

# ***The Contemporary Challenge of Maternal Mortality in the U.S.***

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**48<sup>th</sup> Annual High Risk Obstetrics Seminar**

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**Hilton Franklin Cool Springs, Franklin, TN**





Collaboration in Research



# Warning!!

*This presentation is:*

- 1. Very heavy on data*
- 2. Regrettably short on solutions*
- 3. Speaker has a strange accent*
- 4. Please don't take pictures of slides. They'll be posted*

# Overview

- *The language of maternal mortality*
- *History of maternal mortality in the U.S.*
- *The measurement problem & (3 U.S. measures)*
- *The U.S. in comparative context*
- *The persistence of racial disparities in the U.S.*
- *The problem is larger than maternal mortality*

# **The language of maternal mortality**

**Three widely used definitions of maternal mortality:**

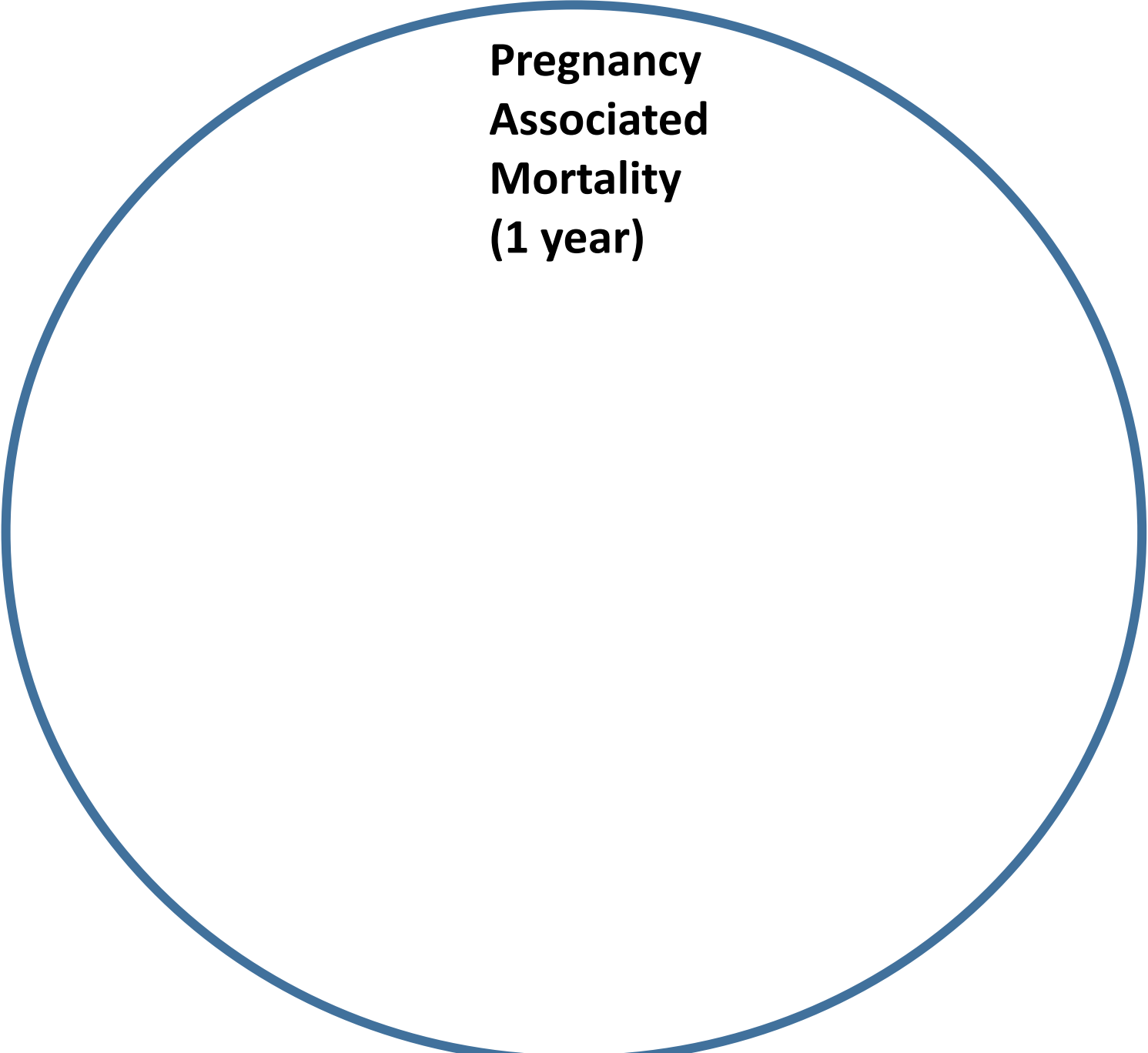
**1. Pregnancy associated death**

**2. Pregnancy related death**

**3 Maternal mortality**

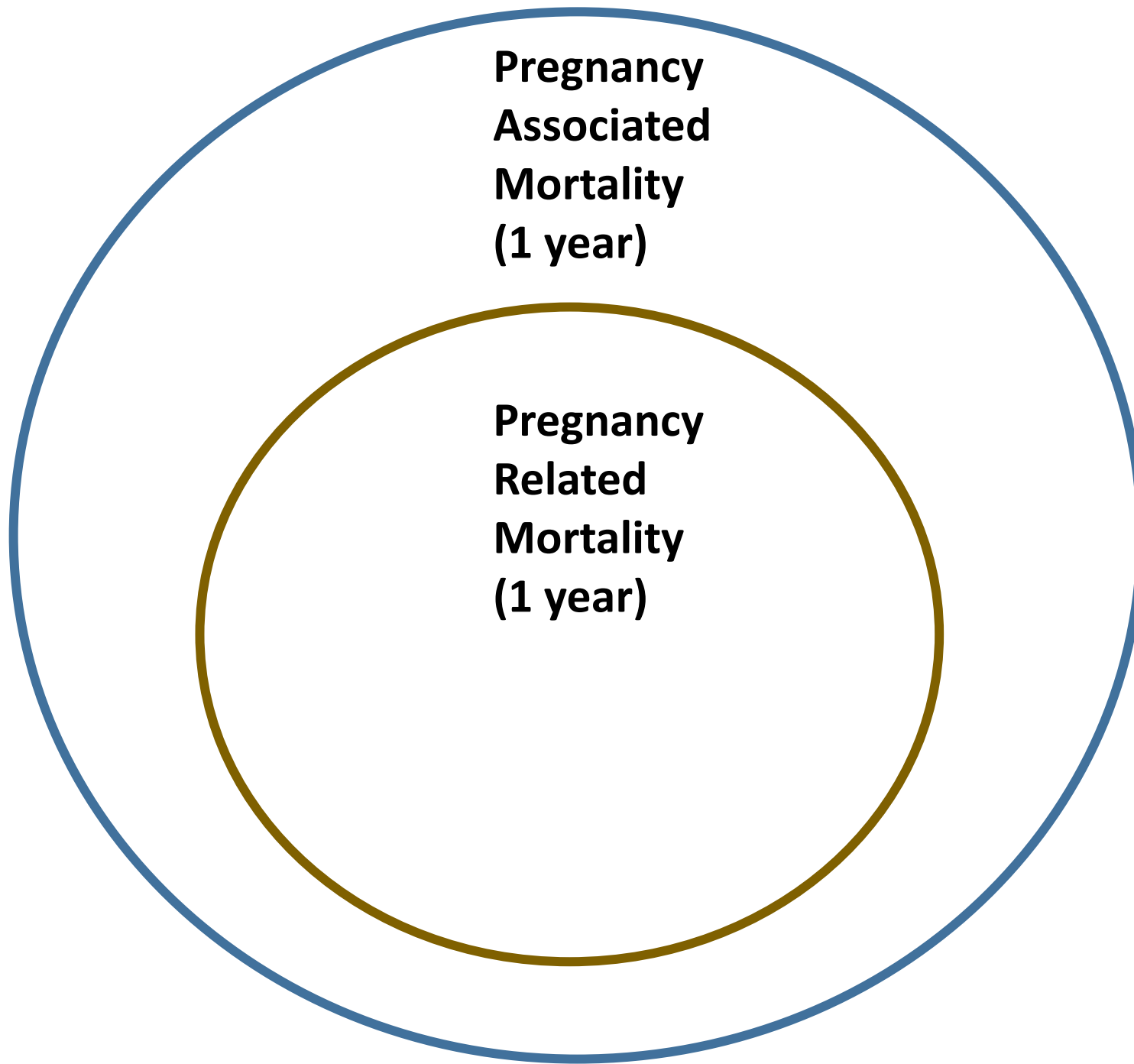
# Three Definitions (in the U.S.)

- **Pregnancy Associated Death** – The death of a women while pregnant or *within one year* of termination of pregnancy, *irrespective of cause*. (*WHO calls these “pregnancy related”*). *Starting point for analyses*.
- **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 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*.



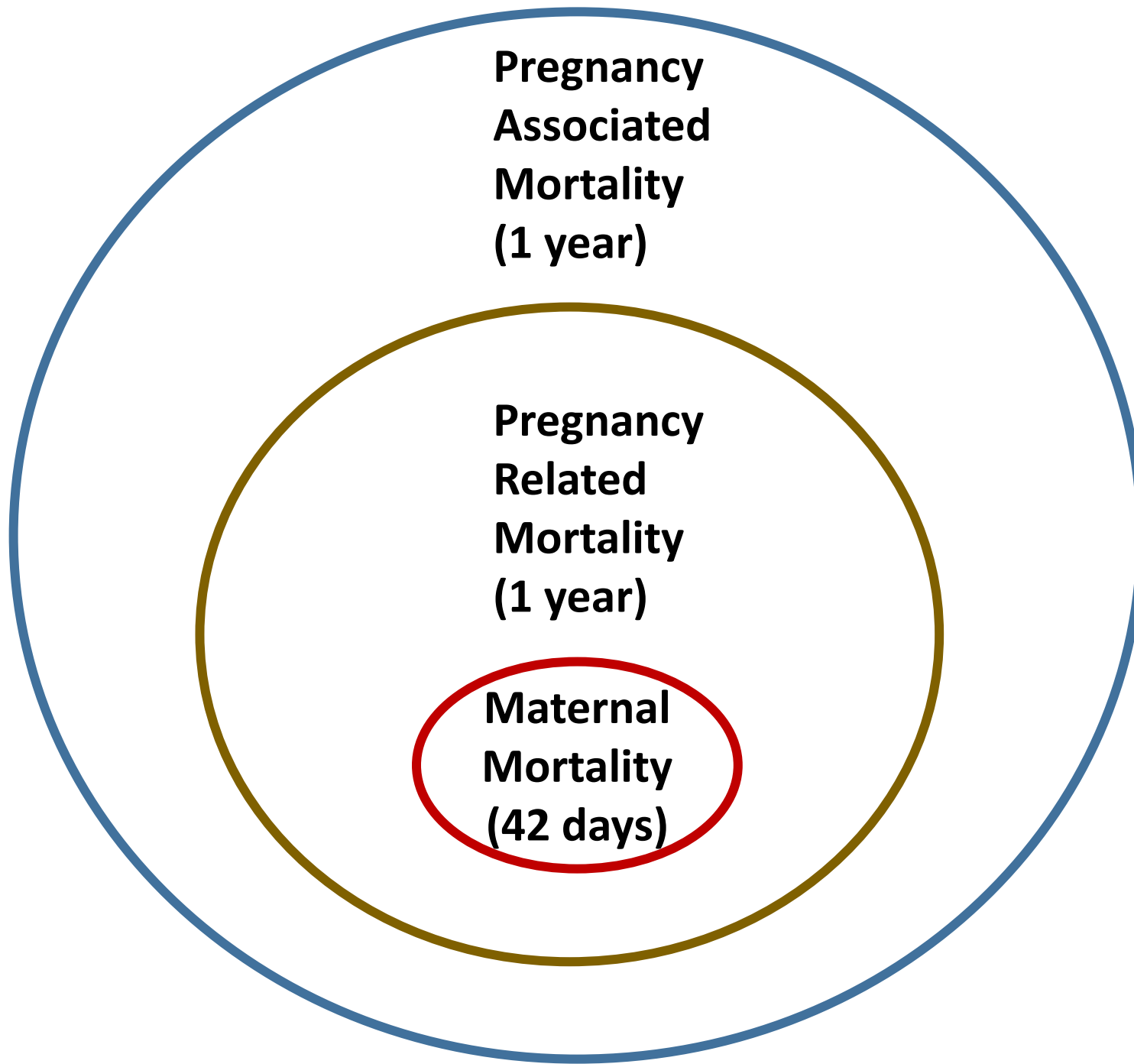
**Pregnancy  
Associated  
Mortality  
(1 year)**

**Pregnancy  
Associated  
Mortality:**  
**All Deaths women  
of reprod. age  
pregnancy to 1  
year ppm**



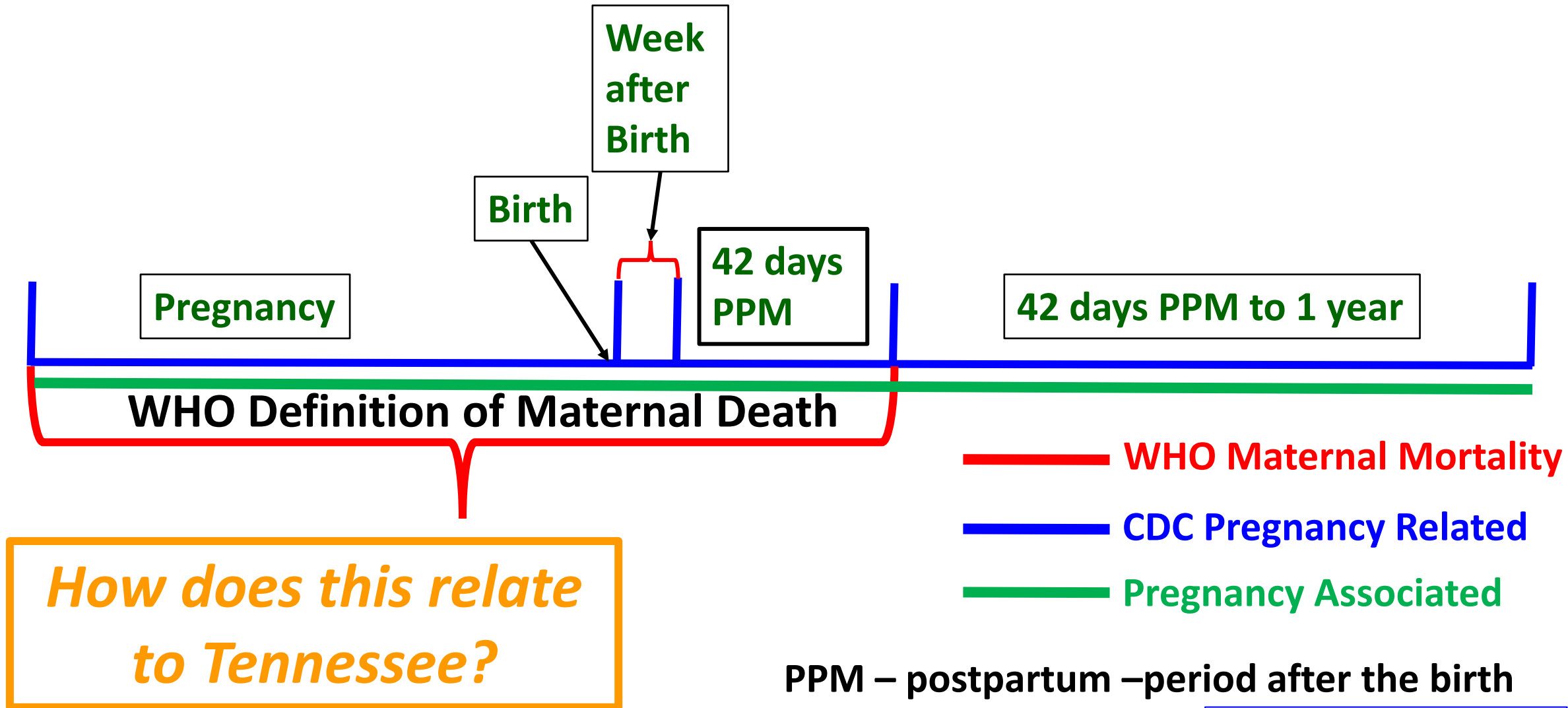
**Pregnancy  
Related  
Mortality:**  
All Deaths  
women of  
reprod. age  
pregnancy to  
**1 year ppm**  
Related to the  
pregnancy





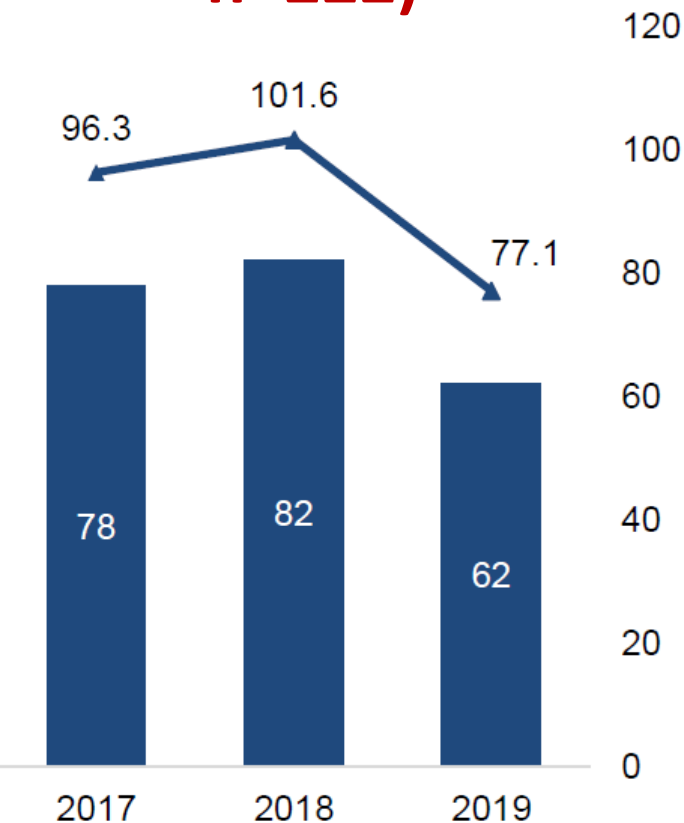
**Maternal Mortality:**  
All Deaths women  
of reprod. age  
pregnancy to **42**  
**days ppm Related**  
**to the pregnancy**

# Timeline of Maternal Mortality Definitions



# 2021 Tennessee Maternal Mortality Annual Report

(2017-2019  
n=222)

