Trends in maternal mortality estimates 2000 to 2023

Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA / Population Division

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Meryem Mohammd 28 gave birth to her third child at Barbara May Maternity Hospital , Ethipioa, through surgery ©UNICEF Ethiopia

Foreword

Since the turn of the century, the world has made huge strides against maternal mortality: a 40% reduction between 2000 and 2023. This report presents more good news: in 2023, for the first time, no countries fell into the extremely high maternal mortality category (defined as over 1000 maternal deaths per 100 000 live births). Additionally, more than one-third of countries surveyed have very low maternal mortality.

Real progress has occurred, including in some of the world's poorest settings. For example, countries including Rwanda and Sri Lanka have reduced maternal mortality dramatically by expanding midwifery services and improving rural healthcare access – strategies that can be shared and adapted to other contexts. I applaud the countries that have achieved the progress reflected here. Their leadership proves that change is possible.

These gains have been driven by advances in research and service delivery. For instance, the use of a simple, low-cost device called a 'drape', combined with WHO-recommended treatments, has been shown to reduce severe bleeding from postpartum haemorrhage by 60%, saving many lives. Providing maternal care during humanitarian emergencies through mobile clinics and health posts saves millions of women and babies who would otherwise miss out on lifesaving medical screenings, vaccinations and treatments.

Despite these gains, progress has slowed since 2016, and reductions in maternal mortality are still far too slow to meet the targets in the Sustainable Development Goals. Today, somewhere in the world, a woman still dies from complications during pregnancy and childbirth every two minutes – an estimated 260,000 in 2023.

Numbers can numb us, but it is crucial that we not normalize these events, when we know that nearly all the women in this report could have survived pregnancy and childbirth, if they had had sufficient access to lifesaving care before, during, and after delivery.

Instead, many lacked access to modern contraception, were denied control over their pregnancies due to violence, or went without essential antenatal monitoring. Others reached health facilities too late, only to find them ill-equipped, lacking the necessary interventions, medications, or the ability to prevent, detect, and treat life-threatening complications like haemorrhage and infection.

Preventable deaths from maternal mortality are deeply rooted in poverty and inequality. Nearly all occur in low-and middle-income countries and communities – the same countries and communities that will be hardest hit by reductions in funding for global health. A woman in sub-Saharan Africa is 400 times more likely to die in childbirth than a woman in Australia and New Zealand.

Even as we work to expand access to services for maternal care, we must pay careful attention to the quality of those services and the skills of the health workers who deliver them, while also addressing other health needs that increase the risk of complications, including noncommunicable and communicable diseases.

When the rights of girls and women are protected and they have access to the services and information they need to control their own lives and bodies, unintended pregnancies, unsafe abortions and maternal deaths fall, while opportunities to participate in education and the workforce increase.

Maternal mortality is not a mystery. We know why it happens, and we have the tools to prevent it. The question, therefore, is not whether we can end preventable maternal deaths, but whether we will.

Dr Tedros Adhanom Ghebreyesus
Director-General, World Health Organization

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From each of the constituent agencies, the following individuals were members of the MMEIG:[1]

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[1] All lists of names are given in alphabetical order by last name.

[2] Technical advice provided prior to 20 January 2025.

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Abbreviations

ARR	annual rate of reduction
BMat model	Bayesian maternal mortality estimation model
BMis model	Bayesian maternal mortality misclassification model for CRVS adjustment
CRVS	civil registration and vital statistics
DHS	Demographic and Health Survey
EPMM	ending preventable maternal mortality
F+/F–	false positive/false negative
GDP	gross domestic product
GFR	general fertility rate
ICD	International statistical classification of diseases and related health problems[3]
LDCs	least developed countries
LLDCs	landlocked developing countries
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MMEIG	United Nations Maternal Mortality Estimation Inter-Agency Group
MMR	maternal mortality ratio
MMRate	maternal mortality rate
PHEIC	Public Health Emergency of International Concern
PM	proportion maternal (i.e. proportion of deaths among women of reproductive age that are due to maternal causes)
PPP	purchasing power parity
RAMOS	reproductive-age mortality study
SBA	skilled birth attendant
SDG	Sustainable Development Goal
Se	sensitivity
SIDS	small island developing States
Sp	specificity
T+/T–	true positive/true negative
TAG	technical advisory group
UHC	universal health coverage

[3] ICD-10 and ICD-11 are both referred to in this document; the numbers indicate the revision (edition) number.

UI	uncertainty interval
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VR	vital registration
WHO	World Health Organization

Nikolett Mitala and Orsolya Heim are cousins living in Budapest, Hungary. Both 29 years old, they are also pregnant with their first babies and nearing the end of their second trimester.

Executive summary

The Sustainable Development Goals (SDGs) came into effect on 1 January 2016 for the 15-year period ending on 31 December 2030. Of the 17 SDGs, the health-related targets can be found in **SDG 3: Ensure healthy lives and promote well-being for all at all ages**. The goal for ending preventable maternal mortality – **SDG target 3.1: "By 2030, reduce the global maternal mortality ratio [MMR] to less than 70 per 100 000 live births"** – is based on a 2014 World Health Organization (WHO) consensus statement on *Targets and strategies for ending preventable maternal mortality (EPMM)* and an EPMM strategy paper published in 2015, which outlined five strategic objectives. In November 2021, these strategic objectives were supplemented by additional global, national, and subnational EPMM indicators and coverage targets to track progress to 2025, highlighting the need to increase coverage of quality maternal health care and improve women's ability to make their own decisions about their sexual and reproductive health (SRH). At the Seventy-seventh World Health Assembly in May 2024, a resolution was passed to **Accelerate progress towards reducing maternal, newborn and child mortality in order to achieve Sustainable Development Goal targets 3.1 and 3.2,** in light of concerns that progress to advance the SDG agenda had stalled.

