UT Southwestern Medical Center

Review of Maternal Mortality in the United States

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Disclosures

- The extending Maternal Care After Pregnancy (eMCAP) program has received support from the Hamon Charitable Foundation, University of Texas Southwestern Medical Center's Program for the Development and Evaluation of Model Community Health Initiatives in Dallas (PDEMCHID), HHS Racial Equity in Postpartum Care Challenge.

- Dr. Nelson serves as a dual-PI for research from Patient Centered Outcomes Research Institute.

- Dr. Nelson is Co-Lead for the North Texas Maternal Health Accelerator.

Objectives

1. Understand the data challenges with maternal mortality reporting.

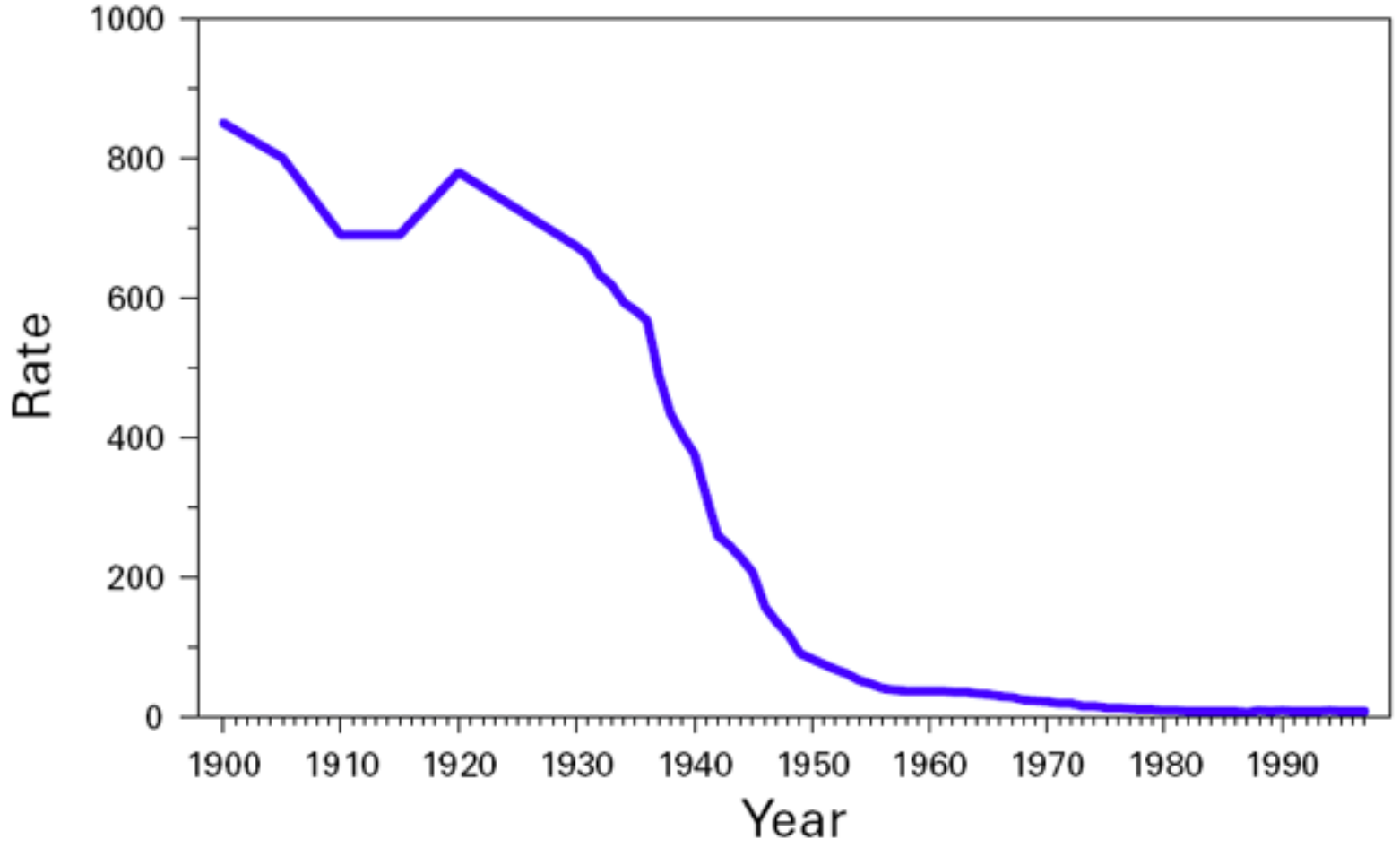
2. Characterize the three major platforms in place for maternal mortality tracking across the United States.

3. Describe the key contributing factors to maternal mortality.

4. Highlight local response efforts for our community in reducing maternal morbidity and mortality.

Maternal Mortality in the United States during the 20th Century

FIGURE 2. Maternal mortality rate,* by year — United States, 1900–1997



*Per 100,000 live births.

Causes of maternal death in the United States, 1987-2013

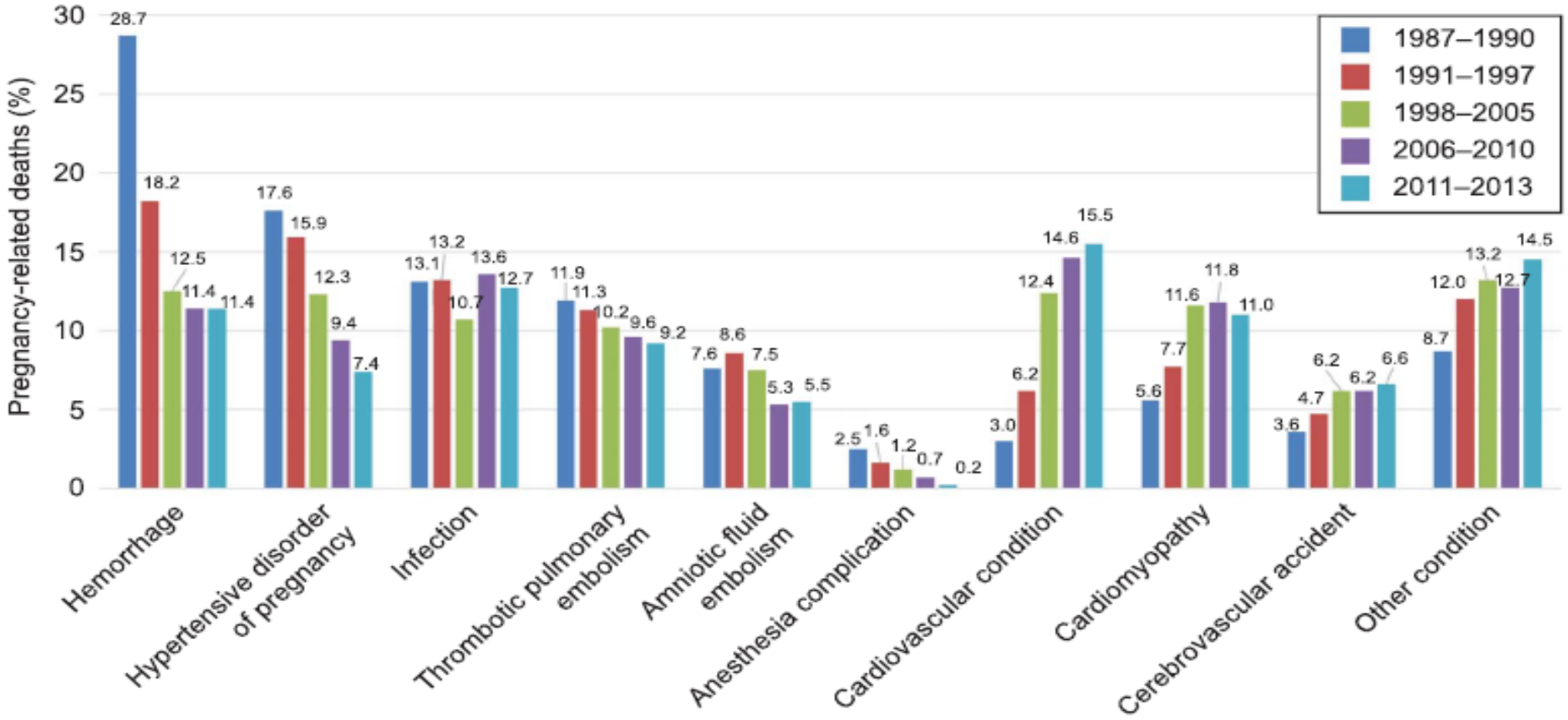


Figure 2. Population-level, cause-specific proportionate pregnancy-related mortality for 1987–1990, 1991–1997, 1998–2005, 2006–2010, and 2011–2013. Results are population-level and can be compared as absolute values.

Creanga. Pregnancy-Related Mortality in the United States. Obstet Gynecol 2017.

Creanga AA, et al. Obstet Gynecol. 2017

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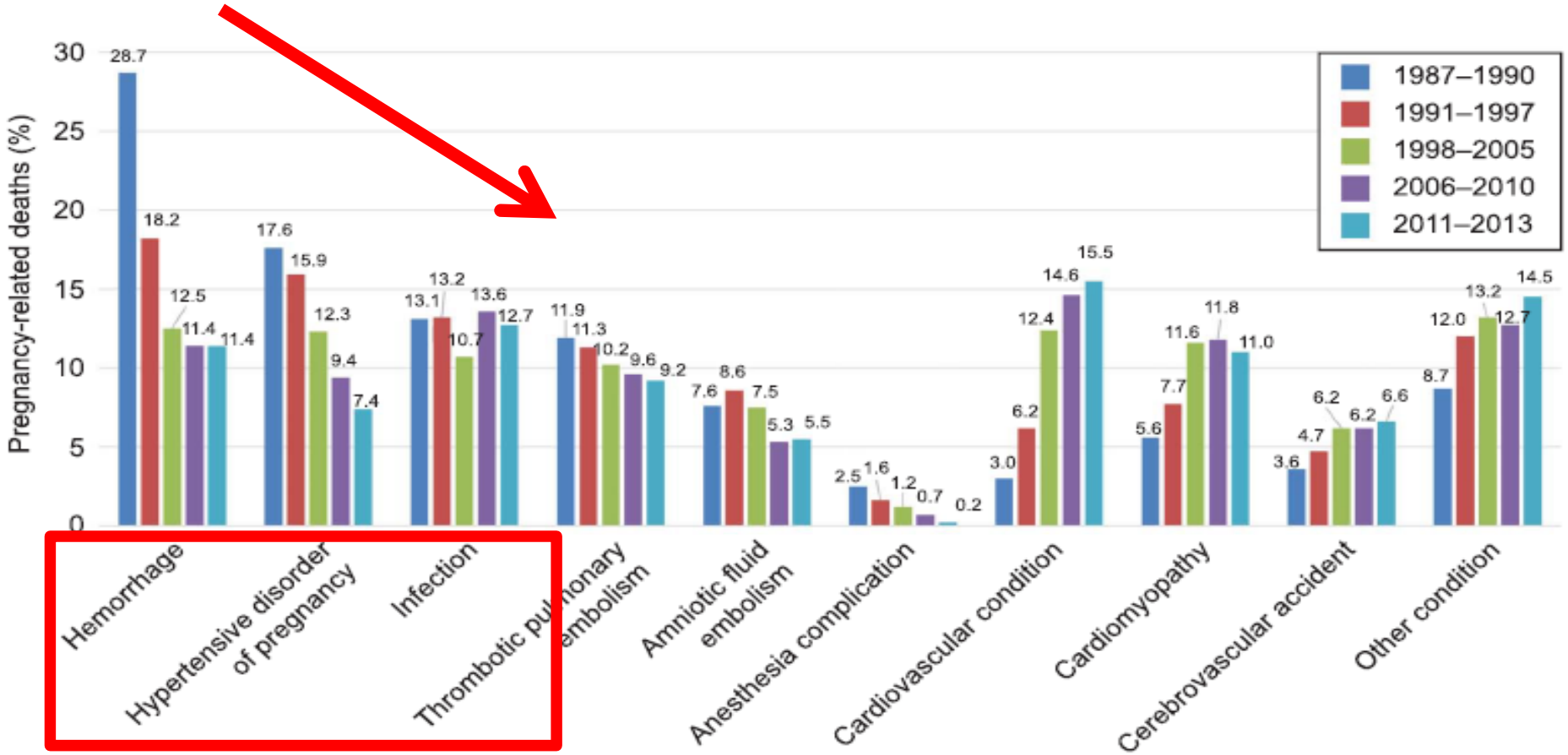

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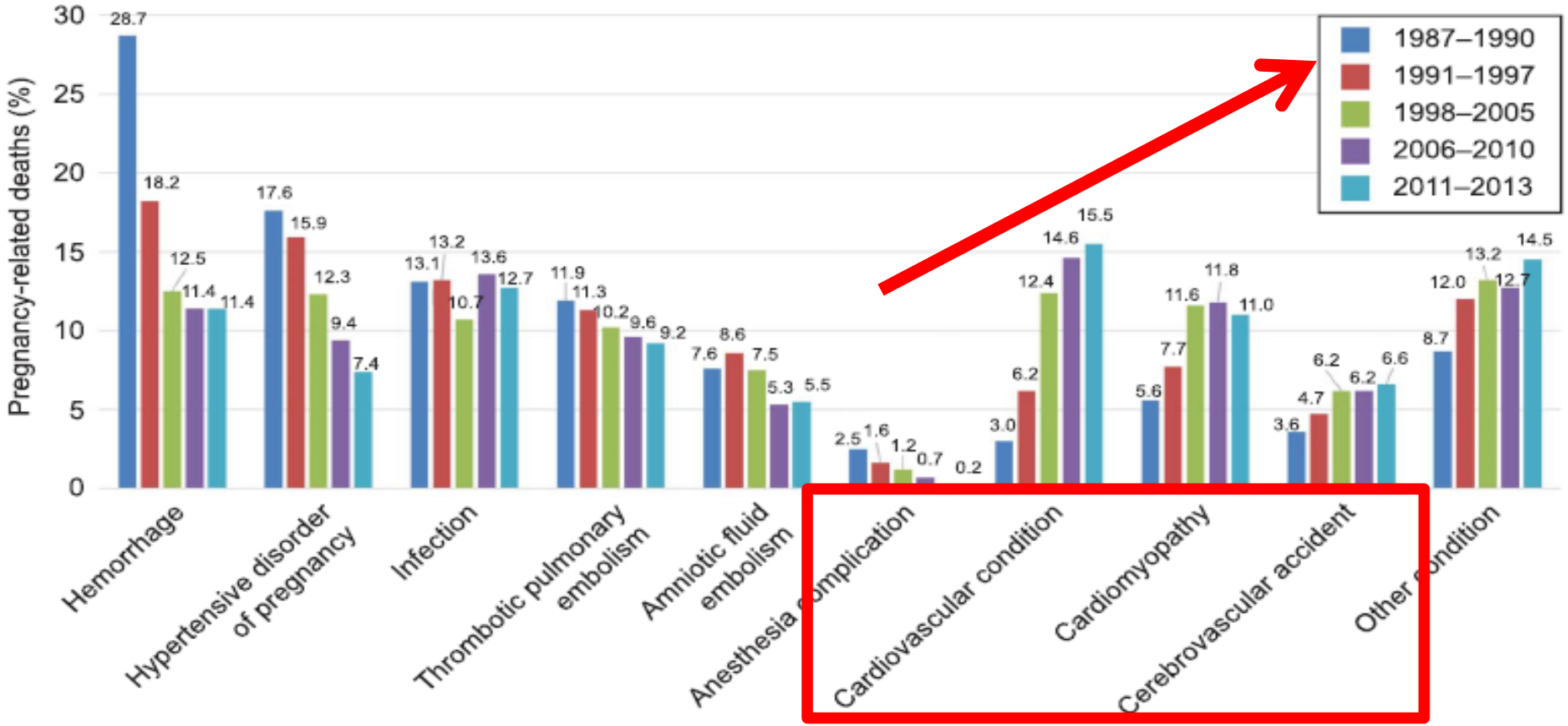

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Maternal Mortality in the United States, 2000-2014

Original Research

Recent Increases in the U.S. Maternal Mortality Rate

Disentangling Trends From Measurement Issues

Marian F. MacDorman, PhD, Eugene Declercq, PhD, Howard Cabral, PhD, and Christine Morton, PhD

OBJECTIVE: To develop methods for trend analysis of vital statistics maternal mortality data, taking into account changes in pregnancy question formats over time and between states, and to provide an overview of U.S. maternal mortality trends from 2000 to 2014.

METHODS: This observational study analyzed vital statistics maternal mortality data from all U.S. states in relation to the format and year of adoption of the pregnancy question. Correction factors were developed to adjust data from before the standard pregnancy question was adopted to promote accurate trend analysis. Joinpoint regression was used to analyze trends for groups of states with similar pregnancy questions.

RESULTS: The estimated maternal mortality rate (per 100,000 live births) for 48 states and Washington, DC (excluding California and Texas, analyzed separately) increased by 26.6%, from 18.8 in 2000 to 23.8 in 2014. California showed a declining trend, whereas Texas had a sudden increase in 2011–2012. Analysis of the measurement change suggests that U.S. rates in the early 2000s were higher than previously reported.

CONCLUSION: Despite the United Nations Millennium Development Goal for a 75% reduction in maternal mortality by 2015, the estimated maternal mortality rate for 48 states and Washington, DC, increased from 2000 to 2014; the international trend was in the opposite direction. There is a need to redouble efforts to prevent maternal deaths and improve maternity care for the 4 million U.S. women giving birth each year.

(Obstet Gynecol 2016;128:447–55)

DOI: 10.1097/AOG.0000000000001556

See related editorial on page 427.

From the Maryland Population Research Center, University of Maryland, College Park, Maryland; the Departments of Community Health Sciences and Biostatistics, Boston University School of Public Health, Boston, Massachusetts; and the California Maternal Quality Care Collaborative, Stanford University Medical School, Palo Alto, California.

Corresponding author: Marian F. MacDorman, PhD, Maryland Population Research Center, 2015 Morrill Hall, University of Maryland, College Park, MD 20742; e-mail: mmacdorm@umd.edu.

Financial Disclosure

The authors did not report any potential conflicts of interest.

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Maternal mortality is an important indicator of the quality of health care both nationally and internationally.[1–5] The Centers for Disease Control and Prevention's National Center for Health Statistics is the source of official U.S. maternal mortality statistics used for both subnational and international comparisons.[6] Earlier studies identified significant underreporting of maternal deaths in the National Vital Statistics System.[7,8] To improve ascertainment, a pregnancy question was added to the 2003 revision of the U.S. standard death certificate. The question has checkboxes to ascertain whether female decedents were not pregnant within the past year, pregnant at the time of death, not pregnant but pregnant within 42 days of death, not pregnant but pregnant 43 days to 1 year before death, or unknown if pregnant within the past year.[9] The addition of this question led to increases in reported maternal mortality rates.[6] However, delays in states' adoption of the new pregnancy question together with use of nonstandard pregnancy questions created a situation where, in any given data year, some states were using the U.S. standard question, others were using questions incompatible with the U.S. standard, and still others had no pregnancy question on their death certificates.[6,10,11]

Due to difficulties in disentangling these effects, the United States has not published an official maternal mortality rate since 2007.[11] This led to a deficit of information both nationally and internationally at a time when greater attention has been focused on maternal mortality than ever before.[1–5,12,13] For example, United Nations' Millennium Development Goal

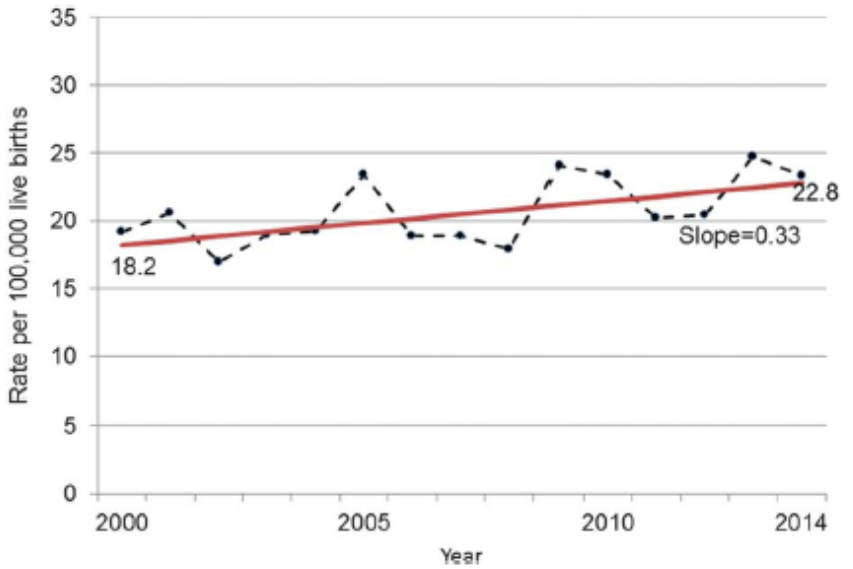

Fig. 1. Adjusted maternal mortality rates, analysis group 1, 2000–2014. Includes 24 states and Washington, DC, that did not have a pregnancy question on their unrevised death certificate and that adopted the U.S. standard question on revision: Arkansas, Arizona, Connecticut, Delaware, Georgia, Idaho, Kansas, Maine, Michigan, Montana, New Hampshire, Nevada, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Vermont, Washington, and Wyoming.

MacDorman. U.S. Maternal Mortality Trends. Obstet Gynecol 2016.

MacDorman MF, et al. Obstet Gynecol. 2016

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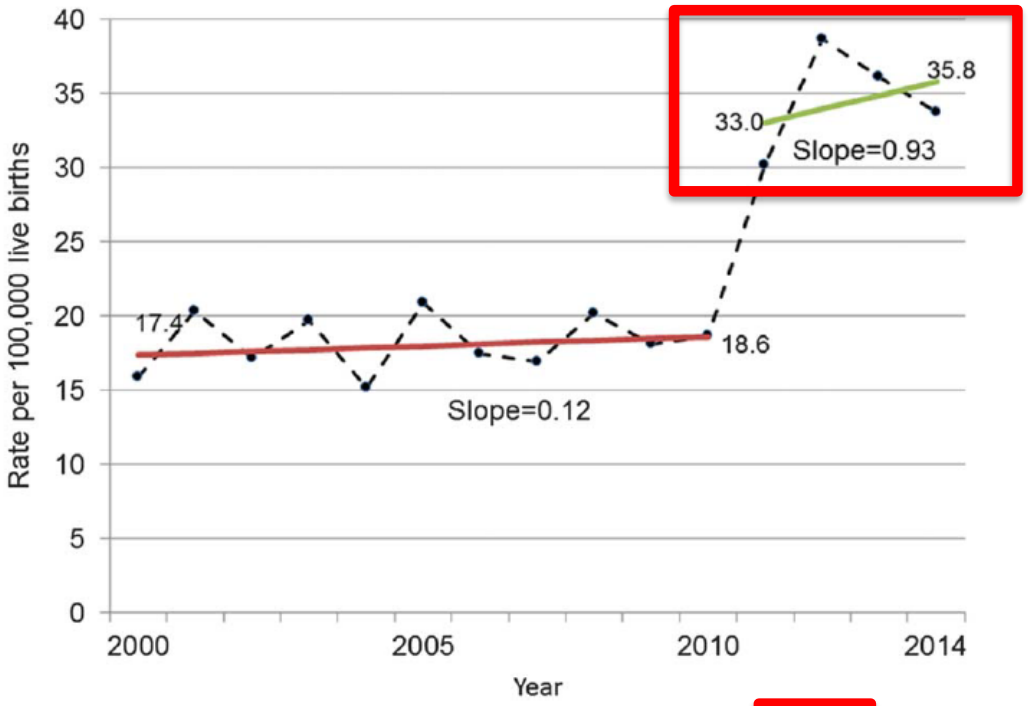

Fig. 4. Adjusted maternal mortality rates, Texas, 2000–2014. Texas revised to the U.S. standard pregnancy question in 2006. The unrevised question asked about pregnancies within the past 12 months.

MacDorman. U.S. Maternal Mortality Trends. Obstet Gynecol 2016.

MacDorman MF, et al. Obstet Gynecol. 2016

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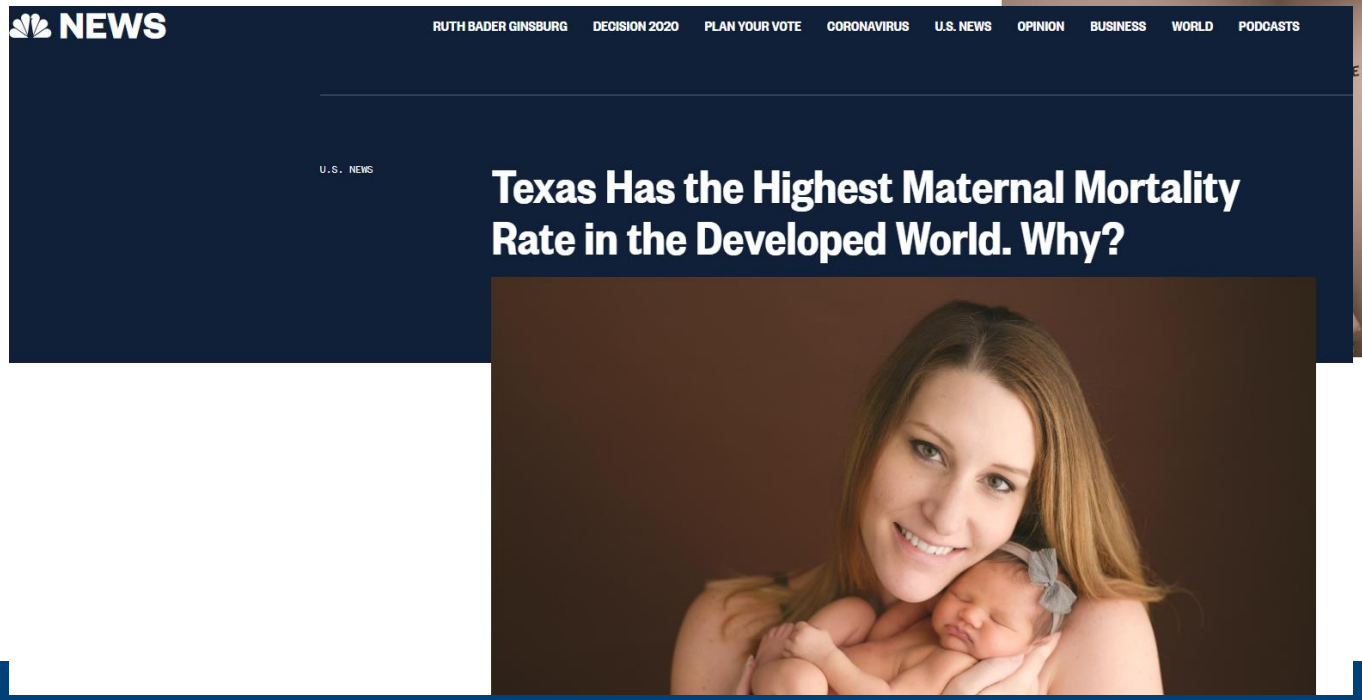
Media response in 2016…



USA Today. 2016.
TexasTribune. 2016.
NBC News. 2016.

Data integrity questioned…

Original Research

Identifying Maternal Deaths in Texas Using an Enhanced Method, 2012

Sonia Baeva, MA, Debra L. Saxton, MS, Karen Ruggiero, PhD, Michelle L. Kormondy, BS, Lisa M. Hollier, MD, MPH, John Hellerstedt, MD, Manda Hall, MD, and Natalie P. Archer, PhD

OBJECTIVE: To more accurately estimate the 2012 maternal mortality ratio for Texas using an enhanced method for identifying maternal deaths.

METHODS: This population-based descriptive study used both data matching and record review to verify pregnancy or delivery within 42 days for 147 deaths with obstetric cause-of-death codes, and used data matching alone to identify additional maternal deaths within the same timeframe. Crude maternal mortality ratios were calculated for confirmed maternal deaths overall, by race and ethnicity, and by age. These maternal mortality ratios were compared with maternal mortality ratios computed using obstetric cause-of-death codes alone (standard method).

