

Racial and Ethnic Disparities in Maternal Morbidity and Mortality

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Maternal mortality or pregnancy-related mortality provides one of the starkest examples of women's health disparities. In the United States, black women are three to four times more likely to die due to pregnancy-related complications than are white women.¹ The five main causes of pregnancy-related mortality are venous thromboembolism, hemorrhage, preeclampsia, infection, and cardiomyopathy.² Black women are more likely to die from each of these top causes of maternal death than their white counterparts.^{2,3} Moreover, pregnant black women when compared with their white counterparts are more likely to have preventable deaths (44% compared with 30%).^{1,4}

Health equity refers to circumstances in which every person has the opportunity to "attain his or her full health potential" and no one is "disadvantaged from achieving this potential because of social position or other socially determined circumstances."⁵ Health disparities have been defined by the Centers for Disease Control and Prevention as "preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations."⁶

Understanding racial and ethnic variation in maternal

health indicators and recognizing contributors to inequity are important first steps toward achieving health equity and eliminating health disparities.

For the first time in U.S. history, the pregnancy-related mortality ratio is increasing. The ratio increased from 9.1 per 100,000 in 1987–1990 to 11.5 per 100,000 in 1991–1997, sparking widespread concern. The most recent estimates indicate that the maternal mortality ratio continues to increase, with an overall ratio of 16 per 100,000 live births in 2006–2010.⁷ The increase in pregnancy-related mortality in the United States is believed to be in part due to enhanced documentation and a change in case definition capturing more true cases of pregnancy-related mortality.⁸ Even after accounting for improved data collection, there appears to be an actual increase in pregnancy-related morbidity. Factors thought to contribute to this rise include health disparities, increasing rates of obesity, delayed childbearing, increased cesarean delivery rates, emerging infections (such as influenza H1N1), and untreated underlying medical conditions.⁹

Review of each maternal death as a sentinel event has provided abundant opportunity for improving obstetric health systems. Reviewing severe maternal morbidity, which occurs much more frequently than pregnancy-related mortality, has the potential to be even more informative. To simplify the identification of severe maternal morbidity, Callaghan and colleagues proposed to define it using 1 of 25 specific International Classification of Diseases, 9th Revision, Clinical Modification diagnosis and procedure codes that capture potentially life-threatening illness and indicators of organ-system failure that likely represent severe events¹⁰ (Box 1). In 2008–2009, the occurrence of severe maternal morbidity was 129 per 10,000 and represented a 75% increase over the estimates in 1998–1999.¹⁰ This ratio continues to increase.¹¹ Non-Hispanic blacks are twice as likely to experience severe maternal morbidities than their white counterparts, and rates of 22 of the 25 indicators of severe maternal morbidity, including eclampsia, heart failure, and need for ventilation, are higher among blacks.¹²

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Box 1. Indicators of Severe Maternal Morbidity

1. Acute myocardial infarction
2. Acute renal failure
3. Adult respiratory distress syndrome
4. Amniotic fluid embolism
5. Aneurysm
6. Cardiac arrest or ventricular fibrillation
7. Disseminated intravascular coagulation
8. Eclampsia
9. Heart failure during procedure or surgery
10. Internal injuries of thorax, abdomen, and pelvis
11. Intracranial injuries
12. Puerperal cerebrovascular disorders
13. Pulmonary edema
14. Severe anesthesia complications
15. Sepsis
16. Shock
17. Sickle cell anemia with crisis
18. Thrombotic embolism
19. Blood transfusion
20. Cardio monitoring
21. Conversion of cardiac rhythm
22. Hysterectomy
23. Operations on heart and pericardium
24. Temporary tracheostomy
25. Ventilation

Most of the data on maternal-mortality disparities focus on non-Hispanic blacks, but the Native American–Alaskan population also have higher maternal-mortality ratios than do non-Hispanic white women. According to the 2005–2007 data, maternal mortality ratios continued to be highest for black women but were second highest for the Native American–Alaskan population. The ratios were 34, 16.9, 11.0, 10.4, and 9.6 per 100,000 for the non-Hispanic black, Native American–Alaskan, Asian–Pacific Islander, non-Hispanic white, and Hispanic populations, respectively.¹³ Further state levels analyses indicated that states with a poverty rate exceeding 18% and immigrant populations exceeding 15% had 77% and 33% increased risk of maternal mortality, respectively, compared with states with lower rates of poverty and immigration.¹³

