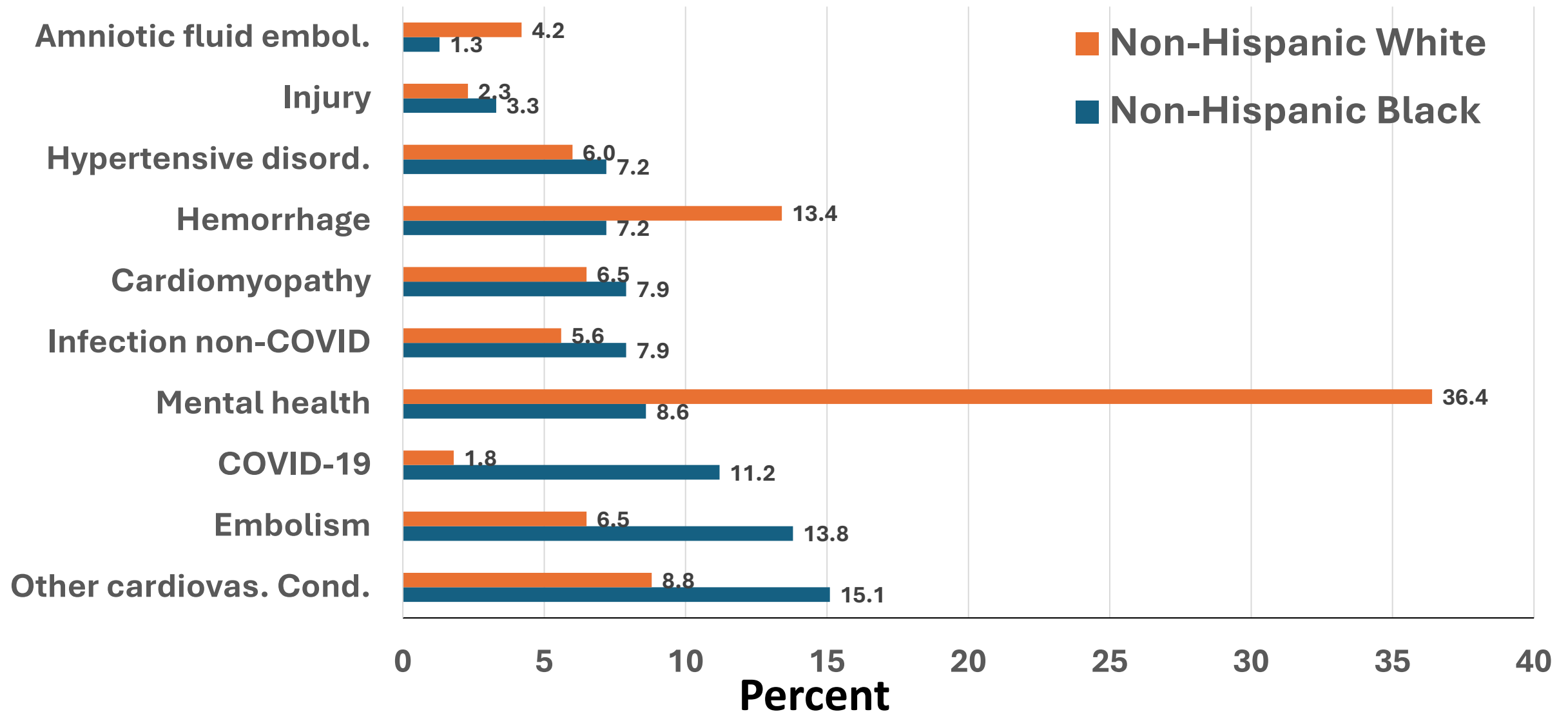
Source: 2000-2020 – Rate estimated from CDC Pregnancy Related Mortality Surveillance System; Includes deaths during pregnancy to 1 year postpartum; 2021-2023 – Rate from National Vital Statistics System data & CDC Wonder Mortality File.

# Infection and Cardiac related Conditions Continue the Leading causes of maternal Deaths in the U.S. 2017-19 & 2020 & 2021

