

# Maternal Mortality in Georgia challenges, progress, and opportunities

Michael K Lindsay MD,MPH  
Division Of Maternal Fetal Medicine Emory  
Gynecology and Obstetrics Department

# Conflict of Interest

- I have no conflicts of interest

# Learning Objectives

- Describe how we measure MM in the US and examine recent trends.
- Review findings and recommendations from 2012,2013 MMRC of maternal deaths in Georgia.
- Describe the Georgia Perinatal Quality Collaborative (GAPQC) role in implementing state-wide patient safety initiatives.

DC Has Highest Maternal Mortality Rate in US; Council Wants to Learn Why

### Maternal Mortality Bill Moves Forward

HEALTH

The horrifying maternal mortality rate in Texas turned out to be wrong, but that's not the biggest issue

The US maternal death rate is unacceptably high. It doesn't have to be.

The lone star state

By Sara Chodosh April 12

## Here's One Issue Blue and Red States Agree On: Preventing Deaths of Expectant and New Mothers

Why the US maternal mortality rate is rising from Indiana to Oregon, lawmakers are passing bills to increase scrutiny of maternal deaths. Often, they're citing our "Lost Mothers" series.

Nina Marti

### Too many black women like Erica Garner are dying in America's maternal mortality crisis

of the stress of trauma and poor health care for black women.

What We've Learned So Far About Maternal Mortality From You, Our Readers

Nearly Dying In Childbirth: Why Preventable Complications Are Growing In U.S. New York City Launches Committee to Review Maternal Deaths

December 22, 2017

Amid intense pregnancy protect mot

SHOCKING RATE OF MATERNAL MORTALITY AND MORBIDITY IN THE UNITED STATES

Shame on us for allowing maternal death rates to soar | Editorial

Three reasons why maternal mortality rates are rising

U.S. Has The Worst Rate Of Maternal Deaths In The Developed World

Black Mothers Keep Dying After Giving Birth. Sharon Irving's Story Explains Why

December 7, 2017 7:51 PM ET

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

## Lost Mothers

An estimated 700 to 900 women in the U.S. died from pregnancy-related causes in 2016. We have identified 134 of them so far.

A Matter Of Life & Death: Why Are Black Women In The U.S. More Likely To Die During Or After Childbirth?

Kim Kardashian's use of a surrogate points to America's crisis in maternal death

A painful puzzle

Is pregnancy in America much deadlier than in other rich countries?

## Why America's Black Mothers and Babies Are in a Life-or-Death Crisis

The answer to the disparity in death has everything to do with the lived experience of being a black woman in America.

NDA VILLAROSA APRIL 11, 2018

## Serena Williams and the realities of the 'maternal mortality crisis'

The data on how many new mothers die in the US are in shambles

Mortality rate for pregnant women is high. Here's why

Medicaid pregnancy program helps maternal mortality rates in NC

Why Are New Mothers Dying In The US More Than In Any Other Developed Country? A New Study Suggests It's Partly The Way We're Counting Them.

A new study confirms that the maternal mortality rate in Texas is alarmingly high. But part of the problem may be a broken system for counting how many women die of pregnancy and birth complications.

Maternal mortality is the shame of US health care

Oregon Tackles Rise in Maternal Deaths and Stark Racial Disparities

## KEEPING THE FOCUS ON NJ'S HIGH MATERNAL-MORTALITY RATES

LILO H. STANTON | JANUARY 22, 2018

State committee would study rising maternal mortality rate in Pennsylvania

Texas' Maternal Mortality Rate: Worst in Developed World, Shrugged off by Lawmakers

## NOBODY KNOWS HOW MANY WOMEN DIE IN CHILDBIRTH AND CONGRESS ISN'T DOING ANYTHING ABOUT IT

BY CARLOS BALLESTEROS ON 10/23/17 AT 10:47 PM

## Why Is U.S. Maternal Mortality So High?

The main reason is not medical errors. It's poverty and access to health care.

Many Women Come Close To Death In Childbirth

# Definitions

- WHO ICD-10:

- Maternal Death

The death of a women while pregnant within 42 days of termination of pregnancy irrespective of duration and site but not from accidental or incidental causes

- Late Maternal Death(1999)

# Pregnancy-Mortality Surveillance Systems in USA

- CDC/National Center Health Statistics
- CDC/Pregnancy Mortality Surveillance System
- Maternal Mortality Review Committees

# National Sources of Maternal Mortality Information

	CDC – National Center for Health Statistics (NCHS)
Data Source	Death certificates
Time Frame	During pregnancy – <u>42 days</u>
Source of Classification	ICD-10 codes
Terms	Maternal death
Measure	Maternal Mortality Rate - # of Maternal Deaths per 100,000 live births
Purpose	Show national trends and provide a basis for international comparison

