Addressing Maternal Deaths in North Carolina: Striving to Reach Zero

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Maternal mortality in North Carolina remains a challenge to families, health systems, and communities. The Maternal Mortality Review Committee is part of the process required to prevent these events. In this commentary, we present an abbreviated description of the 2014-2015 Maternal Mortality Review Committee report, set for publication in December, 2019.

Globally, the United States is the only industrialized nation to experience an increase in maternal mortality over the last 2 decades [1]. The US maternal mortality ratio is highest among the wealthiest nations in the world. In the United States, Black mothers are 3 to 4 times more likely to die in childbirth than White mothers [2, 3]. This reality is a longstanding and unacceptable statistic in perinatal health. These statistics also reflect the fact that maternal deaths result from environments and events extending beyond the health care setting. A woman's risk for death is impacted by her environment and ability to access care, as well as the actions (or inactions) preceding, during, and following delivery.

The North Carolina Department of Health and Human Services (NC DHHS), in collaboration with the state's Maternal Mortality Review Committee (MMRC), released its first report in December 2019 (unpublished as of this publication). As this report demonstrates, North Carolina continues to make strides in the reduction of maternal mortality, however, the Black-White disparity in these deaths remains, with Black women nearly 2 times more likely to die than White women (2014-2015 MMWR report, unpublished data, 2019).

In 2017, an online news outlet, Vox, published a graph of maternal deaths per year using data from the North Carolina State Center for Health Statistics website and reported that North Carolina eradicated this racial disparity [4]. These advances were attributed to our pregnancy care management program. This program is recognized for addressing social determinants of health and ameliorating barriers for Black women. With the MMRC report we, unfortunately, correct the perception that North Carolina, unlike any other state in the United States, has achieved racial equity in maternal mortality. The Vox publication highlights the pitfalls and interpretative error associated with small numbers; in the year highlighted, deaths for White women increased. When aggregate data are examined, the disparity in maternal deaths for Black women compared to White women persists. In North Carolina, many maternal deaths underscore the importance of programs like care management services and "fourth trimester" efforts to continue the trajectory of maternal death reduction and the elimination of the Black-White disparity in maternal mortality.

North Carolina's Maternal Mortality Review Committee

North Carolina has a long-standing history of reviewing its maternal deaths that dates back to 1945. In 1988, the Division of Public Health's (DPH) State Center for Health Statistics introduced an enhanced population-based system for identifying pregnancy-related deaths within the state. Dr. Margaret "Maggie" Harper, obstetrician gynecologist and maternal fetal medicine specialist, worked closely with DPH to request records to individually review each death. These efforts allowed North Carolina to have a fuller understanding of issues contributing to maternal deaths in the state.

In 2013, North Carolina enhanced its review of maternal deaths through the Association of Maternal and Child Health Programs (AMCHP) Every Mother Initiative, which was funded as part of Merck for Mothers. This effort was key to helping North Carolina establish a broader partnership committed to addressing maternal mortality and formed the basis for North Carolina's participation in the Centers for Disease Control and Prevention (CDC) national report [5].

In 2014, Dr. Harper presented to the North Carolina Child Fatality Task Force on the implications of maternal mortality in our state. She shared the current process for reviewing maternal deaths and the challenges it presented. The request was made of the Child Fatality Task Force to support legislation that allowed the development of a MMRC. With the support of the Task Force and key leadership from the North Carolina Medical Society and others, North Carolina's

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MMRC was formalized by the General Assembly, effective December 1, 2015. This legislation established a multidisciplinary committee appointed by the secretary of NC DHHS. The committee is charged with reviewing maternal deaths, making recommendations for prevention, and dissemination of findings. The proceedings of the MMRC are confidential and protected from discovery. The law requires licensed health care providers, facilities, and others to share medical records and other necessary information with NC DHHS, which it then shares with the committee.

