

Understanding What's Real and Not Real in the Current Debate Over U.S. Maternal Mortality

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www.birthbythenumbers.org

Reducing Maternal Mortality Conference
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Versailles, Kentucky
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Outline of the Presentation

- 1. Clarifying Definitions & Historical Context**
- 2. Measuring Maternal Mortality**
- 3. Comparing the U.S. to the Rest of the World**
- 4. The Persistence of Racial Disparities**
- 5. Maternal Mortality as a Public Health Problem**
- 6. Midwifery and Maternal Mortality**



The three widely used definitions of maternal mortality:

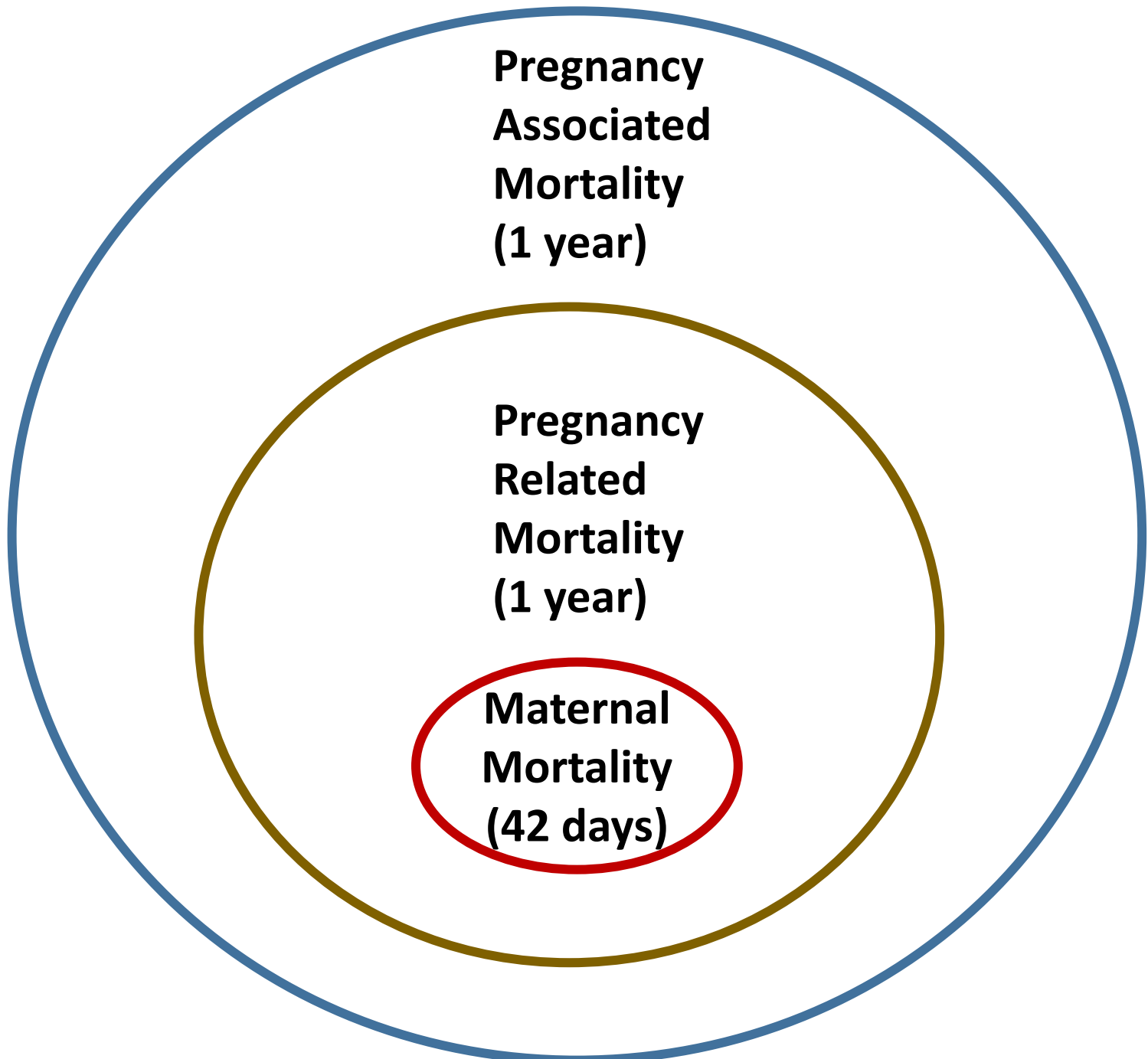
1. Pregnancy associated death

2. Pregnancy related death

3 Maternal mortality

Three Definitions (in the U.S.)

- **Pregnancy Associated Death** – The death of a woman while pregnant or *within one year* of termination of pregnancy, *irrespective of cause*. (*WHO calls these “pregnancy related”*). *Starting point for analyses*.
- **Pregnancy Related Death** – the death of a woman 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 CDC for U.S. trends*.
- **Maternal Mortality Ratio** – the death of a woman *while pregnant or within 42 days of termination 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. Typically reported as a ratio per 100,000 births. *Used in international comparisons*.



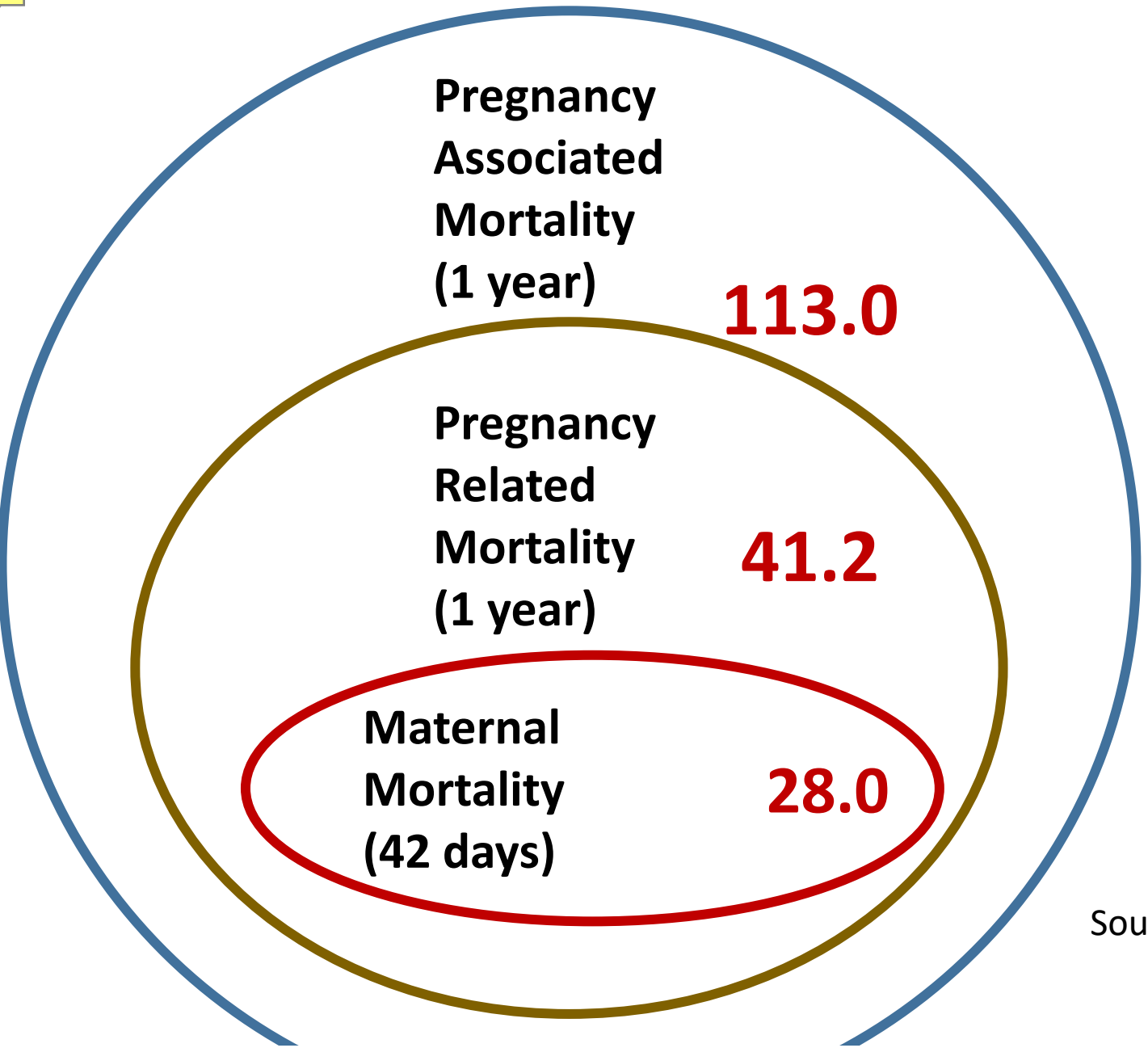
Pregnancy Associated Mortality: Deaths during pregnancy and up to **1 year postpartum**

Pregnancy Related Mortality: Deaths during pregnancy and up to **1 year postpartum & related to the pregnancy**

Maternal Mortality: Deaths during pregnancy and up to **42 days postpartum & related to the pregnancy**



Illustrating the Differences in Measures of Maternal Death: Same State (Tennessee); Same Years; 4 different results.



Using NVSS Data on Tenn.
Maternal Mortality for 2017-2021:
167 Deaths; 402,623 births
Rate – **41.5/100,000**

Sources: *Maternal Mortality in Tennessee 2021* & NVSS.



3 Different U.S. Sources & Different Measures

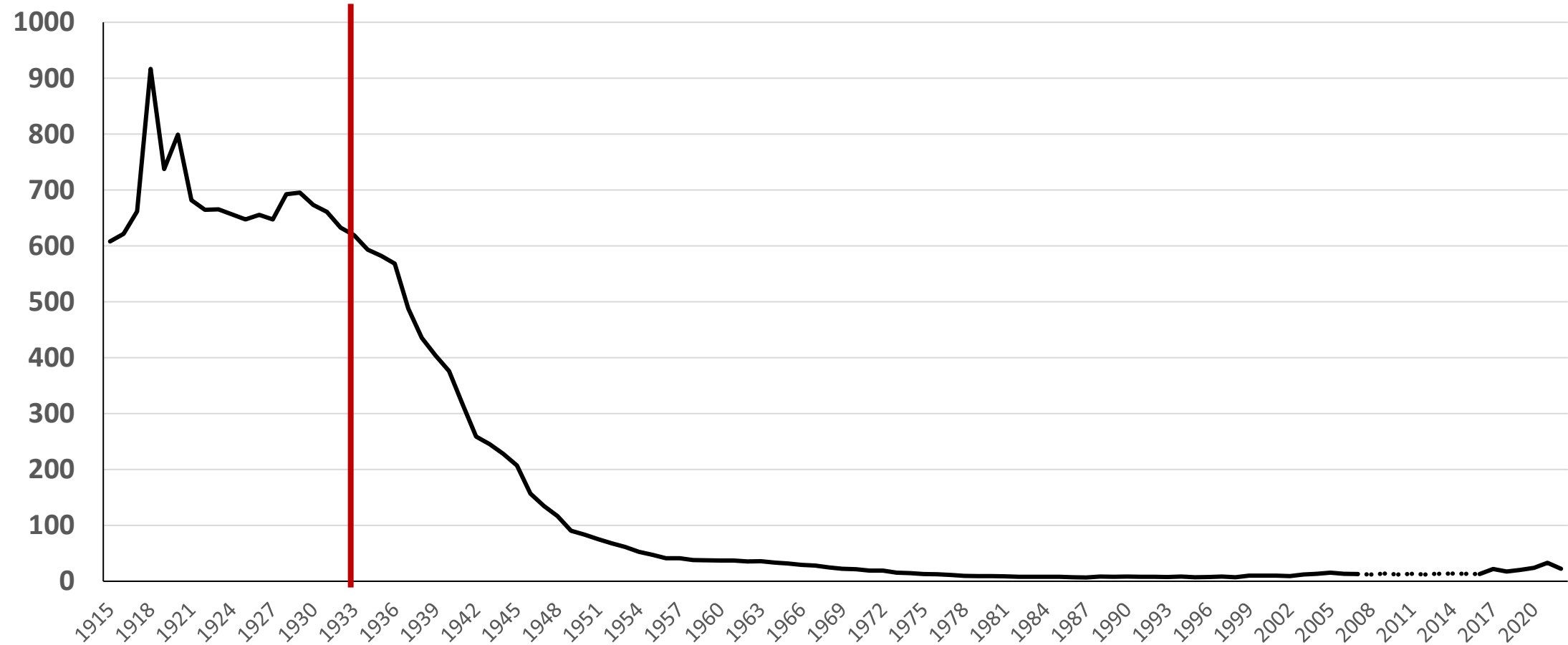
- **U.S. National Vital Stat. System** – Maternal Mortality
- **CDC Pregnancy Related Mortality System** – Pregnancy Related Mortality
- **State Maternal Mortality Review Committees** – Pregnancy Associated, Pregnancy Related & Maternal Mortality depending on states, but primarily Pregnancy Related Mortality

Measuring US Maternal Mortality – 3 Surveillance Systems

	CDC – National Vital Statistics System (NVSS)	CDC – Pregnancy Mortality Surveillance System (PMSS)	State and Local Maternal Mortality Review Committees (MMRCs)
Data Source	Death certificates	Death certificates linked to fetal death and birth certificates	Death certificates linked to fetal death and birth certificates, medical records, social service records, autopsy, informant interviews, etc.
Time Frame	During pregnancy – 42 days	During pregnancy – 365 days	During pregnancy – 365 days
Source of Classification	ICD-10 codes	Medical epidemiologists	Multidisciplinary committees
Terms	Maternal death	Pregnancy associated, (Associated and) Pregnancy related, (Associated but) Not pregnancy related	Pregnancy associated, (Associated and) Pregnancy related, (Associated but) Not pregnancy related
Measure	Maternal Mortality Rate - # of Maternal Deaths per 100,000 live births	Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births	Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births
Purpose	Show national trends and provide a basis for international comparison	Analyze clinical factors associated with deaths, publish information that may lead to prevention strategies	Understand medical and non-medical contributors to deaths, prioritize interventions that effectively reduce maternal deaths