Number of Pregnancy Related Deaths



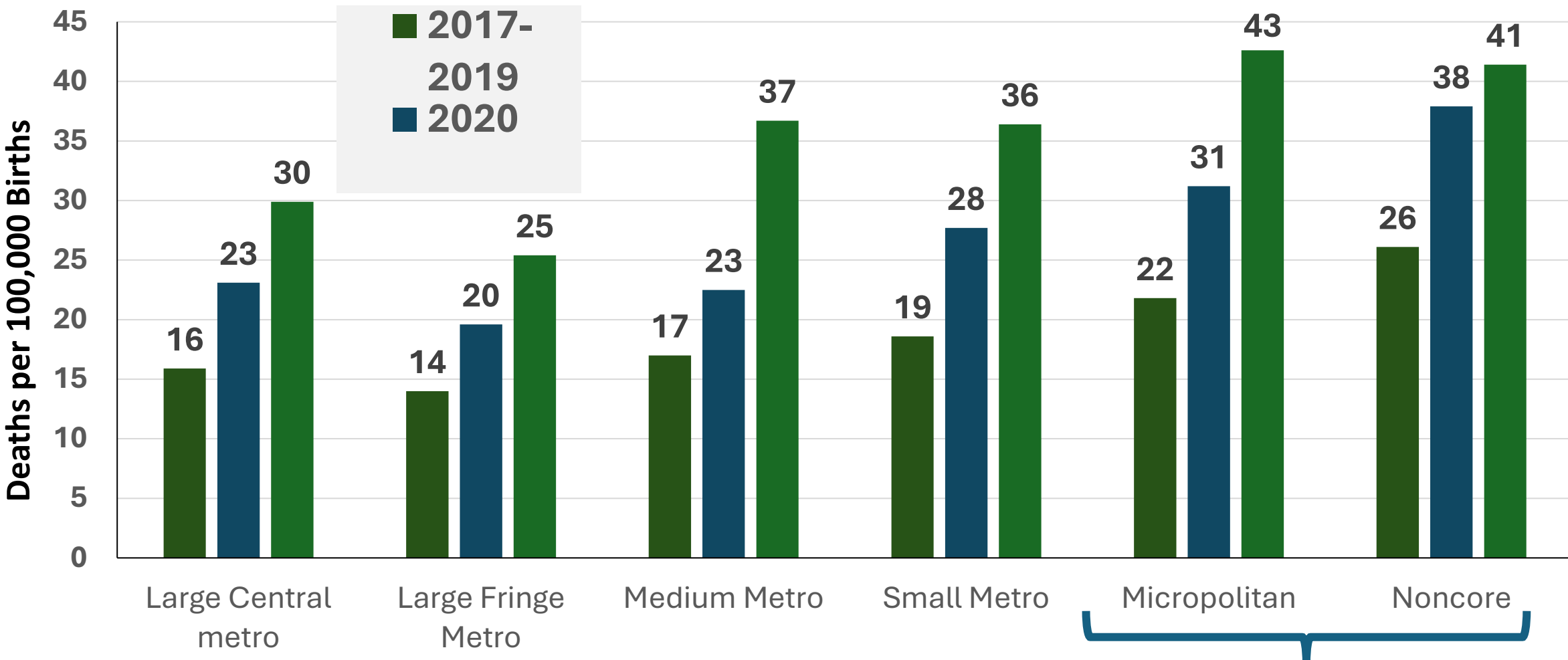
# Underlying Causes of Pregnancy Related Deaths by Race, Maternal Mortality Review Committees, 38 U.S. States, 2020



Source: Trost SL, Busacker A, Leonard M, et al. Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees in 38 U.S. States, 2020. CDC, U.S. DHHS; 2024. <https://www.cdc.gov/maternal-mortality/php/data-research/index.html#:~:text=Data%20on%20525%20pregnancy%2Drelated,Non%2DHispanic%20Black>



# Pregnancy-related mortality ratio by urban-rural classifications: 2017-19, 2020, 2021



Source: CDC Website. [https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm#:~:text=The%20Pregnancy%20Mortality%20Surveillance%20System%20\(PMSS\)%20defines%20a%20pregnancy%2D,or%20aggravated%20by%20the%20pregnancy.e](https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm#:~:text=The%20Pregnancy%20Mortality%20Surveillance%20System%20(PMSS)%20defines%20a%20pregnancy%2D,or%20aggravated%20by%20the%20pregnancy.e)

