

CDC PUBLIC HEALTH GRAND ROUNDS

Meeting the Challenges of Measuring and Preventing Maternal Mortality in the United States



Accessible version: <https://www.youtube.com/watch?v=jAFXdVK0gMU>

November 14, 2017



U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

Maternal Mortality Beyond the Numbers



Eleni Z. Tsigas
CEO, Preeclampsia Foundation

Working with the Media, We Have Put a Face on the Problem of Maternal Mortality



Bryan Anselm for ProPublica

The Last Person You'd Expect to Die in Childbirth

The U.S. has the worst rate of maternal

COSMOPOLITAN STYLE BEAUTY LOVE VIDEO GET COZY

SUBSCRIBE FOLLOW

Why Are American Women Dying in Childbirth?

You would be 10 times safer having a baby in Belarus than in the United States.



WILLIAM MEBANE

By Joy Victory Dec 12, 2015

12.5k



I'm 40 weeks pregnant and nearly 24 hours into labor, and there is vomit everywhere. Stomach acid and red Powerade splatter across the kitchen floor, up the walls and the

What is Preeclampsia?

- **Rapidly progressive pregnancy and postpartum condition characterized by high blood pressure and, usually, protein in the urine**
 - Symptoms may include swelling, sudden weight gain, headache and vision changes
- **HELLP syndrome and eclampsia (seizures) are serious forms of preeclampsia**

Chris and Megan McKee, Catonsville, MD



Sunflowers with Oliver



Sunflowers with Oliver



First
Christmas
without
Mommy

January 26, 1992–May 28, 2016

Christie Polverelli, Upstate New York



**It's a Girl!!!! Never
been so happy, This
May our family will
be complete. ily**



Denial and Delays



Denial and Delays



Baby Elle
born
weighing
1 lb 12 oz.

The Aftermath



April 22, 1987–February 27, 2013

The Aftermath



April 22, 1987–February 27, 2013

Mental Health and Quality of Life Consequences

Anger

Failure

Guilt

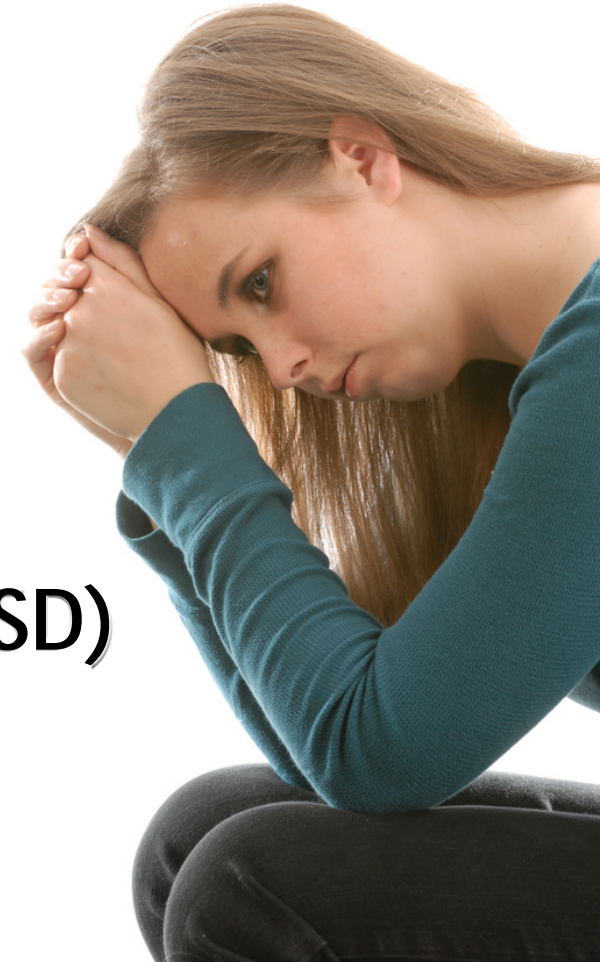
Anxiety

Fractured families

Post-traumatic stress disorder (PTSD)

Depression

Acute stress disorder



Furuta M, et al. BMC Pregnancy Childbirth. 2012 Nov 10;12:125.

Porcel J, et al. Pregnancy Hypertens. 2013 Oct;3(4):254–60.

Stramrood CA, et al. Arch Gynecol Obstet. 2013 Apr;287(4):653–61.

Tia Doster and Daughter Ayah, Miami, Florida



Maternal Morbidity Has Lasting Consequences



Maternal Morbidity Has Lasting Consequences



“I will forever be an advocate for people to take control of their health.” ~ Tia Doster

Tia endured a long emotional recovery from PTSD, in addition to physical therapy and a year on dialysis.

Black Women Are Dying at a Higher Rate



Essence Magazine, Special Report: The Childbirth Crisis No One's Talking About. October 2017

Traumatic Birth Experiences Affect Everybody



“I drove to the house, crying all the way there and all the way back. I was grieving the loss of my wife. The reality of her loss became so real the past night, that it was as if it actually occurred. “

Thank you



Accounting for Maternal Deaths: Action Requires Better Data



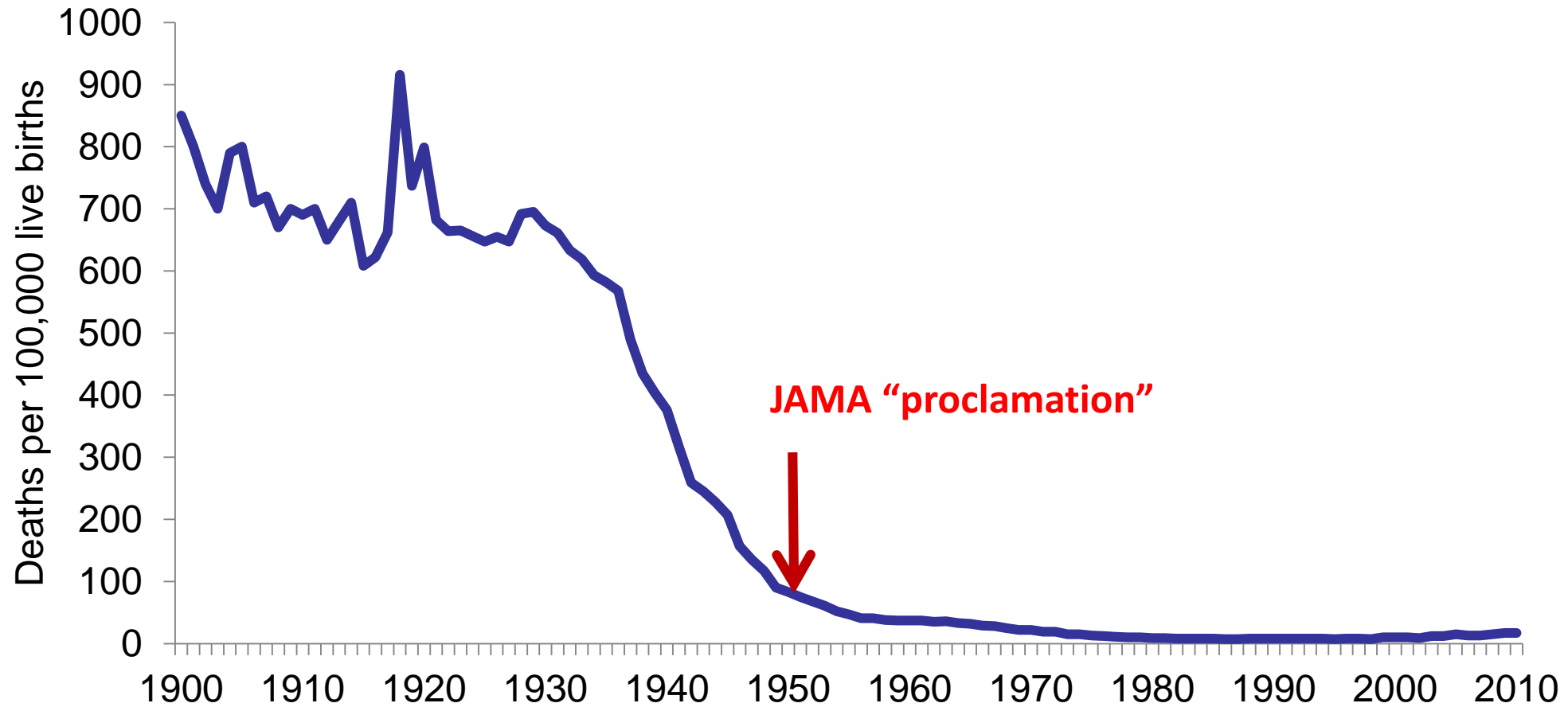
William M. Callaghan, MD, MPH
Chief, Maternal and Infant Health Branch
Division of Reproductive Health
Centers for Disease Control and Prevention