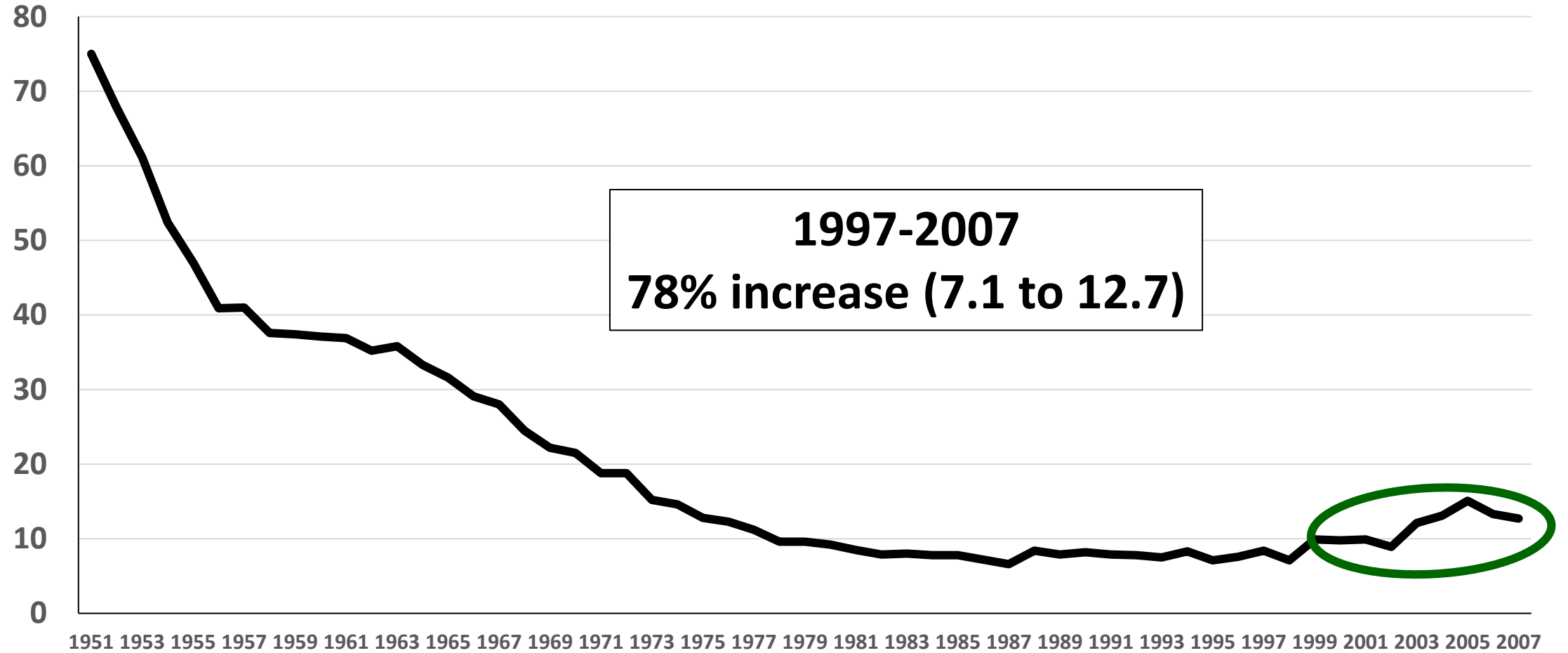
**U.S. Maternal Mortality in
Historic and Comparative
Context –
How do we Compare to the
Rest of the World?**

U.S. Maternal Mortality (per 100,000 births), 1915-2022



Sources: NCHS. Maternal Mortality and Related Concepts. Vital & Health Statistics. Series 33; #3. & annual data reports. 1915-1960 data from NCHS. *Vital Statistics Rates In The United States 1940-1960*. NOTE: Shifts in measurement (e.g. not all states were part of registration system prior to 1933) accounts for some of the variation over time. 2007-2016 based on 2 year estimates of the pregnancy related mortality rate: Petersen E. *MMWR*.9/6/19; 2017: Rossen. *Impact of Pregnancy Checkbox, U.S.* 1999-2017.NCHS.VitalHlthStat.3(44);2020.; 2018: U.S. Hoyert DL Health E-Stat.Hyattsville, MD: NCHS. 2/2022; CDC Wonder Mortality File.

U.S. Maternal Mortality (per 100,000 live births), 1951-2007

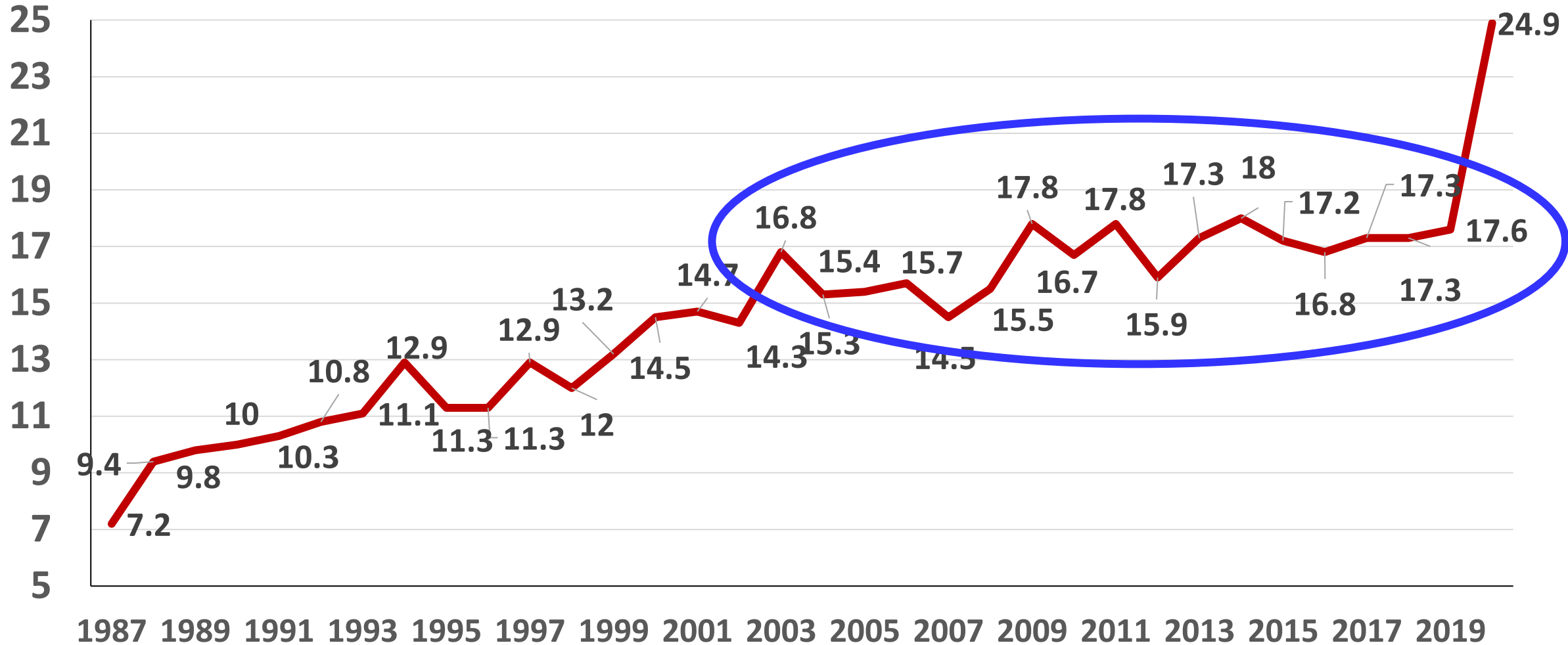


Source: NCHS. Deaths: Final Data. Annual Reports.

Our best existing measure

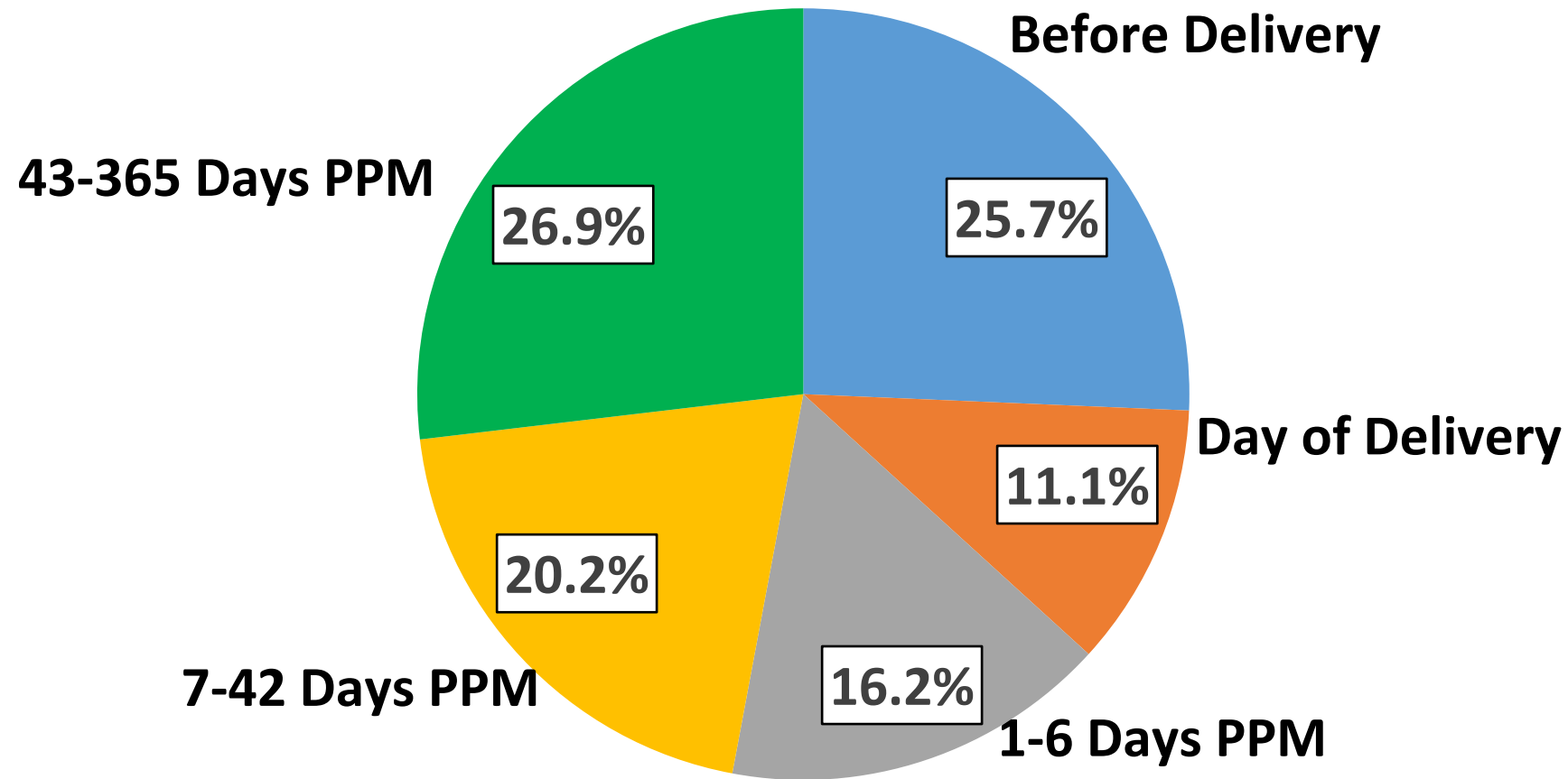
Pregnancy Related Mortality*, U.S., 1987-2020

Pregnancy Related Mortality Ratio (per 100,000 births)



* Deaths during pregnancy and up to 1 year postpartum.

Timing of Maternal Deaths (2020)



NATIONAL CENTER FOR HEALTH STATISTICS

Health E-Stats

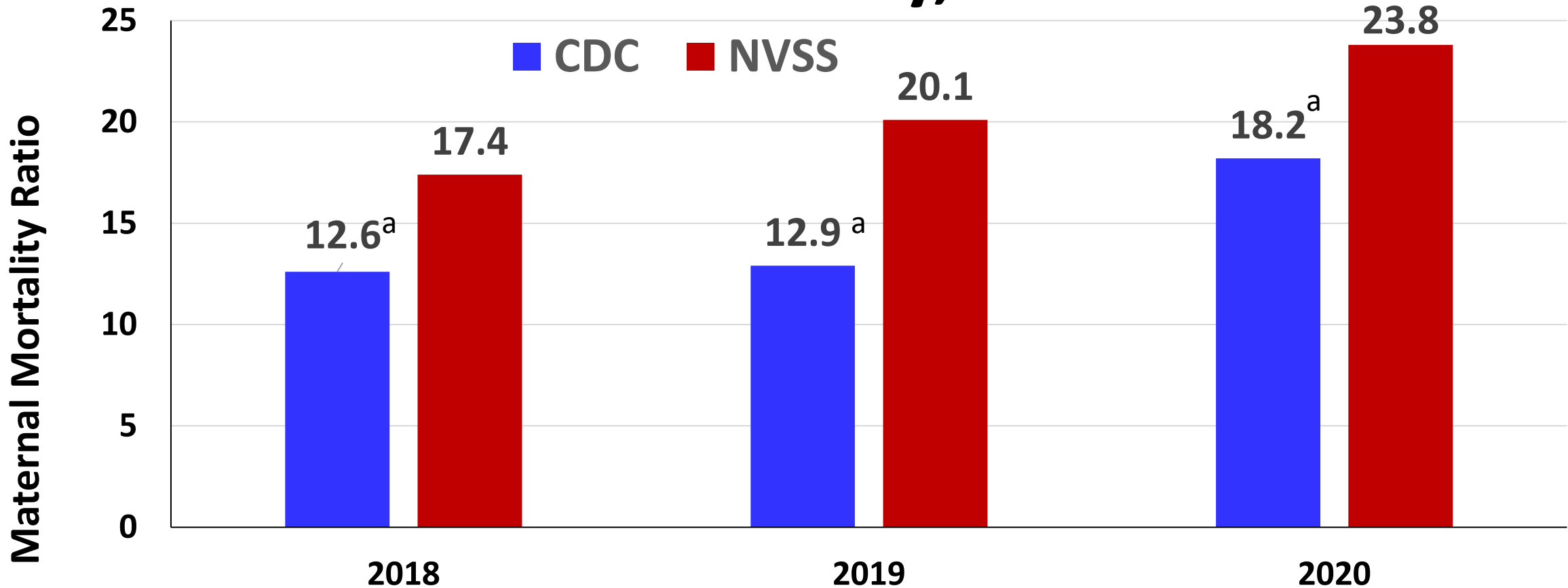
MAY
2024

Maternal Mortality Rates in the United States, 2022

by Donna L. Hoyert, Ph.D.

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 – 2020



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> .

Comparing Maternal Mortality in NVSS data and State MMRCs

	State Comparisons of Maternal Deaths through 1 year Postpartum ^a		
	National Vital Statistics System	State Maternal Mortality Review Committees ^b	% NVSS Higher
	Florida		
2018-2020	27.8	18.9	47.0%
	Georgia		
2018-2020	45.9	30.1	52.5%
	Indiana		
2018-2020	36.9	17.8	107.4 %
	Louisiana		
2018-2019	39.6	24.5	61.6%
	Maryland		
2018	23.9	25.3	-5.5%
	Missouri		
2018-2019	27.5	24.8	10.9%
	New York		
2018	28.7	18.2	57.7%
	Tennessee		
2018-2020	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*. 2023

What Do We Really Know About the Maternal-Mortality Crisis?

How a measurement change fueled a crisis narrative

The Atlantic

AUGUST 6, 2024

Three different measurement systems – does that mean the poor ranking of the U.S. is a measurement artifact?