RESULTS: Fifty-six maternal deaths were confirmed to have occurred during pregnancy or within 42 days postpartum. Using our enhanced method, the 2012 maternal mortality ratio for Texas was 14.6 maternal deaths per 100,000 live births, less than half that obtained using the standard method (n=147). Approximately half (50.3%) of obstetric-coded deaths showed no evidence of pregnancy within 42 days, and a large majority of these incorrectly indicated pregnancy at the time of death. Insufficient information was available to determine pregnancy for 15 obstetric-coded deaths, which were excluded from the 2012 maternal mortality ratio estimate; however, had these deaths been included, the resulting maternal mortality ratio would still be significantly lower than that reported using the standard method.

CONCLUSION: Relying solely on obstetric codes for identifying maternal deaths appears to be insufficient and can lead to inaccurate maternal mortality ratios. A method enhanced with data matching and record review yields more accurate ratios. Results likely have national implications, because miscoding of obstetric deaths with the standard method may affect the accuracy of other states' maternal mortality ratios.

See related editorial on page 759.

(Obstet Gynecol 2018;131:762–9)

DOI: 10.1097/AOG.0000000000002565

From the Division for Community Health Improvement, Texas Department of State Health Services, Austin, the Department of Obstetrics and Gynecology, Baylor College of Medicine, Houston, and the Texas Department of State Health Services, Austin, Texas.

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The authors thank Ashley Hill for her help with this investigation. They also thank members of the Texas Department of State Health Services Center for Health Statistics for their help preparing needed data files and Victor Farinelli for his data support.

Each author has indicated that he or she has met the journal's requirements for authorship.

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Financial Disclosure

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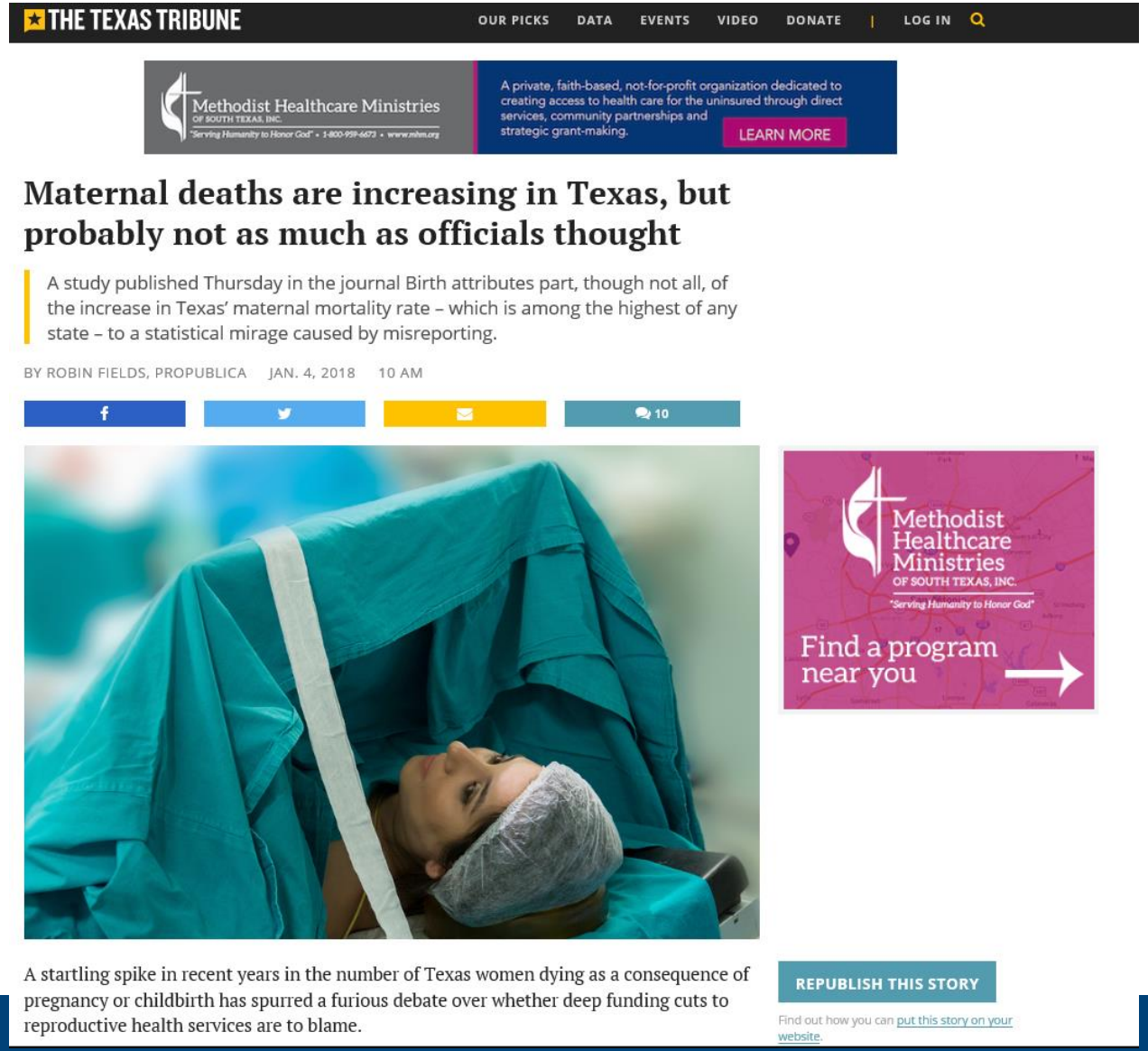
Baeva S et al. Obstet Gynecol. 2018

Media response in 2018…



THE TEXAS TRIBUNE

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Maternal deaths are increasing in Texas, but probably not as much as officials thought

A study published Thursday in the journal Birth attributes part, though not all, of the increase in Texas' maternal mortality rate – which is among the highest of any state – to a statistical mirage caused by misreporting.

BY ROBIN FIELDS, PROPUBLICA JAN. 4, 2018 10 AM

10

A startling spike in recent years in the number of Texas women dying as a consequence of pregnancy or childbirth has spurred a furious debate over whether deep funding cuts to reproductive health services are to blame.

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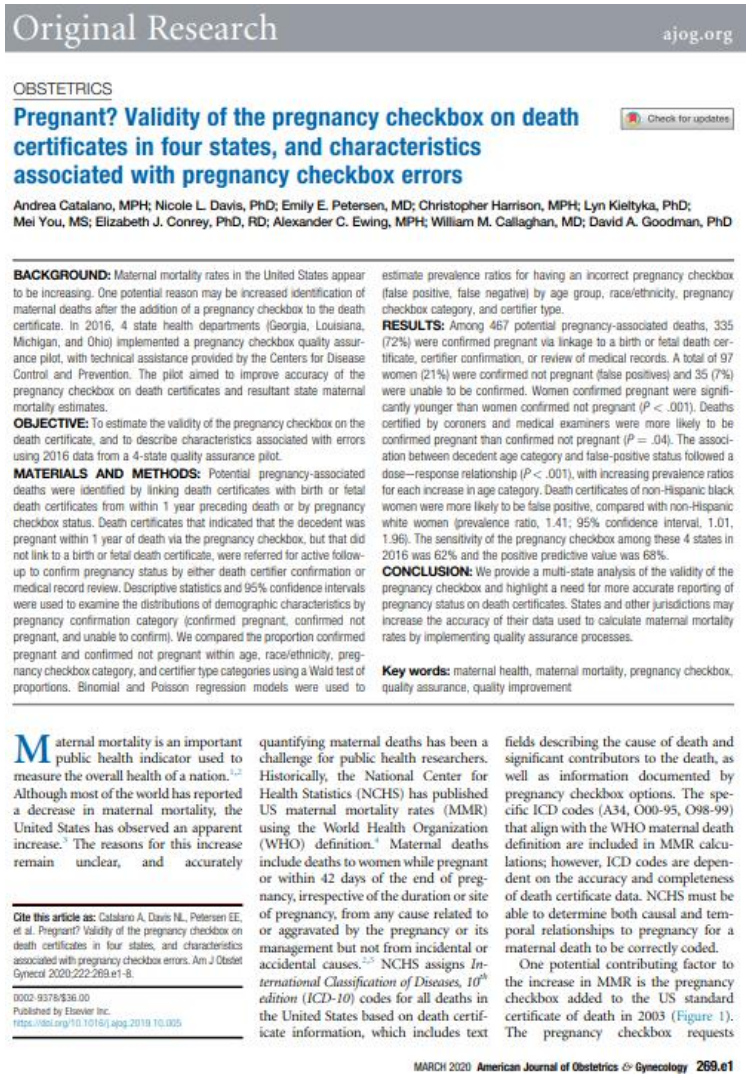
Texas Tribune. Jan 4, 2018

Other states finding challenges with data reporting…



Original Research ajog.org

OBSTETRICS

Pregnant? Validity of the pregnancy checkbox on death certificates in four states, and characteristics associated with pregnancy checkbox errors

Andrea Catalano, MPH; Nicole L. Davis, PhD; Emily E. Petersen, MD; Christopher Harrison, MPH; Lyn Kieltyka, PhD; Mei You, MS; Elizabeth J. Conrey, PhD, RD; Alexander C. Ewing, MPH; William M. Callaghan, MD; David A. Goodman, PhD

BACKGROUND: Maternal mortality rates in the United States appear to be increasing. One potential reason may be increased identification of maternal deaths after the addition of a pregnancy checkbox to the death certificate. In 2016, 4 state health departments (Georgia, Louisiana, Michigan, and Ohio) implemented a pregnancy checkbox quality assurance pilot, with technical assistance provided by the Centers for Disease Control and Prevention. The pilot aimed to improve accuracy of the pregnancy checkbox on death certificates and resultant state maternal mortality estimates.

OBJECTIVE: To estimate the validity of the pregnancy checkbox on the death certificate, and to describe characteristics associated with errors using 2016 data from a 4-state quality assurance pilot.

MATERIALS AND METHODS: Potential pregnancy-associated deaths were identified by linking death certificates with birth or fetal death certificates from within 1 year preceding death or by pregnancy checkbox status. Death certificates that indicated that the decedent was pregnant within 1 year of death via the pregnancy checkbox, but that did not link to a birth or fetal death certificate, were referred for active follow-up to confirm pregnancy status by either death certifier confirmation or medical record review. Descriptive statistics and 95% confidence intervals were used to examine the distributions of demographic characteristics by pregnancy confirmation category (confirmed pregnant, confirmed not pregnant, and unable to confirm). We compared the proportion confirmed pregnant and confirmed not pregnant within age, race/ethnicity, pregnancy checkbox category, and certifier type categories using a Wald test of proportions. Binomial and Poisson regression models were used to estimate prevalence ratios for having an incorrect pregnancy checkbox (false positive, false negative) by age group, race/ethnicity, pregnancy checkbox category, and certifier type.

RESULTS: Among 467 potential pregnancy-associated deaths, 335 (72%) were confirmed pregnant via linkage to a birth or fetal death certificate, certifier confirmation, or review of medical records. A total of 97 women (21%) were confirmed not pregnant (false positives) and 35 (7%) were unable to be confirmed. Women confirmed pregnant were significantly younger than women confirmed not pregnant ($P < .001$). Deaths certified by coroners and medical examiners were more likely to be confirmed pregnant than confirmed not pregnant ($P = .04$). The association between decedent age category and false-positive status followed a dose–response relationship ($P < .001$), with increasing prevalence ratios for each increase in age category. Death certificates of non-Hispanic black women were more likely to be false positive, compared with non-Hispanic white women (prevalence ratio, 1.41; 95% confidence interval, 1.01, 1.96). The sensitivity of the pregnancy checkbox among these 4 states in 2016 was 62% and the positive predictive value was 68%.

CONCLUSION: We provide a multi-state analysis of the validity of the pregnancy checkbox and highlight a need for more accurate reporting of pregnancy status on death certificates. States and other jurisdictions may increase the accuracy of their data used to calculate maternal mortality rates by implementing quality assurance processes.

Key words: maternal health, maternal mortality, pregnancy checkbox, quality assurance, quality improvement

Maternal mortality is an important public health indicator used to measure the overall health of a nation.[1,2] Although most of the world has reported a decrease in maternal mortality, the United States has observed an apparent increase.[3] The reasons for this increase remain unclear, and accurately quantifying maternal deaths has been a challenge for public health researchers. Historically, the National Center for Health Statistics (NCHS) has published US maternal mortality rates (MMR) using the World Health Organization (WHO) definition.[4] Maternal deaths include deaths to women while pregnant or within 42 days of the end of pregnancy, irrespective of the duration or site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from incidental or accidental causes.[2,5] NCHS assigns *International Classification of Diseases, 10th edition* (*ICD-10*) codes for all deaths in the United States based on death certificate information, which includes text fields describing the cause of death and significant contributors to the death, as well as information documented by pregnancy checkbox options. The specific ICD codes (A34, O00-95, O98-99) that align with the WHO maternal death definition are included in MMR calculations; however, ICD codes are dependent on the accuracy and completeness of death certificate data. NCHS must be able to determine both causal and temporal relationships to pregnancy for a maternal death to be correctly coded.

One potential contributing factor to the increase in MMR is the pregnancy checkbox added to the US standard certificate of death in 2003 (Figure 1). The pregnancy checkbox requests

Cite this article as: Catalano A, Davis NL, Petersen EE, et al. Pregnant? Validity of the pregnancy checkbox on death certificates in four states, and characteristics associated with pregnancy checkbox errors. Am J Obstet Gynecol 2020;222:269.e1-8.

0002-9378/$36.00
Published by Elsevier Inc.
https://doi.org/10.1016/j.ajog.2019.10.005

Results

Nearly one-third (31.9%) of death certificates with a positive pregnancy checkbox and for which pregnancy status could be identified were false positive.

Catalano A, et al. AJOG. Mar 2020

Media response later in 2018…

Dallas Morning News. 16 April 2018

Prompted national response to maternal mortality, 2018

The NEW ENGLAND JOURNAL of MEDICINE

Perspective

NOVEMBER 1, 2018

What We Can Do about Maternal Mortality — And How to Do It Quickly

Susan Mann, M.D., Lisa M. Hollier, M.D., Kimberlee McKay, M.D., and Haywood Brown, M.D.

Most Americans take for granted that giving birth in a U.S. hospital will be a safe experience resulting in a healthy mother and baby. However, recent reports in the lay media — an NPR special series called "Lost Mothers: Maternal Mortality in the U.S."; a *New York Times* article on closures of rural maternal services; and a *USA Today* series, "Deadly Deliveries" — discuss increasing maternal mortality in the United States and the significant concern it presents for childbearing women and their families.

Women in the United States are more likely to die from childbirth- or pregnancy-related causes than women in any other high-income country, and black women die at a rate three to four times that of white women. Increasing maternal mortality is a tragedy, and though multiple factors contribute to the risk of maternal death, national and state reviews have identified the most preventable contributors. The Centers for Disease Control and Prevention (CDC) defines a pregnancy-related death as "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." Three types of complications the CDC identifies as the most common potentially preventable are postpartum hemorrhage, severe hypertension, and venous thromboembolism.[1]

So how can the health care community reverse the devastating trend in pregnancy-related deaths? We recommend four actions that can be adopted by every hospital providing obstetrical care, regardless of its size.

First, hospitals can expand their focus on the preventable causes of obstetrical complications and related death. The Alliance for Innovation on Maternal Health (AIM) — a collaboration led by the American College of Obstetricians and Gynecologists (ACOG) and involving 30 other organizations representing the spectrum of women's health care[2] — created several "bundles" of best practices for improving safety in maternity care, to help clinicians, the obstetrical team, and facilities consistently manage the care of high-risk pregnant women, including those with the three most common preventable complications identified by the CDC. We recommend implementation

Mann S, et al. NEJM. 2018

Prompted national response to maternal mortality

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N ENGL J MED 379;18 NEJM.ORG NOVEMBER 1, 2018 1689

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3. Quality of care and collaborative "bundles"
4. Team "huddles" for complex cases (e.g Placenta accreta spectrum disorder)
5. Simulation
6. Preventing maternal deaths act

Mann S, et al. NEJM. 2018

Prompted national response to maternal mortality

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What We Can Do about Maternal Mortality — And How to Do It Quickly

Susan Mann, M.D., Lisa M. Hollier, M.D., Kimberlee McKay, M.D., and Haywood Brown, M.D.

Most Americans take for granted that giving birth in a U.S. hospital will be a safe experience resulting in a healthy mother and baby. However, recent reports in the lay media — an NPR special series called "Lost Mothers: Maternal Mortality in the U.S."; a *New York Times* article on closures of rural maternal services; and a *USA Today* series, "Deadly Deliveries" — discuss increasing maternal mortality in the United States and the significant concern it presents for childbearing women and their families.

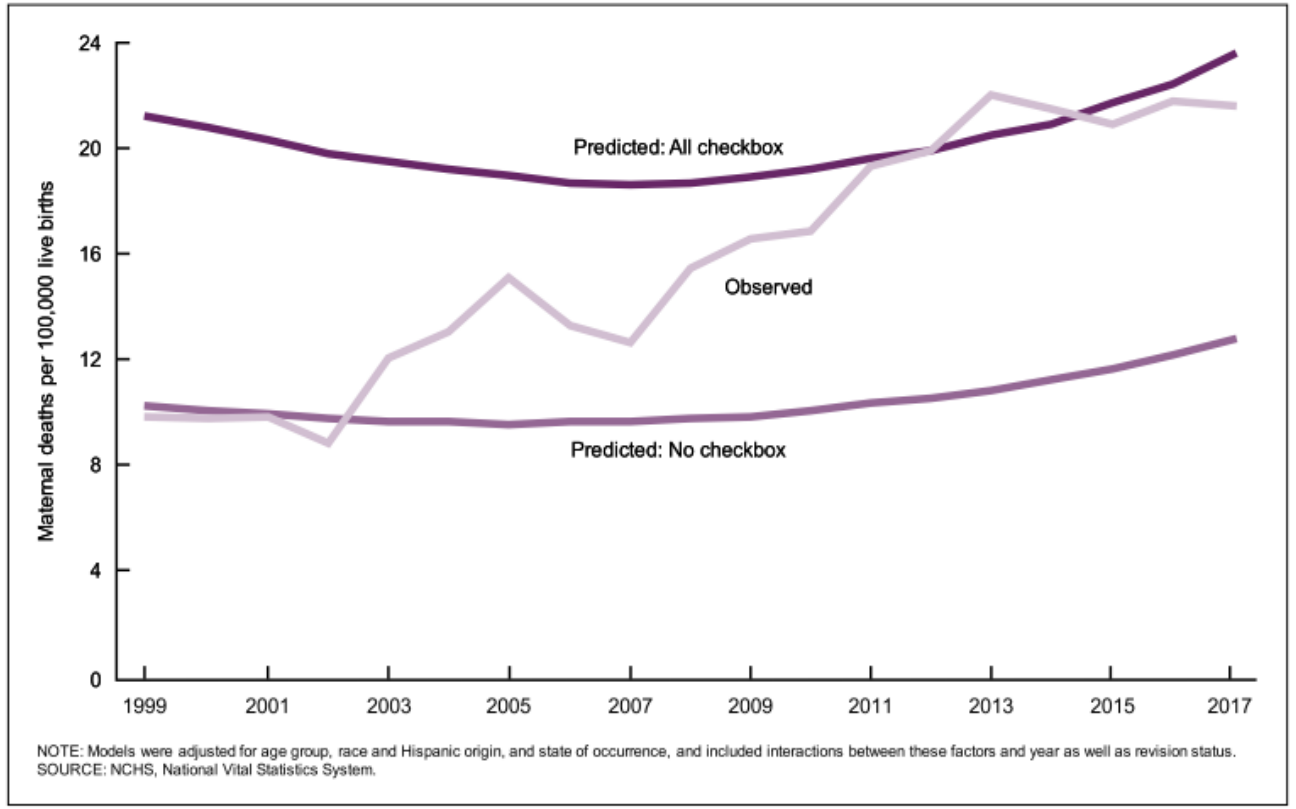
Women in the United States are more likely to die from childbirth- or pregnancy-related causes than women in any other high-income country, and black women die at a rate three to four times that of white women. Increasing maternal mortality is a tragedy, and though multiple factors contribute to the risk of maternal death, national and state reviews have identified the most preventable contributors. The Centers for Disease Control and Prevention (CDC) defines a pregnancy-related death as "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." Three types of complications the CDC identifies as the most common potentially preventable are postpartum hemorrhage, severe hypertension, and venous thromboembolism.[1]

So how can the health care community reverse the devastating trend in pregnancy-related deaths? We recommend four actions that can be adopted by every hospital providing obstetrical care, regardless of its size.

First, hospitals can expand their focus on the preventable causes of obstetrical complications and related death. The Alliance for Innovation on Maternal Health (AIM) — a collaboration led by the American College of Obstetricians and Gynecologists (ACOG) and involving 30 other organizations representing the spectrum of women's health care[2] — created several "bundles" of best practices for improving safety in maternity care, to help clinicians, the obstetrical team, and facilities consistently manage the care of high-risk pregnant women, including those with the three most common preventable complications identified by the CDC. We recommend implementation

1. Recognized challenges with data

Figure 6. Observed and predicted maternal mortality rates: United States, 1999–2017



Rossen LM, et al. Vital Health Stat. 2020

Mann S, et al. NEJM. 2018

Challenges with maternal mortality data

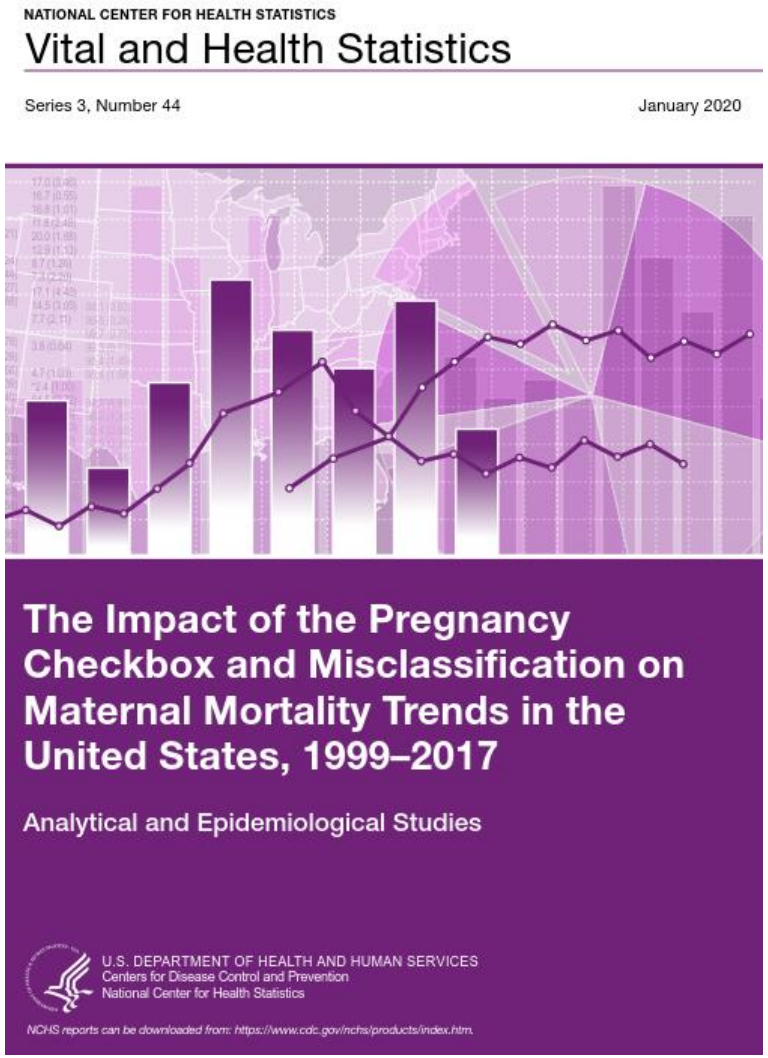
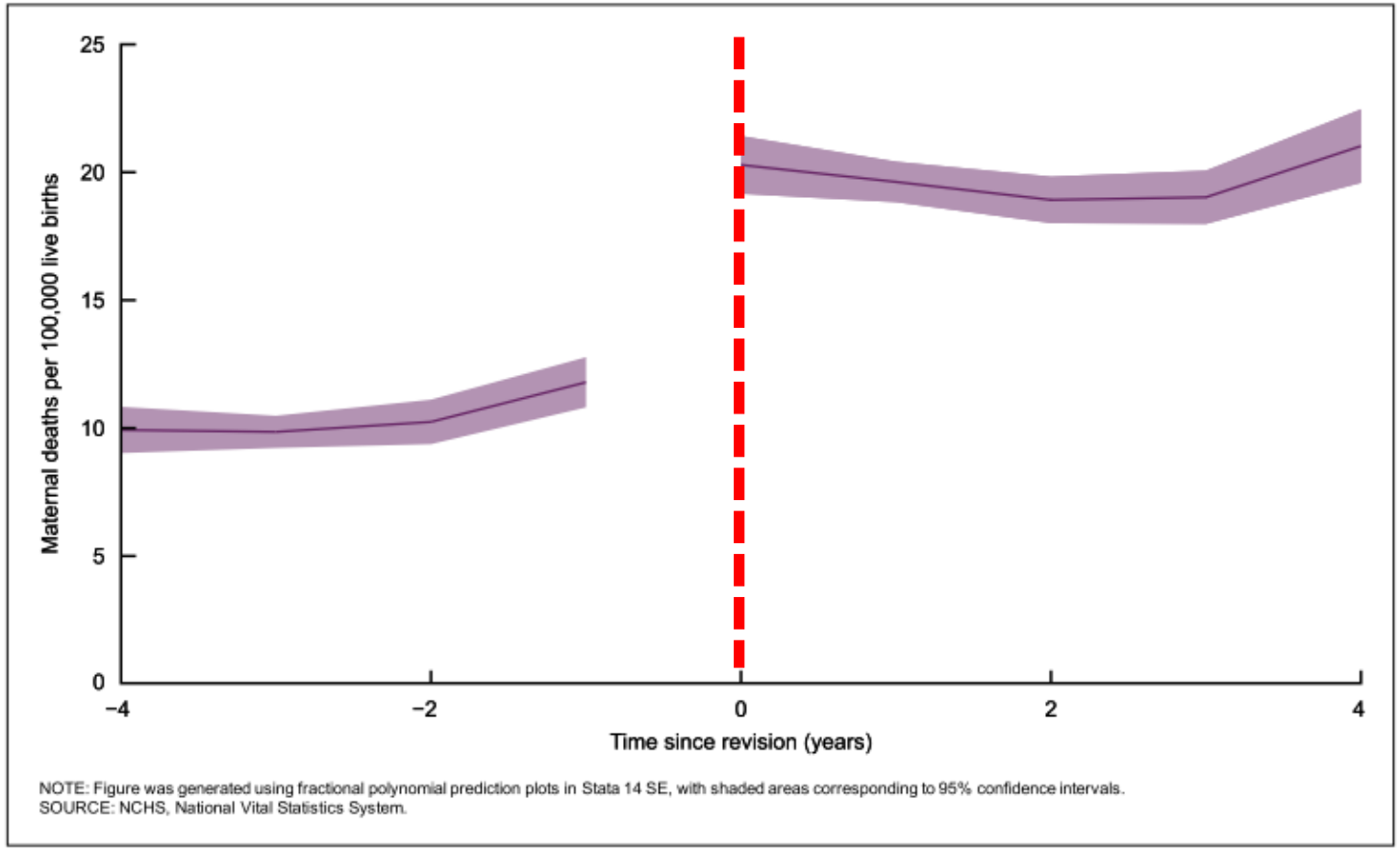


Figure 1. Average change in maternal mortality rates associated with the pregnancy checkbox implementation: United States, 2003–2017

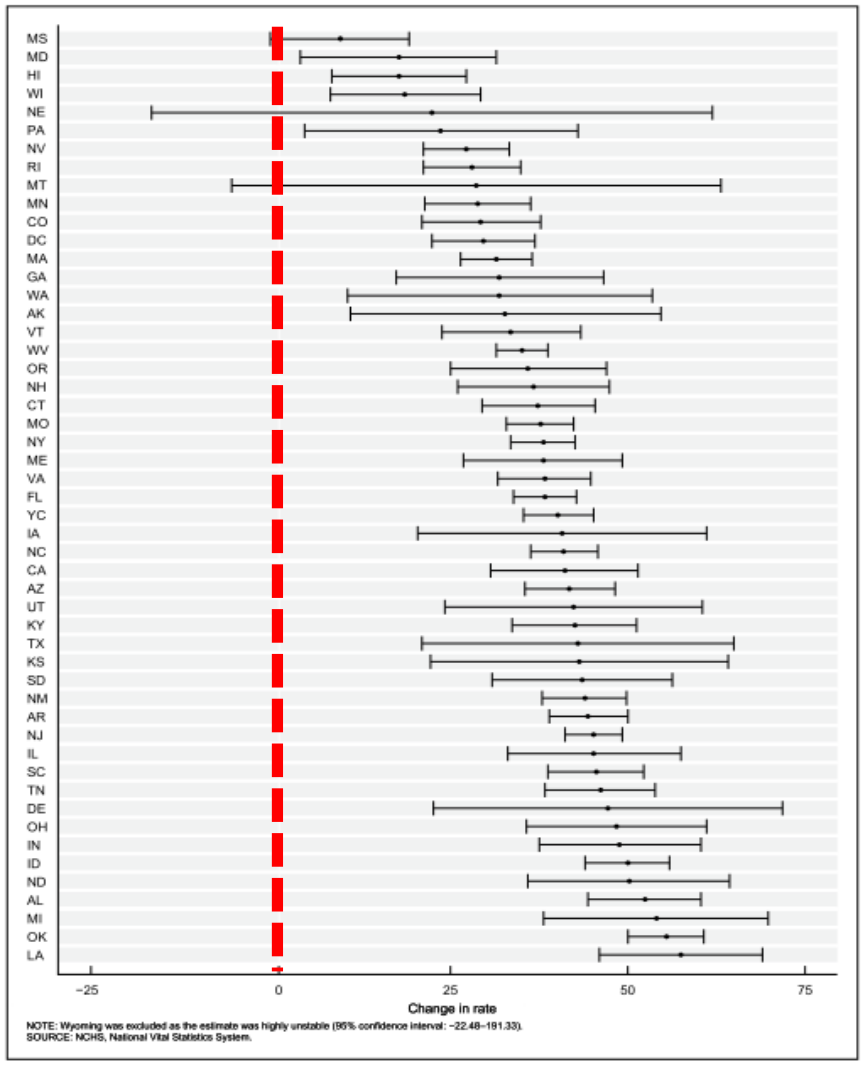


NOTE: Figure was generated using fractional polynomial prediction plots in Stata 14 SE, with shaded areas corresponding to 95% confidence intervals.
SOURCE: NCHS, National Vital Statistics System.