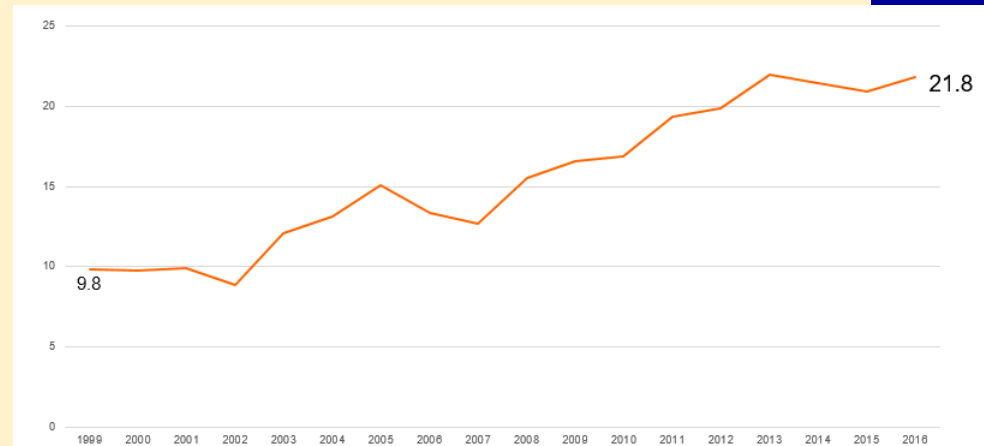
```

graph TD
    State["State:  
- Death Occurred  
- Death Certified  
- Death Registered"]
    NCHS["NCHS:  
- ICD-Code assigned  
- Sent back to state  
- Public dataset created"]
    State --> NCHS
    NCHS --> State
    
```

Adapted from: St Pierre A, et al. Challenges and Opportunities in Identifying, Reviewing, and Preventing Maternal Deaths. Obstet Gynecol. 2018.

# National Sources of Maternal Mortality Information

	CDC – National Center for Health Statistics (NCHS)
Data Source	Death certificates
Time Frame	During pregnancy – <u>42 days</u>
Source of Classification	ICD-10 codes
Terms	Maternal death
Measure	Maternal Mortality Rate - # of Maternal Deaths per 100,000 live births
Purpose	Show national trends and provide a basis for international comparison



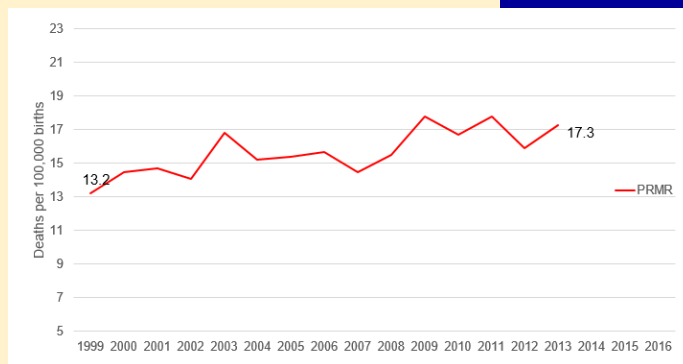
National Vital Statistics System (NVSS); CDC WONDER; Stolen from Callaghan.

Adapted from: St Pierre A, et al. Challenges and Opportunities in Identifying, Reviewing, and Preventing Maternal Deaths. *Obstet Gynecol.* 2018.



# National Sources of Maternal Mortality Information

	CDC – National Center for Health Statistics (NCHS)	CDC – Pregnancy Mortality Surveillance System (PMSS)
Data Source	Death certificates	Death certificates linked to fetal death and birth certificates
Time Frame	During pregnancy – <u>42 days</u>	During pregnancy – <u>365 days</u>
Source of Classification	ICD-10 codes	Medical epidemiologists (PMSS Codes)
Terms	Maternal death	Pregnancy associated, (Associated and) Pregnancy related, (Associated but) Not pregnancy related
Measure	Maternal Mortality Rate - # of Maternal Deaths per 100,000 live births	Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births
Purpose	Show national trends and provide a basis for international comparison	Analyze clinical factors associated with deaths; publish information that may lead to prevention strategies



Pregnancy Mortality Surveillance System (PMSS); CDC WONDER; Stolen from Callaghan.

Adapted from: St Pierre A, et al. Challenges and Opportunities in Identifying, Reviewing, and Preventing Maternal Deaths. Obstet Gynecol. 2018.