Methods and interpretation

The United Nations Maternal Mortality Estimation Inter-Agency Group (MMEIG) – comprising WHO, the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), the World Bank Group and the United Nations Department of Economic and Social Affairs, Population Division (UNDESA/Population Division) – has collaborated with technical experts to develop this new round of global-, regional- and country-level maternal mortality estimates for the period 2000–2023. To provide increasingly accurate estimates of MMR, the previous estimation methods have been further refined to optimize use of country-level data. Official country consultations were conducted between October and December 2024. This process generated additional data for inclusion in the maternal mortality estimation model, demonstrating widespread expansion of in-country efforts to monitor maternal mortality.

This report presents internationally comparable global-, regional- and country-level estimates and trends for maternal mortality between 2000 and 2023.[4] A total of 195 countries and territories[5] met the criteria to be included the data analyses and in the results presented in this report. This is the second report to present estimates and trends for maternal mortality for years that fall within the SDG reporting period, covering the first eight years of the 15-year period, from the start of 2016 until the end of 2023. The new estimates and trends presented in this report supersede all previously published estimates for years that fall within the same time period. Care should be taken to use only these estimates for the interpretation of trends in maternal mortality from 2000 to 2023; due to modifications in methodology and changes in data availability, differences between these and previous estimates should not be interpreted as representing time trends. In addition, when interpreting changes in MMRs over time, one should take into consideration that it is easier to

[4] Estimates have been computed to maximize comparability across countries, thus they are not necessarily the same as official statistics of the countries, which may use alternative rigorous methods.

[5] In addition to 193 WHO Member States, the data include Puerto Rico, which is an Associate Member, and the occupied Palestinian territory, including east Jerusalem, which is a member in the Regional Committee for the WHO Eastern Mediterranean Region.

reduce the MMR when the level is high than when the MMR level is already low. Furthermore, at very low levels of maternal mortality, a small absolute change in the MMR can appear as a large relative difference. The full database, country profiles and all model specification codes used are available online: https://www.who.int/publications/i/item/9789240108462.

For all outcomes of interest, uncertainty was assessed and reported in terms of uncertainty intervals (UIs),[6] which have an 80% probability of containing the true value.

Global estimates for 2023 and trends for 2000–2023

There was limited progress in reducing maternal mortality in the first half of the SDG era. Globally, an estimated 260 000 women died from a maternal cause in 2023, equivalent to over 700 maternal deaths every day, and approximately one every two minutes. This is significantly lower than in 2000, when there were an estimated 443 000 maternal deaths.

The global MMR in 2023 was estimated at 197 (UI 174 to 234) maternal deaths per 100 000 live births, down from 328 (UI 308 to 352) in 2000 – a reduction of 40.0% over the full 24-year period. The average annual rate of reduction (ARR) in the global MMR from 2000 to 2023 was 2.2% (UI 1.4% to 2.8%), meaning that on average, the global MMR declined by 2.2% every year between 2000 and 2023, although progress was uneven during this period. The average ARR in the global MMR from 2016 to 2023 was 1.6% (UI 0.04% to 2.7%). If we assume that this pace of progress will continue until 2030, the global MMR will only be reduced to 177 per 100 000 live births, which is still two and a half times higher than the SDG global target of 70. Achieving SDG target 3.1 by 2030 would require an average ARR of 14.8% over the seven years remaining for observation (2024–2030).

The global lifetime risk of maternal mortality for a 15-year-old girl in 2023 was estimated at 1 in 272 – approximately half the risk faced by a 15-year-old girl in 2000 (1 in 130). The overall proportion of deaths to women of reproductive age (15–49 years) that are due to maternal causes (PM) was estimated at 8.9% in 2023 – down from 10.1% in 2016 and from 12.6% in 2000. This means that, compared with non-maternal causes of death to women of reproductive age, the relative fraction attributed to maternal causes is decreasing. In addition, the effect of HIV on maternal mortality has decreased over time: HIV-related indirect maternal deaths accounted for less than 1% of all maternal deaths in 2023.

Regional- and country-level estimates for 2023

Global trends obscure considerable variation and large inequalities in maternal survival between the regions of the world and countries within those regions. Looking at SDG regional groupings, in 2023, for the first time in this series of MMEIG reports, no SDG region had a “very high” MMR, but sub-Saharan Africa accounted for approximately 70% of global maternal deaths and was the only SDG region with a “high” MMR – estimated at 454 (UI 387 to 572) maternal deaths per 100 000 live births. Two regions had “moderate” MMRs – Oceania (excluding Australia and New Zealand) at 173 (UI 116 to 268) and Central and Southern Asia

[6] All uncertainty intervals (UIs) reported are 80% UI. The data can be interpreted as meaning that there is an 80% chance that the true value lies within the UI, a 10% chance that the true value lies below the lower limit and a 10% chance that the true value lies above the upper limit.

at 112 (UI 97 to 134). Australia and New Zealand had the lowest MMR, estimated at 3 (UI 2 to 4).

