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Author manuscript

*Am J Obstet Gynecol.* Author manuscript; available in PMC 2015 December 01.

Published in final edited form as:

*Am J Obstet Gynecol.* 2014 December ; 211(6): 581–582. doi:10.1016/j.ajog.2014.07.041.

## State-based maternal death reviews: assessing opportunities to alter outcomes

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In 1950, the *Journal of the American Medical Association* reported that, for the first time, the US maternal mortality rate had dipped below 1 per 1000 live births and declared that “Childbearing has been made quite safe.”<sup>1</sup> The Centers for Disease Control and Prevention called the decline from 800-900 maternal deaths per 100,000 live births in 1900 to 10-20 deaths per 100,000 live births in 2000 one of the 10 great public health achievements of the 20th century.<sup>2</sup> There is no question that great strides were made in maternity care and that women and society benefited. But the story is not over. Women still die from conditions directly or indirectly related to pregnancy, and evidence is emerging that the trend that we so rightly celebrated is not continuing.

Accounting for maternal deaths ought to be easy. The events are rare, dramatic, and devastating for the woman's family and those who cared for her. We have a functioning vital statistics system, and all deaths are registered. However, even today, we struggle to assess accurately the number of women who die in the United States because they became pregnant. There is no question that vital statistics by themselves underestimate the number of maternal deaths, largely because of the lack of diagnostic nuance allowed by the coding rules of International Classification of Diseases; this limitation has been demonstrated in the United States and other developed countries.<sup>3-6</sup> In response to the inadequacy of vital records for public health surveillance, in 1986 the Centers for Disease Control and Prevention's Division of Reproductive Health and the American College of Obstetricians and Gynecologists worked to enhance the identification of deaths that are related to pregnancy by establishing the Pregnancy Mortality Surveillance System (PMSS). PMSS relies on state departments of vital statistics to identify deaths during and within 1 year of the end of a pregnancy by all means available. Currently, this system reports a pregnancy-related mortality ratio of approximately 17 per 100,000 live births for 2010. Although the ratio may be stabilizing in recent years, it increased by 50% over the preceding 15 years.<sup>7</sup> Moreover, although PMSS likely captures almost all of the deaths that are possible by using a process based on voluntary reporting, it still likely undercounts these events. Another recent estimate that was based on statistical models place the US maternal mortality rate at 18.5 per 100,000 live births for 2013 and suggests that the United States is among the few countries in the world where the rate is increasing.<sup>8</sup> There is reason to suspect that better identification plays some role in the observed increases, but it would be presumptuous to

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The author reports no conflict of interest.

state categorically that there is no true increase in the risk of maternal death in the United States. We certainly have no evidence that the risk is falling.

State-based identification of maternal deaths is critical if we are to assess more accurately the burden of maternal death, and state-based review is required to better understand the causes of and risk factors for these deaths. Moreover, states have the mandates and authority to act on findings to improve systems of care. Not all states review maternal deaths; among those that do, the organization of the review processes varies. In this issue of the *American Journal of Obstetrics and Gynecology*, Geller et al<sup>9</sup> report the results of a retrospective review of 610 deaths that were recorded in the Illinois Department of Health Maternal Review Form Database for the years 2002–2012. Deaths had been reported to the Department of Public Health, as required by law, and reviewed in their regional perinatal centers. Geller et al<sup>9</sup> reviewed this database in an effort to make a statement about what percentage and what kinds of events might be preventable. Such an effort is necessary to inform rational, evidence-based health system-wide interventions. One-third of the deaths during pregnancy or within 1 year of the end of pregnancy were deemed to be related directly or indirectly to pregnancy, and one-third of these were thought potentially to be preventable on the basis of patient, provider, and systems factors. Deaths because of hemorrhage were most likely to be preventable. Deaths attributed to vascular events were considered less likely to be preventable.

Reviewing maternal deaths would be a fruitless enterprise without evidence that deaths and severe morbidity could be prevented. The finding by Geller et al<sup>9</sup> that one-third of pregnancy-related deaths were preventable is in line with estimates in the literature.<sup>10-12</sup> Assessment of preventability is aimed at discovering opportunities to improve maternal outcomes by improving care. It is not meant to point fingers and place blame. Rather, state-based reviews should be undertaken with the assumption that, if processes of care broke down in a single time and place and the result was a death, such processes likely occur over and over again; however, the outcome is rarely so unfortunate. However, those processes must be improved if there is to be any chance of lowering maternal morbidity and mortality rates. Hence, review of maternal deaths can be seen as an effort in quality improvement, and the effort by Illinois is a good example of how such a review process can function. In their discussion, the authors note that, as a result of work by review committees to shine a light on hemorrhage deaths as potentially preventable, state policy was enacted to mandate training in recognition and treatment of obstetric hemorrhage for all obstetric providers in hospitals with maternity services. This included all physicians who deliver babies, anesthesia personnel, midwives, obstetric nurses, and other personnel in labor and delivery units. The mandate resulted in training >48,000 providers statewide.<sup>13</sup>