U.S. in a Comparative Context, 1910, 1927, 2020

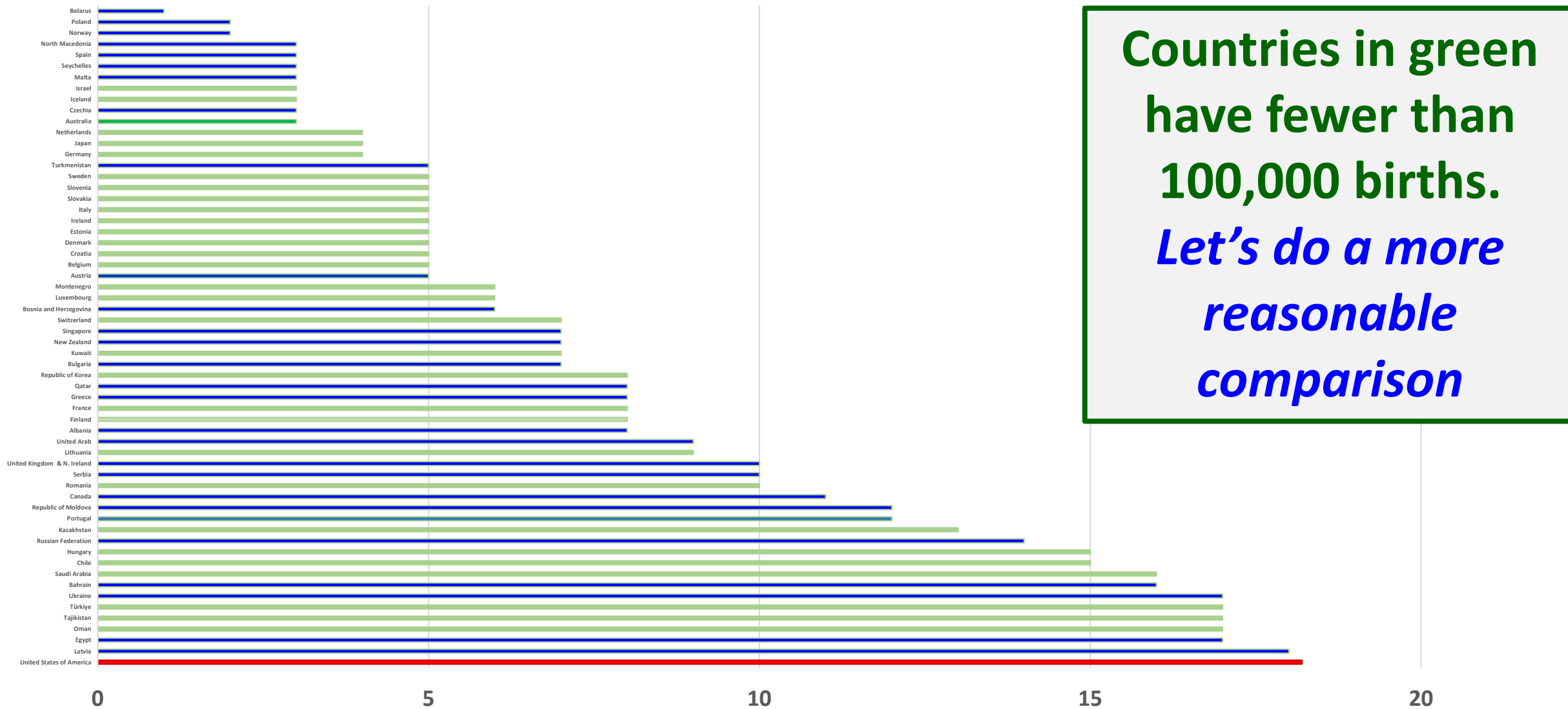
	1901-1910 ¹	1927 ²	2020 ³
	per 100K births	per 100K births	per 100K births
Norway	290	245	2
Australia	530	592	3
Italy	270	264	5
Sweden	230	278	5
Northern Ireland	550	480	5
New Zealand	460	491	7
France	520	287	8
England & Wales ⁴	410	411	10
United States ⁵	650	647	24

Sources & Notes:

1. Meigs. *Maternal Mortality in U.S. & other countries*. 1917; 2. Tandy. *Comparability of Maternal Mortality Rates in the United States and Certain Foreign Countries*. 1933; 3. WHO. *Trends in Maternal Mortality, 2000-2020*; 4. UK rate in 2020; 5. Based on 10 reporting areas (CT,ME,MA,MI,NH,PN,RI,VT,NYC, DC) in 1910 & about 90% of all births in 1927.

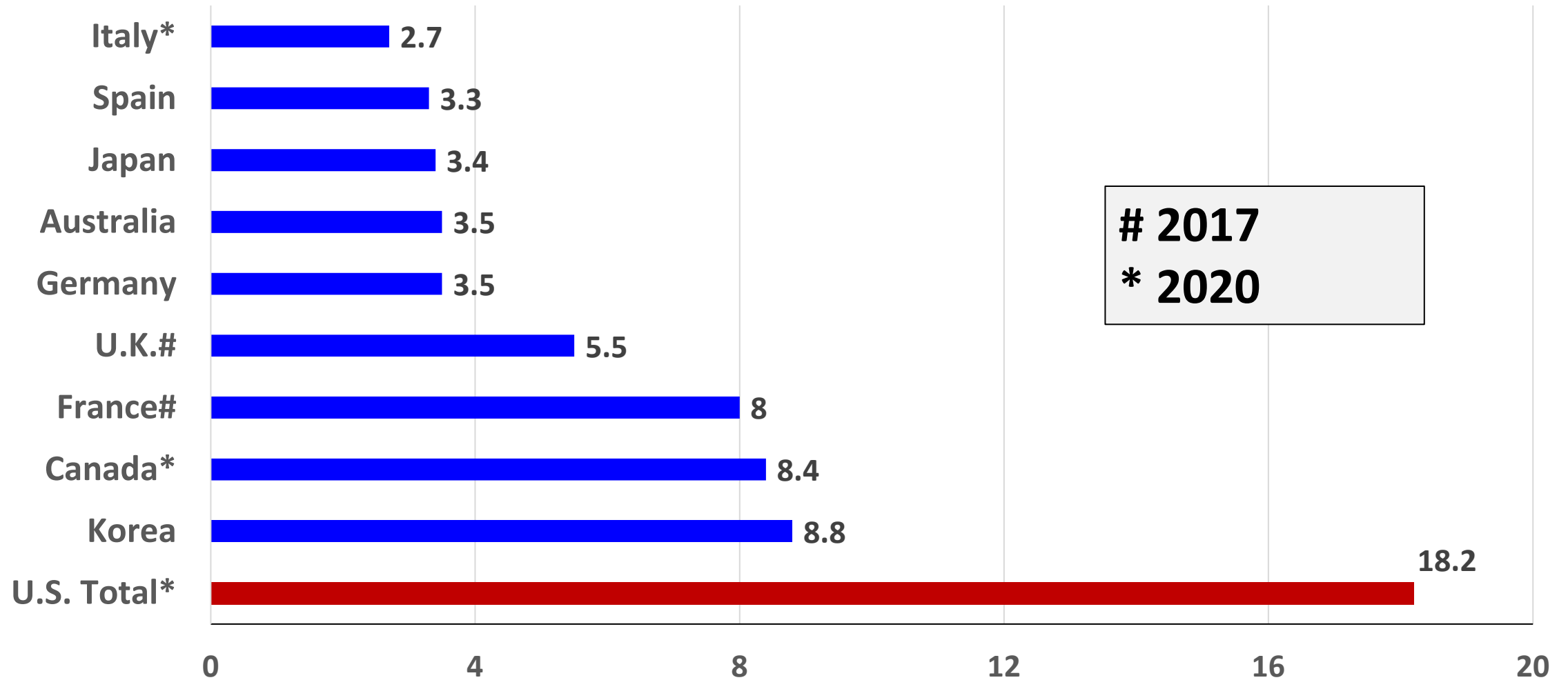
Maternal Mortality Ratios (per 100,000 births), 2020

Using the most conservative measure we have of U.S. maternal mortality

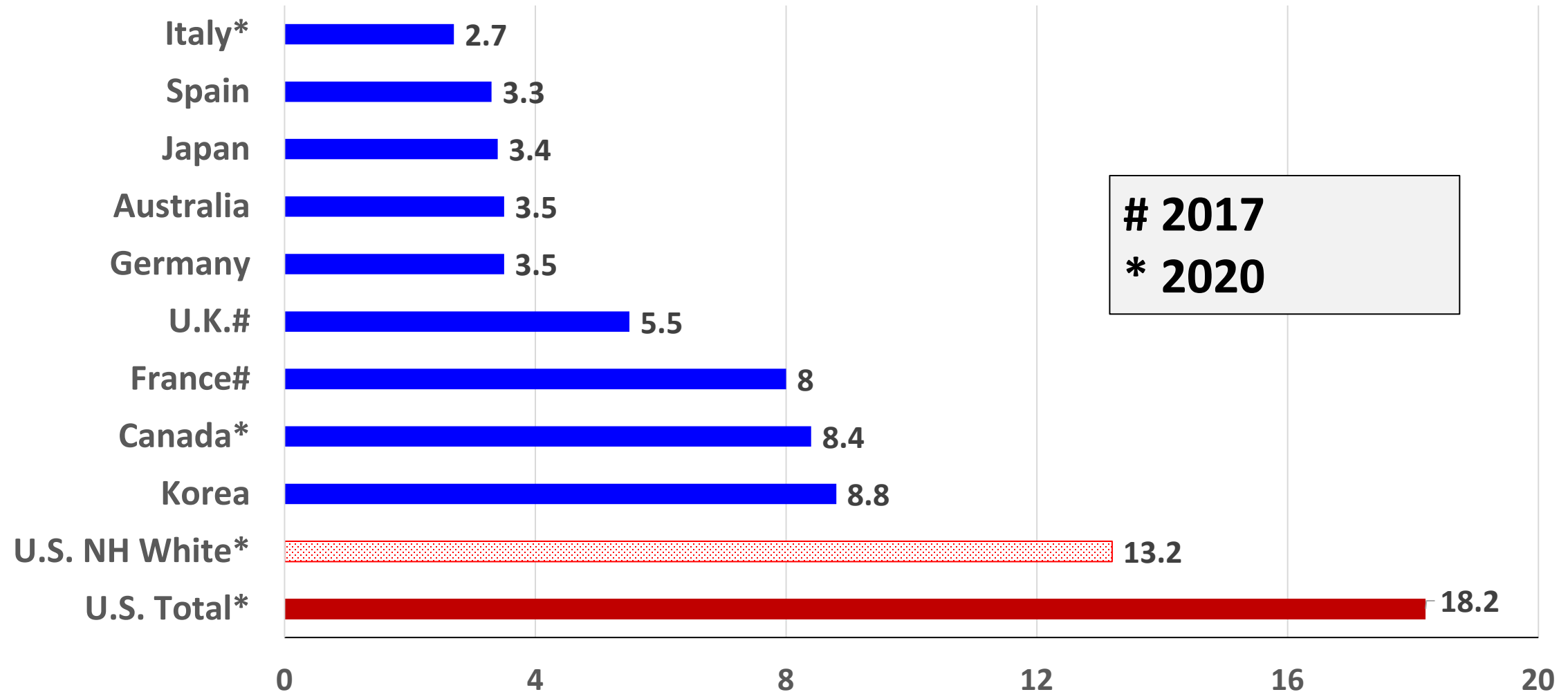


Countries in green have fewer than 100,000 births.
Let's do a more reasonable comparison

U.S. Maternal Mortality Ratio (per 100,000 births) Compared to Industrialized Countries with 300,000+ births, 2021-22



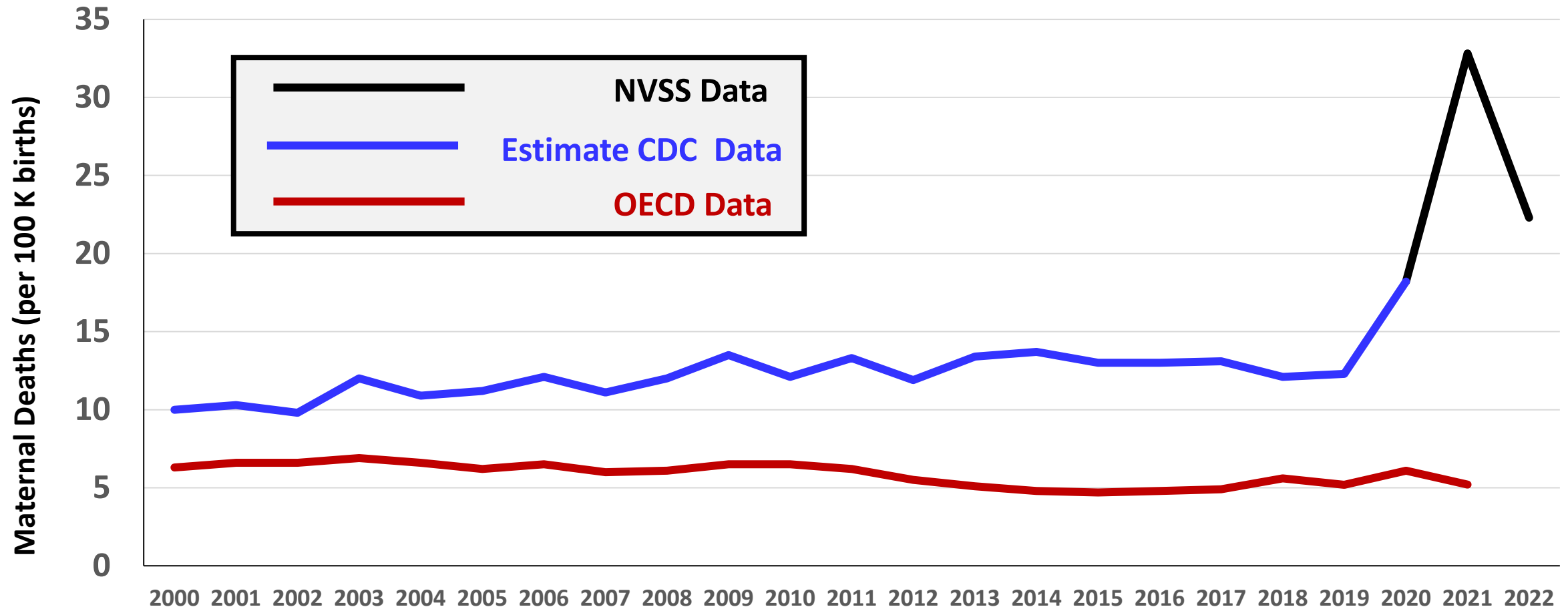
U.S. Maternal Mortality Ratio (per 100,000 births) Compared to Industrialized Countries with 300,000+ births, 2021-22



2017
* 2020



*Maternal Mortality Ratio (per 100K births), 2000-2022, U.S. & Comparable Countries**



* Countries with **300,000+** births (2019): Australia, Canada, France, Germany, Italy, Japan, S. Korea, Spain, United Kingdom

Sources: OECD Health Data 2024; & U.S. Estimated from NVSS & Pregnancy Mortality Surveillance System