These regional differences in the MMR correspond to sizeable differences in the lifetime risk of dying from a maternal cause. A 15-year-old girl in Australia and New Zealand in 2023 had the lowest lifetime risk of dying from a maternal cause (1 in 21 248) – almost 400 times lower than the estimated risk in sub-Saharan Africa (1 in 55). Looking at the subregional level, only one subregion in the world had a very high MMR in 2023: Western Africa with an estimated 690 maternal deaths per 100 000 live births. Middle Africa was the only subregion to have a high MMR, estimated at 415.

The burden of maternal mortality also varies substantially by income group. In 2023, the least developed countries (LDCs) accounted for 43.9% of all maternal deaths in 2023, with an estimated MMR of 313 (UI 277 to 368) maternal deaths per 100 000 live births – almost 60% higher than the estimated global MMR – while the PM was 16.1% and the lifetime risk of maternal death was 1 in 83. Another grouping, the landlocked developing countries (LLDCs) accounted for 19.3% of all maternal deaths in 2023, with an estimated MMR of 284 (UI 244 to 343), while the PM was 14.8% and the lifetime risk of maternal death in an LLDC in 2023 was 1 in 95.

The small island developing States (SIDSs) had a moderate estimated MMR of 193 (UI 155 to 253) maternal deaths per 100 000 in 2023, with a PM of 8.2%, and a 1 in 260 lifetime risk of maternal death.

Emergent humanitarian settings, and conflict, post-conflict and disaster situations significantly hinder progress towards global goals for health and well-being, including targets for reducing maternal mortality. In 2023, the World Bank identified 17 countries and territories as affected by violent conflict and 20 other countries and territories that had high levels of institutional and social fragility. Collectively, these 37 countries and territories accounted for 61.4% of all maternal deaths in 2023. The MMR for the group of conflict-affected countries and territories was 504 (UI 413 to 674) maternal deaths per 100 000 live births – over double the world MMR, with a PM of 18.7%, and a 1 in 51 lifetime risk of maternal death. In countries and territories experiencing institutional and social fragility in 2023, the MMR was 368 (UI 300 to 473) with a PM of 15.1% and a lifetime risk of maternal death of 1 in 79.

The regional-level burden of maternal mortality conceals important differences between countries and territories. In 2023, no countries were estimated to have had “extremely high” maternal mortality. Nine countries were estimated to have had “very high” MMR, eight of which are in sub-Saharan Africa (from higher to lower): Nigeria (993; UI 718 to 1540), Chad (748; UI 493 to 1248), the Central African Republic (692; UI 333 to 1299), South Sudan (692; UI 400 to 1254), Liberia (628; UI 436 to 913), Somalia (563; UI 244 to 1089), Afghanistan (521; UI 339 to 942), Benin (518; UI 393 to 740) and Guinea-Bissau (505; UI 313 to 851). Fourteen countries had a “high” MMR, 43 countries had a “moderate” MMR, 130 countries had a “low” MMR (defined as MMR below 100), and of the latter, 74 had a very low MMR (defined as below 20).

Nigeria had the highest number of maternal deaths and accounted for more than a quarter (28.7%) of all estimated global maternal deaths in 2023, with approximately 75 000 deaths. Three other countries had more than 10 000 maternal deaths in 2023: India (19 000), the Democratic Republic of the Congo (19 000) and Pakistan (11 000) – accounting for 7.2%, 7.2% and 4.1% of global maternal deaths, respectively. Together, these four countries accounted for almost half (47%) of all maternal deaths globally in 2023. Five countries had more than 5000 maternal deaths (but fewer than 10 000) in 2023 (in order from higher to lower numbers): Ethiopia, Afghanistan, the United Republic of

Tanzania, Indonesia and Chad. A total of 84 countries were estimated to have had 20 or fewer maternal deaths in 2023.

Regarding the estimated lifetime risk of maternal mortality in 2023, the countries with the highest estimated risk were Chad and the Central African Republic; in both countries, a 15-year-old girl was estimated to have a 1 in 24 chance of dying of a maternal cause during her lifetime. This risk is 23 000 times greater than the equivalent risk in the Cook Islands, the country with the lowest risk in 2023 (1 in 550 710).

Regional- and country-level trends, between 2000 and 2023

Between 2000 and 2023, the MMR declined in all regions. The region of Central and Southern Asia achieved the greatest overall percentage reduction in MMR (72.9%) from 397 (UI 355 to 457) maternal deaths per 100 000 live births in 2000 to 112 (UI 97 to 134) in 2023. In other SDG regions, the MMR declined by 58.0% in Australia and New Zealand, 52.0% in Northern Africa and Western Asia, 45.1% in Eastern and South-Eastern Asia, 39.6% in sub-Saharan Africa, 38.2% in Oceania (excluding Australia and New Zealand) and 35.1% in Europe and Northern America between 2000 and 2023. Latin America and the Caribbean experienced the smallest reduction in MMR during this time period (16.8%).

During the first half of the SDG period, from 2016 to 2023, three regions achieved a significant reduction in the MMR: Australia and New Zealand (50%; UI 37.8% to 59.9%), Central and Southern Asia (26.5%; UI 16.7% to 33.5%) and sub-Saharan Africa (22.2%; UI 10.6% to 29.5%). The MMR stagnated in four regions during this time (i.e. the UIs crossed zero): Northern Africa and Western Asia, Eastern and South-Eastern Asia, Oceania (excluding Australia and New Zealand) and Europe and North America. The MMR increased significantly in this period in Latin America and the Caribbean with a change of –1.8% (UI –12.7% to –8.0%). This corresponds to an average ARR of –0.3% (UI –1.7% to 1.1%).