At the federal level, the 2018 Preventing Maternal Deaths Act supports the formation of MMRCs in states. In 2019, CDC funded NC DHHS through the ERASE MM (Enhancing Reviews and Surveillance to Eliminate Maternal Mortality) Program, which allows the state to further expand its MMRC and examine all maternal deaths, not only those resulting from obstetric causes. The focus on non-obstetric causes of maternal death includes trauma related to homicide, suicide, and motor vehicle accidents. It also requires the MMRC to engage in a broader examination and understanding of social determinants of health including access to care, transportation, and other issues. Support for staffing will enable the

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MMRC to provide more timely information and allow for more actionable recommendations. This funding also supports training on social determinants of health and implicit bias for the North Carolina MMRC and the abstraction team.

North Carolina Maternal Mortality Review Committee Process

The review process involves meticulously gathering records and examining information. North Carolina uses the following CDC definitions for maternal mortality:

Pregnancy-associated death: the death of a woman while pregnant or within 1 year of the termination of pregnancy, regardless of the cause. These deaths make up the universe of maternal mortality; within that universe are pregnancy-related deaths as well as pregnancy-associated, but not related, deaths [6].

Pregnancy-associated, but not related death: the death of a woman during pregnancy or within 1 year of the end of pregnancy, from a cause that is not related to pregnancy (eg, a pregnant woman dies in an earthquake) [6].

Murphy sidebar

Pregnancy-related death: the death of a woman during pregnancy or within 1 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 [6].

Maternal mortality ratio: number of maternal deaths per 100,000 live births. This is the most common index used to describe maternal mortality both nationally and globally. This ratio represents the risk of maternal death for each pregnancy a woman undergoes.

Maternal Death Identification

In North Carolina, maternal deaths are identified through multiple data sources including vital statistics linkages, literal cause(s) of death recorded on death certificates, diagnoses recorded on hospital discharge and emergency

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department data, and pregnancy checkbox information on the death certificate. Only records where death occurred within 365 days of delivery, fetal death, or pregnancy are included in the MMRC cases files.

Cases Selected for Abstraction

The MMRC case abstractors conduct a thorough review of cases identified to verify pregnancy within a year of death. This process is followed by the MMRC chair, coordinator, and abstraction team meeting to categorize the deaths by timing and cause prior to submitting them to the MMRC subcommittee. The abstraction team collects all available information by contacting health care providers, facilities, and others who may have information related to services provided.

Maternal Death Review

North Carolina's MMRC held its first meeting in 2016, examining maternal deaths beginning with year 2014. In

2019, the MMRC developed subcommittees on 4 topics to strengthen the review process. The topics include: deaths occurring 42 days or less from delivery; substance use; trauma (ie, suicide, homicide, motor vehicle, etc.); and deaths occurring 43 days or more from delivery.

The subcommittee process provides an opportunity for an in-depth review of all pertinent information related to the woman's history and circumstances of her death prior to review by the full MMRC. If the subcommittee feels additional information is needed prior to review by the full MMRC, the abstraction team will request additional records and documents.

Maternal Deaths in the State of North Carolina, 2014-2015

The MMRC reviews maternal death cases to assess whether the death was pregnancy-related or not (see Figure 1). Based on committee determination, the majority of the 136 maternal deaths occurring between 2014 and 2015 were pregnancy-associated, but not related (73%) (2014-2015 MMRC report, unpublished data, 2019). Approximately one-quarter of deaths were classified as pregnancy-related (N = 35) and in one case the MMRC was unable to determine pregnancy-relatedness. The MMRC also determined that nearly two-thirds (63%) were preventable. Of these, 41% were classified as having a good chance to avert the outcome "by one or more changes to patient, family, provider, facility, system and/or community factors" (2014-2015 MMRC report, unpublished data, 2019).

Figure 2 presents 4-year aggregate pregnancy-related death ratios from 2000 to 2015 for non-Hispanic White mothers compared with non-Hispanic Black mothers. Relative risks represent the disparity in mortality rates between the 2 groups. Non-Hispanic White women have significantly lower pregnancy-related mortality rates than non-Hispanic Black women throughout the time period. Mortality rates for non-Hispanic Black mothers declined steadily during this time period, as did relative risks. However, rates for non-Hispanic Black mothers continue to be 1.6 times greater than rates for non-Hispanic Whites.