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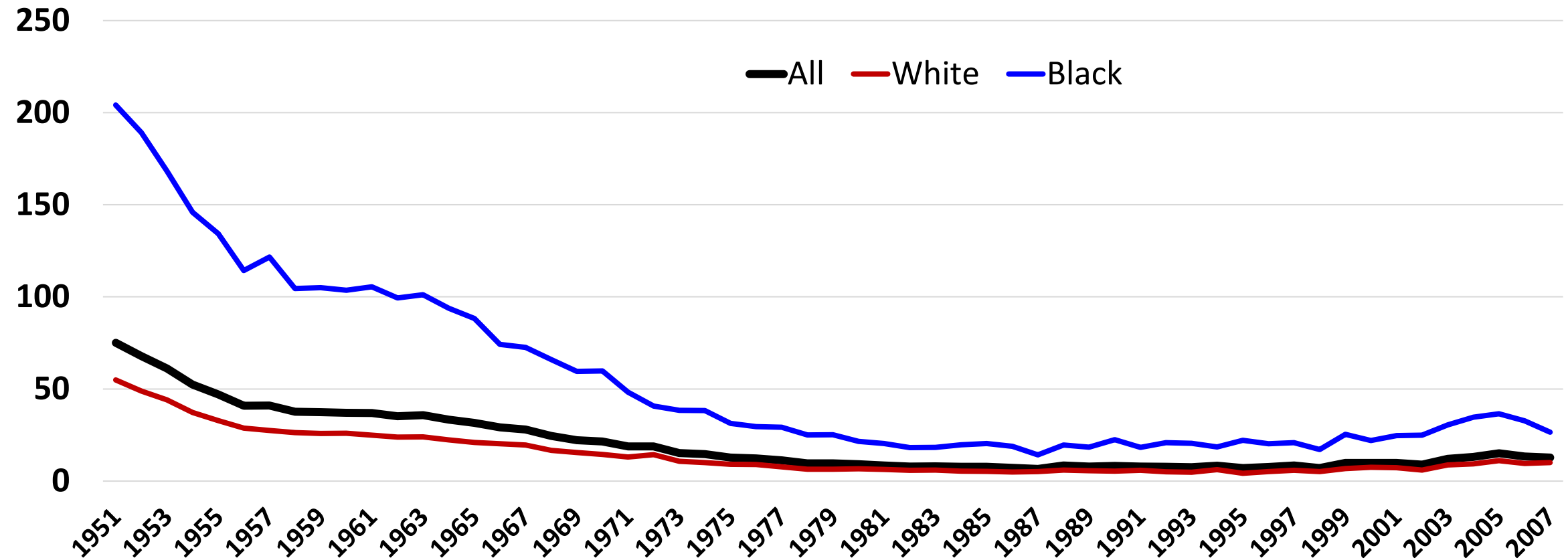
Summary

- No matter how you structure a comparison, the U.S. fares poorly in cross-national comparisons.
- If you include all countries, the U.S. ranks in the 50s; if you limit it to large wealthy countries, the U.S. ranks 10th...out of 10 countries.
- In terms of comparative trends, the U.S. in 2000 had a maternal mortality rate double the average for the comparison countries and over the next 20 years fell further behind.

The Persistence of Racial Disparities

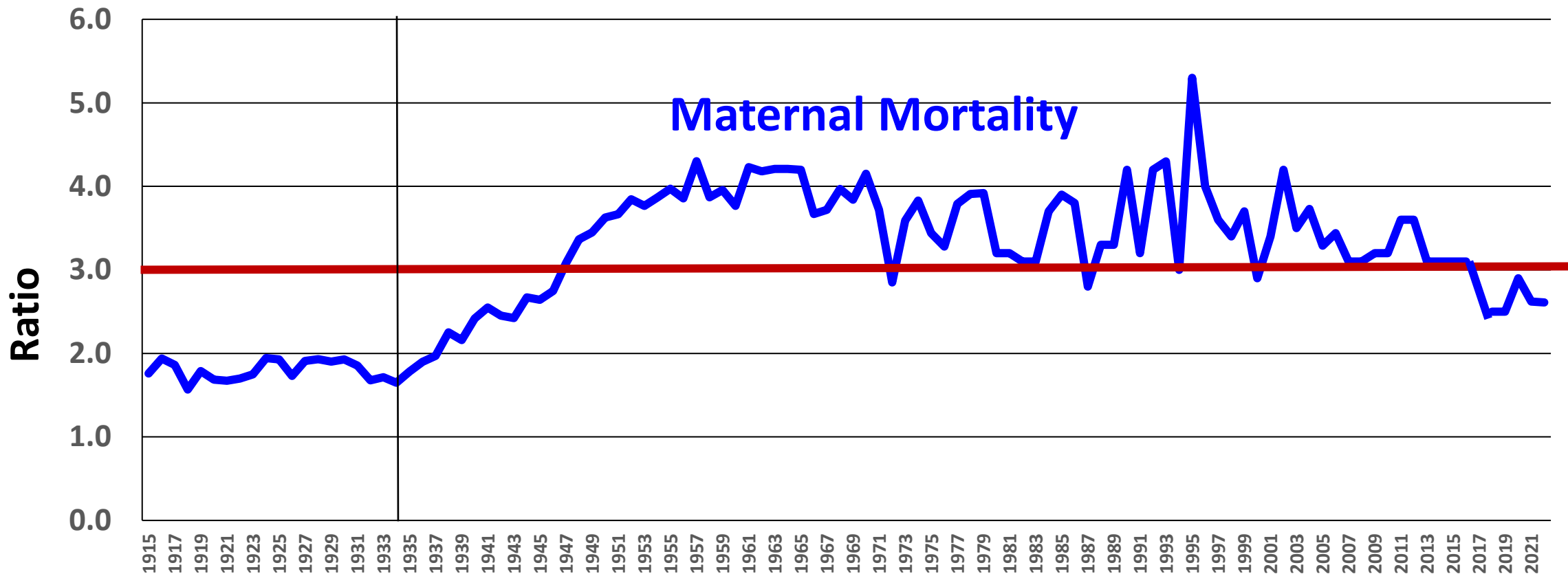


U.S. Maternal Mortality (per 100,000 live births), 1951-2007 by Race



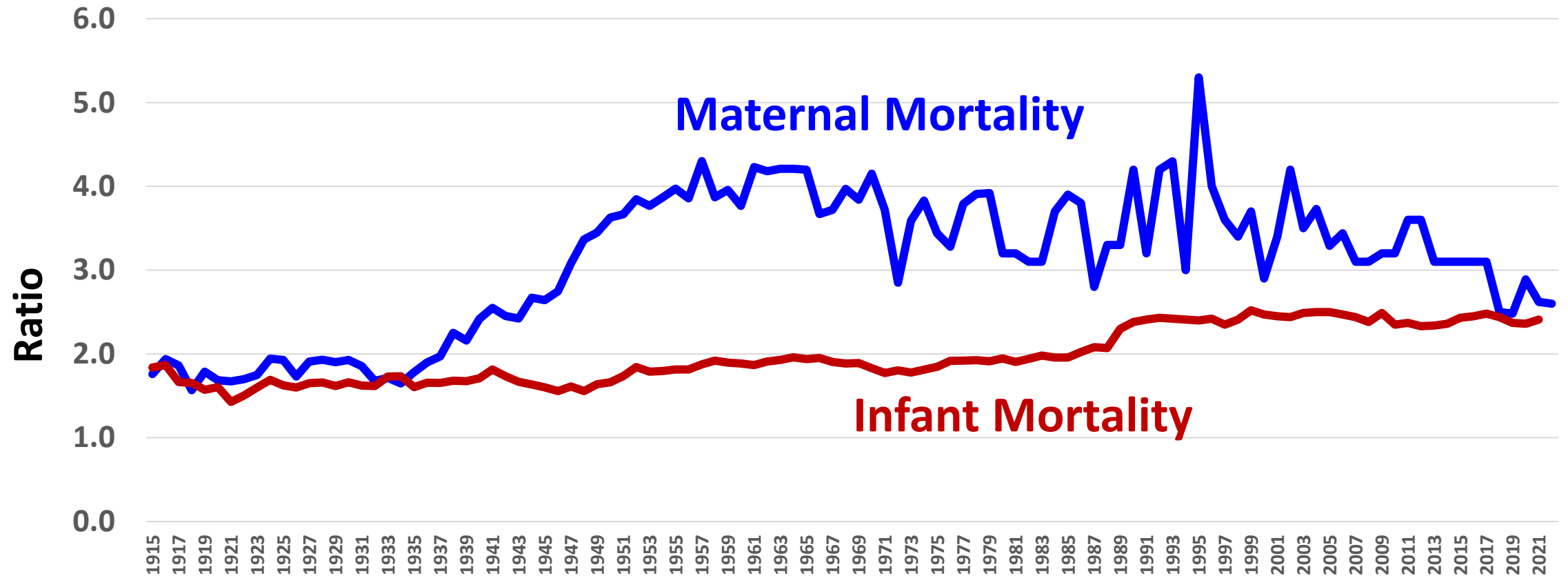
Source: NCHS. Maternal Mortality and Related Concepts. Vital & Health Statistics. Series 33; #3. & annual data reports. 1915-1960 data from NCHS. *Vital Statistics Rates In The United States 1940-1960*. NOTE: Shifts in measurement (e.g. not all states were part of registration system prior to 1933; infant race was based on race of the child until 1980 & then race of the mother post 1980) accounts for some of the variation over time. 2007-2016 based on 2 year estimates of the pregnancy related mortality rate: Petersen E. *MMWR*.9/6/19.

Black to White Ratios, U.S. Maternal Mortality, 1915-2022



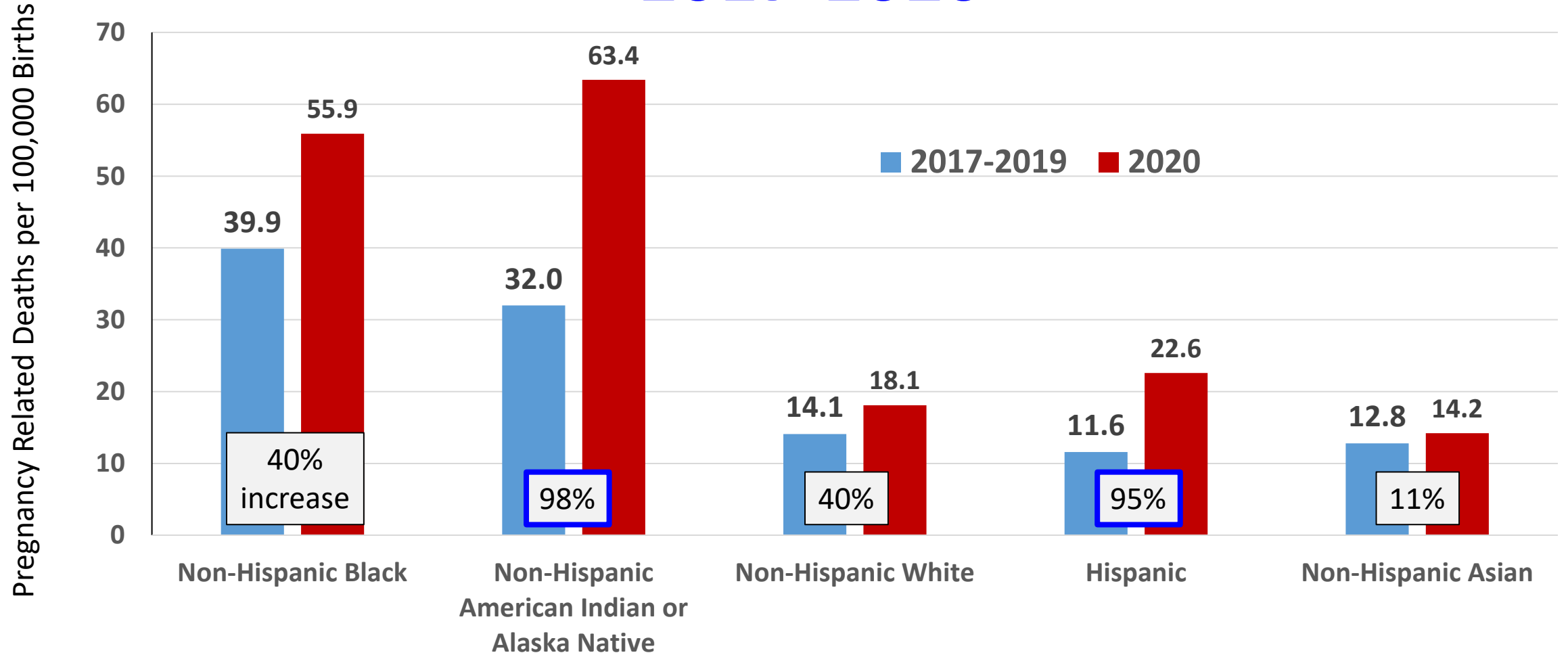
Source: NCHS. Maternal Mortality and Related Concepts. Vital & Health Statistics. Series 33; #3. & annual data reports. 1915-1960 data from NCHS. *Vital Statistics Rates In The United States 1940-1960*. NOTE: Shifts in measurement (e.g. not all states were part of registration system prior to 1933; infant race was based on race of the child until 1980 & then race of the mother post 1980) accounts for some of the variation over time. 2007-2016 based on 2 year estimates of the pregnancy related mortality rate: Petersen E. *MMWR*.9/6/19.

Black to White Ratios, U.S. Infant & Maternal Mortality, 1915-2022



Source: NCHS. Maternal Mortality and Related Concepts. Vital & Health Statistics. Series 33; #3. & annual data reports. 1915-1960 data from NCHS. *Vital Statistics Rates In The United States 1940-1960*. 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 & then race of the mother post 1980) accounts for some of the variation over time. 2007-2016 based on 2 year estimates of the pregnancy related mortality rate: Petersen E. *MMWR*.9/6/19.