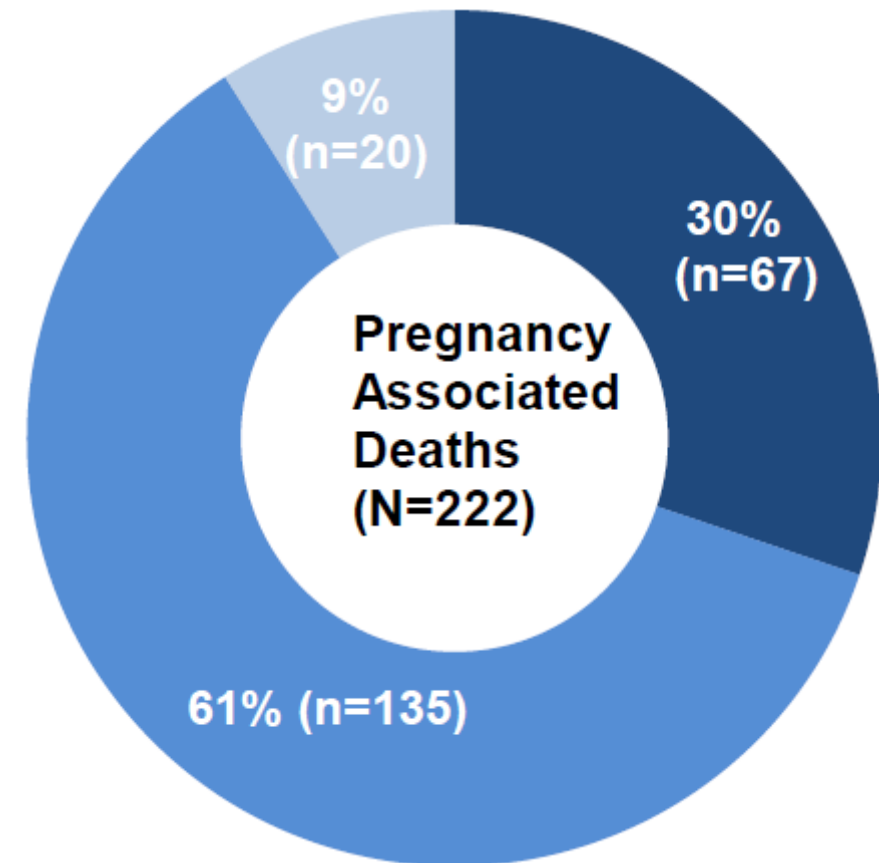


— Rate per 100,000 Live Births

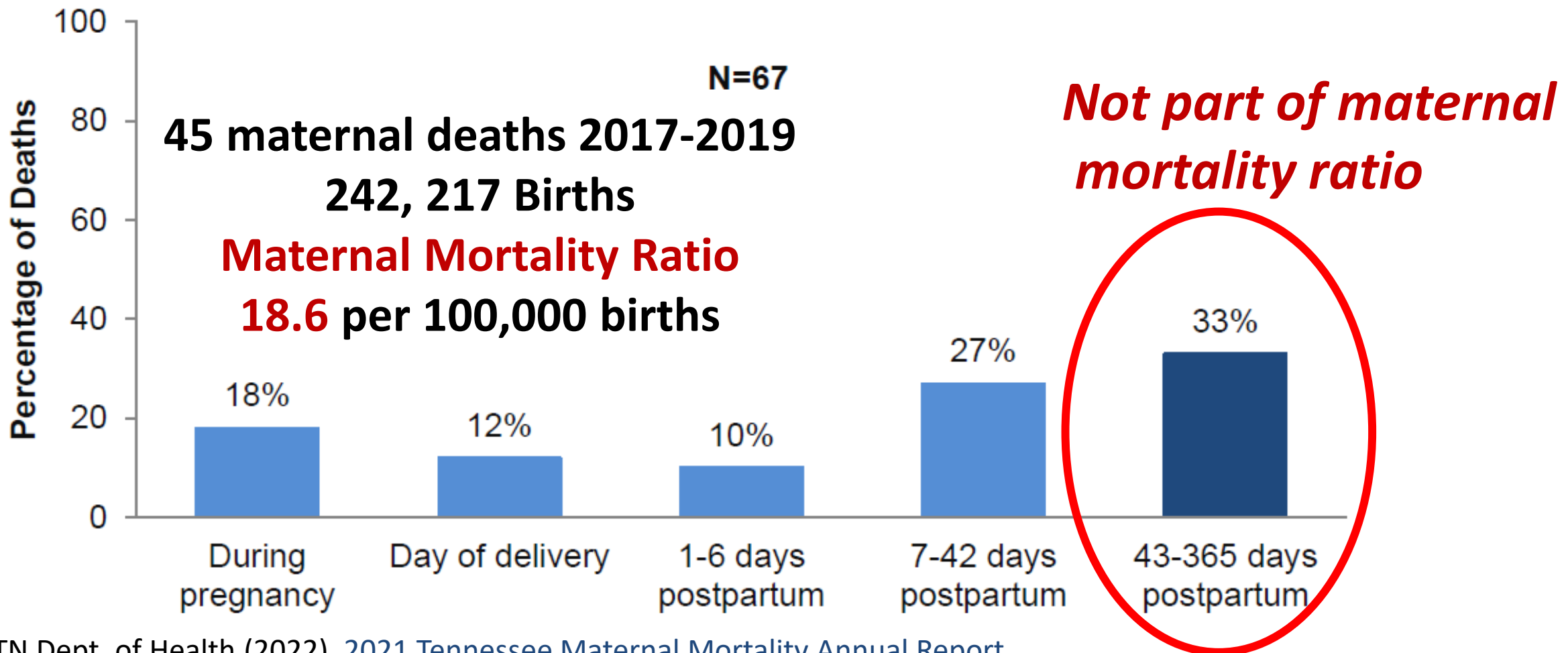
222 deaths  
242, 217 Births  
**Pregnancy Associated**  
Mortality Ratio  
**91.7** per 100,000 births

67 deaths  
242, 217 Births  
**Pregnancy Related**  
Mortality Ratio  
**27.8** per 100,000 births

- Pregnancy-Related
- Pregnancy-Associated, but NOT -Related
- Pregnancy-Associated but Unable to Determine Pregnancy-Relatedness



# Timing of Pregnancy-Related Deaths, Tennessee, 2017-2019





**Pregnancy  
Associated  
Mortality  
(1 year)**

**TN Estimated Mortality Rates  
per 100,000 live births, 2017-19**

**91.7**

**Pregnancy  
Related  
Mortality  
(1 year)**

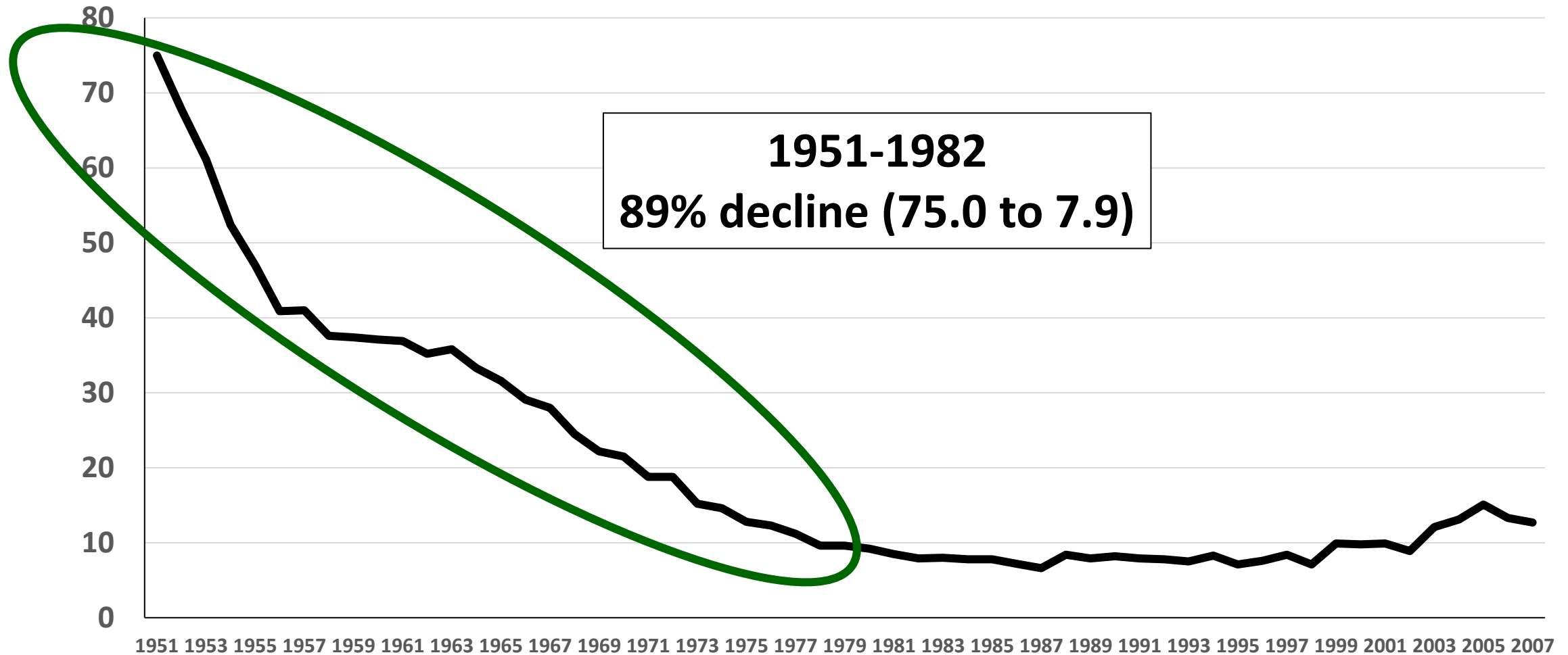
**27.8**

**Maternal  
Mortality  
(42 days)**

**18.6**

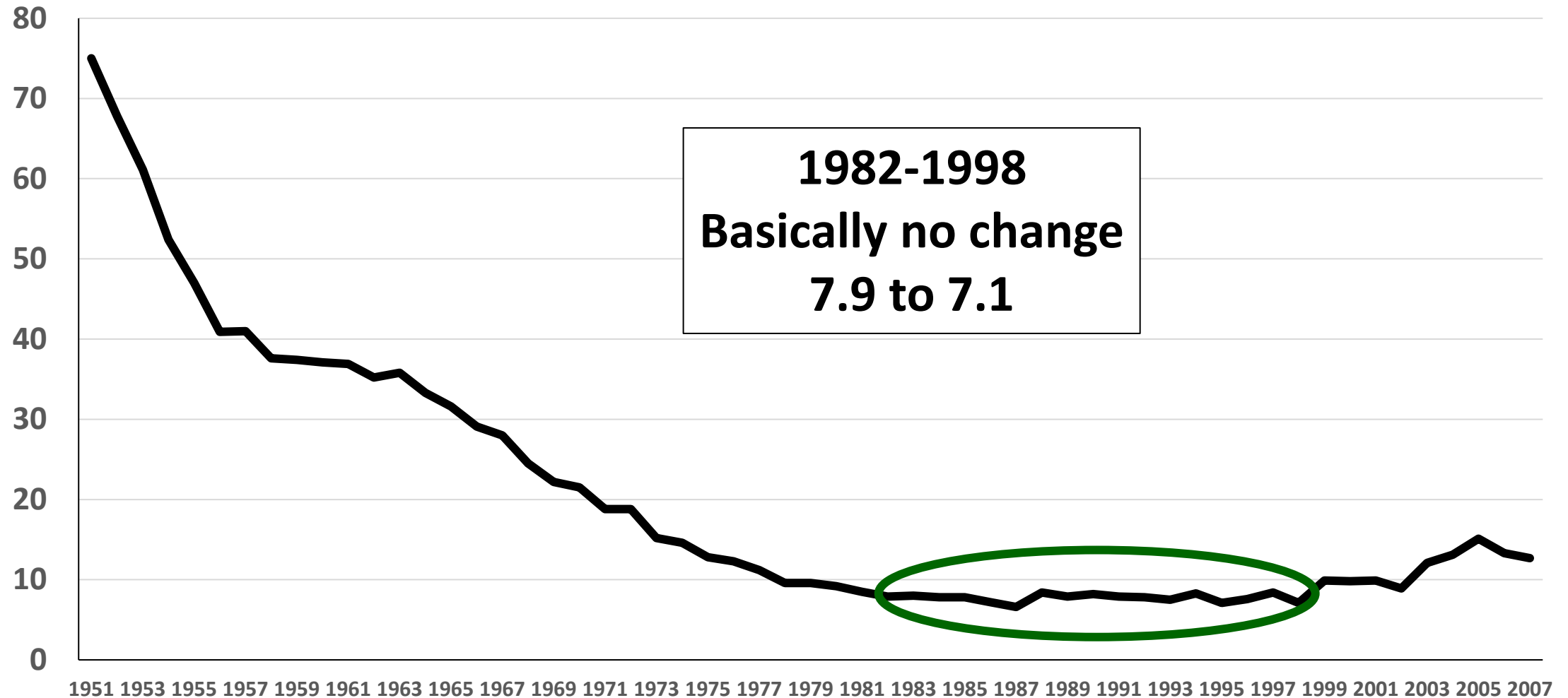
*Since current international and older U.S. reporting used maternal mortality ratios, we'll primarily be focusing on those*

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



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

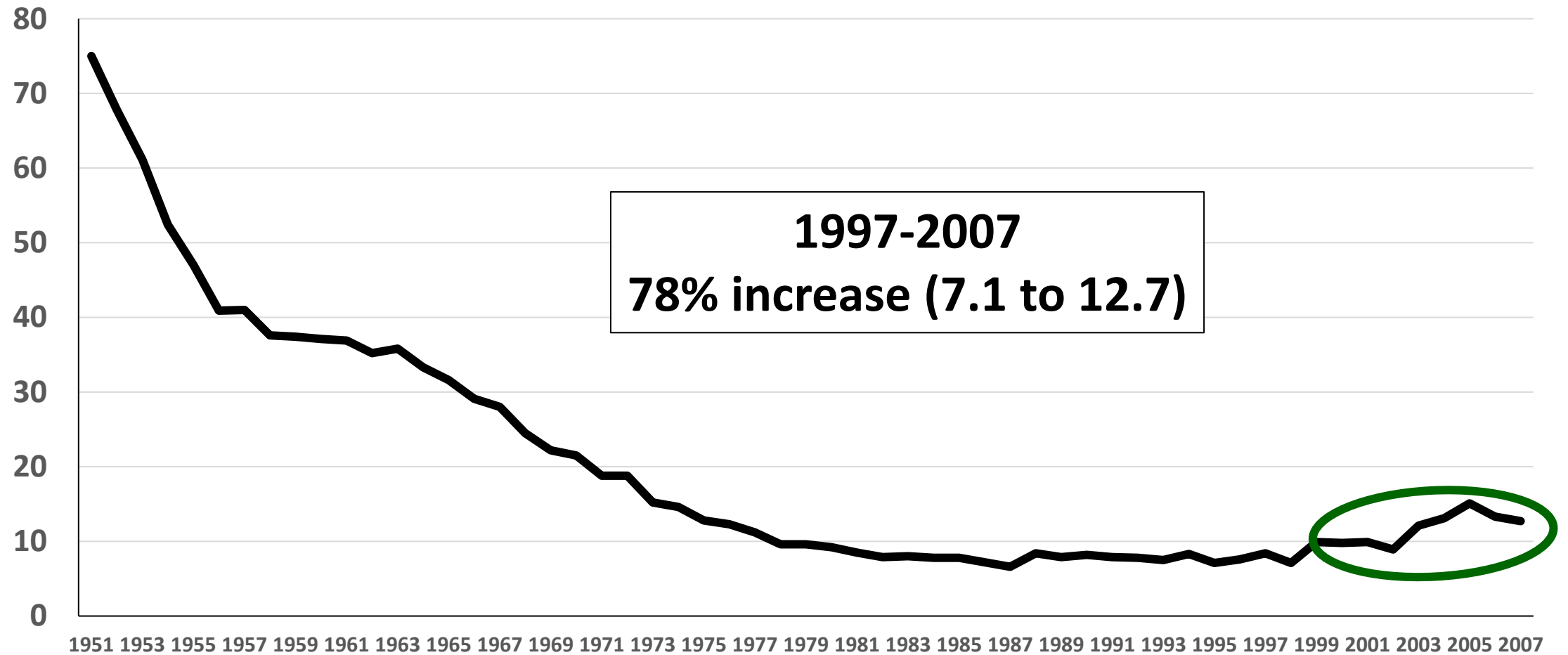
# U.S. Maternal Mortality (per 100,000 live births), 1951-2007



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

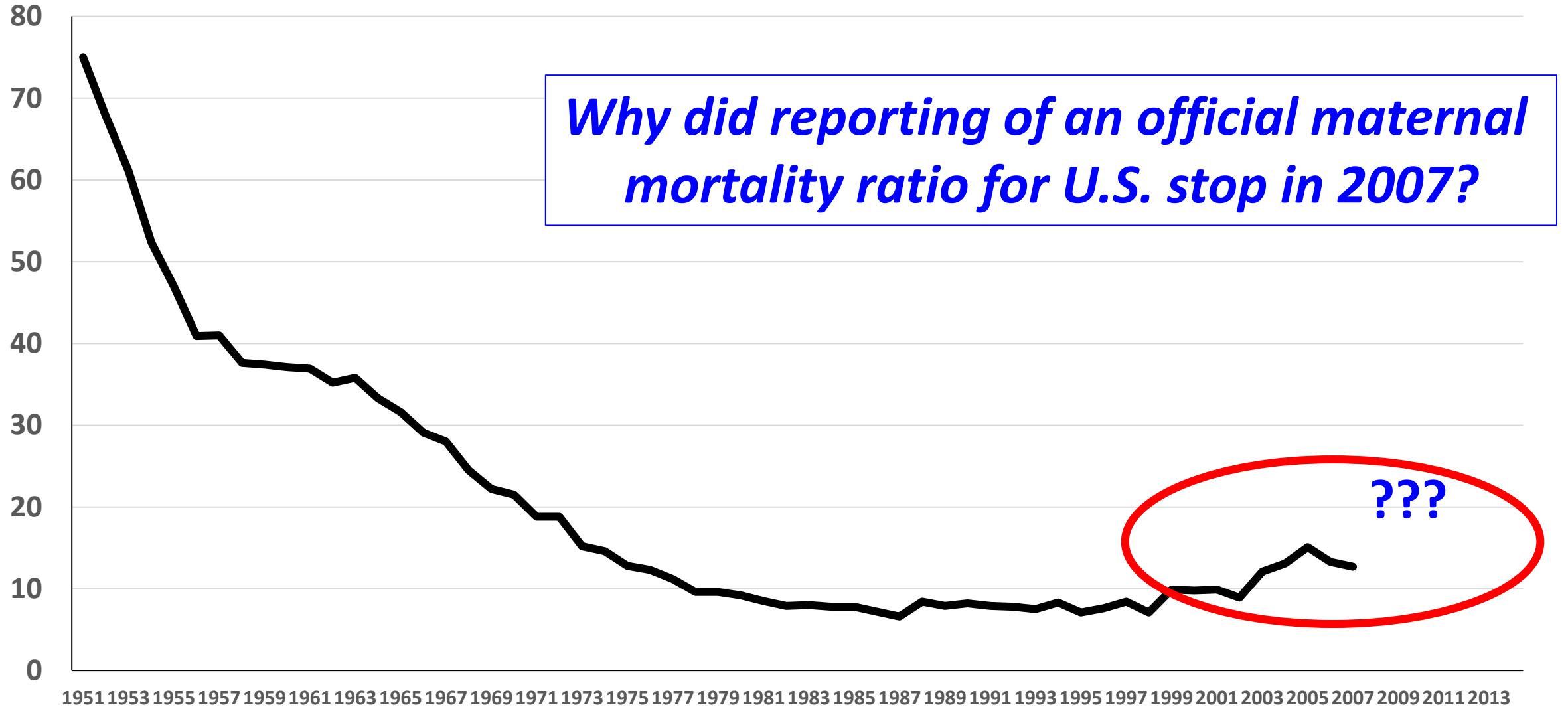


# U.S. Maternal Mortality (per 100,000 live births), 1951-2007



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

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



***How did the U.S. get to the point where they stopped publishing a maternal mortality rate?***

***Efforts to avoid poor case ascertainment led to over-ascertainment***

# The Case of the Pregnancy Checkbox

*“This difficulty [in measuring maternal mortality] would be solved easily if universal birth and stillbirth registration was practiced and if death certificates required a statement as to the association of the puerperal state.”*

*Committee on Maternal Welfare. Maternal Mortality in Philadelphia 1931-1933 (1934)*



Revised (2003) U.S. Standard Certificate of Death

U.S. STANDARD CERTIFICATE OF DEATH

LOCAL FILE NO. STATE FILE NO.