# Pregnancy-Associated Deaths

## Pregnancy-Related Death

The death of a woman during pregnancy or within one year 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

## Pregnancy-Associated but NOT Related Death

The death of a woman during pregnancy or within one year of pregnancy from a cause that is not related to pregnancy

**Unable to Determine**

# Maternal Mortality Review Committee

Data source

- Death certificate linked fetal death/birth certificate
- Medical records, social service

Time: preg-365 days

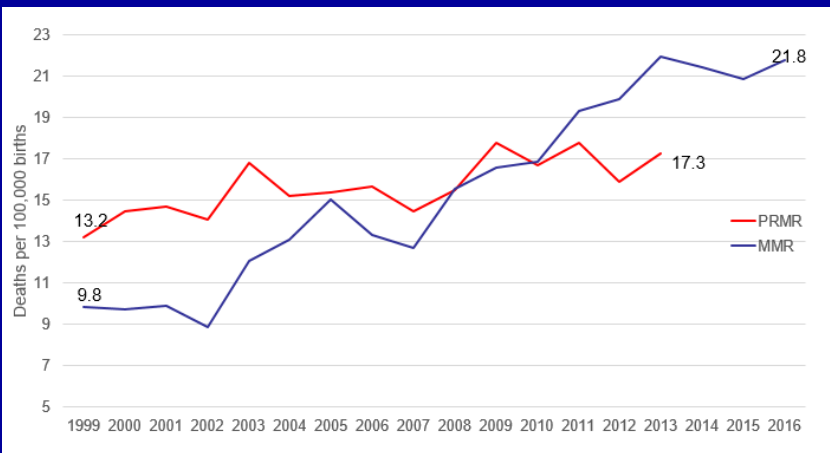
Term :Pregnancy associated/Pregnancy related

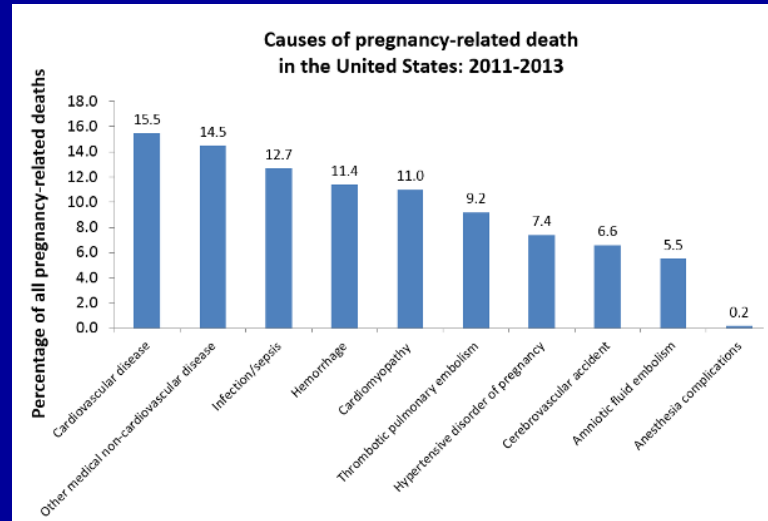
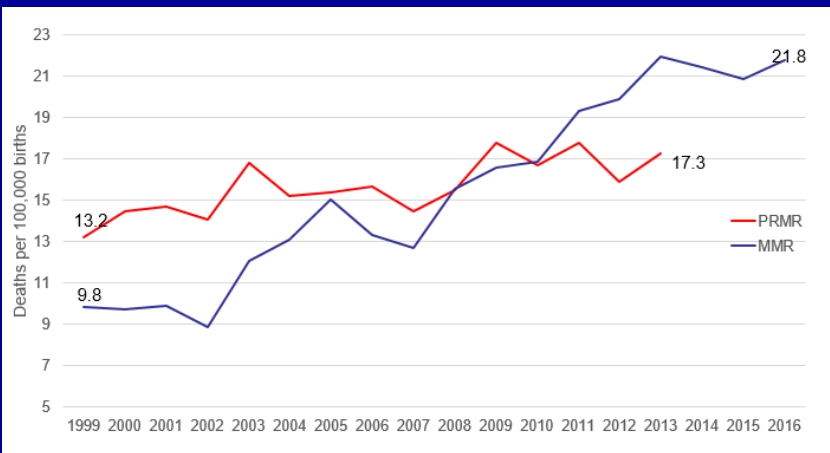
Measure:Deaths/100,000 live births

