

# **Maternal Healthcare Crisis: Maternal Mortality**

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# Presenter Disclosures

Elizabeth Howell, MD, MPP

I have no personal financial relationships with commercial interests relevant to this presentation

# Objectives

- Trends in Maternal mortality
- Risk factors and comorbidities
- Causes of death
- Racial and ethnic disparities

# Childbirth

- Four million births annually in US
- Childbirth #1 reason for hospital admission for commercial payers and Medicaid programs
- Childbirth accounts for quarter of all hospital discharges with annual cost of over \$100 billion
- US spends more on healthcare than any other country

Andrews. HCUP Statistical Brief 59; 2008; Childbirth Connection. 2010; Papanicolas I. Health Care Spending in the United States and Other High-Income Countries. JAMA. 2018;319(10):1024–1039.

# Maternal Healthcare Crisis

**Hospitals know how  
to protect mothers.  
They just aren't  
doing it.**

Alison Young, USA TODAY  
4:54 p.m. EDT July 27, 2018

Opinion

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



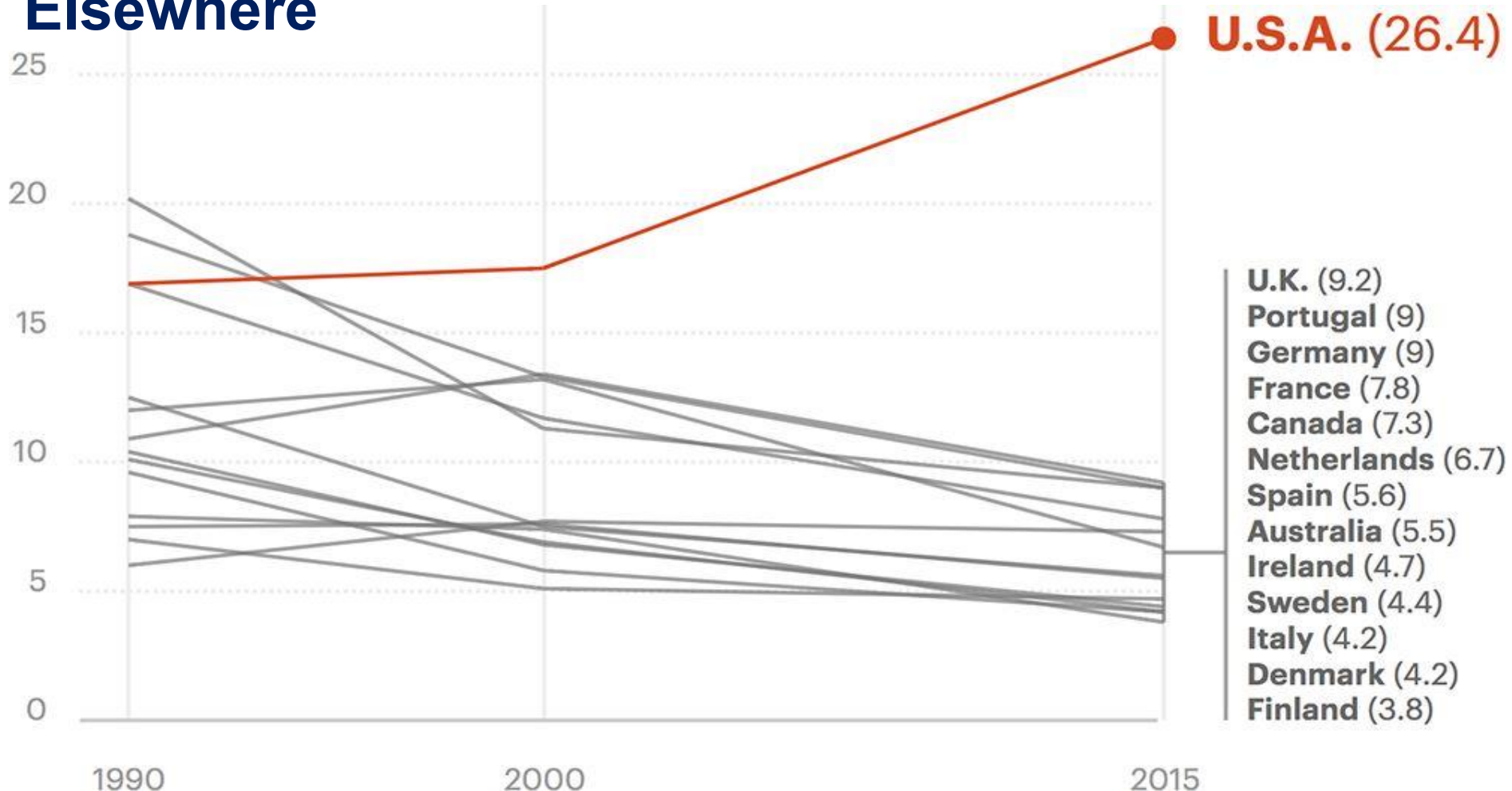
By [Nicholas Kristof](#)

New York Times

July 29, 2017



# US Maternal Mortality Rises while it Declines Elsewhere



ProPublica and NPR. Accessed 9/28/18. <https://www.npr.org/2017/05/12/528098789/u-s-has-the-worst-rate-of-maternal-deaths-in-the-developed-world>

Based on data from "Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015," *The Lancet*. Only data for 1990, 2000 and 2015 was made available in the journal. Source: The Lancet Credit: Rob Weychert/ProPublica

# Maternal Mortality Rankings for US and New York State

- 2015: US ranked **46<sup>th</sup>** in the world in maternal mortality
- 2016: NY ranked **30<sup>th</sup>** with a rate of 20.9 deaths per 100,000 live births

Trends in maternal mortality: 1990-2015 | WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division; Explore Maternal Mortality in New York | 2016 Health of Women and Children Report. 2017.