1. DECEDENT'S LEGAL NAME (Include AKA's if any) (First, Middle, Last) 2. SEX 3. SOCIAL SECURITY NUMBER

4a. AGE-Last Birthday (Years) 4b. UNDER 1 YEAR 4c. UNDER 1 DAY 5. DATE OF BIRTH (Mo/Day/Yr) 6. BIRTHPLACE (City and State or Foreign Country)

7a. RESIDENCE-STATE 7b. COUNTY 7c. CITY OR TOWN

7d. STREET AND NUMBER 7e. APT. NO. 7f. ZIP CODE 7g. INSIDE CITY LIMITS? ☐ Yes ☐ No

8. EVER IN US ARMED FORCES? ☐ Yes ☐ No 9. MARITAL STATUS AT TIME OF DEATH ☐ Married ☐ Married, but separated ☐ Widowed ☐ Divorced ☐ Never Married ☐ Unknown 10. SURVIVING SPOUSE'S NAME (If wife, give name prior to first marriage)

11. FATHER'S NAME (First, Middle, Last) 12. MOTHER'S NAME PRIOR TO FIRST MARRIAGE (First, Middle, Last)

13a. INFORMANT'S NAME 13b. RELATIONSHIP TO DECEDENT 13c. MAILING ADDRESS (Street and Number, City, State, Zip Code)

14. PLACE OF DEATH (Check only one: see instructions)

IF DEATH OCCURRED IN A HOSPITAL: ☐ Hospital ☐ Emergency Room/Outpatient ☐ Dead on Arrival ☐ Hospice facility ☐ Nursing home/Long term care facility ☐ Decedent's home ☐ Other (Specify):

15. FACILITY NAME (If not institution, give street & number) 16. CITY OR TOWN, STATE, AND ZIP CODE 17. COUNTY OF DEATH

18. METHOD OF DISPOSITION: ☐ Burial ☐ Cremation ☐ Donation ☐ Entombment ☐ Removal from State ☐ Other (Specify): 19. PLACE OF DISPOSITION (Name of cemetery, crematory, other place)

20. LOCATION-CITY, TOWN, AND STATE 21. NAME AND COMPLETE ADDRESS OF FUNERAL FACILITY

22. SIGNATURE OF FUNERAL SERVICE LICENSEE OR OTHER AGENT 23. LICENSE NUMBER (Of Licensee)

ITEMS 24-28 MUST BE COMPLETED BY PERSON WHO PRONOUNCES OR CERTIFIES DEATH

24. DATE PRONOUNCED DEAD (Mo/Day/Yr) 25. TIME PRONOUNCED DEAD

26. SIGNATURE OF PERSON PRONOUNCING DEATH (Only when applicable) 27. LICENSE NUMBER 28. DATE SIGNED (Mo/Day/Yr)

29. ACTUAL OR PRESUMED DATE OF DEATH (Mo/Day/Yr) (Spell Month) 30. ACTUAL OR PRESUMED TIME OF DEATH 31. WAS MEDICAL EXAMINER OR CORONER CONTACTED? ☐ Yes ☐ No

CAUSE OF DEATH (See instructions and examples)

32. PART I. Enter the chain of events—diseases, injuries, or complications—that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition resulting in death) a. Due to (or as a consequence of):

Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST b. Due to (or as a consequence of):

c. Due to (or as a consequence of):

d. Due to (or as a consequence of):

APPROXIMATE INTERVAL: Onset to death

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in PART I

33. WAS AN AUTOPSY PERFORMED? ☐ Yes ☐ No

34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? ☐ Yes ☐ No

35. DID TOBACCO USE CONTRIBUTE TO DEATH? ☐ Yes ☐ Probably ☐ No ☐ Unknown

35. IF FEMALE: ☐ Not pregnant within past year ☐ Pregnant at time of death ☐ Not pregnant, but pregnant within 42 days of death ☐ Not pregnant, but pregnant 43 days to 1 year before death ☐ Unknown if pregnant within the past year

37. MANNER OF DEATH ☐ Natural ☐ Homicide ☐ Accident ☐ Pending Investigation ☐ Suicide ☐ Could not be determined

38. DATE OF INJURY (Mo/Day/Yr) (Spell Month) 39. TIME OF INJURY 40. PLACE OF INJURY (e.g., Decedent's home, construction site, restaurant, wooded area) 41. INJURY AT WORK? ☐ Yes ☐ No

42. LOCATION OF INJURY: State: City or Town: Street & Number: Apartment No.: Zip Code:

43. DESCRIBE HOW INJURY OCCURRED: 44. IF TRANSPORTATION INJURY, SPECIFY: ☐ Driver/Operator ☐ Passenger ☐ Native Hawaiian ☐ Pedestrian ☐ Other (Specify):

45. CERTIFIER (Check only one): ☐ Certifying physician-To the best of my knowledge, death occurred due to the cause(s) and manner stated. ☐ Pronouncing & Certifying physician-To the best of my knowledge, death occurred at the time, date, and place, and due to the cause(s) and manner stated. ☐ Medical Examiner/Coroner-On the basis of examination, and/or investigation, in my opinion, death occurred at the time, date, and place, and due to the cause(s) and manner stated.

Signature of certifier: \_\_\_\_\_

46. NAME, ADDRESS, AND ZIP CODE OF PERSON COMPLETING CAUSE OF DEATH (Item 32)

47. TITLE OF CERTIFIER 48. LICENSE NUMBER 49. DATE CERTIFIED (Mo/Day/Yr) 50. FOR REGISTRAR ONLY- DATE FILED (Mo/Day/Yr)

51. DECEDENT'S EDUCATION-Check the box that best describes the highest degree or level of school completed at the time of death. ☐ 8th grade or less ☐ 9th - 12th grade; no diploma ☐ High school graduate or GED completed ☐ Some college credit, but no degree ☐ Associate degree (e.g., AA, AS) ☐ Bachelor's degree (e.g., BA, AB, BS) ☐ Master's degree (e.g., MA, MS, MEng, MEd, MSc, MBA) ☐ Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)

52. DECEDENT OF HISPANIC ORIGIN? Check the box that best describes whether the decedent is Spanish/Hispanic/Latino. Check the "No" box if decedent is not Spanish/Hispanic/Latino. ☐ No, not Spanish/Hispanic/Latino ☐ Yes, Mexican, Mexican American, Chicano ☐ Yes, Puerto Rican ☐ Yes, Cuban ☐ Yes, other Spanish/Hispanic/Latino (Specify):

53. DECEDENT'S RACE (Check one or more races to indicate what the decedent considered himself or herself to be) ☐ White ☐ Black or African American ☐ American Indian or Alaska Native (Name of the enrolled or principal tribe) ☐ Asian Indian ☐ Chinese ☐ Filipino ☐ Japanese ☐ Korean ☐ Vietnamese ☐ Other Asian (Specify): ☐ Native Hawaiian ☐ Guamanian or Chamorro ☐ Samoan ☐ Other Pacific Islander (Specify): ☐ Other (Specify):

54. DECEDENT'S USUAL OCCUPATION (Indicate type of work done during most of working life; DO NOT USE RETIRED).

55. KIND OF BUSINESS/INDUSTRY

PART II (Other significant conditions)

•Enter all diseases or conditions contributing to death that were not reported in the chain of events in Part I and that did not result in the underlying cause of death. See attached examples.

•If two or more possible sequences resulted in death, or if two conditions seem to have added together, report in Part I the one that, in your opinion, most directly caused death. Report in Part II the other conditions or diseases.

CHANGES TO CAUSE OF DEATH

Should additional medical information or autopsy findings become available that would change the cause of death originally reported, the original death certificate should be amended by the certifying physician by immediately reporting the revised cause of death to the State Vital Records Office.

ITEMS 33-34 - AUTOPSY

•33 - Enter "Yes" if either a partial or full autopsy was performed. Otherwise enter "No".

•34 - Enter "Yes" if autopsy findings were available to complete the cause of death; otherwise enter "No". Leave item blank if no autopsy was performed.

ITEM 35 - DID TOBACCO USE CONTRIBUTE TO DEATH?

Check "yes" if, in your opinion, the use of tobacco contributed to death. Tobacco use may contribute to deaths due to a wide variety of diseases; for example, tobacco use contributes to many deaths due to emphysema or lung cancer and some heart disease and cancers of the head and neck. Check "no" if, in your clinical judgment, tobacco use did not contribute to this particular death.

ITEM 36 - IF FEMALE, WAS DECEDENT PREGNANT AT TIME OF DEATH OR WITHIN PAST YEAR?

This information is important in determining pregnancy-related mortality.

ITEM 37 - MANNER OF DEATH

•Always check Manner of Death, which is important: 1) in determining accurate causes of death; 2) in processing insurance claims; and 3) in statistical studies of injuries and death.

•Indicate "Pending investigation" if the manner of death cannot be determined whether due to an accident, suicide, or homicide within the statutory time limit for filing the death certificate. This should be changed later to one of the other terms.

•Indicate "Could not be Determined" ONLY when it is impossible to determine the manner of death.

# To improve case identification:

## *U.S. Standard Pregnancy Question, 2003 (sort of)*

Checkbox format:

IF FEMALE:

- ☐ Not pregnant within past year
- ☐ Pregnant at time of death
- ☐ Not pregnant, but pregnant within 42 days of death
- ☐ Not pregnant, but pregnant 43 days to 1 year before death
- ☐ Unknown if pregnant within the past year

*Meant to solve 2 problems:*

*(1) Most states had no such question; and*

*(2) Different questions used in different states that did ask about pregnancy status.*

*But not every state agreed to participate in the new system right away*

# Delays in Adoption of the U.S. Standard Pregnancy Question among States

| State            | Year Adopted |
|------------------|--------------|
| CA, ID, MT, NY   | 2003         |
| New Jersey       | 2004         |
| Florida          | 2005         |
| Kentucky         | Mid 2010     |
| <b>Tennessee</b> | <b>2012</b>  |
| Massachusetts    | 9/2014       |
| Alabama          | 2016         |
| <b>W. VA</b>     | <b>2017</b>  |

\* Note: Some states adopted change in the middle of the calendar year.

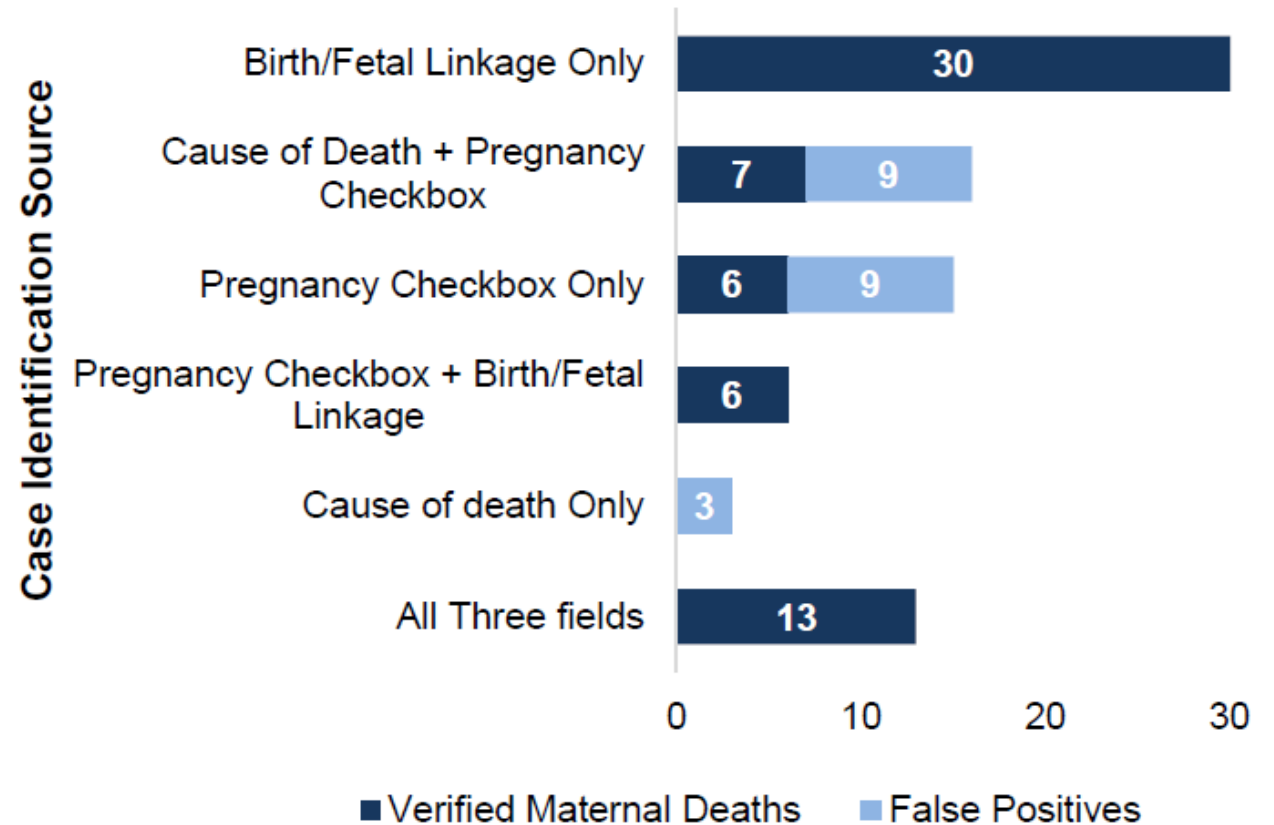
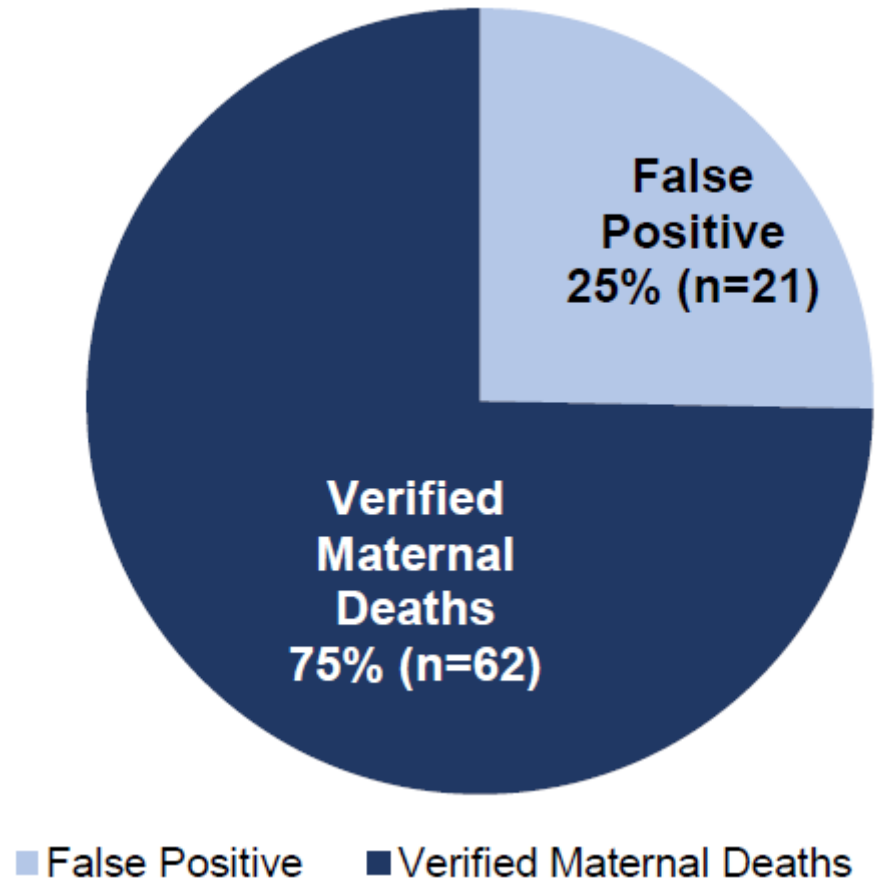
|      | New Adopters* | Total |
|------|---------------|-------|
| 2003 | 4             | 4     |
| 2004 | 7             | 11    |
| 2005 | 7             | 18    |
| 2006 | 4             | 22    |
| 2007 | 2             | 24    |
| 2008 | 7             | 31    |
| 2009 | 0             | 31    |
| 2010 | 4             | 35    |
| 2011 | 2             | 37    |
| 2012 | 4             | 41    |
| 2013 | 1             | 42    |
| 2014 | 5             | 47    |
| 2015 | 2             | 49    |
| 2016 | 1             | 50    |
| 2017 | 1             | 51    |

# Two key problems raised by the checkbox

1. Over ascertainment

2 Loss of precision in identifying causes of maternal death – the rise of “other” causes.

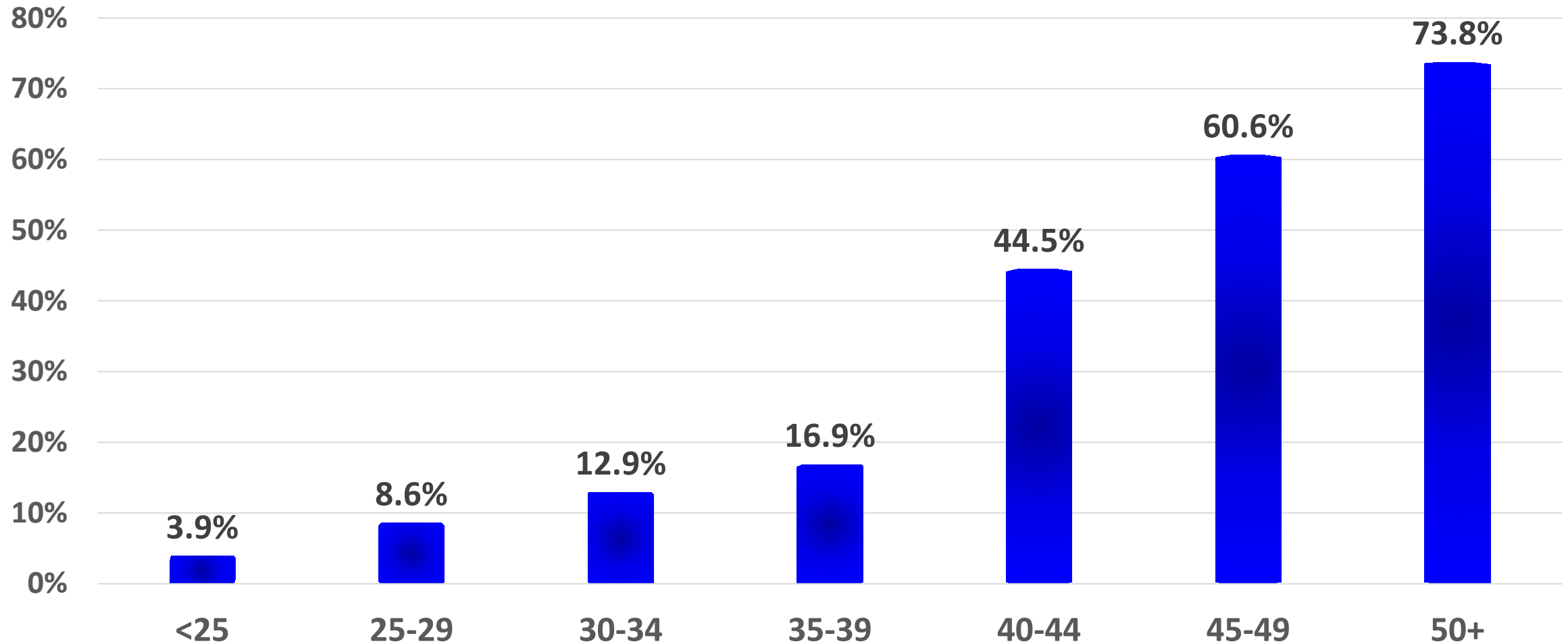
# Pregnancy-Associated Death Case Verification, Tennessee 2019



***In 2019, 1,650 deaths to women 15-44 in Tennessee – 21 false positives are 1.3% of total***

Source: TN Dept. of Health.(2022) 2021 Tennessee Maternal Mortality Annual Report.

# False Positives on the Pregnancy Checkbox by Age



Source: Adapted from Catalano A. Validity of the Pregnancy Checkbox. *AJOG*.2019.online.