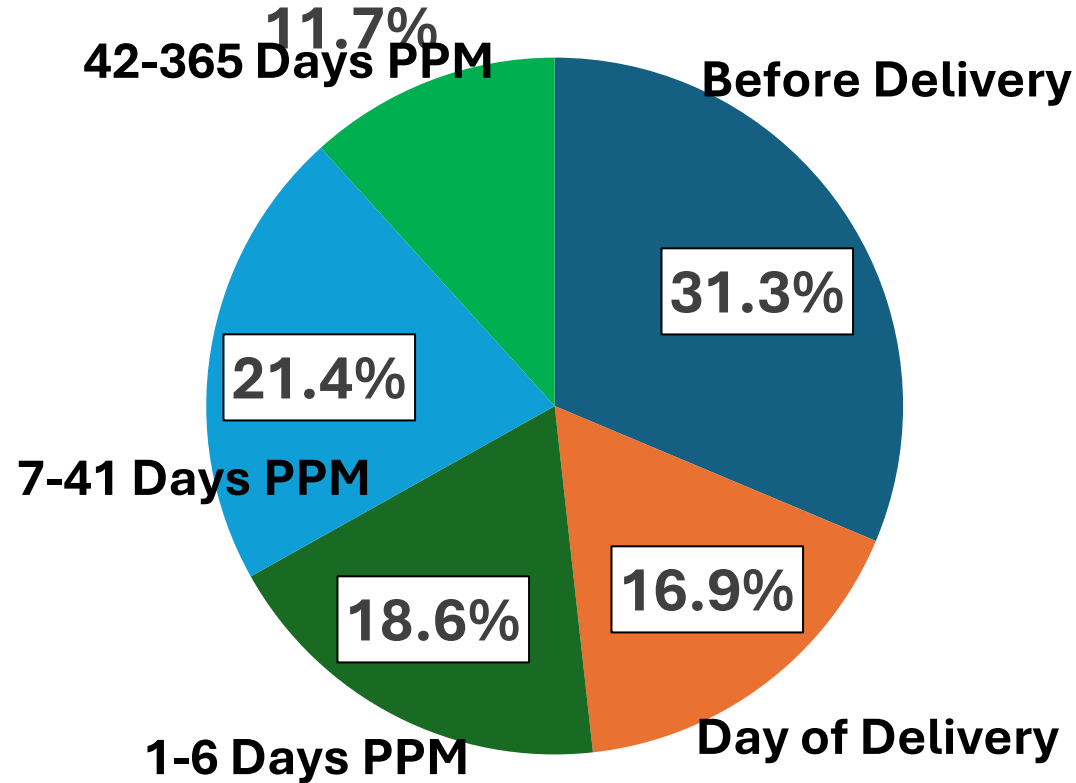
Rural



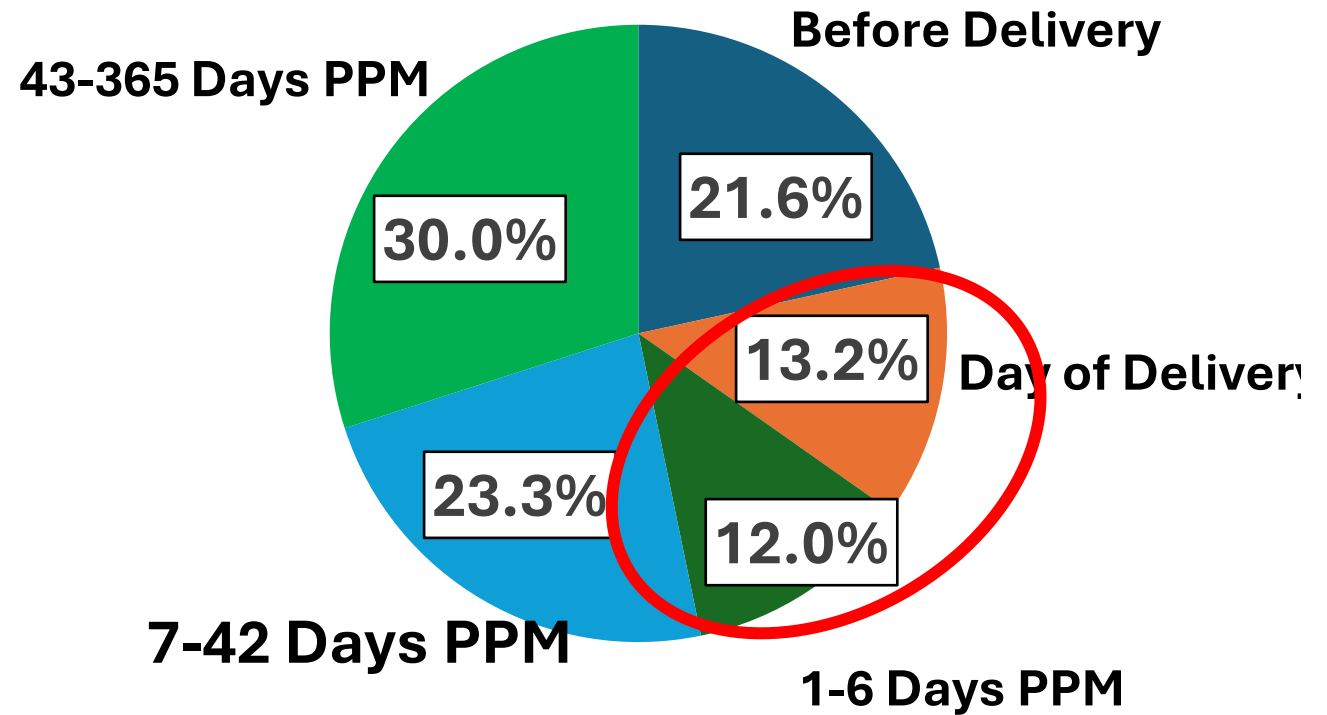


# Documenting the Timing of Maternal Deaths

## (2011-2015)



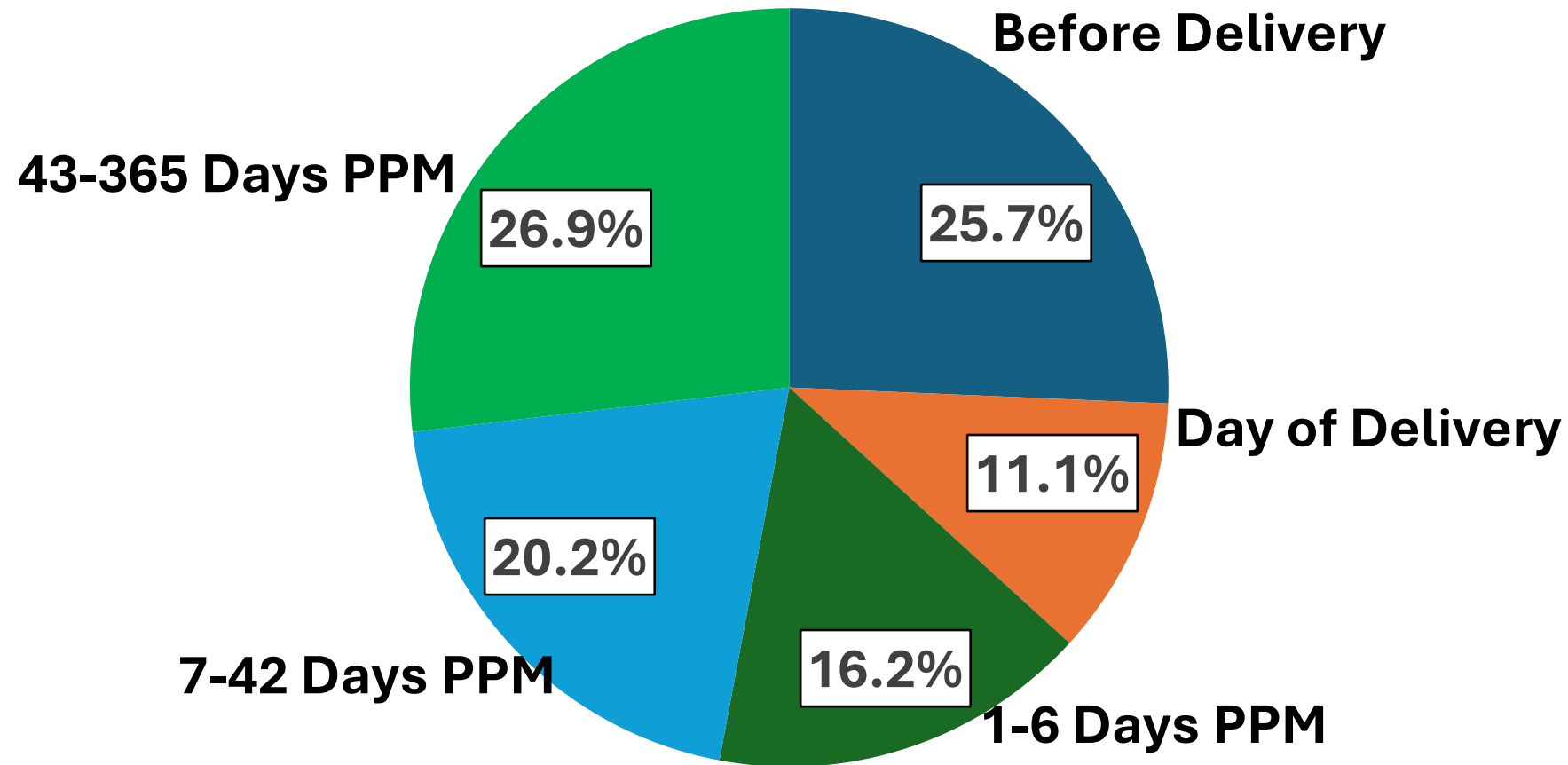
## (2017-19)