MATERNAL DEATHS—ONE IN A THOUSAND

THE JOURNAL takes pride in announcing that for the first time in history the maternal mortality rate for a large nation—the United States of America—has been pushed slightly below the apparently irreducible minimum of 1 maternal death per 1,000 live births. When

This is, indeed, a story of human as well as medical progress. The fact that the chances of survival for the mother are better than 999 out of 1,000 should bring comfort and consolation in a troubled era to expectant mothers and their husbands, their children and their parents. Childbearing has been made quite safe.

Maternal Mortality Rate, United States



Maternal Deaths—One in a Thousand. *JAMA*. 1950;144(13):1096–1097.

Achievements in Public Health, 1900–1999

Healthier Mothers and Babies

At the beginning of the 20th century, for every 1000 live births, six to nine women in the United States died of pregnancy-related complications, and approximately 100 infants died before age 1 year (1,2). From 1915 through 1997, the infant mortality rate declined >90% to 7.2 per 1000 live births, and from 1900 through 1997, the maternal mortality rate declined almost 99% to <0.1 reported death per 1000 live births (7.7 deaths per 100,000 live births in 1997) (3) (Figures 1 and 2). Environmental interventions, improvements in nutrition, advances in clinical medicine, improvements in access to health care, improvements in surveillance and monitoring of disease, increases in education levels, and improvements in standards of living contributed to this remarkable decline (1). Despite these improvements in maternal and infant mortality rates, significant disparities by race and ethnicity persist. This report summarizes trends in reducing infant and maternal mortality in the United States, factors contributing to these trends, challenges in reducing infant and maternal mortality, and provides suggestions for public health action for the 21st century.

DEADLY DELIVERY

THE MATERNAL
HEALTH CARE CRISIS
IN THE USA



HEALTH IS A
HUMAN RIGHT
AMNESTY
INTERNATIONAL



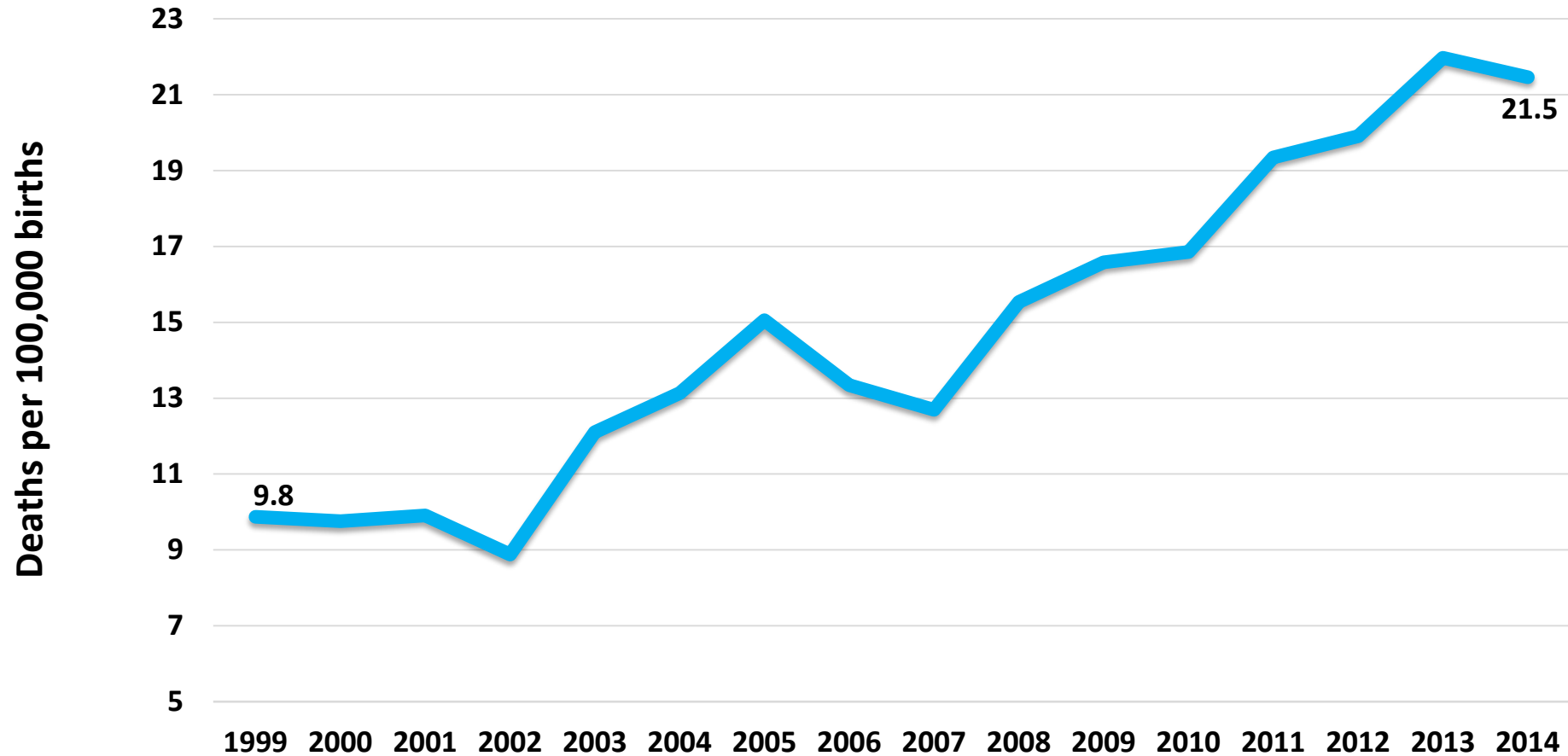
SundayReview | OP-ED COLUMNIST

If Americans Love Moms, Why Do We Let Them Die?