# Maternal Mortality Definitions

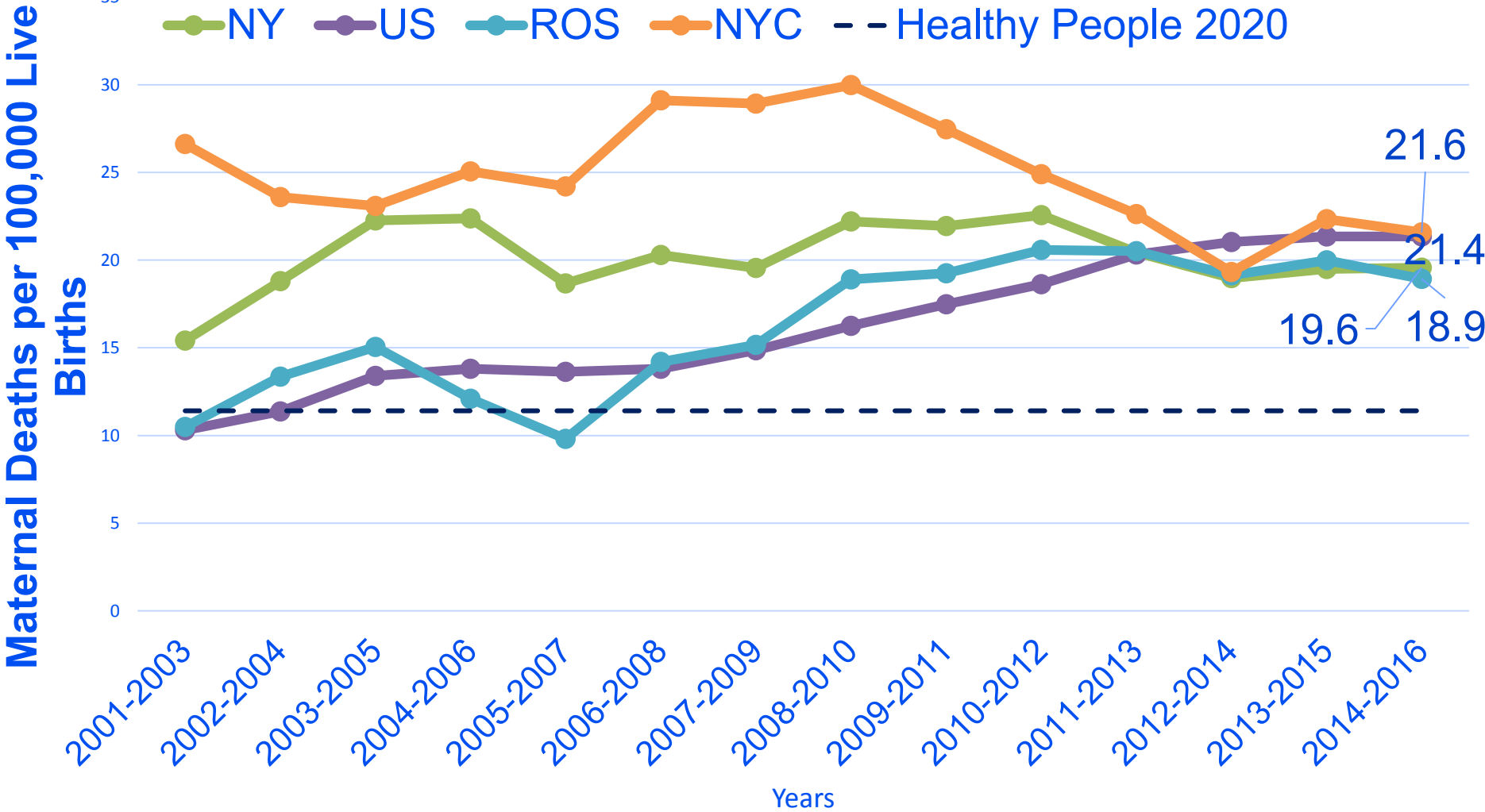
- Maternal mortality: the death of a woman during pregnancy or within 42 days of termination of pregnancy
- A pregnancy-related death: the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.
- A pregnancy-associated but Not related death: the death of a woman during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy.



# **New York State Maternal Mortality Review Initiative**

- Comprehensive population-based review of all maternal deaths in New York State
- Started in 2010 and examines:
  - Pregnancy-Related Deaths
  - Pregnancy-Associated but Not Related Deaths
- Informs interventions to reduce risk of maternal deaths

# Trends in Maternal Mortality in New York State



\*Causes of death from death records A34, O00-O95,O98-O99.  
 2000-2014 data from NY Vital Records. 2015 NY and national data from CDC Wonder database.

# Demographic Risk Factors for Maternal Mortality

- Race
- Low socioeconomic status
- Lack of prenatal care
- Advanced maternal age
- Lower educational attainment

Berg, Obstetrics & Gynecology 2010; Saftlas Am J Epidemiol. 2000; Callaghan, Sem in Perin 2012; Hirshberg A. Sem in Perin 2017.

# Clinical Risk Factors for Maternal Mortality

- Chronic health conditions – diabetes, hypertension, cardiac disease
- Obesity
- Cesarean delivery
  - Increased risk of venous thrombotic event, hemorrhage, infection
  - Increased risk abnormal placentation

Callaghan WM. Overview of Maternal Mortality in the United States. *Semin Perinatol.* 2012;36(1):2-6; Hirshberg A. *Sem in Perin* 2017.

# Maternal Demographic Characteristics for Pregnancy-Related Deaths in New York State

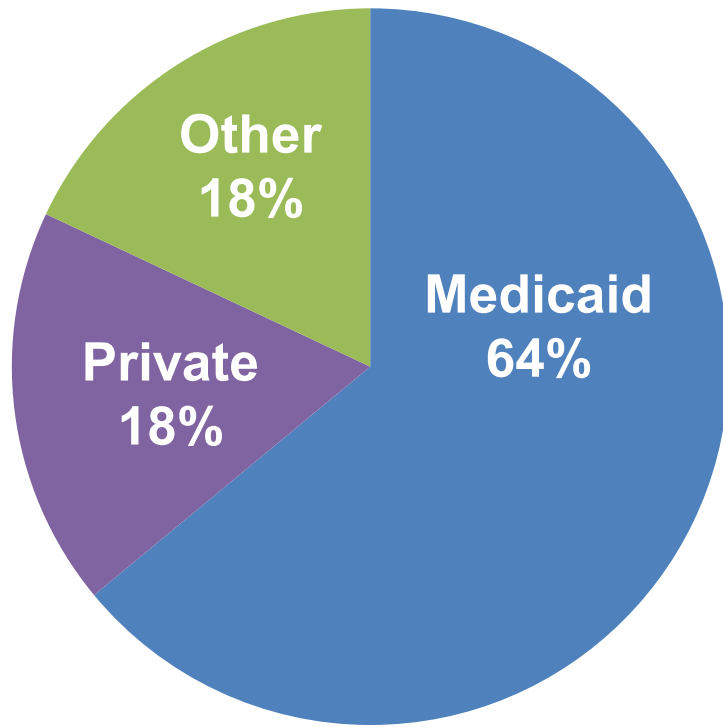
Pregnancy-Related Deaths	MMR 2006-2008 (N=125)	MMR 2012-2014 (N=89)*
Medicaid Insurance	45%	64%
High School Education or Less	28%	52%
English as Primary Language	63%	64%
Single Marital Status	48%	53%
First time mothers	30%	29%
Inadequate or No Prenatal care	18%	10%