Reviewing maternal deaths, gaining an understanding of the causes, and taking action on findings are steps that are consistent with the call for national action<sup>14</sup> and returning the “M” to maternal-fetal medicine.<sup>15</sup> The recent formation of the National Partnership for Maternal Safety is indeed encouraging.<sup>16</sup> Many organizations have come together to acknowledge that we as a country can do better in providing safe, evidence-based maternity care. The commitment to roll out patient safety bundles that provide best practices to address hemorrhage, severe hypertension, and venous thromboembolism prevention as well as

process-oriented bundles that define maternal early warning criteria, to provide guidance for reviewing severe maternal events in birthing facilities, and to acknowledge the need for family and staff support when a death or severe event occurs is an enormous first step in making pregnancy in the United States safer. Implicit in these national efforts is the ability to review deaths at the geopolitical level where action can be taken. In most instances, that level is the state. Geller et al<sup>9</sup> demonstrate how this works in Illinois, and there are other similar examples throughout the country.<sup>17-19</sup> We find ourselves in a time with a focus on maternal health that we have not seen since attention was drawn to the problem of maternal death in the early 20th century. It is incumbent on us all to seize the moment.

## Acknowledgments

The findings and conclusions in this report are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

## REFERENCES

1. Maternal deaths: one in a thousand. JAMA. 1950; 144:1096–7. <http://dx.doi.org/10.1001/jama.1950.02920130048016>.
2. Centers for Disease Control and Prevention. Achievements in public health, 1900-1999: healthier mothers and babies. MMWR Morb Mortal Wkly Rep. 1999; 48:849–58. [PubMed: 10563522]
3. Horon IL. Underreporting of maternal deaths on death certificates and the magnitude of the problem of maternal mortality. Am J Public Health. 2005; 95:478–82. [PubMed: 15727980]
4. Centers for Disease Control. Enhanced maternal mortality surveillance: North Carolina, 1988 and 1989. MMWR Morb Mortal Wkly Rep. 1991; 40:469–71. [PubMed: 2062301]
5. Centers for Disease Control and Prevention. Pregnancy-related mortality: Georgia, 1990-1992. MMWR Morb Mortal Wkly Rep. 1995; 44:93–5. [PubMed: 7838089]
6. Deneux-Tharoux C, Berg C, Bouvier-Colle MH, et al. Underreporting of pregnancy-related mortality in the United States and Europe. Obstet Gynecol. 2005; 106:684–92. [PubMed: 16199622]
7. Centers for Disease Control and Prevention. [June 20, 2014] Pregnancy mortality surveillance system. Available at: <http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PMSS.html>.
8. Kassebaum NJ, Bertozzi-Villa A, Coggeshall MS, et al. Global, regional, and national levels and causes of maternal mortality during 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2014; 384:980–1004. [PubMed: 24797575]
9. Geller SE, Koch AR, Martin NJ, Rosenberg D, Bigger H; for the Illinois Department of Public Health Maternal Mortality Review Committee Working Group. Assessing preventability of maternal mortality in Illinois: 2002-2012. Am J Obstet Gynecol. 2014; 211:698, e1–11. [PubMed: 24956547]
10. Panting-Kemp A, Geller SE, Nguyen T, Simonson L, Nuwayhid B, Castro L. Maternal deaths in an urban perinatal network, 1992-1998. Am J Obstet Gynecol. 2000; 183:1207–12. [PubMed: 11084567]
11. Berg CJ, Harper MA, Atkinson SM, et al. Preventability of pregnancy-related deaths: results of a state-wide review. Obstet Gynecol. 2005; 106:1228–34. [PubMed: 16319245]
12. Nannini A, Weiss J, Goldstein R, Fogerty S. Pregnancy-associated mortality at the end of the twentieth century: Massachusetts, 1990-1999. J Am Med Womens Assoc. 2002; 57:140–3. [PubMed: 12146603]
13. Kilpatrick SJ, Prentice P, Jones RL, Geller S. Reducing maternal deaths through state maternal mortality review. J Womens Health. 2012; 21:905–9.
14. Main EK, Menard MK. Maternal mortality: time for national action. Obstet Gynecol. 2013; 122:7356.

15. D'Alton M. Where is the “M” in maternal-fetal medicine. *Obstet Gynecol.* 2010; 116:1401–4. [PubMed: 21099610]
16. D'Alton M, Main EK, Menard MK, Levy BS. The National Partnership for Maternal Safety. *Obstet Gynecol.* 2014; 123:973–7. [PubMed: 24785848]
17. California Maternal Quality Care Collaborative. [June 25, 2014] Advancing California maternity care through data-driven quality improvement. Available at: <https://www.cmqcc.org/>.
18. Florida Health. [June 25, 2014] Pregnancy-associated mortality review (PAMR). Available at: <http://www.floridahealth.gov/reports-and-data/PAMR/index.html>.
19. Maryland Department of Health and Mental Hygiene. [June 25, 2014] State maternal mortality review (MMR) program. Available at: <http://phpa.dhmh.maryland.gov/mch/SitePages/mmr.aspx>.