# It's Never Simple: Impact of the Checkbox – Worse and Better Ascertainment

- While the checkbox contributed to errors, a Four MMRC Committee study showed that the **checkbox also improved identification of pregnancy-related deaths**. **Without the pregnancy checkbox, states would have missed approximately:**
  - **50% of pregnancy-related deaths that occurred during pregnancy**
  - **11% of pregnancy-related deaths that occurred within 42 days of the end of pregnancy, and**
  - **8% of pregnancy-related deaths that occurred within 43 days to 1 year of the end of pregnancy**

**would have been missed.**



# How can there be so much misclassification?

## *Who completes death certificates?*

- *Death certificates can be signed by **a medical examiner, a primary physician, an attending physician, a non-attending physician, a nurse practitioner, a forensic pathologist or a coroner**, but it varies according to state law. In Texas, for example, a justice of the peace can sign. Typically, deaths have to be recorded with local health departments within 72 hours of the death, and to the state within five to seven days.*
- *Only about 8% of death certifications involve an autopsy*

PBS. Frontline. PostMortem.(2/1/2011) <https://www.pbs.org/wgbh/pages/frontline/post-mortem/things-to-know/death-certificates.html>

***Is there another system?***

***The Pregnancy Related Mortality  
Surveillance System***

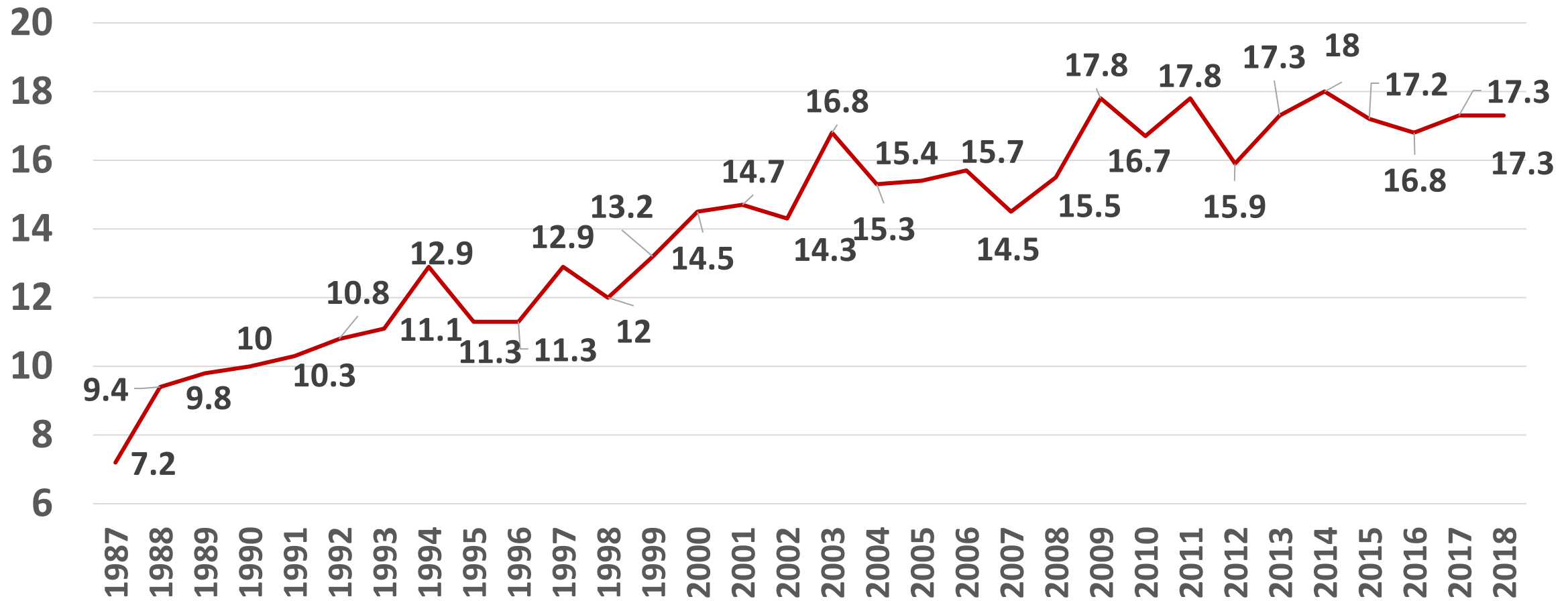
# Data for CDCs Pregnancy Related Mortality System

*Each year, CDC requests the 52 reporting areas (50 states, New York City, and Washington DC) to **voluntarily send copies of death certificates for all women who died during pregnancy or within 1 year of pregnancy, and copies of the matching birth or fetal death certificates**, if they have the ability to perform such record links. All of the information obtained is summarized, and medically trained epidemiologists determine the cause and time of death related to the pregnancy. Causes of death are coded by using a system established in 1986 by the American College of Obstetricians and Gynecologists and the Centers for Disease Control and Prevention Maternal Mortality Study Group.*

# Our best existing measure

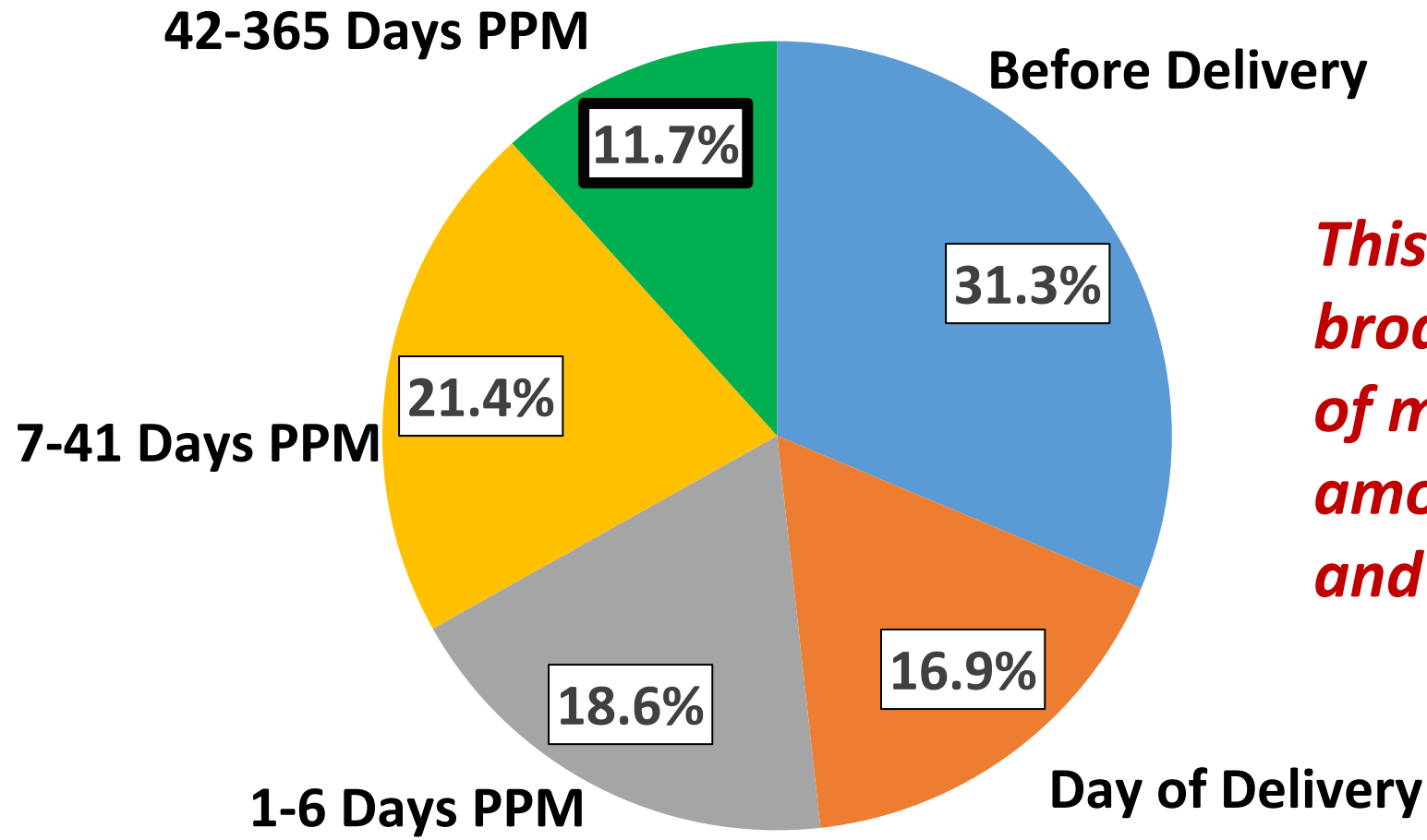
## *Pregnancy Related Mortality, U.S., 1987-2018*

Pregnancy Related Mortality Ratio (per 100,000 births)



Source: CDC. Adapted from Creanga. Pregnancy-Related Mortality in the United States. *Obstet Gynecol* 2017 & Petersen E. et al. Vital Signs: Pregnancy-Related Deaths, U.S., 2011–2015,. *MMWR* .vol.68. May 7, 2019. 1-7 & Petersen E et al. Racial/Ethnic Disparities in Pregnancy Related Deaths – U.S. 2007-'16. *MMWR* 9/6/19.

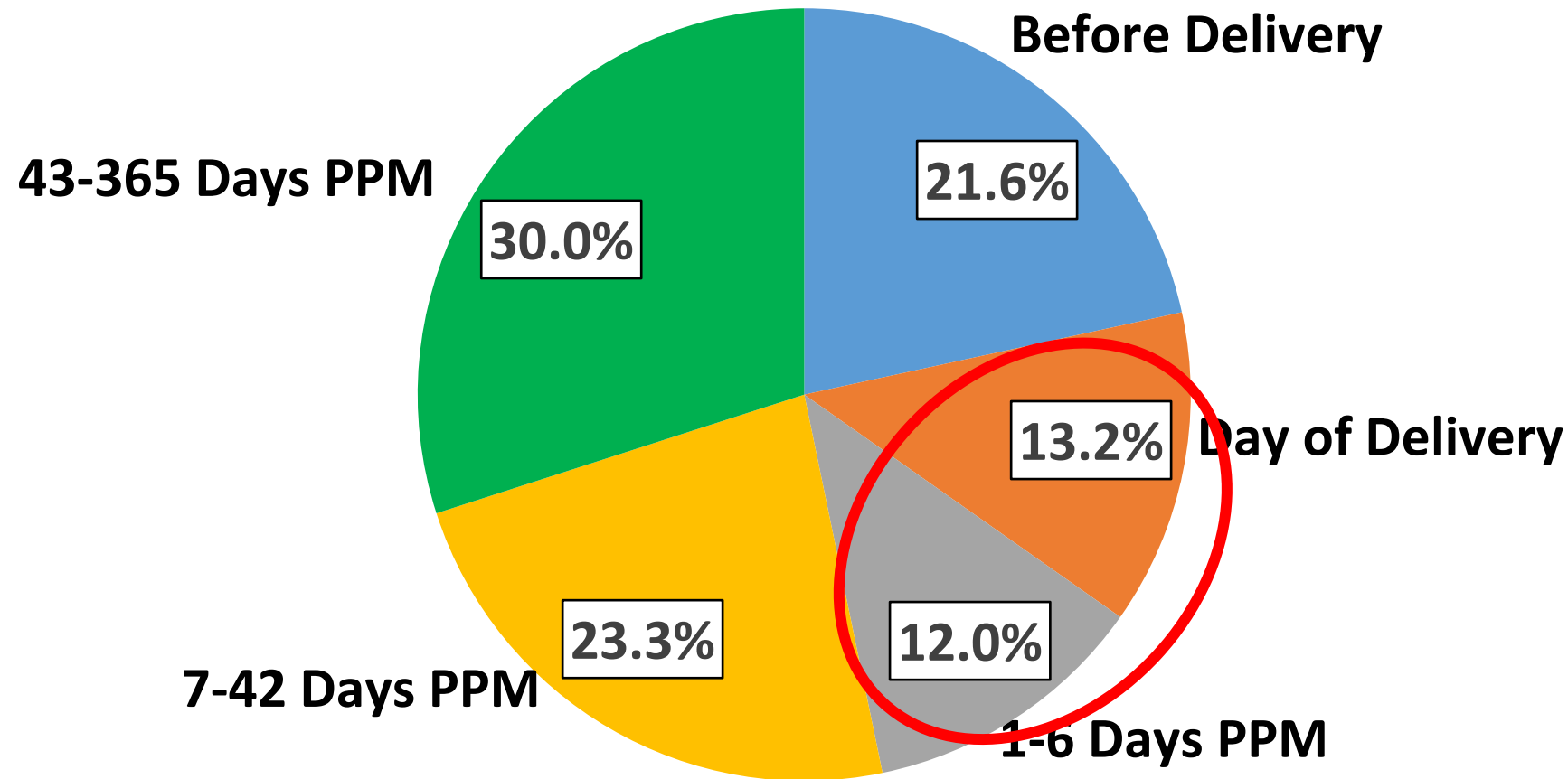
# Timing of Maternal Deaths



*This changed the broader understanding of maternal mortality among policymakers and the public*

Source: 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.

# Timing of Maternal Deaths

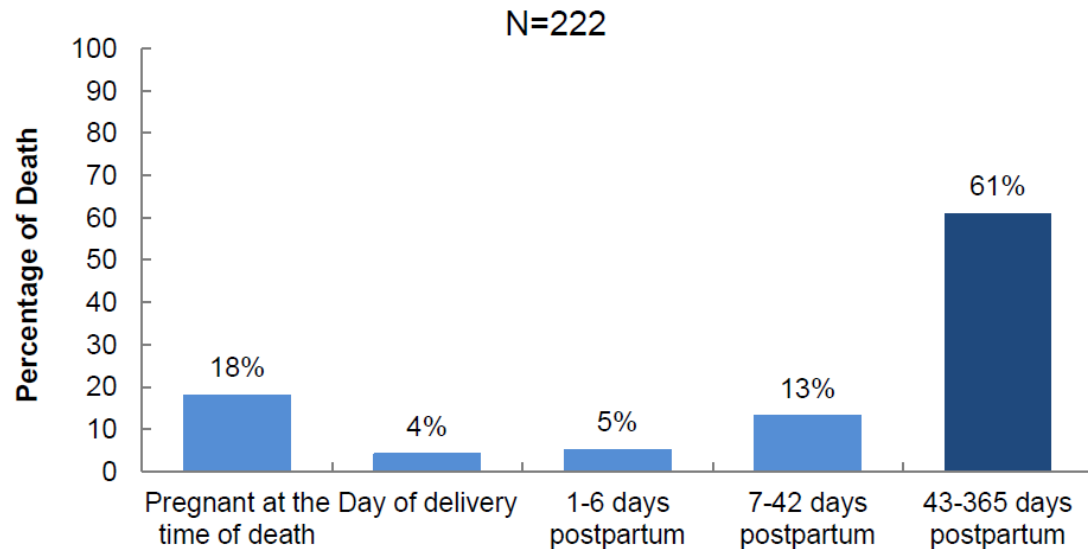


***This is the  
foundation for  
extending  
postpartum  
Medicaid  
(Tenn. started  
4/4/22)***

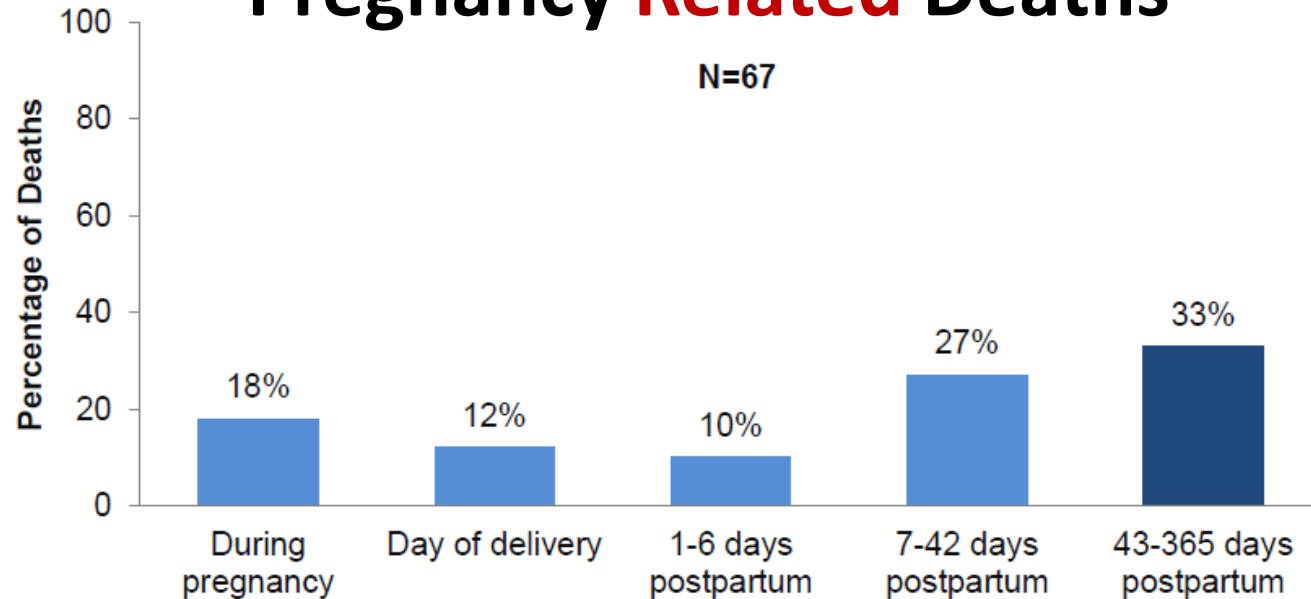
Source: Trost SL, Beauregard J, Njie F, et al. *Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees in 36 US States, 2017–2019*. Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services; 2022.