Data source: NYS Maternal Mortality Review

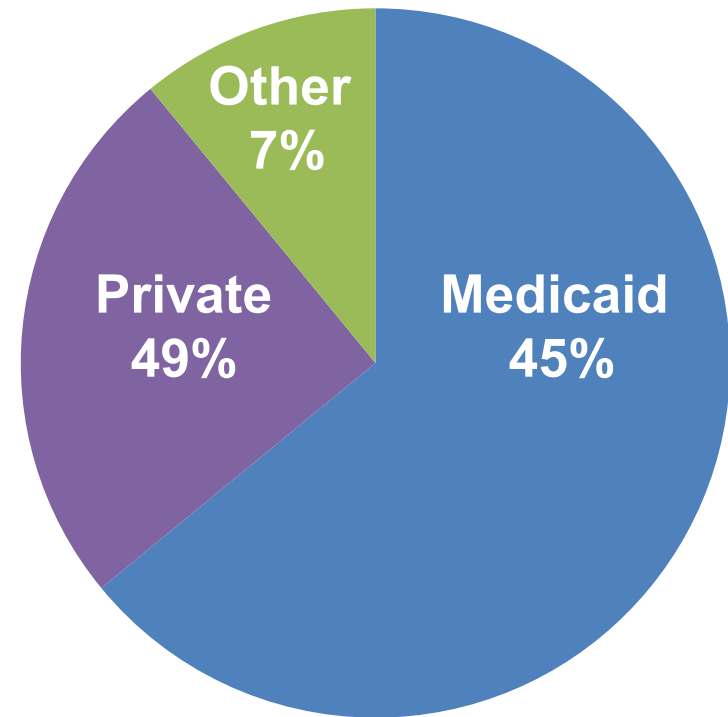
\*2014 not complete

# Pregnancy-Related Deaths by Health Insurance, New York State 2012–2014\*

## Pregnancy-Related Deaths



## Live Births



Data source: NYS Maternal Mortality Review NYS Vital Statistics

# Maternal Clinical Characteristics for Pregnancy-Related Deaths in New York State

Pregnancy-Related Deaths	MMR 2006-2008 (N=125)	MMR 2012-2014 (N=89)*
Pre-pregnancy Overweight or Obese	45%	60%
Cesarean Delivery	63%	66%
Delivered at Level 3 or Regional Perinatal Center	76%	64%

Data source: NYS Maternal Mortality Review  
\*2014 not complete

# Trends in Risk Factors

- Advancing maternal age
- Increasing rates of obesity
  - e.g. 30% of maternal deaths in 2006-2008 were obese vs. 51% of deaths in 2012-2014 (NYS)
- Rising rates of chronic conditions
  - Hypertension, diabetes increasing
  - Percentage of maternal deaths with 2 or more risk factors increased (NYS)



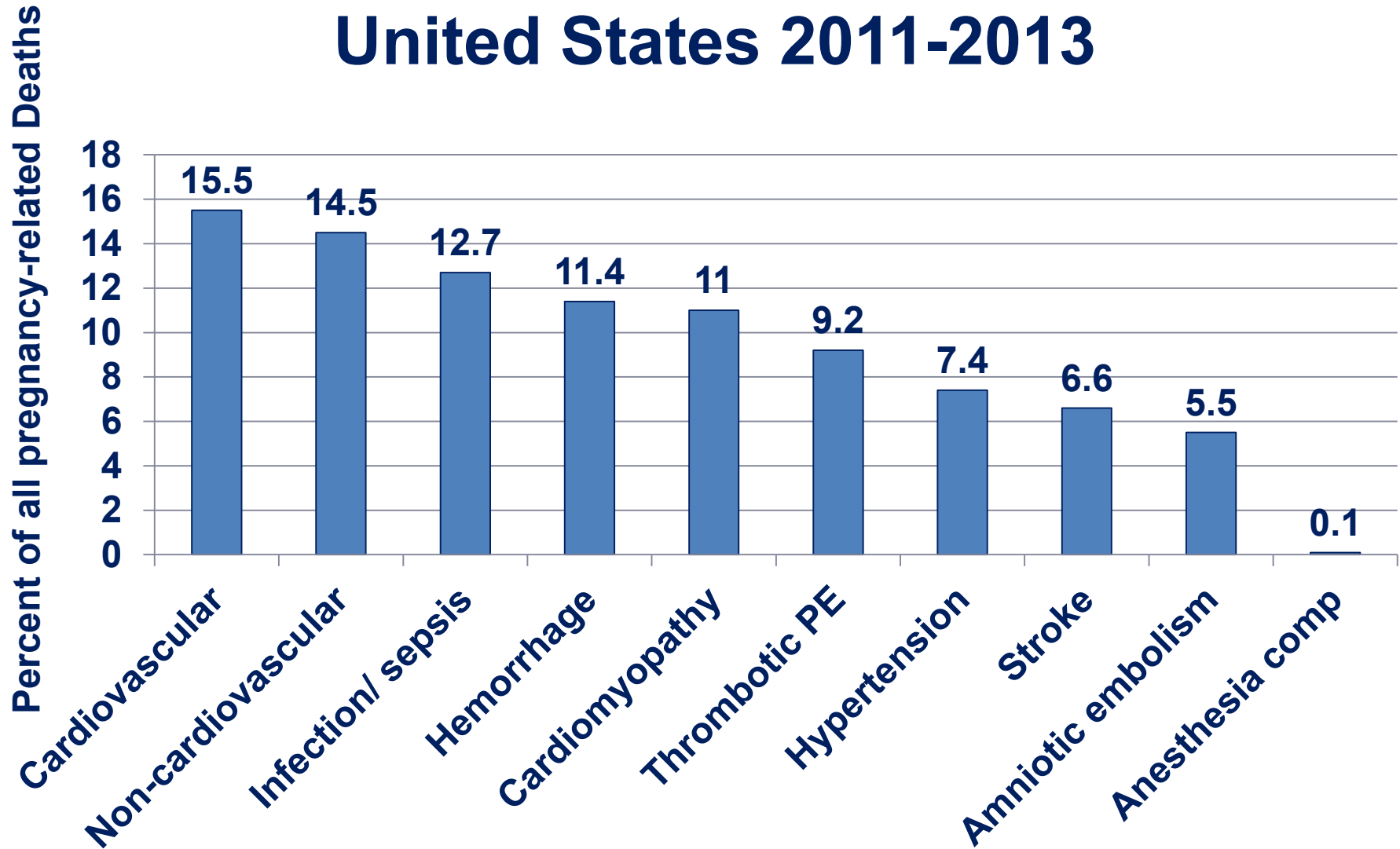
# Top Six Causes of Pregnancy-Related Deaths New York State Maternal Mortality Review Cohort

Cause of Death	2006-2008 N=125	2012-2014* N=89
Hemorrhage	23%	16%
Hypertensive disorders	23%	7%
Embolism (not cerebral)	17%	25%
Cardiovascular conditions	10%	7%
Infection	3%	17%
Cardiomyopathy	2%	11%

