



DISCUSSION

New estimates of maternal mortality and how to interpret them: choice or confusion?

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Abstract: *Two independent exercises to estimate levels of maternal mortality took place during 2010, one published by the Institute for Health Metrics and Evaluation in Seattle, USA, the other published by four UN agencies (UNICEF, UNFPA, World Bank and World Health Organization). Although both approaches are based on similar sets of empirical country data, their statistical methods differ in important respects – with implications for the resulting global, regional and country estimates. This paper examines the differences, discusses both the value and inherent limitations in such exercises, proposes ways of interpreting the different estimates and suggests how such exercises could be made more relevant to the needs of country-level decision-makers. It calls on the global community to invest seriously in working with countries to generate primary data on maternal mortality using measurement methods that reduce uncertainty and generate data on a continuing basis. The best routine source of data on maternal deaths is a civil registration system that assures permanent, compulsory and universal recording of the occurrence and characteristics of vital events, including births and deaths, and causes of death. The record of deaths among women of reproductive age derived from civil registration is often the first step in conducting a confidential enquiry into and preventing maternal deaths.*
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2010 was the year of maternal mortality estimates. In April, the *Lancet* published maternal mortality figures developed at the Institute for Health Metrics and Evaluation (IHME), an academic institution based at the University of Washington, Seattle, USA.¹ In September, a different set of numbers was issued by UN agencies UNICEF, UNFPA, World Bank and World Health Organization, working in collaboration with technical experts from the University of Berkeley, California, USA.² Both sources included data for nearly all countries (IHME 181, UN 174), along with regional and global totals. Both covered similar time spans (IHME 1980–2008, UN 1990–2008). Both calculated overall and annual average rates of change. Both claimed to be based on a systematic review of all available

data. Both applied adjustments to country-reported data in order to improve comparability and correct for bias. Both used statistical modelling to generate estimates for countries or time periods where data are lacking. Both acknowledged the important impact that HIV has had on maternal mortality, especially in sub-Saharan Africa. Both claimed to have found substantial declines in maternal mortality in recent years. Both included estimates of uncertainty around the numbers.

Despite these broad measures of agreement, there are important differences, both in the regional and global totals and in the individual country estimates. So what is a potential user to make of these two sets of numbers? Is one superior to the other? How can users choose between the

two? Why are the UN estimates for 2008 so different from those issued in 2005? For those confused by the sudden upsurge in numbers – and you are not alone – here are some frequently asked questions and answers that may help in understanding, and using, the new estimates.

What are the differences between the two sets of numbers?

- **Globally, the differences in maternal deaths are small**

In terms of numbers of maternal deaths in 2008, the difference between the two sets of estimates is around 4%. IHME estimated some 342,900 maternal deaths compared with UN estimates of 358,000.

- **Uncertainty ranges are significantly different**

With regard to the estimates of the maternal mortality ratio (MMR), IHME estimated 251 per 100,000 live births in 2008 (range 221–289) compared with the UN estimate of 260 (range 200–370). As is clear from Figure 1, the uncertainty range is wider for the UN estimates than for those developed by IHME. This is due to the statistical methods used to calculate uncertainty, but does not mean that the UN estimates are inherently less precise than IHME's; both are uncertain.

Figure 1. Uncertainty interval for the 2008 maternal mortality ratio: IHME compared with UN estimates

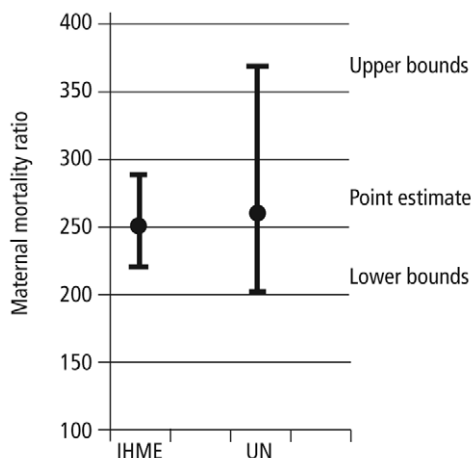
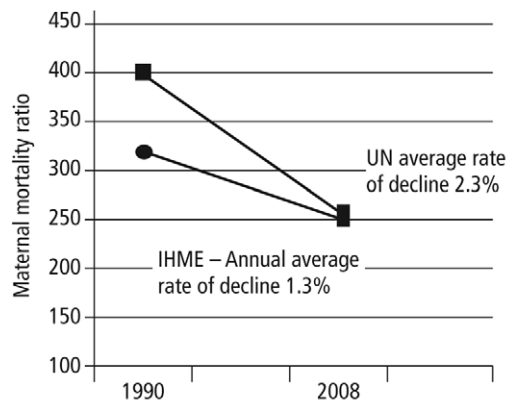


Figure 2. Trends in maternal mortality ratios 1990–2008: IHME and UN estimates



- **Rates of change are significantly different**

An important difference between the two sets of estimates is the rate of change since 1990. IHME estimated a global annual average rate of decline between 1990 and 2008 of 1.3%, (range 1.0, 1.5) compared with a decline of 2.3% estimated by the UN agencies (range 2.1, 2.4).^{*} The explanation lies in the differences in the estimated 1990 starting point, with IHME estimating a 1990 maternal mortality ratio of 320 per 100,000 compared with the UN estimate of 400 per 100,000 (Figure 2). Either way, both sets of estimates show rates of change well below the annual 5.5% decline that would be needed to attain the MDG5 target. It is worth noting that an attempt in 2005 by the UN agencies to estimate rates of change suggested an annual rate of decline between 1990 and 2005 of only 0.4% overall, but 2.5% when limited to countries with several empirical data points.³

- **There are important differences in country estimates**

Whereas the global figures and trends appear broadly similar, there are important differences when it comes to individual country values. IHME estimates are higher than UN estimates in some countries; the reverse is true in others (Figure 3).

^{*}However, IHME estimated a rate of decline in a “no HIV scenario” of 2.4% annually.

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