Between 2016 and 2023, progress in reducing the MMR was also apparent in the LDCs and LLDCs, with a 25.5% reduction in the MMR and an average ARR of 4.2% (UI 2.9% to 5.1%) in the former, and 31.2% reduction in the MMR and an average ARR of 5.3% (UI 3.8% to 6.6%) in the latter. However, the MMR stagnated in the SIDSs during this period, with a 3.9% (UI –11.9% to 15.5%) reduction in MMR and an average ARR of 0.6% (UI –1.6% to 2.4%).

The proportion of deaths due to maternal causes in women of reproductive age declined in all regions during the first half of the SDG era, with the largest reduction in sub-Saharan Africa, from 19.8% in 2016 to 16.9% in 2023.

In conflict-affected countries and territories, as defined by the World Bank, the MMR reduced by 21.5% in the same period, from 643 (UI 562 to 763) maternal deaths per 100 000 live births in 2016 to 504 (UI 413 to 674) in 2023, and by 14.5% in countries and territories with institutional and social fragility from 431 (UI 365 to 518) in 2016 to 368 (UI 300 to 473) in 2023.

In 35 countries, the overall reduction in MMR between 2000 and 2023 was greater than 70%. The largest change in MMR was observed in Belarus with 94.6% improvement, followed by Bhutan with 85.3% and Kazakhstan with 83.5%. The MMR unfortunately increased in 16 countries between 2000 and 2023, ranging from –162% in the Bolivarian Republic of Venezuela to –2.9% in Grenada. The increase in MMR was significant in four countries: Dominican Republic, Jamaica, USA and the Bolivarian Republic of Venezuela. The lifetime risk of maternal mortality declined in all countries between 2000 and 2023 except for nine countries, where it remained stable: Botswana, Canada, Cyprus, Dominican Republic,

Gabon, Greece, Portugal, USA and the Bolivarian Republic of Venezuela. The PM increased in 30 countries during this time, including 14 high-income countries and seven upper-middle-income countries.

In the first half of the SDG era, the overall change in MMR in the countries included in this report ranged from the largest overall reduction of 60.3% in Australia (ARR 13.2%) to the largest increase in mortality: −112.3% in Botswana (ARR −10.7%). The lifetime risk of maternal mortality decreased in all but 12 countries over this eight-year period, including two SIDSs and six LLDCs. The PM decreased in all but 20 countries between 2016 and 2023.

The COVID-19 pandemic was a global crisis that fell within the time range of the current estimates. The number of maternal deaths and MMR rose in 2021 mirroring the pattern of excess deaths among women aged 15–49 years between 2020 and 2021. However, the interruption to the downward trajectory of global MMR was short-lived. In 2022, the global MMR and number of maternal deaths were lower than they had been in the three years immediately prior to the COVID-19 Public Health Emergency of International Concern (PHEIC). The overall proportion of deaths due to maternal causes (PM) remained stable during the years of the PHEIC.

Conclusions

SDG 3 includes a direct global target to reduce maternal mortality to less than 70 maternal deaths per 100 000 live births by 2030. Despite the challenges of recent years, there have been successes in tackling maternal mortality; for example, in 2023, for the first time since the MMEIG started reporting, no countries had MMR higher than 1000 maternal deaths per 100 000 live births. Another promising development in 2023 was that over a third of countries globally had extremely low MMR. However, while progress has been made, the reduction in MMR remains insufficient to meet this global target by 2030.

Recent years have brought into sharp focus a range of external factors that affect the strength of health systems. Crises, including the COVID-19 pandemic, climate change, economic and political upheaval, and armed conflicts, have put some populations at greater risk of adverse maternal health outcomes. While having a direct impact on the health of the population, these crises also threaten the functioning of national health systems, and – when combined with social determinants, such as gender norms and racial biases – impede the delivery of health care services to those most in need.

Multisectoral action is essential to target the causes of maternal mortality, not only to achieve SDG target 3.1, but also related commitments in SDG 3 (good health and well-being), SDG 1 (end poverty in all its forms everywhere), SDG 5 (achieve gender equality and empower all women and girls) and SDG 10 (reduce inequalities). Nearly all maternal deaths, whether they result from direct causes such as obstetric haemorrhage, hypertensive disorders of pregnancy, unsafe abortion, or indirect obstetric causes (such as noncommunicable diseases), are preventable with evidence-based interventions that are accessible, affordable, and available through quality health services. But beyond biomedical causes, there are also four areas of determinants of maternal mortality that need to be addressed through multisectoral action.

First, it is crucial to recognize and address social determinants, including education, ethnicity, gender, income, and race, which impede women's access to and use of SRH services and are strong predictors of maternal mortality and morbidity. Socially marginalized women and girls are more likely to lack access to care and receive poor-quality care. Political commitment, sustainable financing

and a coherent strategic approach are essential to achieve universal access to SRH services.