Data source: NYS Maternal Mortality Review

\*2014 not complete

# Causes of Pregnancy-Related Deaths United States 2011-2013



CDC Mortality Surveillance System -

<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pmss.html>

# Timing of Pregnancy-Related Deaths New York State

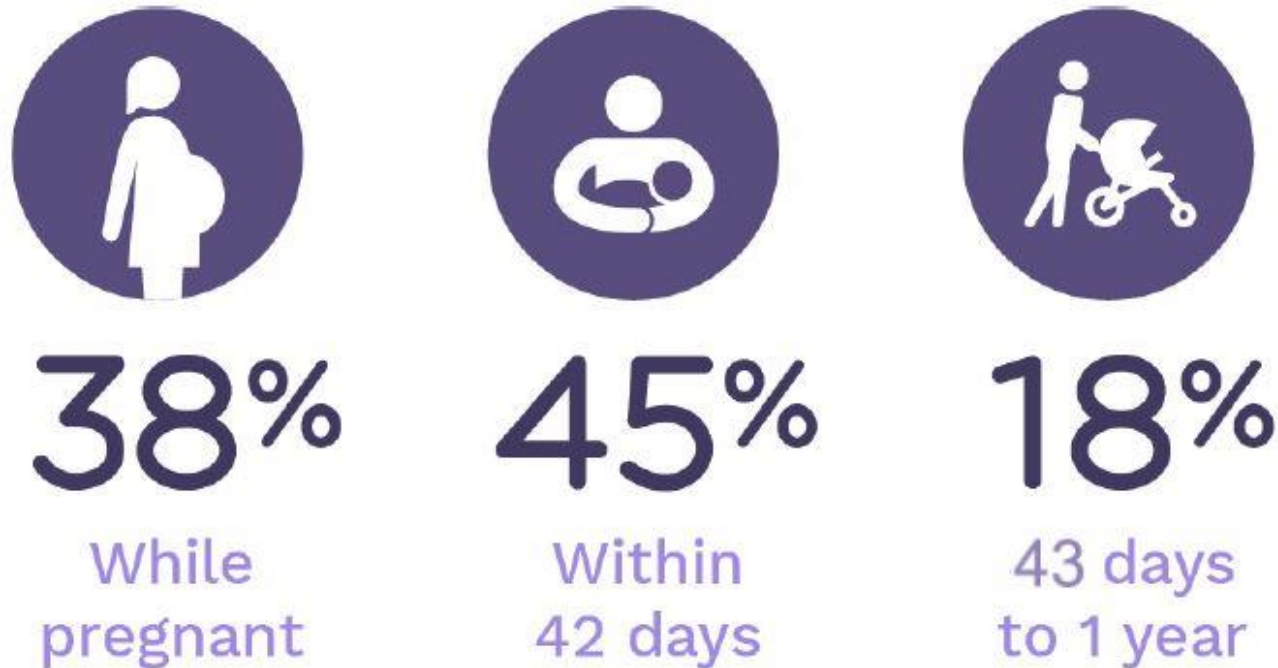
	2006-2008 (N=125)	2012-2014* (N=89)
Antepartum	12%	13%
During labor or delivery	9%	3%
Within a day of delivery	32%	30%
First week after delivery	22%	18%
1-6 weeks postpartum	20%	18%
43 days to 1 year	6%	15%

Data source: NYS Maternal Mortality Review

\*2014 not complete

# Timing of Pregnancy-Related Deaths CDC Data

Figure 1. Distribution of Pregnancy-Related Deaths by Timing of Death in Relation to Pregnancy



Capacity to Review and Prevent Maternal Deaths. (2018). Report from nine maternal mortality review committees. Retrieved from [http://reviewtoaction.org/Report\\_from\\_Nine\\_MMRCs](http://reviewtoaction.org/Report_from_Nine_MMRCs).

# Nothing Protects Black Women From Dying in Pregnancy and Childbirth

Not education. Not income. Not even being an expert on racial disparities in health care.

by **Nina Martin**, ProPublica, and **Renee Montagne**, NPR, Dec. 7, 2017, 8 a.m. EST

**PROPUBLICA** TOPICS ▾ SERIES ▾ ABOUT



*Shalon MauRene Irving was a lieutenant commander of the U.S. Public Health*

## LOST MOTHERS

# How Hospitals Are Failing Black Mothers

A ProPublica analysis shows that women who deliver at hospitals that disproportionately serve black mothers are at a higher risk of harm.

by **Annie Waldman**, Dec. 27, 2017, 8 a.m. EST



Erica  
Garner  
Andrew  
Burton/Getty  
Images

## BLACK ENTERPRISE

A GROWING EPIDEMIC: BLACK WOMEN FACE MAJOR DISPARITY IN MATERNAL MORTALITY



by Janell Hazelwood  
March 2, 2018

# Disparities in Maternal Mortality

- Minorities represent half of US births and racial/ethnic minorities suffer higher maternal mortality rates
- Black women 3 to 4 times more likely to die than white women – largest disparity among population perinatal health measures
- Native Americans, some Asians, some Latinas also have elevated rates

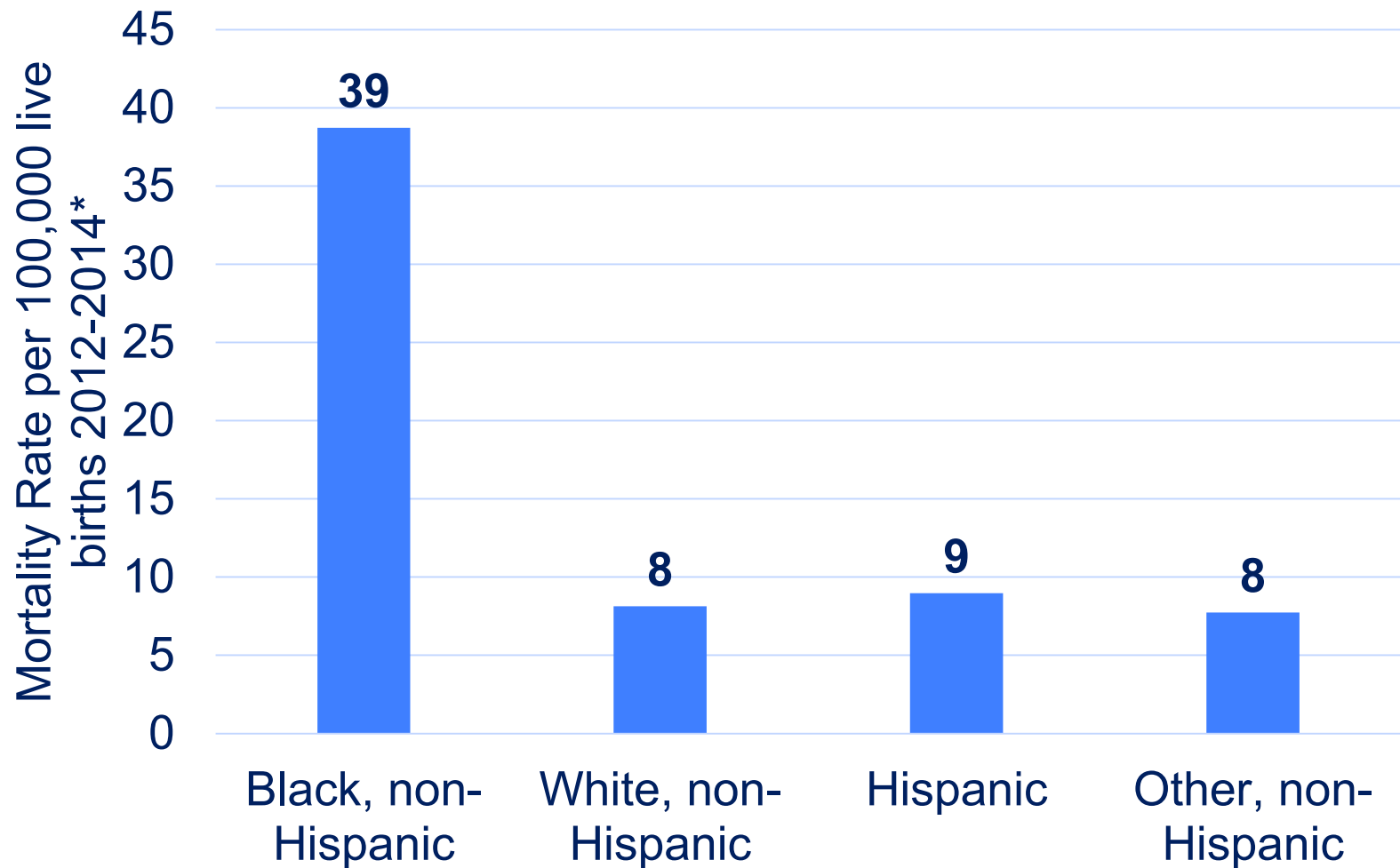
CDC Pregnancy Mortality Surveillance System at:  
<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pmss.html>

# Definition of Disparities

- “Health equity and health disparities are intertwined. Health equity means social justice in health (i.e. no one is denied the possibility to be healthy for belonging to a group that has historically been economically/ socially disadvantaged). Health disparities are the metric we use to measure progress toward achieving health equity.”(Dr. Paula Braveman)

Braveman P. Public Health Rep. Jan-Feb 2014;129 Suppl 2:5-8.