U.S. Pregnancy Related Mortality by Race, 2017-2020



Source: CDC Pregnancy Related Mortality Surveillance System.

https://www.cdc.gov/maternal-mortality/php/pregnancy-mortality-surveillance/?CDC_AAref_Val=https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm



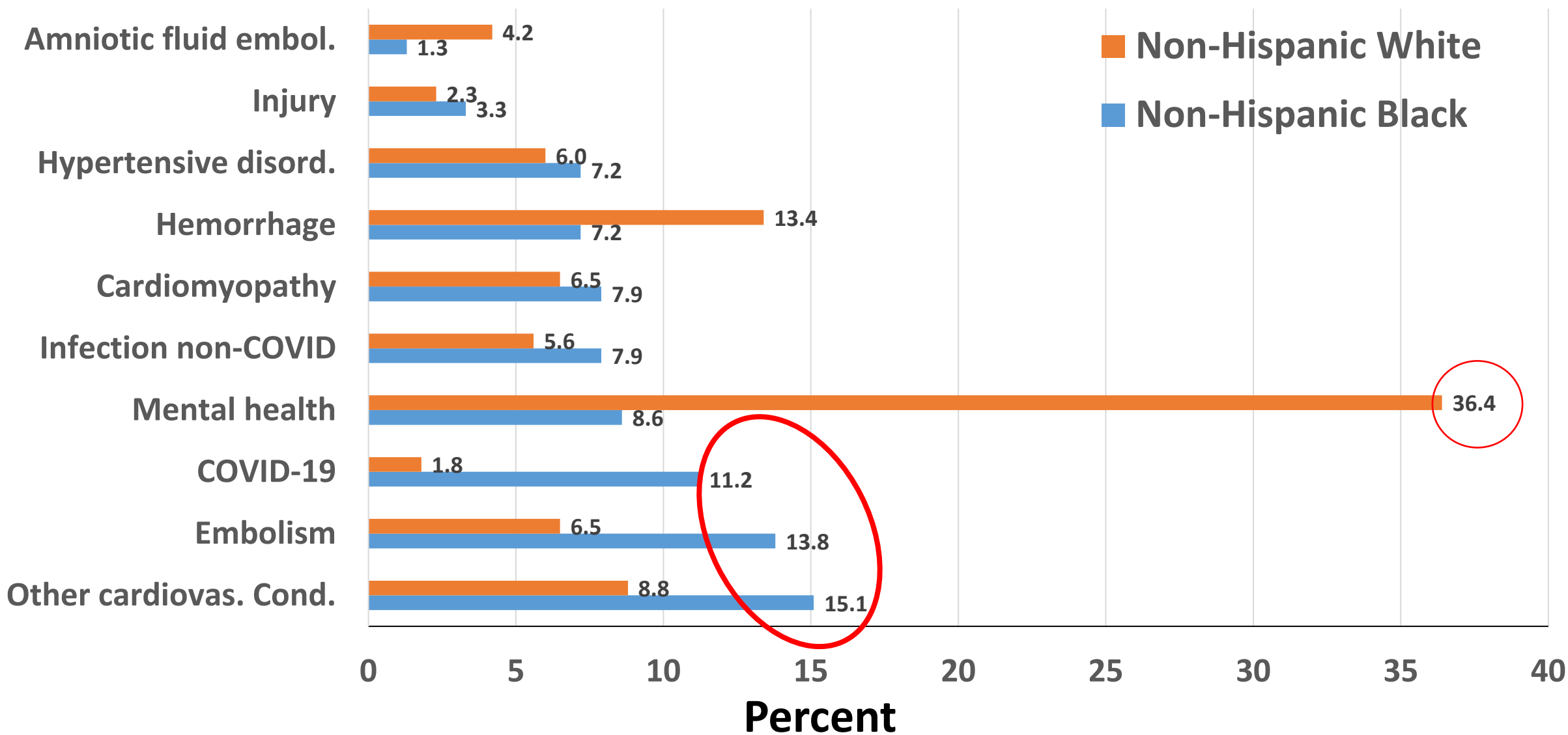
U.S. Maternal Mortality, by Race/Ethnicity, 2018-2022

	2018	2019	2020	2021	2022
Non-Hisp. White	14.9	17.9	19.1	26.6	19.0
Non-Hisp. Black	37.3	44.0	55.3	69.9	49.5
Hispanic	11.8	12.6	18.2	28.0	16.9
Non-Hisp Asian	13.3	13.8	12.3	16.8	13.2
Non-Hisp. AIAN	*	49.2	48.5	118.7	46.7
All	17.4	20.1	23.8	32.9	22.3

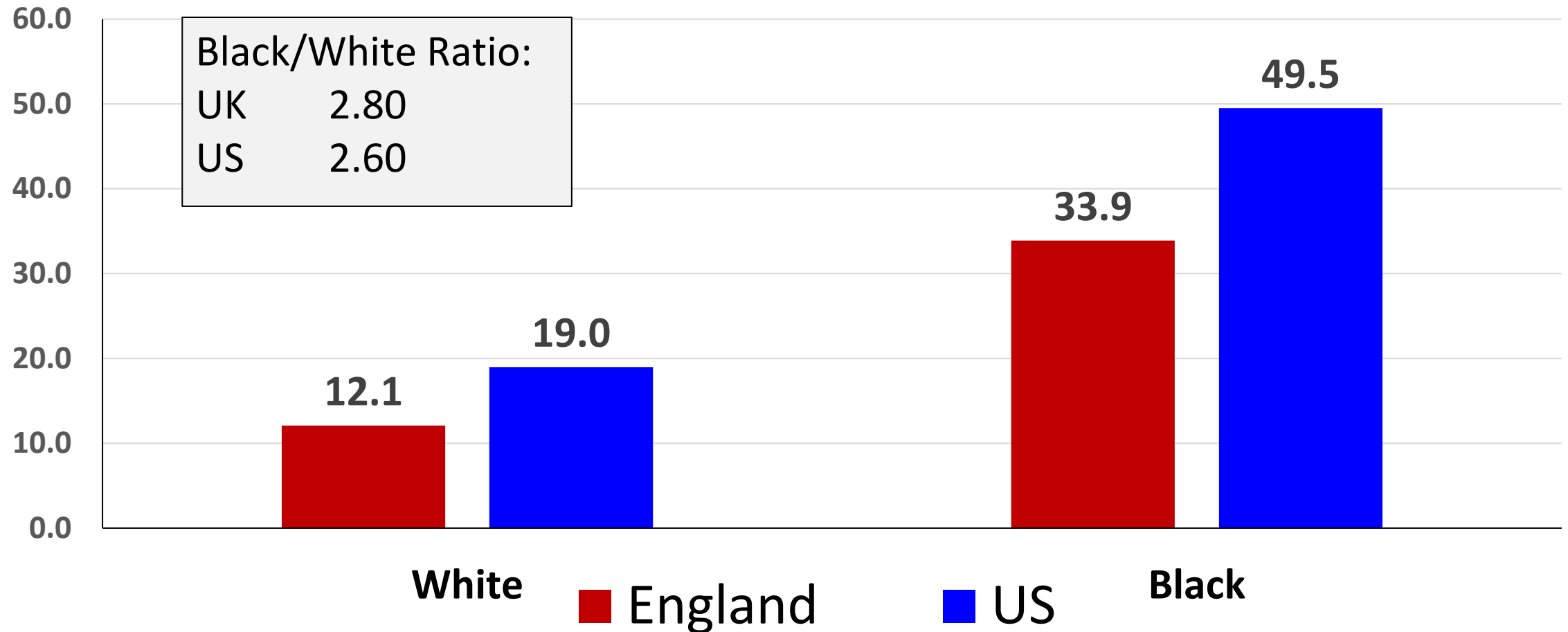
AIAN – American Indian Alaskan native



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



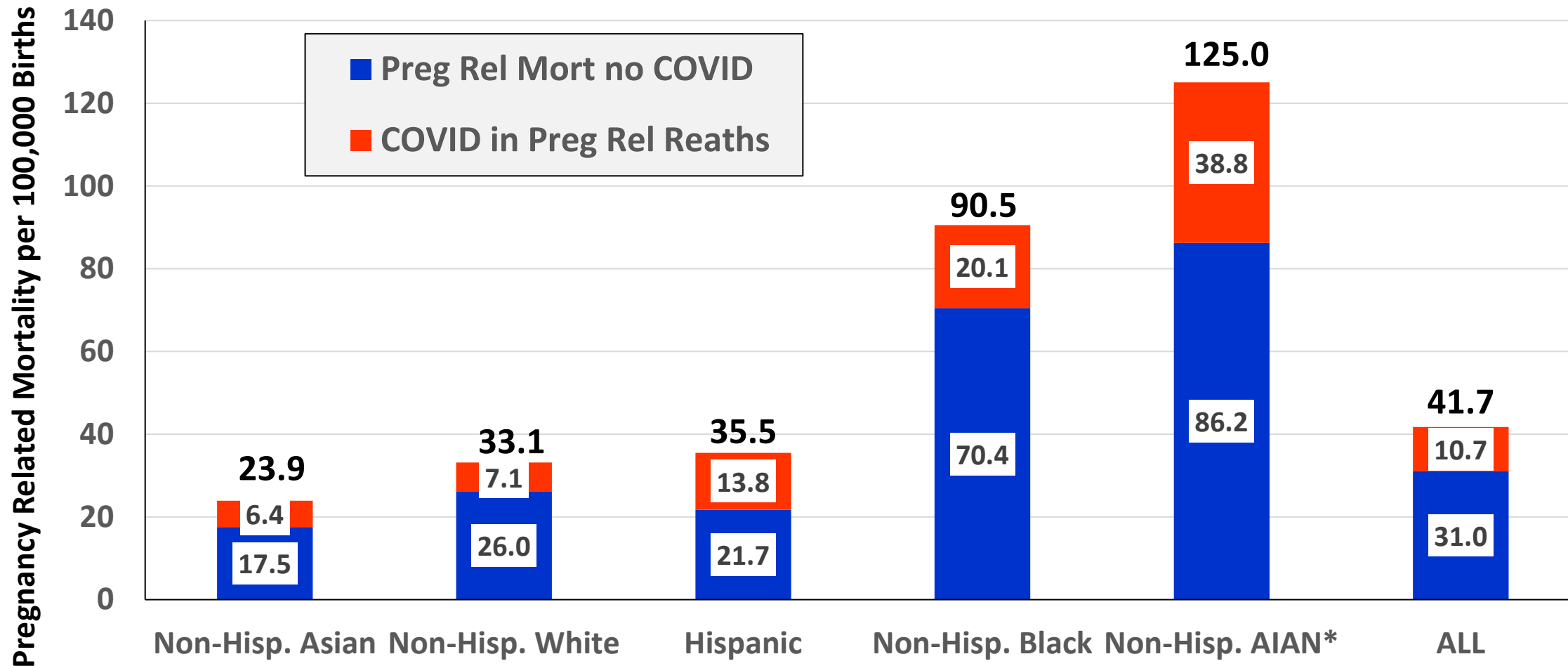
Maternal Mortality (per 100,000 births) by Race, U.S. (2022) and England (2020-2022)



Sources: U.S., Adjusted PMSS rate; 2/22/22; MBRRACE-UK. Confidential Enquiries into Maternal Deaths and Morbidity 2019-21. Oxford:NPEU, 2022.



Pregnancy Related # Death Ratios with & without a COVID Code by Race-Ethnicity, April, 2020 – December, 2021

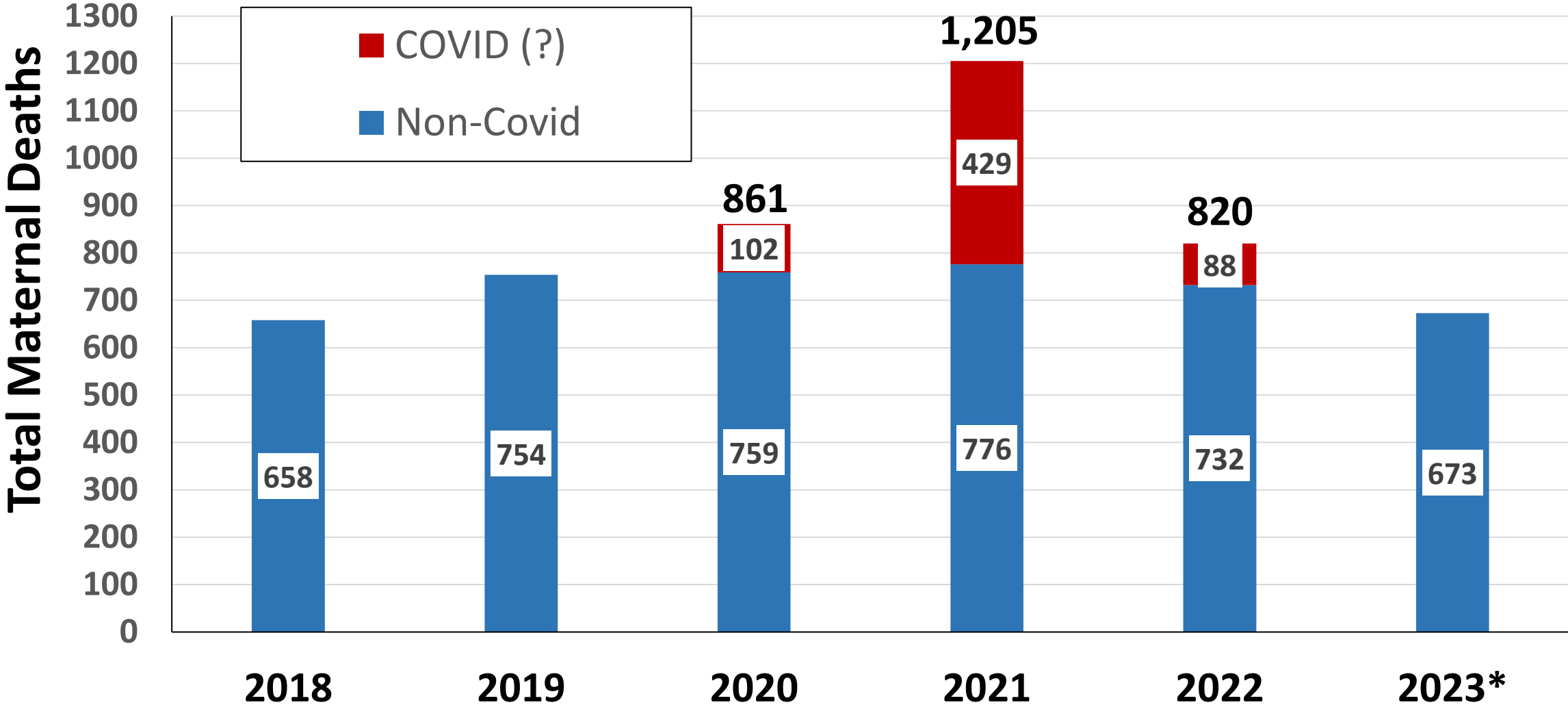


Deaths during pregnancy and up to 1 year after delivery;

*AIAN – American Indian Alaskan Native

**Maternal Mortality as a
Public Health Problem:**
Context & Causes of Death
(and a note on COVID)

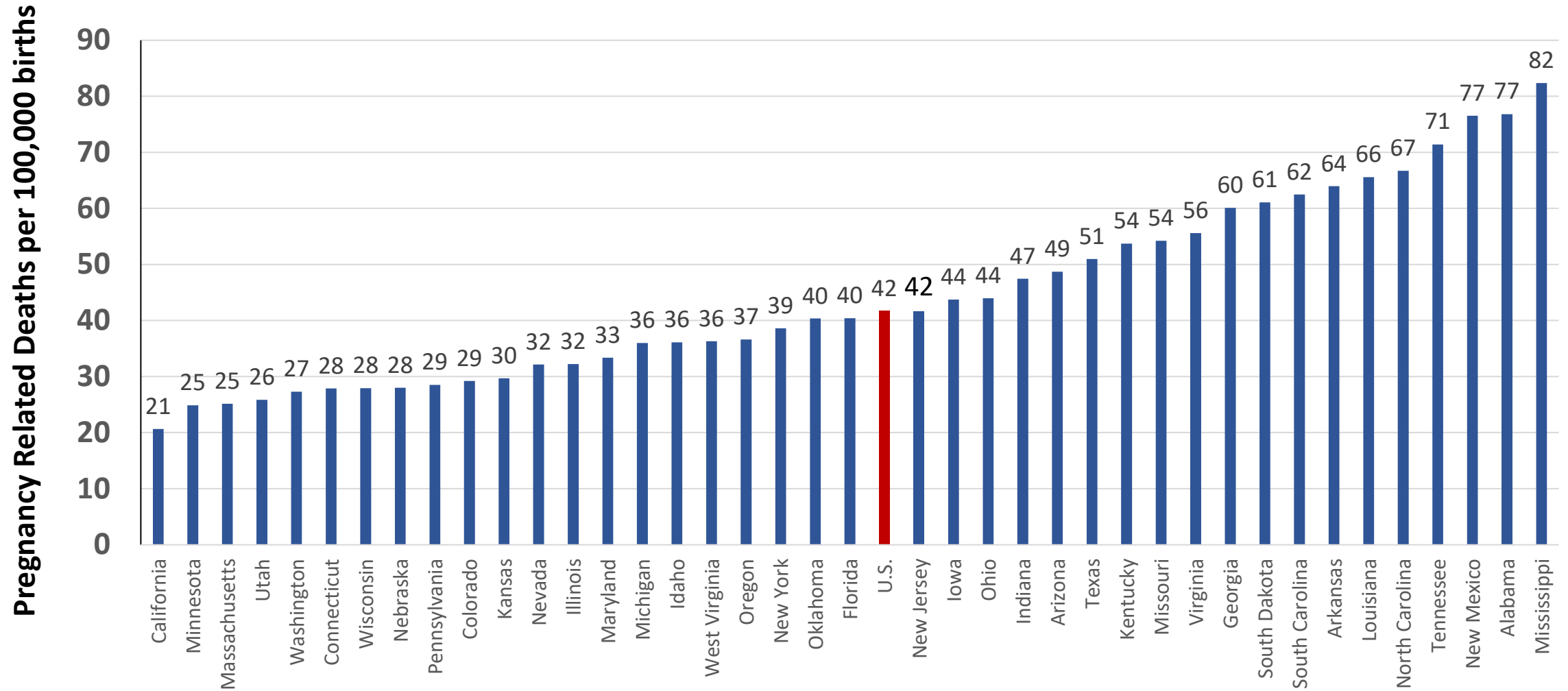
2018-2023 COVID & Maternal Deaths



* 2023 Provisional; < 10 COVID deaths



Pregnancy Related Mortality* by State during the Pandemic (2020Q2-Q4, 2021)