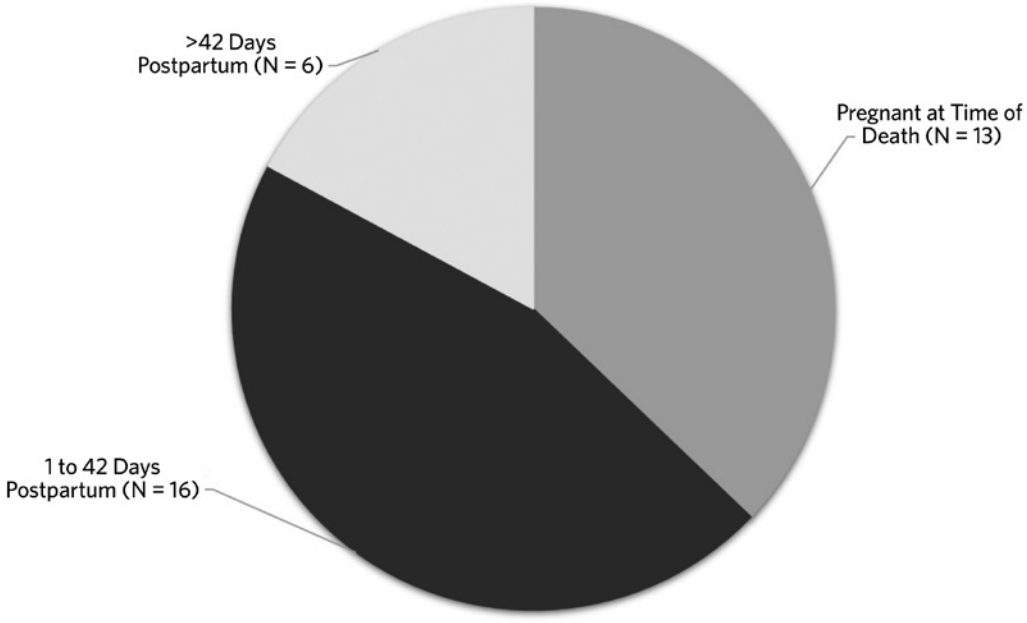
MMRC Recommendations Based on the 2014-2015 Maternal Death Reviews

The MMRC recommendations are framed and grouped under specific headings: patient-family, community-public health, provider, facility, and systems of care.

Patient-family. Women need better understanding of the importance of preconception health and the impact of chronic conditions, such as obesity and poorly controlled hypertension on pregnancy risk. Women and their families need better education about the signs and symptoms of postpartum depression and where/when to seek help.

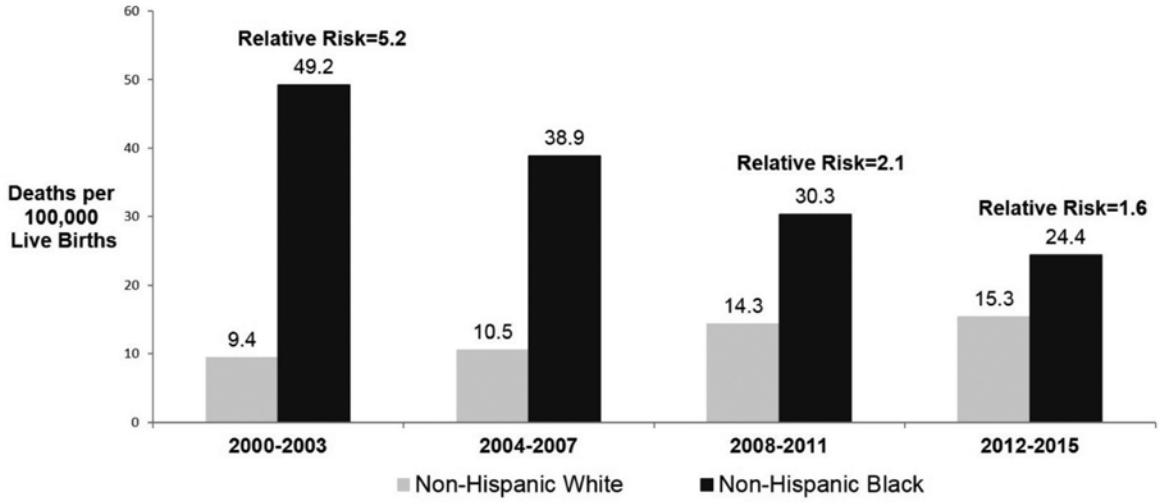
Community-public health. There is a need for improved access to preconception, postpartum, and maternal care; to improve care management/care coordination between providers and organizations; and to expand substance use resources and support for maternal mental health and interpersonal violence.