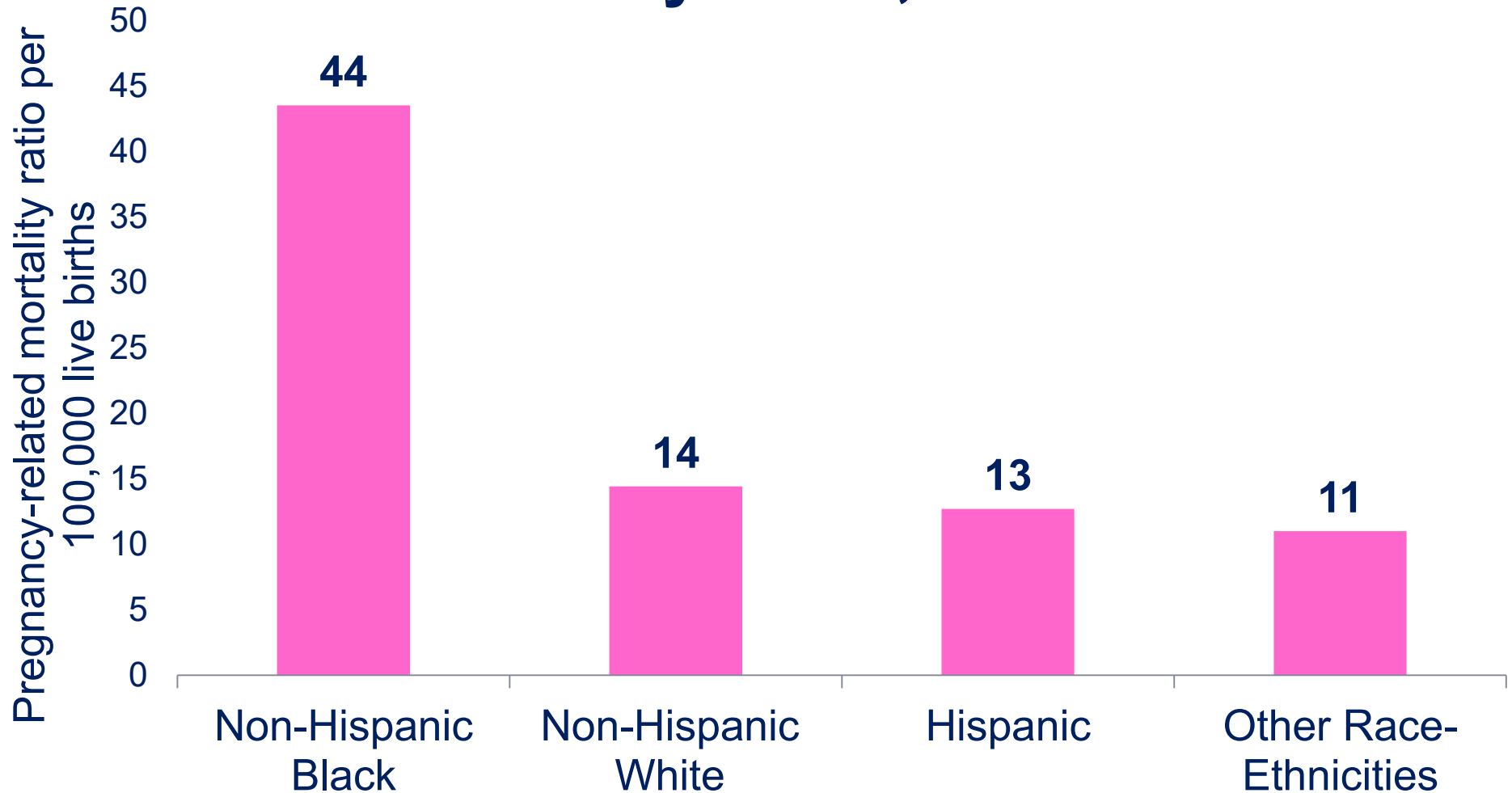
# Pregnancy-Related Mortality Ratios by Race/Ethnicity, New York State, 2012-2014\*



Data source: NYS Maternal Mortality Review; Mortality Rate is death per 100,000 live births in 2012-2014; \*2014 not complete

