

# Maternal Mortality in the Twenty-First Century



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## KEYWORDS

- Maternal mortality • Severe maternal morbidity • Racial disparities
- Maternal mortality ratio • Pregnancy-related death

## KEY POINTS

- Maternal mortality plagues much of the world, with 303,000 maternal deaths in 2015. This number represents a global maternal mortality ratio of 216 maternal deaths per 100,000 live births.
- The World Health Organization has created a goal to decrease the global maternal mortality ratio to 70 maternal deaths per 100,000 live births by the year 2030.
- The maternal mortality ratio is higher in the United States than in any other developed nation and has increased over the last several years.
- Significant racial disparities exist in the rates of maternal mortality in the United States.

## INTRODUCTION

Maternal death was quite common in the nineteenth century with as many as 7 deaths per 100 births in some hospitals in the United States.<sup>1</sup> By the early twentieth century, maternal mortalities improved but plateaued at approximately 6 to 9 maternal deaths per 1000 live births.<sup>2</sup> Most maternal deaths during this time were secondary to poor obstetric education and delivery practices, and most of them were preventable.<sup>2</sup> In the 1920s, most deliveries occurred at home under the care of midwives or general practitioners. Deliveries during this time were often performed without following principles of aseptic technique, resulting in infection, with sepsis causing 40% of maternal deaths.<sup>2</sup> The large majority of the remaining maternal deaths were secondary to hemorrhage or preeclampsia/eclampsia.<sup>2</sup> In the 1930s, a link was demonstrated between poor aseptic practice, excessive operative deliveries, and high maternal mortality. These data were published in the 1933 White House Conference on Child Health Protection, Fetal, Newborn, and Maternal Mortality and Morbidity report.<sup>2</sup> State medical

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boards took note of this and previous reports, which lead to a new focus on maternal health at the state level.<sup>2</sup> This call to action led to the establishment of the first hospital and state maternal mortality review committees in the 1930s and 1940s. Over the following years, these committees developed institutional practice guidelines and defined minimum physician qualifications needed to gain hospital delivery privileges. Over the same period, hospital deliveries became favored over home deliveries throughout the country, increasing from 55% to 90% from 1938 to 1948.<sup>2</sup> Deliveries in hospitals were performed under aseptic conditions and allowed for care of the poor by state-provided services. These changes led to decreases in maternal mortality after 1930. Declines in rates of maternal mortality became even more pronounced with medical advances, including the use of antibiotics, oxytocin, improved blood transfusion technique, and better management of hypertensive conditions of pregnancy.<sup>2</sup> These advances and changes in practice led to a further decrease in maternal mortality of 71% over a 10-year period from 1939 to 1948.<sup>2</sup> From 1950 to 1973, deaths from septic abortion decreased by 89%, which is likely partially attributable to the legalization of induced abortion beginning in some states in 1967, followed by legalization in all states in 1973.<sup>2,3</sup>

Despite the improvements made in the twentieth century, maternal mortality continues to plague much of the world, disproportionately affecting developing nations. According to the United Nations Maternal Mortality Estimation Inter-Agency Group, there were 303,000 maternal deaths in 2015.<sup>4</sup> This number represents an overall global maternal mortality ratio (MMR) of 216 maternal deaths per 100,000 live births, a 44% decrease over the prior 25 years.<sup>4</sup> The MMR varied greatly by region ranging from 12 deaths per 100,000 live births in developed regions to 546 deaths per 100,000 live births in sub-Saharan Africa and as high as 1100 deaths per 100,000 live births in Sierra Leone.<sup>4</sup> Current trends in worldwide maternal mortality demonstrate a range of annual reduction from 1.8% in the Caribbean to 5.0% for Eastern Asia.<sup>4</sup> Although these reductions in global maternal mortality represent a trend in the right direction, this decrease fell short of the United Nations Millennium Development Goal of a reduction of 75% in the MMR between 1990 and 2015.<sup>5</sup> The World Health Organization (WHO) has presented new Sustainable Development Goals with the objective of reducing the global MMR to less than 70 deaths per 100,000 live births from 2015 to 2030.<sup>6</sup> In order to achieve this ambitious goal, countries will need to decrease their MMR at an annual rate of reduction of at least 7.5%, a far accelerated rate compared with the last 25 years.<sup>4</sup> Reasons cited for the decrease in maternal mortalities over the last 25 years include a decrease in the total fertility rate, increased maternal education, and increased access to skilled birth attendants among various other improvements.<sup>7</sup> Strategies for ongoing reduction of the global maternal mortality, as outlined in the WHO Sustainable Development Goals, include a human rights-based approach to maternal and newborn health, which includes eliminating inequities that lead to disparities in access, quality, and outcomes of care within and between countries. The need for improvements in care, including sexual and reproductive health, family planning, and newborn and child survival, are also cited as needed strategies to continue to improve maternal mortalities.<sup>6</sup>

Of the 171 countries studied by the United Nations Maternal-Mortality Estimation Inter-Agency Group, 158 demonstrated a reduction in maternal mortality over the 25 years studied.<sup>4</sup> Alarmingly, there are 13 countries that have increasing rates of maternal mortality. These countries include Bahamas, Georgia, Guyana, Jamaica, North Korea, St. Lucia, Serbia, South Africa, Suriname, Tonga, United States, Venezuela, and Zimbabwe. The United States is the ONLY developed nation with an increasing MMR, and, in fact, the current MMR in the United States is almost 2

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