

# Maternal mortality in 2000-2017

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

WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division

## UNITED STATES OF AMERICA

Year	Maternal mortality ratio (MMR) <sup>a,*</sup>	Maternal deaths <sup>*</sup>	HIV-related indirect maternal deaths <sup>*</sup>	Live births <sup>b</sup>	Proportion of maternal deaths among deaths of female reproductive age (PM, %) <sup>a,*</sup>
	Per 100 000 live births (lb)	Numbers	Numbers	Thousands	
2000	12 [12-12] <sup>c</sup>	470	19	3961	<0.1
2005	13 [13-14]	560	13	4135	<0.1
2010	15 [14-15]	600	10	4074	<0.1
2015	18 [16-19]	680	6	3900	<0.1
2017	19 [17-21]	720	5	3899	<0.1

<sup>a</sup> MMR and PM are calculated for women 15-49 years.

<sup>b</sup> Live birth data are from United Nations, Population Division. World Population Prospects 2019. New York: UN Population Division, Department of Economic and Social Affairs, 2019.

<sup>c</sup> 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.

<sup>\*</sup> 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 (%)	
2000-2017	-2.6 [-3.3, -1.9]
2010-2017	-3.4 [-5.2, -1.7]

## Available data sources

Data from civil registration vital statistics system (CRVS):

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Maternal deaths <sup>c</sup>	292	272	250	329	320	343	320	316	301	328	276
Female deaths <sup>e</sup>	63665	65923	67365	68895	69423	69753	71656	72133	75364	77628	79539
Adjustment factor <sup>f</sup>	1.45	1.45	1.45	1.45	1.45	1.44	1.44	1.44	1.44	1.43	1.42
Sensitivity <sup>g</sup>	0.584	0.584	0.584	0.584	0.584	0.584	0.584	0.584	0.584	0.598	0.612
Specificity <sup>h</sup>	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993	0.9993	0.9994	0.9995
Completeness <sup>i</sup>	100	100	100	100	100	100	100	100	100	100	100
Usability <sup>j</sup>	97.6	97.5	97.2	97.3	97.6	97.8	97.9	98	97.9	98	97.6
Maternal deaths not included <sup>k</sup>	–	–	–	–	–	–	–	–	–	–	–
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Maternal deaths <sup>c</sup>	293	323	–	–	–	–	–	–	–	–	–
Female deaths <sup>e</sup>	78912	76973	–	–	–	–	–	–	–	–	–
Adjustment factor <sup>f</sup>	1.42	1.42	–	–	–	–	–	–	–	–	–
Sensitivity <sup>g</sup>	0.626	0.640	–	–	–	–	–	–	–	–	–
Specificity <sup>h</sup>	0.9995	0.9996	–	–	–	–	–	–	–	–	–
Completeness <sup>i</sup>	100	100	–	–	–	–	–	–	–	–	–
Usability <sup>j</sup>	97.9	97.9	–	–	–	–	–	–	–	–	–
Maternal deaths not included <sup>k</sup>	–	–	281	391	395	396	356	482	517	599	553
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Maternal deaths <sup>c</sup>	–	–	–	–	–	–	–	764	715	754	–
Female deaths <sup>e</sup>	–	–	–	–	–	–	–	75193	76872	80314	–
Adjustment factor <sup>f</sup>	–	–	–	–	–	–	–	0.89	0.90	0.90	–
Sensitivity <sup>g</sup>	–	–	–	–	–	–	–	0.778	0.778	0.778	–
Specificity <sup>h</sup>	–	–	–	–	–	–	–	0.9971	0.9971	0.9971	–
Completeness <sup>i</sup>	–	–	–	–	–	–	–	100	100	100	–
Usability <sup>j</sup>	–	–	–	–	–	–	–	98.2	98.1	98.2	–
Maternal deaths not included <sup>k</sup>	531	631	650	643	699	704	748	–	–	–	–

<sup>d</sup> ICD10 codes O00-O95; O98-O99 Pregnancy, childbirth and the puerperium and A34 Obstetrical tetanus; ICD9 codes 630-676 Complications of pregnancy, childbirth and the puerperium.

Late maternal deaths (O96) and those deaths due to sequelae of obstetric complications (O97) are excluded for the purposes of international comparison.

<sup>e</sup> Female deaths data are from Life tables for WHO Member States. World Health Organization, Geneva; 2018.

<sup>f</sup> Please refer to the MMR Report for details available at: [www.who.int/reproductivehealth/publications/maternal-mortality-2017/en/](http://www.who.int/reproductivehealth/publications/maternal-mortality-2017/en/).

<sup>g</sup> Proportion of correctly classified maternal deaths out of all true maternal deaths.

<sup>h</sup> Proportion of correctly classified non-maternal deaths out of all true non-maternal deaths.

<sup>i</sup> Completeness = percentage of registered deaths of females of reproductive age. See Section 3.1.1 in attached technical notes.

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

<sup>k</sup> 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.