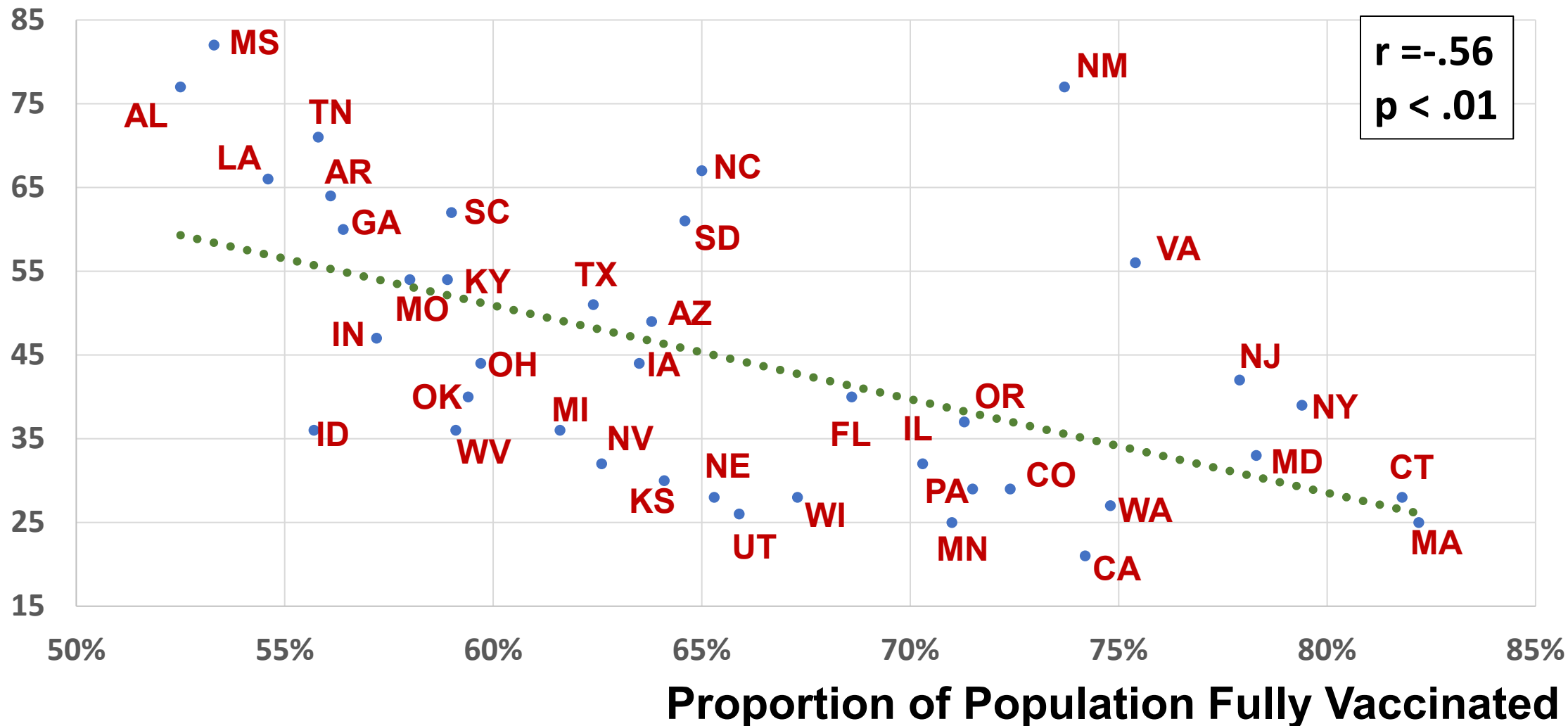
* States with > 10 maternal deaths

Source: CDC Wonder NVSS Mortality File

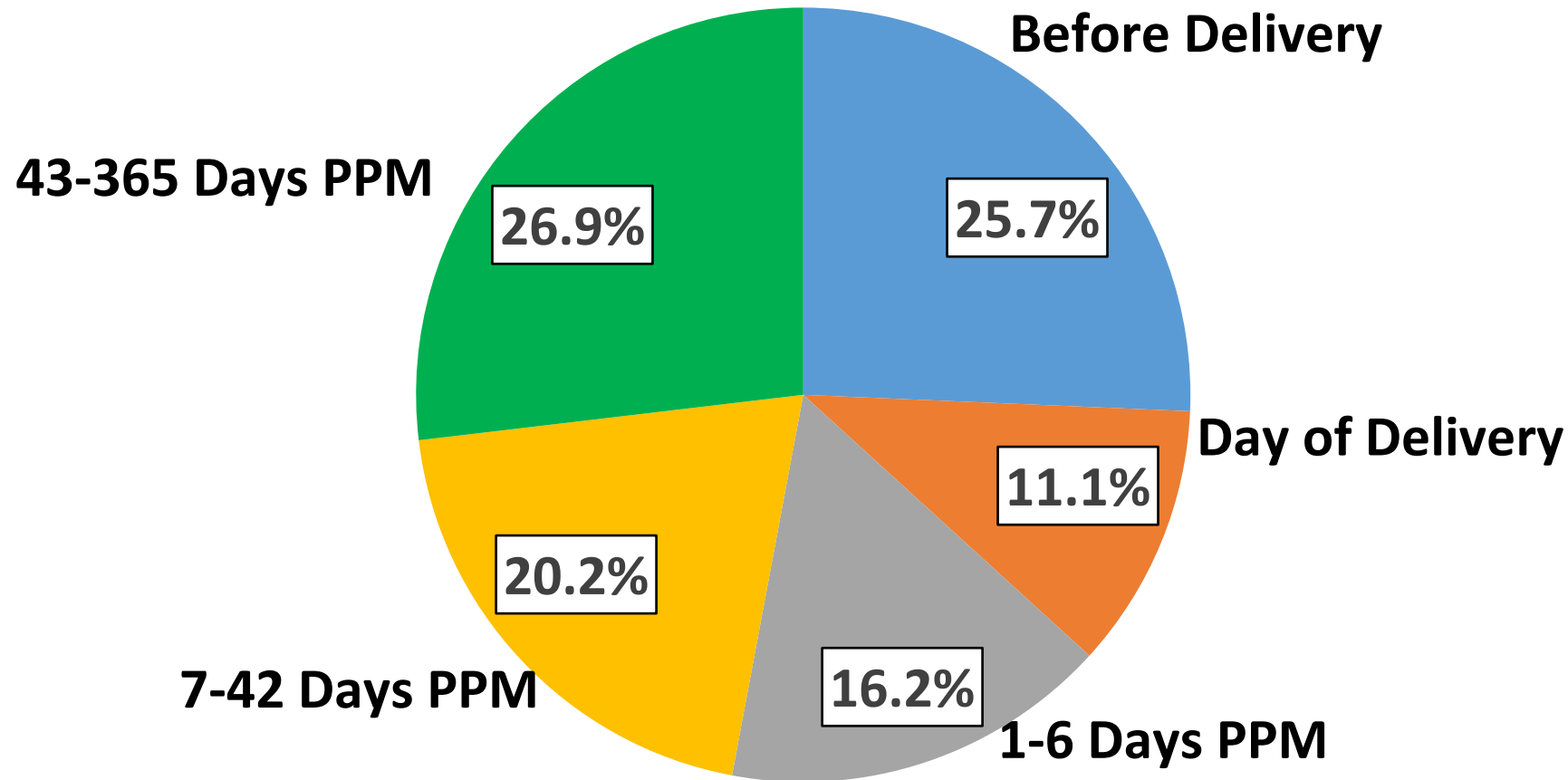
www.birthbythenumbers.org

State Pregnancy Related Mortality (per 100,000 births) (4/20-12/21) & Vaccination Rates

Maternal Mortality (per 100,000) during Pandemic



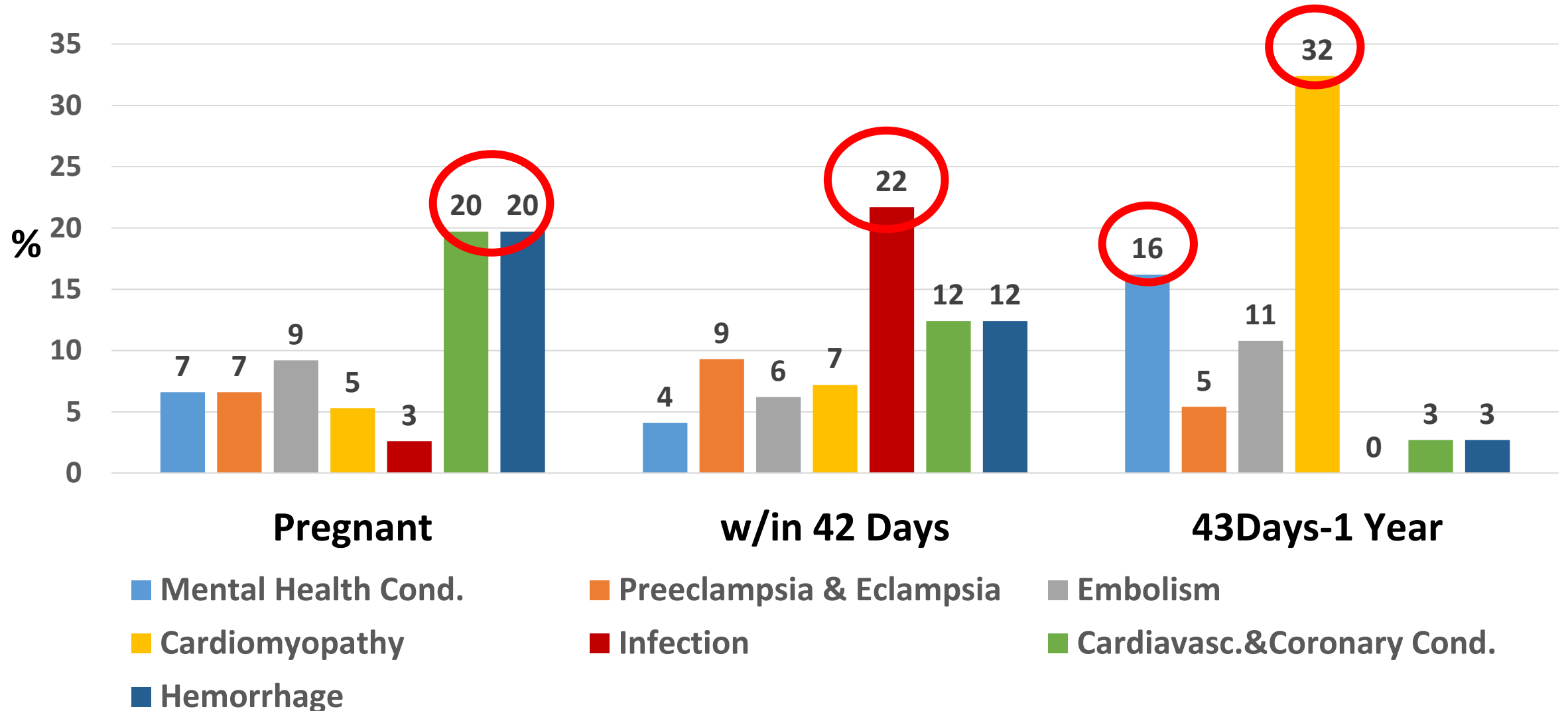
Timing of Maternal Deaths (2020)



If 73% of the pregnancy related deaths occur in pregnancy or postpartum, only focusing on hospital care at the time of birth will never solve the problem.

Moving to a Public Health Approach

Underlying Causes of Pregnancy-Related Deaths, by *Timing of Death*



Source: CDC. 2018. *Report from 9 Maternal Mortality Review Committees.*

Not just about maternal mortality

National Vital Statistics Reports



Volume 72, Number 10

September 22, 2023

Deaths: Final Data for 2020

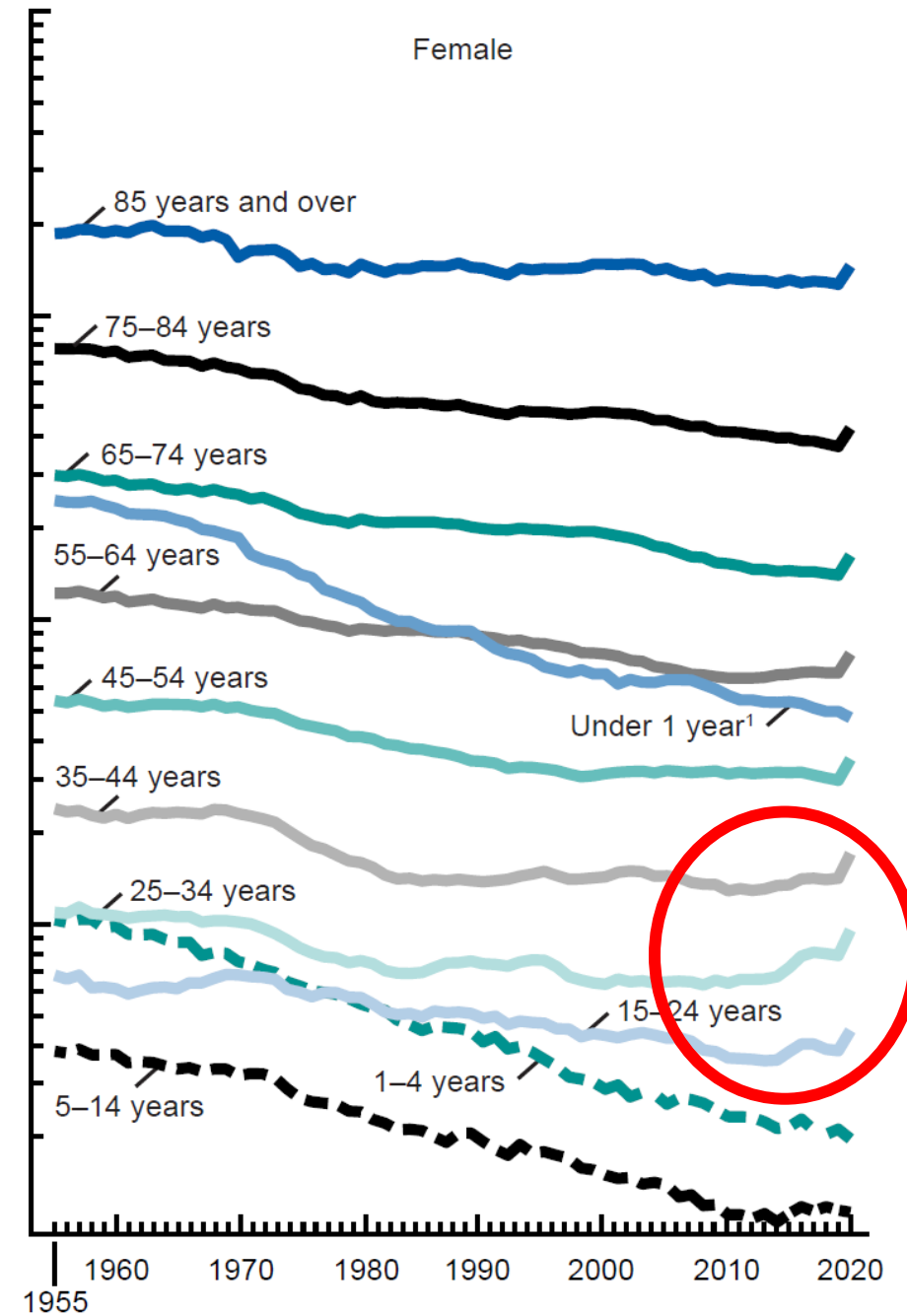
by Kenneth D. Kochanek, M.A., Sherry L. Murphy, B.S., Jiaquan Xu, M.D., and Elizabeth Arias, Ph.D.

