## Maternal mortality in 2000-2017

Internationally comparable MMR estimates by the Maternal Mortality Estimation Inter-Agency Group (MMEIG)  

**SA MO A**

<table>
<thead>
<tr>
<th>Year</th>
<th>Maternal mortality ratio (MMR)</th>
<th>Maternal deaths</th>
<th>HIV-related indirect maternal deaths</th>
<th>Live births</th>
<th>Proportion of maternal deaths among deaths of female reproductive age (PM, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per 100 000 live births (lb)</td>
<td>Numbers</td>
<td>Numbers</td>
<td>Thousands</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>88 [48-169]</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>2005</td>
<td>72 [37-144]</td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>2010</td>
<td>58 [28-120]</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>2015</td>
<td>45 [21-100]</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2017</td>
<td>43 [20-97]</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

* MMR and PM are calculated for women 15-49 years.  
* The uncertainty intervals (UI) for all estimates refer to the 80% uncertainty intervals (10th and 90th percentiles of the posterior distributions). This was chosen as opposed to the more standard 95% intervals because of the substantial uncertainty inherent in maternal mortality outcomes.  
* Figures presented in the table are estimates based on national data, such as surveys or administrative records, or other sources, produced by the international agency when country data for some year(s) is not available, when multiple sources exist, or when there are data quality issues.

### Annual rate of reduction based on estimated MMR (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Rate of Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2017</td>
<td>4.2 [1.7, 6.6]</td>
</tr>
<tr>
<td>2010-2017</td>
<td>4.2 [1.2, 6.9]</td>
</tr>
</tbody>
</table>
Available data sources

Data from civil registration vital statistics system (CRVS):

** No national level maternal mortality data were identified **
Available data sources (continued)

** Excluded data from CRVS: **

** Not applicable **
## Available data sources (continued)

Data from other sources:

<table>
<thead>
<tr>
<th>Study period</th>
<th>Source</th>
<th>Maternal deaths</th>
<th>Pregnancy-related deaths</th>
<th>Female deaths, 15-49</th>
<th>Maternal PM</th>
<th>Pregnancy-related PM</th>
<th>Reported MMR per 100,000 lb</th>
<th>Adjusted MMR per 100,000 lb</th>
<th>F+</th>
<th>F-</th>
<th>U+</th>
</tr>
</thead>
</table>

** Notes **

n Maternal deaths defined according to the ICD-10.
ño Pregnancy-related deaths defined according to ICD-10.
p Maternal PM is calculated when deaths are defined as “maternal”.
qi Pregnancy-related PM is calculated when reported deaths are defined as pregnancy related deaths.
r False positive: true non-maternal death which may be incorrectly labeled as a maternal death.
s False negative: maternal death which may be incorrectly classified as a non-maternal death.
t Maternal deaths not registered in the CRVS.
u Calculated/derived from studies which undertake specialized analyses of routine reporting of maternal deaths.

** No other sources identified **
Available data sources (continued)

Data from studies excluded in regression:

** No exclusions **
Predictor variables used in the model

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP per capita, PPP (constant 2011 Int $)</th>
<th>General Fertility Rate per 1000 women 15-49</th>
<th>Skilled Birth Attendant (%) of births</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>4356</td>
<td>137</td>
<td>79.0</td>
</tr>
<tr>
<td>2005</td>
<td>5319</td>
<td>131</td>
<td>81.0</td>
</tr>
<tr>
<td>2010</td>
<td>5577</td>
<td>123</td>
<td>82.0</td>
</tr>
<tr>
<td>2015</td>
<td>5717</td>
<td>115</td>
<td>84.0</td>
</tr>
<tr>
<td>2017</td>
<td>5915</td>
<td>113</td>
<td>84.0</td>
</tr>
</tbody>
</table>

* A 5-year moving average was calculated.

