

## Maternal Mortality Botswana 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	182 [153, 223]	0.02 [0.02, 0.02]	45	50	91
2005	201 [172, 237]	0.02 [0.02, 0.02]	42	54	109
2010	156 [138, 177]	0.03 [0.02, 0.03]	27	58	90
2015	184 [164, 207]	0.05 [0.05, 0.06]	17	61	112
2020	186 [151, 230]	0.06 [0.05, 0.08]	13	62	115

<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	-0.08 [-1.49, 1.36]	-1.53 [-34.69, 23.78]
2010, 2020	-1.77 [-4.28, 0.71]	-19.32 [-53.36, 6.87]

\* 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

No data excluded

## Data from other sources

Table 3: Data from other sources

Study period*	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>
[2005, 2006)	CSO Stats Brief 2009/17	Miscellaneous	71	NA	NA	0.0164971	NA	157.70	173.470	NA	NA	NA
[2006, 2007)	CSO Stats Brief 2009/17	Miscellaneous	62	NA	NA	0.0152277	NA	139.79	153.769	NA	NA	NA
[2007, 2008)	CSO Stats Brief 2009/17	Miscellaneous	82	NA	NA	0.0223598	NA	183.47	201.817	NA	NA	NA
[2008, 2009)	CSO Stats Brief 2014/2	Miscellaneous	88	NA	NA	0.0267416	NA	195.73	215.303	NA	NA	NA
[2009, 2010)	CSO Stats Brief 2014/2	Miscellaneous	86	NA	NA	0.0293515	NA	189.57	208.527	NA	NA	NA
[2010, 2011)	CSO Stats Brief 2014/2	Miscellaneous	82	NA	NA	0.0287443	NA	163.00	179.300	NA	NA	NA
[2011, 2012)	CSO Stats Brief 2014/2	Miscellaneous	85	NA	NA	0.0370437	NA	188.86	207.746	NA	NA	NA
[2012, 2013)	CSO Stats Brief 2014/2	Miscellaneous	74	NA	NA	0.0287464	NA	147.90	162.690	NA	NA	NA
[2013, 2014)	CSO Stats Brief 2014/1	Miscellaneous	91	NA	NA	0.0421709	NA	182.60	200.860	NA	NA	NA
[2014, 2015)	CSO Botswana - Maternal mortality ratio 2011 - 2015	Miscellaneous	72	NA	NA	0.0321719	NA	127.00	139.700	NA	NA	NA
[2014, 2015)	Statistics Botswana, 2022	Miscellaneous	72	NA	NA	0.0384037	NA	151.60	166.760	NA	NA	NA
[2015, 2016)	CSO Botswana - Maternal mortality ratio 2011 - 2015	Miscellaneous	73	NA	NA	0.0417499	NA	151.60	166.760	NA	NA	NA
[2015, 2016)	Statistics Botswana, 2022	Miscellaneous	73	NA	NA	0.0349752	NA	127.00	139.700	NA	NA	NA
[2016, 2017)	Maternal Mortality Ratio 2017	Miscellaneous	85	NA	NA	0.0533963	NA	156.60	172.260	NA	NA	NA
[2016, 2017)	Statistics Botswana, 2022	Miscellaneous	85	NA	NA	0.0533963	NA	156.60	172.260	NA	NA	NA
[2017, 2018)	Maternal Mortality Ratio 2017	Miscellaneous	75	NA	NA	0.0581428	NA	143.20	157.520	NA	NA	NA
[2017, 2018)	Statistics Botswana, 2022	Miscellaneous	75	NA	NA	0.0581428	NA	143.20	157.520	NA	NA	NA
[2018, 2019)	Statistics Botswana, 2022	Miscellaneous	71	NA	NA	0.0385912	NA	133.70	147.070	NA	NA	NA

Table 3: Data from other sources (*continued*)

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>
[2019, 2020)	Statistics Botswana, 2022	Miscellaneous	87	NA	NA	0.0496179	NA	166.30	182.930	NA	NA	NA
[2020, 2021)	Statistics Botswana, 2022	Miscellaneous	76	NA	NA	0.0426066	NA	130.50	143.550	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

No data excluded

## Predictor variables used in the model

Table 4: 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	10506	110	96
2005	11897	100	98
2010	13379	100	99
2015	15628	100	100
2020	15830	90	100

<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.