# Timing of Pregnancy **Associated & Related** Deaths, TN, 2017-2019

## Pregnancy **Associated** Deaths



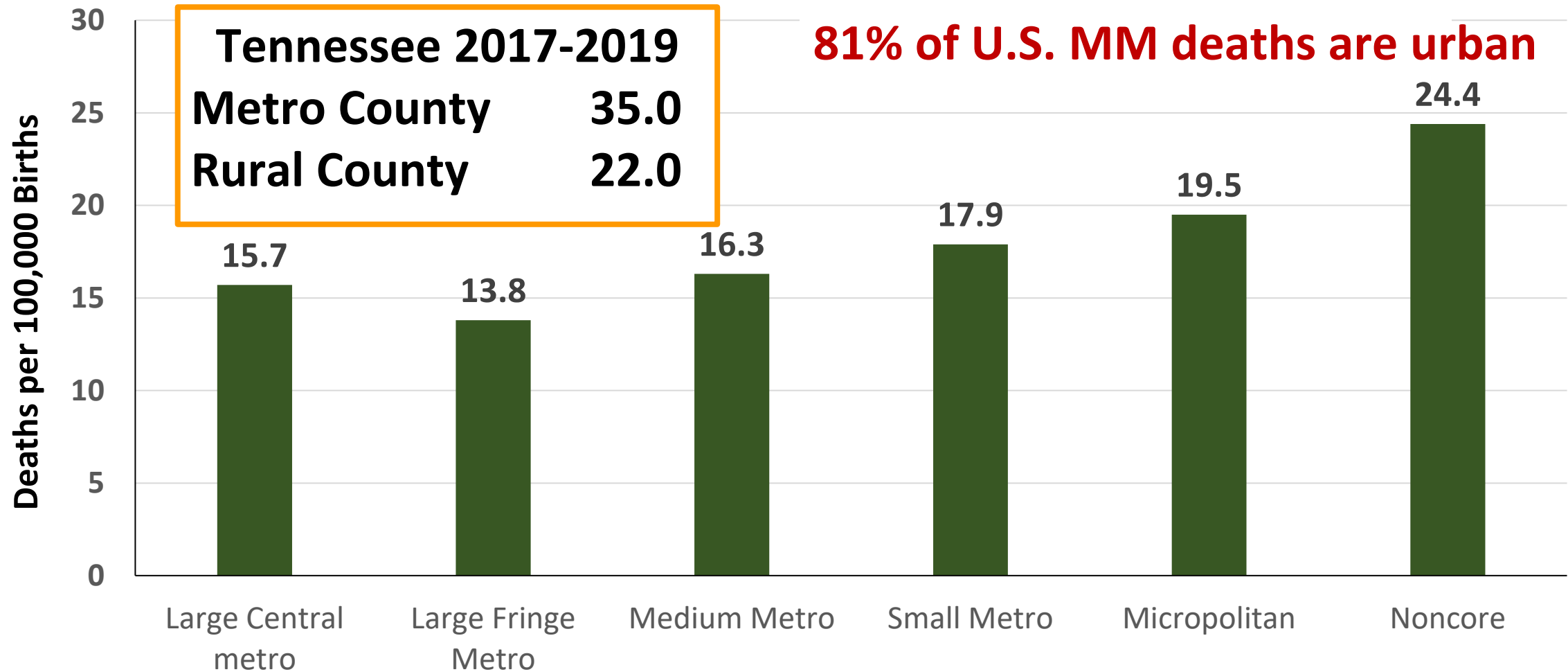
## Pregnancy **Related** Deaths



**60% of pregnancy **related** and 74% of pregnancy **associated** deaths are postpartum.**

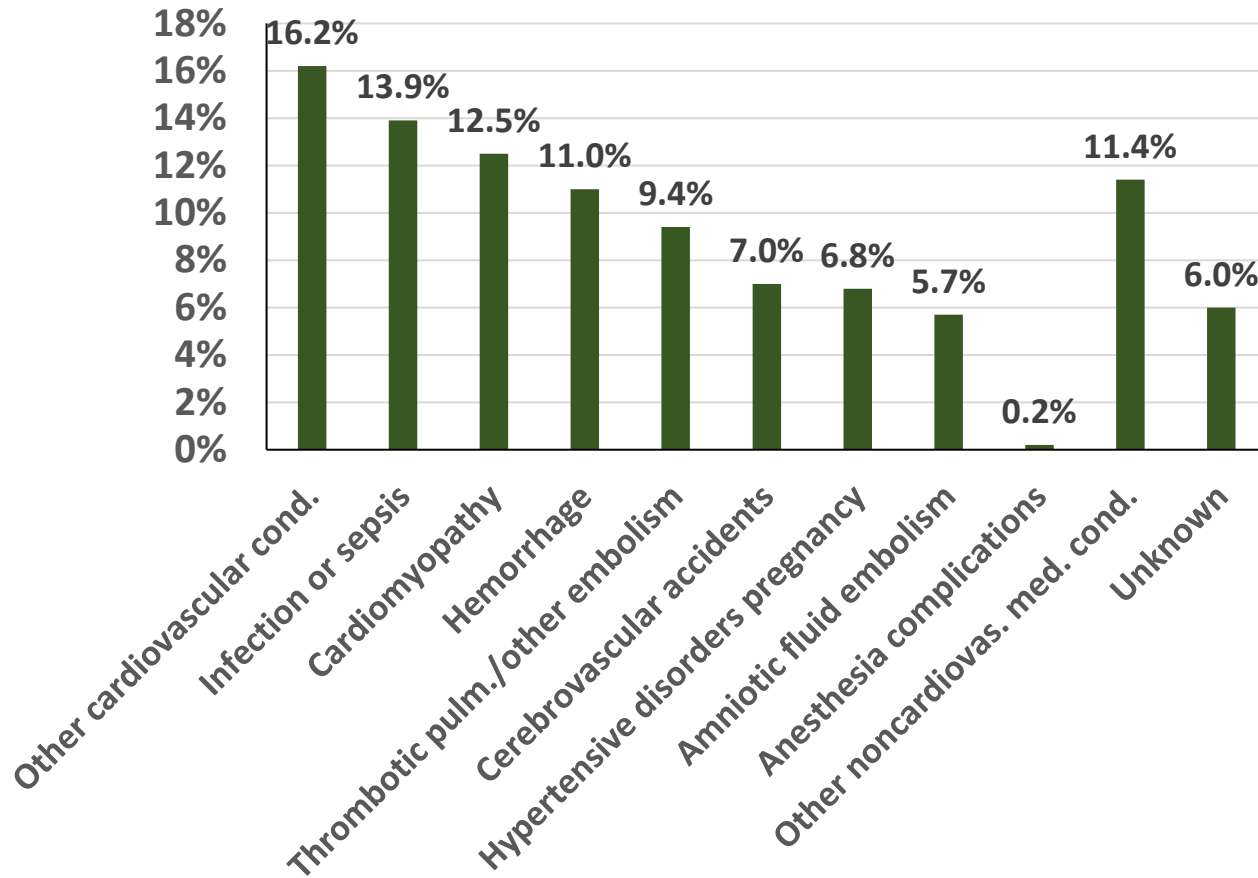


# Pregnancy-related mortality ratio by urban-rural classifications: 2016-2018

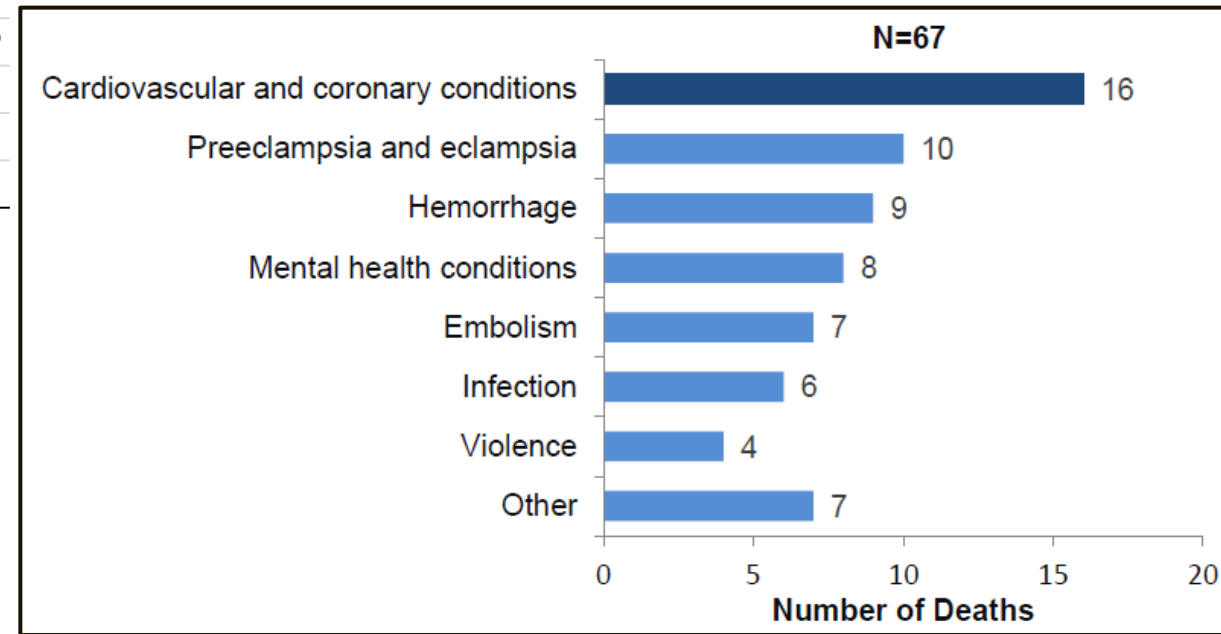


Source: CDC Website. [https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm#:~:text=The%20Pregnancy%20Mortality%20Surveillance%20System%20\(PMSS\)%20defines%20a%20pregnancy%2D,or%20aggravated%20by%20the%20pregnancy.e](https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.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

# Causes of pregnancy-related death in the United States: 2016-2018



## Tennessee, 2017-2019



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)

# Are maternal deaths preventable?

## 36 MMRCs in U.S. 2017-2019

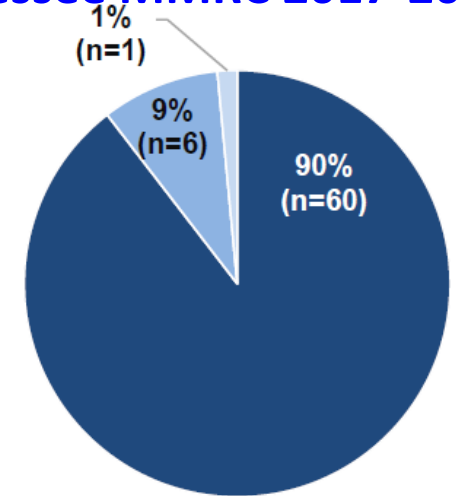
**Table 6.** Percentage of pregnancy-related deaths determined by MMRCs to be preventable, data from Maternal Mortality Review Committees in 36 US states, 2017–2019\*

|                 | n   | %    |
|-----------------|-----|------|
| Preventable     | 839 | 84.2 |
| Not Preventable | 157 | 15.8 |

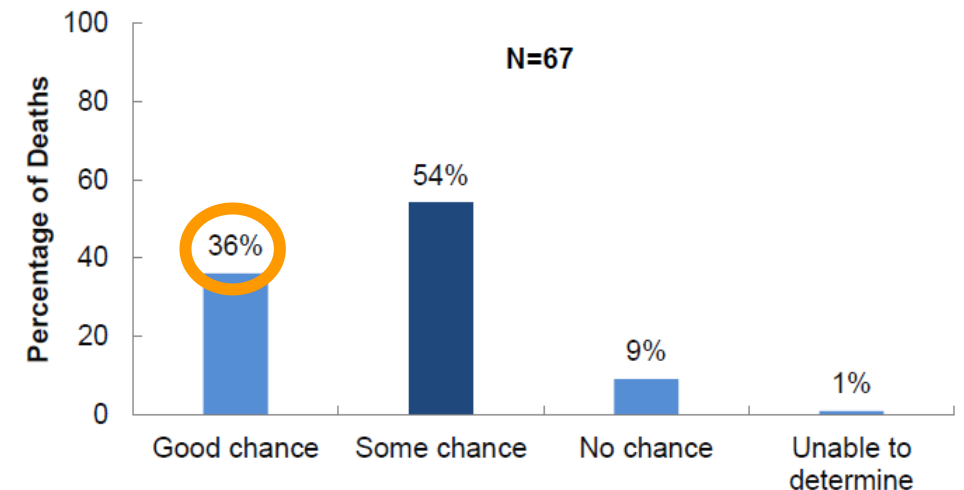
\*A preventability determination was missing (n=4) or unable to be determined (n=18) for a total of 22 (2.2%) pregnancy-related deaths.

***Balancing advocacy and reality –  
how much is controllable by the  
medical and public health system  
& how much requires a functional  
social system that identifies and  
treat problems early?***

## Tennessee MMRC 2017-2019



**Figure 16.** Committee's Determination on Chance to Alter Outcome for Pregnancy-Related Deaths, Tennessee, 2017-2019



# Comparing the U.S. to the Rest of the World

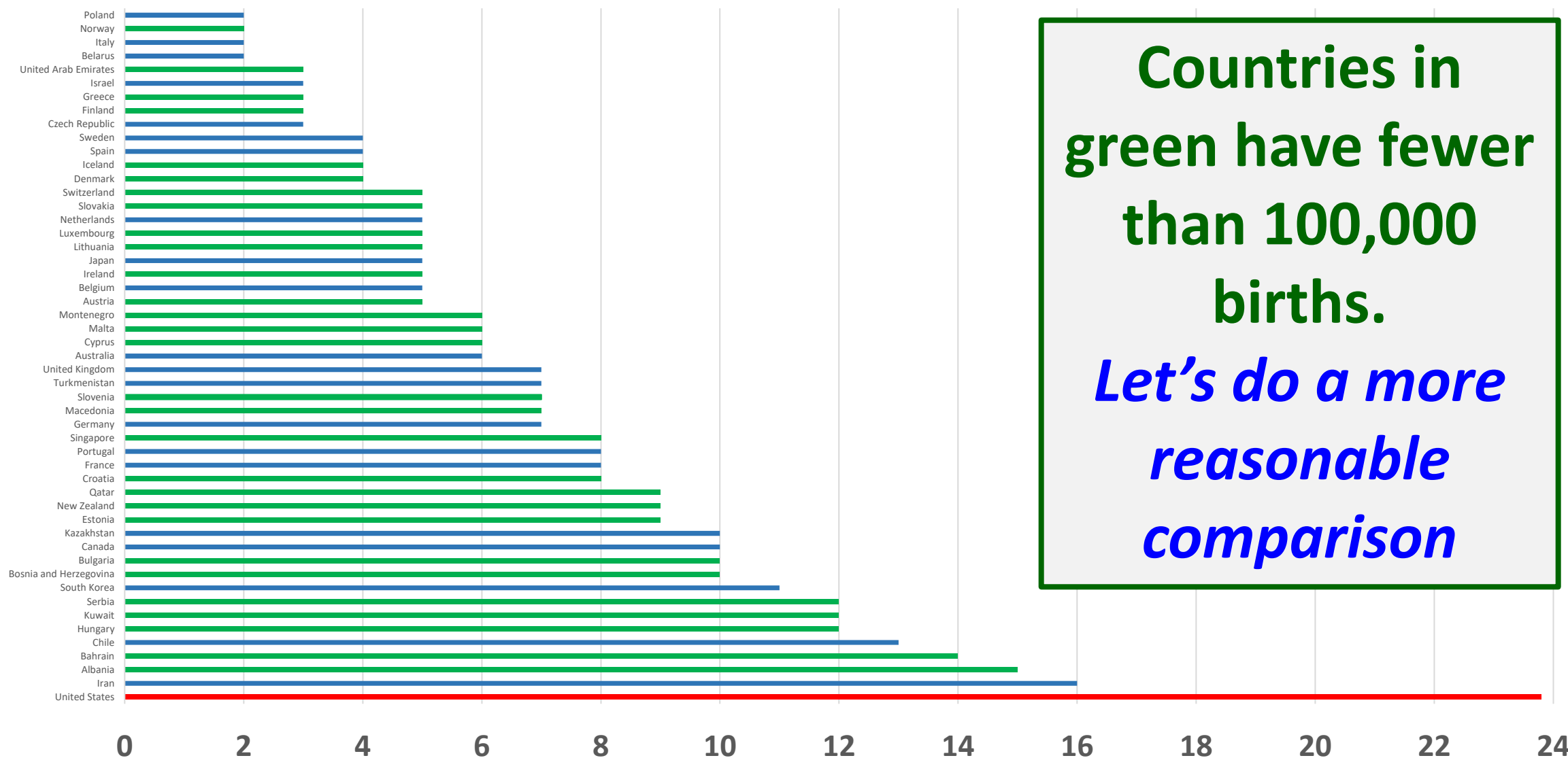
# U.S. in a Comparative Context, 1910, 1927, 2020

|                              | 1901-1910 <sup>1</sup> | 1927 <sup>2</sup> | 2017-2020 <sup>3</sup> |
|------------------------------|------------------------|-------------------|------------------------|
|                              | per 100K births        | per 100K births   | per 100K births        |
| Norway                       | 290                    | 245               | 0                      |
| Italy                        | 270                    | 264               | 3                      |
| Sweden                       | 230                    | 278               | 4                      |
| Australia                    | 530                    | 592               | 4                      |
| Northern Ireland             | 550                    | 480               | 5                      |
| England & Wales <sup>4</sup> | 410                    | 411               | 7                      |
| France                       | 520                    | 287               | 8                      |
| New Zealand                  | 460                    | 491               | 9                      |
| United States <sup>5</sup>   | 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. OECD Health Data 2022; WHO. *Trends in Maternal Mortality, 2000-2017*; 4. UK rate in 2017; 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), 2017-20

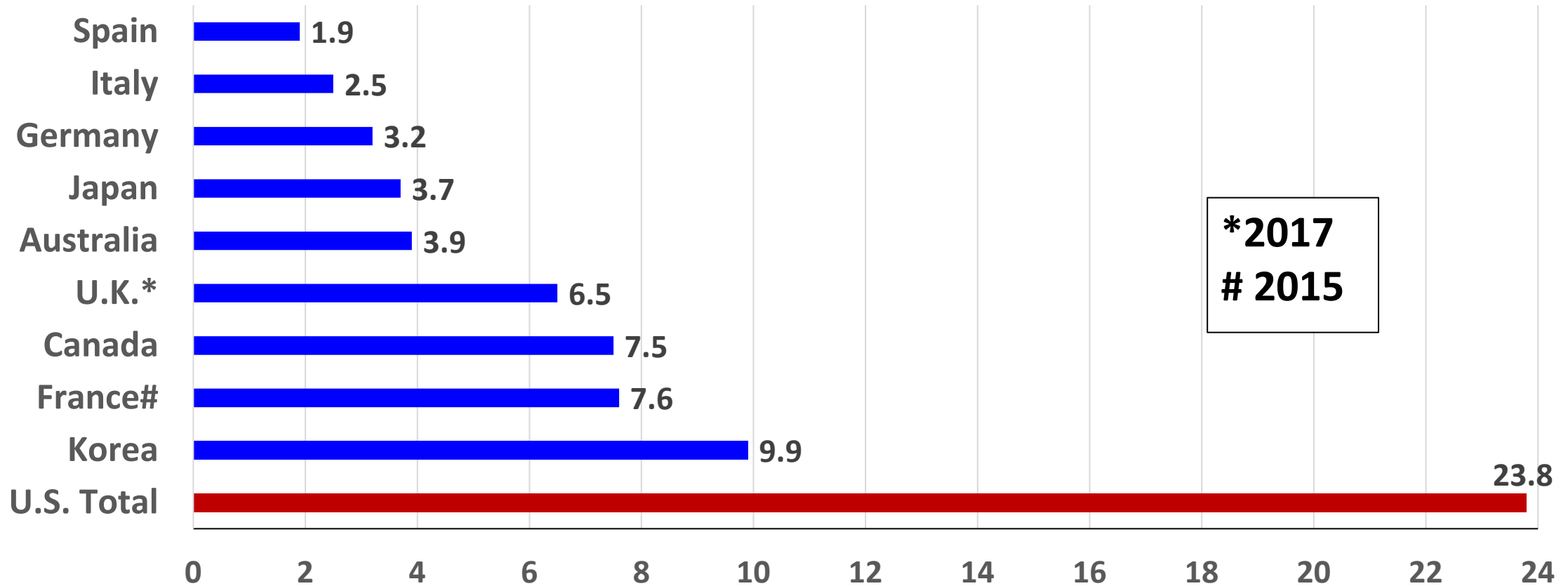


Source: WHO. *Trends In Maternal Mortality, 2000-2017*. (Geneva, 2019) . U.S. U.S. Hoyert DL NCHS E-Stats; 4/21. <https://doi.org/10.15620/cdc:103855>

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

# U.S. Maternal Mortality Ratio (per 100,000 births ) in 2020

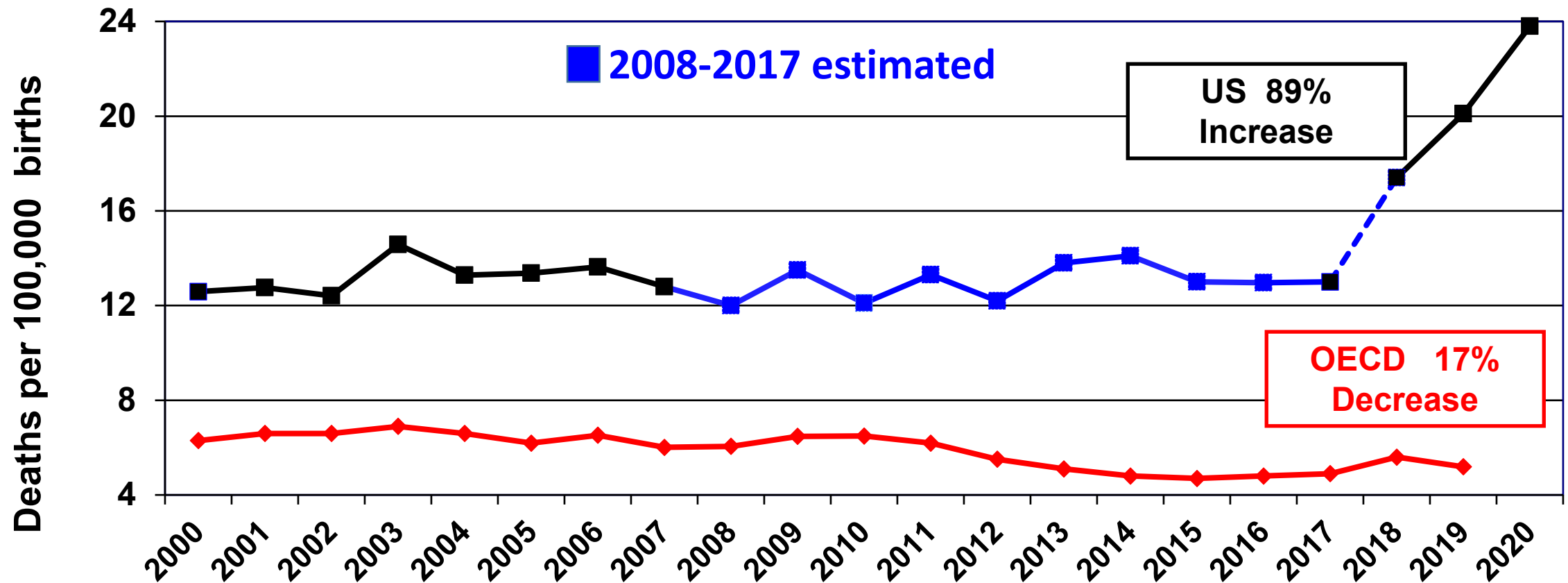
## Compared to Industrialized Countries with 300,000+ births, 2018-19



Source: OECD Health Data 2022 & U.S. Hoyert DL . NCHS Health E-Stats; 2/22/22.

