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Maternal mortality in New York—Looking back, looking forward

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ABSTRACT

New York City was ahead of its time in recognizing the issue of maternal death and the need for proper statistics. New York has also documented since the 1950s the enormous public health challenge of racial disparities in maternal mortality. This paper addresses the history of the first Safe Motherhood Initiative (SMI), a voluntary program in New York State to review reported cases of maternal deaths in hospitals. Review teams found that timely recognition and intervention in patients with serious morbidity could have prevented many of the deaths reviewed. Unfortunately the program was defunded by New York State. The paper then focuses on the revitalization of the SMI in 2013 to establish three safety bundles across the state to be used in the recognition and treatment of obstetric hemorrhage, severe hypertension in pregnancy, and the prevention of venous thromboembolism; and their introduction into 118 hospitals across the state. The paper concludes with a look to the future of the coordinated efforts needed by various organizations involved in women's healthcare in New York City and State to achieve the goal of a review of all maternal deaths in the state by a multidisciplinary team in a timely manner so that appropriate feedback to the clinical team can be given and care can be modified and improved as needed. It is the authors' opinion that we owe this type of review to the women of New York who entrust their care to us.

Efforts to regulate health began in New York City (NYC). The city required licensing of midwives in 1716 despite not requiring licensing of physicians until 1760. Although, midwives were licensed, no records were accurately kept of births and mortality. It was estimated that birth was "successful" 95% of the time, while other undocumented sources suggest a maternal mortality of approximately 2% during this era. Dr. William Shippen in Philadelphia initiated the first formal training for midwives in the colonies in Philadelphia in 1765. A short course in midwifery was instituted in NYC beginning in 1799.

Receiving very little public attention was a treatise on preventing maternal mortality by Oliver Wendell Holmes Sr.,[1] a physician at the Massachusetts General Hospital. In 1843, he published, in a defunct medical journal, New England Quarterly Journal of Medical Surgery an article entitled, "The Contagiousness of Puerperal Fever." The report by Holmes is an early example of a systematic approach to the prevention of maternal mortality. Of interest, Holmes was ridiculed years later by two prominent obstetricians in Philadelphia: Drs. Charles Meigs and Hugh Hodge. These

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obstetricians remain well known for their contributions to the field of obstetrics and gynecology but are not known for falling on the wrong side of history. Controversy on practice guidelines is not new to the specialty of obstetrics. This continues to be a current challenge with implementing guidelines for the standardization of care.

Origins of maternal mortality review

The birth of maternal mortality review occurred in New York City. In 1917, a Committee on Public Health Relations of the New York Academy of Medicine was convened. It was stated that there was "no satisfactory statistical data on the subject of Puerperal deaths in NYC."[2] The study was never completed because of inaccurate and incomplete records, a problem which still plagues current efforts at understanding maternal mortality in New York State. It has been estimated, however, that in 1900, the MMR in the United States was approximately 900/100,000.[3]

Public review of maternal deaths, in the form of open meetings started in Philadelphia in 1931. Cases were reviewed in the amphitheater of the Philadelphia General Hospital where hospital staff, attending physicians, interns, residents, and medical students were required to be present. This was an early example of mortality review that was used to educate the medical profession. In the 1940s, an NYC program was developed to address maternal mortality. It included the establishment of a consultation program, four antenatal clinics run by the NYC Department of Health and Midwifery supervision. A program reported MMR in NYC from 1944 to 1951 as 132/100,000.[4] Racial disparities have long been documented in NY and for the years 1951–1962 the mortality rates were 4/100,000 for white women compared to 170/100,000 for black women. While mortality in both white and black mothers improved in subsequent decades this disparity in maternal mortality has persisted.

Pakter et al.[5] report on the NYC MMR from July 1964 to June of 1966 as 54/100,000. This rate declined to 37.7/100,000 in the period of 1970–1972. A 50% decline in abortion-associated mortality was noted during this period with no accompanying decline in the non-abortion associated maternal deaths. This was due to liberalized abortion law around this time in NY State, prior to Roe v Wade. Before 1970, deaths due to abortion were the leading cause of maternal death in NY. Throughout the 20th century MMR has declined.[6] Advances in anesthesia, blood banking, antibiotics, and the legalization of abortion have contributed greatly. However, the MMR has actually increased in the new millennium and racial disparities remain.[6]

Since the inception of the maternal fetal medicine fellowship, there have been very significant advances in fetal and neonatal medicine including the virtual elimination of RH disease, reduction in stillbirth, therapies for women at risk for preterm birth to delay delivery and improve neonatal outcome.[7–12] Numerous superb prenatal diagnosis centers exist with the potential for transfer of mothers to tertiary care facilities, so that immediate neonatal and surgical intervention can be performed. There have been additional advances in fetal therapy for twin-twin transfusion syndrome and the landmark study of myelomeningocele showing the benefit of fetal surgical intervention.[13–15] Genomics now has enormous additional potential for diagnoses of rare conditions. Unfortunately, these advances are in dramatic contrast to the lack of improvement in maternal health, with demonstrated increased rates of maternal mortality and morbidity. This has led to the publication of many articles calling attention to this,[16–19] as well as those that provided concrete plans for action.[20,21]

Revitalization of plans to reduce maternal morbidity and mortality in New York State

In January 2013, a group of concerned Obstetric clinical leaders in New York State came together with ACOG District II to address the exceedingly high rate of maternal mortality in New York. This rate was in stark contrast to the great medical care we had all witnessed at our respective institutions. A robust discussion of all potential issues requiring focus occurred. There was general agreement that although there were many needed areas that should be addressed, initial focus would on the three preventable causes of maternal death. ACOG District II was thought to be the perfect administrative arm because of their close knit collaborative efforts with all obstetric clinicians in the state and a proven track record of success involving other projects. The district comprises of a diverse mix of institutions. There are 127 hospitals offering maternity care, the majority of which deliver fewer than 3000 babies per year. Just over one quarter of hospitals are level three facilities.

The meeting concluded with two principles that, in our opinion, would be the key to our success. First, that no one person or institution would own the initiative. It was agreed that unless there was general ownership, any efforts to change maternal morbidity and mortality would not be successful. We agreed to meet every quarter and rotate the hosting institution with emphasis on varying the locations, acknowledging this general ownership. The second principal was that the protocols developed for the three clinical issues would be consensus based and collaborative. It was with this esprit de corps among our group that the work began.

Commercial support was also sought and we were most fortunate that Merck for Mothers made a commitment to invest resources to enable us standardize care practices for the leading causes of maternal mortality in New York State.[22]

The Safe Motherhood Initiative (SMI), a voluntary program to review reported cases of maternal death in hospitals throughout the state, conducted extensive multidisciplinary, on-site reviews from 2001 through 2009. The data gathered from these reviews assisted hospitals in making protocol changes to improve patient safety and raise awareness of risk factors that can contribute to serious morbidity such as obesity, severe hypertension, long-standing diabetes, and pre-existing cardiac conditions. SMI review teams found that timely recognition and intervention in such situations could have prevented many of the deaths reviewed and as a result, the SMI made a commitment to the thorough assessment of chronic medical conditions in the preconception period and during pregnancy, developing and providing much needed