Second, the health of vulnerable groups is often neglected as a result of deep-rooted inequalities in gender and social norms, which can permeate communities, families and interpersonal relationships, impeding women's health- and care-seeking behaviours. Within the health system, discrimination and bias can manifest in the advice given, the options offered, and the quality of care made available to service users, resulting in negative experiences and poor health-seeking behaviours relating to sexual and reproductive health and rights. A strong intersectional approach, applying a dignity, human-rights, and justice perspective to empowering women, reducing gender-based (and other intersecting forms of) inequality, and eliminating poverty, is essential to improve maternal health outcomes. Equity-informed maternal health interventions can help achieve justice in health.

Third, the health system has a central role in shaping women's experiences and outcomes during pregnancy, childbirth and the postpartum period. Access to safe, quality, respectful and affordable SRH care, including maternal health services, is integral to safeguarding rights and improving trust in institutions and services. Weak health systems with (i) insufficient numbers of adequately trained and competent health workers; (ii) shortages of essential medical supplies; and (iii) lack of accountability can result in poor-quality care. Strengthening health systems to increase the numbers of well trained and well supervised health workers; address shortages of essential medical supplies; and improve accountability to the rights of women and girls, can help achieve universal coverage of high-quality maternal health services for all.

Lastly, health systems must be able to respond to local needs and meet emerging challenges. Improving health facility capabilities, optimizing the health workforce, and sustainably financing health services can increase the strength and resilience of health systems to external shocks and disruptions, such as climate change, conflict, post-conflict and disaster situations, and pandemics – all of which hamper progress towards global health goals. The EPMM milestones include an imperative that all countries have a preparedness and response plan that promotes maternal and newborn survival and health with a coordinated mechanism in place for implementation, procurement of emergency supplies, and monitoring survival and health outcomes.

Now is the time for coordinated global, regional, national and community action to reach global maternal health targets. With less than half of the SDG period remaining, whole-of-government and whole-of-society approaches are urgently needed to accelerate progress towards SDG target 3.1 and related SDG commitments. Achieving the almost 15% annual rate of reduction in MMR required to meet the SDG target 3.1 and avert an estimated 700 000 maternal deaths between 2024 and 2030 presents an unprecedented challenge. Rapid action is needed to safeguard maternal health and end the tragedy of maternal mortality. Women have the right to not only survive pregnancy but thrive in good health.

Mother and baby born through caesarean section meet for first time [Armenia]
© WHO / Malin Brin

Navigation

1

Introduction

1.1 Global commitments to reduce maternal mortality

The Sustainable Development Goals (SDGs) came into effect on 1 January 2016 for the 15-year period ending on 31 December 2030. Of the 17 SDGs, the health-related targets can be found in **SDG3: Ensure healthy lives and promote well-being for all at all ages** *(1)*. The goal for ending preventable maternal mortality – **SDG target 3.1: "By 2030, reduce the global maternal mortality ratio [MMR] to less than 70 per 100 000 live births"** – is based on a 2014 World Health Organization (WHO) consensus statement on *Targets and strategies for ending preventable maternal mortality (EPMM)* and an EPMM strategy paper published in 2015 *(2-4)*. **Box 1.1** presents all the key information about the EPMM targets and objectives.

In alignment with the SDGs and in parallel to the EPMM targets and objectives, the United Nations Secretary-General's Global Strategy for Women's, Children's and Adolescents' Health (2016–2030) was launched, providing a vision for improving the health of every woman and every child, everywhere *(5)*. Initially established to galvanize efforts to improve women and children's health in the years running up to the conclusion of the era of the Millennium Development Goals (MDGs), the Global Strategy was updated to include adolescents and to align with the SDG priorities and timeline and the three overarching objectives "survive" (end preventable deaths), "thrive" (ensure health and well-being) and "transform" (expand enabling environments). The *Indicator and monitoring framework for the Global Strategy for Women's, Children's and Adolescents' Health (2016–2030)*, published by WHO, builds on the SDG3 targets *(6)*. The five key indicators for the "survive" objective are MMR (SDG indicator 3.1.1), the under-five mortality rate (SDG indicator 3.2.1), the neonatal mortality rate (SDG indicator 3.2.2), the stillbirth rate and the adolescent mortality rate (the latter two of which are not SDG indicators) *(6)*.

In November 2021, the five EPMM strategic objectives (**Box 1.1**) were supplemented by additional global, national and subnational EPMM indicators and coverage targets to track progress to 2030, highlighting the need to increase coverage of quality maternal health care and improve women's ability to make their own decisions about their sexual and reproductive health (SRH) *(7)*.

In May 2024, at the Seventy-seventh World Health Assembly, a resolution was passed to **Accelerate progress towards reducing maternal, newborn and child mortality in order to achieve Sustainable Development Goal targets 3.1 and 3.2** *(8)*. Proposed by 24 countries, the resolution recalled global commitments on reducing maternal, newborn and child mortality and the SDG vision of realizing the human rights of all and the empowerment of women and girls. It raised concerns that progress to advance the SDG agenda and the Global Strategy targets has stalled against a backdrop of low health literacy, worsening rates of malnutrition, poor water supply, sanitation and hygiene, and the impacts of climate change, conflict and the COVID-19 pandemic on health outcomes. The resolution invited Member States to take steps to improve maternal, newborn and child health, including several steps specifically to significantly reduce maternal mortality and increase

Box 1.2 Steps to accelerate progress towards reducing maternal mortality, as outlined in the 2024 World Health Assembly resolution:

- Reorient health systems towards a primary health care approach.
- Scale up evidence-based cost-effective interventions.
- Promote access to affordable, high-quality and respectful care for normal births and obstetric complications.
- Enable access to essential, safe, quality medicines.
- Establish networks of care with strong referral mechanisms.
- Facilitate universal access to SRH services, including identifying and removing barriers to safe, high-quality and affordable care.
- Invest in country-led health information management systems and the health and care workforce.