Nicholas Kristof JULY 29, 2017

Maternal Mortality Rate 1999–2014



Maternal Mortality: Vital Statistics Definition

Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Vital Statistics: The Basis for Identification

- **Based on death certificates sent from the states**
- **Coded by ICD-10 coding rules**
- **Information based on cause of death and checkbox indicating recent or current pregnancy status**
 - Checkbox introduced in 2003 with incremental uptake over time
 - Not all maternal deaths have a clinically meaningful code
- **Historically, maternal deaths were undercounted**
- **Pilot studies of checkbox suggest misclassification**
 - No recent pregnancy
 - Cause of death not related to pregnancy
- **Death certificates may paint an incomplete picture**

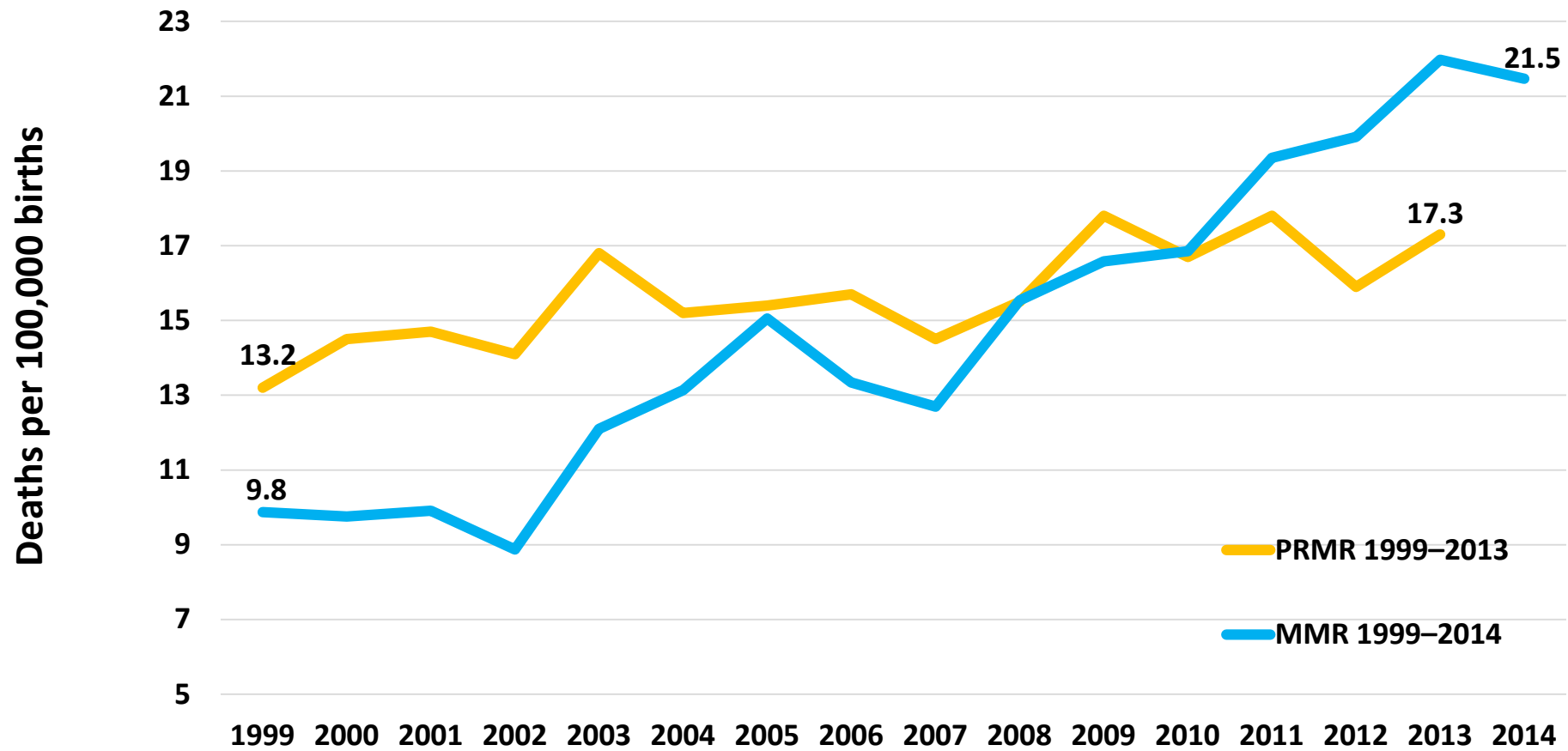
Pregnancy Mortality Surveillance System (PMSS)

- **ACOG/CDC Maternal Mortality Study Group (1986)**
- **Pregnancy-associated**
 - All deaths during pregnancy and within the year following the end of pregnancy
- **Pregnancy-related**
(subset of pregnancy-associated; causal relationship)
 - Complication of pregnancy
 - Aggravation of an unrelated condition by the physiology of pregnancy
 - Chain of events initiated by the pregnancy
- **Pregnancy-related mortality ratio (PRMR)**

PMSS: Enhanced Surveillance

- **Based on information from states**
 - Death certificates AND
 - Linked birth or fetal death certificates
- **Independent of ICD-10**
- **Information includes cause of death (COD) and checkbox indicating recent or current pregnancy status and details concerning pregnancy**
 - COD descriptions often unclear
 - If checkbox only and unclear COD, difficult to include or exclude
- **Clinical relevance instead of rule-based designation of COD**