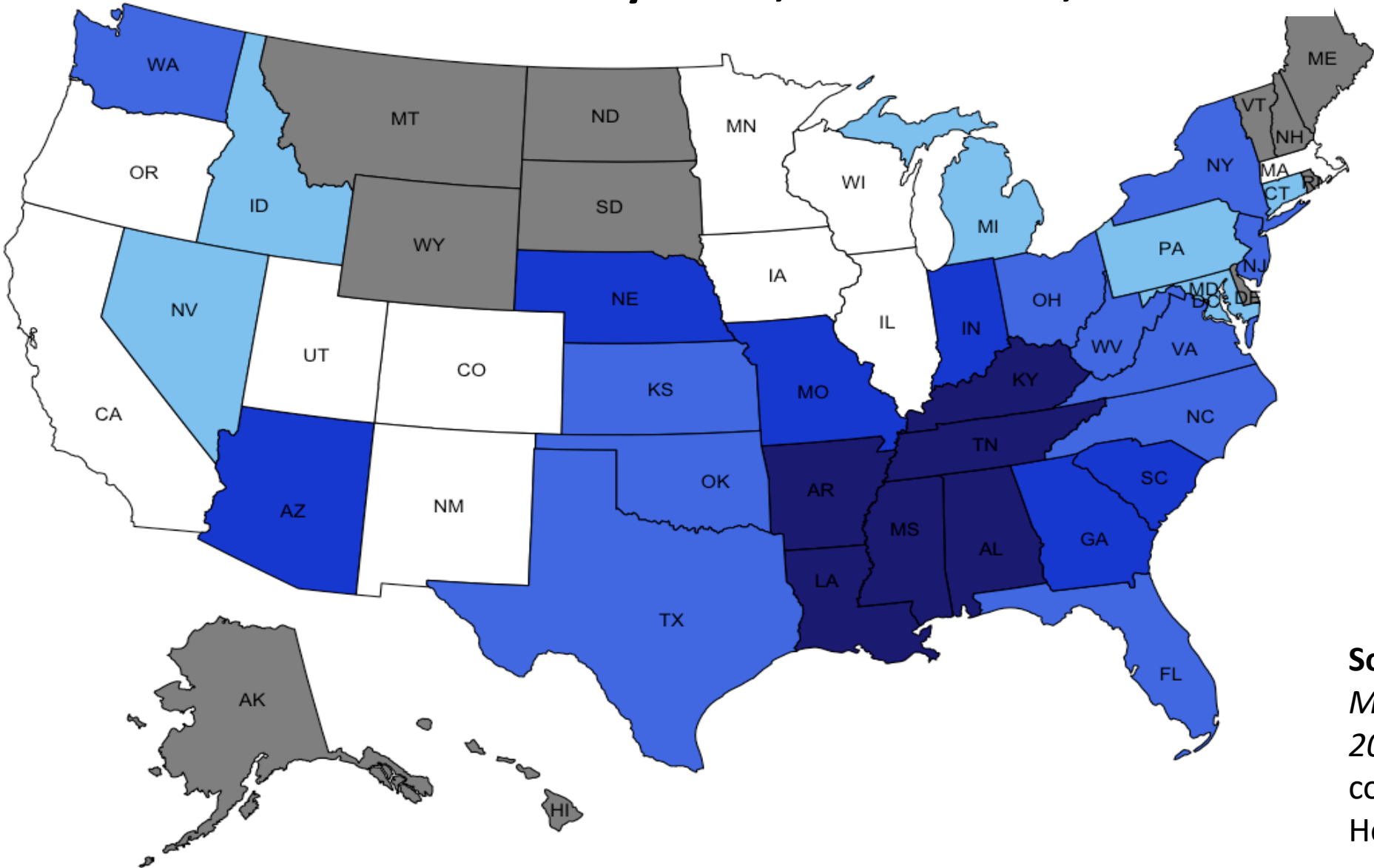


# Maternal Mortality Ratio (per 100K births), 2000-2020, U.S. & Comparable Countries\*



\* Countries with **300,000+** births (2017): Australia, Canada, France, Germany, Italy, Japan, S. Korea, Spain, United Kingdom

# Maternal Mortality Ratio, U.S. States\*, 2018-20



| State     | 2018-20 MMR |
|-----------|-------------|
| Arkansas  | 40.4        |
| Kentucky  | 39.7        |
| Alabama   | 36.2        |
| Tennessee | 34.6        |
| Louisiana | 31.8        |

**Source:** NCHS. NVSS.  
*Maternal Mortality by State, 2018-2020.* Personal communication, Donna Hoyert

\* States with < 10 maternal deaths, 2018-2020, are excluded from reporting

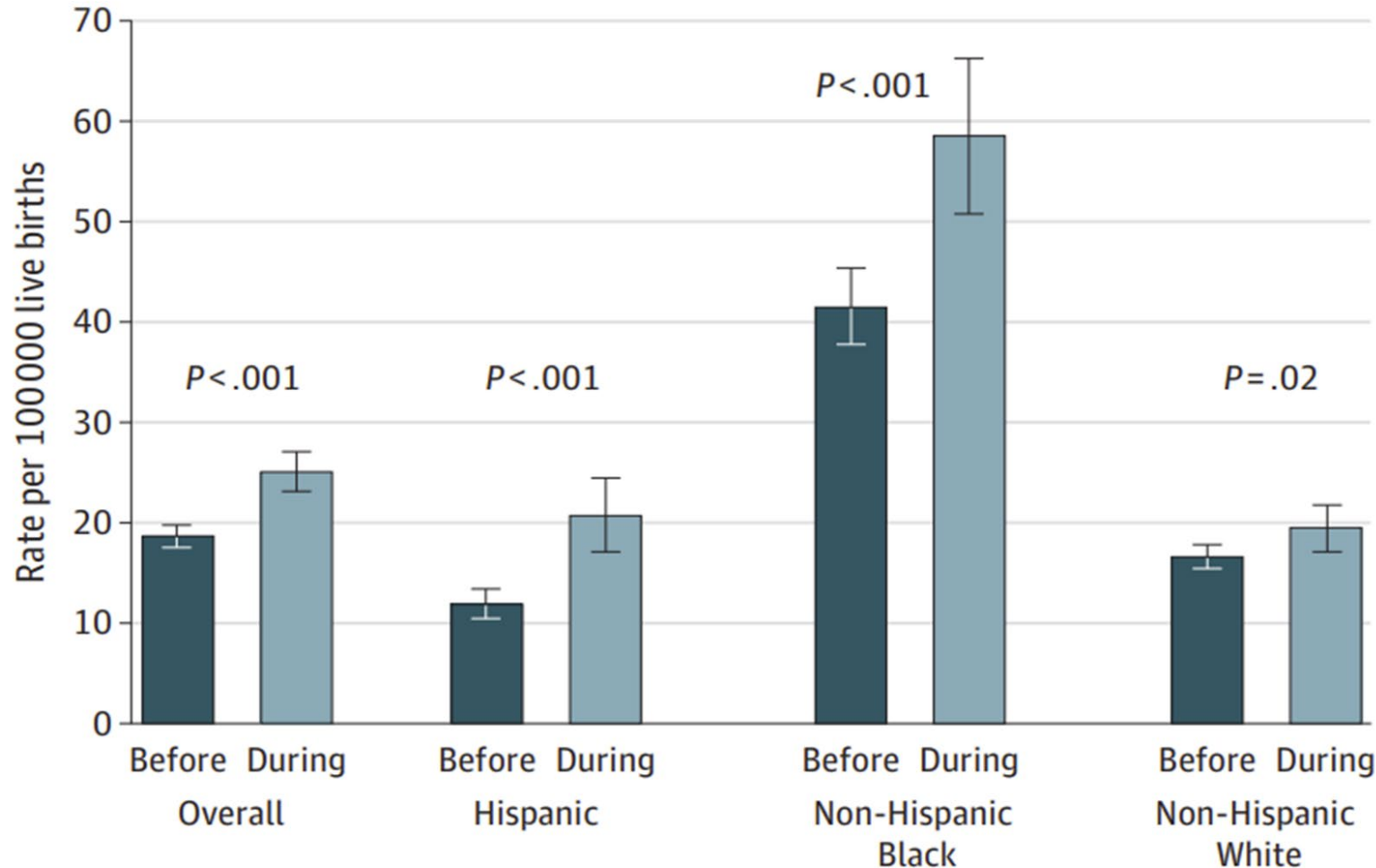
Mortality Rate per 100,000

|         |             |             |
|---------|-------------|-------------|
| No Data | 15.0 - 19.9 | 25.0 - 30.0 |
| <15.0   | 20.0 - 24.9 | 30.0+       |

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

# The Pandemic Influence??

## *U.S. Maternal Mortality Rates (95% CI) Before and During the COVID-19 Pandemic by Race and Ethnicity*



Race and ethnicity by period of the pandemic

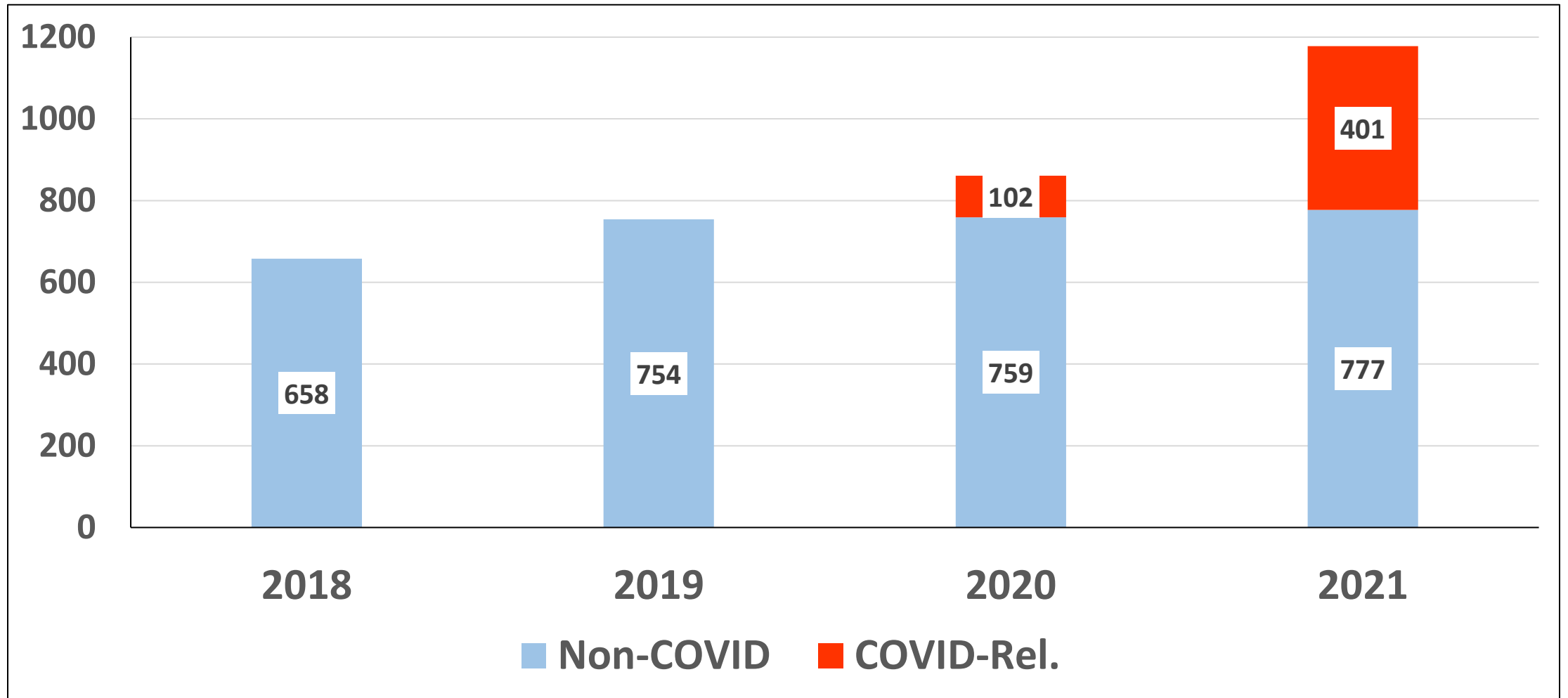
**Maternal Mortality rates Increased 33% during the pandemic in 2020.**

**Largest relative increase among Hispanics (74%) & non-Hispanic Blacks (40%). Largest absolute increase (17 deaths/100K) among NHB**

Source: Thoma & Declercq (2022)

JAMA Network Open

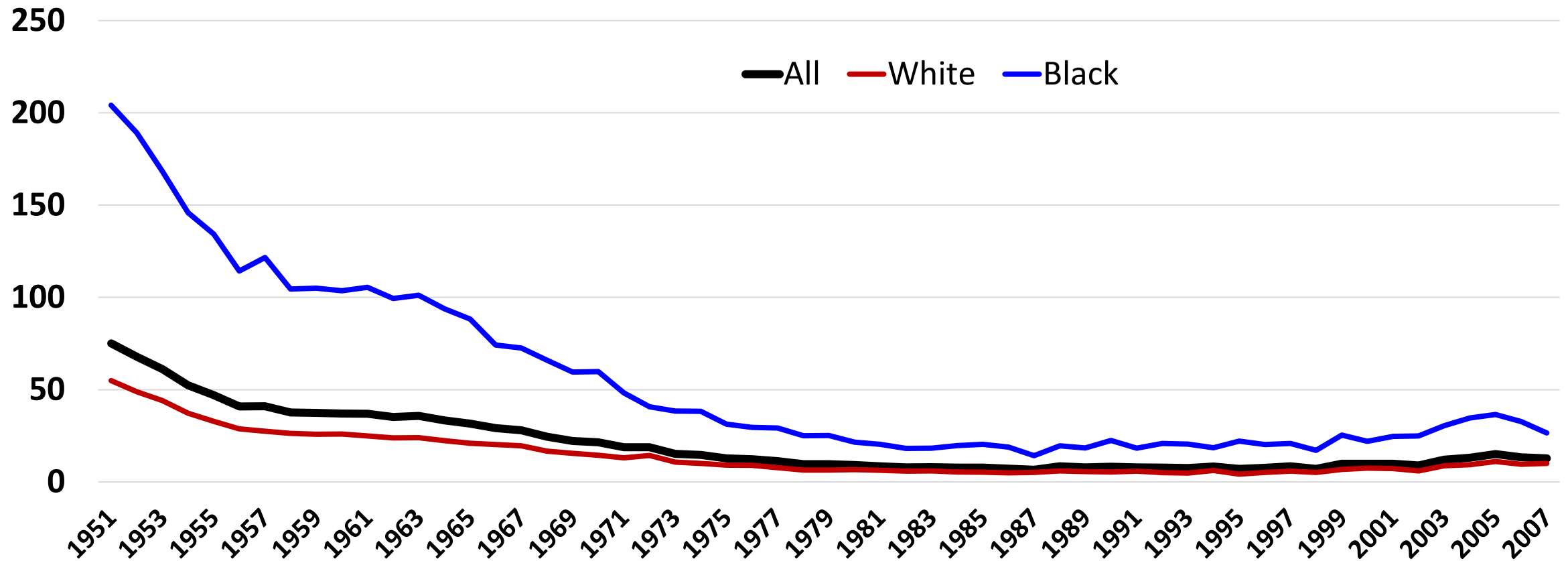
# U.S. Total Maternal Deaths 2018-2021



Source: GAO.(2022) *Maternal Health: Outcomes Worsened and Disparities Persisted During the Pandemic.*

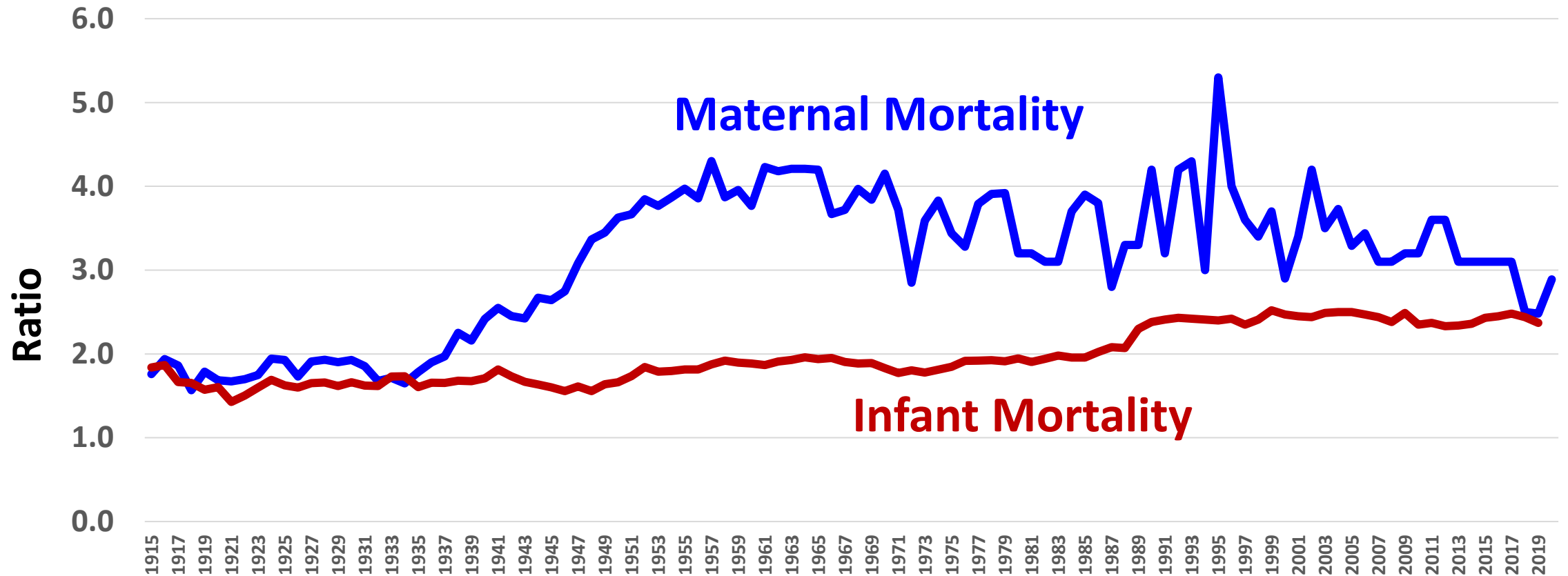
# **The Persistence of Racial Disparities**