Rossen LM, et al. Vital Health Stat. 2020

Challenges with maternal mortality data

Figure 5. Average change in maternal mortality rates associated with the pregnancy checkbox implementation, by state of occurrence: United States, 2003–2017



NOTE: Wyoming was excluded as the estimate was highly unstable (95% confidence interval: −22.48–191.33).
SOURCE: NCHS, National Vital Statistics System.

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Challenges with maternal mortality data

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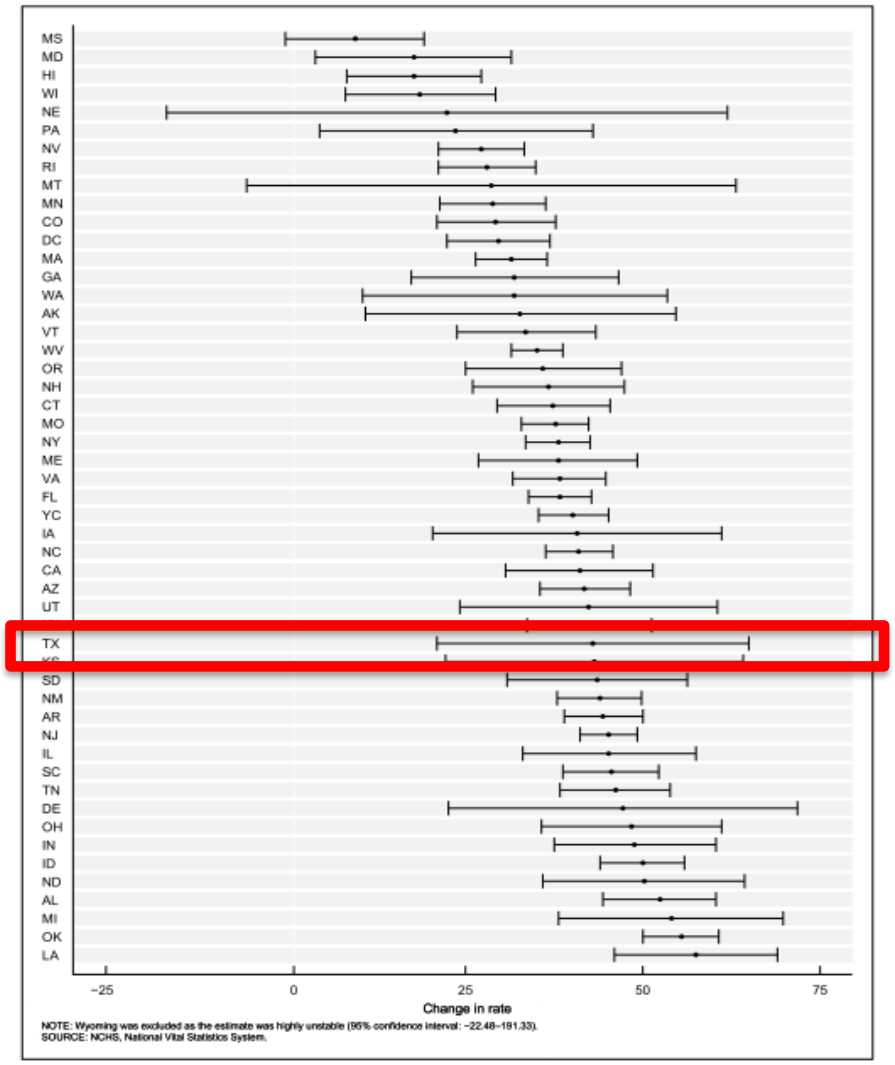

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Challenges with maternal mortality data

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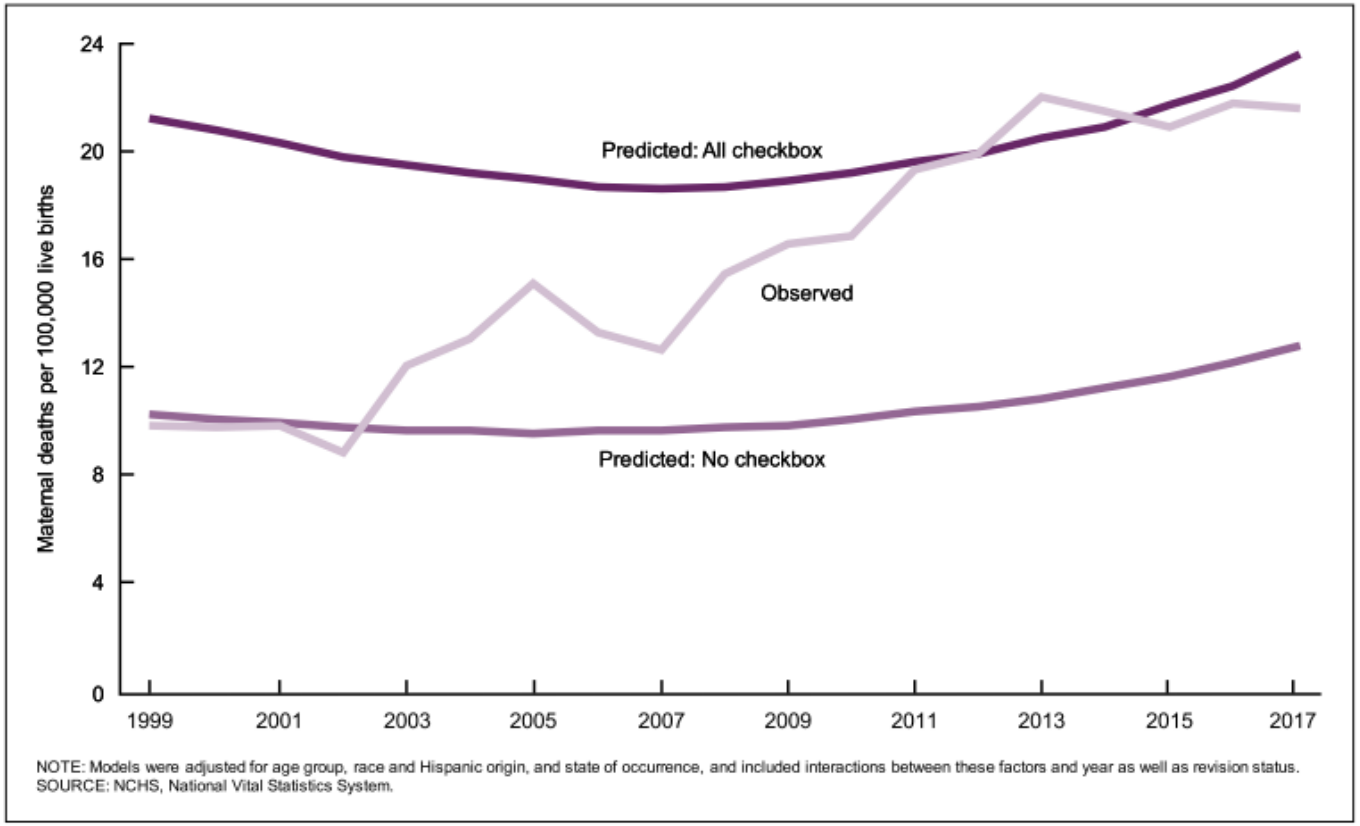


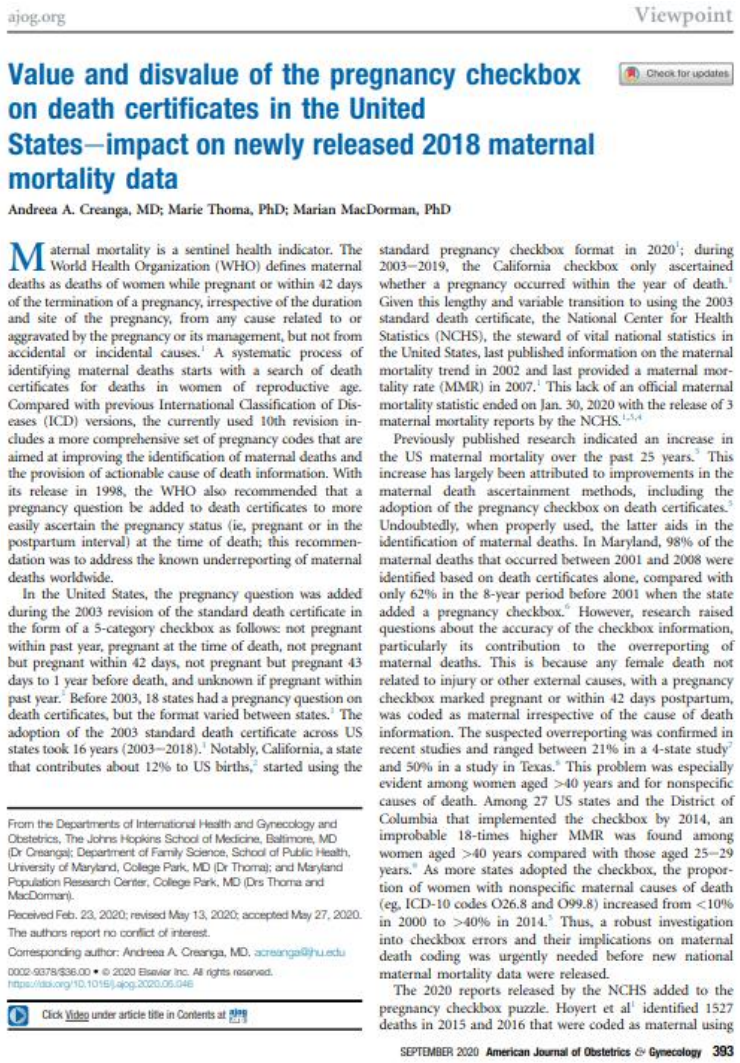
NOTE: Models were adjusted for age group, race and Hispanic origin, and state of occurrence, and included interactions between these factors and year as well as revision status.
SOURCE: NCHS, National Vital Statistics System.

Conclusions

This report examines the impact of the staggered adoption of the 2003 revision of the standard death certificate on trends in maternal mortality in the United States from 1999 through 2017. Results suggest that the observed increases in MMRs during this time period were largely due to the staggered implementation of the checkbox, which increased identification of maternal deaths. Averaging over the period 2003–2017, the checkbox resulted in an MMR increase of 9.6 deaths per 100,000 live births (95% CI: 8.6–10.6). Estimated trends accounting for the implementation of the checkbox indicated that there were no significant changes in MMRs over time, although trends varied by maternal age, race and Hispanic origin, and cause of maternal death. Additionally, the misclassification of pregnancy status on the death certificate likely contributed to increasing trends among women aged 40 and over and among nonspecific causes of maternal death.

Rossen LM, et al. Vital Health Stat. 2020

Challenges with maternal mortality data



ajog.org Viewpoint

Value and disvalue of the pregnancy checkbox on death certificates in the United States—impact on newly released 2018 maternal mortality data

Andreea A. Creanga, MD; Marie Thoma, PhD; Marian MacDorman, PhD

Maternal mortality is a sentinel health indicator. The World Health Organization (WHO) defines maternal deaths as deaths of women while pregnant or within 42 days of the termination of a 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.[1] A systematic process of identifying maternal deaths starts with a search of death certificates for deaths in women of reproductive age. Compared with previous International Classification of Diseases (ICD) versions, the currently used 10th revision includes a more comprehensive set of pregnancy codes that are aimed at improving the identification of maternal deaths and the provision of actionable cause of death information. With its release in 1998, the WHO also recommended that a pregnancy question be added to death certificates to more easily ascertain the pregnancy status (ie, pregnant or in the postpartum interval) at the time of death; this recommendation was to address the known underreporting of maternal deaths worldwide.

In the United States, the pregnancy question was added during the 2003 revision of the standard death certificate in the form of a 5-category checkbox as follows: not pregnant within past year, pregnant at the time of death, not pregnant but pregnant within 42 days, not pregnant but pregnant 43 days to 1 year before death, and unknown if pregnant within past year.[2] Before 2003, 18 states had a pregnancy question on death certificates, but the format varied between states.[1] The adoption of the 2003 standard death certificate across US states took 16 years (2003–2018).[1] Notably, California, a state that contributes about 12% to US births,[2] started using the standard pregnancy checkbox format in 2020[1]; during 2003–2019, the California checkbox only ascertained whether a pregnancy occurred within the year of death.[1] Given this lengthy and variable transition to using the 2003 standard death certificate, the National Center for Health Statistics (NCHS), the steward of vital national statistics in the United States, last published information on the maternal mortality trend in 2002 and last provided a maternal mortality rate (MMR) in 2007.[1] This lack of an official maternal mortality statistic ended on Jan. 30, 2020 with the release of 3 maternal mortality reports by the NCHS.[1,3,4]

Previously published research indicated an increase in the US maternal mortality over the past 25 years.[5] This increase has largely been attributed to improvements in the maternal death ascertainment methods, including the adoption of the pregnancy checkbox on death certificates.[5] Undoubtedly, when properly used, the latter aids in the identification of maternal deaths. In Maryland, 98% of the maternal deaths that occurred between 2001 and 2008 were identified based on death certificates alone, compared with only 62% in the 8-year period before 2001 when the state added a pregnancy checkbox.[6] However, research raised questions about the accuracy of the checkbox information, particularly its contribution to the overreporting of maternal deaths. This is because any female death not related to injury or other external causes, with a pregnancy checkbox marked pregnant or within 42 days postpartum, was coded as maternal irrespective of the cause of death information. The suspected overreporting was confirmed in recent studies and ranged between 21% in a 4-state study[7] and 50% in a study in Texas.[8] This problem was especially evident among women aged >40 years and for nonspecific causes of death. Among 27 US states and the District of Columbia that implemented the checkbox by 2014, an improbable 18-times higher MMR was found among women aged >40 years compared with those aged 25–29 years.[9] As more states adopted the checkbox, the proportion of women with nonspecific maternal causes of death (eg, ICD-10 codes O26.8 and O99.8) increased from <10% in 2000 to >40% in 2014.[3] Thus, a robust investigation into checkbox errors and their implications on maternal death coding was urgently needed before new national maternal mortality data were released.

The 2020 reports released by the NCHS added to the pregnancy checkbox puzzle. Hoyert et al[1] identified 1527 deaths in 2015 and 2016 that were coded as maternal using

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births.[3] After accounting for the use of the checkbox by all states throughout this period in modeling exercises, the NCHS concluded that the predicted national MMRs did not change considerably between 1999 and 2017, despite varying somewhat by age, race, Hispanic origin, and cause of death.[3] In other words, the NCHS attributes the observed increase in MMR in the United States during this period to the use of the checkbox for maternal death ascertainment and not to a true increase in the rate of dying from pregnancy complications.

Creanga AA, et al. AJOG. Sept 2020

Prompted national response to maternal mortality

Perspective

NOVEMBER 1, 2018

What We Can Do about Maternal Mortality — And How to Do It Quickly

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Mann S, et al. NEJM. 2018

1. Recognized challenges with data (2024)

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OBSTETRICS

Maternal mortality in the United States: are the high and rising rates due to changes in obstetrical factors, maternal medical conditions, or maternal mortality surveillance?

K. S. Joseph, MD, PhD; Sarka Lisonkova, MD, PhD; Amélie Boutin, MSc, PhD; Giulia M. Muraca, MPH, PhD; Neda Razaz, MPH, PhD; Sid John, MSc; Yasser Sabr, MHSc, MD; Wee-Shian Chan, MSc, MD; Azar Mehrabadi, MSc, PhD; Justin S. Brandt, MD; Enrique F. Schisterman, PhD; Cande V. Ananth, PhD, MPH

BACKGROUND: National Vital Statistics System reports show that maternal mortality rates in the United States have nearly doubled, from 17.4 in 2018 to 32.9 per 100,000 live births in 2021. However, these high and rising rates could reflect issues unrelated to obstetrical factors, such as changes in maternal medical conditions or maternal mortality surveillance (eg, due to introduction of the pregnancy checkbox).

OBJECTIVE: This study aimed to assess if the high and rising rates of maternal mortality in the United States reflect changes in obstetrical factors, maternal medical conditions, or maternal mortality surveillance.

STUDY DESIGN: The study was based on all deaths in the United States from 1999 to 2021. Maternal deaths were identified using the following 2 approaches: (1) per National Vital Statistics System methodology, as deaths in pregnancy or in the postpartum period, including deaths identified solely because of a positive pregnancy checkbox, and (2) under an alternative formulation, as deaths in pregnancy or in the postpartum period, with at least 1 mention of pregnancy among the multiple causes of death on the death certificate. The frequencies of major cause-of-death categories among deaths of female patients aged 15 to 44 years, maternal deaths, deaths due to obstetrical causes (ie, direct obstetrical deaths), and deaths due to maternal medical conditions aggravated by pregnancy or its management (ie, indirect obstetrical deaths) were quantified.

RESULTS: Maternal deaths, per National Vital Statistics System methodology, increased by 144% (95% confidence interval, 130–159) from 9.65 in 1999–2002 (n=1550) to 23.6 per 100,000 live births in 2018–2021 (n=3489), with increases occurring among all race and ethnicity groups. Direct obstetrical deaths increased from 8.41 in 1999–2002 to 14.1 per 100,000 live births in 2018–2021, whereas indirect obstetrical deaths increased from 1.24 to 9.41 per 100,000 live births: 38% of direct obstetrical deaths and 87% of indirect obstetrical deaths in 2018–2021 were identified because of a positive pregnancy checkbox. The pregnancy checkbox was associated with increases in less specific and incidental causes of death. For example, maternal deaths with malignant neoplasms listed as a multiple cause of death increased 46-fold from 0.03 in 1999–2002 to 1.42 per 100,000 live births in 2018–2021. Under the alternative formulation, the maternal mortality rate was 10.2 in 1999–2002 and 10.4 per 100,000 live births in 2018–2021; deaths from direct obstetrical causes decreased from 7.05 to 5.82 per 100,000 live births. Deaths due to preeclampsia, eclampsia, postpartum hemorrhage, puerperal sepsis, venous complications, and embolism decreased, whereas deaths due to adherent placenta, renal and unspecified causes, cardiomyopathy, and preexisting hypertension increased. Maternal mortality increased among non-Hispanic White women and decreased among non-Hispanic Black and Hispanic women. However, rates were disproportionately higher among non-Hispanic Black women, with large disparities evident in several causes of death (eg, cardiomyopathy).

CONCLUSION: The high and rising rates of maternal mortality in the United States are a consequence of changes in maternal mortality surveillance, with reliance on the pregnancy checkbox leading to an increase in misclassified maternal deaths. Identifying maternal deaths by requiring mention of pregnancy among the multiple causes of death shows lower, stable maternal mortality rates and declines in maternal deaths from direct obstetrical causes.

Key words: cause of death, epidemiology, maternal mortality, surveillance, United States

Joseph KS et al. Am J Obstet Gynecol. 2024

UTSouthwestern Medical Center

Challenges with maternal mortality data: Terminology

TABLE 1. Key Definitions of Terms Related to Maternal Mortality

Term	Definition
Pregnancy-associated death	**The death of a person while pregnant or within 1 year of pregnancy, regardless of cause (may be related or unrelated to pregnancy)**
Pregnancy-associated, but not related, death	**The death of a person while pregnant, or within 1 year of pregnancy, from a cause that is unrelated to pregnancy**
Pregnancy-related death	**The death of a person while pregnant or within 1 year of pregnancy from a pregnancy complications, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy**
Maternal death (WHO definition)	**The death of a person while pregnant or within 42 days of pregnancy, regardless of the duration and site of the pregnant and from any cause related to or aggravated by the pregnancy and its management, but not from accidental or incidental causes**

WHO, World Health Organization.

Nelson DB, Fomina J. Contemp OBGYN. 2023

Challenges with maternal mortality data: Data collection

Within the United States, three different government data sources report maternal deaths:

1. **National Vital Statistics System (NVSS)**: provides official reports used for international comparisons and includes deaths related to pregnancy that occur during pregnancy and up to 42 days postpartum
2. **Pregnancy-Related Mortality Surveillance System (PMSS)**: reports the pregnancy-related mortality rate (pregnancy-related deaths that occur during pregnancy and up to 1 year postpartum)
3. **State Maternal Mortality Review Committees (MMRC)**: utilize varying definitions for each state, as well as a third category of pregnancy-associated deaths (deaths of pregnant people whether related to pregnancy or not)

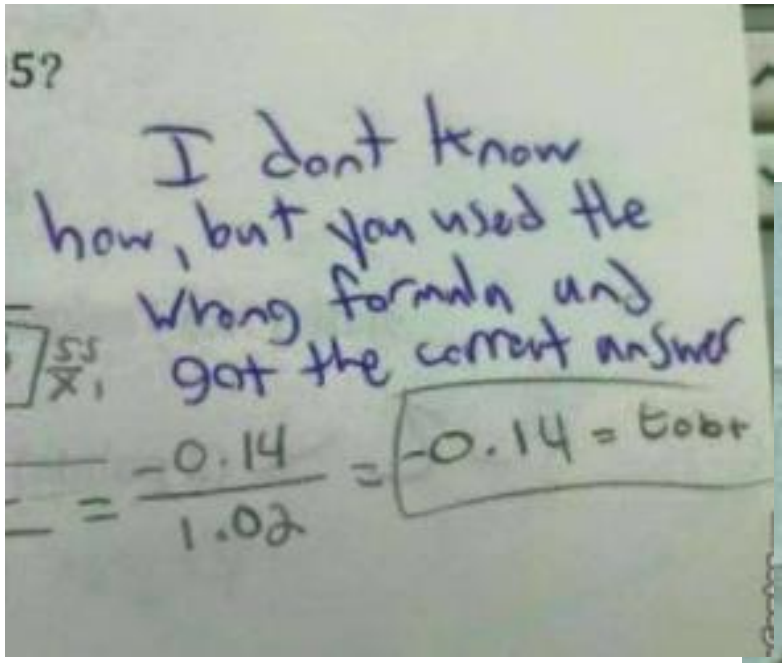
Nelson DB, Fomina J. Contemp OBGYN. 2023
Chen Y et al. JAMA Netw Open. 2025
Declercq E, Thoma M. JAMA. 2023

Challenges with maternal mortality data: Data collection

- All three measures rely on state vital statistics systems to provide the initial data, which are then refined into mortality estimates using different approaches.
- These different methods typically yield inconsistent estimates of the magnitude, and trends, for rates of maternal mortality.
- Despite these differences, the NVSS has advantages in timeliness and transparency, whereas PMSS and MMRC typically experience reporting delays.
- Differing definitions, and subcategorizations among organizations further complicate comparisons among states and countries.

Nelson DB, Fomina J. Contemp OBGYN. 2023
Chen Y et al. JAMA Netw Open. 2025
Declercq E, Thoma M. JAMA. 2023

Correct answer but with wrong logic?



Correct answer but with wrong logic?

Maternal mortality in the United States, 2017

Original Research

Pregnancy-Related Mortality in the United States, 2011–2013

Andreea A. Creanga, MD, PhD, Carla Syverson, CNM, MN, Kristi Seed, BSc, and William M. Callaghan, MD, MPH

OBJECTIVE: To update national population-level pregnancy-related mortality estimates and examine characteristics and causes of pregnancy-related deaths in the United States during 2011–2013.

METHODS: We conducted an observational study using population-based data from the Pregnancy Mortality Surveillance System to calculate pregnancy-related mortality ratios by year, age group, and race–ethnicity groups. We explored 10 cause-of-death categories by pregnancy outcome during 2011–2013 and compared their distribution with those in our earlier reports since 1987.

RESULTS: The 2011–2013 pregnancy-related mortality ratio was 17.0 deaths per 100,000 live births. Pregnancy-related mortality ratios increased with maternal age, and racial–ethnic disparities persisted with non-Hispanic black women having a 3.4 times higher mortality ratio than non-Hispanic white women. Among causes of pregnancy-related deaths, the following groups contributed more than 10%: cardiovascular conditions ranked first (15.5%) followed by other medical conditions often reflecting pre-existing illnesses (14.5%), infection (12.7%), hemorrhage (11.4%), and cardiomyopathy (11.0%). Relative to the most recent report of Pregnancy Mortality Surveillance System data for 2006–2010, the distribution of cause-of-death categories did not change considerably. However, compared with serial reports before 2006–2010, the contribution of hemorrhage, hypertensive disorders of pregnancy, and anesthesia complications declined, whereas that of cardiovascular and other medical conditions increased (population-level percentage comparison).

CONCLUSION: The pregnancy-related mortality ratio and the distribution of the main causes of pregnancy-related mortality have been relatively stable in recent years.

(Obstet Gynecol 2017;130:366–73)
DOI: 10.1097/AOG.0000000000002114

The risk of death during and shortly after pregnancy from pregnancy-related causes has not declined in the United States for more than 25 years.[1] Data from the Centers for Disease Control and Prevention's (CDC) Pregnancy Mortality Surveillance System show that the pregnancy-related mortality ratio has increased from approximately 10 deaths per 100,000 live births in the early 1990s to 16 deaths per 100,000 live births for the aggregate period 2006–2010.[2] The same data document important, persistent racial–ethnic disparities in pregnancy-related mortality for greater than 20 years and suggest a continuing increasing contribution of chronic diseases, particularly cardiovascular disease, to mortality.[2] Reasons for the reported increase in pregnancy-related mortality are not entirely clear, although improvements in the identification of these events–use of data linkages and of a pregnancy question (ie, checkbox) on the 2003 U.S. standard death certificate–were shown to have an important contribution (Creanga AA, Callaghan WM. Recent increases in the U.S. maternal mortality rate: disentangling trends from measurement issues [letter]. Obstet Gynecol 2017;129:206–7).[3,4]

To provide the most recent national, population-level information regarding overall pregnancy-related mortality, causes of death, and populations at risk, we examine pregnancy-related mortality in the United States

From the Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia; and the Department of International Health, Johns Hopkins Bloomberg School of Public Health, and the Department of Gynecology and Obstetrics, Johns Hopkins School of Medicine, Baltimore, Maryland.