STAT

Maternal deaths represent the canary in the coal mine for women's health

By Eugene Declercq and Neel Shah

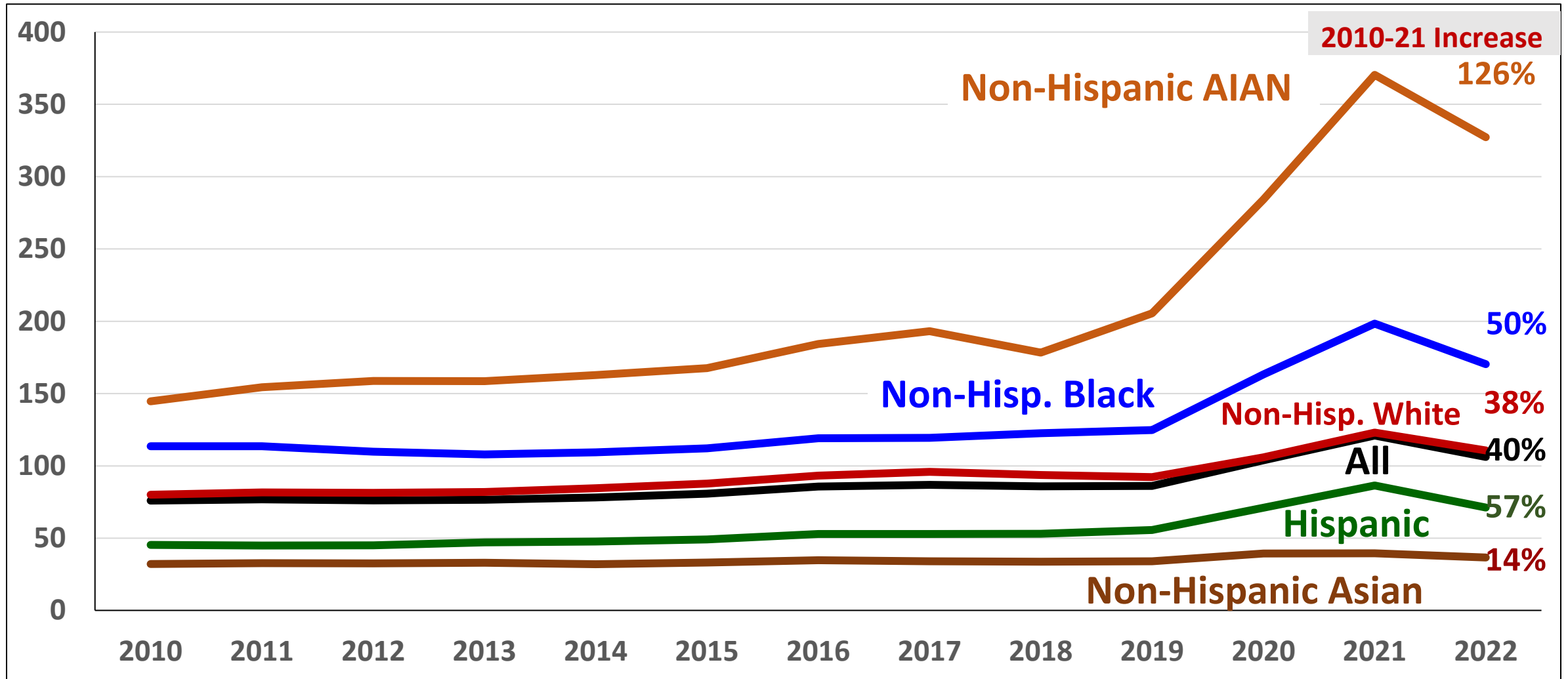
August 22, 2018





The Problem is Bigger than Maternal Mortality

Overall Deaths rates (per 100K), Females 15-44, 2010-2022



2010-21 Increase 126%

Non-Hispanic AIAN

Non-Hisp. Black

Non-Hisp. White 38%

All 40%

Hispanic 57%

Non-Hispanic Asian 14%

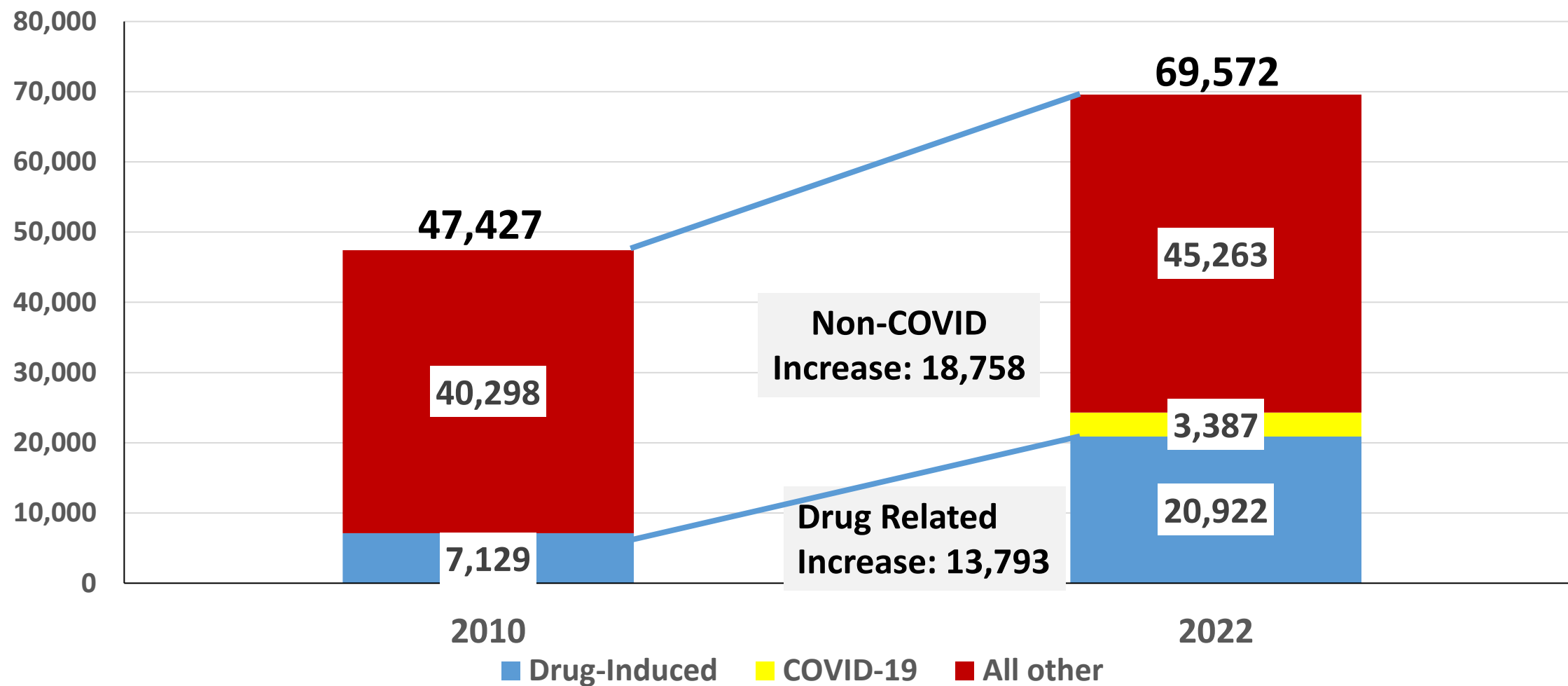
All Female Deaths 15-44

2010 -- 47,427; 2022 – 69,569 (COVID 3,390); 2022 maternal deaths – 820

Source: CDC Wonder

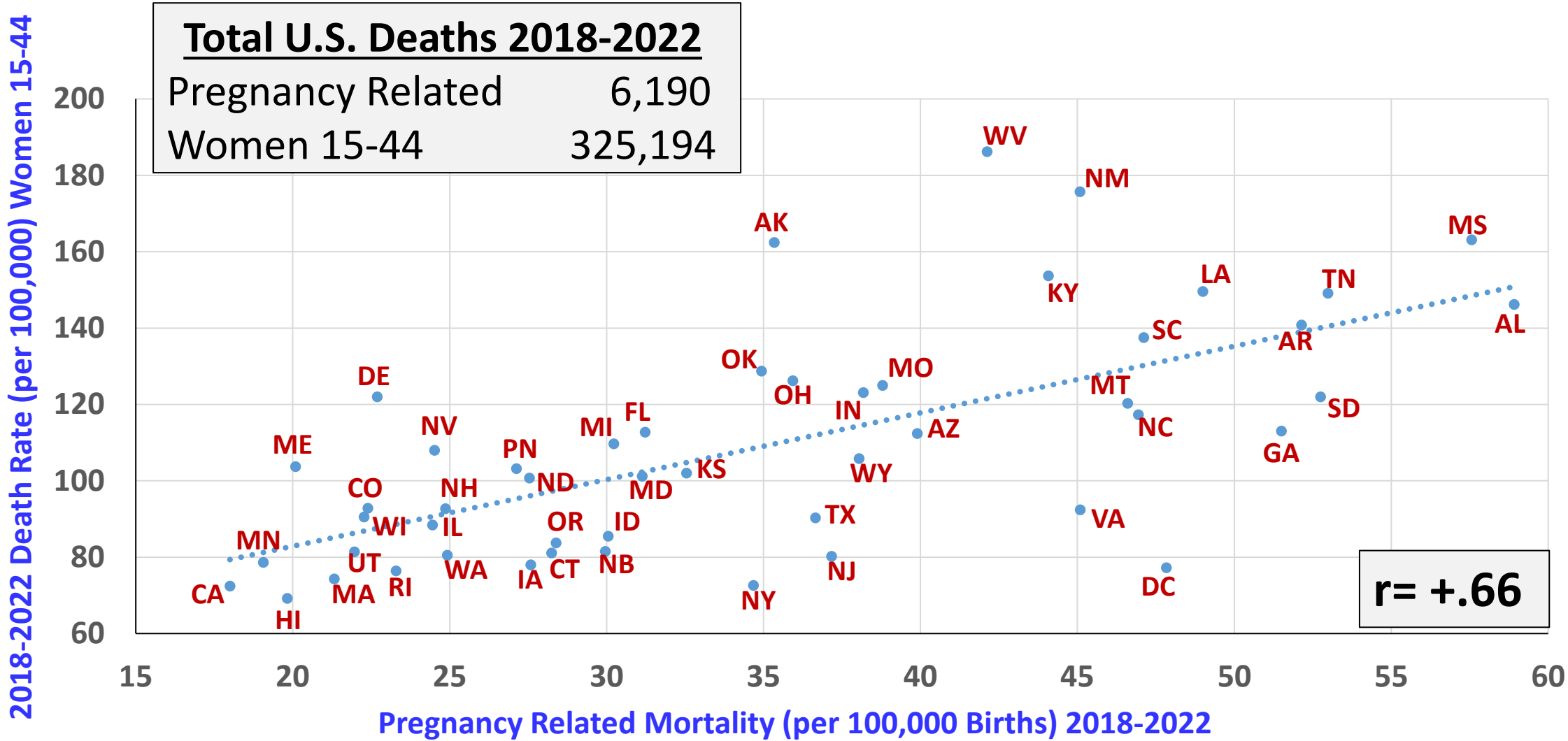
www.birthbythenumbers.org

Female Deaths (15-44) 2010-2022: **73%** of the non-COVID increase came from Drug Related Causes





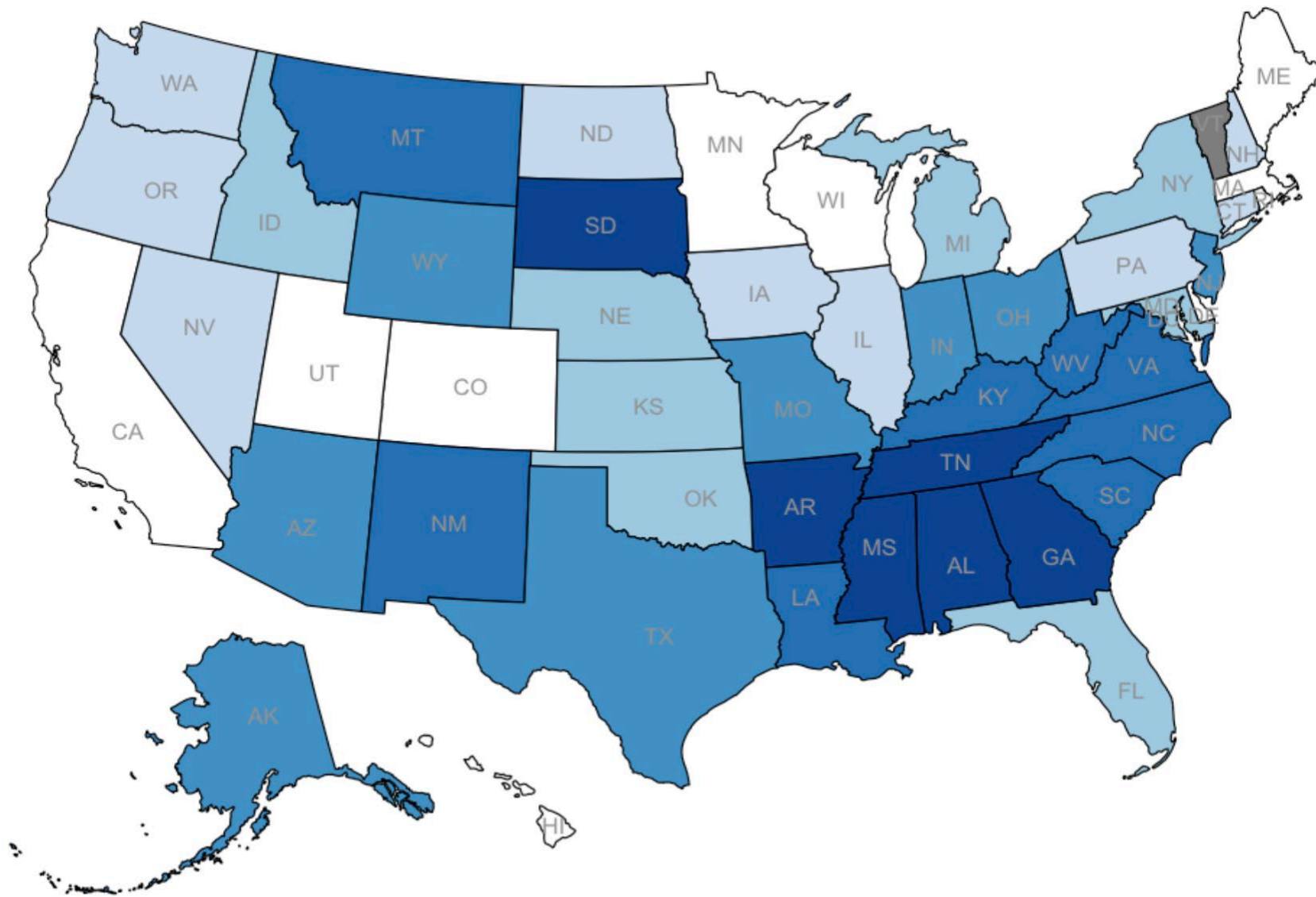
Relationship Between Pregnancy Related Mortality and Overall Death Rate for Women 15-44, U.S. States*, 2018-2022