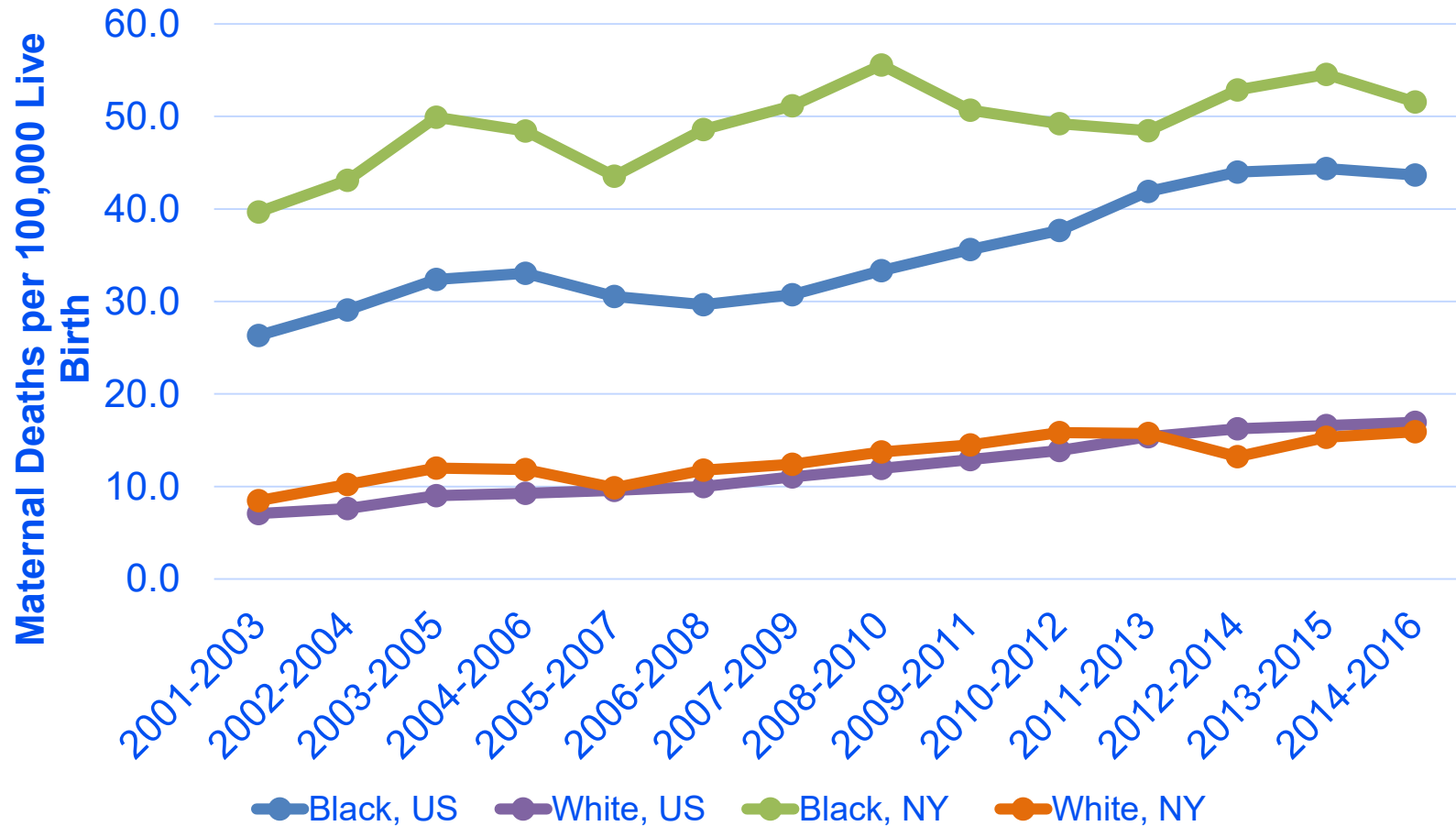


# Pregnancy-Related Mortality Ratios by Race-Ethnicity in US, 2011-2013



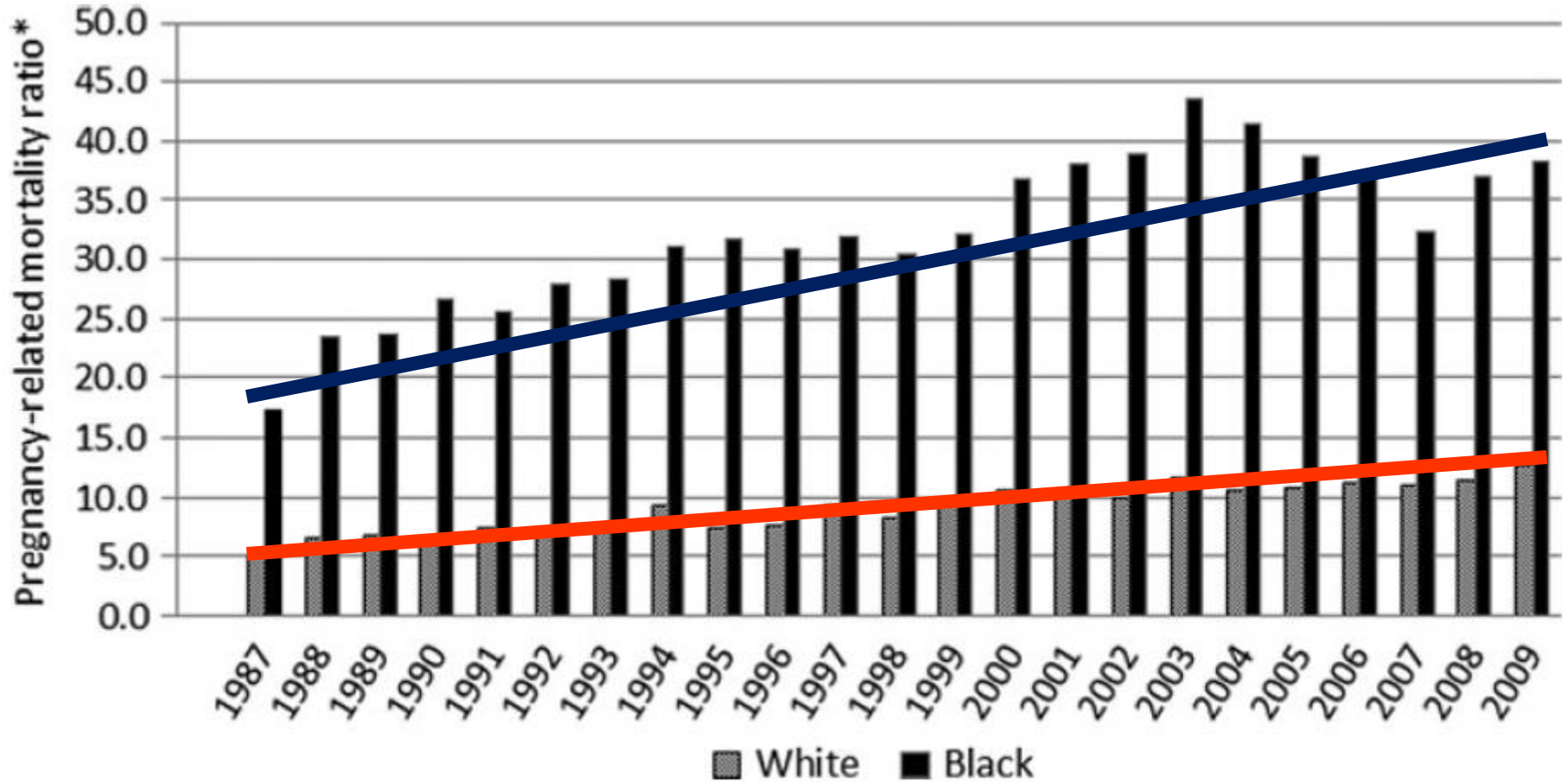
Creanga Obstet Gynecol. 2017;130(2),366–373.

# Trends in Maternal Mortality by Race, NYS



National maternal mortality trends derived from CDC Wonder Database available at <https://wonder.cdc.gov/>  
 NYS trends derived from NYS Vital Statistics