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Each author has indicated that he or she has met the journal's requirements for authorship.

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Financial Disclosure
The authors did not report any potential conflicts of interest.

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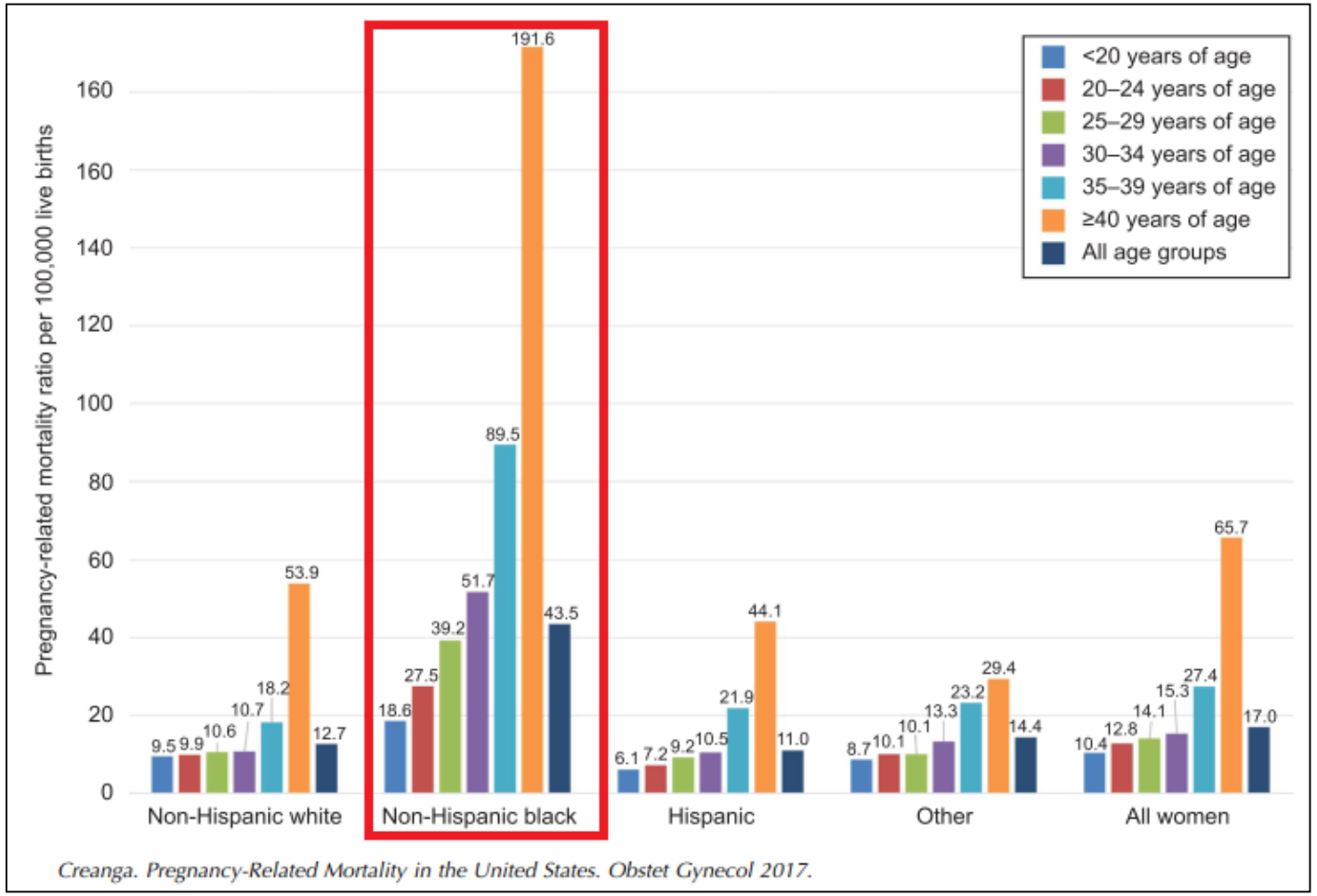
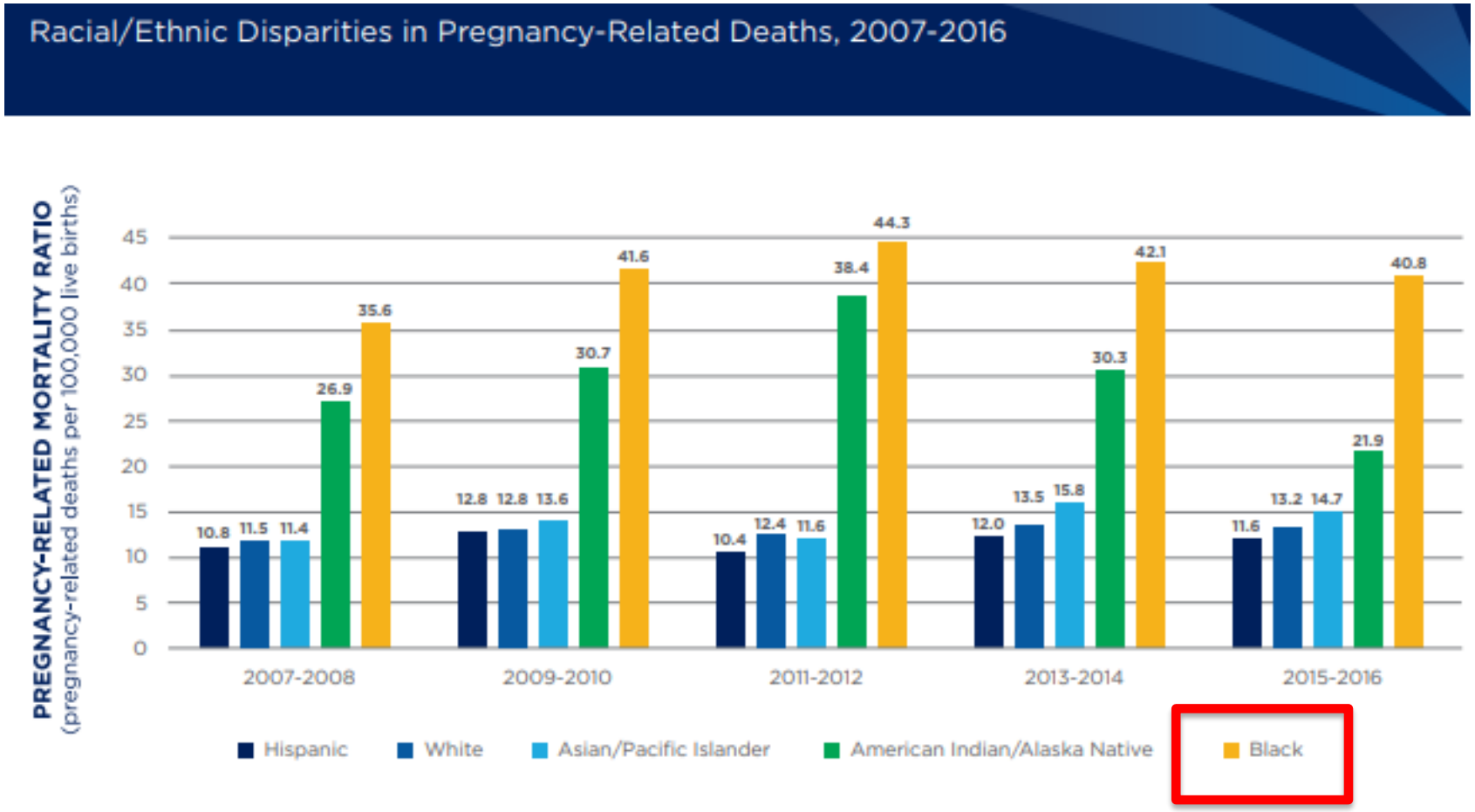


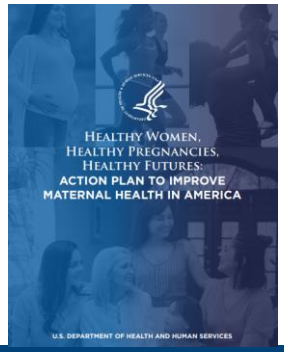
Creanga. Pregnancy-Related Mortality in the United States. Obstet Gynecol 2017.

Creanga AA, et al. Obstet Gynecol. 2017

UT Southwestern Medical Center

Marked disparity among pregnant individuals for maternal mortality





Again, despite challenges with data—disparity exists!

Marked disparity among pregnant individuals for maternal mortality

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Introduction

Commentaries on maternal health in the United States highlight concerns related to the high and rising rates of maternal death.[1,2] However, doubts linger regarding the accuracy of the maternal mortality estimates.[3–5] Maternal mortality tends to be underestimated even in countries with good vital registration systems because pregnancy status at the time of death (or in immediate past) is sometimes overlooked. The National Center for Health Statistics (NCHS) recommended the addition of a pregnancy checkbox to the death certificate in 2003 as a mechanism to improve maternal death ascertainment (Glossary; Appendix, A and B).

Although the introduction of the pregnancy checkbox led to a rapid increase in reported maternal mortality rates between 2003 and 2017,[6–8] subsequent studies conducted by the NCHS showed that this increase was an artifact.[9–11] Use of the pregnancy checkbox resulted in some egregious

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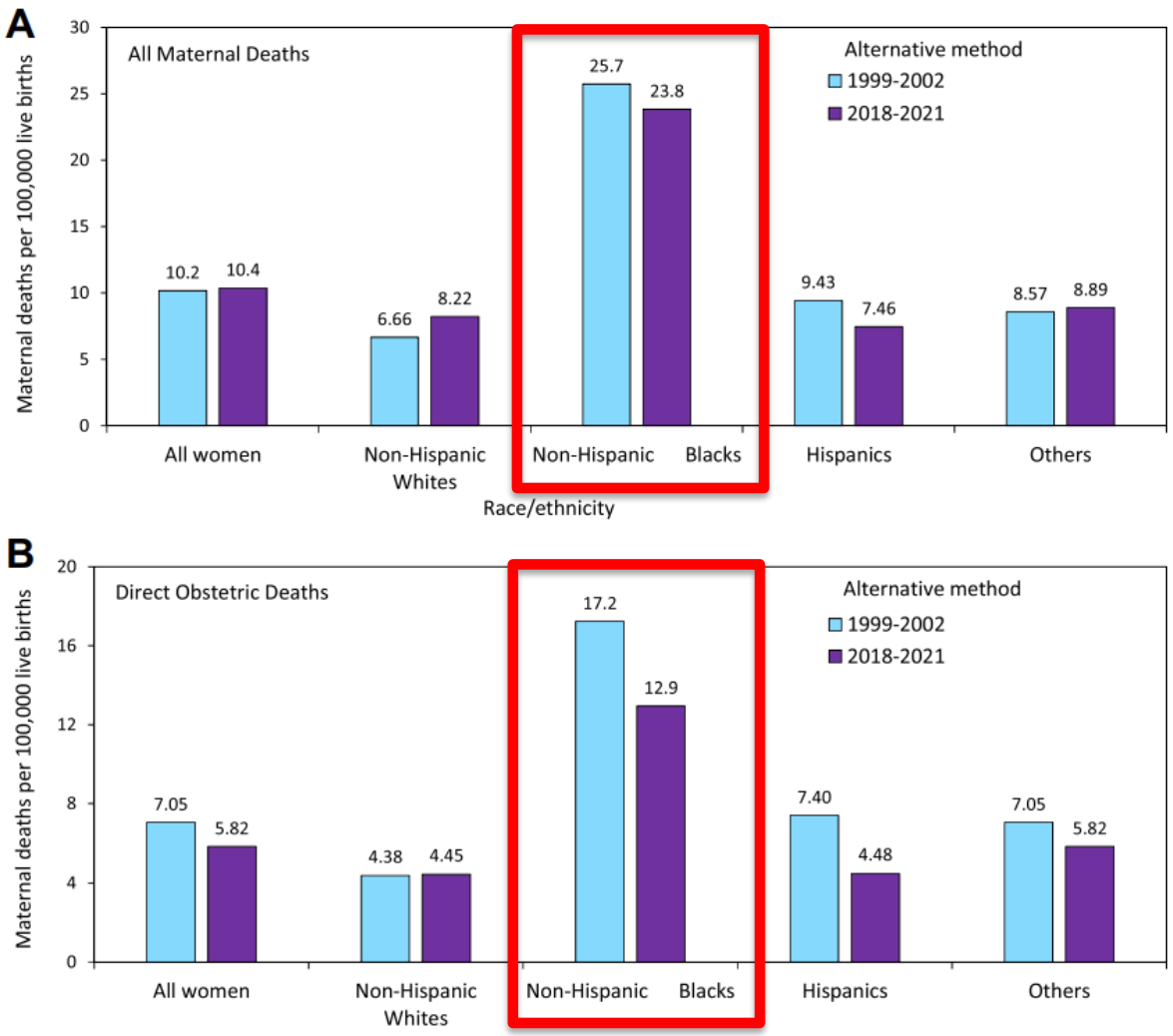
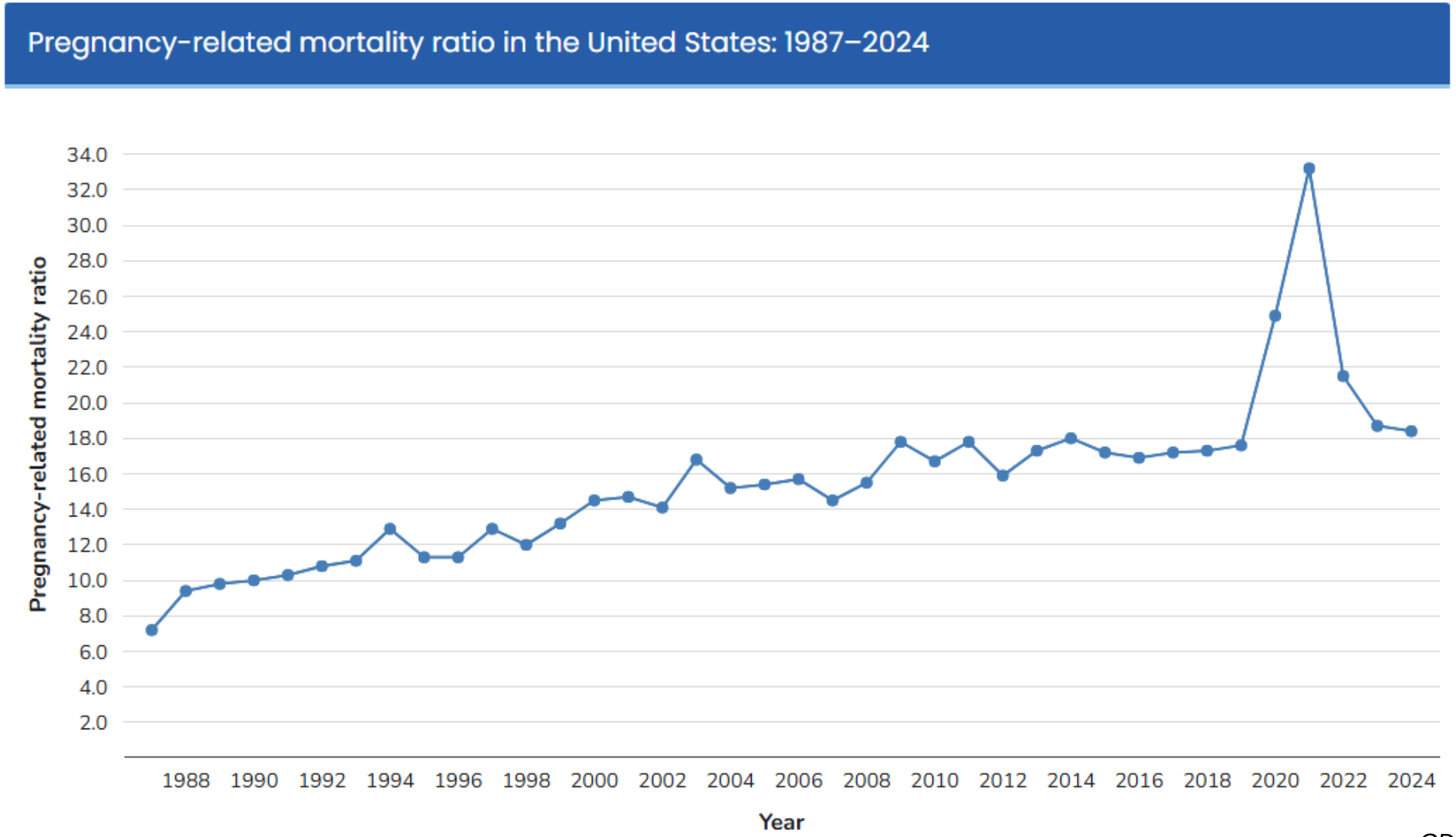


Joseph KS, et al. AJOG 2024

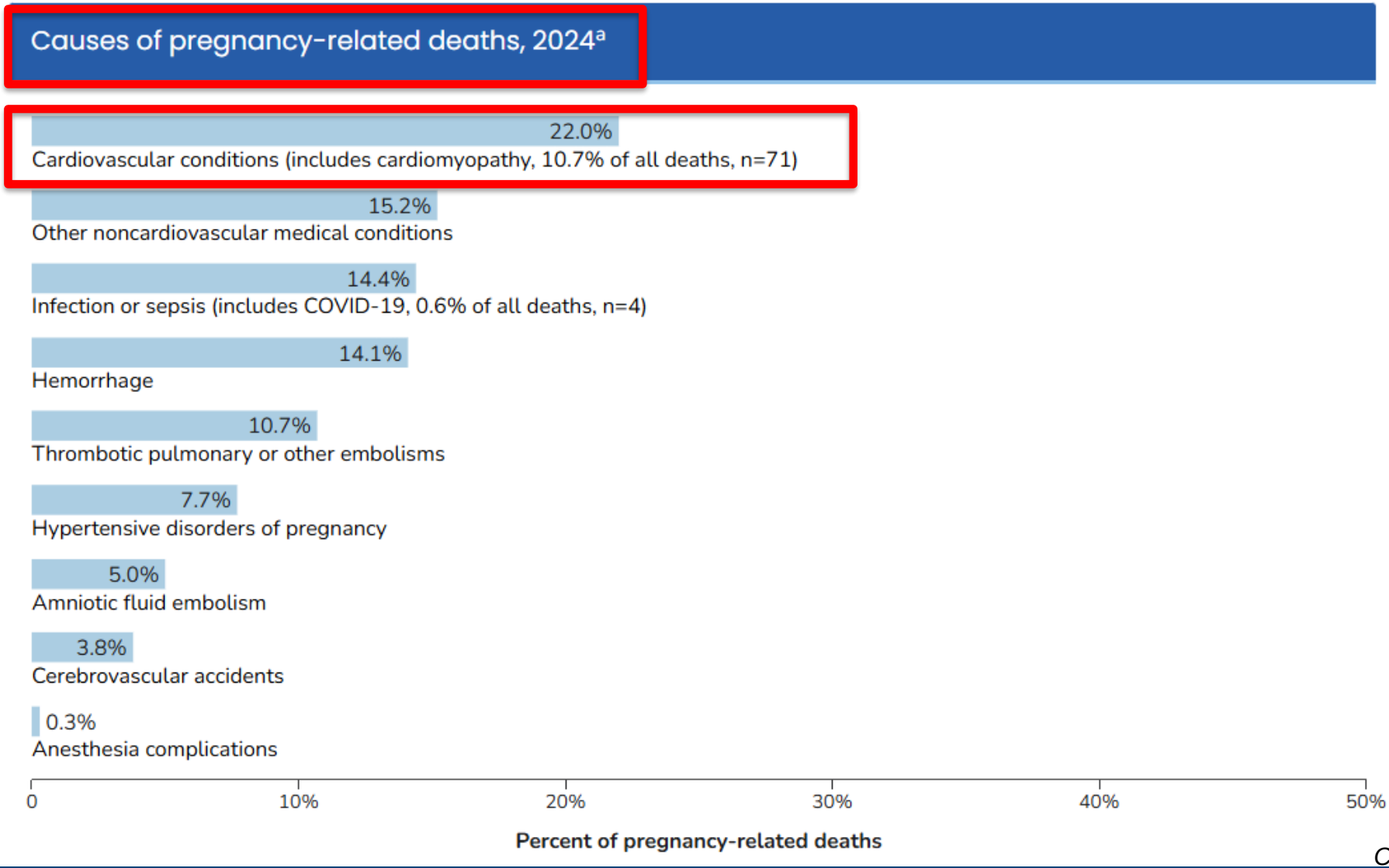
UTSouthwestern Medical Center

Current data from the Pregnancy Mortality Surveillance System (PMSS)



CDC. Published Dec 18, 2025.

Current data from the Pregnancy Mortality Surveillance System (PMSS)



CDC. Published Dec 18, 2025.

Prompted national response to maternal mortality

The NEW ENGLAND JOURNAL of MEDICINE

Perspective

NOVEMBER 1, 2018

What We Can Do about Maternal Mortality — And How to Do It Quickly

Susan Mann, M.D., Lisa M. Hollier, M.D., Kimberlee McKay, M.D., and Haywood Brown, M.D.

Most Americans take for granted that giving birth in a U.S. hospital will be a safe experience resulting in a healthy mother and baby. However, recent reports in the lay media — an NPR special series called "Lost Mothers: Maternal Mortality in the U.S."; a *New York Times* article on closures of rural maternal services; and a *USA Today* series, "Deadly Deliveries" — discuss increasing maternal mortality in the United States and the significant concern it presents for childbearing women and their families.

Women in the United States are more likely to die from childbirth- or pregnancy-related causes than women in any other high-income country, and black women die at a rate three to four times that of white women. Increasing maternal mortality is a tragedy, and though multiple factors contribute to the risk of maternal death, national and state reviews have identified the most preventable contributors. The Centers for Disease Control and Prevention (CDC) defines a pregnancy-related death as "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." Three types of complications the CDC identifies as the most common potentially preventable are postpartum hemorrhage, severe hypertension, and venous thromboembolism.[1]

So how can the health care community reverse the devastating trend in pregnancy-related deaths? We recommend four actions that can be adopted by every hospital providing obstetrical care, regardless of its size.

First, hospitals can expand their focus on the preventable causes of obstetrical complications and related death. The Alliance for Innovation on Maternal Health (AIM) — a collaboration led by the American College of Obstetricians and Gynecologists (ACOG) and involving 30 other organizations representing the spectrum of women's health care[2] — created several "bundles" of best practices for improving safety in maternity care, to help clinicians, the obstetrical team, and facilities consistently manage the care of high-risk pregnant women, including those with the three most common preventable complications identified by the CDC. We recommend implementation

N ENGL J MED 379;18 NEJM.ORG NOVEMBER 1, 2018 1689

1. Recognized challenges with data
2. Maternal levels of care (regionalization)
3. Quality of care and collaborative "bundles"
4. Team "huddles" for complex cases (e.g Placenta accreta spectrum disorder)
5. Simulation
6. **Preventing maternal deaths act**

Mann S, et al. NEJM. 2018

2018 Preventing Maternal Deaths Act

ECONOMY NATIONAL SECURITY BUDGET IMMIGRATION CORONAVIRUS.GOV

STATEMENTS & RELEASES

Bill Announcement

Issued on: **December 21, 2018**

★ ★ ★

H.R. 1318, the "Preventing Maternal Deaths Act of 2017," which reauthorizes, amend, and expand the Safe Motherhood initiative within the Centers for Disease Control and Prevention, including authorizing support for State and tribal Maternal Mortality Review Committees that meet certain requirements;

HOUSE COMMITTEE ON ENERGY & COMMERCE
CHAIRMAN FRANK PALLONE, JR.

ABOUT E&C SUBCOMMITTEES COMMITTEE ACTIVITY NEWSROOM SUBSCRIBE

HEARING ON "IMPROVING MATERNAL HEALTH: LEGISLATION TO ADVANCE PREVENTION EFFORTS AND ACCESS TO CARE"

Date: Tuesday, September 10, 2019 - 10:00am
Location: 2123 Rayburn House Office Building
Subcommittees: Health (116th Congress)

The Subcommittee on Health of the Committee
Tuesday, September 10, 2019, at 10:00 a.m. in t
Office Building. The hearing is entitled, "Improvi
Efforts and Access to Care."

Whitehouse.gov

Maternal Mortality Review Committees

TEXAS Health and Human Services | Texas Department of State Health Services

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Home > Maternal and Child Health > Maternal Mortality and Morbidity Review Committee

Maternal Mortality and Morbidity Review Committee

Background and Purpose

The Maternal Mortality and Morbidity Task Force was created by Senate Bill 495, 83rd Legislature, Regular Session, 2013, which added Texas Health and Safety Code Chapter 34. Maternal Mortality and Morbidity Task Force. The name of the Task Force was changed to the Texas Maternal Mortality and Morbidity Review Committee by Senate Bill 750, 86th Legislature, Regular Session, 2019 in alignment with the federal Preventing Maternal Deaths Act of 2018. Later in 2019, the review committee was awarded Center for Disease Control and Prevention funding for the for the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) Program.

