Inter-Connection of Maternal Health/Mortality and Infant Health/Mortality

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Director, CDC Division of Reproductive Health
Secretary’s Advisory Committee on Infant Mortality
April 9, 2019
AGENDA

- CDC’s Impact Pyramid for Infant Mortality Prevention
- Maternal Mortality and Morbidity
- Infant Mortality
- Maternal Health Influence
- Policy Issues
- Summary
- Discussion
PUBLIC HEALTH IMPACT PYRAMID

Socio-economic Factors

Changing the Context
To make individual’s default decisions healthier

Long-lasting Protective interventions

Clinical Interventions

Counseling & Education

Smallest impact

Largest impact

Source: Frieden TR. A framework for public health impact: The health impact pyramid. AJPH 2009; Shared during 2013 SACIM Meeting
INFANT MORTALITY PREVENTION STRATEGIES
FROM 2013 SACIM MEETING

- Improving women’s health prior to conception
- Treatment of chronic conditions in pregnancy
- Long acting reversible contraception (birth spacing)
- Safe infant sleep, injury prevention
- New models of care (e.g. Centering)
- Improving quality of perinatal care (e.g. reducing non-indicated C-Sections)
- Perinatal regionalization
- Health insurance, employment

Source: April 2013 SACIM Meeting
IMPACT PYRAMID FOR INFANT MORTALITY PREVENTION

- **Safe sleep counseling, Smoking Cessation**

- **Gestational diabetes treatment, Vaginal progesterone**

- **No elective C/S policies, Long Acting Reversible Contraceptives**

- **Perinatal Regionalization, Tobacco Control Policies, Crib Recalls, State FP Waivers**

- **Health Insurance, Education, Housing, Employment, Earned Income Tax Credits**

Source: Frieden TR. A framework for public health impact: The health impact pyramid. AJPH 2009; Shared during 2013 SACIM Meeting
OPPORTUNITIES FOR COLLABORATION
FROM 2013 SACIM MEETING

- COIIN
- Maternal Mortality Initiative
- Surveillance of Preventive Services
- Tips from Former Smokers Campaign
- CDC’s National ART Surveillance System
Maternal Mortality
Focus On Infants During Childbirth Leaves U.S. Moms In Danger

May 12, 2017 - 5:00 AM ET
Heard on Morning Edition

NINA MARTIN, PROPUBLICA
RENEE MONTAGNE

The New York Times Magazine

Childbirth is killing black women in the US, and here's why

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

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

By LINDA VILLAROSA APRIL 11, 2018

Maternal mortality: An American crisis

COURTESY OF ELLE TRANTER
Each year in the U.S., about 700 women die as a result of pregnancy complications.

Black women are 3 – 4 times more likely to die of pregnancy-related causes than white women.

BLACK AND WHITE DISPARITIES IN PREGNANCY-RELATED MORTALITY PERSIST

Source: Pregnancy Mortality Surveillance System, 2006-2013
DESPITE TECHNOLOGY, MATERNAL MORTALITY IS NOT IMPROVING

Source: Centers for Disease Control and Prevention, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion
CAUSES OF PREGNANCY-RELATED DEATHS CHANGED BETWEEN 1987 AND 2013

Source: Pregnancy Mortality Surveillance System
PREGNANCY-RELATED DEATHS: DIVING DEEPER

Underlying Causes of Pregnancy-Related Deaths, by Race

<table>
<thead>
<tr>
<th>Cause</th>
<th>non-Hispanic Black</th>
<th>non-Hispanic White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage</td>
<td>8.1</td>
<td>10.5</td>
</tr>
<tr>
<td>Cardiovascular and Coronary Conditions</td>
<td>5.2</td>
<td>9.3</td>
</tr>
<tr>
<td>Infection</td>
<td>14.0</td>
<td>14.4</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>11.6</td>
<td>15.5</td>
</tr>
<tr>
<td>Embolism</td>
<td>11.3</td>
<td>13.4</td>
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<tr>
<td>Preeclampsia and Eclampsia</td>
<td>10.3</td>
<td>12.8</td>
</tr>
<tr>
<td>Mental Health Conditions</td>
<td>1.2</td>
<td>10.5</td>
</tr>
</tbody>
</table>

CONTRIBUTING FACTORS AMONG PREGNANCY-RELATED DEATHS

NON-CLINICAL FACTORS ALSO PLAY A ROLE IN PREGNANCY-RELATED DEATHS

- Few instances of community factors contributing to pregnancy-related deaths have been found by MMRCs.
- Evidence supports the role of social determinants for disparities in other related morbidity and mortality (e.g., pre-term birth, infant mortality).
- MMRCs have proposed a framework incorporating health equity into the reviews looking at community factors such as:
  - General health services environment
  - Reproductive health services environment
  - Behavioral health environment
  - Transportation environment
  - Social and economic environment

THE RATE OF SEVERE MATERNAL MORBIDITY IS INCREASING

Rate of severe maternal mortality per 100,000 delivery hospitalizations

Severe maternal morbidity (SMM) includes unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman’s health.