# CDC US Pregnancy-related Mortality by Race



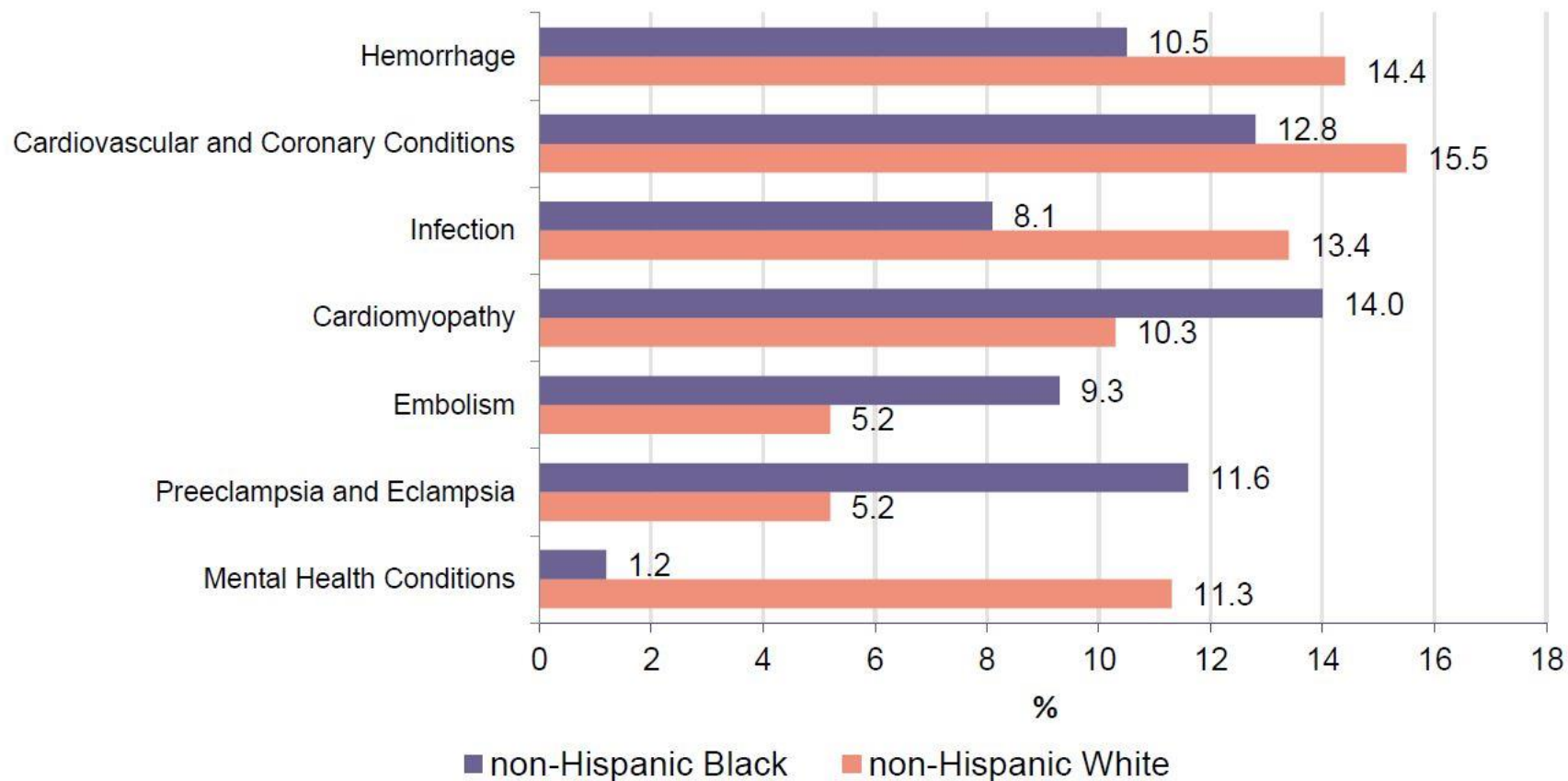
# Top Six Causes of Pregnancy-Related Deaths by Race/Ethnicity, New York State 2012-2014\*

Cause of Death	Total (N=89)	White, Non-Hispanic (N=27)	Black, Non-Hispanic (N=39)	Hispanic (N=15)	Other (N=8)
Embolism	22 (25%)	6	10	3	3
Hemorrhage	14 (16%)	4	4	3	3
Infection	15 (17%)	6	5	3	1
Cardiomyopathy	10 (11%)	4	4	2	0
Hypertensive disorders	6 (7%)	2	4	0	0
Cardiovascular problems	6 (7%)	0	3	2	1

Data source: NYS Maternal Mortality Review\*2014 not complete

# Leading Causes of Pregnancy-Related Deaths by Race, CDC Data

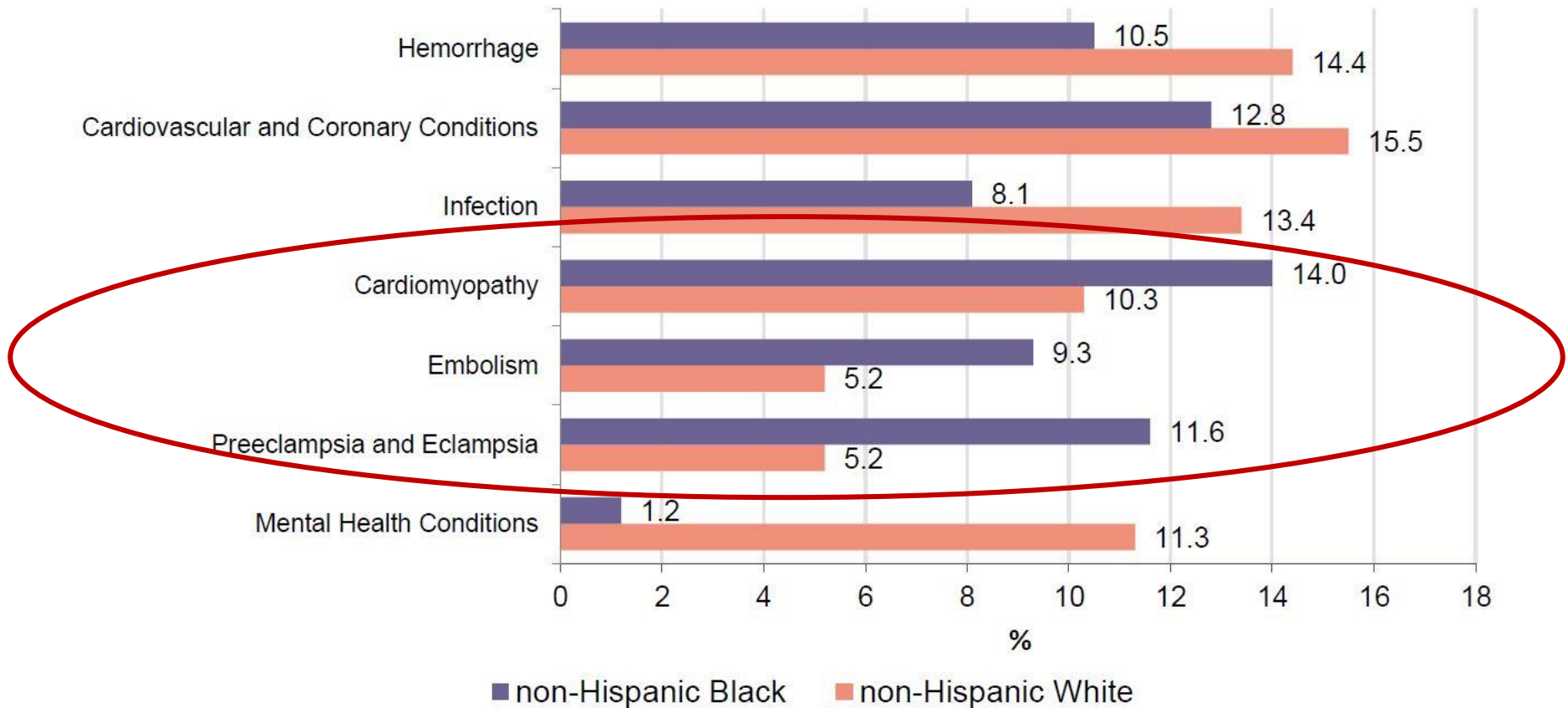
Figure 5. Leading Underlying Causes of Pregnancy-Related Deaths, by Race-Ethnicity



Capacity to Review and Prevent Maternal Deaths. (2018). Report from nine maternal mortality review committees. Retrieved from [http://reviewtoaction.org/Report\\_from\\_Nine\\_MMRCs](http://reviewtoaction.org/Report_from_Nine_MMRCs).