The multidisciplinary review committee within the Department of State Health Services (DSHS) will study maternal mortality and morbidity. The review committee:

- studies and reviews cases of pregnancy-related deaths and trends in severe maternal morbidity,
- determines the feasibility of the review committee studying cases of severe maternal morbidity, and
- makes recommendations to help reduce the incidence of pregnancy-related deaths and severe maternal morbidity in Texas.

https://www.dshs.texas.gov/mch/Maternal-Mortality-and-Morbidity-Review-Committee.aspx

Maternal Mortality Review Committees

State	Percentage of Population That Is Rural*	Year Established	Year Legislated
Alabama*	41.0	2018	2018
Alaska*	34.0	1989	n/a
Arizona	10.2	2011	2011
Arkansas*	43.8	n/a	n/a
California	5.0	2006	n/a
Colorado	13.8	1993	n/a
Connecticut	12.0	2015	2018
Delaware	16.7	2011	2008
District of Columbia	0.0	2018	2018
Florida	8.8	1996	n/a
Georgia	24.9	2012	2014
Hawaii	8.1	2016	2016
Idaho	29.4	2007	2007
Illinois	11.5	2000/2016[†]	n/a
Indiana	27.6	2018	2018
Iowa*	36.0	1952	n/a[‡]
Kansas	25.8	2018	2018
Kentucky*	41.6	1995[§]	2018
Louisiana	26.8	1992	2018
Maine*	61.3	2005	2005
Maryland	12.8	2000	2000
Massachusetts	8.0	1997	n/a
Michigan	25.4	1950	n/a
Minnesota	26.7	2012	n/a
Mississippi*	50.6	2017	2017
Missouri	29.6	2011	n/a
Montana*	44.1	2013	2013
Nebraska	26.9	2013	2013
Nevada	5.8	n/a	n/a
New Hampshire*	39.7	2013	2010
New Jersey	5.3	1932	n/a
New Mexico	22.6	1993	n/a
New York	12.1	2010	n/a
North Carolina*	33.9	2015	2015
North Dakota*	40.1	n/a	n/a
Ohio	22.1	2010	n/a
Oklahoma*	33.8	2009	n/a
Oregon	19.0	2018	2018
Pennsylvania	21.3	2018	2018
Rhode Island	9.3	1931	n/a
South Carolina*	33.7	2016	2016
South Dakota*	43.3	n/a	n/a
Tennessee*	33.6	2017	2016
Texas	15.3	2014	2013
Utah	9.4	1995	n/a
Vermont*	61.1	2011	2011
Virginia	24.5	2002	n/a
Washington	15.9	2016	2016
West Virginia*	51.3	2008	2008
Wisconsin	29.8	1997	n/a
Wyoming*	35.2	n/a	n/a

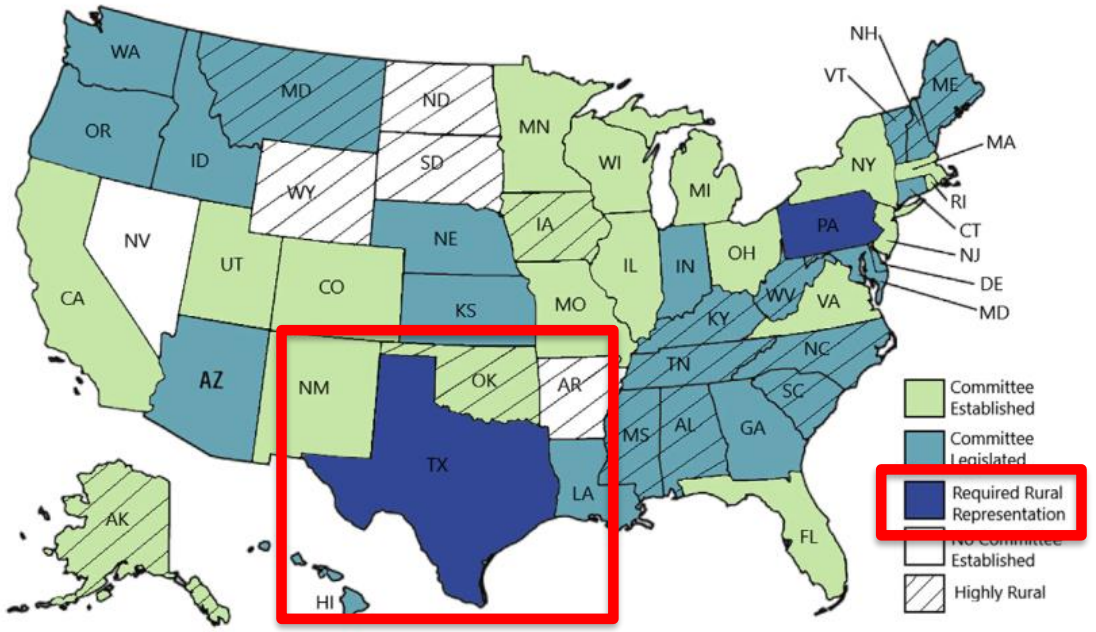
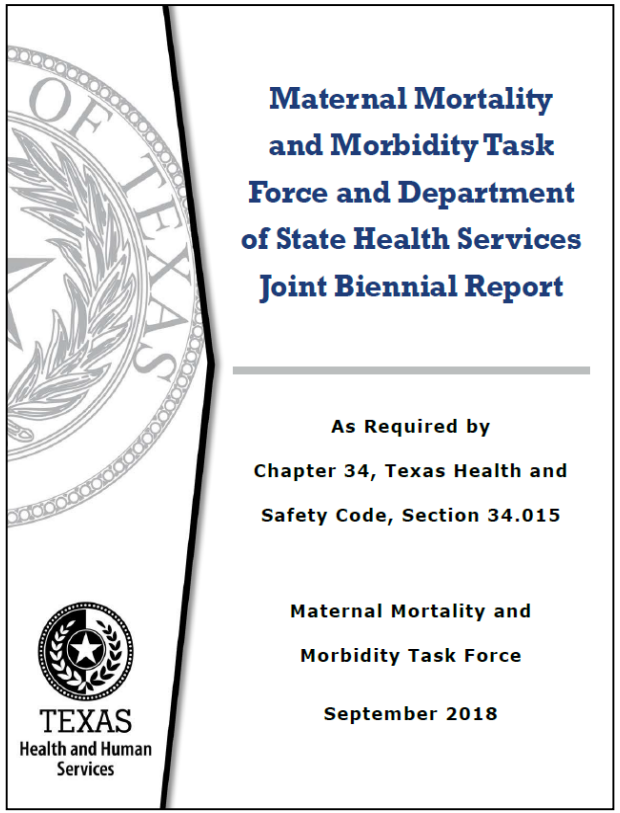
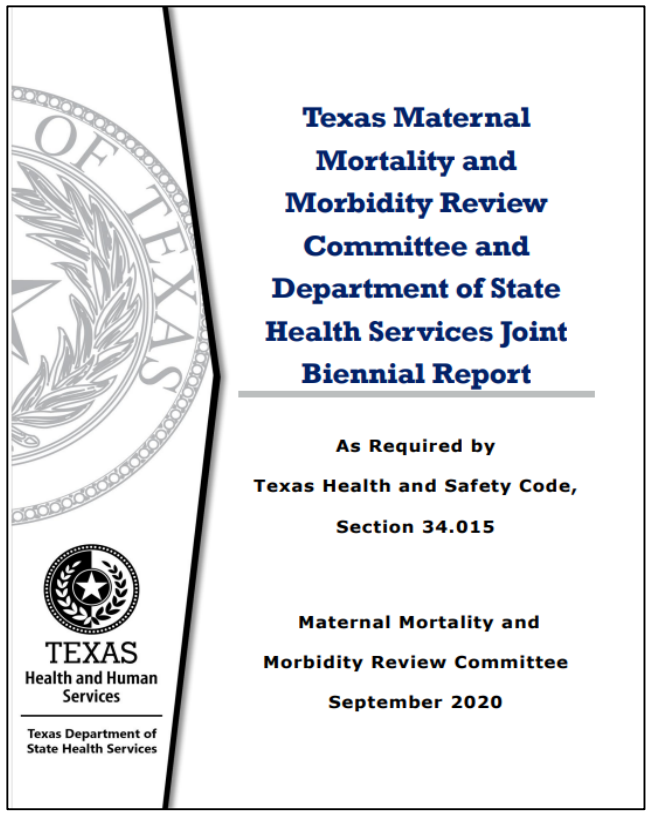


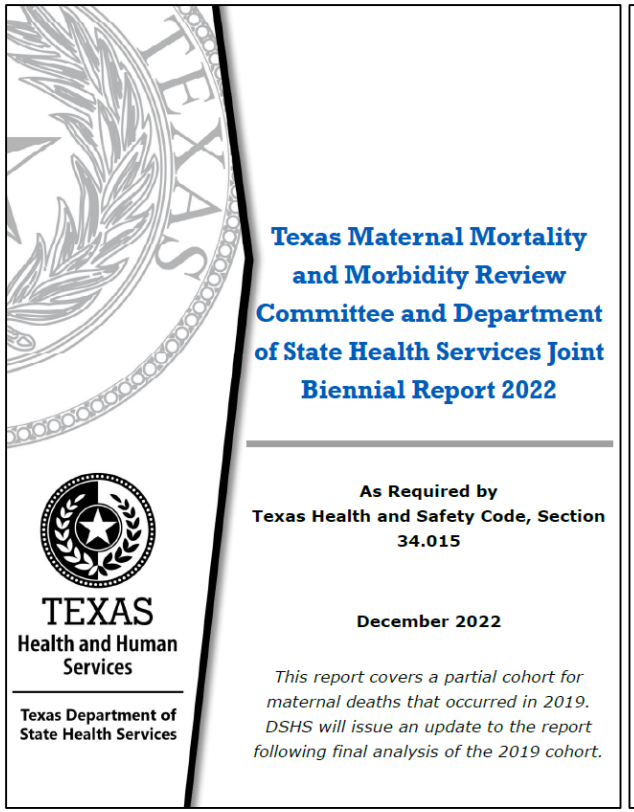
Figure 3. Highly rural states* and the status of state and the District of Columbia Maternal Mortality Review Committees in the United States, as of December 2018. *Highly rural states defined as those with 30% or more of the population residing in rural communities, as of 2010 Decennial Census, U.S. Census Bureau (U.S. Census Bureau, 2018).

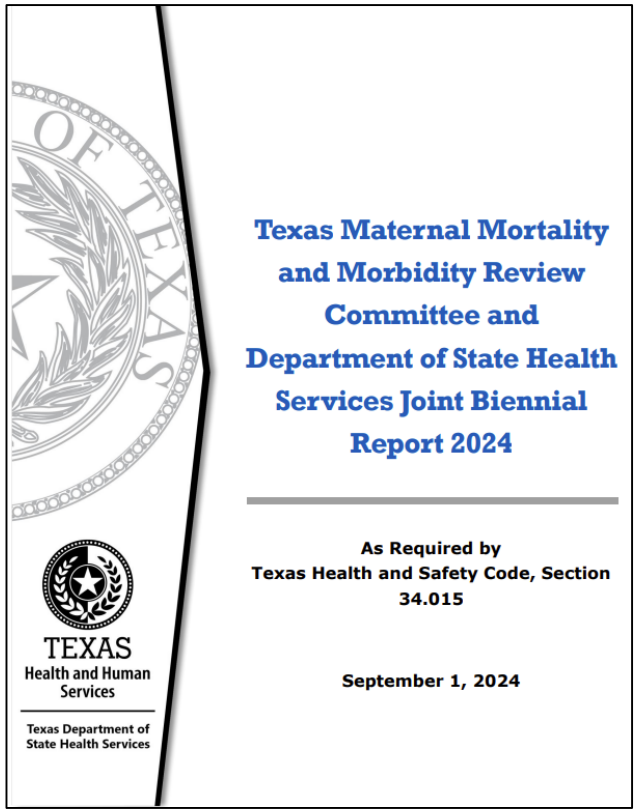
Kozhimannil KB, et al. Women's Health Issues. 2019

Maternal Mortality Review Committee Reports in Texas









Texas Maternal Mortality and Morbidity Task Force Report, 2018, 2020, 2022, 2024

Maternal Mortality Review Committees in Texas, 2018

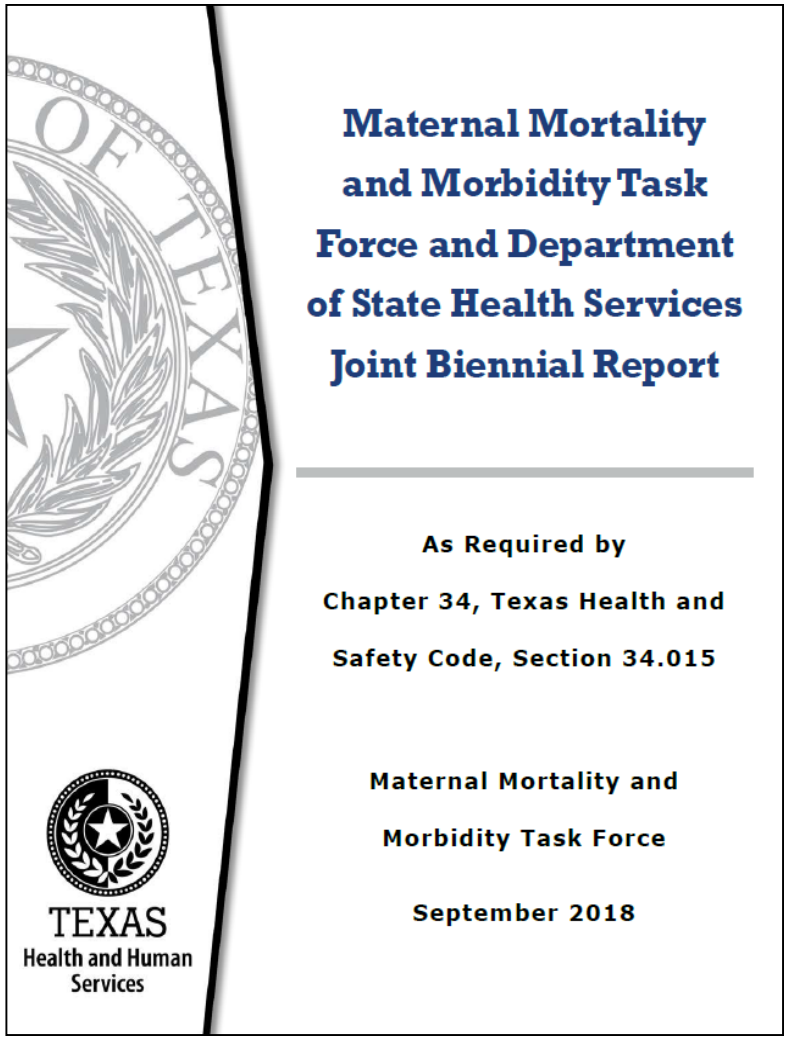


Table C1. Maternal Death by Cause and Timing of Death, Texas, 2012-2015

Cause of Death	TIMING OF DEATH While Pregnant	0-7 Days Postpartum	8-42 Days Postpartum	43-60 Days Postpartum	61+ Days Postpartum	TOTAL
Drug Overdose	0	3	7	5	49	**64**
Other Causes	5	5	6	3	44	**63**
Cardiac Event	2	12	9	5	27	**55**
Homicide	2	1	5	2	32	**42**
Infection/Sepsis	1	3	14	3	11	**32**
Suicide	0	1	2	2	28	**33**
Cerebrovascular Event	0	8	9	1	9	**27**
Hemorrhage	3	12	2	0	3	**20**
Hypertension/Eclampsia	0	7	4	0	7	**18**
Pulmonary Embolism	2	3	4	2	2	**13**
Amniotic Embolism	1	9	0	0	0	**10**
Substance Use Sequelae (e.g., liver cirrhosis)	0	0	2	0	3	**5**
TOTAL	**16**	**64**	**64**	**23**	**215**	**382**

PREPARED BY: Maternal & Child Health Epidemiology, Division for Community Health Improvement, DSHS.

DATA SOURCES: 2012-2015 Death Files, 2011-2015 Live Birth and Fetal Death Files. Center for Health Statistics, DSHS.

NOTES: Maternal deaths were confirmed by matching each woman's death record with a birth or fetal death within 365 days. Deaths due to cancer or motor vehicle crashes were excluded from these analyses. Timing of death was determined using a combination of pregnancy status on the death record and days elapsed between delivery and death. If a woman was identified as pregnant at time of death and 0 days elapsed between delivery and death, then this was counted as death while pregnant. All other deaths were identified as postpartum maternal deaths, and were further categorized based on the number of days

Texas Maternal Mortality and Morbidity Task Force Report, 2018

Maternal Mortality Review Committees findings are similar elsewhere

Expert Reviews ajog.org

Maternal self-harm deaths: an unrecognized and preventable outcome

Kimberly Mangla, MD; M. Camille Hoffman, MD, MSCS; Caroline Trumpff, PhD; Sinclaire O'Grady, BA; Catherine Monk, PhD

Maternal mortality continues to be a public health priority in national and international communities. Maternal death rates secondary to medical illnesses such as cardiovascular disease, preeclampsia, and postpartum hemorrhage are well documented. The rates of maternal death secondary to self-harm, including suicide and overdose, have been omitted from published rates of maternal mortality, despite growing attention to the prevalence of perinatal mood disorders, estimated at up to 15% of pregnant and postpartum women in the United States. Underlying psychiatric disorder, including depression, is consistently identified as a risk factor in substance abuse and suicide. The rate of opioid-associated morbidity and mortality has recently been deemed a national crisis. Pregnancy does not protect against these risks, and the postpartum period has been identified as a particularly vulnerable time. The lack of consistent and inclusive data on self-harm deaths in the pregnancy-postpartum period is alarming. This review will identify barriers to reporting and ascertainment of maternal suicide and overdose deaths, summarize geographic-specific data available, address potential social and psychological biases that have led to neglect of the topic of maternal self-harm deaths, and suggest recommendations that incorporate the whole woman in prenatal care and thus prevention of this devastating outcome.

Key words: maternal morbidity, maternal mortality, maternal self-harm, maternal suicide, neonatal abstinence syndrome, postpartum suicide, pregnancy opiate prescriptions, pregnancy opiates, pregnancy substance abuse, pregnancy suicide

Maternal mortality, death during pregnancy or the postpartum period, is a barometer of a population's health, with decreasing national rates correlating with advancing medical progress. In contrast to reductions in pregnancy and postpartum-associated deaths around the world, one recent study reported a 26% overall increase in maternal mortality across 48 US states between 2000 and 2014.[1]

The uptick in the US maternal mortality rate is explained by shifts in medical diseases and improved ascertainment. Yet across the United States, ascertainment approaches to maternal death typically do not count those associated with behavioral health problems such as suicide and overdose, two of the leading causes of death worldwide for women of childbearing age.[2]

In the United States, there has been a consistent rise in opiate use, misuse, and death, including among pregnant and postpartum women.[3] This review covers the neglected topic of maternal death from self-harm, in particular suicide and overdose, specifically the following: (1) the challenges in obtaining reliable epidemiological statistics on maternal mortality via self-harm; (2) current data on the rates of maternal self-harm deaths and their antecedents, including those associated with the US opioid epidemic; (3) speculation as to the factors rendering maternal mortality via self-harm a silenced public health issue; and (4) recommendations for improved prevention of self-harm maternal mortality.

Epidemiology

The US maternal mortality rate secondary to overdose or suicide is unclear, with trends in rates over time even less so.[4] This is due to changes in reporting methodologies and differences in the inclusion criteria as well as accuracy and availability of data collection across states. Currently the Centers for Disease Control and Prevention (CDC) defines maternal mortality as the death of a woman while pregnant or within 1 year of pregnancy termination, regardless of duration, from any cause related to or aggravated by pregnancy or its management, but not from accidental or incidental causes.[5]

This definition of maternal mortality has shifted over the years with respect to timing. Between 1979 and 1999, the *International Classification of Diseases* (ICD), ninth revision, included deaths during pregnancy and the puerperium, a term including only up to 42 days postpartum by which time a woman's physiology was believed to return to normal, an approach underscoring the dismissal of brain-behavior etiology in maternal mortality.[6,7]

A recent population-based report demonstrated the peak incidence of maternal self-harm–related death is between 9 and 12 months postpartum, supporting efforts to extend the time period inclusive of pregnancy-related deaths.[8] The CDC relied and continues

From the Departments of Psychiatry (Dr Mangla) and Obstetrics and Gynecology (Dr Monk and Ms O'Grady) and Division of Behavioral Medicine, Department of Psychiatry (Drs Trumpff and Monk), Columbia University Medical Center, New York, NY; Department of Obstetrics and Gynecology, University of Colorado School of Medicine/Denver Health and Hospital Authority, Denver, Colorado (Dr Hoffman); and New York State Psychiatric Institute, New York, NY (Dr Monk).

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The authors report no conflict of interest.

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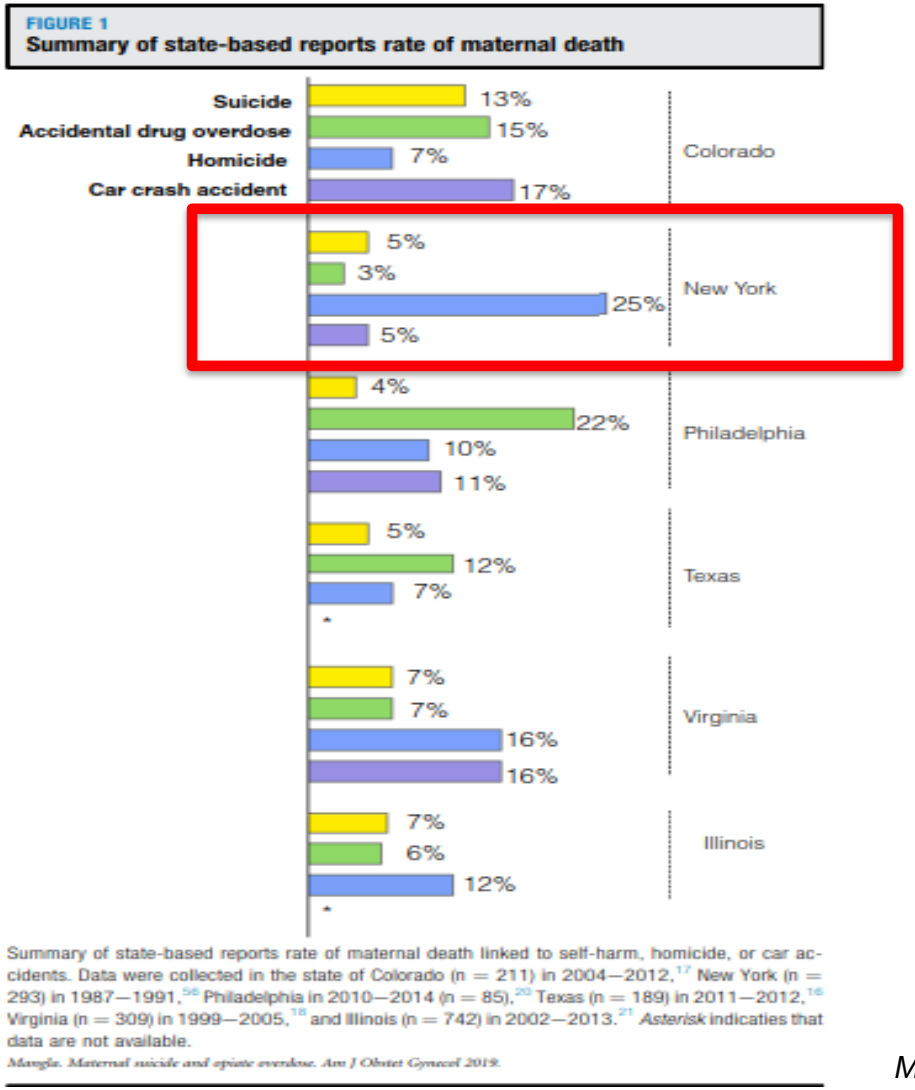

Summary of state-based reports rate of maternal death linked to self-harm, homicide, or car accidents. Data were collected in the state of Colorado (n = 211) in 2004–2012,[17] New York (n = 293) in 1987–1991,[56] Philadelphia in 2010–2014 (n = 85),[20] Texas (n = 189) in 2011–2012,[16] Virginia (n = 309) in 1999–2005,[18] and Illinois (n = 742) in 2002–2013.[21] *Asterisk* indicates that data are not available.

Mangla. Maternal suicide and opiate overdose. Am J Obstet Gynecol 2019.

Mangla K, et al. AJOG. 2019

Maternal Mortality Review Committees findings are similar elsewhere

THE JOURNAL OF MATERNAL-FETAL & NEONATAL MEDICINE
https://doi.org/10.1080/14767058.2019.1687678

Taylor & Francis

OTHER

Challenges and opportunities to understand, discuss, and decrease maternal mortality rates in the United States. The New Jersey experience

Joseph Apuzzio[a], Lisa Gittens-Williams[a], Damali Campbell[a] and Robyn D'Oria[b]

[a]Department of Obstetrics, Gynecology & Women's Health, Rutgers New Jersey Medical School, Newark, NJ, USA; [b]Central Jersey Family Healthcare Consortium, North Brunswick, NJ, USA

ABSTRACT

Maternal mortality improvement depends on the proper classification used in defining maternal deaths. Since there are several definitions of maternal deaths depending upon the proximate cause of the death, if the death is related to the physiologic changes during pregnancy or not and the timing of the death, some opportunities for improvement may be missed to decrease the overall maternal mortality rate in the USA if the correct definition is not utilized appropriately.

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KEYWORDS
Definitions; maternal mortality; pregnancy-related; pregnancy-associated; prevention; maternal morbidity

The New Jersey maternal mortality review team (MMRT) reviews all maternal deaths within 1 year of a pregnancy event. Upon review, it is determined if the death was pregnancy-related or not-related and recommendations for improvement are made

Currently, about 27 states have MMRT. Many states do not. The reporting process from each state is not standardized and the data not uniform.

The Centers for Disease Control and Prevention (CDC) recognizes that the information about maternal mortality in the USA is imperfect. Imperfect data gives flawed conclusions. So what's the answer? The answer is that there needs to be a uniform process in the USA whereby each state reports maternal mortality using the same standard definitions using the same case review form and report in a standardized fashion.

The definitions below must be understood, recognized, and used by all parties involved in reporting cases. Therefore an understanding of the definitions of maternal mortality is critically important.

A *pregnancy-related* death is one that occurs due to a complication of pregnancy or related to the physiologic changes of pregnancy.

A *pregnancy-associated* death may be due to c
accident, drug overdose, and others.

The usual approach to improving maternal mortali
rates is to concentrate on *pregnancy-related* deaths u
to 42 d after delivery. However, are not maternal deat

after 42 d from birth or pregnancy-associated deaths not as important to deal with as well? A review of the last report of the New Jersey MMRT reveals that almost 50% of pregnancy-related deaths occur after 42 d.

The New Jersey MMRT believes that any maternal death including those up to 364 d after delivery should be reviewed, cause of the death identified and recommendations for improvement in maternity care or other determinants of health should be sought. The committee is committed to improving maternity care for all causes of maternal deaths.

A review of the 25 cases in the year 2018 revealed that only one death was considered pregnancy-related, 4 the cause was undetermined and 20 were pregnancy-associated but not related. The one death that was pregnancy-related was a case of postpartum hemorrhage that was deemed preventable. The proximate cause of the 20 pregnancy-associated cases was three suicide, three homicide, five drug overdose, 3 motor vehicle accidents, 2 cardiac, infection 2, seizures 1, renal failure 1. Although these 20 cases were not pregnancy-related, some certainly were preventable. There should

provided to decrease these maternal deaths. Programs and resources should be dedicated to suicide prevention, domestic violence, drug abuse, auto safety, and the long term medical management of chronic medical diseases with perhaps a "medical home" for the patient.

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Apuzzio J, et al. J Mat Fet Neo Med. 2019

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Taylor & Francis

ORIGINAL ARTICLE

Two decades of interventions in New York State to reduce maternal mortality: a systematic review

Sarah J. Ricklan[a], Isabel Cuervo[b,c], Andrei Rebarber[c,d], Nathan S. Fox[d] and Taraneh Shirazian[a,c]

[a]NYU Langone Health, New York, NY, USA; [b]Weill Cornell Medical College, Cornell University, New York, NY, USA; [c]Saving Mothers, New York, NY, USA; [d]Maternal Fetal Medicine Associates PLLC, New York, NY, USA

ABSTRACT

Objective: To perform a systematic review of interventions to reduce maternal mortality in New York.

Study design: We conducted a systematic review of literature published between 2000 and January 2019 reporting interventions to reduce maternal mortality in New York using PubMed and search terms: pregnancy-related death or maternal mortality OR maternal death AND New York. Eight hundred and ninety-three articles were reviewed by title, content, and focus on New York interventions or policies. Ten met inclusion criteria. A second review of the Safe Motherhood Initiative (SMI) identified an additional six articles.

Results: Nine articles described hospital-based initiatives; one described a community-based initiative. No prospective randomized controlled trials in a nonsimulated setting were identified. Several articles described SMI bundles; one tested simulated checklist implementation. Three presented results of bundle implementation but did not significantly impact measured maternal mortality and/or morbidity. The single community-based initiative provided doulas to low-income women, yielding significantly lower rates of preterm birth and low birthweight, but no

Conclusion: Current hospital-based interventions have not reduced maternal mortality in New York. The single community-based intervention identified reduced adverse birth outcomes. Continued concern about maternal mortality in New York suggests community-based approaches should be considered to affect change in conjunction with longer term hospital-based interventions.

ARTICLE HISTORY
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Accepted 25 October 2019

KEYWORDS
Community-based; interventions; maternal death; maternal mortality; Safe Motherhood Initiative

Introduction

On the global stage, the United States has a remarkably high burden of maternal mortality, or pregnancy-related deaths, among economically similar nations [1]. A pregnancy-related death has been defined by the Centers for Disease Control and Prevention as a woman's death while pregnant or within one year of being pregnant for any reason related to the pregnancy [2]. In the most recent global report in 2015, the United States placed 46th among all countries ranked [1]. From 2011 to 2015, the US maternal mortality ratio was 20.7 deaths per 100 000 live births [3], and recently published data from 2013 to 2017 suggests the US maternal mortality ratio from that period was 29.6 [4]. When US maternal mortality is viewed state by state, New York maternal mortality remains in the bottom half of all 50 states, ranking 30th (lower ranking indicates higher mortality) from 2011 to 2015 [3] and 23rd from 2013 to 2017 [4]. Between 2012 and 2016, the state had a maternal mortality rate of 19.2 per 100,000 live births [5]; other values suggest it was 20.6 between 2011 and 2015 [3] and 25.5 from 2013 to 2017 [4]. The leading causes of pregnancy-related death in New York between 2012 and 2013 included embolism (29%), hemorrhage (17.7%), infection (14.5%), and cardiomyopathy (11.3%) [6]. In New York, most (66.1%) pregnancy-related deaths between 2012 and 2013 involved cesarean deliveries, and 9.7% of pregnancy-related deaths occurred before delivery [6].