# (National) Sources of Maternal Mortality Information

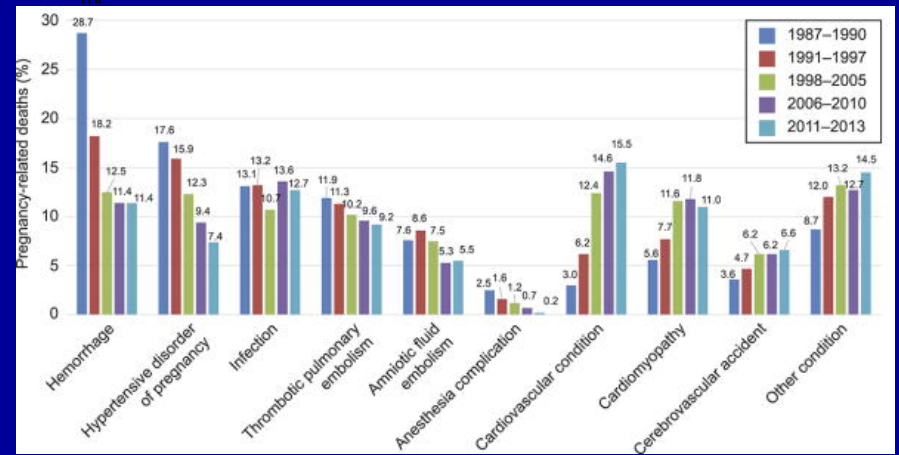
	CDC – National Center for Health Statistics (NCHS)	CDC – Pregnancy Mortality Surveillance System (PMSS)	Maternal Mortality Review Committees
Data Source	Death certificates	Death certificates linked to fetal death and birth certificates	Death certificates linked to fetal death and birth certificates,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

Adapted from: St Pierre A, et al. Challenges and Opportunities in Identifying, Reviewing, and Preventing Maternal Deaths. Obstet Gynecol. 2018.





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



Source: Creanga A, et al. Pregnancy-Related Mortality in the United States, 2011-2013. Obstet Gynecol 2017.

# US Standard Certificate of Death 2003 Revision

- If Female
  - not pregnant within past year
  - pregnant at time of death
  - not pregnant , but pregnant within 42 days of death
  - not pregnant but pregnant 43 days to 1 year before death
  - unknown if pregnant within the past year

# Maternal Deaths in The United States

- About 500-600 year.
- Approximately one-half of all maternal deaths considered preventable.



# MM Crisis In Georgia

- In 2010 Amnesty International “Deadly Delivery: The Maternal Health Care Crisis in the USA”
- GA 50<sup>th</sup> MM
- Maternal Mortality Ratio
  - 2001-2006 24.8 100,000/live births
  - 2010 23.2
  - 2011 28.7
  - 2012 19.2
- Amnesty International 2010

# Georgia Maternal Mortality Review Committee (MMRC)

- Results of a 3 year process collaboration
  - ✓ Georgia Department of Public Health
  - ✓ Georgia Obstetric and Gynecological Society
  - ✓ Centers for Disease Control and Prevention
  - ✓ Georgia General Assembly and Governor Nathan Deal

# Case Identification





Georgia

# Maternal Mortality

2012

*Case Review*



June 2015



# Maternal Mortality Review – Summary Findings 2012

[https://  
ource=st  
oundat](https://source=stfoundat)

- 86 maternal deaths in 2012; 26 (29%) were pregnancy-related and 60 (71%) pregnancy-associated
- 32% of pregnancy-related deaths occurred while pregnant or within one day of the end of pregnancy
- 52% of the pregnancy-related deaths occurred within the first 42 days after the pregnancy ended

# Maternal Mortality Review – Summary Findings 2013

- 79 maternal deaths in 2013 compared with 86 deaths in 2012, 32 were pregnancy-related and 47 pregnancy-associated
- 16 (50%) of the 32 pregnancy-related deaths were determined by the MMRC to be preventable
- 60% of the pregnancy-related deaths occurred within the first 42 days after the pregnancy ended
- 50% of the pregnancy-related deaths occurred among women 29 years of age or younger
- 69% of the pregnancy-related deaths had a pre-existing medical condition
- Of the 79 total maternal deaths 52% were Medicaid recipients and 18% had private insurance

# Causes of Pregnancy-Related Deaths

## 2012 (26)

- Hemorrhage (28%)
- Hypertension (16%)
- Cardiac (16%)
- Embolism (16%)
- Seizures (12%)
- Other (12%)

## 2013 (32)

- Cardiomyopathy (25%)
- Hemorrhage (16%)
- Embolism (16%)
- Cardiovascular and coronary conditions (6%)
- Infections (6%)
- Pregnancy-specific condition (6%)
- Anesthesia complications (6%)
- Mental health conditions (6%)
- Other (13%)

# Causes of Pregnancy-Associated Deaths

2012 (60)

- Motor vehicle accidents (15%)
- Homicide (15%)
- Suicide (15%)
- Heart disease (13%)
- Cancer (12%)
- Drug toxicity (12%)
- Other (18%)

2013 (47)

- Motor vehicle accidents (19%)
- Drug toxicity (15%)
- Homicide (13%)
- Respiratory conditions (11%)
- Non-peripartum or postpartum cardiomyopathy (6%)
- Other cardiovascular (6%)
- Suicide (6%)
- Cancer (4%)
- Diabetes (4%)
- Sepsis (4%)
- Other (12%)



# Georgia Maternal Mortality – Key Opportunities for Prevention

- After two full years of review, many opportunities for improvement were identified and fall into 2 major categories:
  - Education of providers, patients and community regarding potential or actual problems that most commonly lead to poor maternal outcomes/death
  - Early identification of risk factors associated with maternal mortality and appropriate follow up of these problems

