

## Maternal Mortality Bolivia (Plurinational State of) 2000-2020

Internationally comparable MMR estimates by the Maternal Mortality Inter-Agency Group (MMEIG): WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division

Table 1: Estimates

Year	MMR <sup>a*†</sup>	PM <sup>b*†</sup>	HIV-related indirect deaths <sup>†</sup>	Live births <sup>c</sup> (Thousands)	Maternal deaths <sup>†</sup>
2000	284 [235, 348]	0.14 [0.11, 0.17]	1	256	727
2005	230 [188, 287]	0.11 [0.09, 0.14]	2	257	591
2010	184 [146, 239]	0.09 [0.07, 0.12]	2	263	484
2015	165 [124, 231]	0.08 [0.06, 0.11]	1	263	434
2020	161 [103, 272]	0.08 [0.05, 0.13]	1	263	423

<sup>a</sup> Maternal mortality ratio (MMR) defined as maternal deaths per 100,000 live births for women of reproductive age (15-49 years).

<sup>b</sup> Proportion maternal (PM) defined as the proportion of all-cause deaths for women of reproductive age (15-49 years) that are due to maternal causes.

<sup>c</sup> UN Population Division, Department of Economic and Social Affairs. World Population Prospects. New York; 2022.

\* 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.

Table 2: Estimates

Period	Annual rate reduction*	Percent change in MMR*
2000, 2020	2.97 [0.34, 4.96]	44.75 [6.57, 62.94]
2010, 2020	1.37 [-2.39, 4.65]	12.81 [-27.04, 37.19]

\* 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.

## Data from civil registration vital statistics system (CRVS)

No data available

## Excluded data from CRVS

Table 3: Excluded data from CRVS

Study period <sup>*</sup>	Completeness <sup>a</sup>	Usability <sup>b</sup>	Reason for exclusion
[2000, 2001)	33.51628	19.67546	Usability < 60%
[2001, 2002)	29.87840	21.49845	Usability < 60%
[2002, 2003)	44.56885	21.61810	Usability < 60%
[2003, 2004)	40.02350	26.49636	Usability < 60%

<sup>a</sup> Completeness = percentage of registered deaths of females of reproductive age.

<sup>b</sup> Usability = percentage of deaths that is estimated to be recorded with a well-defined code; completeness proportion\*(1-proportion ill-defined)\*100.

\* Kindly note the interpretation of notation: for a period [a,b) the observation starts on date a and ends before date b; thus a period covering 1st January 2000 through 31st December 2000 is denoted [2000,2001).

## Data from other sources

Table 4: Data from other sources

Study period <sup>*</sup>	Source	Source type	Maternal deaths <sup>a</sup>	Preganancy-related deaths <sup>b</sup>	Female deaths, 15-49	Maternal PM <sup>c</sup>	Pregnancy-related PM <sup>d†</sup>	MMR per 100,000 lb <sup>e</sup>	Adjusted MMR per 100,000 lb	F+ <sup>f†</sup>	F- <sup>g†</sup>	U+ <sup>h†</sup>
[1986.83, 1993.83)	DHS 1993 - 1994	Survey	NA	NA	NA	NA	0.2018600	505.9716	472.6158	NA	NA	NA
[1989.16, 1994.16)	DHS 1994	Miscellaneous	NA	NA	NA	NA	0.1605296	390.0000	364.2414	NA	NA	NA
[1996.82, 2003.82)	DHS 2003	Survey	NA	NA	NA	NA	0.1273958	264.4520	246.2421	NA	NA	NA
[2001.3, 2008.3)	DHS 2008	Survey	NA	NA	NA	NA	0.1657240	334.9904	311.7990	NA	NA	NA
[2011, 2012)	Estudio Nacional de Mortalidad Materna 2011 Bolivia	Miscellaneous	538	NA	NA	0.0828235	NA	160.0000	176.0000	NA	NA	NA

<sup>a</sup> Maternal deaths defined according to the ICD-10.

<sup>b</sup> Pregnancy-related deaths defined according to ICD-10.

<sup>c</sup> Maternal PM is calculated when deaths are defined as maternal.

<sup>d</sup> Pregnancy-related PM is calculated when reported deaths are defined as pregnancy related deaths.

<sup>e</sup> The MMR in this column is calculated from the PM.

<sup>f</sup> False positive: true non-maternal death which may be incorrectly labeled as a maternal death.

<sup>g</sup> False negative: maternal death which may be incorrectly classified as a non-maternal death.

<sup>h</sup> Maternal deaths not registered in the CRVS.

<sup>\*</sup> Kindly note the interpretation of notation: for a period [a,b) the observation starts on date a and ends before date b; thus a period covering 1st January 2000 through 31st December 2000 is denoted [2000,2001).

<sup>†</sup> Calculated from studies which undertake specialized analyses of routine reporting of maternal deaths.

<sup>‡</sup> Survey data has been adjusted by 1.1 for underreporting and standardized by age when obtained using the direct sisterhood method.