There are significant racial and regional disparities in pregnancy-related deaths in New York. In one review, the statewide maternal mortality ratio for black non-Hispanic women was four times greater than that of white women [7]; other studies similarly showed that black women died of pregnancy-related causes at higher rates [8], and that black race can be considered a risk factor for maternal mortality [9]. In addition, Hispanic ethnicity has been considered a risk factor [9]. These racial and ethnic variables may be the strongest risk factors for maternal death [9]. Such disparities

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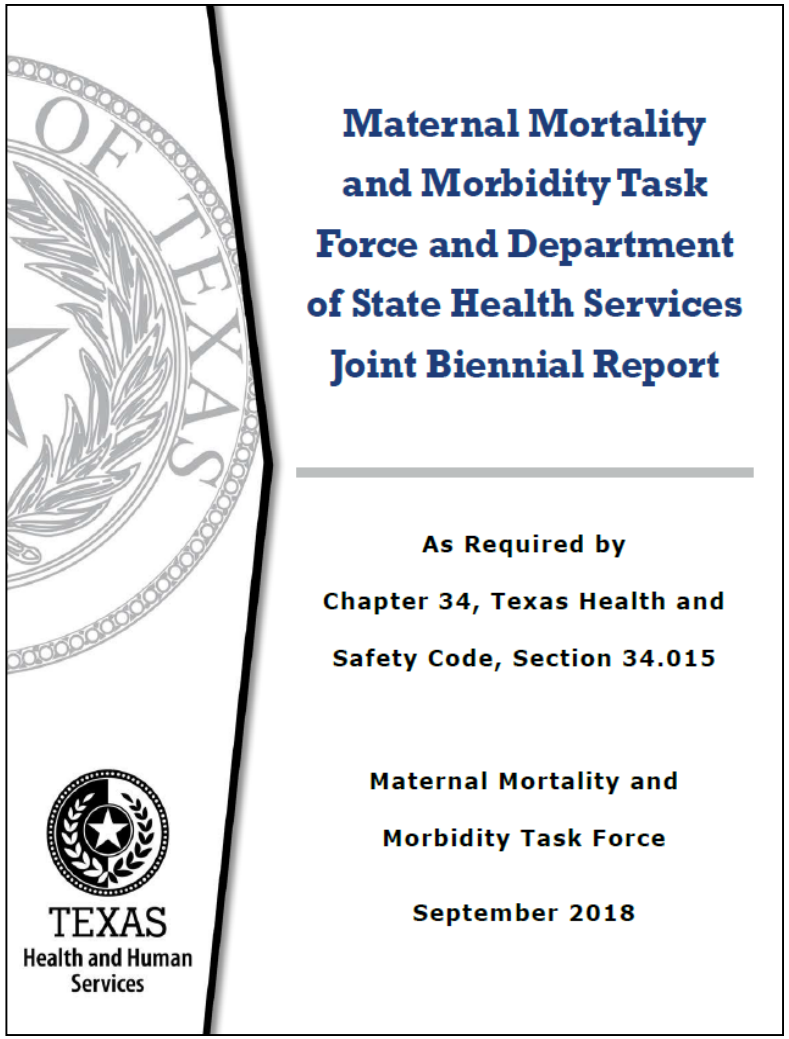
Ricklan SJ et al. J Mat Fet Neo Med. 2019

Maternal Mortality Review Committees in Texas, 2018



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Substance Use Sequelae (e.g., liver cirrhosis)	0	0	2	0	3	**5**
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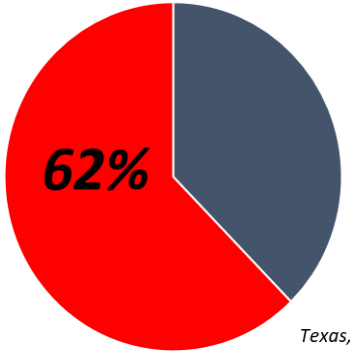
PREPARED BY: Maternal & Child Health Epidemiolog Improvement, DSHS.

6 weeks-1 year

DATA SOURCES: 2012-2015 Death Files, 2011-2015 Live Birth and Fetal Death Files. Center for Health Statistics, DSHS.

NOTES: Maternal deaths were confirmed by matching each woman's death record with a birth or fetal death within 365 days. Deaths due to cancer or motor vehicle crashes were excluded from these analyses. Timing of death was determined using a combination of pregnancy status on the death record and days elapsed between delivery and death. If a woman was identified as pregnant at time of death and 0 days elapsed between delivery and death, then this was counted as death while pregnant. All other deaths were identified as postpartum maternal deaths, and were further categorized based on the number of days

Timing of death after delivery



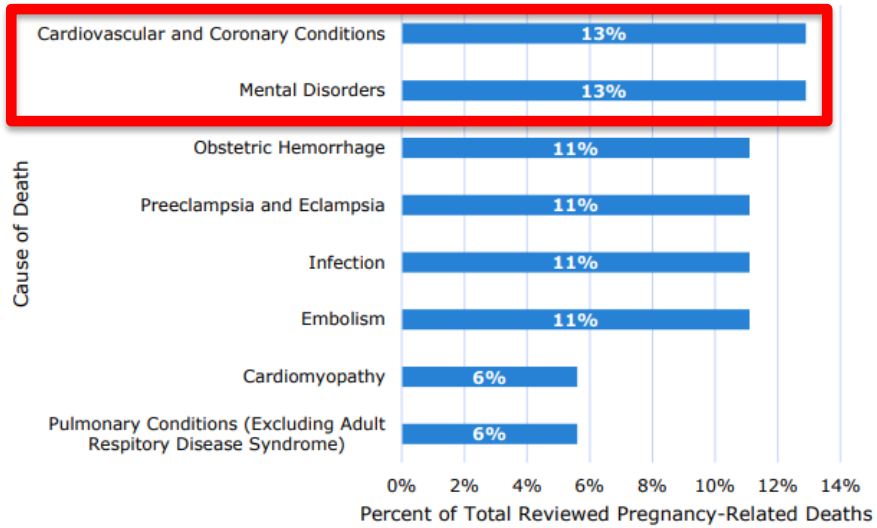
Texas, 2012-2015

Texas Maternal Mortality and Morbidity Task Force Report, 2018

Maternal Mortality Review Committees in Texas, 2020

Within Texas reported in 2020, 71% of deaths occur postpartum!!!

Chart F-1: Leading Underlying Causes of Reviewed Pregnancy-Related Deaths, Texas, 2013 (N=44 of 54 Reviewed Pregnancy-Related Deaths)

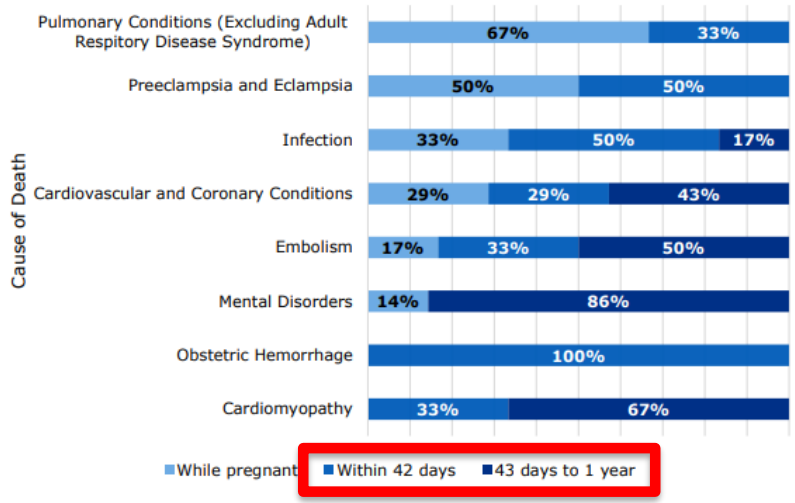


PREPARED BY: Healthy Texas Mothers and Babies Branch, Maternal & Child Health Unit, Division for Community Health Improvement, the Department of State Health Services (DSHS).

DATA SOURCE: 2013 Death Files, DSHS

NOTES: Amniotic fluid embolism is not included in the embolism grouping due to differences in etiology and opportunities for prevention. Mental disorders include deaths to suicide, overdose, poisoning, and unintentional injuries determined by the MMMRC to be related to a mental disorder.

Chart F-2: Top Underlying Causes of Reviewed Pregnancy-Related Deaths by Timing of Death in Relation to Pregnancy, Texas 2013 (N=44 of 54 Reviewed Pregnancy-Related Deaths)



PREPARED BY: Healthy Texas Mothers and Babies Branch, Maternal & Child Health Unit, Division for Community Health Improvement, the Department of State Health Services (DSHS).

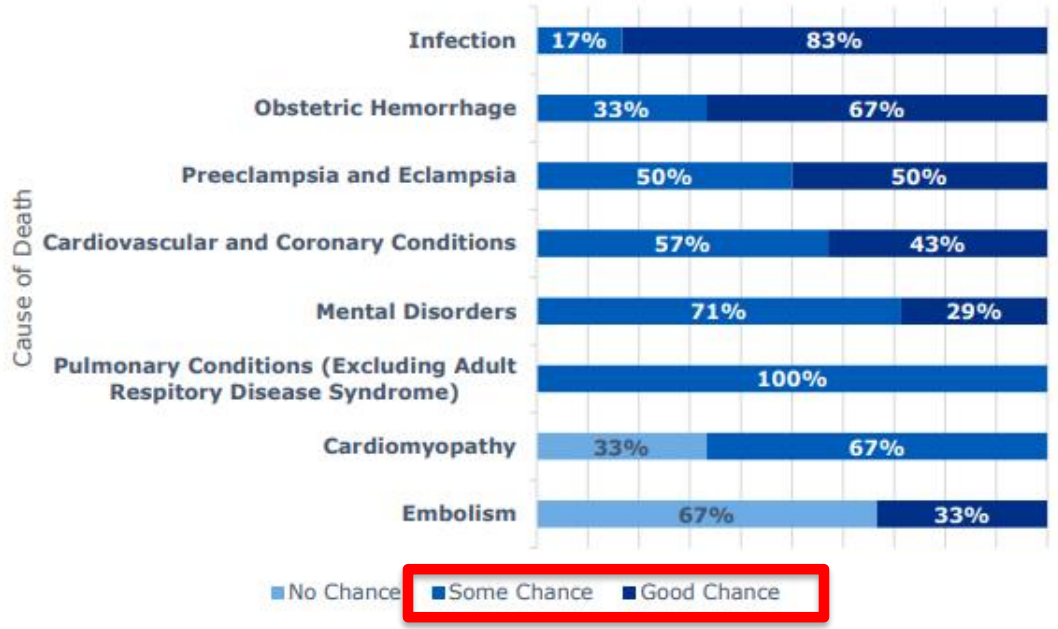
DATA SOURCE: 2013 Death Files, DSHS

NOTES: Amniotic fluid embolism is not included in the embolism grouping due to differences in etiology and opportunities for prevention.

Texas Maternal Mortality and Morbidity Task Force Report, 2020

Maternal Mortality Review Committees in Texas, 2020

Chart F-3: Degree of Preventability for Top Underlying Causes of Reviewed Pregnancy-Related Deaths by Rating of Chance to Alter Outcome, Texas, 2013 (N=44 of 54 Reviewed Pregnancy-Related Deaths)



PREPARED BY: Healthy Texas Mothers and Babies Branch, Maternal & Child Health Unit, Division for Community Health Improvement, the Department of State Health Services (DSHS).

DATA SOURCE: 2013 Death Files, DSHS

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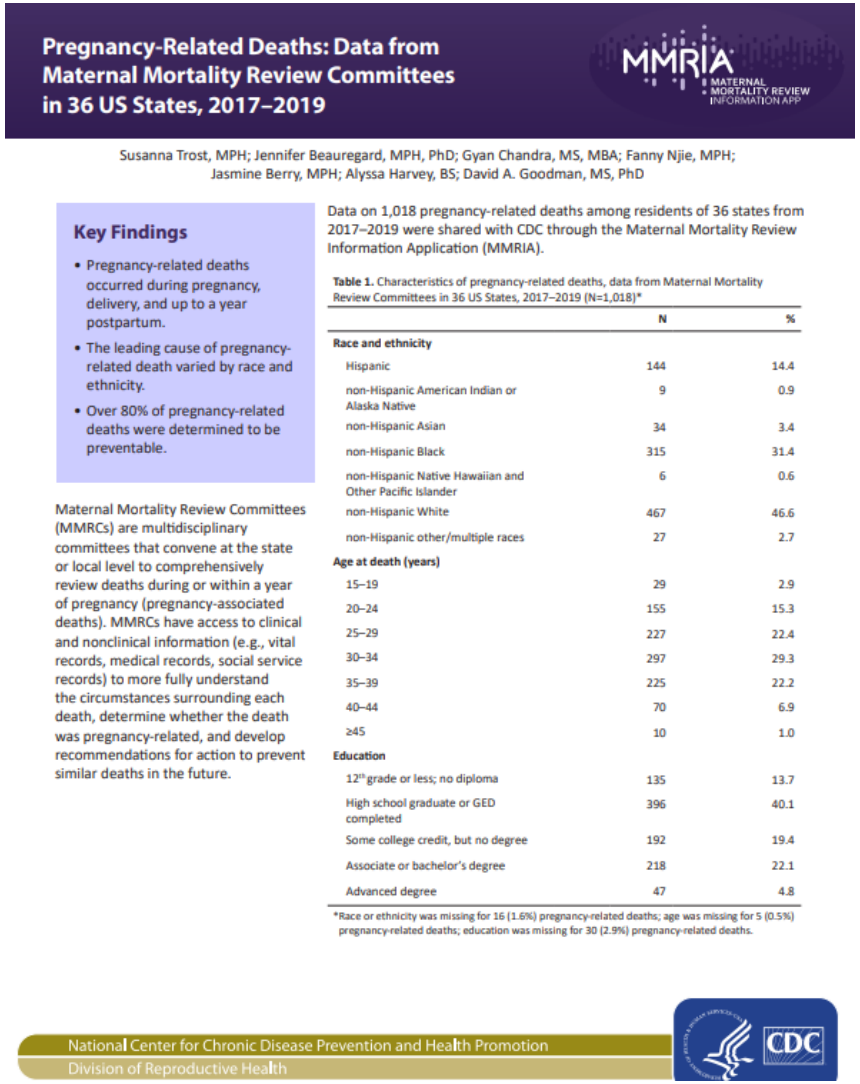
Texas Maternal Mortality and Morbidity Task Force Report, 2020

Maternal Mortality Review Committees in 36 other states…in 2022



Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees in 36 US States, 2017–2019

MMRIA MATERNAL MORTALITY REVIEW INFORMATION APP

Susanna Trost, MPH; Jennifer Beauregard, MPH, PhD; Gyan Chandra, MS, MBA; Fanny Njie, MPH; Jasmine Berry, MPH; Alyssa Harvey, BS; David A. Goodman, MS, PhD

Key Findings

- Pregnancy-related deaths occurred during pregnancy, delivery, and up to a year postpartum.
- The leading cause of pregnancy-related death varied by race and ethnicity.
- Over 80% of pregnancy-related deaths were determined to be preventable.

Maternal Mortality Review Committees (MMRCs) are multidisciplinary committees that convene at the state or local level to comprehensively review deaths during or within a year of pregnancy (pregnancy-associated deaths). MMRCs have access to clinical and nonclinical information (e.g., vital records, medical records, social service records) to more fully understand the circumstances surrounding each death, determine whether the death was pregnancy-related, and develop recommendations for action to prevent similar deaths in the future.

Data on 1,018 pregnancy-related deaths among residents of 36 states from 2017–2019 were shared with CDC through the Maternal Mortality Review Information Application (MMRIA).

Table 1. Characteristics of pregnancy-related deaths, data from Maternal Mortality Review Committees in 36 US States, 2017–2019 (N=1,018)*

	N	%
Race and ethnicity		
Hispanic	144	14.4
non-Hispanic American Indian or Alaska Native	9	0.9
non-Hispanic Asian	34	3.4
non-Hispanic Black	315	31.4
non-Hispanic Native Hawaiian and Other Pacific Islander	6	0.6
non-Hispanic White	467	46.6
non-Hispanic other/multiple races	27	2.7
Age at death (years)		
15–19	29	2.9
20–24	155	15.3
25–29	227	22.4
30–34	297	29.3
35–39	225	22.2
40–44	70	6.9
≥45	10	1.0
Education		
12th grade or less; no diploma	135	13.7
High school graduate or GED completed	396	40.1
Some college credit, but no degree	192	19.4
Associate or bachelor's degree	218	22.1
Advanced degree	47	4.8

*Race or ethnicity was missing for 16 (1.6%) pregnancy-related deaths; age was missing for 5 (0.5%) pregnancy-related deaths; education was missing for 30 (2.9%) pregnancy-related deaths.

National Center for Chronic Disease Prevention and Health Promotion
Division of Reproductive Health

CDC

Among pregnancy-related deaths with information on place of last residence **82% of decedents lived in urban** counties.

Table 3. Distribution of pregnancy-related deaths by timing of death in relation to pregnancy, data from Maternal Mortality Review Committees in 36 US states, 2017–2019*

	N	%
During pregnancy	216	21.6
Day of delivery	132	13.2
1–6 days postpartum	120	12.0
7–42 days postpartum	233	23.3
43–365 days postpartum	301	30.0

Specific timing information is missing (n=2) or unknown (n=14) for 16 (1.6%) pregnancy-related deaths.

65% of deaths occurred AFTER delivery

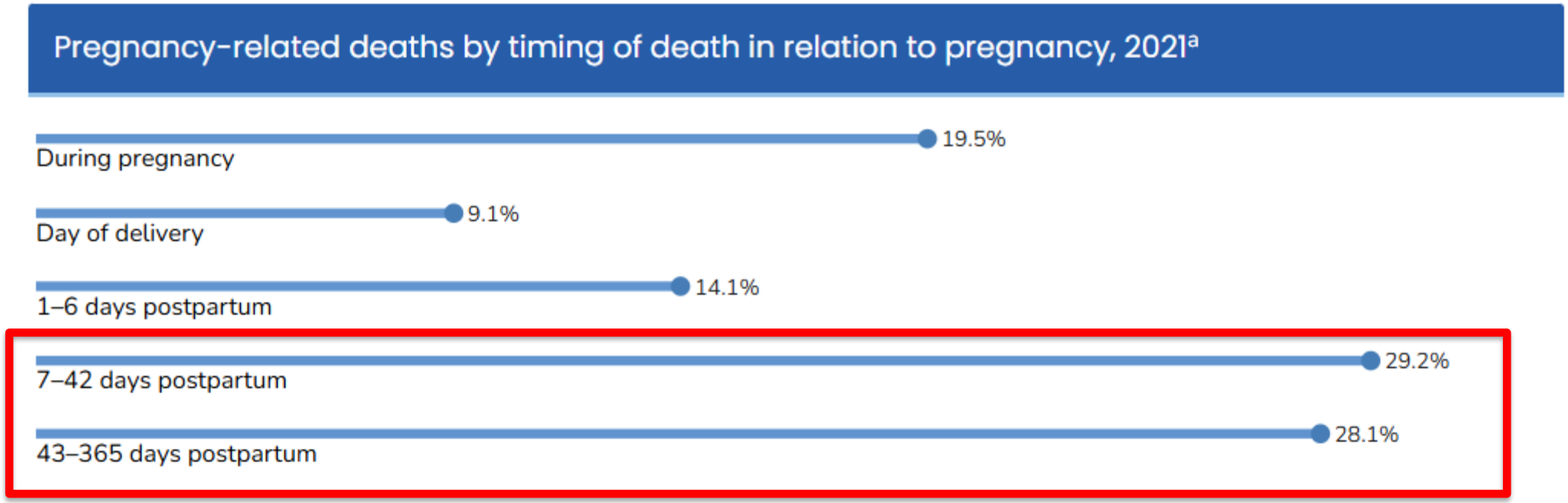
Table 6. Percentage of pregnancy-related deaths determined by MMRCs to be preventable, data from Maternal Mortality Review Committees in 36 US states, 2017–2019*

	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.

Trost SL, et al. Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees in 36 US States, 2017–2019. Oct 2022

Current data from the Maternal Mortality Review Committees



Nearly half of all pregnancy-related deaths occurred 7-365 days postpartum!

CDC. Published Aug 22, 2025.

Current data from the Maternal Mortality Review Committees

Preventable pregnancy-related deaths, 2021[a,b]

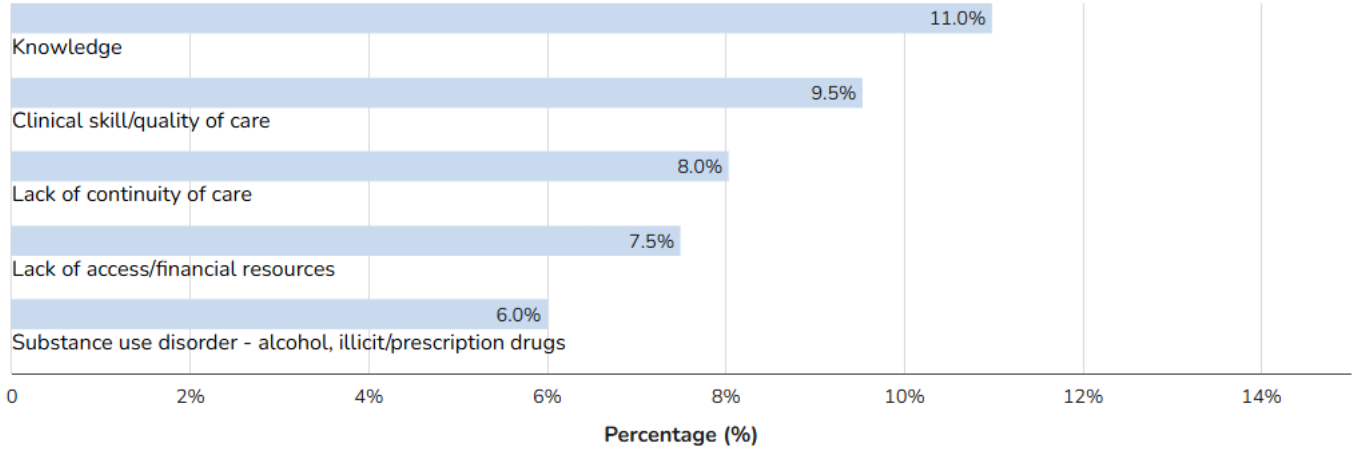
87%

Among deaths with a preventability determination, 87% were determined by MMRCs to be preventable.

[a] Deaths with missing or unable to determine values are not included in percent calculations.

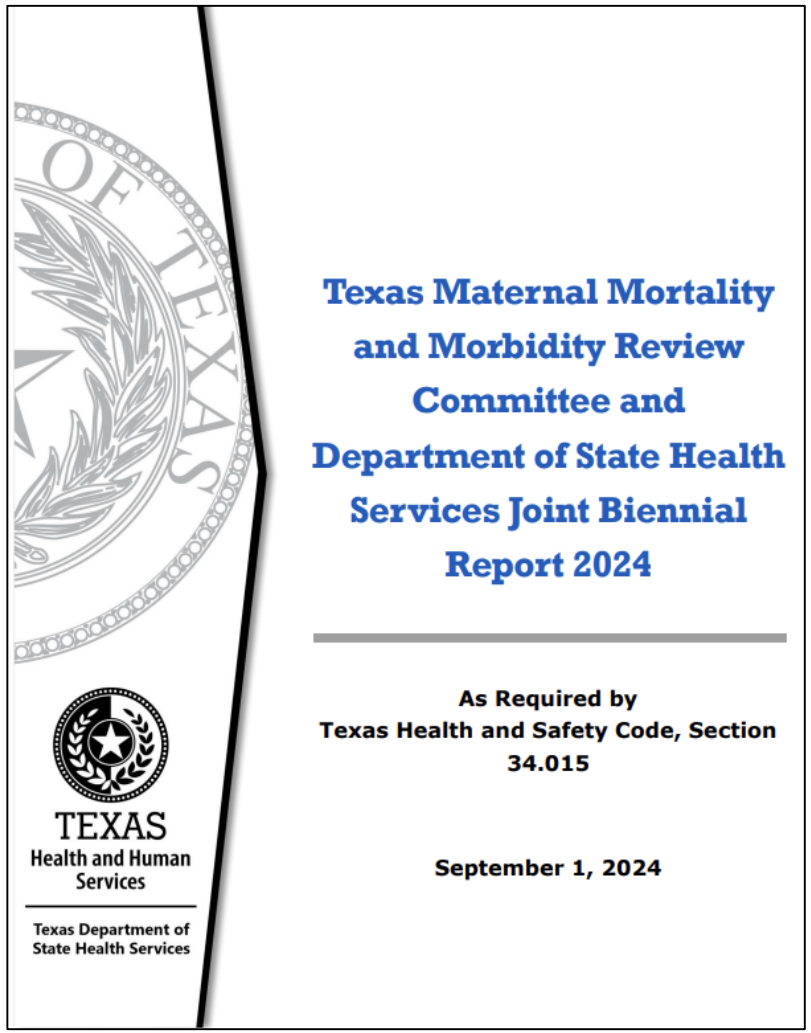
[b] A preventability determination was missing (n=2) or unable to be determined (n=14) for a total of 16 (1.8%) pregnancy-related deaths.

Five most frequent contributing factor classes among preventable pregnancy-related deaths, 2021[a]



CDC. Published Aug 22, 2025.

Maternal Mortality Review Committees in Texas, 2024

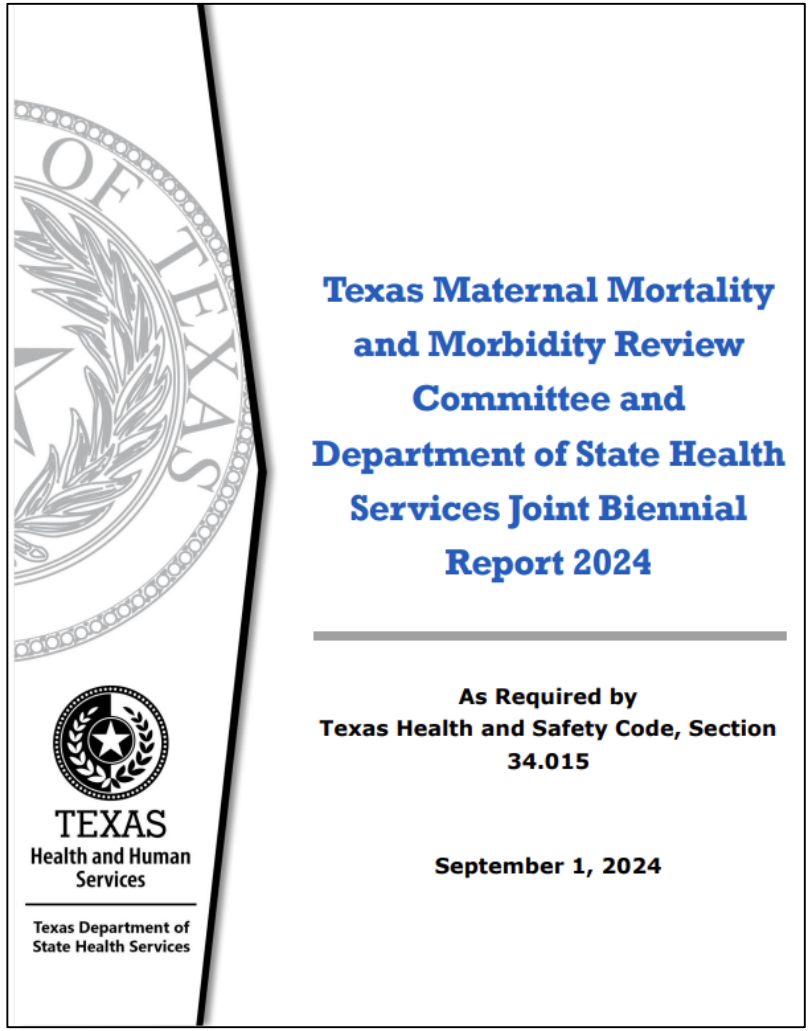


Finding #1 – **42 percent** of the reviewed pregnancy-associated deaths from the 2020 case cohort are pregnancy-related.