Comparing Measures

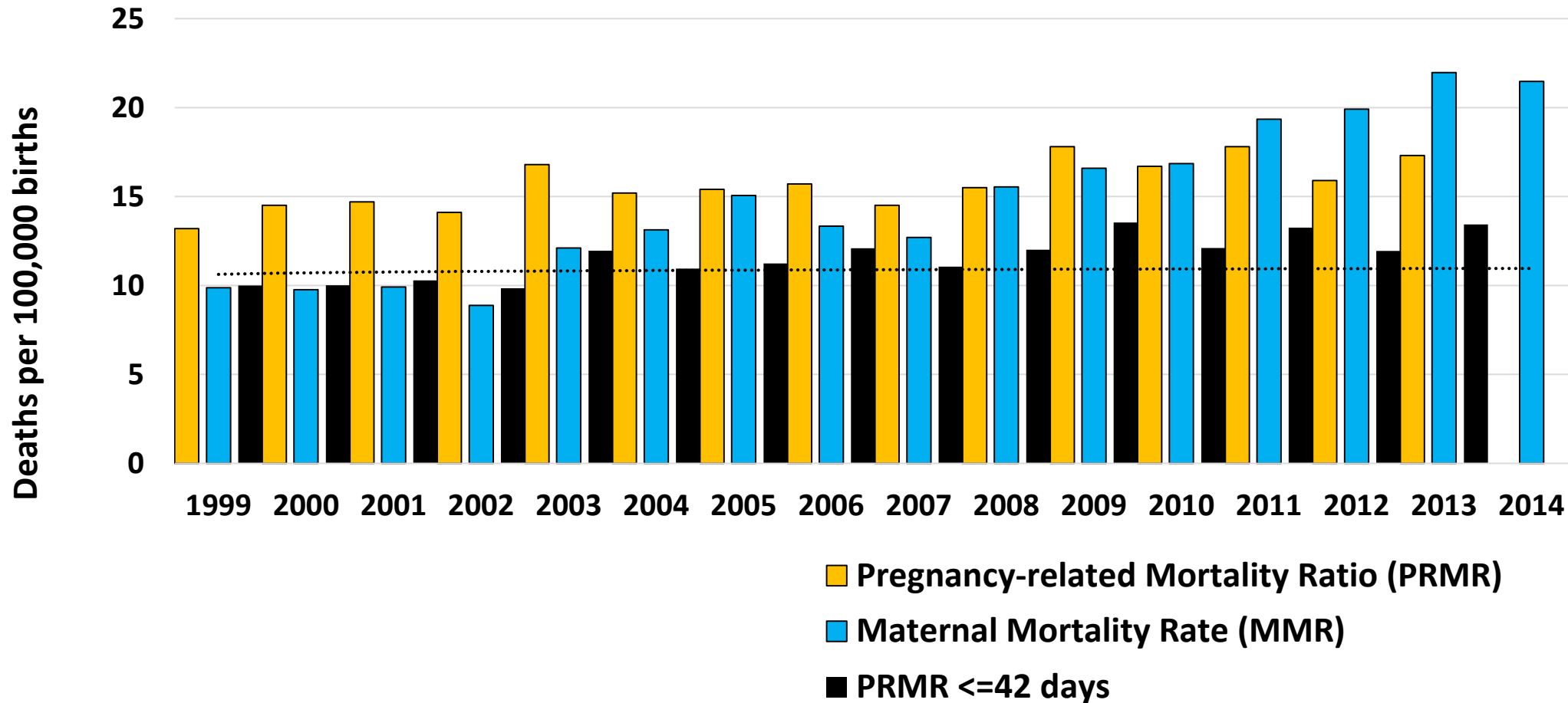


PRMR: Pregnancy-related mortality ratio

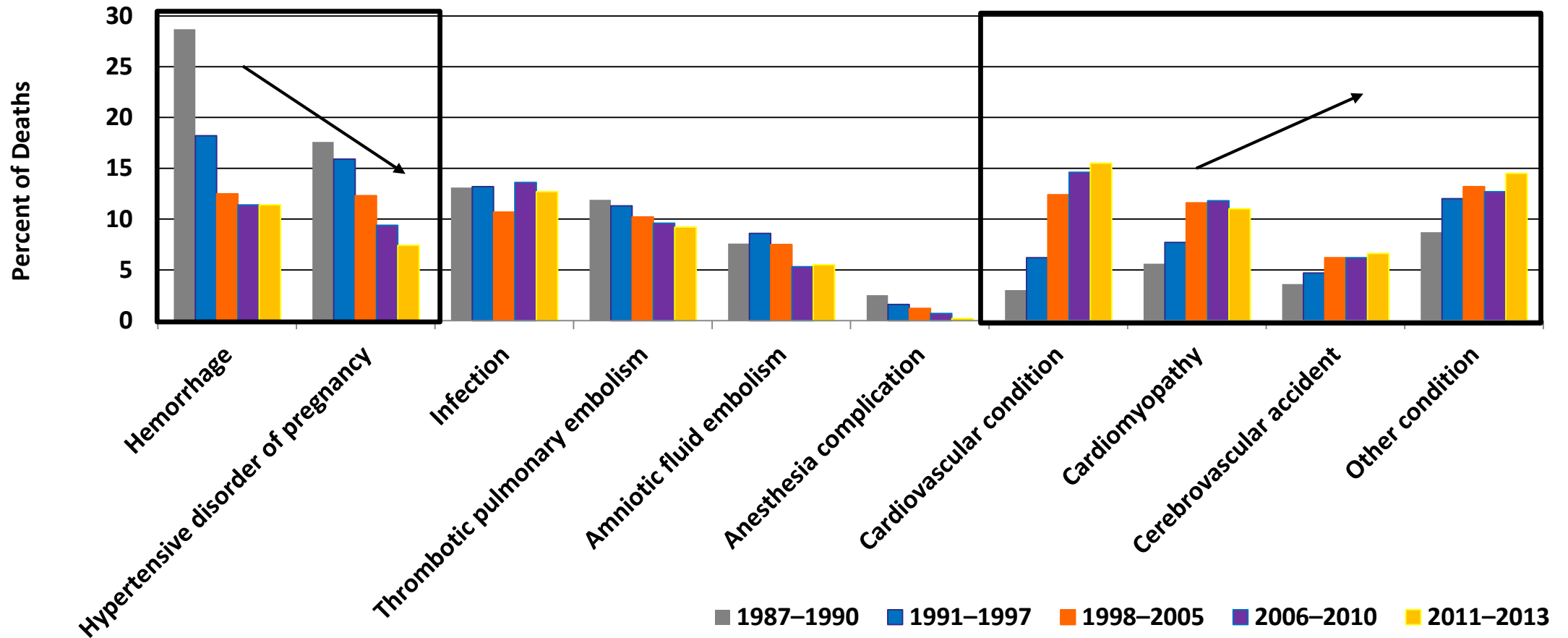
MMR: Maternal mortality rate

cdc.gov/reproductivehealth/maternalinfanthealth/pmss.html

Pregnancy-related Mortality and Maternal Mortality 1999–2014

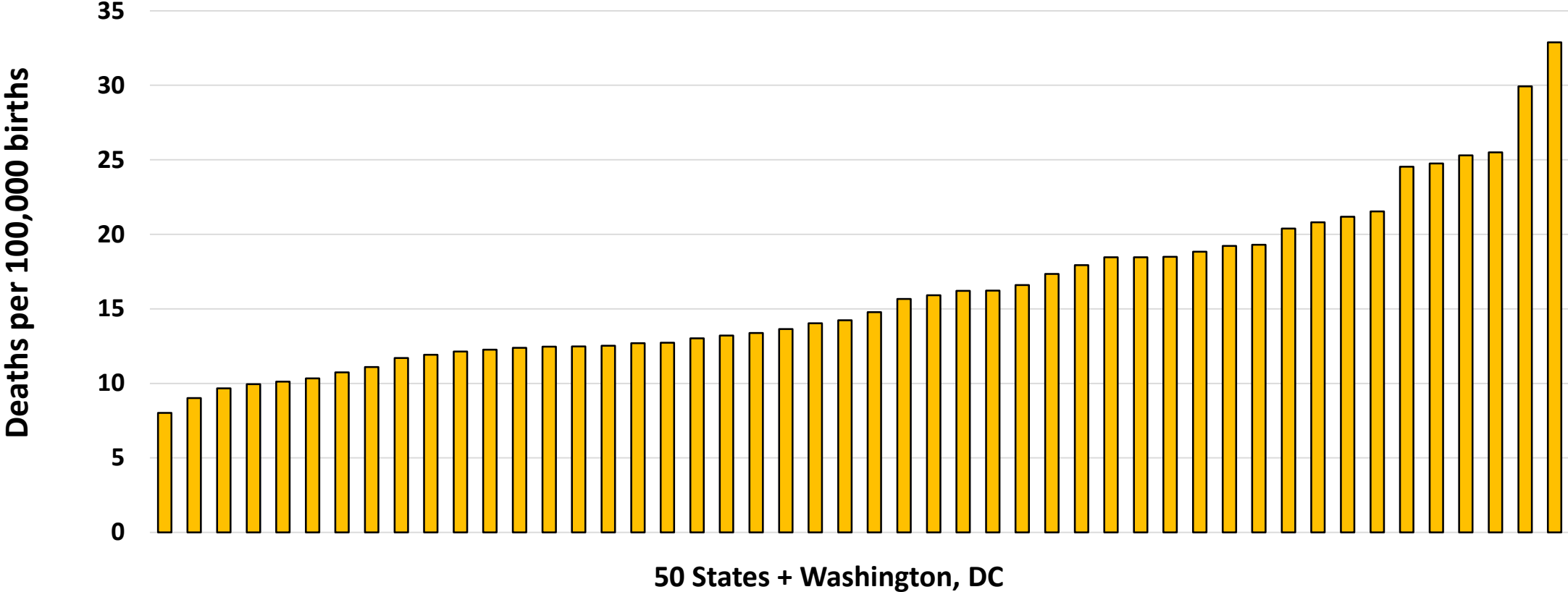


Cause-specific Proportionate Pregnancy-related Mortality PMSS, 1987–2013

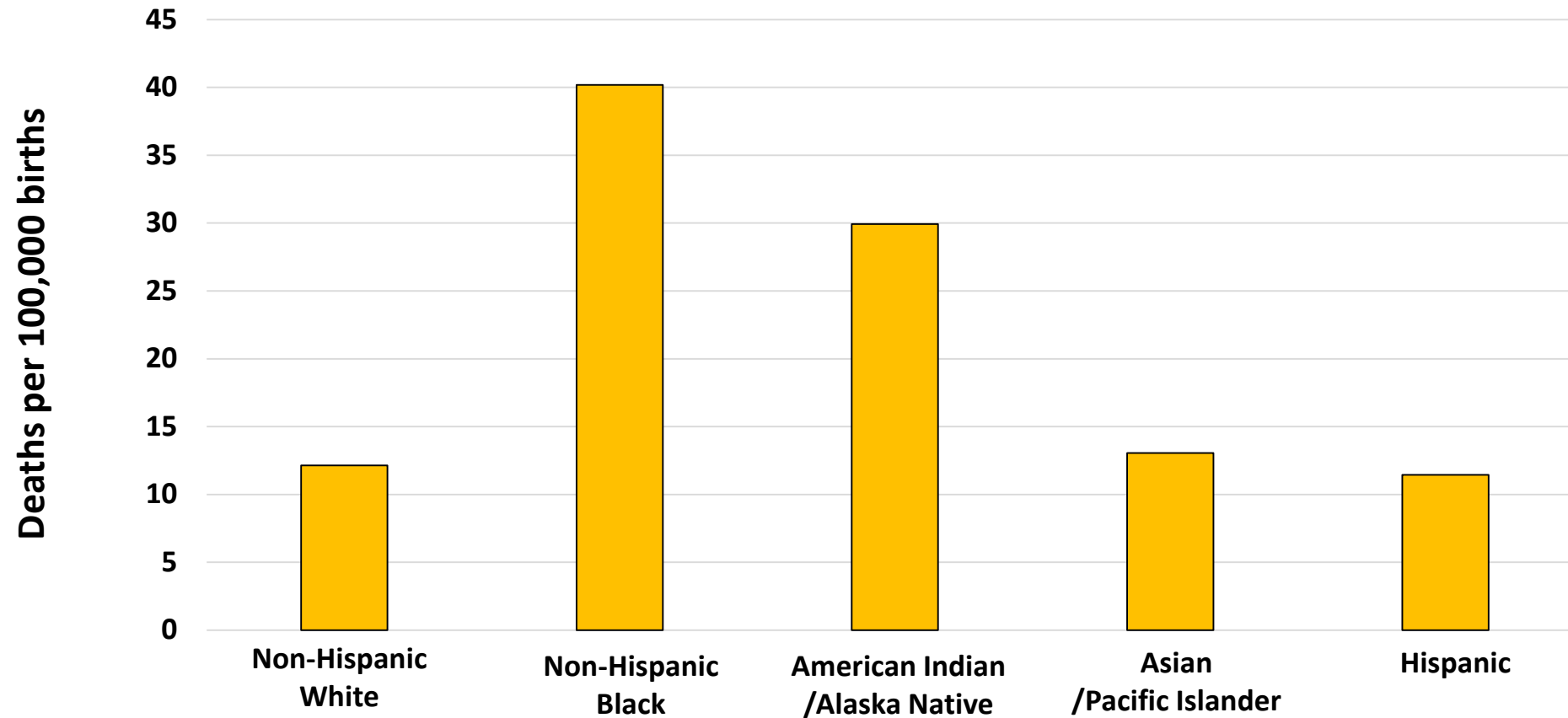


De-identified State Specific Pregnancy Mortality Ratios

PMSS, 2006–2013



Pregnancy-related Mortality by Race and Hispanic Ethnicity, 2006–2013



What Are the Real Trends in Maternal Mortality?

- **The measured maternal mortality rate is increasing**
- **The pregnancy-related mortality ratio has increased but is now relatively stable**
- **Disparities are persistent, and some causes of death may be increasing**
- **There are hints that efforts to improve identification have resulted in misclassification**
 - What is the extent of the false positives?
 - What is the extent of the false negatives?
 - Why are mistakes being made?

Beyond Better Data

- **We need to aspire to something greater**
 - Information needed for prevention will not be found on death certificates
- **There is no acceptable rate of maternal mortality**

Where Can We Go?

- **Surveillance of maternal mortality is driven by information from state-based reviews which:**