FIGURE 1.
Pregnancy-Related Deaths by Timing of Maternal Death for North Carolina Residents, 2014-2015



Source. NC DHHS/Division of Public Health/Women's & Children's Health Section based on Maternal Mortality Review Committee (MMRC) Decisions, August 2019.

FIGURE 2.
Comparison of Pregnancy-Related Deaths for Non-Hispanic Black and Non-Hispanic White North Carolina Residents, 2000-2015



Source. NC DHHS/Division of Public Health/Women's & Children's Health Section based on Maternal Mortality Review Committee (MMRC) Decisions, August 2019.

Provider. Providers need education about prevention, identification, and treatment of life-threatening maternal conditions, such as severe preeclampsia; emergency department providers often serve as the initial contact for pregnant and postpartum women and should be part of provider education. Improvements in coordination of care, communication, and handoffs between providers; better identification and treatment of severe hypertension in the postpartum period; and more provider education to avoid discontinuation of prescribed medications for chronic conditions due to pregnancy are recommended.

Facility. Ensure protocols are in place for sepsis, infection control, management of hyperemesis, discharge instructions/follow-up after pregnancy loss/miscarriage, postpartum hemorrhage, trauma, screening for interpersonal violence, and use of telemedicine in emergency situations. Hospitals should adopt national protocols similar to the Alliance for Innovation on Maternal Health (AIM) safety bundles/guidelines focused on best practices for maternal care.

Systems of care. Improve health care access to allow for preconception, maternal, and postpartum care (eg, ensure health care coverage for at least 1 year postpartum); establish stronger laws to protect victims of interpersonal violence; establish guidelines for transfers or referrals to high-risk care, which should include a process for risk stratification to ensure the most appropriate referral; ensure women can receive care at the appropriate level hospital; ensure all pregnant women have a mental health risk screening.

The MMRC identified several social determinants of health that either directly or indirectly contributed to maternal death. Many women either did not seek care or were unable to seek care due to health insurance barriers. Medicaid expansion was identified as a potential system gap that could have prevented these maternal deaths by removing a woman's obstacle to ongoing or follow-up care. Expansion of Medicaid has been identified as one mechanism for North Carolina to increase access to care for individuals who currently have little or no access to obstetric care [7]. Many women who died in the postpartum period or who entered pregnancy with unmanaged health issues following a prior pregnancy may have benefitted from expanded access to health care and necessary health interventions during the interconception period.

The provider knowledge gap about the signs and symptoms of postpartum obstetric emergencies, such as severe preeclampsia is one of several focus areas for the national Alliance for Innovation on Maternal Health (AIM). AIM is a national collaboration focused on improving maternal morbidity and mortality. The Perinatal Quality Collaborative of North Carolina (PQCNC) leads the AIM work in our state in an effort to promote the use of standard guidelines, or "bundles," directed at the management of life-threatening obstetric conditions.

One of the bundles rarely highlighted is the Health Disparities Reduction bundle. This bundle addresses steps individuals, providers, and systems can adopt to reduce ethnic and racial disparities in maternal mortality [8]. This bundle attempts to reduce the individual risks for any woman who encounters a health care provider or system.

As North Carolina continues to address maternal mortality, efforts such as those mentioned in the MMRC recommendations will be critical as we strive to reach zero maternal deaths in our state. NCMJ

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