Sources: **2011-2015**: Petersen E. et al. Vital Signs: Pregnancy-Related Deaths, United States, 2011–2015, and Strategies for Prevention, 13 States, 2013–2017. *MMWR* .vol.68. May 7, 2019. 1-7; **2017-2019**: Trost SL, Beauregard J, Njie F, et al. *Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees in 36 US States, 2017–2019*. Atlanta, GA: CDC, US DHHS; 2022.



# Timing of Maternal Deaths (2020)





# Comparing Data from the CDC Pregnancy Related Mortality Surveillance to the National Vital Statistic System Data

NATIONAL CENTER FOR HEALTH STATISTICS

# Health E-Stats

MAY  
2024

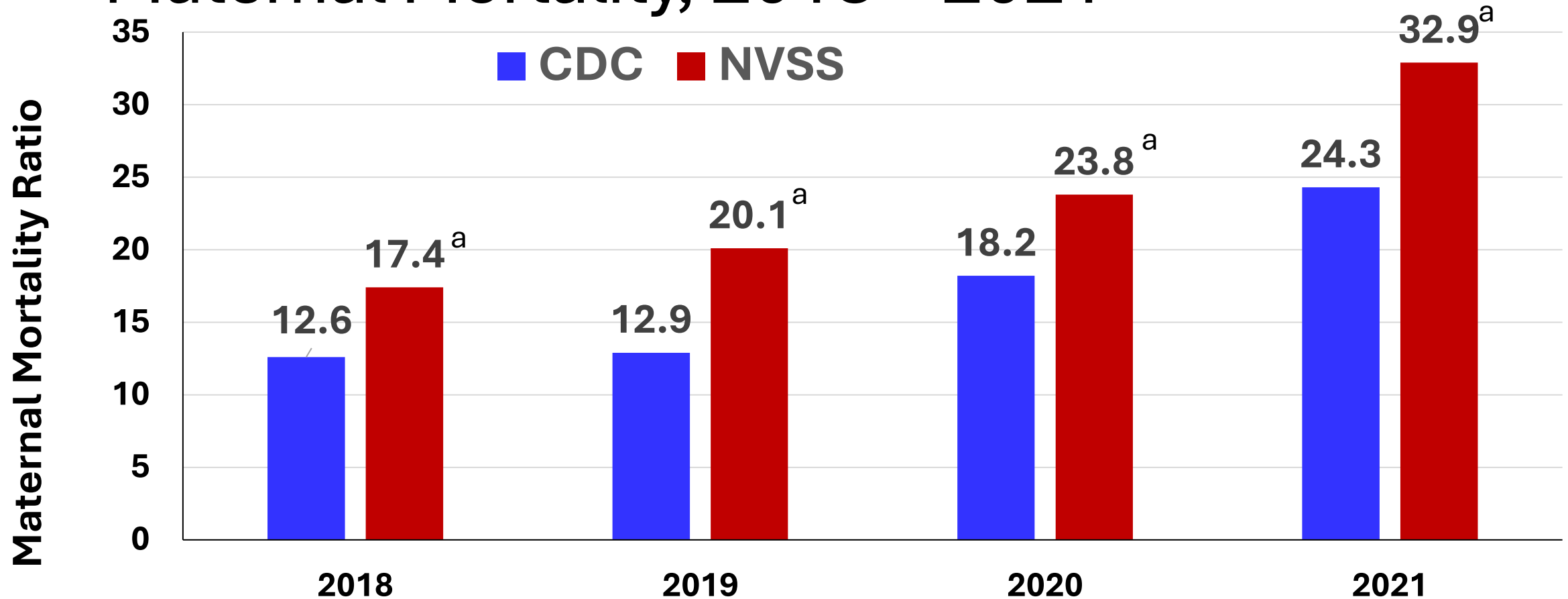
## Maternal Mortality Rates in the United States, 2022

by Donna L. Hoyert, Ph.D.