 - Go beyond vital statistics
 - Inform and evaluate local quality improvement initiatives
 - Provide an accurate national picture for trends and causes of death

Building U.S. Capacity to Review and Prevent Maternal Deaths

- **Technical assistance for jurisdiction-level maternal mortality review**
- **Promote identification of interventions with the greatest potential to end preventable maternal mortality**
- **CDC Division of Reproductive Health initiative supported by funding from Merck**

Review to Action

➤ **Resource developed by Association of Maternal and Child Health Programs in partnership with the CDC Foundation and CDC**

➤ **Goals**

- Assist states to establish maternal mortality review committees
- Connecting states with committees
- Standardize processes

Policies and Practices to Protect Lives of Pregnant Women, Mothers and Mothers to Be



Lisa M. Hollier, MD, MPH, FACOG

President-elect, American College of Obstetricians and Gynecologists

Chair, Texas Maternal Mortality and Morbidity Task Force

Professor, Baylor College of Medicine

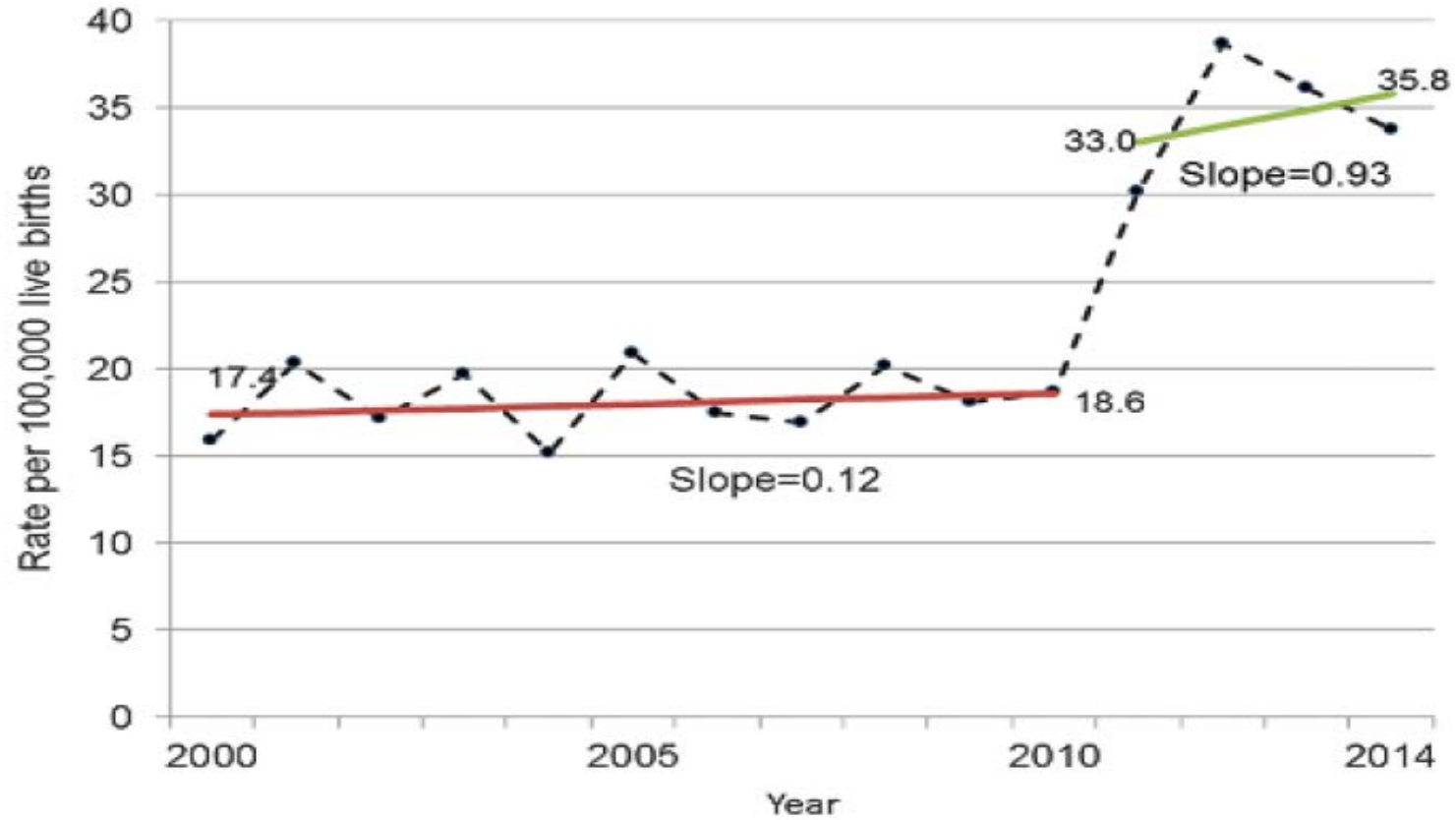
NEWS AUG 12 2017, 5:56 AM ET

Texas Has the Highest Maternal Mortality Rate in the Developed World. Why?

by ELIZABETH CHUCK

In the Headlines

Maternal Mortality Ratio -- Texas



MacDorman et al. Obstet Gynecol 2016, 128(3). 447-455.