# 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. Infant & Maternal Mortality, 1915-2020***



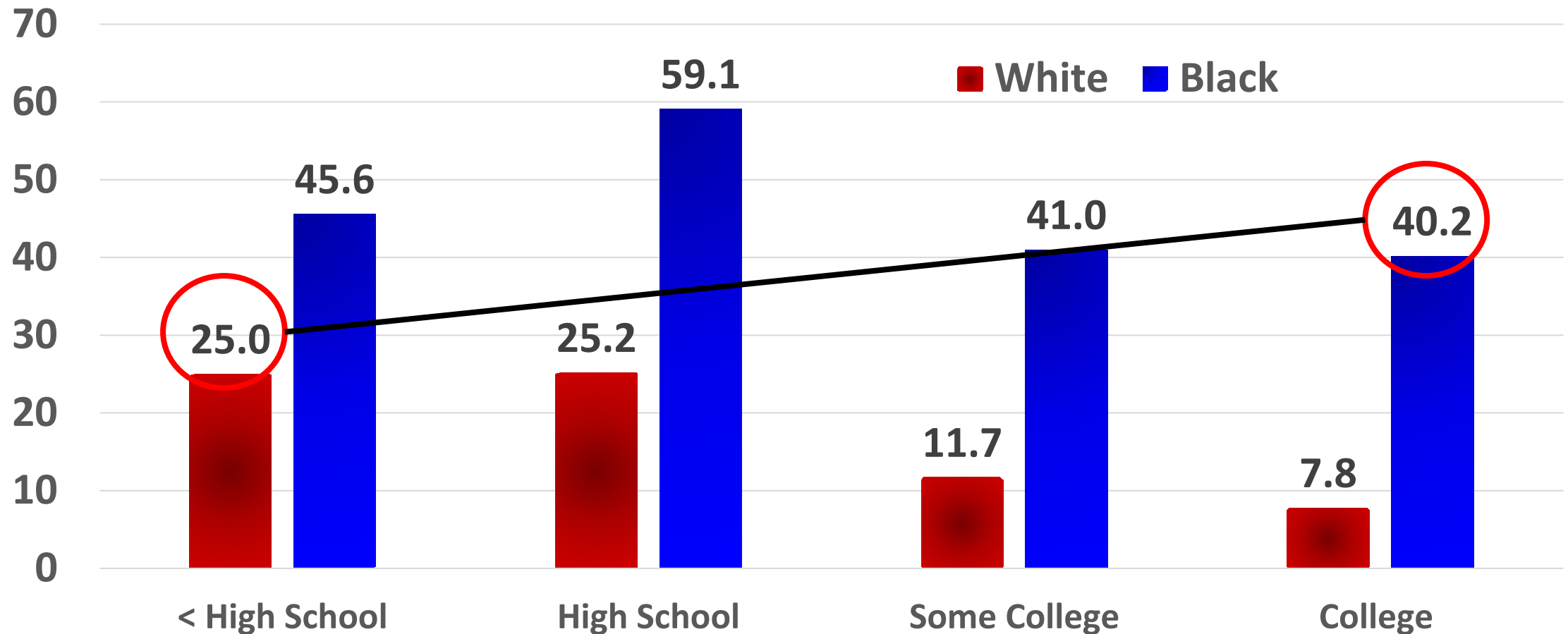
**Source:** NCHS. Maternal Mortality and Related Concepts. Vital & Health Statistics. Series 33; #3. & annual data reports. 1915-1960 data from NCHS. *Vital Statistics Rates In The United States 1940-1960*. NOTE: Shifts in measurement (e.g. not all states were part of registration system prior to 1933; 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.



# Maternal Mortality, by Race/Ethnicity and Age

| U.S. Mat Mortality<br>Rates per 100,000 births | 2018 | 2019 | 2020 | 2018-20<br>Rate | 2018-20<br>Change |
|--|------|------|------|-----------------|-------------------|
| Non-Hispanic White                             | 14.9 | 17.9 | 19.1 | 17.4            | 28.1%             |
| Non-Hispanic Black                             | 37.3 | 44.0 | 55.3 | 45.9            | 48.3%             |
| Hispanic                                       | 11.8 | 12.6 | 18.2 | 14.2            | 54.2%             |
| All  | 17.4 | 20.1 | 23.8 | 20.4            | 36.8%             |
| Tennessee # Preg-Rel<br>Deaths                 | 2017 | 2018 | 2019 | 2017-19<br>Rate | 2017-19<br>Change |
| Non-Hispanic White                             | 12   | 10   | 6    | 17.7            | -50%              |
| Non-Hispanic Black                             | 8    | 11   | 14   | 69.4            | +75%              |

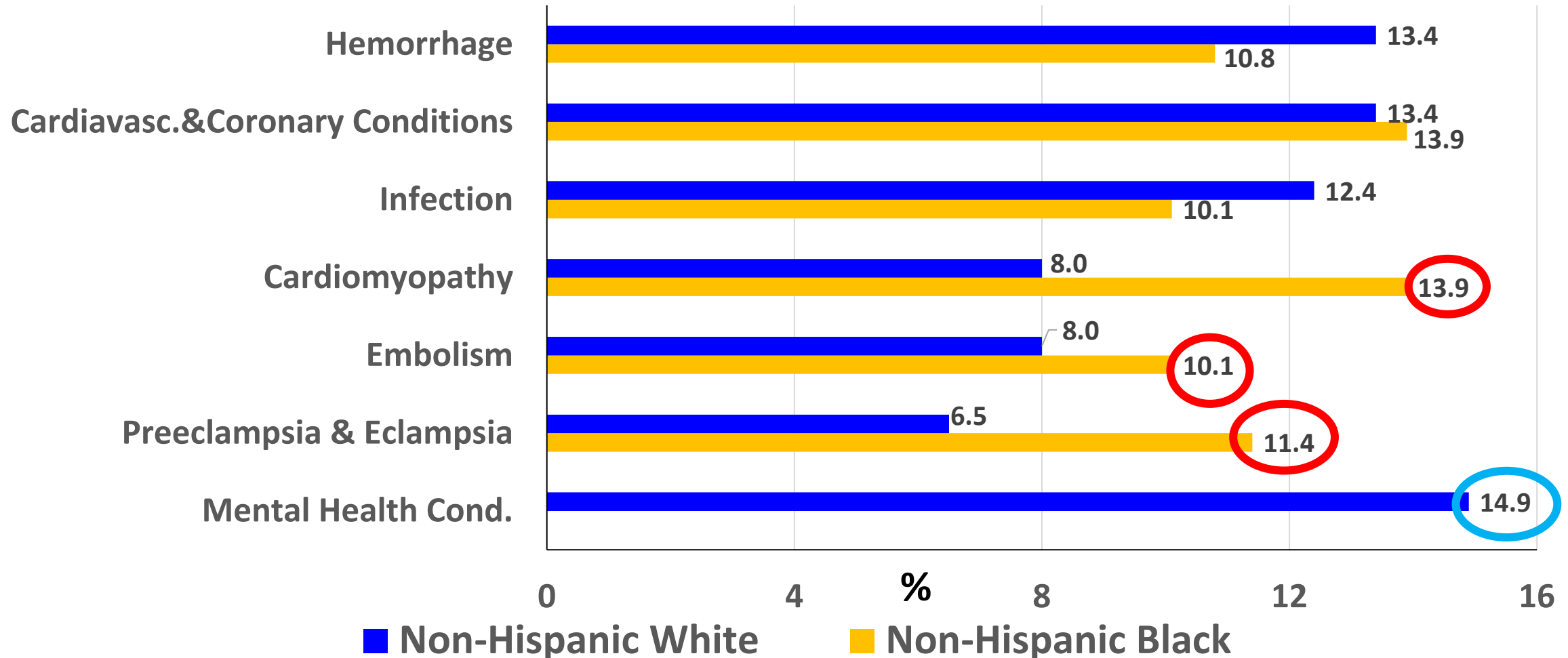
# Pregnancy-related mortality ratios (per 100,000 live births) by race/ethnicity, U.S. 2007-2016



Source: Petersen E et al. Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016. *MMWR* 2/7/19; 68 (35): 762-765.

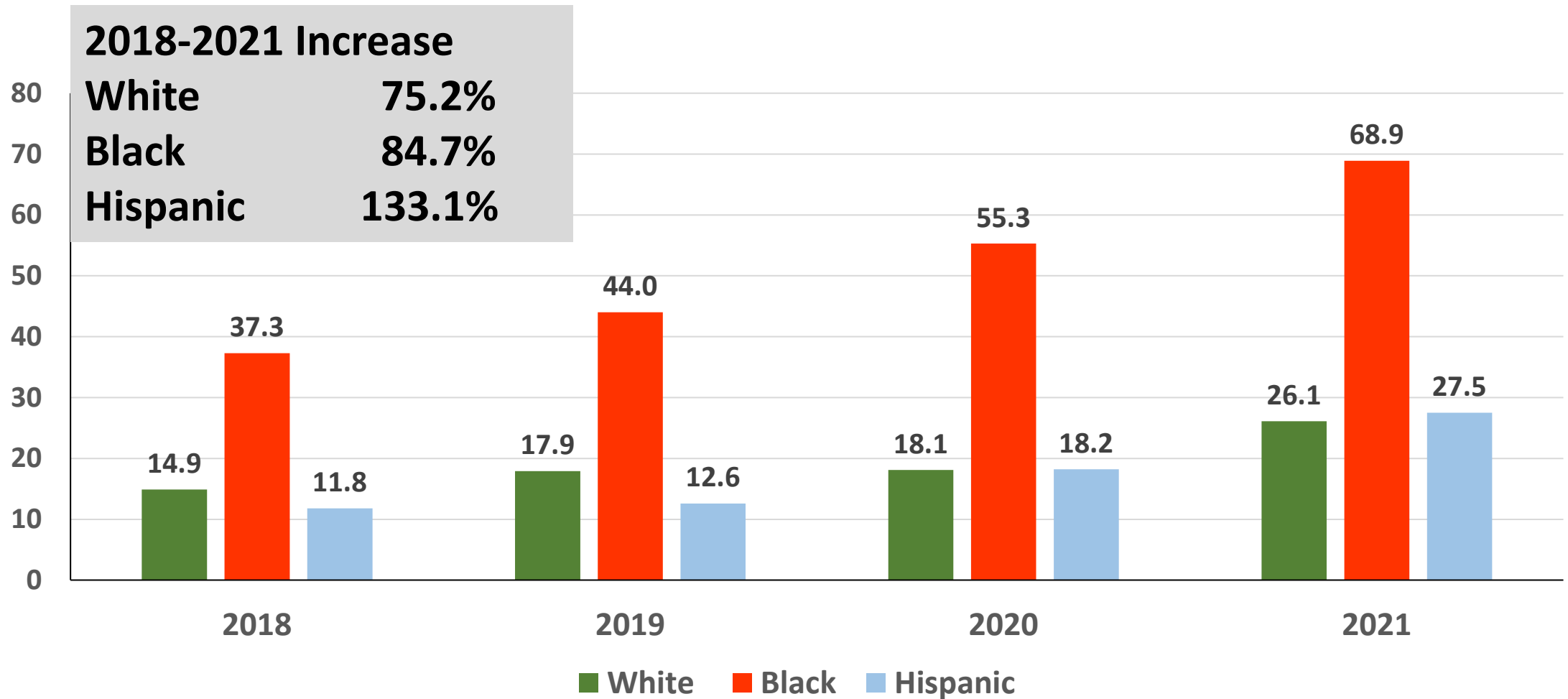
# Manifestation of Racial Disparities

## Leading Underlying Causes of *Pregnancy-Related Deaths, by Race-Ethnicity*



Source: CDC.(2019) Pregnancy-Related Deaths: Data from 14 U.S. Maternal Mortality Review Committees, 2008-2017.

# U.S. Maternal Mortality Ratios (per 100,000) by Race/Ethnicity 2018-2021

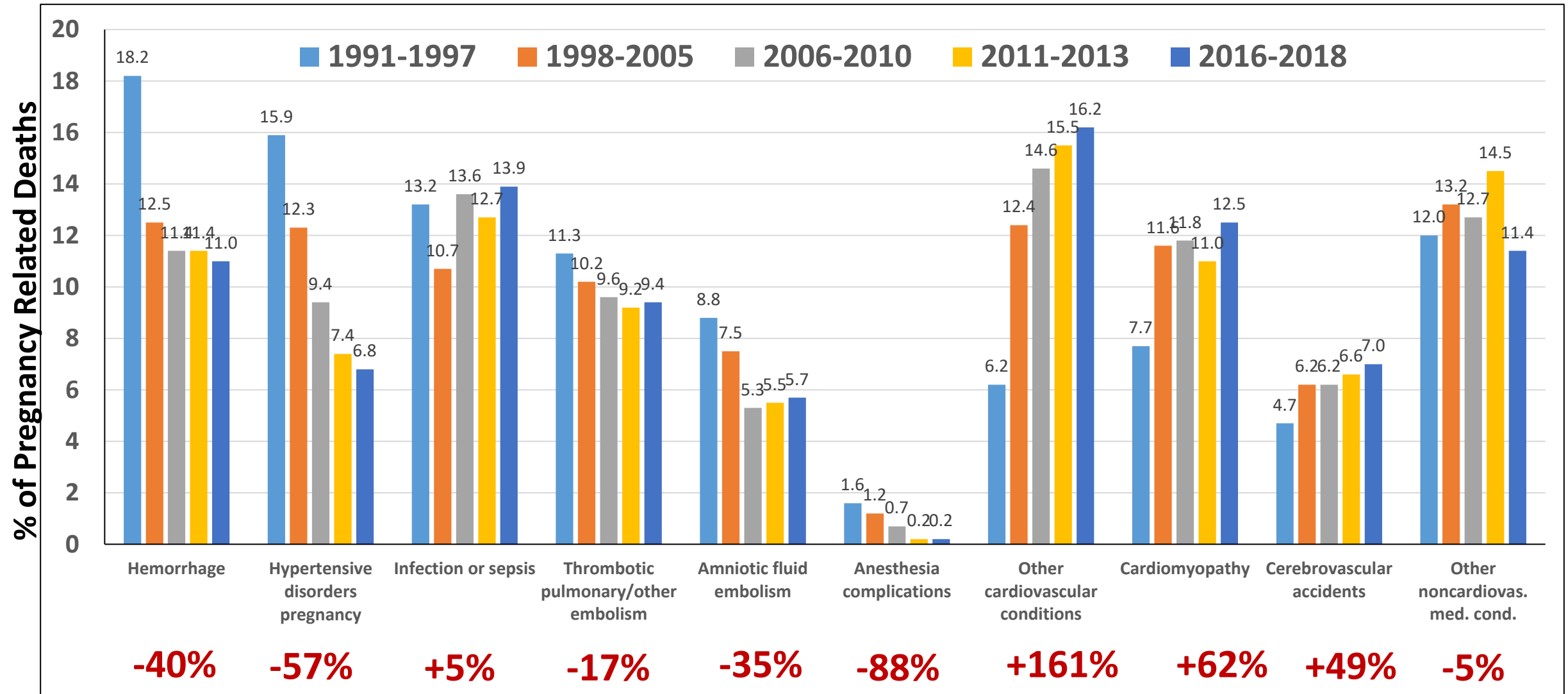


Source: GAO.(2022) *Maternal Health: Outcomes Worsened and Disparities Persisted During the Pandemic*.

# Maternal Mortality as a Public Health Problem: *Timing & Causes of Death*

# Maternal Mortality as a Public Health Problem

Cause-specific proportionate **Pregnancy-Related** mortality: U. S., 1991–2018.



Source: Creanga. Pregnancy-Related Mortality in the United States.  
*Obstet Gynecol* 2017(1991-2013); CDC PRMSS (2016-2018).

# Not just about maternal mortality

## National Vital Statistics Reports

Volume 70, Number 8



July 26, 2021

### Deaths: Final Data for 2019

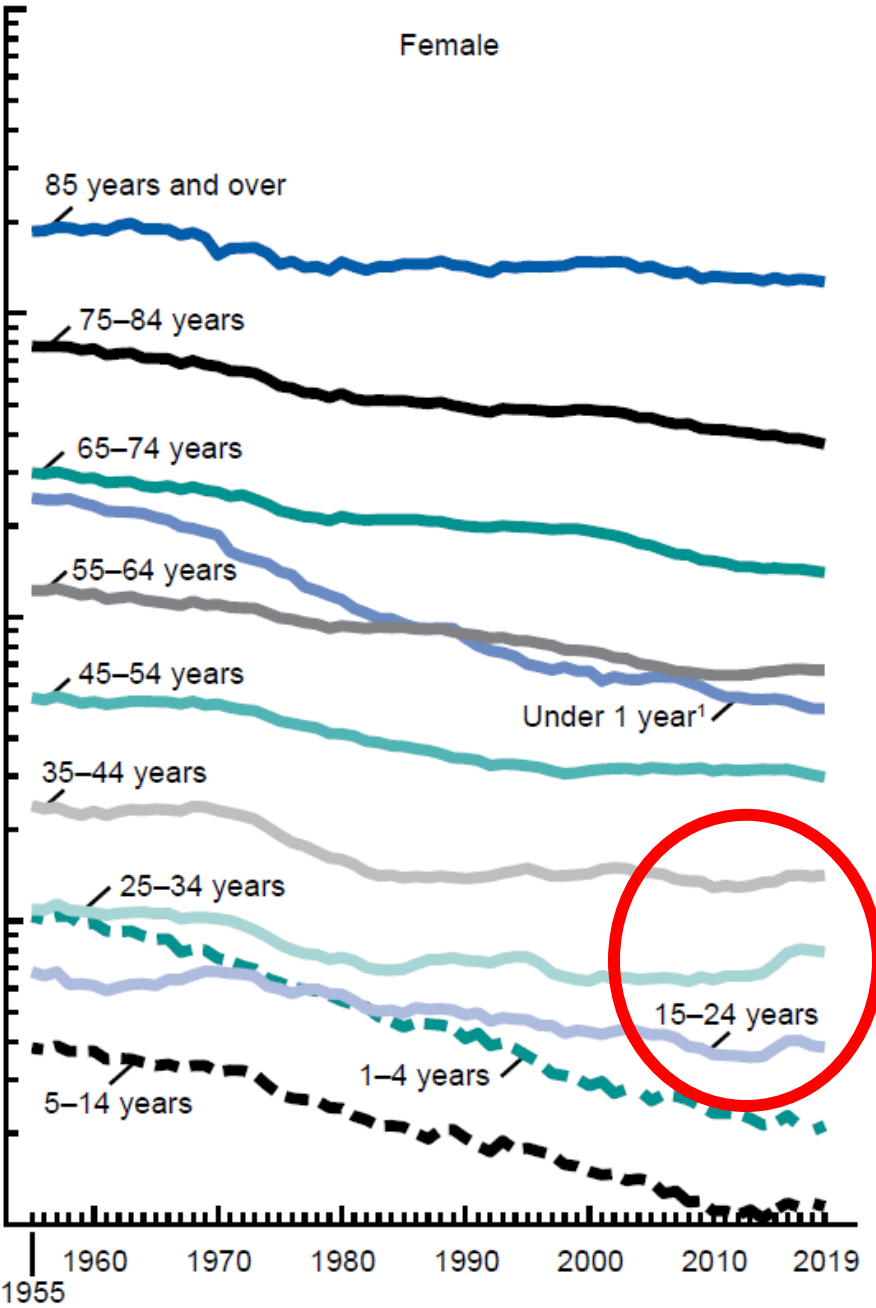
by Jiaquan Xu, M.D., Sherry L. Murphy, B.S., Kenneth D. Kochanek, M.A., and Elizabeth Arias, Ph.D.,  
Division of Vital Statistics

