VIEWPOINT

Reducing Maternal Mortality in the United States

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Every year in the United States, more than 700 women die of complications related to pregnancy and childbirth and more than 50 000 women experience a life-threatening complication (severe maternal morbidity).[1] Maternal mortality in the United States more than doubled between 2000 and 2014, from 9.8 to 21.5 maternal deaths per 100 000 live births, at a time when 157 of 183 countries in a World Health Organization study reported decreases in maternal mortality.[2] Among 31 countries in the Organisation for Economic Cooperation and Development reporting maternal mortality data in 2014, the United States ranked 30th, ahead of only Mexico and more than 3 times higher than Canada and the United Kingdom.[2] Meanwhile, large racial/ethnic, socioeconomic, and geographic disparities persist.[1] For example, African American women are nearly 3 times as likely to die of complications related to pregnancy and childbirth compared with white women (56.3 vs 20.3 maternal deaths per 100 000 live births in 2013-2014), a gap that has not narrowed in decades.[1]

In the 21st century, no woman should ever die of complications related to pregnancy and childbirth in the United States. Reducing maternal mortality and achieving zero maternal deaths in the United States will require learning from every maternal death, ensuring quality and safety of maternity care for all women, and improving women's health across their life course.

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Learn From Every Maternal Death

First, it is important to review, report, and learn from every maternal death. Presently, maternal deaths in the United States are counted by 3 methods[3]: the National Vital Statistics System, the Pregnancy Mortality Surveillance System, and state maternal mortality review committees (MMRCs).

The National Vital Statistics System uses *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (*ICD-10*) diagnosis codes and a pregnancy checkbox on death certificates to identify maternal deaths up to 42 days postpartum (maternal mortality). The National Vital Statistics System shows national trends and provides the basis for international comparisons but is constrained by the checkbox and has not published an official maternal mortality rate since 2007.[3] The Pregnancy Mortality Surveillance System uses linked birth and death certificates to identify maternal deaths up to 365 days postpartum (pregnancy-related mortality). The availability of information about pregnancy reported on birth certificates enhances case ascertainment and clinical analyses, but the Pregnancy Mortality Surveillance System is still constrained by the limitations of vital statistics.[3]

Maternal mortality reviews by MMRCs can help strengthen public health surveillance.[3] By linking vital statistics with prenatal and hospital records, autopsy reports, informant interviews, social services, and other records, MMRCs can more comprehensively assess causes of death and opportunities for prevention. Currently, 33 states have existing MMRCs.[3] The Centers for Disease Control and Prevention is working with state MMRCs to adopt a common case review data system called MMRIA (Maternal Mortality Review Information Application), with the goal of expanding to a national maternal mortality surveillance system in the next few years to learn from every maternal death.

Ensure Quality and Safety of Maternity Care

Most maternal deaths in the United States are preventable. A recent Centers for Disease Control and Prevention report based on MMRC reviews of 237 maternal deaths in 9 states concluded that 63% of the deaths were preventable.[3] Most deaths were related to clinician, facility, and system factors, such as inadequate training, missed or delayed diagnosis of complications, delayed or ineffective response to obstetric emergencies, or poor communication and coordination between clinicians.[3] Thus, reducing maternal mortality will require efforts to ensure quality and safety of maternity care for all women.

Quality improvement (QI) science has been used to improve health care quality and outcomes, such as reducing nosocomial infections and providing early elective delivery. In 2006, the California Maternal Quality Care Collaborative, in collaboration with the state public health department and many other partners, launched a statewide QI initiative to improve the quality and safety of maternity care in hospitals throughout California.[4] This effort was aided by the use of QI toolkits that included best practices, educational tools, sample protocols, policies, and other resources as well as a data center that provided real-time data collection and QI support.[4]

In a controlled trial of one such QI toolkit that involved 147 hospitals with more than 330 000 annual births, severe maternal morbidity from obstetrical hemorrhage decreased by 20.8% (from 22.7 to 18.0 severe maternal morbidities per 100 hemorrhage cases) at intervention hospitals compared with a 1.2% reduction at comparison hospitals.[5] Overall maternal mortality in California decreased by 57% between 2006 and 2013, from 16.9 to 7.3 maternal deaths per 100 000 live births.[4] Maternal mortality among African American women also de-

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creased by nearly 50%, from 51.0 deaths per 100 000 live births (2005-2007) to 26.4 deaths per 100 000 live births (2011-2013).[4]

These improvements in California led to the launch of the Alliance for Innovation in Maternal Health by the federal Maternal and Child Health Bureau in 2015.[6] Led by the American College of Obstetricians and Gynecologists and in collaboration with 25 national organizations, the Alliance has engaged 18 states and more than 800 hospitals in implementing QI initiatives using maternal safety bundles.[6] Similar to QI toolkits, these safety bundles are designed to assist clinicians, hospitals, and health systems in improving the 4Rs: readiness, recognition, response, and review/reporting.[6] Although it is too early to see an effect on outcomes, several states are reporting substantial quality improvement, including Illinois, which has shown an increase in timely treatment of severe hypertension from 42% to 79%.[4] The Alliance is working to put these safety bundles into practice in every birthing hospital in the United States, with the goal of reducing maternal mortality by half by 2025.

Improve Women's Health Across the Life Course

Ensuring quality and safety of maternity care for all women will not eliminate maternal mortality in the United States. Achieving zero maternal deaths will require improving women's health not only during pregnancy but also across their life course. Women are increasingly becoming pregnant while managing chronic conditions, such as hypertension, diabetes, heart disease, and obesity, which can increase their risk for complications during pregnancy.[7,8] These factors, along with improved surveillance and increasing maternal age, may account for most of the observed increases in maternal mortality and severe morbidities in the United States.[2]

Improving women's health is not going to be easy. Doing so starts with ensuring access to quality health care for all women. Despite the gains under the Affordable Care Act, nearly 1 in 7 US women of childbearing age remain uninsured. Proposed Medicaid waivers in some states to restrict eligibility, enrollment, and benefits; increasing health care premiums and deregulation of Affordable Care Act health plans; proposed religious and moral exemptions for contraceptive coverage; and defunding of Planned Parenthood could further reduce access to primary and preventive health services, preconception and interconception care, family planning, and other services vital to protecting women's health.

Health care is important to health, but so are social determinants of health. Adverse childhood experiences have been linked to chronic health problems. The cumulative stress of poverty for girls and women in low-income households can take a physiological toll on their long-term health.[9] The experience of racism in the lives of many women of color can lead to "weathering," or accelerated aging, which could contribute to higher rates of chronic health conditions as well as maternal mortality and severe morbidities among even college-educated African American women.[9] Thus, improving women's health will require addressing social inequality of which the high maternal mortality rates in the United States are symptomatic and ensuring the conditions in which all girls, women, and families can be healthy.

ARTICLE INFORMATION

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