## Available data sources (continued)

**Excluded data from CRVS:**

Study period	Completeness <sup>1</sup>	Usability <sup>m</sup>	Reasons for exclusion
1998-1999	100	98.0	CRVS overlaps with spec. study
1999-2000	100	97.9	CRVS overlaps with spec. study
2000-2001	100	97.0	CRVS overlaps with spec. study
2001-2002	100	96.9	CRVS overlaps with spec. study
2002-2003	100	97.6	CRVS overlaps with spec. study
2003-2004	100	97.5	CRVS overlaps with spec. study
2004-2005	100	98.0	CRVS overlaps with spec. study
2005-2006	100	97.7	CRVS overlaps with spec. study
2006-2007	100	98.2	CRVS overlaps with spec. study
2007-2008	100	98.3	CRVS overlaps with spec. study
2008-2009	100	97.8	CRVS overlaps with spec. study
2009-2010	100	97.5	CRVS overlaps with spec. study
2010-2011	100	98.2	CRVS overlaps with spec. study
2011-2012	100	98.3	CRVS overlaps with spec. study
2012-2013	100	98.1	CRVS overlaps with spec. study
2013-2014	100	98.1	CRVS overlaps with spec. study

<sup>1</sup> Completeness = percentage of registered deaths of females of reproductive age (please refer to the MMR Report for details available at: [www.who.int/reproductivehealth/publications/maternal-mortality-2017/en/](http://www.who.int/reproductivehealth/publications/maternal-mortality-2017/en/)).

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

## Available data sources (continued)

Data from other sources:

Study period	Source	Maternal deaths <sup>n</sup>	Pregnancy-related deaths <sup>o</sup>	Female deaths, 15-49	Maternal PM <sup>p</sup>	Pregnancy-related PM <sup>q</sup>	Reported MMR per 100,000 lb	Adjusted MMR per 100,000 lb	F <sup>+r,u</sup>	F <sup>-s,u</sup>	U <sup>+t,u</sup>
1998-1999	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	404		76647	0.5			10			
1999-2000	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	469		77992	0.6			12			
2000-2001	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	504		79044	0.6			13			
2001-2002	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	517		83364	0.6			13			
2002-2003	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	468		83224	0.6			12			
2003-2004	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	584		83704	0.7			14			
2004-2005	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	528		82493	0.6			13			
2005-2006	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	550		82979	0.7			13			
2006-2007	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	570		82752	0.7			14			

Study period	Source	Maternal deaths <sup>n</sup>	Pregnancy-related deaths <sup>o</sup>	Female deaths, 15-49	Maternal PM <sup>p</sup>	Pregnancy-related PM <sup>q</sup>	Reported MMR per 100,000 lb	Adjusted MMR per 100,000 lb	F+ <sup>r,u</sup>	F- <sup>s,u</sup>	U+ <sup>t,u</sup>
2007-2008	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	547		80821	0.7			13			
2008-2009	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	583		79601	0.7			14			
2009-2010	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	632		79679	0.8			15			
2010-2011	Country consultation 2015: CDC's Pregnancy Mortality Surveillance System	571		76165	0.7			14			
2011-2014	Pregnancy-Related Mortality in the United States 2011-2013	1883		225610	0.8			16			

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

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

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

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

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

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

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

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

## Available data sources (continued)

Data from studies **excluded** in regression:

Study period	Citation	Reasons for exclusion
1999-2003	Changes in Pregnancy Mortality Ascertainment: United States, 1999-2005	Annual information available in alternate study
2006-2011	Pregnancy-related mortality in the United States, 2006-2010	Annual information available in alternate study

## Predictor variables used in the model

Year	GDP per capita, PPP (constant 2011 Int \$) <sup>v</sup>	General Fertility Rate per 1000 women 15-49	Skilled Birth Attendant (% of births)
2000	44903	56	99.0
2005	49213	57	99.0
2010	49798	56	99.0
2015	52916	53	99.0
2017	54243	52	99.0

<sup>v</sup> 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.

*Source:* World Bank, International Comparison Program Database. July 30, 2019.