#### STAT

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

By Eugene Declercq and Neel Shah

August 22, 2018



# Births in U.S. by Maternal Age, 2020

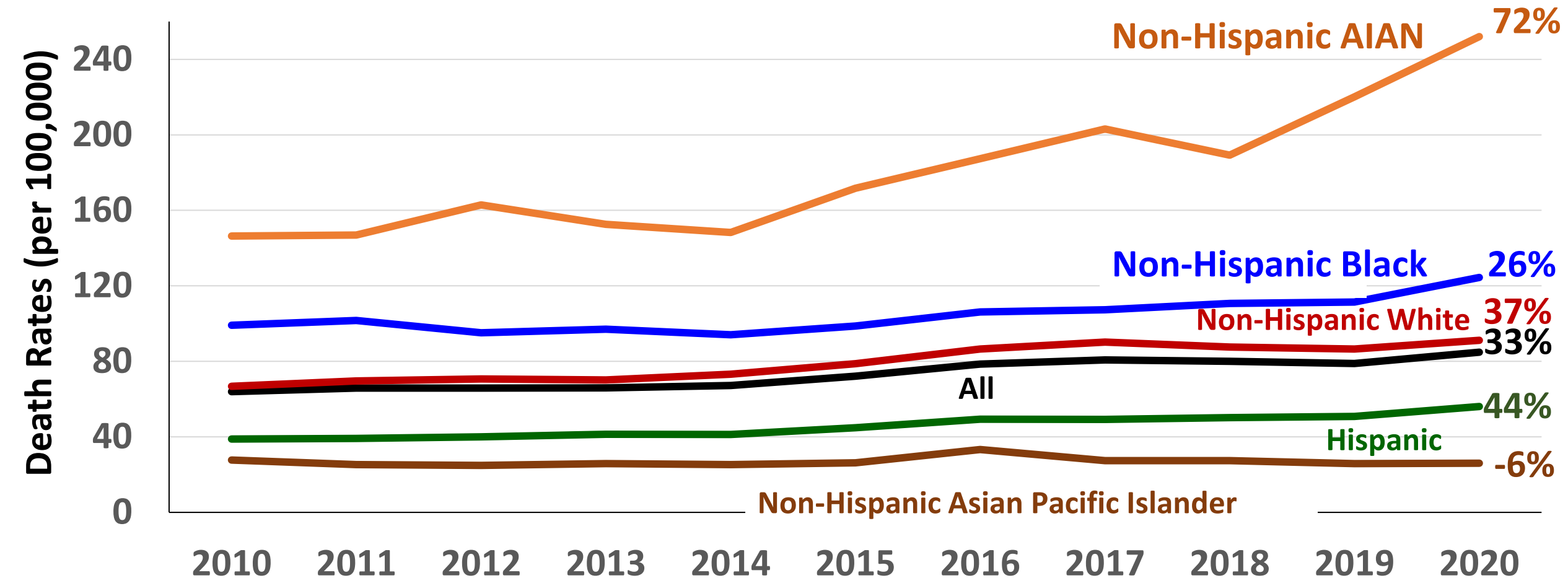
| Age          | # Births         | %             |
|--------------|------------------|---------------|
| <20          | 159,808          | 4.4%          |
| 20-24        | 665,595          | 18.4%         |
| <b>25-29</b> | 1,024,402        | <b>28.3%</b>  |
| <b>30-34</b> | 1,069,984        | <b>29.6%</b>  |
| 35+          | 693,858          | 19.2%         |
| Total        | <b>3,613,647</b> | <b>100.0%</b> |



# The Problem is Bigger than Maternal Mortality

Deaths rates (per 100K), Females **25-34**, by Race/Ethnicity, 2010-20

**% Increase  
2010-2020**



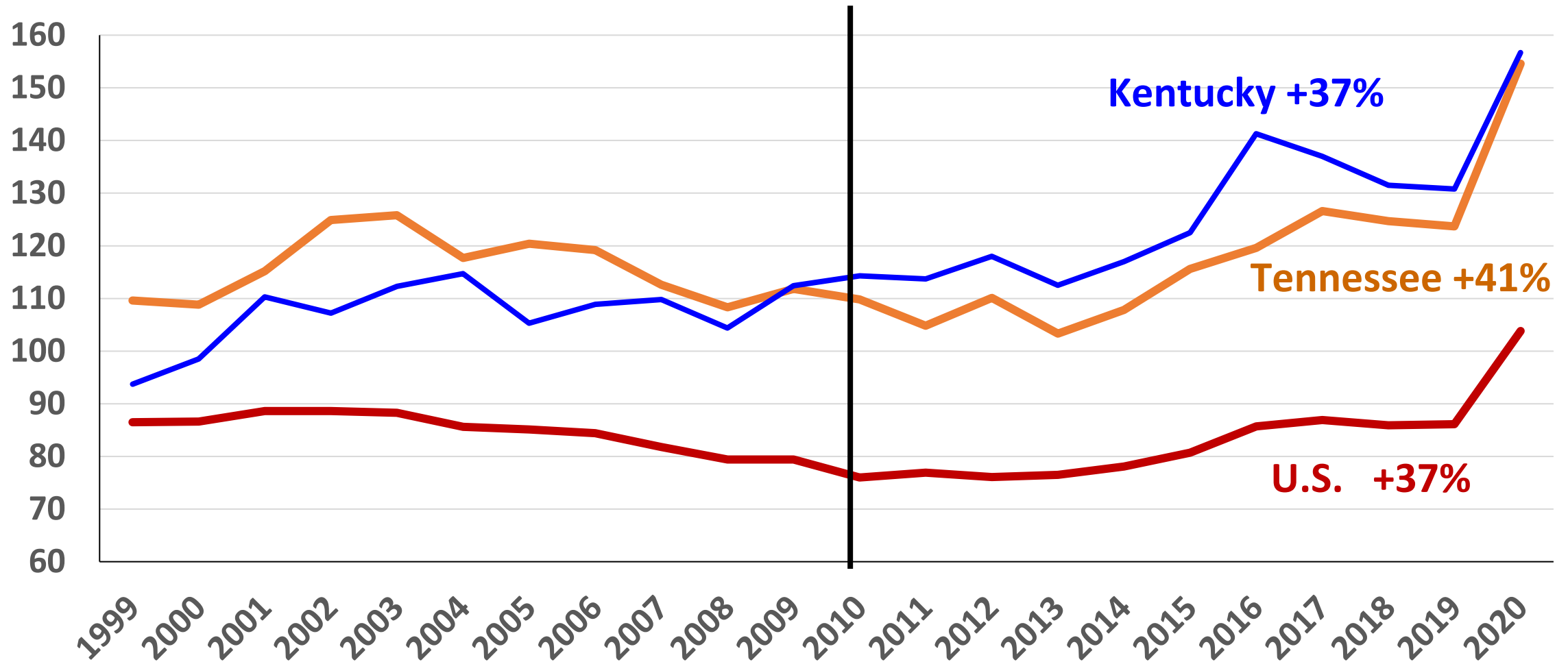
**NOTE: Pregnancy related mortality rate increased by <1% 2010-2018**

**All Female Deaths 25-34**  
**2010 -- 13,067; 2020 -- 21,654**

Source: NCHS.CDC Wonder  
Online Database

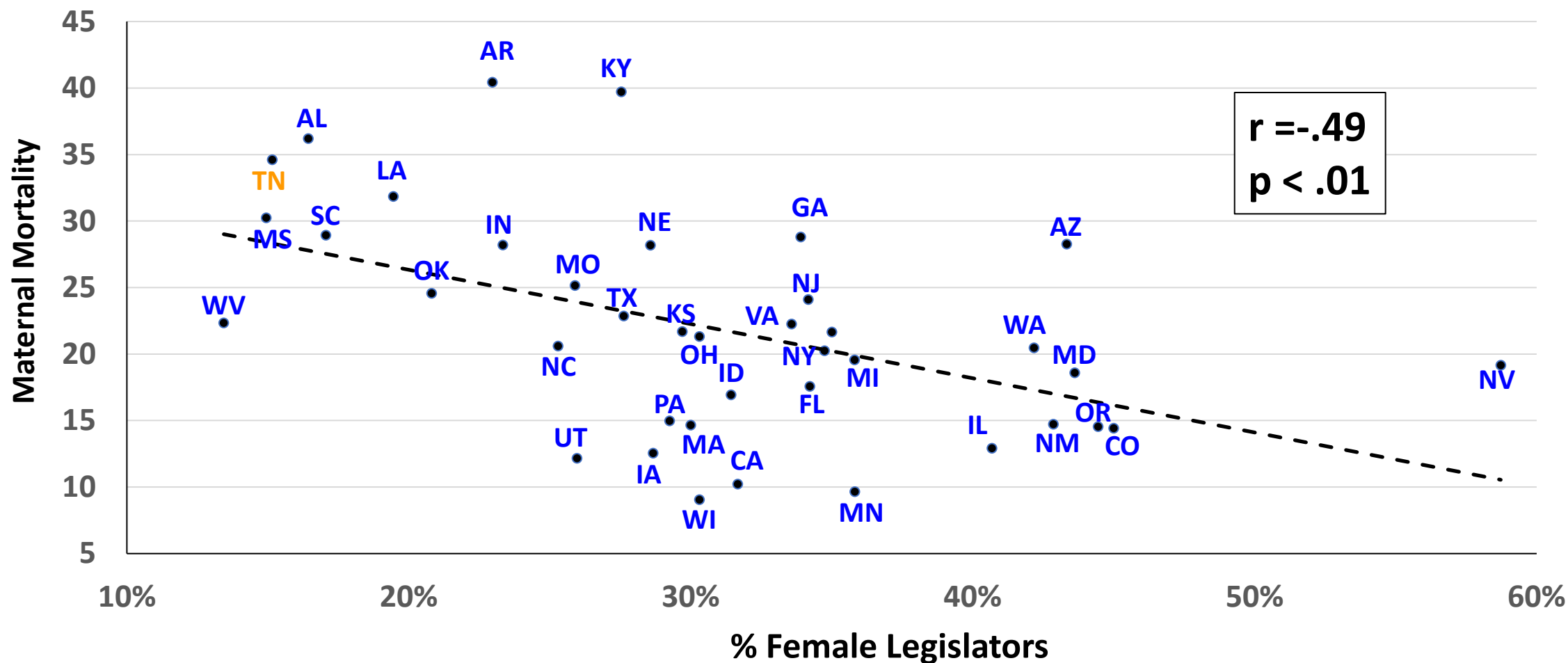
[www.birthingthenumbers.org](http://www.birthingthenumbers.org)

# Overall Death Rates, Women 15- 44, TN, KY, US, 1999-2020 & 2010-2020 Increase



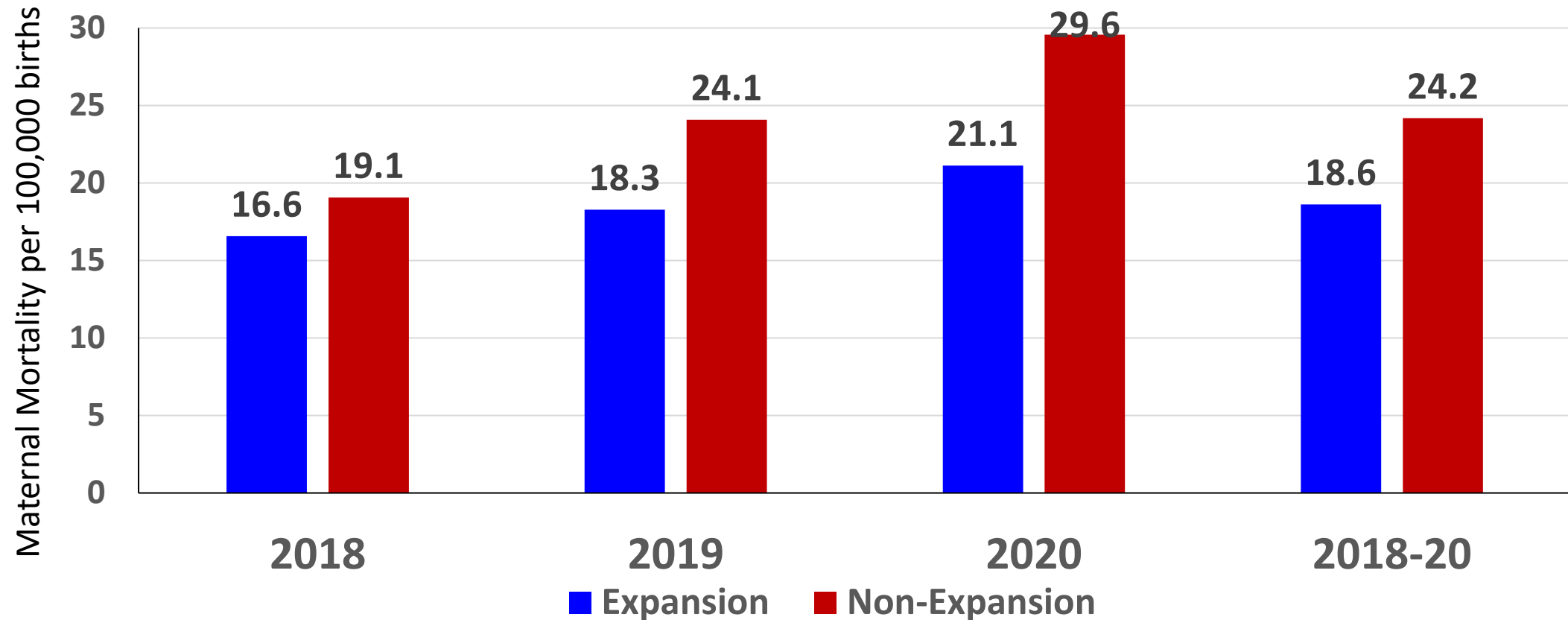
# Oh, Oh and by the way, politics

State Maternal Mortality (per 100,000 births) 2018-2020\* & % Female State Legislators 2020



\* 39 states with at least 10 maternal deaths 2018-2020.

# Maternal Mortality in Medicaid Expansion & Non-Expansion States



*The 12 non expansion states had a 30% higher maternal mortality rate for 2018-2020, with a 40% higher rate in 2020.*

# So what do we do about all this?

- Continue efforts to improve clinical care at the time of birth with AIMS bundles and PNQIN campaigns.
- Recognize that the problem is a women's health problem more than a maternal health problem.
- Establish community-based programs on women's health in general and in particular, Black women's health. *Programs need to be based on an assessment of what people in the community say they need, not what we tell them that they need.*
- Use the concern with maternal mortality to enact programs that support women through the lifespan.

# Take Home Points

- *Even with imperfect data, there is no doubt the U.S. is performing poorly.*
- *Despite ascertainment issues, problem with maternal mortality is real and potentially growing.*
- *Racial disparities are pronounced and COVID has exacerbated them*
- *Women's death rates are increasing faster than maternal deaths, driven in large part by substance use, mental health and violence issues. **These issues aren't separate from maternal health***
- *Made strides in improving hospital care at the time of birth, but future improvements need to come from community efforts **prior, during and after pregnancy.***

# Black Maternal Health Week

April 11 - 17, 2021



BLACK MAMAS MATTER:  
CLAIMING OUR POWER, RESILIENCE & LIBERATION

Join us April 11-17 for a week of activism and community building for Black Mamas! In solidarity with National Minority Health Month and the International Day for Maternal Health and Rights, **Black Mamas Matter Alliance** founded BMHW to raise awareness, inspire activism, and strengthen organizing for Black maternal health. Join the conversation: **#BMHW21** and **#BlackMaternalHealthWeek**

[www.blackmamasmatter.org/bmhw](http://www.blackmamasmatter.org/bmhw)



# 10 YEARS

2010



2020

## EVERY MOTHER COUNTS



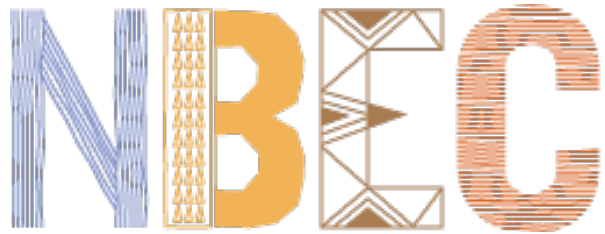
## WE'RE BACK!

WHEN:

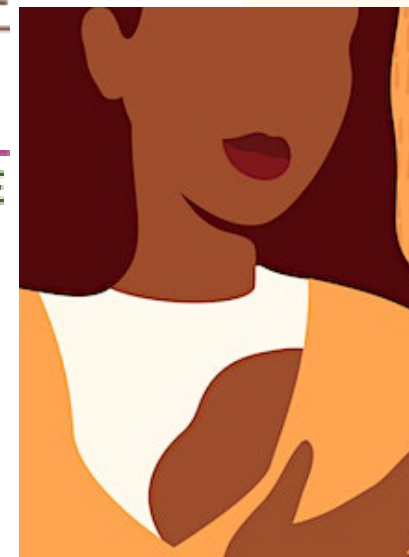
Sunday, June 5th

WHERE:

The Wharf  
District Pier  
Washington, DC



## NATIONAL BIRTH EQUITY COLLABORATIVE



ONLINE + IN-PERSON



ENHANCING

*Community Resilience*

TO IMPROVE MATERNAL  
HEALTH WORKSHOP:

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





Nairi



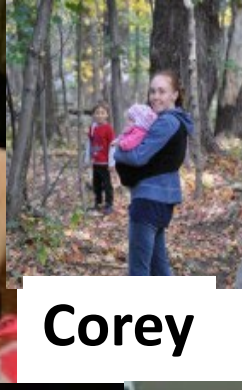
Lee



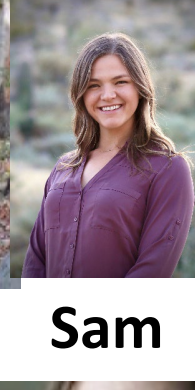
Maya



Ruby



Corey



Sam



Lucy



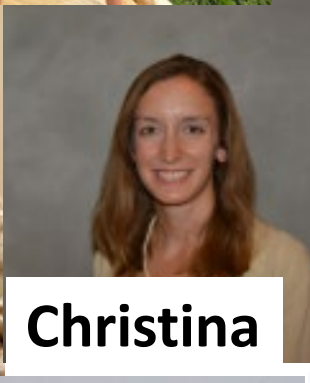
Staige



Jordy



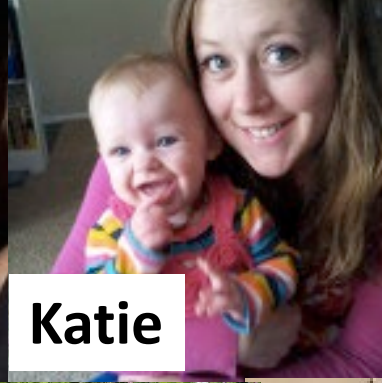
Kylia



Christina



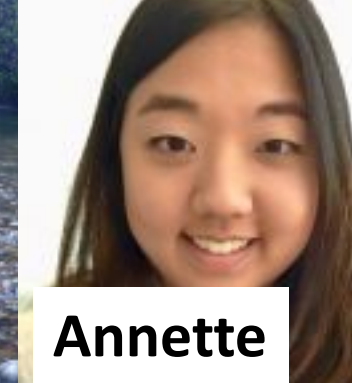
Sarah



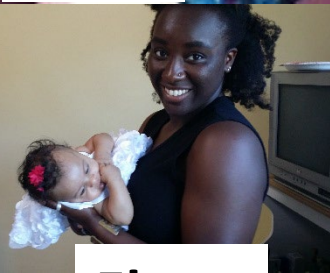
Katie



Sheridan



Annette



Ebere



Allison



Brittany



Jessica



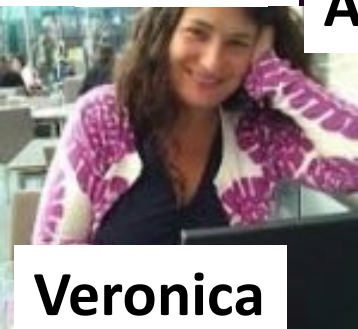
Maura



Kali



Isabelle



Veronica

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Twitter: [@BirthNumbers](https://twitter.com/BirthNumbers)

FACEBOOK: [www.facebook.com/BirthByTheNumbers](https://www.facebook.com/BirthByTheNumbers)