Source: WHO, 2024 *(8)*.

Box 1.1 Ending preventable maternal mortality (EPMM)

Key EPMM targets

- **Ending preventable maternal mortality (EPMM) target**: By 2030, all countries should reduce MMR by at least two thirds of their 2010 baseline level. The average global target is an MMR of less than 70 maternal deaths per 100 000 live births by 2030 *(2)*.

- **EPMM supplementary national target**: By 2030, no country should have an MMR higher than 140 maternal deaths per 100 000 live births (twice the global target) *(3)*.

Country targets to increase equity in maternal mortality by 2030, depending on baseline MMR in 2010:

- **For countries with an MMR less than 420 in 2010: reduce the MMR by at least two thirds from the 2010 baseline by 2030.**
- **For countries with an MMR greater than 420 in 2010: the rate of decline should be steeper so that in 2030, no country has an MMR greater than 140.**
- **For all countries with low baseline MMR in 2010 (below 70): achieve equity in MMR for vulnerable populations at the subnational level** *(3)*.

Strategic framework for EPMM *(3)*

- **Guiding principles for EPMM**

- Empower women, girls and communities.
- Protect and support the mother–baby dyad.
- Ensure country ownership, leadership and supportive legal, technical and financial frameworks.
- Apply a human rights framework to ensure that high-quality reproductive, maternal and newborn health care is available, accessible and acceptable to all who need it.

- **Cross-cutting actions for EPMM**

- Improve metrics, measurement systems and data quality to ensure that all maternal and newborn deaths are counted.
- Allocate adequate resources and effective health-care financing.

- **Five strategic objectives for EPMM**

i. Address inequities in access to and quality of sexual, reproductive, maternal and newborn health care.
ii. Ensure universal health coverage for comprehensive sexual, reproductive, maternal and newborn health care.
iii. Address all causes of maternal mortality, reproductive and maternal morbidities and disabilities.
iv. Strengthen health systems to respond to the needs and priorities of women and girls.
v. Ensure accountability to improve quality of care and equity.

Sources: WHO, 2014 *(2)* and WHO, 2015 *(3)*.

access to high-quality health services before, during and after pregnancy and childbirth – see **Box 1.2**.

With seven years of observation remaining during the SDG period – i.e. January 2024 to December 2030 – inaction is not an option if we are to accelerate country-led progress and realize SDG target 3.1 and the Global Strategy targets.

1.2 Measuring progress

Improving the measurement of maternal mortality is a key priority within the process of monitoring progress towards SDG target 3.1, as outlined in the 2015 EPMM cross-cutting strategy to "Improve metrics, measurement systems and data quality" *(3)* and the 2021 EPMM "Data for action" milestone *(7)*. The combined progress report for the Every Newborn Action Plan (ENAP) and EPMM,[7] published in 2023 at the mid-point of the SDG era, reported that the global annual rate of reduction (ARR) of the MMR was 1.3% between 2010 and 2020, and it estimated that acceleration of the ARR to 11.6% is required between 2021 and 2030 to meet the global MMR target *(9)*.

Data for the global maternal mortality estimates come from many sources, including civil registration and vital statistics (CRVS) systems, population-based household surveys, reproductive-age mortality surveys (RAMOS), censuses, and specialized maternal mortality studies. Strong CRVS systems are generally considered to be the gold standard for mortality measurement, but the WHO's 2020 SCORE global report on health data systems found that over two thirds of low-income countries had not established a standardized system to report causes of death *(10)*. Furthermore, country-driven efforts are still needed to establish and strengthen CRVS systems so that all births, deaths and causes of death are accurately recorded *(11)*.

Across these data sources, two types of reporting error affect the accuracy of maternal mortality measurement: incompleteness and misclassification. Incompleteness (also known as missingness or underreporting) occurs when deaths are not registered (for further information, refer to section 2.3 in Chapter 2). This is a particular challenge where no formal CRVS system exists or where CRVS coverage is incomplete. Misclassification occurs when the cause of death (e.g. whether it is a maternal or non-maternal death) is not recorded accurately. The accurate classification of maternal deaths relies on the use of standardized cause-of-death classification according to *International statistical classification of diseases and related health problems* (ICD) manual *(12, 13)*[8] and *The WHO application of ICD-10 to deaths during pregnancy, childbirth and puerperium: ICD-MM (14)*.

1.3 Development of maternal mortality estimates 2000 to 2023

The United Nations Maternal Mortality Estimation Inter-Agency Group (MMEIG) – comprising WHO, the United Nations Agency for Children (UNICEF), the United Nations Population Fund (UNFPA), the World Bank Group and the United Nations Department of Economic and Social Affairs, Population Division (UNDESA/Population Division) – was established in 2006 to harmonize and improve estimation and modelling methods across United Nations agencies. The MMEIG collaborated with technical experts via its Advisory Group to develop this new round of global-, regional- and country-level maternal mortality estimates for the period 2000–2023. The Technical Advisory Group (TAG) on Maternal Mortality and Maternal Cause of Death Estimation – composed of demographers, epidemiologists and statisticians from different world regions – provided technical advice *(15)*. The estimates for 2000–2023 presented in this report are the 11th in a series of analyses by WHO, UNICEF and other United Nations partner agencies to examine global, regional and country progress in reducing maternal mortality *(16-25)*. To provide increasingly accurate estimates of MMR, the previous estimation methods have been

[7] The combined efforts of ENAP and EPMM have since been renamed "Every Woman Every Newborn Everywhere" (EWENE).