50,000 women were affected in the United States in 2014.

Sources: The National (Nationwide) Inpatient Sample (NIS)
Trends in Infant Mortality
INFANT MORTALITY RATES FOR THE 10 LEADING CAUSES OF DEATH IN 2016

1Statistically significant decrease in mortality rate from 2015 to 2016 (p < 0.05).
NOTES: A total of 23,161 deaths occurred in children under age 1 year in the United States in 2016, with an infant mortality rate of 587.0 infant deaths per 100,000 live births. The 10 leading causes of infant death in 2016 accounted for 67.5% of all infant deaths in the United States. A total of 23,455 infant deaths occurred in 2015, with an infant mortality rate of 589.5 infant deaths per 100,000 live births. Rankings for 2015 data are not shown. Causes of death are ranked according to number of deaths. Access data table for Figure 5 at: https://www.cdc.gov/nchs/data/databriefs/db293_table.pdf#5.
Birth defects are a leading cause of infant deaths, accounting for 20% of all infant deaths.

- **Critical congenital heart disease (CCHD)**
  - Represents about 25% of all congenital heart disease
  - CCHD poses a risk for serious complications, including death, shortly after birth
  - Newborn screening by pulse oximetry was added to the Recommended Uniform Screening Panel in 2011
  - CCHD screening nationwide could save an estimated 120 babies each year

• Preterm birth and low birth weight accounted for about 17% of infant deaths in 2015.

• Preterm birth rates decreased from 2007 to 2014, in part, to declines in the number of births to teens and young mothers.

• Preterm births rose for the second straight year in 2016.

• Contributors to pre-term birth include age, race, socioeconomic status and behavior.

Is the state of maternal health playing a role in why pre-term births are increasing?

PRE-TERM BIRTHS ON THE RISE

RACIAL DIFFERENCES IN PRE-TERM BIRTHS REMAIN

SIDS/SUID AND INFANT MORTALITY

• In 2016, there were 3,607 sudden unexpected infant deaths (SUID) in the United States.
• Many of these deaths are preventable with safe sleep practices.
• Social determinants of health (housing, education, etc.) may contribute to a larger percentage of deaths among some racial groups.
Rates of Sleep-Related Infant Deaths Dropped in 1990s BUT HAVE NOT DECLINED SINCE 2000

Source: June 2017 wonder.cdc.gov/cmf-icd10.html
RACIAL AND ETHNIC DISPARITIES EXIST IN SLEEP-RELATED INFANT DEATHS


<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Deaths per 100,000 Live Births</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian/Alaska Native</td>
<td>217</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>190</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>87</td>
</tr>
<tr>
<td>Hispanic</td>
<td>53</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>38</td>
</tr>
</tbody>
</table>
UNINTENTIONAL INJURIES ARE ANOTHER CAUSE OF INFANT MORTALITY

Source: CDC Childhood Injury Report: Patterns of Unintentional Injuries Among 0-19 Year Olds in the United States, 2000-2006, Figure 13: Injury Deaths Among Children Less Than 1 Year
Maternal Morbidity and Mortality Influence on Infant Health and Mortality
MATERNAL HEALTH IS A KEY DRIVER OF INFANT HEALTH

Maternal conditions, behaviors and environments contribute to infant health and mortality, including pre-term births.

• Hypertensive disorder / cardiovascular disease
• Diabetes
• Obesity
• Tobacco
• Substance Use
• Poor Nutrition
• Environment/Social Determinants of Health

Policy Issues Impacting Maternal and Infant Health
WHAT POLICY ISSUES CAN BE ADDRESSED TO IMPROVE MATERNAL AND INFANT HEALTH?

- Racial/ethnic disparities
- Pre-conception health
- Women’s healthcare
- Post-partum health
- More research needed on factors that drive adverse maternal health and infant outcomes
  - Social
  - Biologic
  - Environmental
  - Policy
SUMMARY

Given the clear connection maternal morbidity and mortality has on infant health, SACIM has an opportunity to address maternal health to prevent infant mortality.

Consider the large roles of pre-term birth and safe sleep, which are responsible for a large proportion of deaths. The Committee can also focus on maternal health factors and delve more deeply into other causes such as injury, SID/SUID, and the influence of social determinants of health on maternal and infant health.
CONCLUSION

Don't throw the baby out with the bathwater!
DISCUSSION

What are the opportunities to improve infant and maternal health in terms of:

• Research
• Surveillance
• Clinical care
• Service delivery
• Health equity
• Insurance coverage
• Financial support
• Work place & wages
THANK YOU