Gross Domestic Product (GDP) per capita measured in purchasing power parity (PPP) equivalent dollars using 2011 as the baseline year were taken from World Bank Group (World Development Indicators published July 30, 2019) supplemented by other sources (e.g. United Nations, the International Monetary Fund, the Organisation for Economic Co-operation and Development, and MMEIG member’s estimates) used to inform trends in instances with missing country-years in the World Bank Group data set.


General fertility rate


Percentage of births attended by skilled health personnel (doctors, nurses or midwives).

Maternal crisis deaths

<table>
<thead>
<tr>
<th>Years with crisis mortality</th>
<th>Crisis deaths to women 15-49&lt;sup&gt;y&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>20</td>
</tr>
</tbody>
</table>

<sup>y</sup> Please see next page for details on how maternal mortality was calculated in years with crisis deaths.
Calculation of maternal mortality during crisis years

Crisis years and mortality shocks

The 1990–2016 life tables published by WHO in 2018 (1) account for “crises” due to natural disasters and conflict (as defined by the International statistical classification of diseases and related health problems [ICD], 10th revision [2]), because of the potential for substantial increases in death rates during the crisis-affected years, a phenomenon described as “mortality shocks”. According to the life tables, “mortality shocks” include deaths whose underlying cause was due to a natural disaster or – in the case of war and conflict deaths – “an injury due to war, civil insurrection or organized conflict, whether or not that injury occurred during the time of war or after cessation of hostilities” (1).

A crisis year for the purpose of estimated maternal mortality is defined in the following two ways (all years that meet either definition are included as crisis years):

- a year in which (a) there are at least 10 deaths attributable to mortality shocks among women of reproductive age (i.e. 15–49 years) and (b) these deaths constitute at least 10% of the total number of deaths to women aged 15–49 in that respective country-year (1) and in addition (c) in the five-year period surrounding the year, there are at most two additional crisis years; and

- a year identified by the United Nations Inter-agency Group for Child Mortality Estimation (UN IGME) as a crisis year for the estimation of child mortality (3) (this includes crises in potentially longer periods, i.e. for recent ongoing crises).

Maternal mortality estimation

The approach taken in this round of maternal mortality estimation was to estimate the “crisis-free” proportion maternal (PM) to maintain consistency across all countries.

The method for estimation of maternal deaths for countries with one or more crisis years is described below.

Any data points that overlap with the crisis period are recalculated to refer to the proportion of crisis-free maternal or pregnancy-related deaths among the total number of crisis-free deaths to women of reproductive age, referred to as “crisis-free observed PM”. Pregnancy-related PMs are adjusted based on the assumption that the proportion of pregnancy-related deaths among the deaths attributable to mortality shocks is equal to the proportion of women in the population who are pregnant or postpartum at the time of the crisis. The proportion of pregnant women in the population is set equal to the general fertility rate, based on the assumption of a one-year period associated with a live birth (4).

For each year, the MMEIG Bayesian maternal mortality estimation (BMAt) model provides posterior samples of maternal deaths:

- The median of this sample constitutes the point estimate for the number of maternal deaths. The reported estimates of PM are the crisis-free PMs, the point estimate for the number of maternal deaths divided by the total number of crisis-free deaths among women of reproductive age.
For non-crisis years, the 10th and 90th percentiles of the BMat samples for maternal deaths constitute the 80% uncertainty interval (UI). For crisis years, we include additional uncertainty by multiplying the samples of maternal deaths by values between 0.9 and 1.2.

This approach results in estimates of maternal mortality that are considered crisis-free within the larger envelope of all deaths among women of reproductive age, because deaths among pregnant women that are attributable to mortality shocks would be considered pregnancy-related deaths but not maternal deaths, according to the ICD definition. It is possible that crisis-related factors may contribute to maternal mortality but empirical evidence to distinguish maternal deaths from among pregnancy-related deaths in the context of mortality shocks is limited. To reflect the paucity of evidence on the effect of crisis on maternal mortality, UIs were widened. Future estimation exercises will continue to review the methods developed to account for natural disasters, conflict and other types of mortality shocks (e.g. disease pandemics).

References