# Leading Causes of Pregnancy-Related Deaths by Race, CDC Data

Figure 5. Leading Underlying Causes of Pregnancy-Related Deaths, by Race-Ethnicity



Capacity to Review and Prevent Maternal Deaths. (2018). Report from nine maternal mortality review committees. Retrieved from [http://reviewtoaction.org/Report\\_from\\_Nine\\_MMRCs](http://reviewtoaction.org/Report_from_Nine_MMRCs).

## Top Six Causes of Pregnancy-Associated but Not Related Deaths by Race/Ethnicity, NYS, 2012-2014\*

	Total (N=147)	White, non- Hispanic (N=70)	Black, non- Hispanic (N=40)	Hispanic (N=23)	Other (N=14)
Injury	77 (52%)	40	15	11	11
Cancer	14 (10%)	8	3	3	0
Infection	7 (5%)	3	2	1	1
Cardiac arrhythmia	8 (5%)	5	3	0	0
Unknown	6 (4%)	2	2	2	0
Pulmonary	8 (5%)	1	5	1	1

Data source: NYS Maternal Mortality Review; \*2014 not complete

# Pregnancy-Associated Deaths Classified as Injury, by Race/Ethnicity, New York State 2012-2014\*

Injury	Total (N=77)	White, non-Hispanic (N=40)	Black, non-Hispanic (N=15)	Hispanic (N=11)	Other (N=11)
Substance Abuse	23 (30%)	19	1	2	1
Suicide	13 (17%)	5	2	2	4
MVA	17 (22%)	10	2	3	2
Homicide	15 (15%)	1	7	4	3
Undetermined injury	9 (12%)	5	3	0	1

Data source: NYS Maternal Mortality Review; \*2014 not complete



# Maternal Death is Tip of the Iceberg

- For every maternal death, 100 women suffer severe maternal complications related to pregnancy and childbirth
- Significant racial/ethnic disparities exist
- Over one-half maternal deaths/severe events preventable
- Improving quality important lever to improve outcomes and reduce disparities

Callaghan. *Obstet Gynecol* 2012;120:1029-36; Creanga. *J. of Women's Health* 2014 Building U.S. Capacity to Review and Prevent Maternal Deaths. (2018). Report from nine maternal mortality review committees. Howell. *Am J Obstet Gynecol*. 2016 Aug;215(2):143-52.

# How Did We Get Here?

# Race/ Ethnicity

## Patient Factors

- Socio-demographics: age, education, poverty, insurance, marital status, employment, language, literacy
- Knowledge, beliefs, health behaviors
- Psychosocial: stress, self-efficacy, social support

## Community/ Neighborhood

- Community, social network
- Neighborhood: crime, poverty, built environment, housing

## Provider Factors

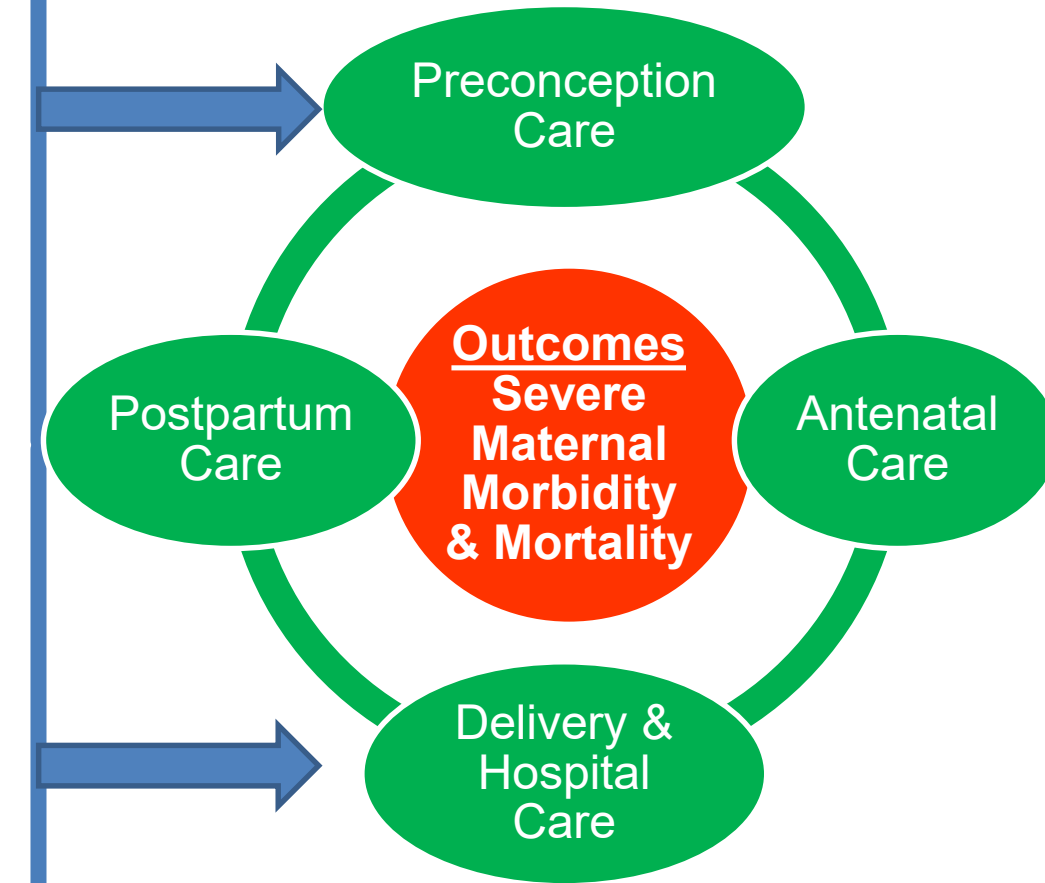
- Knowledge, experience, implicit bias, cultural competence, communication

## System Factors

- Access to high quality care, transportation, structural racism, policy

Health status: comorbidities (e.g. HTN, DM, obesity, depression);  
Pregnancy complications

**Figure 1: Pathways to Racial and Ethnic Disparities in Severe Maternal Morbidity & Mortality**



Howell EA. Clin Obstet Gynecol. 2018 Jun;61(2):387-399



## READINESS

### *Every health system*

- Establish systems to accurately document self-identified race, ethnicity, and primary language.
  - Provide system-wide staff education and training on how to ask demographic intake questions.
  - Ensure that patients understand why race, ethnicity, and language data are being collected.
  - Ensure that race, ethnicity, and language data are accessible in the electronic medical record.
  - Evaluate non-English language proficiency (e.g. Spanish proficiency) for providers who communicate with patients in languages other than English.
  - Educate all staff (e.g., inpatient, outpatient, community-based) on interpreter services available within the healthcare system.
- Provide staff-wide education on:
  - Peripartum racial and ethnic disparities and their root causes.
  - Best practices for shared decision making.
- Engage diverse patient, family, and community advocates who can represent important community partnerships on quality and safety leadership teams.

<http://safehealthcareforeverywoman.org/patient-safety-bundles/reduction-of-peripartum-raciaethnic-disparities/>

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