# Additional Areas of Concern Associated with Poor Maternal Outcomes

- **Obesity**

- 58% of reviewed maternal deaths had documented BMIs of >30
- Co-existed with chronic medical conditions such as DM and cHTN and postpartum complications
- Appears to be inadequate monitoring of obese pregnant/postpartum patients
- Lack of referral to MFM or cardiologist for morbid obesity

# Additional Areas of Concern Associated with Poor Maternal Outcomes

- **Chronic medical conditions**
  - Women with chronic medical conditions often did not receive referrals to treat those chronic medical conditions during pregnancy or postpartum
  - Women with high risk or chronic conditions often did not receive preconceptual or early pregnancy counseling on their increased risks during pregnancy
- **Cardiomyopathies and cardiovascular conditions such as hypertension**

# Additional Areas of Concern Associated with Poor Maternal Outcomes

- **Drugs in pregnancy**
  - Inappropriate usage of prescription, nonprescription and illicit drugs during pregnancy and postpartum
  - Lack of prescription history being available to providers
  - Inappropriate mixing or adding of medications to those prescribed
  - Lack of documented screening for prescription and/or illegal substance abuse
- **Availability of high risk care**
  - Lack of transfer or referral to a higher level of care when indicated
  - Inability of incarcerated pregnant women to get the appropriate level of care
  - Lack of standardization for treatment and referral of high risk pregnancies

# Additional Areas of Concern Associated with Poor Maternal Outcomes

- **Hemorrhage**
  - Delayed recognition and treatment of hemorrhage in postpartum women by both patients and providers
- **Anxiety/depression**
  - Inadequate screening of pregnant and postpartum women for depression and other mental health issues
  - Possible lack of access to mental health services
  - Potential lack of awareness by patients or providers of benefits and safety of antidepressant therapy during pregnancy and postpartum period

# Recommendations from 2013 Case Review

- Medical Education Opportunities
- Community Education Opportunities
- Policy Recommendations

# Recommendations from 2013

## Case Review

- **Medical education opportunities**
  - Partner with GaPQC to implement AIM patient safety bundles related to CV disease and hemorrhage
  - Consider appropriate consults for high risk patients
  - Encourage interconceptual and postpartum f/u and care
  - Encourage depression screening during pregnancy/postpartum
  - Encourage taking/recording of complete medical history
  - Prescribe affordable medications
  - Encourage patients to take medications as directed

# Georgia Perinatal Quality Collaborative (GaPQC)

- Started in November 2012; Cathy Bonk (OB) and David Levine (Neo)
- Multidisciplinary – about 15 people initially; 35 now
- Goal is to identify and implement QI initiatives to improve Ga's maternal and neonatal outcomes
- Have looked at antenatal steroid use and LARC implementation for OB; CCHD screening, antibiotic stewardship, NAS mgt for Peds
- Large increase in last 3 years of states having PQC – California
- Ga received funding from CDC for project implementation
- Meets twice yearly; monthly phone calls
- Now has support of state, DPH and GOGS for implementation of AIM bundles



# Currently Available AIM Bundles

- Obstetric Hemorrhage
- Severe Hypertension in Pregnancy
- Maternal Venous Thromboembolism
- Obstetric Care for Women with Opioid Use Disorder
- Maternal Mental Health: Depression and Anxiety
- Postpartum Care Basics for Maternal Safety
- Prevention of Retained Vaginal Sponges after Birth
- Reduction of Peripartum Racial/Ethnic Disparities
- Safe Reduction of Primary Cesarean Birth
- Severe Maternal Morbidity Review
- Support after a Severe Maternal Event