## Data from studies excluded in regression

Table 5: Data from studies excluded in regression

Study period*	Source	Source type	Reason for exclusion
[1982.33, 1989.33)	DHS 1998	Miscellaneous	Start date before 1985
[1984.16, 1989.16)	DHS 1994	Miscellaneous	Start date before 1985
[2000, 2001)	Census	Census	Quality of census measurement not clear

\* Kindly note the interpretation of notation: for a period [a,b) the observation starts on date a and ends before date b; thus a period covering 1st January 2000 through 31st December 2000 is denoted [2000,2001).

## Predictor variables used in the model

Table 6: Predictor variables used in the model

Year	GDP <sup>a*</sup> (Per capita, PPP)	GFR <sup>b</sup> (Per 1000 women ages 15-49)	SBA <sup>c</sup> (%)
2000	5422	130	64
2005	5768	110	73
2010	6669	100	82
2015	7957	90	86
2020	8363	80	85

<sup>a</sup> WHO, MMEIG. Gross domestic product (GDP) per capita measured in purchasing power parity (PPP) equivalent dollars using 2017 as the baseline year were taken from World Bank's World Development Indicators (WDI) database, and in instances supplemented by unofficial estimates derived by MMEIG using growth rates in United Nations GDP data and/or previous MMEIG GDP estimates. Geneva; 2021.

<sup>b</sup> General fertility rate (GFR) from UN Population Division, Department of Economic and Social Affairs. World Population Prospects. New York; 2022.

<sup>c</sup> Skilled Birth Attendant (SBA) from WHO, UNICEF joint SBA database. Geneva; 2022. In some instances, supplemented with unofficial estimates derived by MMEIG. Annual series were estimated by fitting a multilevel time series (AR1) model with region- and country-specific intercepts and slopes.

\* A 5-year moving average was calculated.

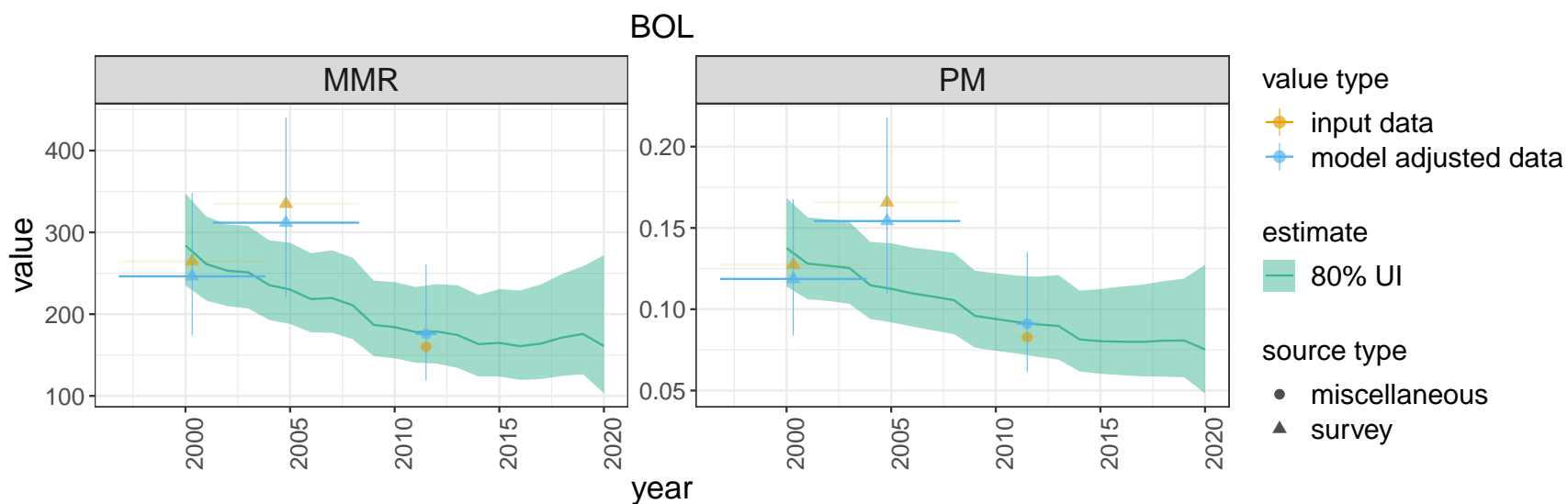
## Estimates

(Input data) The following adjustments were applied to maternal deaths depending on the source type:

1. An age-standardization was applied to population based surveys that obtained data from the direct sisterhood method.
2. An upward adjustment of 10% was applied to all input data that were not obtained from CRVS or specialized studies, to account for underreporting.

(Model adjusted data) The following model adjustments were applied to maternal deaths depending on the source type and the definition of reported deaths

1. A model adjustment derived from BMIs was applied to maternal deaths obtained from CRVS.
2. A model adjustment was applied to observations of pregnancy-related deaths to remove accidental/incidental (non-maternal) deaths from the count.





## Crisis years

The criteria for crisis-years are described below.

- 1) 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 (12) and in addition (c) in the five-year period surrounding the year, there are at most two additional crisis years; and
- 2) 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 (this includes crises in potentially longer periods, i.e. for recent ongoing crises).

Table 7: Crisis years

Year	Crisis deaths <sup>a</sup> women ages 15-49
2020	1266

<sup>a</sup> UN Population Division, Department of Economic and Social Affairs. World Population Prospects. New York; 2022.