Preconception health of the mother is an important contributor to maternal health disparities. Comorbid conditions, which increase the risk of severe maternal morbidity, such as hypertensive disease, asthma, and uterine leiomyomas, are more prevalent among black women.¹⁴ Obesity also is more prevalent in black women (39.6% compared with 21.8% in white women) and exacerbates many morbidities as well as the antecedents of mortality.^{2,15} In addition, black women are more likely to have an unintended pregnancy, present late to prenatal care, and lack

insurance coverage.¹⁶ This triad contributes to pregnant black women presenting with more advanced disease and having a higher likelihood of inadequate response to therapy.¹⁷ Among high-risk pregnancies, black women are 9.9 times more likely to die than white women with the same complications.³

Determinants of health include factors that contribute to a population's physical, social, and mental well-being. There are five recognized categories of determinants of health: social environment, biology and genetics, physical environment, individual behavior, and health service.¹⁸ Among these determinants, blacks when compared with non-blacks are disproportionately disadvantaged. The presence of poverty, low education, unemployment, and homelessness all have been described as factors associated with worse health outcomes. Blacks when compared with non-blacks are more likely to have not completed high school (21% compared with 10.5%), have inadequate housing (9.4% compared with 4.6%), and live below the poverty line (24% compared with 10%).¹⁹

Conversely, a supportive social environment can be beneficial to health. The "Hispanic Paradox" describes the finding that Hispanic life expectancy rates exceed those of non-Hispanic whites despite a generally disadvantaged socioeconomic situation.²⁰ In addition, Hispanic mortality rates are significantly lower than rates for blacks with whom many similar socioeconomic conditions are shared. Although studied in pregnancy only in a limited fashion, there is some indication that the Hispanic Paradox can translate into lower rates of maternal–neonatal morbidity and mortality when compared with blacks.^{21,22} The proposed protective effects include a strong family structure, healthy migrant bias, and lower rates of poor health behaviors such as smoking.²⁰

Environment plays a strong role in health outcomes, and blacks are more likely to reside in physical settings with high crime and to have more frequent exposure to environmental toxicants.¹⁹ These factors have been associated with poor health status. Within these physical environments, availability of quality care also may be limited. Given that 40% of maternal deaths are preventable, hospital quality may factor into disparities in outcome.¹ Further, institutional and health care provider biases or racism may lead to missed opportunities for early intervention to decrease morbidity.²³ Blacks are disproportionately affected by barriers to access for contraception and family planning, thereby limiting the ability to prevent unintended pregnancy and ensure safe spacing of pregnancy.²⁴ A short interpregnancy interval (time from delivery of a live birth to the next pregnancy) of



less than 6 months is associated with a 2.5 times greater risk of maternal death.^{25,26} Although recently there has been an overall decrease in the unintended pregnancy rate, black women continue to have much higher rates of unintended pregnancy than their white counterparts (45% compared with 22%).²⁶ Women with unintended pregnancies are less likely to initiate timely prenatal care, and women with high-risk pregnancies who have no prenatal care are five times more likely to die.^{3,27}

Although these determinants affect outcomes, there is substantial appreciation that another model that explains disparities between black and white women is the life-course model.^{28,29} The life-course perspective incorporates the concept that early life exposures to stress influence future reproductive health and that chronic accommodation of stress results in wear and tear, or allostatic load. The concept of allostasis refers to the body's ability to regulate internal physiology in response to physical and psychosocial stressors. Adverse environments can act as acute or chronic stressors that exert physiologic effects that may mediate reproductive outcomes.³⁰ High stress levels affect neuroendocrine pathways, resulting in hypertension and insulin resistance. Over the life course, continued exposure to stress creates a weathering effect on organs, and individuals who have had chronic stress may enter pregnancy with a heightened susceptibility to disease and a diminished ability to recover.³¹ We present the intersecting components of disparities in Figure 1.

Healthy People 2020 has an overarching goal of reducing health disparities and health inequity for all groups and has set a goal of a 10% reduction in pregnancy-related mortality (from 12.7 maternal deaths/100,000 live births in 2007 to 11.4 deaths/100,000 by 2020).³² Medical interventions that may curb health disparities include increased access to interconception care, preconception care, quality prenatal care, and health care throughout the life course.³³ More research on the specific contributions of risk factors that elucidates possible interventions is needed. A number of organizations, including the American College of Obstetricians and Gynecologists (the College), the Society for Maternal-Fetal Medicine, and the Institute of Medicine have recognized the contribution of health disparities to the overall trend of increasing pregnancy-related mortality and morbidity and have called for interventions to improve this disparity.³⁴ Given the complexity of the causes for these health disparities, both targeted interventions aimed at black women and interventions to improve obstetric care for all women are warranted.