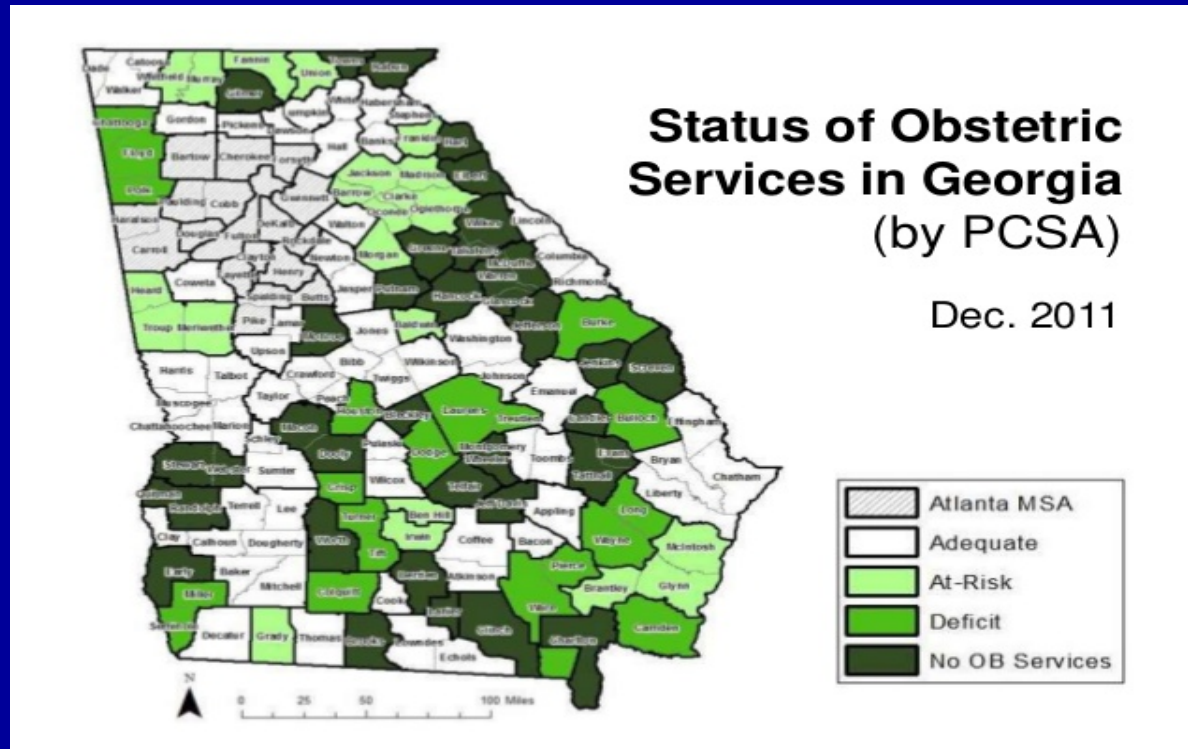
# Recommendations from 2013 Case Review

- **Community education opportunities**
  - Partner with community agencies to promote prenatal care and evidence-based programs such as centering pregnancy
  - Publicize importance of following provider recommendations to ensure a healthy pregnancy
  - Publicize healthy eating habits/maintenance of healthy weights
  - Support contraception education/LARCs
  - Publicize dangers of smoking during pregnancy
  - Promote Georgia's regional perinatal system for: 1) referral and treatment of high risk pregnancies and 2) coordination of patient safety initiatives

# Recommendations from 2013 Case Review

- **Policy recommendations**
  - Support legislation to preserve women's health care system including rural labor and delivery units so that all pregnant women will have access to care within a reasonable distance
  - Maintain and increase funding for Public Health Departments when possible
  - Work to extend insurance coverage into months after delivery to manage high risk comorbidities
  - Support implementation of designated maternal levels of care (HB 909)

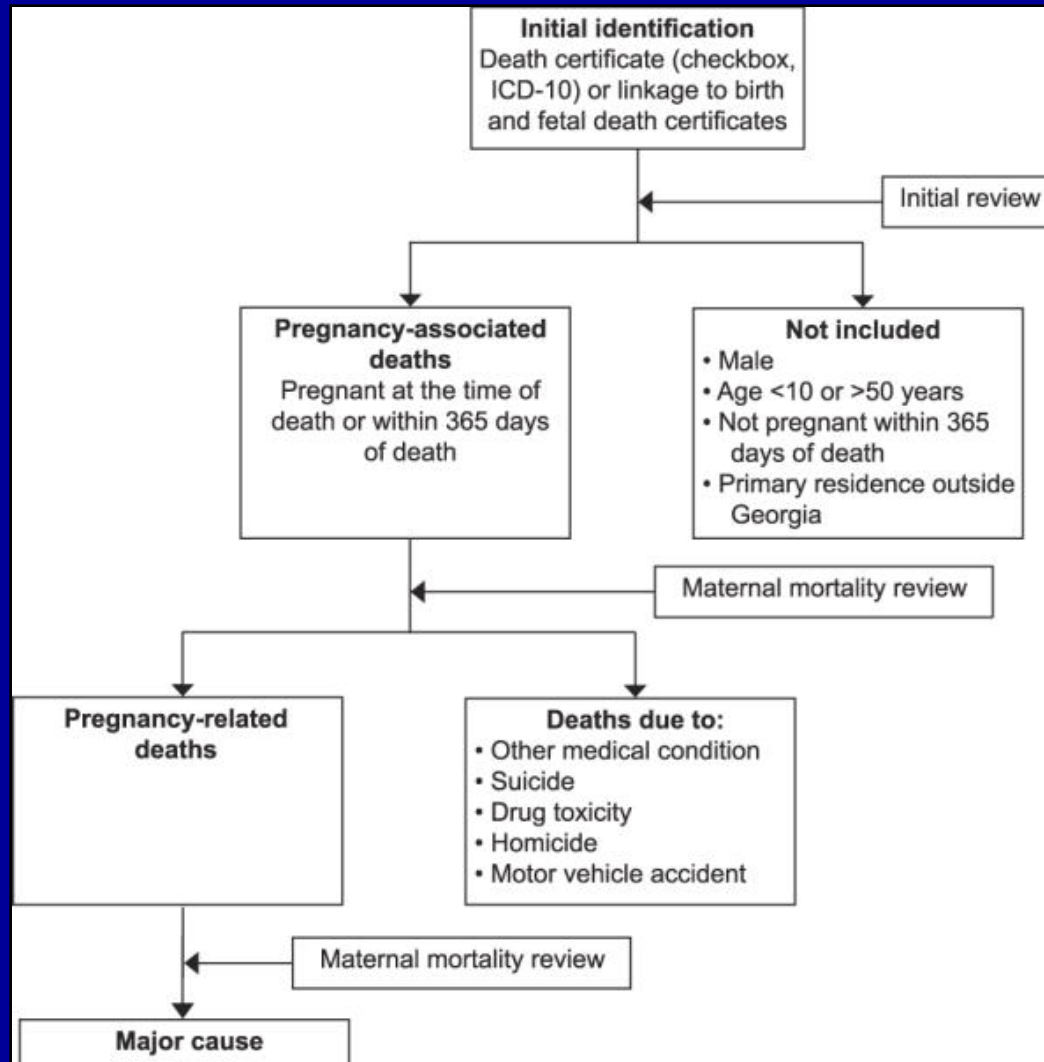
# Georgia's Obstetric Care Crisis (Zertuche)