[8] ICD-11 (the 11th revision of the ICD) was adopted by the World Health Assembly in May 2019 and came into effect on 1 January 2022. Further information is available at the ICD-11 homepage *(12)*. At the time of developing the MMR estimates presented in this report, no Member State had reported data using the ICD-11 system. Information about ICD codes in this report therefore relates to ICD-10. The ICD-11 rules can be accessed in the reference guide of ICD-11 *(13)*.

further refined to optimize use of country-level data. The estimates reported in this new edition for 2000–2023 supersede those in the previous edition and all earlier estimates.

As with all United Nations estimates, the work of the MMEIG includes direct engagement with Member States as a fundamental and integral part of the estimation process. The country consultations strengthen partnerships between governments and the MMEIG and facilitate government technical capacity-building, and thus these estimates benefit from government input into MMEIG data sources, methods and preliminary estimates.

Official country consultations were conducted with WHO Member States between October and December 2024, following the development of preliminary MMR estimates for the years 2000–2023. WHO Member States that nominated technical focal persons for maternal mortality, and/or had SDG focal persons, were provided with draft estimates for their country and a detailed description of the MMEIG processes and methods for estimating levels and trends of maternal mortality. These consultations gave countries the opportunity to review the draft country estimates, data sources and methods; to provide the MMEIG with additional primary data sources that may not have been previously reported or used in the analyses; to build shared understanding of the strengths and weaknesses of the available data and the estimation process; and to establish a broad sense of ownership of the results. These country consultations generated additional data for inclusion in the estimation model, demonstrating widespread expansion of in-country efforts to monitor maternal mortality. Annex 1 presents a summary of the process of the country consultations.

The MMEIG's commitment to improving maternal mortality measurement goes beyond estimation, with ongoing efforts to improve the reporting and classification of maternal deaths on the national level. This is reflected in the guidance and tools developed to support national-level maternal mortality reporting *(11)*. The MMEIG also provides technical support to individual governments when requested.

1.4 Causes of maternal illness and death

Haemorrhage is a direct obstetric cause of death and remains the leading cause of maternal mortality globally. Other direct obstetric causes of maternal death include hypertensive disorders of pregnancy; pregnancy-, childbirth- and postpartum-related infections; and complications of unsafe abortion. Indirect obstetric causes as a group are the second most common cause of maternal death globally, and these include noncommunicable diseases (NCDs) and chronic conditions, such as pre-existing hypertensive disorders and diabetes mellitus, and maternal infectious and parasitic diseases, many of which can pre-date pregnancy *(26, 27)*. The third most common cause of maternal death is hypertensive disorders of pregnancy (one of the direct obstetric causes mentioned above). However, there is wide regional heterogeneity in the contribution of these various causes of maternal death, which indicates substantial inequities in access to – and the quality of – basic and emergency obstetric care *(26)*. Despite the existence of clinical and health-system interventions to prevent many of these causes of death, they are often not available or accessible for manifold reasons, leading to a high burden of death, particularly in low- and middle-income countries *(26)*.

Gestational diabetes is the most common medical disorder in pregnancy *(28)*. Other NCDs commonly experienced by pregnant women include asthma, cardiac conditions, epilepsy, haemoglobinopathies, and mental health and substance use conditions.

It is important to emphasize that maternal health is not only a biomedical matter. Beyond the biomedical causes of maternal morbidity and mortality described above, other factors affecting maternal health outcomes include *(29)*:

- social determinants of health, such as education, ethnicity, race, gender and income;
- harmful gender norms, biases and inequalities that obstruct the rights of women and girls;
- weak health systems that lack adequately trained and competent health workers and essential medical supplies, providing poor quality care with little accountability; and
- external factors, such as climate change, conflict and humanitarian crises, which cause instability and fragility (see Chapter 5, section 5.2).

1.5 Presentation of this report's methods and findings

This report presents global, regional and country-level estimates and trends for maternal mortality between 2000 and 2023. Chapter 2 provides the definitions of key terms and describes the key measures relevant to maternal mortality. Chapter 3 describes in detail the methodology employed to develop the estimates. Chapter 4 presents the estimates and trends at the global, regional and country levels. Chapter 5 assesses performance so far towards SDG target 3.1, discusses the implications of the estimates for future efforts towards achieving the target, and underlines the importance of improved data quality for estimating maternal mortality. Chapter 6 presents conclusions. The first three annexes to this report describe the country consultation process, present an overview of the Bayesian maternal mortality misclassification (BMis) model for CRVS adjustment, and describe the methods used to derive a complete series of annual estimates for each predictor variable. Finally, Annexes 4–16 present the MMR estimates and trends for the different regional groupings (i.e. for SDG reporting and for WHO, UNICEF, UNFPA, the World Bank Group and UNDESA/Population Division), as well as the country-level estimates and trends.