Maternal Mortality Review Committees

➤ Verify the accuracy of reported information

- Case identification
 - ❑ O-codes from death certificates (including “late” codes for deaths up to 1 year)
 - ❑ Matching each woman's death record with a birth or fetal death within 365 days

● Case verification

- ❑ Cases with obstetric causes of death without a birth or death certificate match are then matched to inpatient hospital discharge records
- ❑ Medical records are requested
- ❑ Autopsy information, investigative reports

The image shows a U.S. Standard Certificate of Death form for Marie Baptiste. The form is filled out with the following information:

- Decedent's Legal Name:** Marie Baptiste
- Sex:** F
- Age-Last Birthday:** 30
- Under 1 Day:** 4/3/79
- State of Birth:** Haiti
- Residence State:** Georgia
- County:** Fulton
- City or Town:** Atlanta
- ZIP Code:** 30341
- Marital Status:** Married
- Spouse's Name:** Andre Baptiste
- Father's Name:** June Filias
- Mother's Name:** Marie Filias
- Place of Death:** Regional Center Hospital, Atlanta, GA 30327
- Method of Disposition:** Burial
- Funeral Home:** Brothers Funeral Home 1342 Worcester Dr. NE Atlanta, GA 30306
- Date of Death:** 4/26/09
- Time Pronounced Dead:** 0030
- Medical Examiner:** Jose Gomez
- License Number:** 5566
- Signature:** [Signature]
- CAUSE OF DEATH:** Cardiogenic Shock
- Underlying Cause:** Peripartum Cardiomyopathy due to NSTEMI

Maternal Mortality Review Committees

➤ Characterize the maternal death

1. Was the death pregnancy-related?
 - ❑ If she had not been pregnant, would she have died?
2. What was the cause of death?
3. Was the death preventable?
4. What were critical contributing factors to the death?



Maternal Mortality Review Committees

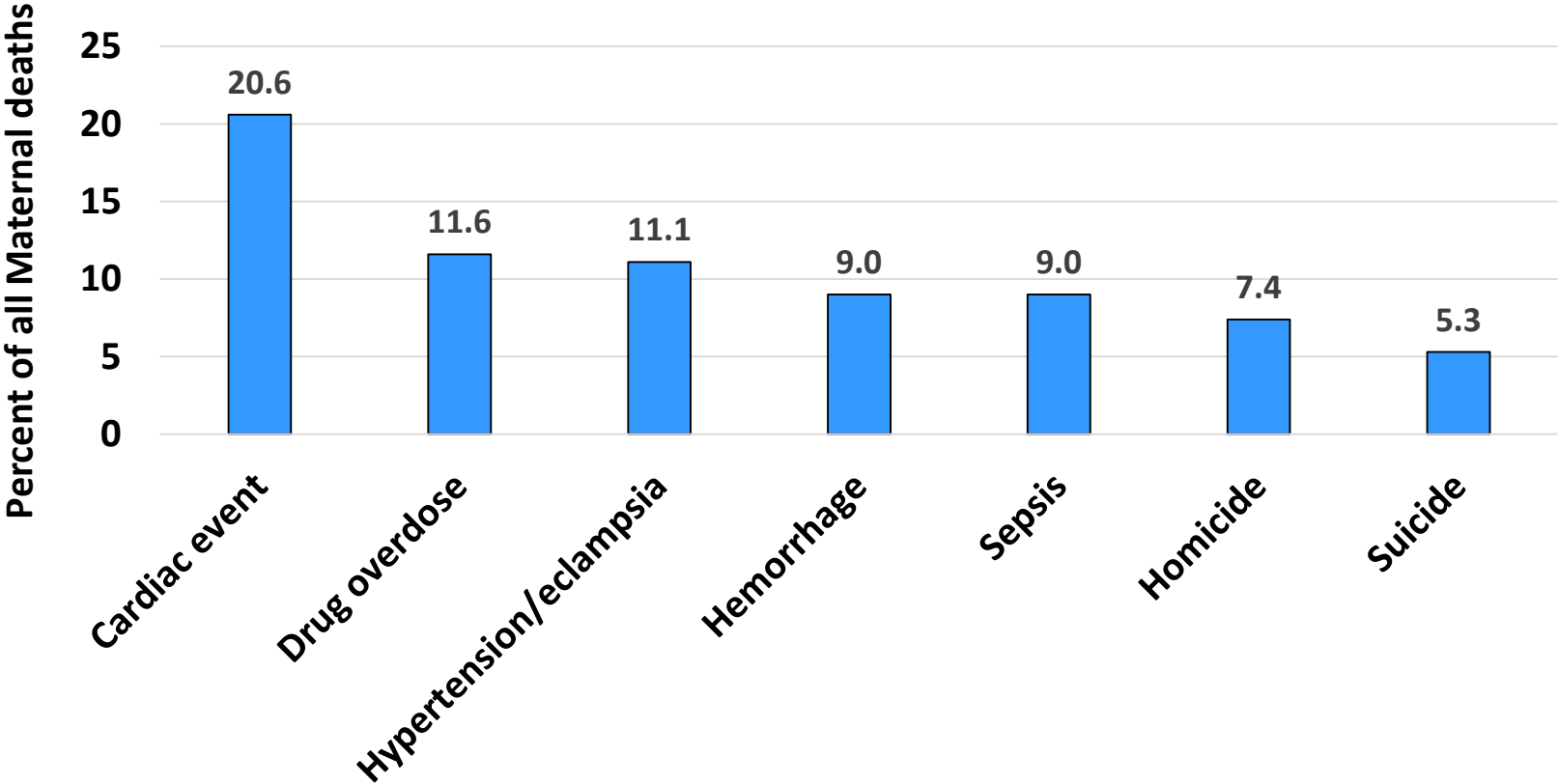
➤ Opportunities for prevention

5. What are recommendations and actions to address these factors?
6. What is the anticipated impact of those actions if implemented?