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This report presents maternal mortality rates for 2022 based on data from the National Vital Statistics System. A maternal death is defined by the World Health Organization as “the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes” (1). Maternal mortality rates—the number of maternal deaths per 100,000 live births—are shown in this report by age group and race and Hispanic origin.

# Comparing CDC & NVSS Estimates of U.S. Maternal Mortality, 2018 – 2021



**NVSS** – National Vital Statistics System; **CDC** – Pregnancy Mortality Surveillance System

a. Based on the reported pregnancy related rate limited to 42 days postpartum. Figure adjusted based on CDC report estimating 73.1% of maternal deaths occurring during pregnancy and up to 42 days postpartum.

Sources: NVSS Hoyert. Maternal mortality rates in the United States, 2021. NCHS Health E-Stats. 2023; CDC: adapted from <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm> .

# U.S. Maternal Mortality in Different Measurement Systems

	U.S. National Comparisons		
	National Vital Statistics System (NVSS)2021	CDC's Pregnancy Related Mortality Surveillance System (PMSS)	% NVSS Higher
<b>Maternal Mortality</b>			
2018	17.4	12.6 <sup>a</sup>	38.1%
2019	20.1	12.9 <sup>a</sup>	55.8%
2020	23.8	18.2 <sup>a</sup>	30.8%
2021	32.9	24.3 <sup>a</sup>	35.4%
<b>Pregnancy Related Mortality</b>			
2018	24.7 <sup>b</sup>	17.3	42.8%
2019	28.7 <sup>b</sup>	17.6	63.1%
2020	35.1 <sup>b</sup>	24.9	41.0%
2021	45.5 <sup>b</sup>	33.2	37.0%

a. Based on the reported pregnancy related rate limited to 42 days postpartum. Figure adjusted based on CDC report estimating 70% of maternal deaths occurring during pregnancy and up to 42 days postpartum.

b. Includes additional cases with O96 code which adds death from any obstetric cause occurring more than 42 days but less than one year after delivery.

Source: Updated from Measuring Maternal Mortality. JAMA. 2023

# U.S. Maternal Mortality in Different Measurement Systems

	State Comparisons of Maternal Deaths through 1 year Postpartum <sup>a</sup>		
	National Vital Statistics System	State Maternal Mortality Review Committees <sup>b</sup>	% NVSS Higher
	<b>Florida</b>		
<b>2018-2020</b>	27.8	18.9	47.0%
	<b>Georgia</b>		
<b>2018-2020</b>	45.9	30.1	52.5%
	<b>Indiana</b>		
<b>2018-2020</b>	36.9	17.8	107.4 %
	<b>Louisiana</b>		
<b>2018-2019</b>	39.6	24.5	61.6%
	<b>Maryland</b>		
<b>2018</b>	23.9	25.3	-5.5%
	<b>Missouri</b>		
<b>2018-2019</b>	27.5	24.8	10.9%
	<b>New York</b>		
<b>2018</b>	28.7	18.2	57.7%
	<b>Tennessee</b>		
<b>2018-2020</b>	44.6	37.9	17.7%

a. PMSS state rates are not presented for comparison because CDC cannot, based on contracts with the states to supply their data to CDC, publish specific state rates.

b. Rates drawn from state MMRC reports from states averaging at least 50,000 births annually and which published reports that included data on the years 2018, 2019 or 2020. To stabilize estimates, when available multiple years were combined.

Source: Measuring Maternal Mortality. JAMA.

# Summary

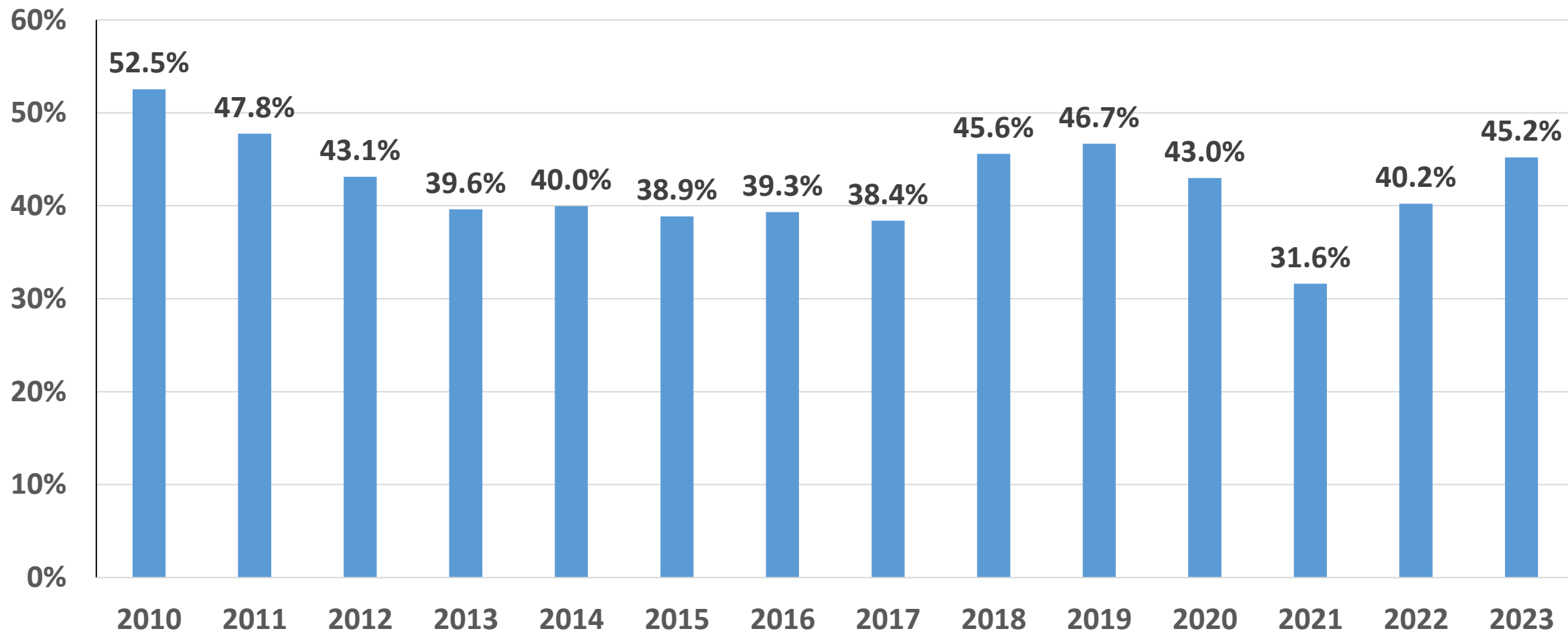
- The Pregnancy Related Maternal Mortality System provides a reasonable alternative to the National Vital Statistics Syst.(NVSS) & it documented a steady increase in maternal deaths, 1987 to 2005.
- It has also shown a plateauing of the ratio from 2008-2019, though the difference between the two ratios in recent years has increased.
- The question is whether that plateauing is at an acceptable level and for that we need to place the U.S. in a comparative context.
- The resumption of the official reporting shows a rapid increase from 2018-2021, largely the result of the COVID pandemic. The PMSS showed a larger relative increase in the mortality rate 2020-2021 than the NVSS did.