# Maternal Mortality in Georgia 2010-2012

- ▶ Goals: Characterize pregnancy-associated deaths and examine the relationship between area of residence and pregnancy associated deaths and pregnancy-related mortality ratios in Georgia from 2010-2012

**Fig. 1. Description of the process to identify and classify pregnancy-associated deaths. ICD-10, International Statistical Classification of Diseases and Related Health Problems, 10th Revision.**



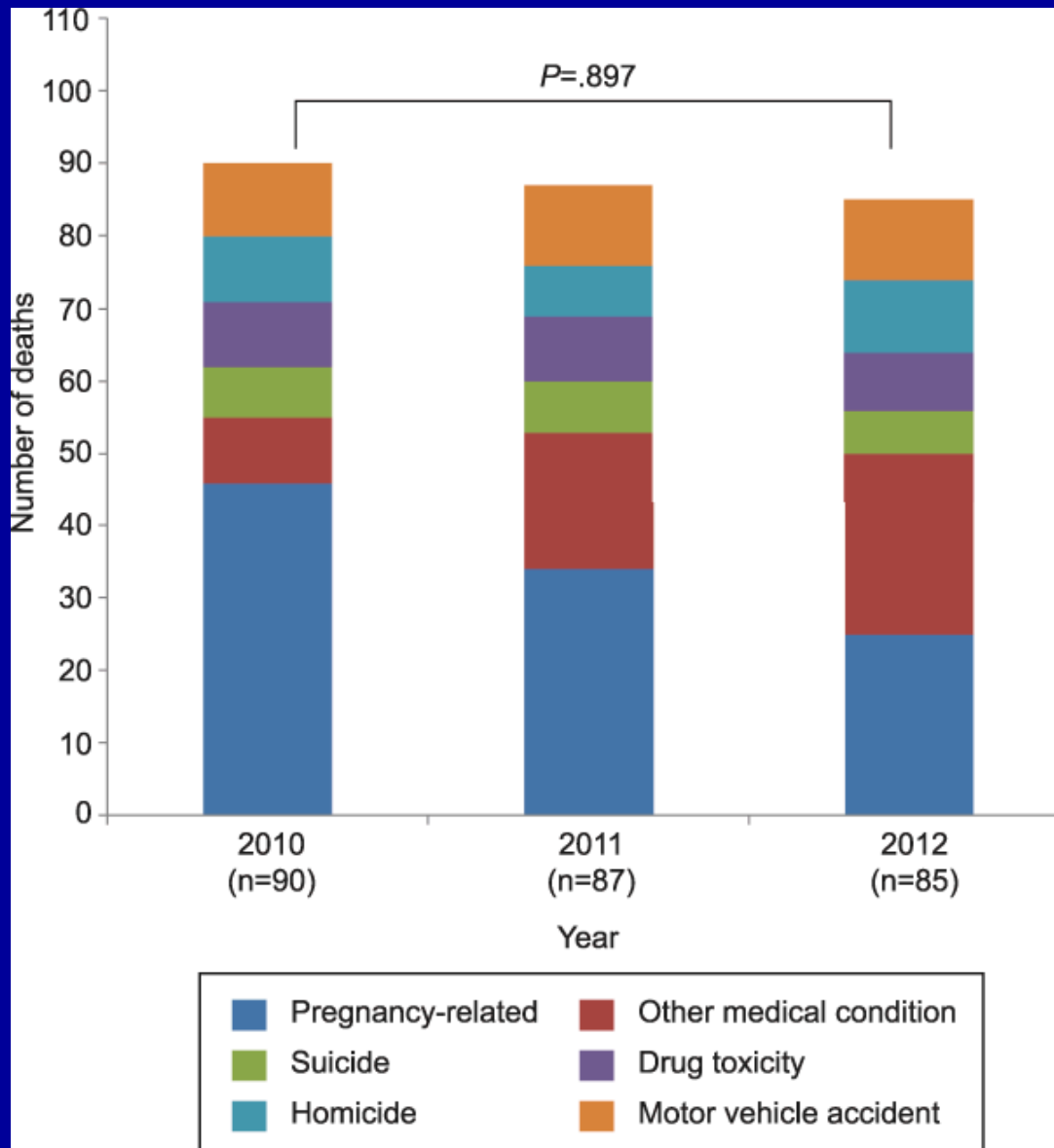


Fig. 2. Number and distribution of pregnancy-associated deaths in Georgia from 2010 to 2012.

# Maternal Mortality in Georgia 2010-2012

- ▶ During 3 year study period overall mortality ratio was
- ▶ 26.5(95% CI 21.9-32.1) per 100,000/live births
- ▶ 2010: 34.4(95%CI 25.8-45.9) per 100,000/births
- ▶ 2011 25.7(95% CI 18.4-35.9)
- ▶ 2012 19.2 (95% CI 13.0-28.4)
- ▶ P=0.55

OBSTETRICS GYNECOLOGY  
2016:128:113-20



# Maternal Mortality in Georgia Stratified by Geography 2010-2012

- ▶ Rural: 27.1(95% CI 16.9-43.3) per 100,000 births
- ▶ Nonrural: 24.4(95% CI 17.4-34.3)
- ▶ Metro ATL: 27.7(95% CI 21.3-36.1)
- ▶ P=.845

OBSTETRICS GYNECOLOGY  
2016:128;113-20.

# Maternal Mortality in Georgia Stratified by Race 2010-2012

- ▶ Black women 49.5(95% CI 38.9-63.1) per 100.000/live births
- ▶ White women 14.3(95% CI 9.9-20.7)
- ▶  $P < .001$

OBSTETRICS GYNECOLOGY 2016;128:113-20

# Maternal Mortality in Georgia Stratified by Race and Geography

Black women most likely to die

- ▶ Hypertensive disorders
- ▶ Hemorrhage
- ▶ VTE
- ▶ Cardiomyopathy

White women

- ▶ Suicide
- ▶ Homicide

OBSTETRIC GYNECOLOGY 2016;128;1113-20.

# Racial Disparity Maternal Mortality

- African –American to White ↑ 3.5-4 higher