Maternal Mortality Review Committees Findings and Recommendations

Top causes of maternal death in Texas 2011–2012



- Access to substance use services
- Pregnant women given priority
- Evidence-based screening and referral

Maternal Mortality Review Committees: Lessons Learned

➤ Enhanced data collection processes

- Educational programs
- Legislation
- Appropriations

➤ Translating data into action

- Understanding the causes/contributing factors
- Recommendations to state medical societies

*Maternal Mortality and Morbidity
Task Force and Department of State
Health Services*

Joint Biennial Report



MATERNAL MORTALITY IN TEXAS

Using Precision Public Health to Improve Maternal Outcomes

National Agenda on Maternal Mortality

➤ **National Partnership to Eliminate Preventable Maternal Mortality**

- CDC and CDC Foundation
- Association of Maternal & Child Health Programs (AMCHP)
- 23 organizations

➤ **Council on Patient Safety in Women's Health Care**

- American College of Obstetricians and Gynecologists (ACOG)
- Health Resources and Services Administration (HRSA)
- Alliance for Innovation on Maternal Health (AIM)
- 21 organizations

Alliance for Innovation on Maternal Health

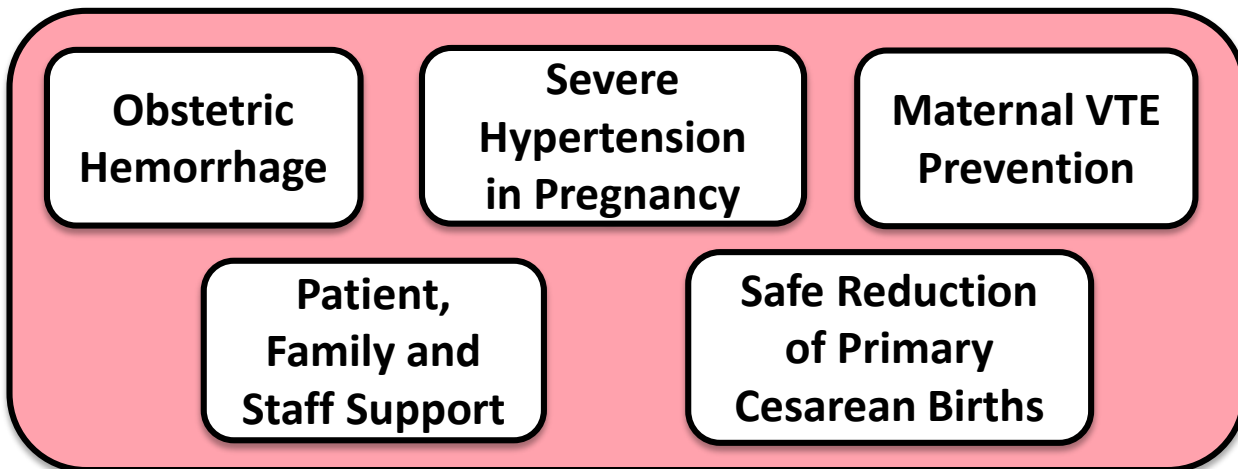
- **National data-driven maternal safety and quality improvement initiative working to:**
 - Reduce maternal mortality
 - Reduce severe maternal morbidity
- **Disseminates condition-specific “bundles” —evidence-based action steps to guide best care**

Implementation to
National Scale

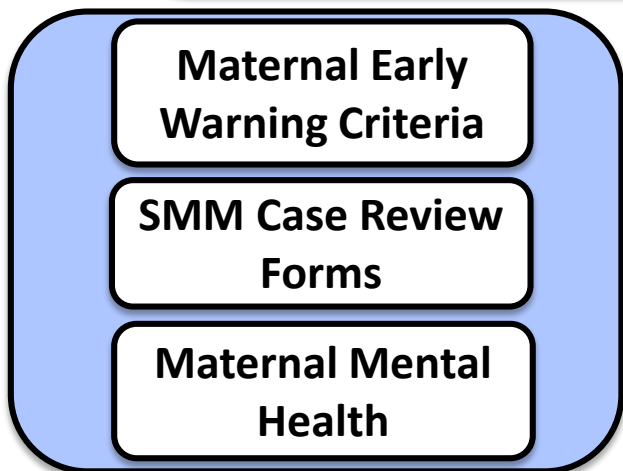


AIM Quality and Safety Bundles

Safety Bundles



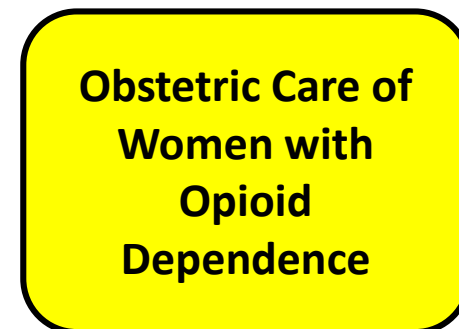
Safety Tools



For Every Birth



Just Out



Levels of Maternal Care

- **The goal of regional maternal care is for pregnant women to receive care in facilities that are appropriate to their risk, thereby reducing maternal morbidity and mortality in the United States.**



LoMC

Levels of Maternal Care
Verification Program

Step 1:
Complete
LOCATe.



Step 2:
Conduct on-site
review.



Step 3:
Verify level of
maternal care.

National Agenda on Maternal Mortality

H.R. 1318 – Preventing Maternal Deaths Act of 2017

S.1112 – Maternal Health Accountability Act of 2017

- **Strengthen state efforts to prevent maternal deaths**
- **Support states in establishing or expanding maternal mortality review**
- **Promote national information sharing**



The Role of Public-Private Partnerships in Generating Evidence for High-Impact Solutions



Mary-Ann Etiebet, MD, MBA

Executive Director
Merck for Mothers

Merck for Mothers



Bringing
the best
of Merck
to create a world
where no woman
dies giving life



6.6 million
women reached,
and counting

30 countries
100 partners
50 programs

HER LIFE

2.5m women with
improved quality of
care

3.7m women with
access to modern
contraception

638k women
empowered to
demand quality care

HER HEALTHCARE

51k providers
equipped to offer
quality care

18.9m people
with access to quality
facilities

15.4m people with access
to lifesaving products

Merck's Legacy: A Decades-Long Commitment to Improving Global Health Outcomes



EVERY WOMAN
EVERY CHILD



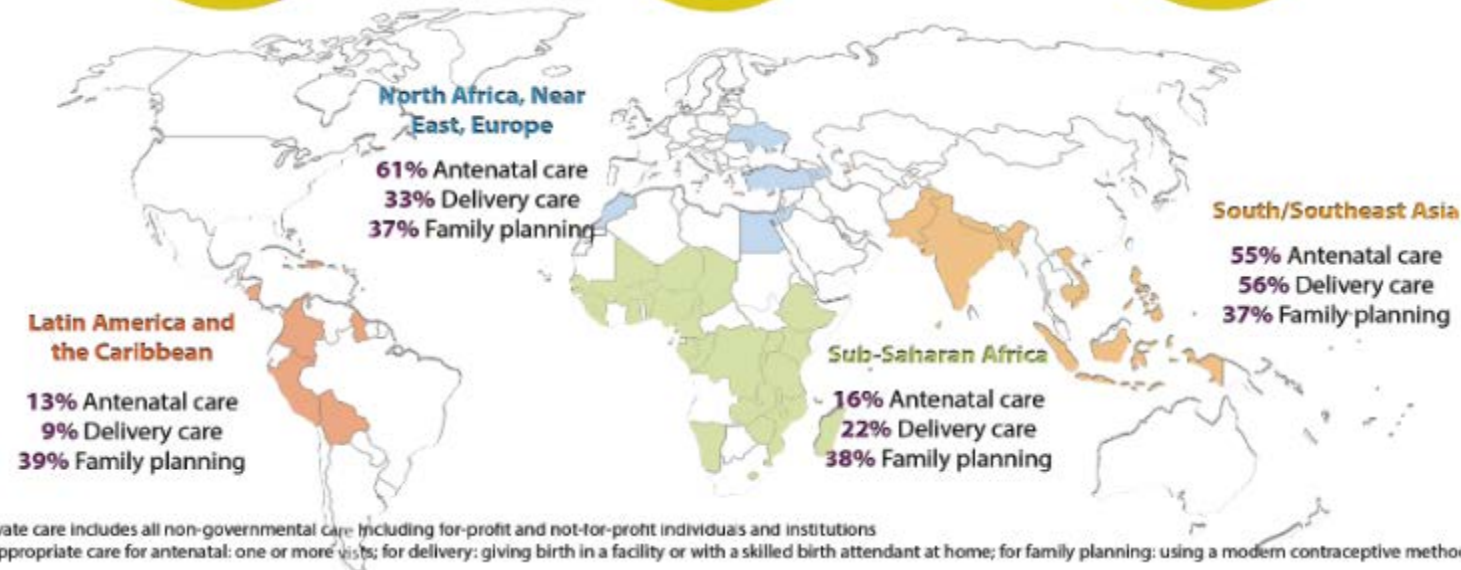
"Women are the cornerstone of a healthy and prosperous world. When a woman survives pregnancy and childbirth, her family, community and nation thrive."