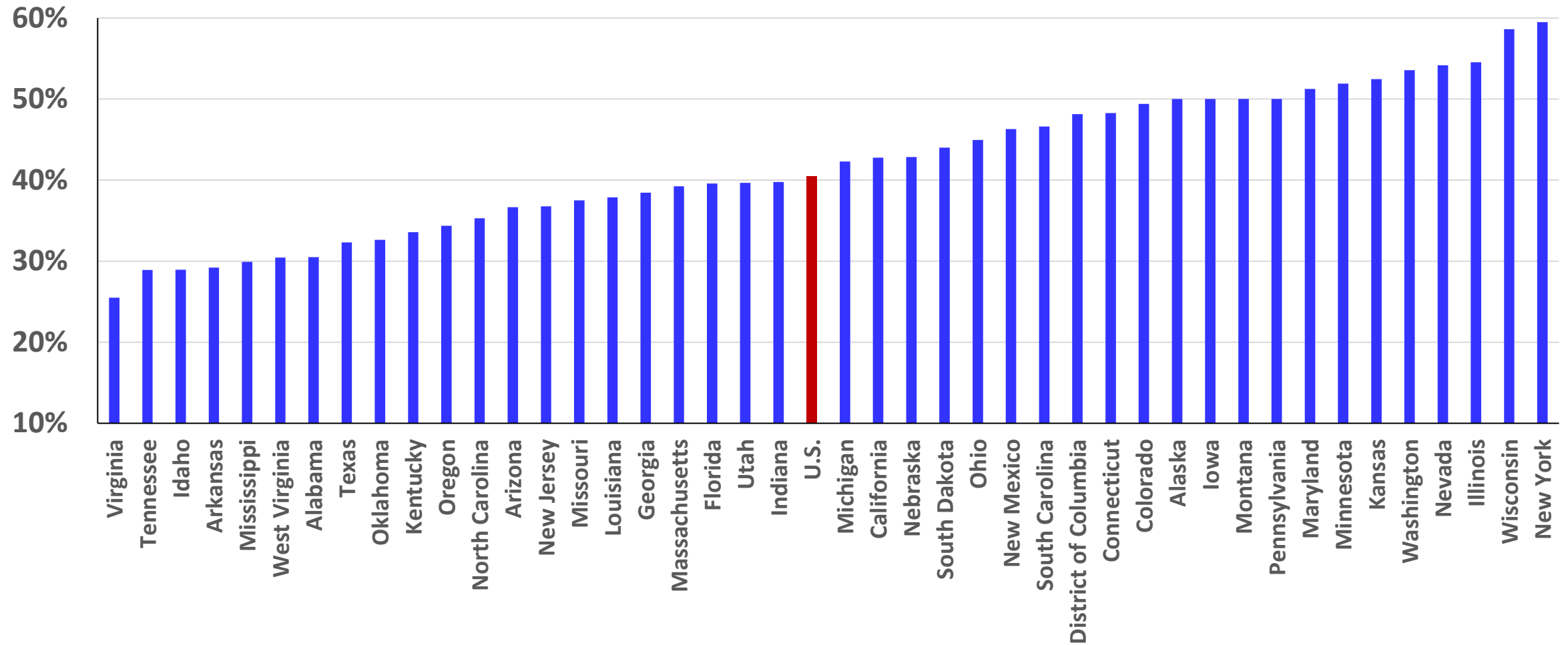
**Are more autopsies the solution?**

# Rate of Autopsies in Maternal Deaths

*In national death certificate data from 2018-2023, only 40.5% of maternal deaths involved an autopsy*