Finding #2 – **Most pregnancy-related deaths were preventable. 80%!**

Texas Maternal Mortality and Morbidity Task Force Report, 2024

Maternal Mortality Review Committees in Texas, 2024

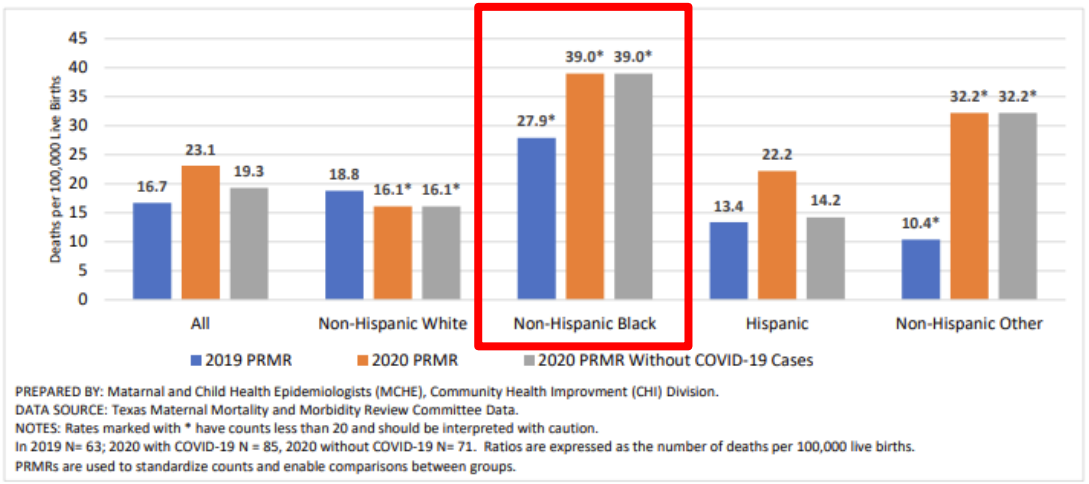


Finding #6 – A complex interaction of factors and characteristics contribute to preventable death.

Finding #7 – Compared to 2019, the 2020 Texas pregnancy-related mortality ratio increased, and **disparities persisted**, with non-Hispanic Black women, older women, and women with a high school education or less being most disproportionately impacted.

Appendix B. Pregnancy-Related Mortality Ratios (PRMRs), 2019 and 2020

Figure B-1. Pregnancy-Related Mortality Ratios by Race and Ethnicity, 2019 and 2020.



PREPARED BY: Matarnal and Child Health Epidemiologists (MCHE), Community Health Improvment (CHI) Division.
DATA SOURCE: Texas Maternal Mortality and Morbidity Review Committee Data.
NOTES: Rates marked with * have counts less than 20 and should be interpreted with caution.
In 2019 N= 63; 2020 with COVID-19 N = 85, 2020 without COVID-19 N= 71. Ratios are expressed as the number of deaths per 100,000 live births.
PRMRs are used to standardize counts and enable comparisons between groups.

Texas Maternal Mortality and Morbidity Task Force Report, 2024

Trends in maternal mortality rates across states, 2018-2023

Original Research ajog.org

OBSTETRICS

Trends in maternal mortality rates by state, United States, 2018 to 2023

Lauren M. Rossen, PhD, MS; Donna L. Hoyert, PhD; Isabelle Horon, DrPH; Amy M. Branum, PhD

BACKGROUND: The United States maternal mortality rate increased after 2018, with a marked increase in 2021 followed by a decline in 2022 and 2023. Trends at the state level have not yet been examined, likely due to the small numbers of maternal deaths occurring annually in most states. Small area estimation models can provide more reliable estimates of maternal mortality at the state level, by borrowing strength over time and across geographic areas.

OBJECTIVE: To examine state-level trends in maternal mortality rates from 2018 through 2023 and the contribution of COVID-19–related maternal deaths to the trends.

STUDY DESIGN: Serial cross-sectional study of state-level mortality and natality data from the United States National Vital Statistics System from 2018 through 2023. Maternal deaths, defined as deaths occurring during or within 42 days of termination of pregnancy (n=4964), and live births (n=22,080,966). Hierarchical Bayesian models with spatiotemporal random effects were used to estimate smoothed maternal mortality rates (maternal deaths per 100,000 live births) and the percentage of maternal deaths involving COVID-19 by state of residence from 2018 to 2023.

RESULTS: Maternal mortality rates showed consistent temporal patterns across states, peaking in 2021 and declining in 2022 to 2023. However, there was variation in magnitude, with rates 4.6 times larger in Tennessee than in California in 2021. COVID-19 accounted for the observed increases across nearly all states; maternal mortality rates excluding COVID-19 deaths were stable across most states.

CONCLUSION: Findings show the impact of the COVID-19 pandemic on trends in maternal mortality rates by state, with maternal deaths involving COVID-19 nearly entirely accounting for the increases seen in maternal mortality in 2020 and 2021. Findings can inform efforts to prevent maternal deaths where rates are highest and highlight areas where maternal mortality rates are low or declining for further examination of factors that may be related to these lower rates.

Key words: COVID-19, maternal health, pregnancy

Introduction

The United States maternal mortality rate increased by 16% from 2018 to 2019, by 18% from 2019 to 2020, and by 38% (23.8–32.9 maternal deaths per 100,000 live births) from 2020 to 2021,[1] followed by declines in 2022 (to 22.3) and 2023 (to 18.6).[2] While this pattern was seen across all demographic groups, the magnitude of the increases during the peak of the COVID-19 pandemic varied by age and race/ethnicity.[2] Nearly all of the increase in maternal mortality rates observed in 2020 and 2021 was a result of COVID-19, with available data indicating that COVID-19 accounted for 12% of maternal deaths in 2020, 36% of maternal deaths in 2021, and 11% of maternal deaths in 2022.[1–3] Without maternal deaths involving COVID-19, maternal mortality rates would have been 21.0, 21.2, and 19.9 in 2020, 2021, and 2022, respectively, comparable to the rate in 2019 (20.1), before the pandemic.[3]

Maternal mortality, an indicator of population health, is higher in the United States than in comparable high-income countries and has been recognized as a public health crisis.[4–7] However, generally less than approximately 1000 maternal deaths occur per year in the United States. These small numbers of deaths have made it challenging to examine state-level differences or trends, as estimates for the majority of states are typically suppressed in data resources such as Centers for Disease Control and Prevention's Wide-ranging Online Data for Epidemiologic Research, an online data dissemination platform that publishes US Vital Statistics.[3] Only 13 states had 20 or more maternal deaths in 2022, with rates for other states suppressed due to disclosure risk (counts 1–9) or lack of statistical reliability (counts or rates based on less than 20 events).[3]

Hierarchical Bayesian spatiotemporal modeling has been used to provide more stable estimates of health outcomes by geography, by borrowing strength across areas and/or time.[8] A recent article used this approach to model state-level patterns in maternal mortality by race/ethnicity, from 1999 through 2019.[8] This article had some notable limitations, however, as it did not account for the staggered implementation of the pregnancy checkbox across states from 2003 to 2017, which led to an apparent increase over that time period when maternal mortality rates would likely have not changed substantially in the absence of the measurement changes.[10,11] No research to date has examined state-level temporal trends in maternal mortality rates during the COVID-19 pandemic, although one recent study described longer term trends among groups of states and compared selected states.[12] Pregnant and postpartum women were at a higher risk for adverse outcomes associated with COVID-19[13,14] especially during the Delta wave in fall of 2021.[15,16]

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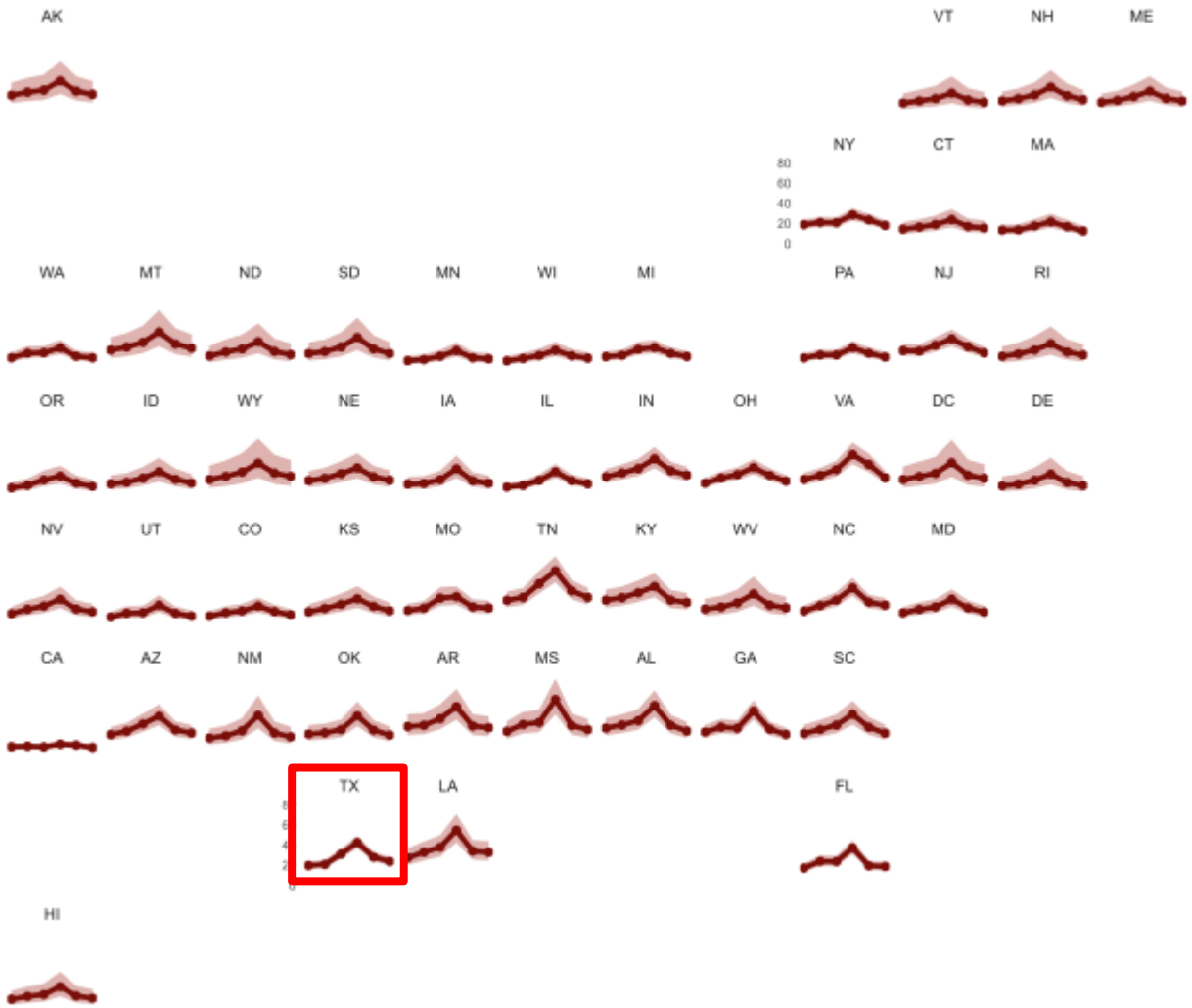

Rosen LM et al. AJOG. 2026

UTSouthwestern Medical Center

Trends in maternal mortality rates across states, 2018-2023 (excluding COVID-19)

Original Research ajog.org

OBSTETRICS

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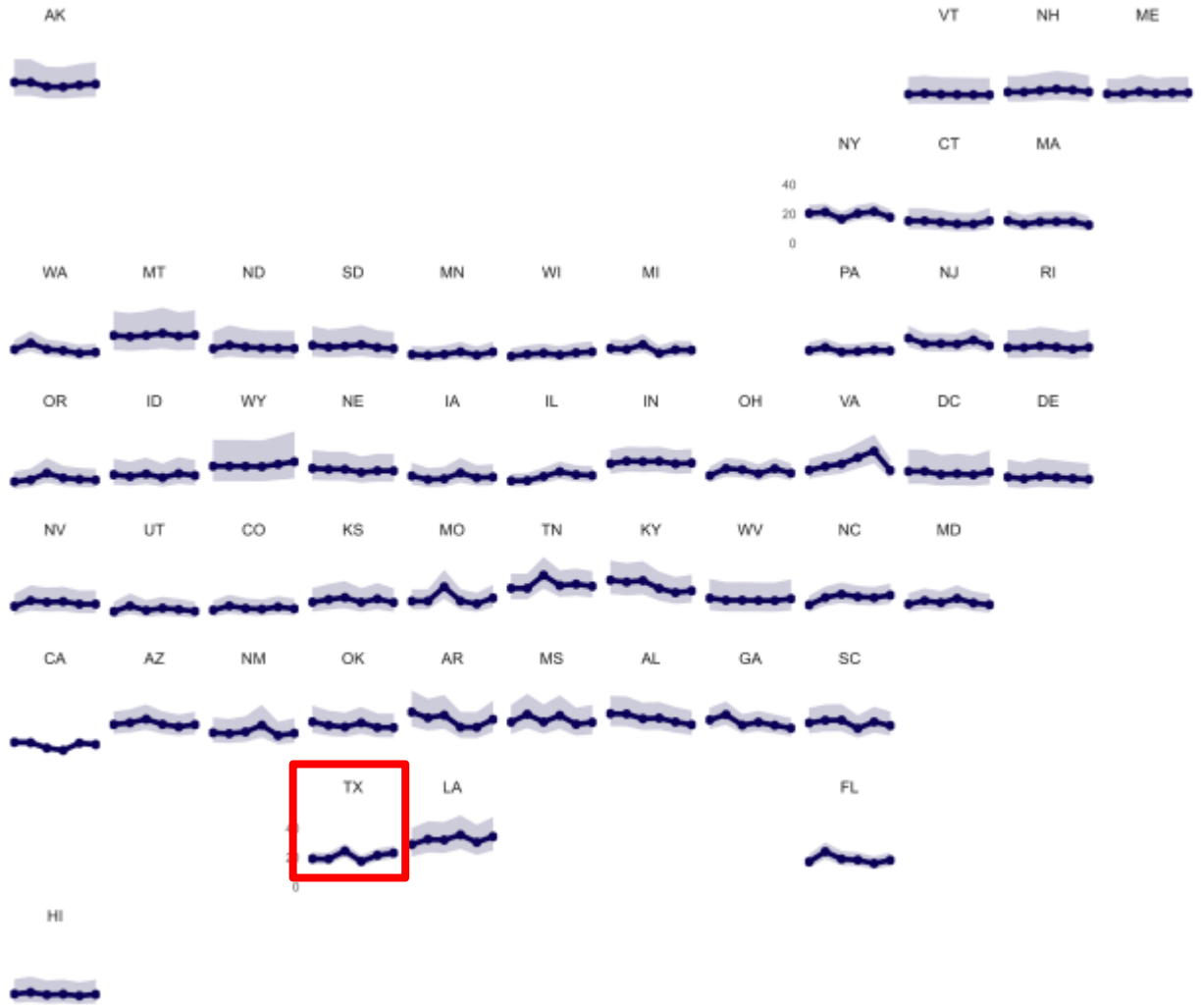

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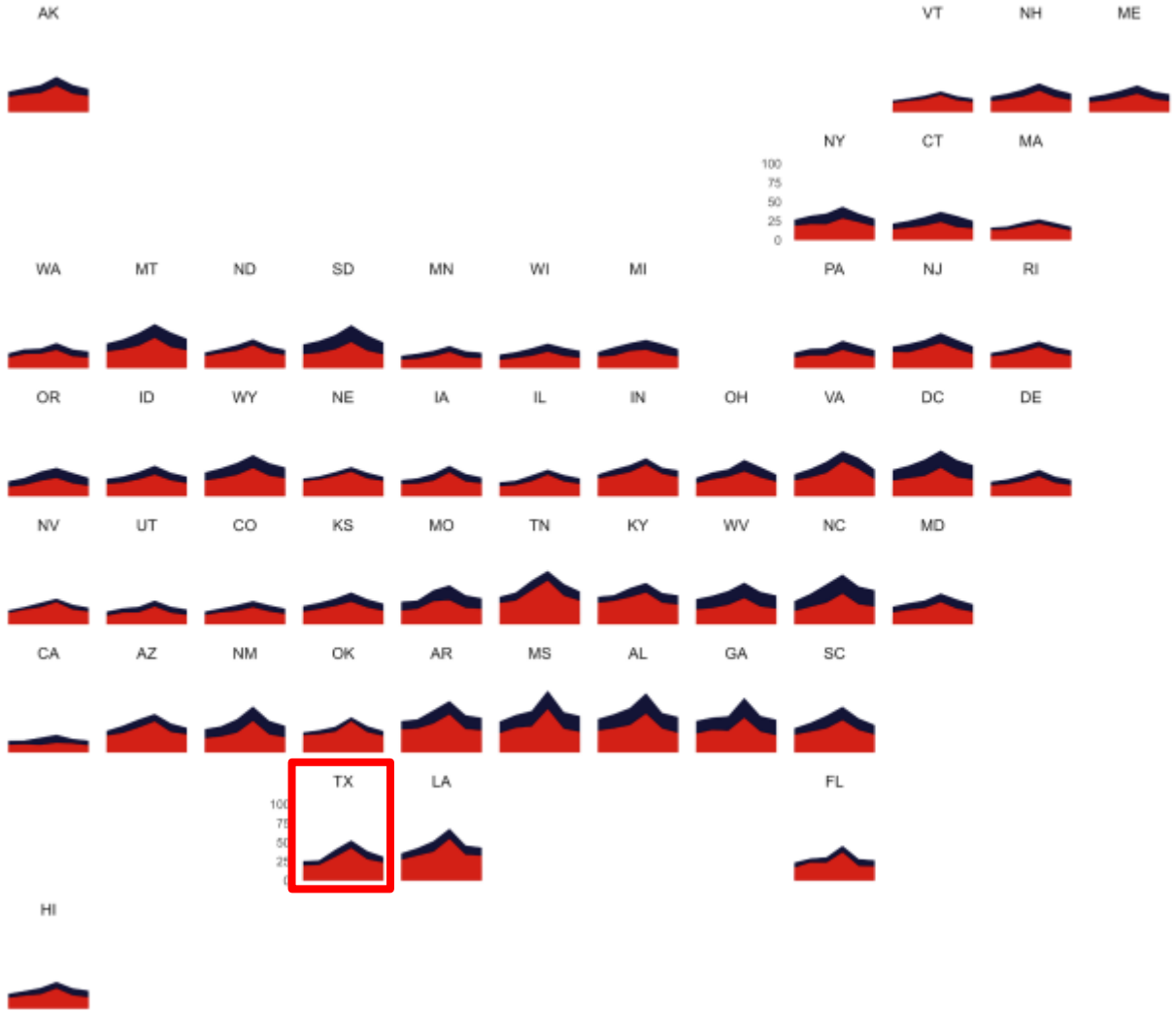

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UTSouthwestern Medical Center

Maternal Mortality Review Committees in Texas, 2024

RECOMMENDATIONS

1. Improve **access to comprehensive health services** for all women of child-bearing age, including preconception, pregnancy, postpartum, and interpregnancy periods; facilitate continuity of care; implement effective care transitions; and promote safe birth spacing to reduce gaps and improve lifelong health.
2. Prioritization of **resources and treatments for pregnant and postpartum patients in future public health emergencies** based on the consistent pattern of increased morbidity, mortality, and susceptibility in this population.
3. Engage **Black communities and address health disparities** in maternal and women's health program development
4. Implement and amplify provider awareness of and participation in **statewide maternal health and safety initiatives** to reduce maternal mortality, morbidity, and health disparities.
5. Increase public awareness and **community engagement** to foster a culture of maternal health, safety, and disease prevention.
6. Improve integrated **behavioral health care access** for reproductive age women with mental health and substance use disorders.
7. Improve infrastructure and programs to **address violence** and intimate partner violence at state and community levels.
8. Foster safe and **supportive community environments** to help women achieve their full health potential.
9. Support emergency and maternal health service coordination and implement **evidence-based, standardized protocols** to prevent, identify, and manage obstetric and postpartum emergencies.
10. Improve **postpartum care management**, including education and health care coordination for those with mental health and/or high-risk medical conditions.
11. Prioritize continuing education, diversification, and increasing **maternal health workforce** capacity.
12. Apply **continuous process improvement** strategies for maternal mortality review protocols to support and increase case review capacity, quality, and recommendation development.

Texas Maternal Mortality and Morbidity Task Force Report, 2024

Local responses in light of this information over the past 10 years…

- The extending Maternal Care After Pregnancy (eMCAP) mobile health unit for southern Dallas County, **2020**.
- The tele-eMCAP mobile unit and telehealth program for eastern Dallas County, **2023**.
- Patient Centered Outcomes Research IMPACT study, **2024**.
- HHSC-sponsored mobile health unit for rural care in Hunt County, **2025**.
- North Texas Maternal Health Accelerator, **2026**.

extending Maternal Care After Pregnancy (eMCAP)

HHS Racial Equity in Postpartum Care Challenge

Innovative methods to improve equity of postpartum care for Black or African American and American Indian/Alaska Native women enrolled in Medicaid or the Children's Health Insurance Program (CHIP), including follow-up care for diabetes, postpartum depression and/or postpartum anxiety, hypertension, and substance use disorders (SUD)

The Joint Commission

Our Websites

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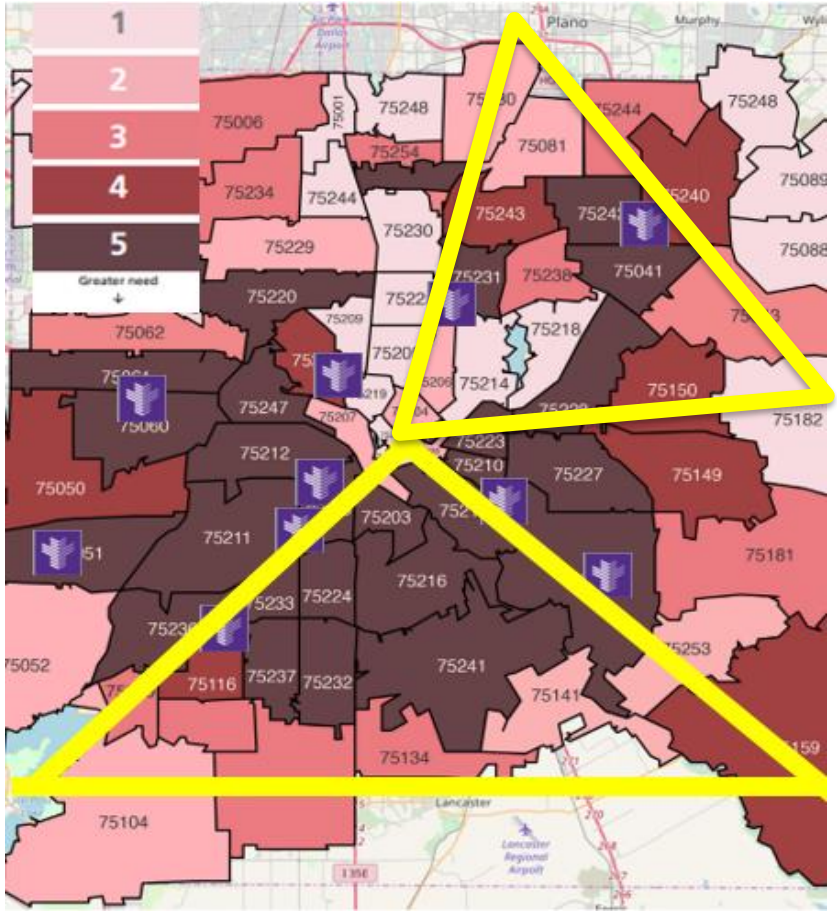
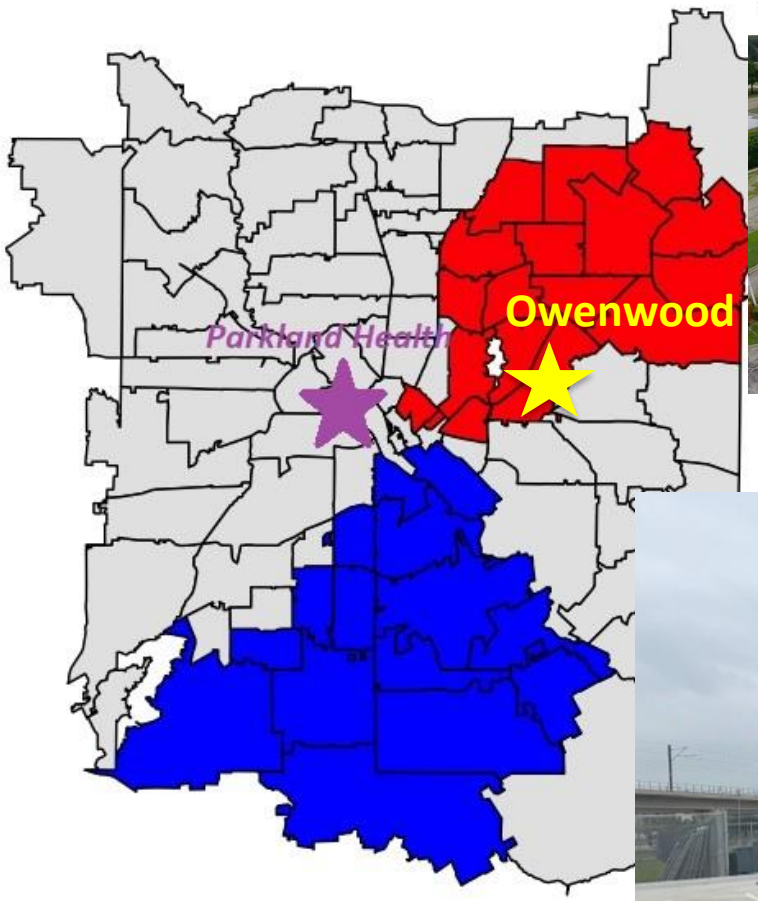
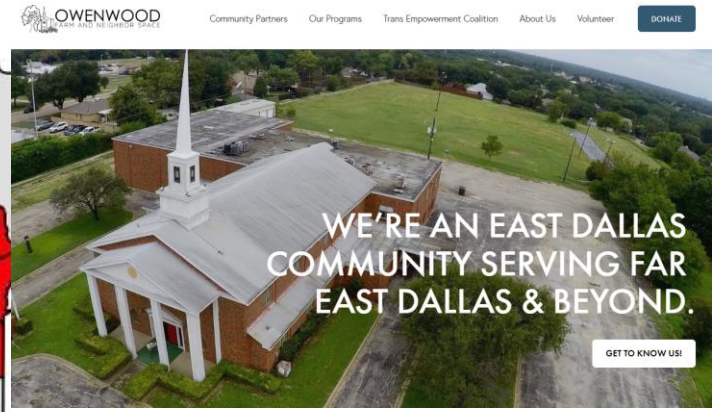
John M. Eisenberg Patient Safety and Quality Awards

Congratulations 2022 Awardees

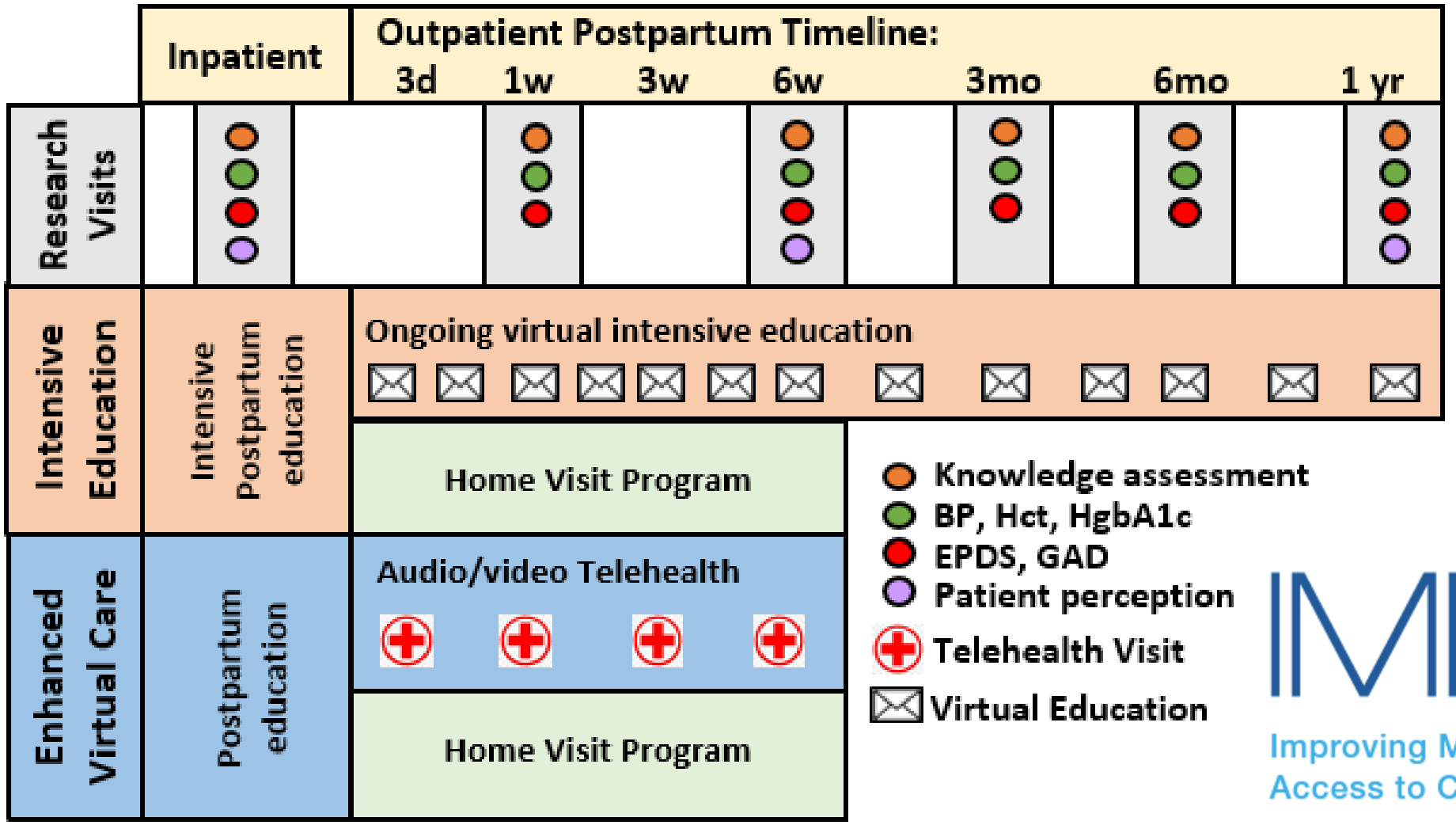
Future state efforts of eMCAP …TeleMCAP + Community-based Partners







extending Maternal Care After Pregnancy (eMCAP) to PCORI



IMPACT

Improving Maternal Postpartum Access to Care through Telemedicine

extending Maternal Care After Pregnancy (eMCAP) to PCORI

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Improving maternal postpartum access to care through telemedicine (IMPACT): A multi-center randomized controlled trial of postpartum interventions to improve access and outcomes

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ABSTRACT

Background: Postpartum care is essential for maternal health and significantly impacts long-term health outcomes, yet it remains inadequately addressed, particularly among Non-Hispanic Black and Hispanic individuals. The primary objective of the Improving Maternal Postpartum Access to Care through Telemedicine (IMPACT) study is to compare the effectiveness of two postpartum care models on early postpartum complication detection, hospital readmission prevention, postpartum health knowledge, quality of life, and chronic medical condition management among medically underserved individuals.