- Ken Frazier, Merck President & CEO

Using Data to Identify Opportunities for Intervention

About 40% of women receive maternal and family planning care from private health providers

LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE



Understanding the Problem of Maternal Mortality in Nigeria

- **Nigeria has the largest number of maternal deaths**
 - Nearly 20% of all maternal deaths globally
- **Like the United States, Nigeria's maternal mortality ratio (MMR) is increasing**
 - In recent years, the MMR increased from 545 to 576 deaths per 100,000 live births
- **Fewer than 40% of deliveries take place in a health facility**
 - Of these facility deliveries, 40% are with private providers



Implementing Evidence-Based Solutions in Nigeria

➤ Introducing a total market approach

- Increase the number of deliveries in health facilities
- Improve the quality of both public and private maternity care
- Improve linkage between private and public facilities to ensure access to comprehensive obstetric care

➤ Establishing maternal and perinatal death reviews

- Initiate routine, multidisciplinary reviews to enable quality improvement at facilities



Pathfinder
INTERNATIONAL

Saving Mothers
giving life



Understanding the Problem of Maternal Mortality in Our Own Backyard



CDC FOUNDATION

Helping CDC Do More, Faster



- Based on new maternal mortality review data:**
- **Nearly 60% of maternal deaths are preventable**
 - **The leading drivers of maternal death differ by race and age**
 - **Mental health has been identified as a leading underlying cause of pregnancy-related death**

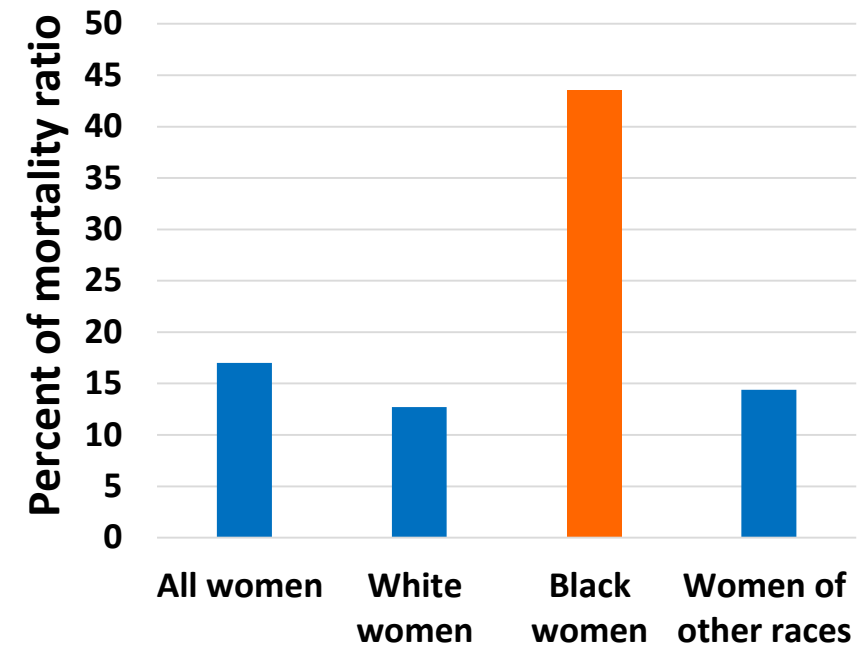
Understanding the Drivers of Disparities in Maternal Health Outcomes

- **Evidence of disrespect and abuse in the global literature**
 - Poorest women have the worst maternal outcomes
 - 20% of poor women report being disrespected and abused
- **Are negative experiences contributing to the disparities we observe in maternal health outcomes?**
 - *Merck for Mothers* has partnered with researchers to answer this question

COLUMBIA UNIVERSITY | MAILMAN SCHOOL of PUBLIC HEALTH

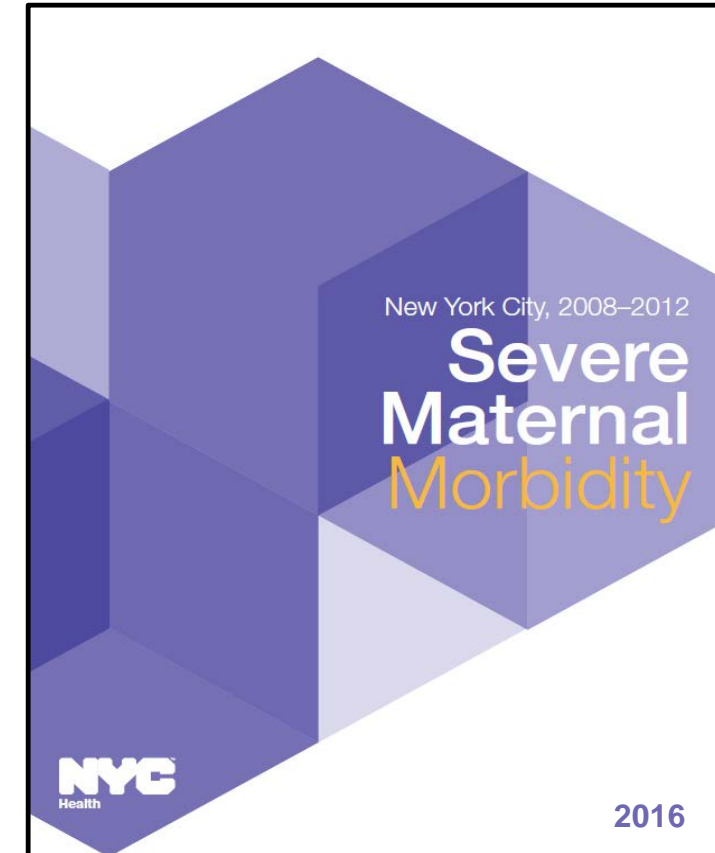
AVERTING MATERNAL DEATH AND DISABILITY (AMDD)

Pregnancy-related mortality ratios by race (CDC, 2011–2013)



Understanding the More Prevalent Problem of Severe Maternal Morbidity

- **Globally, there are five near-misses for every woman who dies from pregnancy or childbirth**
 - There are 20 cases of severe maternal morbidity for every death
- **In the United States more than 50,000 women each year suffer severe complications**
 - **New York City**
 - ❑ Women with at least one chronic condition are at least three times more likely to suffer from severe maternal morbidity
 - ❑ Deliveries complicated by severe maternal morbidity cost \$6,000 more than deliveries with no complications



Implementing Evidence-Based Solutions in the United States

- **Addressing direct drivers of maternal mortality**
- *Merck for Mothers* supported implementation of safety bundles to standardize care for three of the top drivers of maternal mortality in 300+ facilities across five states

- **Addressing indirect drivers of maternal mortality**
- We are working with community-based organizations to link pregnant women with chronic conditions to care and social services



From Awareness to Action



LOST MOTHERS: MATERNAL MORTALITY IN THE U.S.

Many Nurses Lack Knowledge Of Health Risks To Mothers After Childbirth

August 17, 2017 - 5:00 AM ET
Heard on Morning Edition

NINA MARTIN, PROPUBLICA



RENEE MONTAGNE

FROM 



SundayReview | EDITORIAL

America's Shocking Maternal Deaths

By THE EDITORIAL BOARD | SEPT. 3, 2016





Thank you

CDC PUBLIC HEALTH GRAND ROUNDS

Meeting the Challenges of Measuring and Preventing Maternal Mortality in the United States



November 14, 2017



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