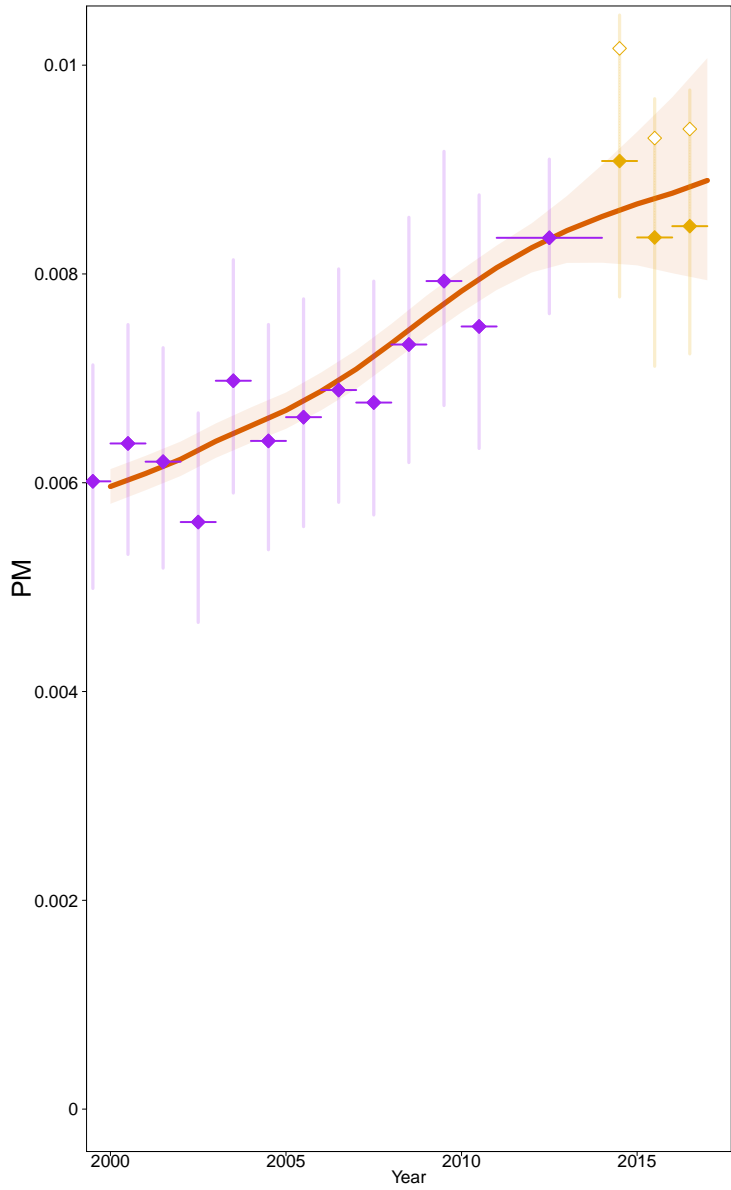
General fertility rate

*Source:* World Population Prospects 2019. New York: UN Population Division, Department of Economic and Social Affairs, 2019.

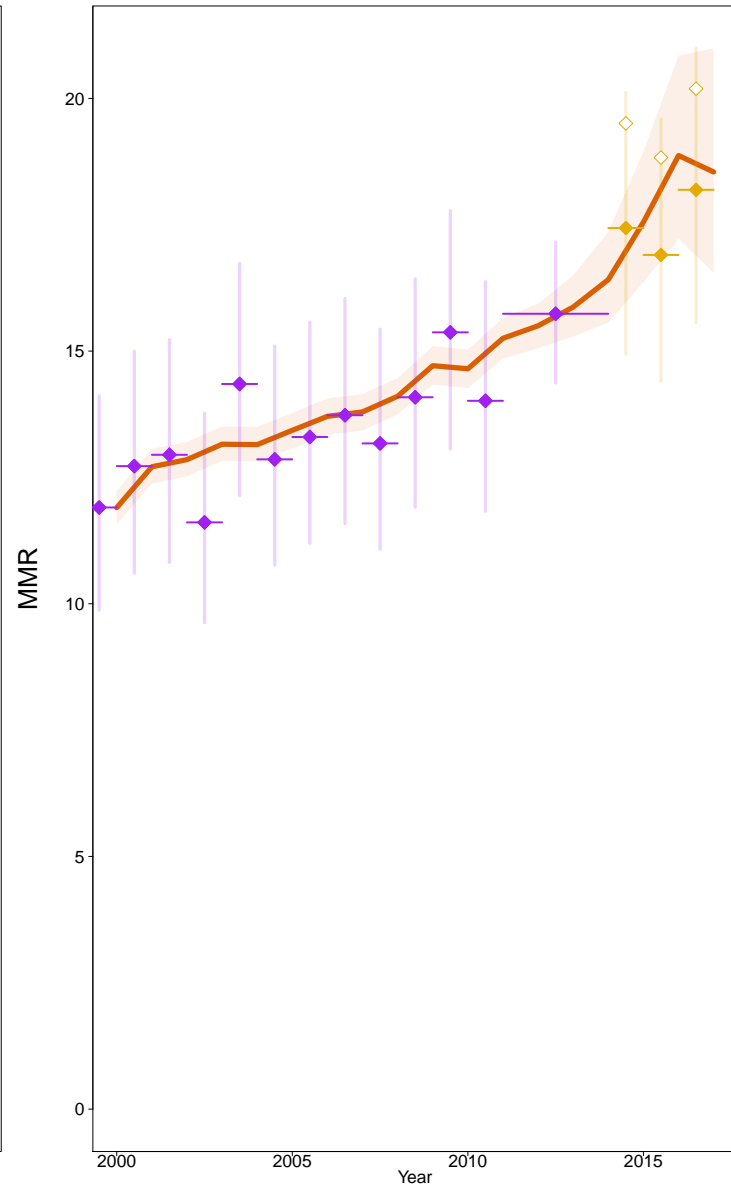
Percentage of births attended by skilled health personnel (doctors, nurses or midwives).

*Source:* WHO, UNICEF. WHO and UNICEF Joint Skilled Birth Attendant (SBA) database. Geneva: WHO; 2019.

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- Estimates -
- BMat 2019
- Observed Data
- Adjusted Data
- Data type -
- CRVS
- Spec. studies