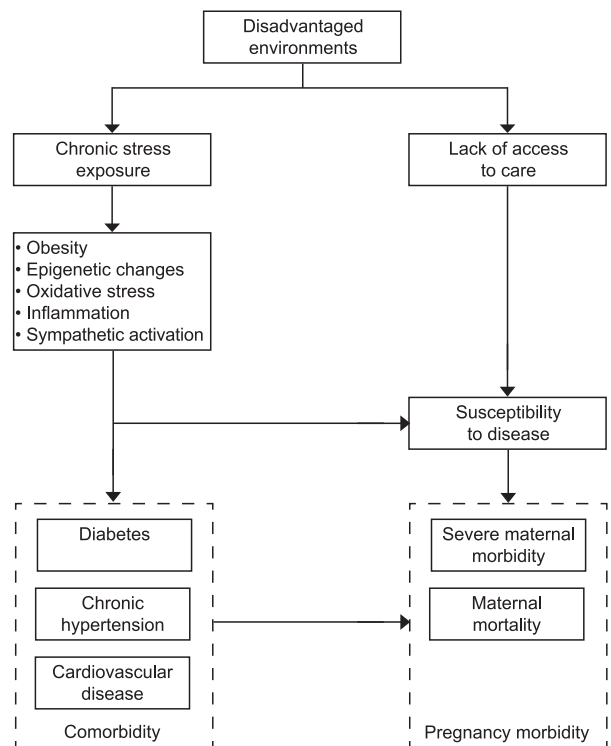


Fig. 1. The intersecting components of health disparities. *Louis. Disparities in Maternal Morbidity and Mortality. Obstet Gynecol 2015.*

Access to insurance through the provisions of the Affordable Care Act (ACA) may narrow the gap in health disparities, because there is ample evidence that those who are uninsured have worse health outcomes. The ACA has allowed millions of Americans access to health insurance through a combination of Medicaid expansions and Exchanges, resulting in an approximately 25% reduction in the number of uninsured Americans.³⁵ As a result of insurance expansions, women will be able to be monitored beyond the postpartum visit, and preconception health planning now may be newly possible for the millions of women who used to lose coverage 60 days postpartum before the ACA. Women with pregnancy-related complications, such as gestational diabetes, preeclampsia, fetal growth restriction, and preterm birth, are more likely to develop metabolic and cardiovascular disease. These women will have an opportunity for early detection of chronic disease and preventive health care to optimize health before the subsequent pregnancy. Coverage for contraception without copayment may allow for optimal birth spacing of 18 months or greater, which has been shown to mitigate mortality and severe morbidity for both mother and child.^{30,36} Although there is great potential for better care with



greater access to insurance, the results of the ACA on maternal and infant health are as yet too early to judge. Additionally, the ACA excludes undocumented immigrants, who are less likely to access prenatal care owing to lack of financial resources in addition to language barriers.³⁷

Further improvements in maternal morbidity and mortality can be made with initiatives to reduce cesarean delivery rates, particularly the first cesarean delivery.^{38,39} Causes of pregnancy-related mortality such as venous thromboembolism, hemorrhage, and infection are exacerbated or precipitated by cesarean delivery.⁴⁰ National efforts to prevent primary cesarean deliveries include more realistic definitions of active labor and development of algorithms for the diagnosis and management of labor arrest.³⁸ There also has been an increased focus on optimal pregnancy spacing.²⁷

Statewide quality collaboratives have the power to educate health care providers and promote change.⁴¹ Collaboratives have focused on disparities and stratifying deaths by race-ethnicity as a way to better understand health-system contributions to outcomes.⁴² The National Partnership for Maternal Safety is a joint effort between the College, the Centers for Disease Control and Prevention, the Society for Maternal-Fetal Medicine, the Health Resources and Services Administration, and the Association of Women's Health Obstetric and Neonatal Nurses among other partners. This partnership has developed a safety plan to decrease preventable maternal morbidity and mortality.^{5,43} The World Health Organization's Safe Childbirth Checklist contains reminders of safe practices to be used at four critical junctures in care during birth. The pilot implementation demonstrated a 150% increase in adherence to the safe practices, with 25 of 29 of them being implemented successfully at each delivery.⁴⁴ The College also has developed the "Making Obstetrics and Maternity Safer" (MOMS) campaign. This campaign calls for federal funding for research on evidence-based maternal health practices and research to decrease disparities.

The solutions for decreasing maternal health disparities are complex. The authors believe that there must be a focus on all boats rising with the tide as well as specific interventions that target the modifiable determinants of health disparities in black women. Although there is an increased focus on maternal health and prevention of pregnancy-related mortality, global interventions not aimed at the specific challenges that black women face in achieving equal outcomes may not achieve health equity and may not decrease maternal health disparities in the United States. More research is needed on the modifi-

able contributors to disparities, including interventions for stress, obesity, and leiomyomas, as well as the structural drivers of inequity and obstacles to equitable health care.⁴⁵ Although some of the interventions may be targeted toward individuals, health care provider-level and hospital-level factors also must be a focus in the effort to decrease preventable deaths.

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