# Rate of Autopsies in Pregnancy Related\* Deaths by State^ 2018-2023



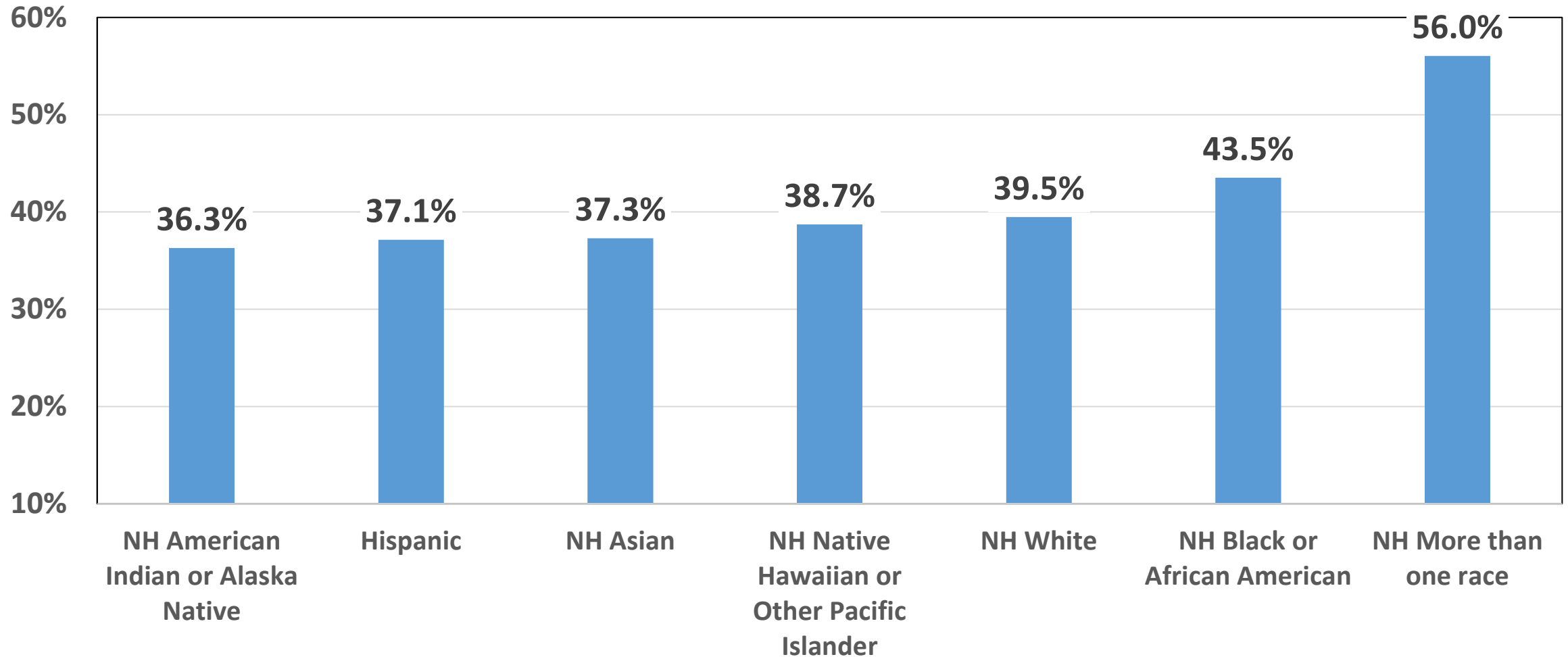
\* Deaths during pregnancy through 1 year postpartum.

^ States with at least 10 autopsies 2018-2022.

Source: CDC Wonder Mortality File

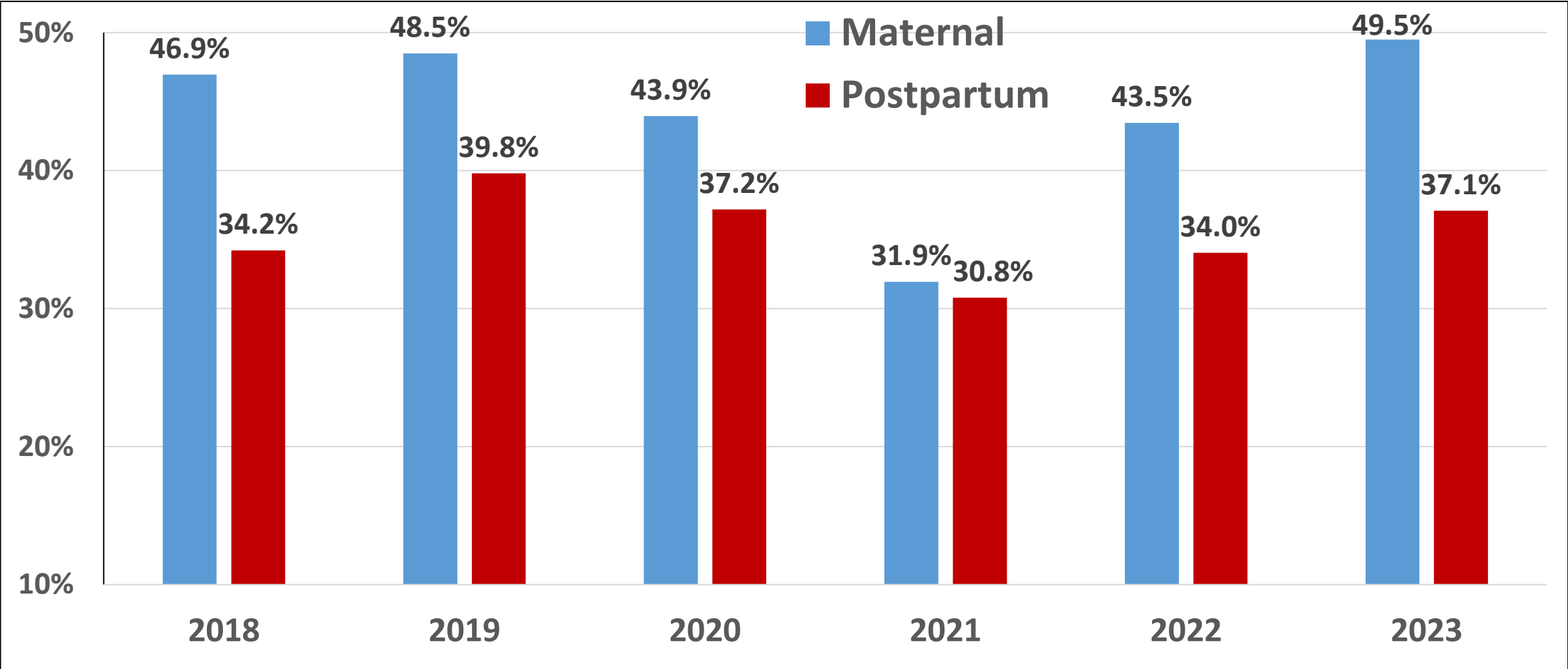
[www.birthbythenumbers.org](http://www.birthbythenumbers.org)