Method: The IMPACT study is a multi-center, randomized controlled trial conducted at Parkland Hospital in Dallas, Texas, and Grady Memorial Hospital in Atlanta, Georgia. It aims to compare two postpartum care models (intensive education vs. enhanced virtual care) among 3500 Non-Hispanic Black and Hispanic postpartum individuals of lower socioeconomic status. Phase I (year 1) involves collecting baseline data and refining the study based on patient feedback. Phase II (year 2–4) continues recruiting participants and assigns them to each model randomly. Data collection spans a one-year follow-up period (1 week, 6 weeks, 3 months, 6 months, and 1 year after enrollment), including maternal health outcomes, mental health assessments, laboratory tests, and patient-reported measures.

Conclusion: The IMPACT study provides an innovative approach to postpartum care, utilizing telemedicine to enhance access and education for underserved populations. The study findings will have significant implications for healthcare providers and policymakers, offering evidence-based guidance for optimizing postpartum care delivery and informing clinical guidelines that can help reduce maternal health disparities.

1. Introduction

In the United States (US), significant challenges and disparities in maternal health outcomes persist, with maternal mortality rates among the highest in developed countries. Approximately 2 % of all births are affected by severe maternal morbidity annually [1–3]. Recent studies have revealed an increases in maternal mortality and morbidity, with notable and persistent disparities across racial, ethnic, and socioeconomic groups [4–11]. Non-Hispanic Black individuals, experience nearly three times the maternal mortality rate of their White counterparts and have a 40 % higher risk of severe maternal morbidity, even after controlling for sociodemographic factors and comorbid conditions [1,2,7,8,12,13].

While maternal health care traditionally has focused on the prenatal period, there is growing recognition of the significance of the postpartum period, given that nearly two-thirds of maternal deaths and complications occur after delivery [6–8,14,15]. The postpartum period, defined as the 12 months following childbirth, represents a critical opportunity for early detection and intervention, not only to prevent adverse maternal physical and mental health outcomes but also to

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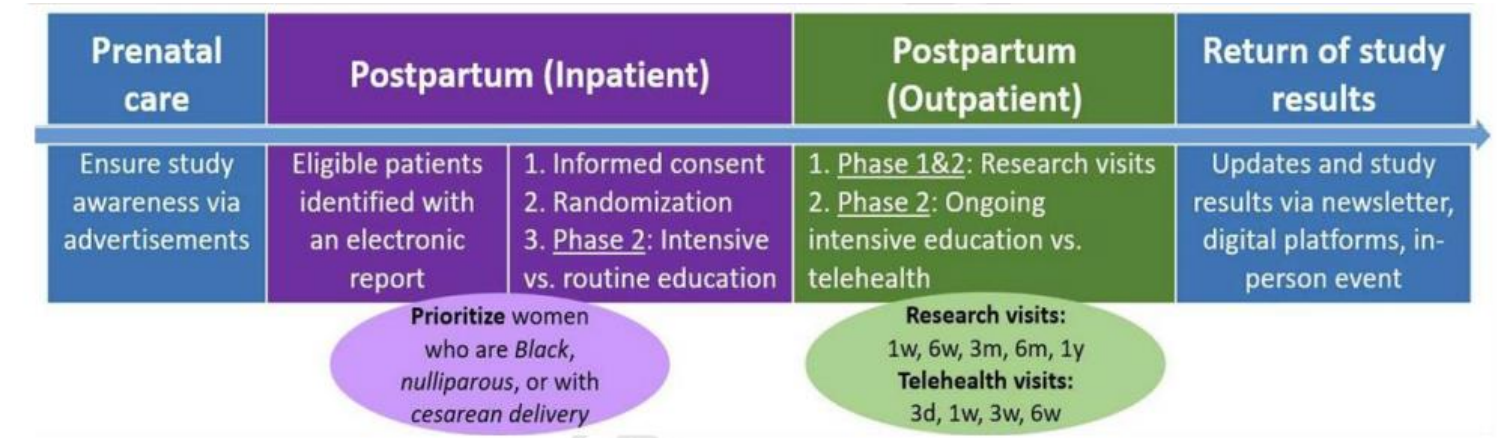
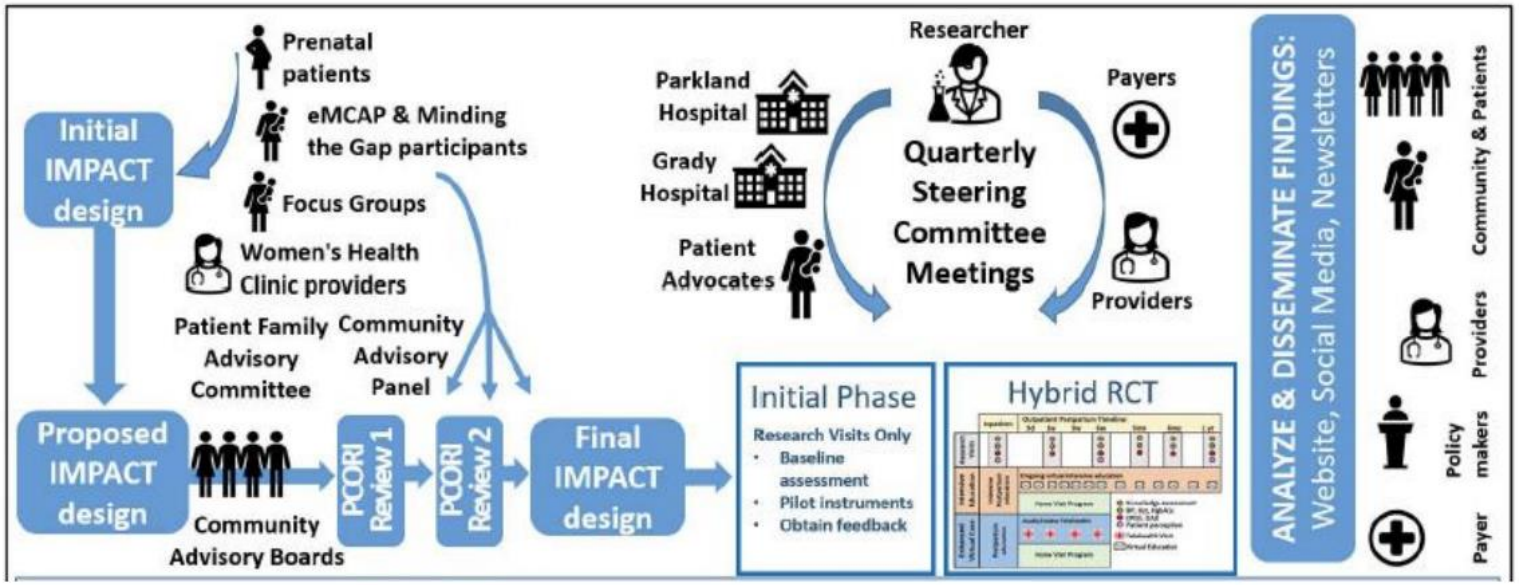




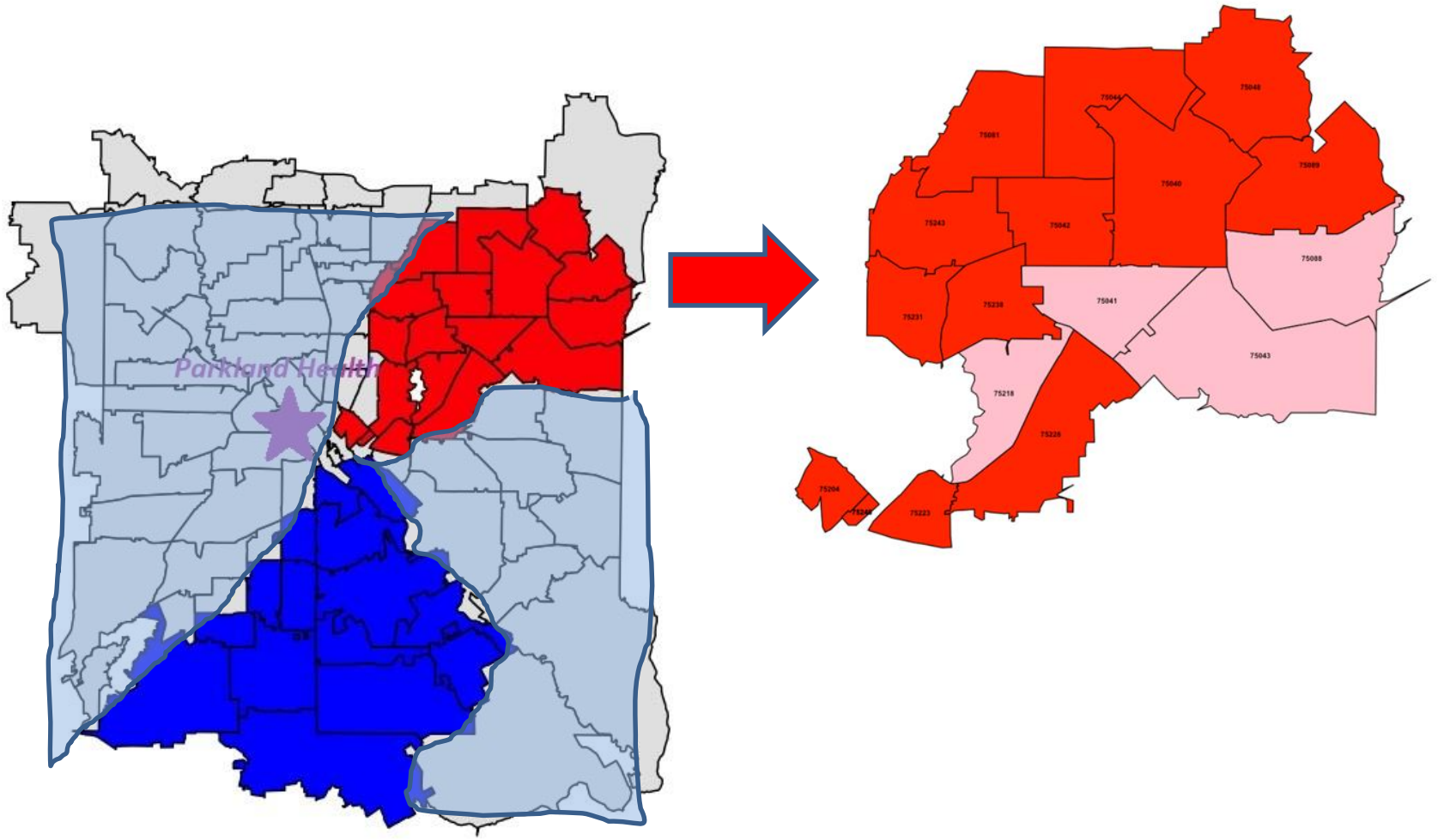
Zhang R et al. Contemp Clin Trials. 2025. Online 14 Mar 2025

Efforts of eMCAP in 2025 and beyond… TeleMCAP + PCORI

Enroll **TeleMCAP** patients with medical complications

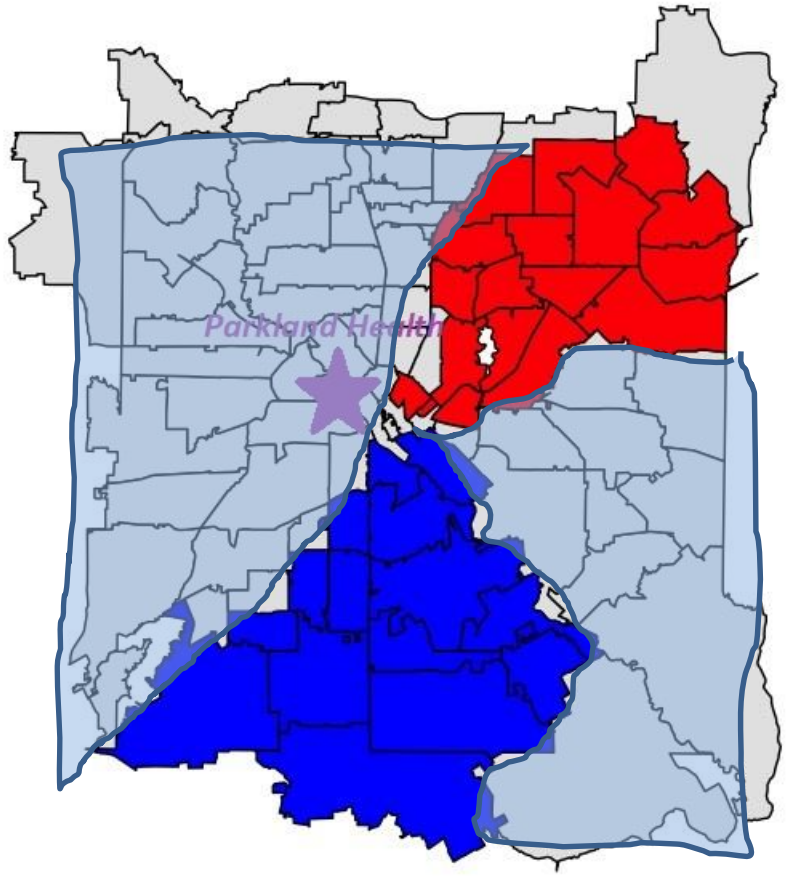
Enroll all **eMCAP** patients living in area

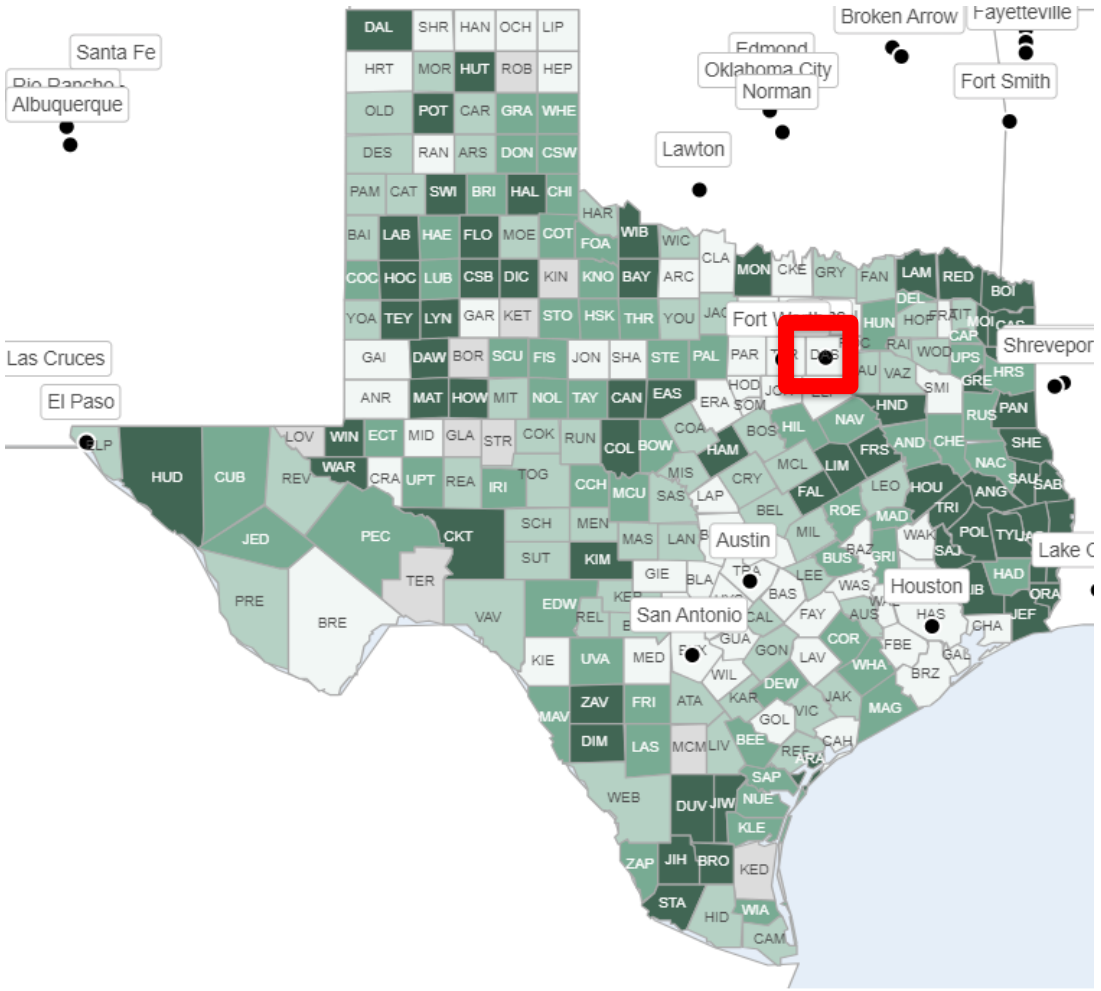
Enroll eligible for **PCORI** living in all other regions



IMPACT
Improving Maternal Postpartum Access to Care through Telemedicine

Future state efforts of eMCAP in 2026 and beyond…





UT Southwestern Medical Center

eMCAP + TeleMCAP + PCORI + HHS and beyond…

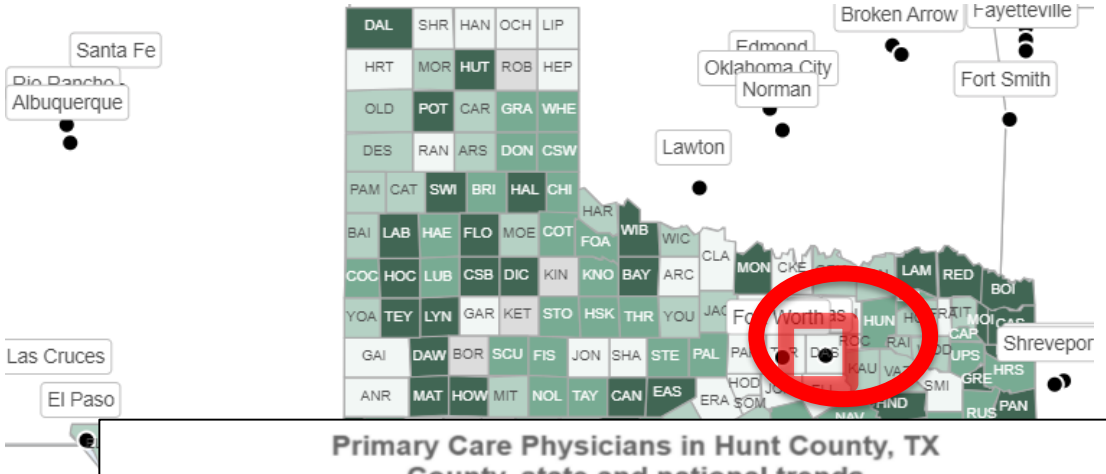
TEXAS
Health and Human Services

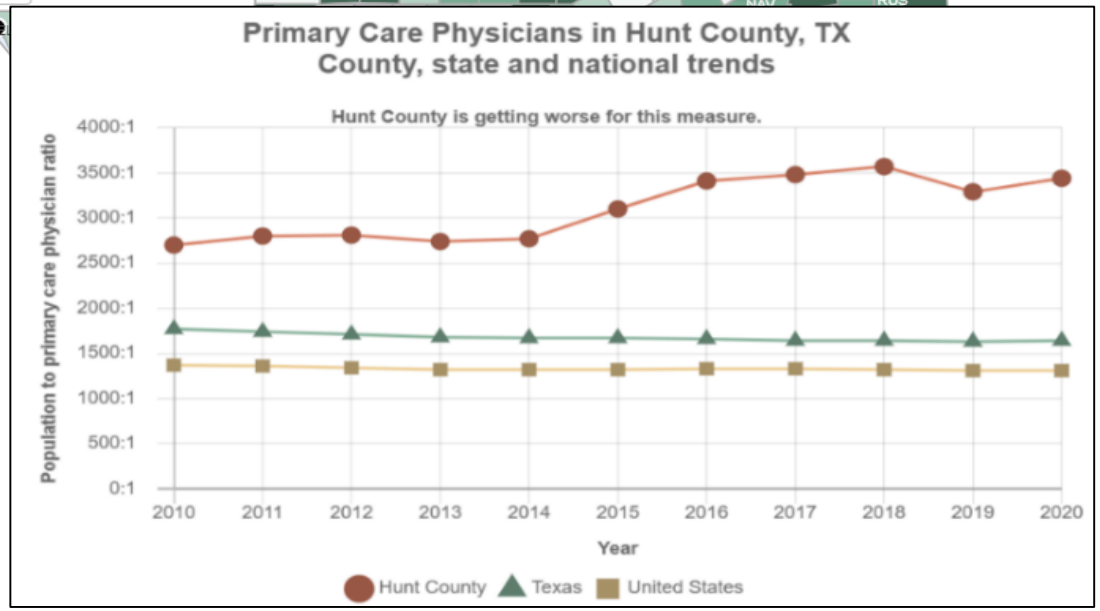
Cecile E. Young, Executive Commissioner

Request for Applications (RFA)

Grant for
Women's Preventive Mobile Health Units
RFA No. HHS0014012

DEADLINE FOR SUBMISSION OF APPICATIONS
January 12, 2024, by 10:30 a.m. Central Time





UTSouthwestern Medical Center

A future state…Mobile Health Unit fleet:

eMCAP + HHS + Reproductive Services

North Texas Maternal Health Accelerator, launched 2026

$26+M program

Addressing 66,000 births/year across all of Dallas and Tarrant Counties

Partnership with 50+ organizations including all major health systems:

- **UTSW**
- **Parkland Health**
- **THR**
- **Baylor**
- **Methodist**
- **Baylor**

To summarize…Tangible deliverables to take-away as shared-learnings from our experiences

1. Emphasize the need for good data to guide good decisions.
2. Identify target regions (we cannot “boil the ocean”).
3. Leverage the electronic medical record by standardized needs assessment → link to medical record (ask the same question, same way, and document it consistently).
4. Have an “answer” when need identified—Community-Based Organizations are meaningful.
5. Flip care model from “in the hospital or clinic” to “in the community.”

More work to be done!!!

Test your knowledge: Quiz question

When in timing of death in relation to pregnancy is the MOST common in the United States?

A. During pregnancy

B. Day of delivery

C. After delivery

Test your knowledge: Quiz question

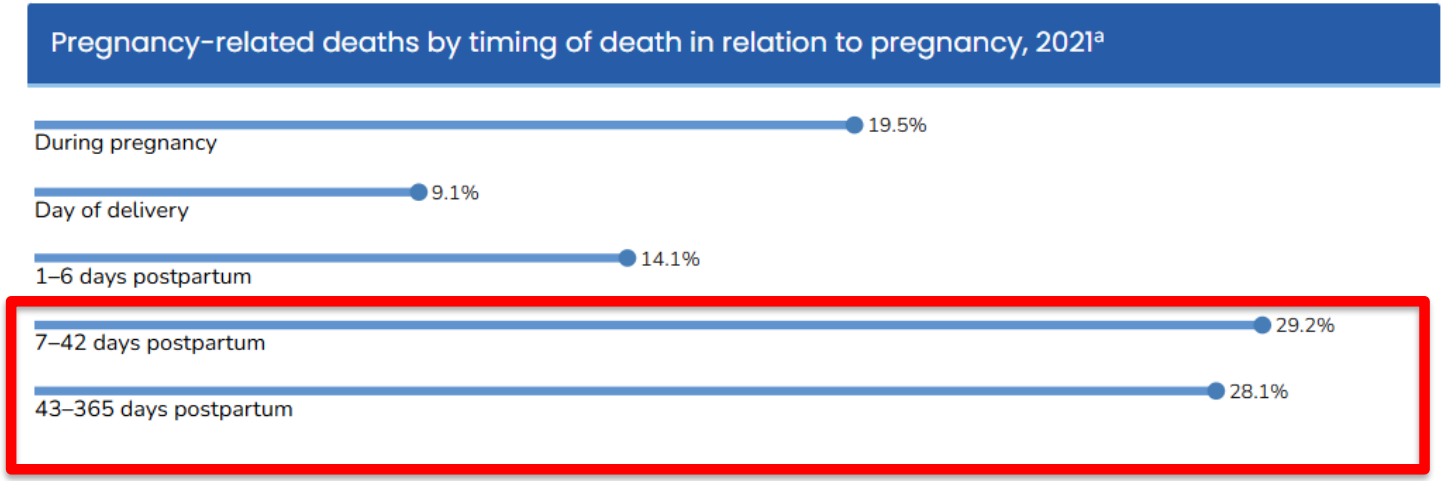
When in timing of death in relation to pregnancy is the MOST common in the United States?

A. During pregnancy

B. Day of delivery

C. 1-6 days postpartum

D. 7-365 days postpartum



To summarize Maternal Mortality Data in the United States:

- **Maternal mortality is an important, complex issue.**
- **Obtaining accurate data for maternal mortality has been challenging: differing definition/terminology, "checkbox," etc.**
- **Interest has reinvigorated efforts for improvement—with surprising findings:**
  - **Causes are evolving from the classic "triad."**
  - **Postpartum (up to 1 year) is now recognized to be a vulnerable period for our patients.**
  - **There remain disparities in care.**

Thank you


Women's
Preventive Health
Mobile Services


HOPE
PLEASE DONATE: