Maternal Mortality Brazil 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[a*†]	PM[b*†]	HIV-related indirect deaths[†]	Live births[c] (Thousands)	Maternal deaths[†]
2000	68 [67, 70]	0.03 [0.03, 0.03]	0	3489	2386
2005	70 [68, 72]	0.03 [0.03, 0.03]	0	3238	2266
2010	64 [62, 65]	0.03 [0.03, 0.03]	0	3042	1942
2015	62 [61, 64]	0.03 [0.03, 0.03]	0	3022	1879
2020	72 [57, 93]	0.03 [0.03, 0.04]	0	2787	2011

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

[b] 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.

[c] 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	-0.26 [-1.55, 0.95]	-5.41 [-36.22, 17.22]
2010, 2020	-1.23 [-3.74, 1.19]	-13.11 [-45.35, 11.24]

* 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)

Table 3: Data from civil registration vital statistics system (CRVS)

Study period*	Maternal deaths[a]	Female deaths[b]	CRVS adjustment factor[c †]	Sensitivity[d †]	Specificity[e †]	Completeness[f †]	Usability[g]	Maternal deaths not included[h]
[1995, 1996)	1607	60959	2.113113	0.4689515	0.9997684	70.75339	0.6104100	NA
[2018, 2019)	1626	61926	1.292619	0.7583070	0.9995309	100.00000	0.9495365	NA
[2019, 2020)	1546	62554	1.293214	0.7583070	0.9995309	100.00000	0.9436487	NA

[a] Maternal deaths from CRVS defined as ICD10 codes O00-O95; O98-O99 Pregnancy, childbirth and the puerperium and A34 Obstetrical tetanus. Late maternal deaths (O96) and those deaths due to sequalae of obstetric complications (O97) are excluded for the purposes of international comparison. WHO. International statistical classification of diseases and related health problems. Geneva; 2010.

[b] Female deaths 15-49 from the Civil Registration and Vital Statistics System (CRVS).

[c] CRVS adjustment factor = adjustment factor to account for the difference between CRVS-reported PM and true PM.

[d] Sensitivty = proportion of correctly classified maternal deaths out of all true maternal deaths.

[e] Specificity = proportion of correctly classified non-maternal deaths out of all true non-maternal deaths.

[f] Completeness = percentage of registered deaths of females of reproductive age.

[g] Usability = percentage of deaths that is estimated to be recorded with a well-defined code; completeness proportion*(1-proportion ill-defined)*100.

[h] Did not meet inclusion criteria due to: 1) low completeness and usability, or 2) other specialized studies are used. Please see next section of the profile for details.

[*] 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).

[†] Peterson E, Chou D, Moller A-B, Gemmill A, Say L, Alkema L. Estimating maternal mortality using data from national civil registration vital statistics systems: A Bayesian hierarchical bivariate random walk model to estimate sensitivity and specificity of reporting. arXiv:190908578 [stat] [Internet]. 2019 Sep 18 [cited 2021 Aug 11]; Available from: http://arxiv.org/abs/1909.08578.

Excluded data from CRVS

Table 4: Excluded data from CRVS

Study period*	Completeness[a]	Usability[b]	Reason for exclusion
[1985, 1986)	58.28606	49.87032	Usability < 60%
[1986, 1987)	60.72398	50.91144	Usability < 60%
[1987, 1988)	60.44655	51.17351	Usability < 60%
[1988, 1989)	61.73500	52.17499	Usability < 60%
[1989, 1990)	61.52560	52.44273	Usability < 60%
[1990, 1991)	61.11433	52.86268	Usability < 60%
[1991, 1992)	61.07173	53.54203	Usability < 60%
[1992, 1993)	62.65979	54.87248	Usability < 60%
[1993, 1994)	66.70461	56.49388	Usability < 60%
[1994, 1995)	69.07667	58.98734	Usability < 60%
[1996, 1997)	72.84054	63.05763	CRVS overlaps with specialized study
[1997, 1998)	72.02040	64.19593	CRVS overlaps with specialized study
[1998, 1999)	74.12948	64.88408	CRVS overlaps with specialized study
[1999, 2000)	74.61853	65.43559	CRVS overlaps with specialized study
[2000, 2001)	76.18249	67.13360	CRVS overlaps with specialized study
[2001, 2002)	78.25705	68.22168	CRVS overlaps with specialized study
[2002, 2003)	78.65775	69.63271	CRVS overlaps with specialized study
[2003, 2004)	78.35955	71.20024	CRVS overlaps with specialized study
[2004, 2005)	80.92424	72.45404	CRVS overlaps with specialized study
[2005, 2006)	82.35239	74.91751	CRVS overlaps with specialized study
[2006, 2007)	83.61118	77.69569	CRVS overlaps with specialized study
[2007, 2008)	84.56419	79.73760	CRVS overlaps with specialized study
[2008, 2009)	87.28852	81.71501	CRVS overlaps with specialized study
[2009, 2010)	90.56575	83.76930	CRVS overlaps with specialized study
[2010, 2011)	91.79843	85.63351	CRVS overlaps with specialized study
[2011, 2012)	92.78343	87.61605	CRVS overlaps with specialized study
[2012, 2013)	94.30829	89.45762	CRVS overlaps with specialized study
[2013, 2014)	96.52017	91.05275	CRVS overlaps with specialized study
[2014, 2015)	98.08873	93.46596	CRVS overlaps with specialized study
[2015, 2016)	100.00000	95.09782	CRVS overlaps with specialized study
[2016, 2017)	100.00000	94.64614	CRVS overlaps with specialized study

Table 4: Excluded data from CRVS *(continued)*

Study period*	Completeness[a]	Usability[b]	Reason for exclusion
[2017, 2018)	100.00000	95.10106	CRVS overlaps with specialized study

[a] Completeness = percentage of registered deaths of females of reproductive age.
[b] 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 5: Data from other sources

Study period*	Source	Source type	Maternal deaths[a]	Preganancy-related deaths[b]	Female deaths, 15-49	Maternal PM[c]	Pregnancy-related PM[d‡]	MMR per 100,000 lb[e]	Adjusted MMR per 100,000 lb	F+[f†]	F-[g†]	U+[h†]
[1989.33, 1996.33)	DHS 1996	Survey	NA	NA	NA	NA	0.1096775	258.22173	238.19773	NA	NA	NA
[1996, 1997)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	3039	NA	62031	0.0489916	NA	115.02971	115.02971	NA	NA	NA
[1997, 1998)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	3319	NA	60863	0.0545323	NA	127.30432	127.30432	NA	NA	NA
[1998, 1999)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	3467	NA	62185	0.0557530	NA	129.84318	129.84318	NA	NA	NA
[1999, 2000)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	3004	NA	62008	0.0484454	NA	113.49900	113.49900	NA	NA	NA
[2000, 2001)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2351	NA	80529	0.0291945	NA	67.38320	67.38320	NA	NA	674
[2001, 2002)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2209	NA	61431	0.0359590	NA	82.20003	82.20003	NA	NA	NA
[2002, 2003)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2321	NA	61965	0.0374566	NA	88.02978	88.02978	NA	NA	NA
[2003, 2004)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2217	NA	61763	0.0358953	NA	86.81392	86.81392	NA	NA	NA

Table 5: Data from other sources *(continued)*

Study period*	Source	Source type	Maternal deaths[a]	Preganancy-related deaths[b]	Female deaths, 15-49	Maternal PM[c]	Pregnancy-related PM[d ‡]	MMR per 100,000 lb[e]	Adjusted MMR per 100,000 lb	F+[f †]	F-[g †]	U+[h †]
[2004, 2005)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2302	NA	62043	0.0371033	NA	87.33914	87.33914	NA	NA	NA
[2005, 2006)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2267	NA	74452	0.0304491	NA	70.01235	70.01235	NA	NA	647
[2006, 2007)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2272	NA	61639	0.0368598	NA	85.39723	85.39723	NA	NA	NA
[2007, 2008)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2226	NA	61879	0.0359734	NA	84.28818	84.28818	NA	NA	NA
[2008, 2009)	Country consultation: Maternal mortality in Brazil, 1996 - 2012	Specialized study	2017	NA	62997	0.0320174	NA	75.21900	75.21900	NA	NA	NA
[2009, 2010)	PAHO maternal mortality data set (reflecting communication on data requests collected via questionnaire). November - December, 2018	Specialized study	2087	NA	71622	0.0291391	NA	68.26955	68.26955	42	424	224
[2010, 2011)	PAHO maternal mortality data set (reflecting communication on data requests collected via questionnaire). November - December, 2018	Specialized study	1973	NA	70011	0.0281813	NA	64.85865	64.85865	49	333	254

Table 5: Data from other sources *(continued)*

Study period*	Source	Source type	Maternal deaths[a]	Preganancy-related deaths[b]	Female deaths, 15-49	Maternal PM[c]	Pregnancy-related PM[d ‡]	MMR per 100,000 lb[e]	Adjusted MMR per 100,000 lb	F+[f †]	F-[g †]	U+[h †]
[2011, 2012)	PAHO maternal mortality data set (reflecting communication on data requests collected via questionnaire). November - December, 2018	Specialized study	1800	NA	69964	0.0257275	NA	59.32762	59.32762	42	349	185
[2012, 2013)	PAHO maternal mortality data set (reflecting communication on data requests collected via questionnaire). November - December, 2018	Specialized study	1724	NA	68714	0.0250895	NA	57.71677	57.71677	26	364	139
[2013, 2014)	PAHO maternal mortality data set (reflecting communication on data requests collected via questionnaire). November - December, 2018	Specialized study	1803	NA	67101	0.0268699	NA	60.85049	60.85049	28	425	113
[2014, 2015)	PAHO maternal mortality data set (reflecting communication on data requests collected via questionnaire). November - December, 2018	Specialized study	1900	NA	64983	0.0292384	NA	63.29114	63.29114	54	403	0
[2015, 2016)	PAHO maternal mortality data set (reflecting communication on data requests collected via questionnaire). November - December, 2018	Specialized study	1872	NA	64004	0.0292482	NA	61.94573	61.94573	13	417	0