# Rate of Autopsies in Pregnancy Related\* Deaths by Race/Ethnicity, 2018-2023



\* Deaths during pregnancy through 1 year postpartum. NH-non-Hispanic

# Rate of Autopsies in Maternal and Postpartum Deaths, 2018-2023

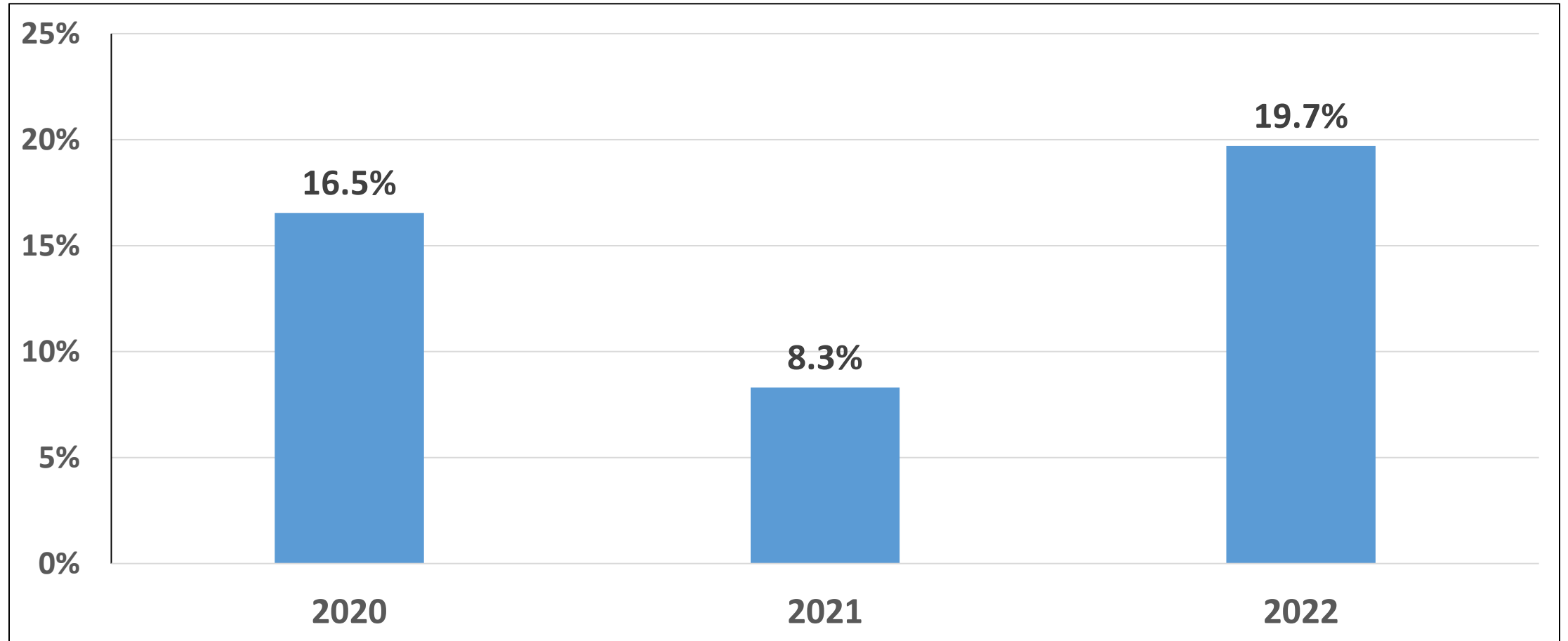


- Maternal Deaths during pregnancy through 42 days postpartum.
- Postpartum – Deaths between 43-365 days

Source: CDC Wonder Mortality File

[www.birthbythenumbers.org](http://www.birthbythenumbers.org)

# Rate of Autopsies in Pregnancy Related\* Deaths with COVID code, 2020-2022



\* Deaths during pregnancy through 1 year postpartum. NH-non-Hispanic

# Summary

- *It's not clear how reliable the publicly available data on the rate of autopsies performed is. It's presented for background and context.*
- *The autopsy data shows wide variation across states in autopsy rates in maternal deaths, but not so much variation by race/ethnicity or overtime.*
- *The reported autopsy data calls for a much more extensive review.*