



H176 Maternal Death Investigation in the Setting of Rising Maternal Mortality in the United States: Trends in Maryland From 2003 to 2019

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Learning Overview: The goal of this presentation is to highlight maternal death investigation in the forensic setting, to emphasize the characteristics of this at-risk population, as well as the utility of proper documentation for the benefit of public health.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by bringing awareness to the public health issue that is the increasing United States Maternal Mortality Rate (MMR) by reinforcing the role of medicolegal death investigators, coroners, and forensic pathologists when it comes to investigation of deaths in women of childbearing age.

MMR has been steadily increasing in the United States since 1987, reaching 31.2 maternal deaths per 100,000 live births as documented in 2016, despite the United Nations Millennium Development Goal for a 75% decrease in maternal mortality from 1990–2015. Focusing on “preventable” causes of maternal mortality—those which may have been averted by one or more changes in the health care system related to clinical care, facility management, public health infrastructure, and/or patient factors—is an important step in addressing this national public health issue. Involvement of medical examiner and coroner offices is vital in the initiative to better understand the underlying cause of maternal deaths and explain changes in MMRs.

From January 2003 with preliminary data up to the current date, 345 maternal deaths were reported to the Office of the Chief Medical Examiner (OCME) in Maryland. While relatively uncommon in the forensic setting, these cases highlight characteristics of this at-risk population, as well as the utility of proper documentation for the benefit of public health.

The Maryland OCME records from 2003 onward were searched for reported cases in which the “pregnant in the last year” box was checked—an addition Maryland made to all death certificates in 2001. These deaths were then subclassified as follows: cardiovascular conditions (32.2%), intoxication/substance abuse (16.5%), non-cardiovascular medical conditions (13.3%), homicide (12.5%), injury/accident (12.5%), infection (3.8%), hemorrhage (3.5%), cerebrovascular (2.6%), and suicide (2.9%). One case was classified as undetermined (0.2%).

Pregnancy-related deaths are those which occur within 365 days of pregnancy and are related to or aggravated by pregnancy or its management. Of the 345 deaths reported to the Maryland OCME over a 17-year period, 42% were identified as pregnancy-related (excluding homicide, intoxication/substance abuse, injury/accident, and infectious causes unrelated to pregnancy). Pulmonary embolism was the leading cause of cardiovascular deaths (29%). Beginning in 2013, a shift in the trend was noted in that deaths related to intoxication/substance abuse surpassed those related to cardiovascular disease (26.1% intoxication vs. 20.3% cardiovascular). However, pulmonary embolism (8%) remained the leading cause of pregnancy-related cardiovascular death.

Between two five-year periods (2007–2011 and 2012–2016), the United States MMR increased by 37.2% (reaching 28.4 deaths per 100,000 live births), while the Maryland rate decreased by 7.6% (23 deaths per 100,000 live births). While trends for more recent years in Maryland have improved, there is still work to be done to achieve the national and global goals for maternal mortality rates (target 11.4 deaths per 100,000 live births). In our population, cardiovascular disease remains a leading cause of pregnancy-related deaths, with pulmonary embolism being the most prevalent cause of death in the peri- and postpartum period. Nationally, cardiovascular conditions were responsible for greater than one-third of pregnancy-related deaths from 2011–2015. Globally, obstetrical hemorrhage followed by hypertensive disorders account for the majority. Forensic pathologists and medicolegal investigators need to be aware of these deaths and at-risk populations so as not to misdiagnose and/or misclassify these deaths. Encouraging other providers to report these deaths to medical examiner/coroner offices, as well as proper and accurate documentation on death certificates by forensic pathologists, will help measure the true magnitude of the problem, identify at-risk populations, and allow health departments to focus protective efforts on women who need it the most.

Maternal Mortality, Pregnancy-Related Deaths, Reporting Maternal Deaths