Source: CDC Wonder Mortality files

* Excludes Vermont with < 10 Pregnancy Related Deaths

**Reimagining the maternal mortality crisis as
a women's health crisis & midwives' role in
addressing it.....**



Pregnancy Related Mortality[#] Ratios, U.S. States*, 2018-22

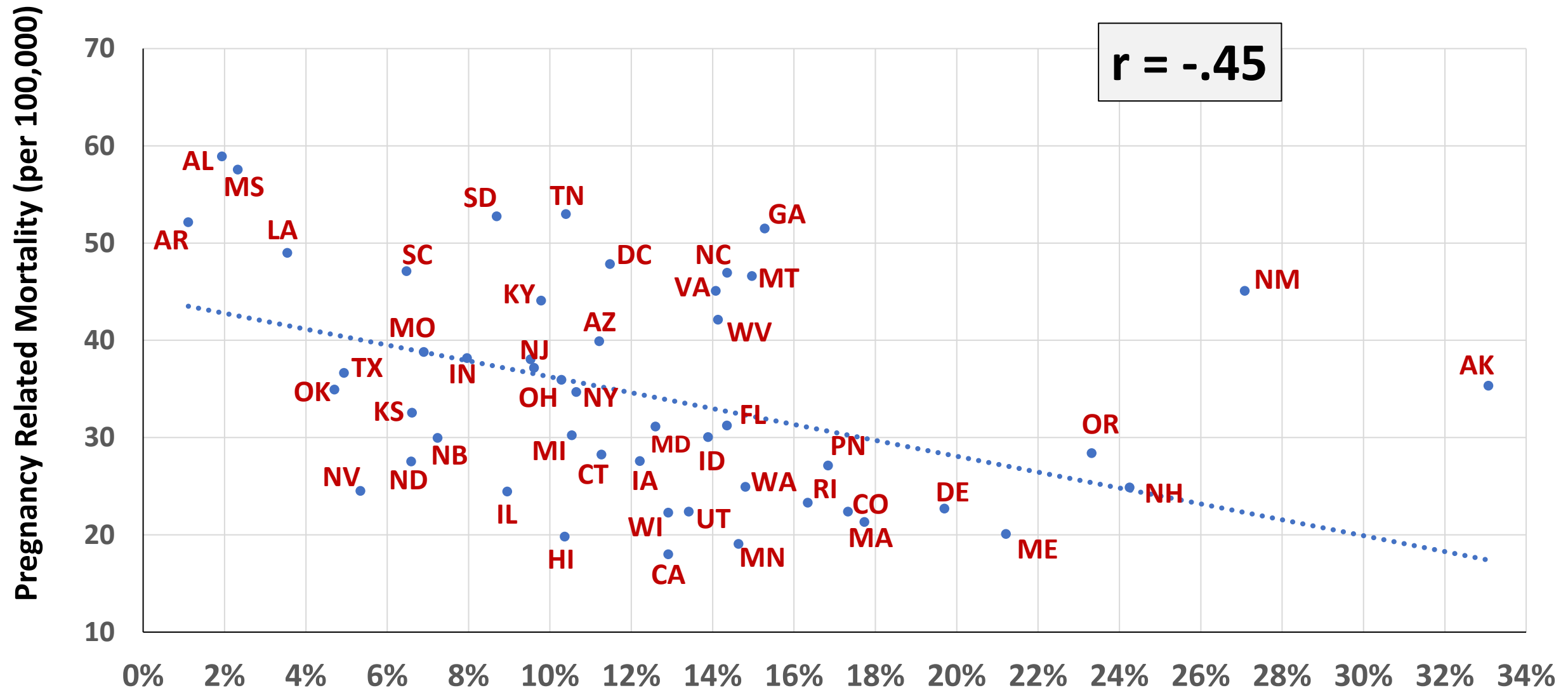
Deaths during pregnancy through 1 year postpartum

* States with < 10 pregnancy related deaths, 2018-2022, are excluded from reporting





Relationship Between % Midwife Attended Births & Pregnancy Related Mortality* (per 100,000 births), U.S. States, 2018-2022



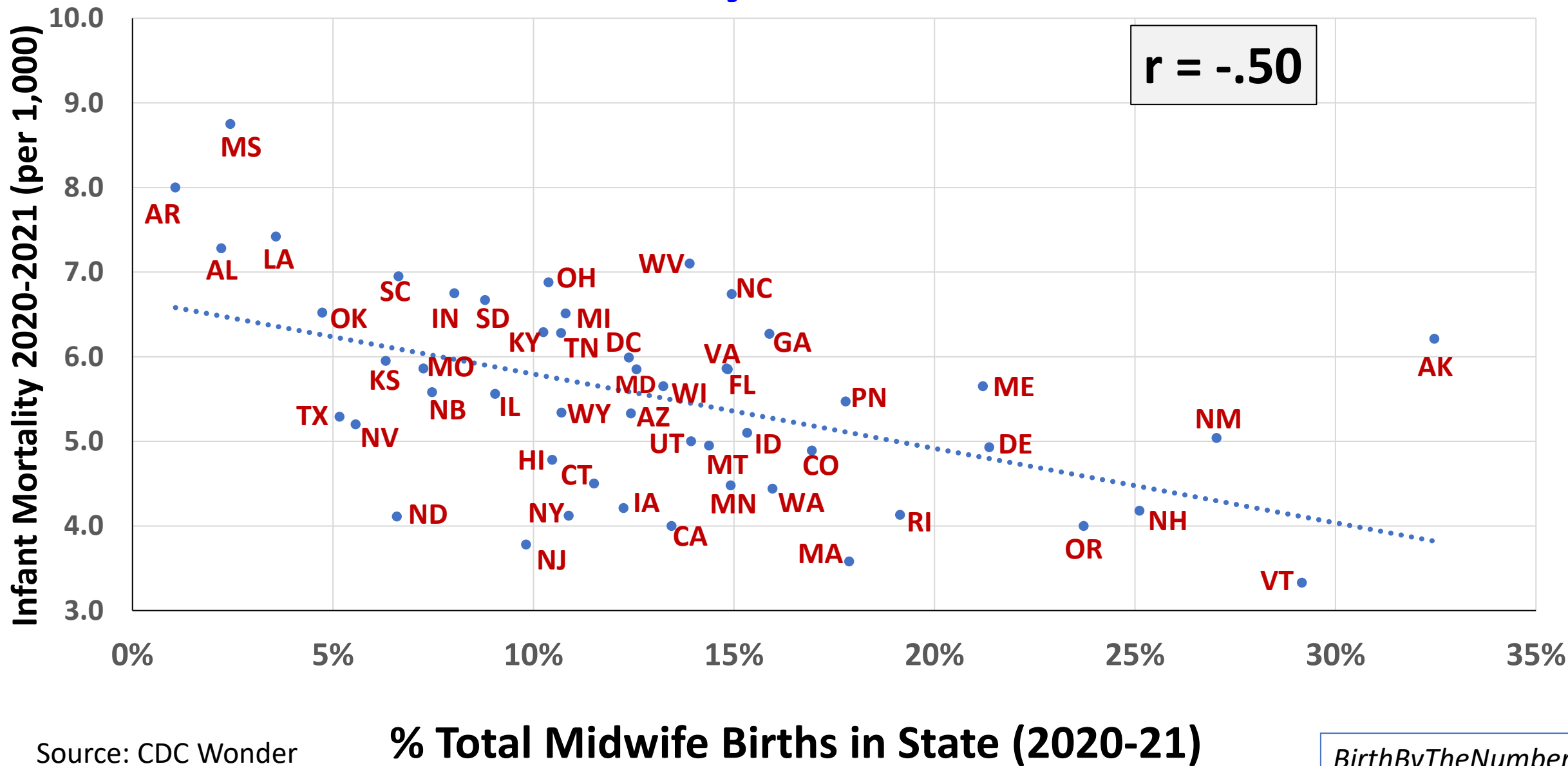
* Deaths during pregnancy through 1 year postpartum

% Total Midwife Births in State

Source: CDC Wonder (Vermont excluded with <10 deaths)

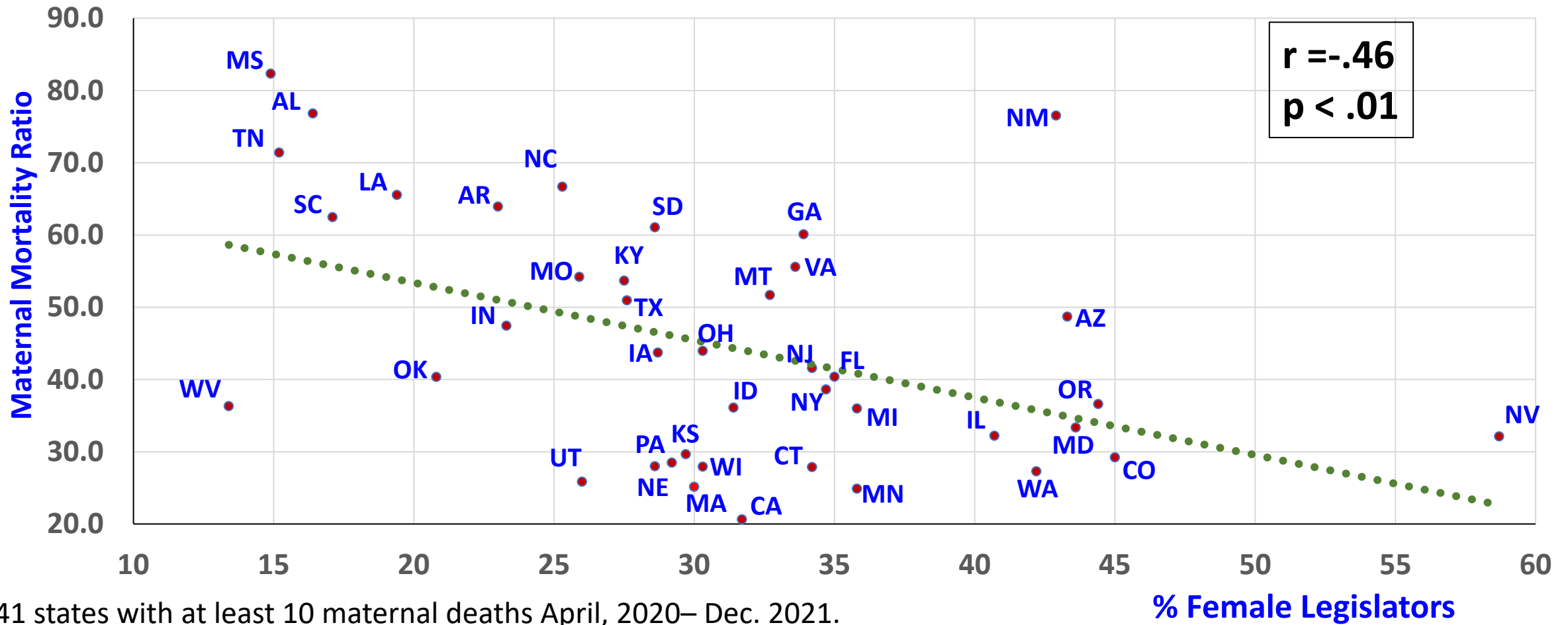


Relationship Between Midwife Attended Births & State Infant Mortality (per 1,000 births), 2020-2021





Pregnancy Related Mortality (per 100,000 births) 2018-2021* and % Female State Legislators 2021



* 41 states with at least 10 maternal deaths April, 2020– Dec. 2021.

% Female Legislators

Sources: % Female Legis – Nat’l Conf State Legisl.; Pregnancy Related Mortality – CDC Wonder

www.birthbythenumbers.org

Much of the rest of today's program will involve addressing the "how" and "why" of midwifery's role in preventing maternal morbidity and death. There's a need for:

- Continual policy advocacy to advance the role of midwives*
- Expansion of educational programs to train more midwives in general and in particular, midwives of color*
- Increased opportunities for midwives to practice & get paid a fair wage for their work*
- Enhancing the role of the midwife in the community & in primary women's health care.*



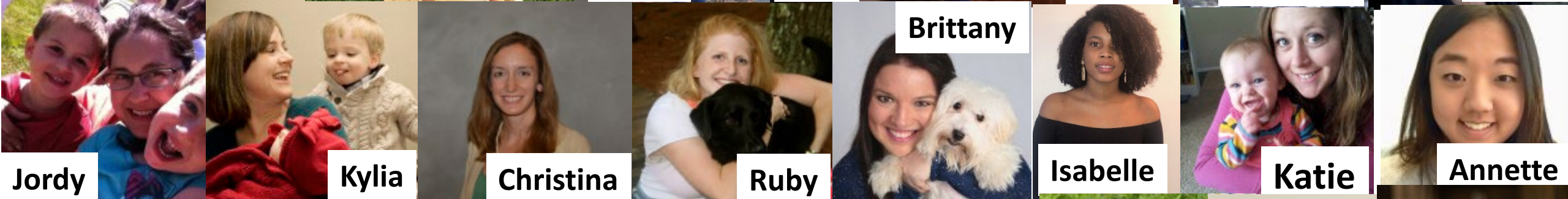
August 26, 2024



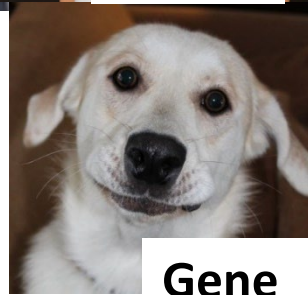
Black Maternal Health Week
 April 11 - 17, 2024



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Gene

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