  - Irrespective of education or income level
  - Ratio essentially unchanged for 50-60 years
- 
- CDC

# References

1. International Classification of Diseases, 10<sup>th</sup> Revision, Geneva, World Health Organization, 2004.
2. Berg CJ, Atrash HK, Koonin LM, Tucker M. Pregnancy-related mortality in the United States 1987-1990. *Obstet Gynecol* 1996;88:161-67.
3. MacKay AP, Rochat R, Smith JC, Berg CJ. The checkbox determining pregnancy status to improve maternal mortality surveillance. *AM J Prev Med* 2000;19(1):35.

4. King J. Maternal mortality in the USA. Taylor International Symposium “Maternal Mortality”, Washington DC, May 3, 2011
5. CDC WONDER <http://wonder.cdc.gov>
6. Main EK, Menard MK. Maternal mortality time for national action. *Obstet Gynecol* 2013;122(4):735-6.
7. Berg C, Callaghan W, et al. Pregnancy-related mortality in the US 1998-2005. *Obstet Gynecol* 2010;116:1302-1309.

8. Deadly delivery the maternal health care crisis in the USA. Amnesty International 2010 Available at [Http://w.w.wAmnestyusa.org/sites/default/files/pdfs/deadlydelivery.pdf](http://www.Amnestyusa.org/sites/default/files/pdfs/deadlydelivery.pdf). Retrieved December 7, 2015
9. Georgia Maternal Mortality 2012 Case Review. Available at [http://dph.Georgia.gov/Georgia/MMR2012 case review](http://dph.Georgia.gov/Georgia/MMR2012case-review).
10. Platner M, Loucks TL, Lindsay MK, Ellis JE. Pregnancy-Associated Deaths in rural, nonrural and metropolitan areas of Georgia. *Obstet Gynecol* 2016;128:113-20.

# References

11. Geller SE, Rosenberg D, Cox S, Brown M, Simonson L, Kilpatrick S. A scoring system identified near miss maternal morbidity during pregnancy. *J Clin Epidemiology* 2004;57:716-20.