Table 5: Data from other sources *(continued)*

Study period*	Source	Source type	Maternal deaths[a]	Preganancy-related deaths[b]	Female deaths, 15-49	Maternal PM[c]	Pregnancy-related PM[d ‡]	MMR per 100,000 lb[e]	Adjusted MMR per 100,000 lb	F+[f †]	F-[g †]	U+[h †]
[2016, 2017)	PAHO maternal mortality data set (reflecting communication on data requests collected via questionnaire). November - December, 2018	Specialized study	1841	NA	62078	0.0296562	NA	63.37349	63.37349	16	401	0
[2017, 2018)	Country consultation 2019	Specialized study	1719	NA	60844	0.0282526	NA	58.23171	58.23171	31	415	0

[a] Maternal deaths defined according to the ICD-10.
[b] Pregnancy-related deaths defined according to ICD-10.
[c] Maternal PM is calculated when deaths are defined as maternal.
[d] Pregnancy-related PM is calculated when reported deaths are defined as pregnancy related deaths.
[e] The MMR in this column is calculated from the PM.
[f] False positive: true non-maternal death which may be incorrectly labeled as a maternal death.
[g] False negative: maternal death which may be incorrectly classified as a non-maternal death.
[h] Maternal deaths not registered in the CRVS.
[*] 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).
[†] Calculated from studies which undertake specialized analyses of routine reporting of maternal deaths.
[‡] 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 6: Predictor variables used in the model

Year	GDP[a*] (Per capita, PPP)	GFR[b] (Per 1000 women ages 15-49)	SBA[c] (%)
2000	11533	70	98
2005	12631	60	99
2010	14751	60	99
2015	15119	50	99
2020	14521	50	99

[a] 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.

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

[c] 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.

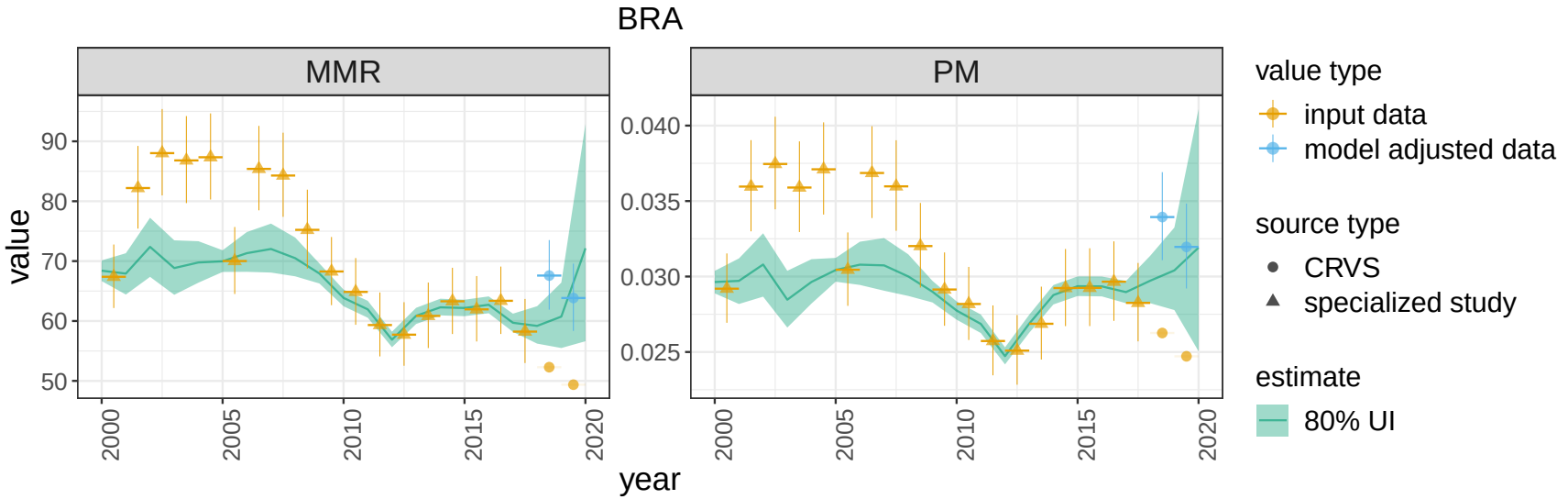
Estimates

(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[a] women ages 15-49
2020	10362

[a] UN Population Division, Department of Economic and Social Affairs. World Population Prospects. New York; 2022.