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Routine check up on a pregnant woman [Bangladesh]
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Navigation

2

Definitions and measures

As of 1 January 2022, implementation began of the 11th revision of the *International statistical classification of diseases and related health problems* (ICD): ICD-11 *(1)*. At the time of developing the MMR estimates in this report, no Member State had yet reported data to the WHO Mortality Database using the ICD-11 system; all CRVS data used as input for this report were prepared according to ICD-10. Nonetheless, ICD-11 is relevant for current mortality and thus for policy and programming and is therefore described here along with the ICD-10.

2.1 Definitions for key terms used in this report

In the ICD-11, **maternal death** is defined as: the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from unintentional[10] or incidental causes *(1)*.

A maternal death can either be direct or indirect. **Direct obstetric deaths (or direct maternal deaths)** are those "resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium), and from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above" *(1)*. Deaths due to obstetric haemorrhage or hypertensive disorders in pregnancy, for example, or those due to complications of anaesthesia or caesarean section are classified as direct maternal deaths.

Indirect obstetric deaths (or indirect maternal deaths) are those maternal deaths "resulting from previous existing disease or disease that developed during pregnancy and not due to direct obstetric causes but were aggravated by the physiologic effects of pregnancy" *(1)*. For example, deaths due to aggravation (by pregnancy) of an existing cardiac or renal disease are considered indirect maternal deaths.

HIV-related indirect maternal deaths are deaths to HIV-positive women caused by the aggravating effect(s) of pregnancy on HIV; the interaction between pregnancy and HIV becomes the underlying cause of death. These are counted as indirect maternal deaths. There is an ICD code for HIV disease complicating pregnancy, childbirth and the puerperium (O98.7 in ICD-10; JB63.7 in ICD-11) for identifying HIV-related indirect maternal deaths.[11]

Incidental HIV deaths (or HIV-related non-maternal deaths) are deaths caused by HIV/AIDS that occur to women who happen to be pregnant, in labour or postpartum (also defined as "HIV-related deaths to women during pregnancy, delivery or puerperium" *(2)*); these are not maternal deaths and are not included in the numerator of MMR.

A death occurring during pregnancy, childbirth and the puerperium (also known as a **pregnancy-related death**) is defined as: "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death (obstetric and non-obstetric)" *(1)*; this definition includes unintentional/accidental and incidental causes. This definition allows measurement of deaths that occur during pregnancy, childbirth and puerperium while acknowledging that such measurements do not strictly conform to the standard "maternal death" concept in settings where accurate information about causes of death based on medical certification is unavailable. For instance, in some surveys (e.g. those employing the sisterhood method), relatives of a woman of reproductive age who has died are asked about her pregnancy status at the time of death without eliciting any further information on the cause or circumstances of the death. These surveys measure deaths to women during pregnancy, childbirth and the puerperium

[10] Care has been taken to ensure that the definition of maternal death used for international comparison of mortality statistics remains stable over time, but the word "unintentional" has been used in the ICD-11 definition *(1)* in place of the word "accidental", which was used in ICD-10 *(2)*.

[11] For HIV-related indirect maternal deaths, code O98.7 can be found in the 2019 version of ICD-10 and code JB63.7 can be found in ICD-11.

(i.e. pregnancy-related deaths) rather than maternal deaths.[12]

A late maternal death is "the death of a woman from direct or indirect obstetric causes, more than 42 days but less than one year after termination of pregnancy" *(1)*. Like maternal deaths, late maternal deaths also include both direct and indirect maternal/obstetric deaths. Complications of pregnancy or childbirth can lead to death beyond the six-week (42-day) postpartum period, and the increased availability of modern life-sustaining procedures and technologies enables more women to survive adverse outcomes of pregnancy and delivery, and delays some deaths beyond the postpartum period. Specific codes capturing deaths occurring beyond 42 days are included in the ICD-10 (O96 and O97) *(3)* and ICD-11 (JB61 and JB62)[13]. Late maternal deaths are not included in the numerator of the MMR for this report for reasons of international comparability.

Maternal deaths and late maternal deaths are combined in ICD-11 under the new grouping of **"comprehensive maternal deaths"** *(1)*.

The distinctions between maternal and non-maternal deaths and HIV-related and non-HIV-related deaths are summarized in **Table 2.1**.

Table 2.1 Types of deaths occurring during pregnancy, childbirth and puerperium (known as "pregnancy-related deaths")

	Maternal deaths	Non-maternal deaths
Non-HIV-related deaths (the woman may or may not have had HIV)	**Non-HIV-related maternal deaths:** Direct and indirect maternal deaths and late maternal deaths from either obstetric complications or a disease (other than HIV) aggravated by pregnancy	**Non-HIV-related non-maternal deaths:** Deaths to pregnant and postpartum women from unintentional/accidental or incidental causes (other than HIV) not related to nor aggravated by pregnancy
HIV-related deaths (the woman was known to have had HIV)	**HIV-related maternal deaths:** Indirect maternal deaths and late maternal deaths caused by the aggravating effects of pregnancy on HIV	**HIV-related non-maternal deaths:** Deaths to pregnant or postpartum women caused by HIV/AIDS not aggravated by pregnancy

[12] Some recent Demographic and Health Surveys (DHS) have added the following questions to the sisterhood questions: "Was (NAME)'s death due to an act of violence?" and "Was (NAME)'s death due to an accident?". These allow the identification of accidental deaths and deaths from violence, but crucially they still do not allow the removal of incidental deaths from the numerator. For this reason, these observations continue to be considered pregnancy-related deaths for the purposes of the estimates presented in this report.

[13] In the ICD-11, late maternal deaths are coded as JB61. A death from sequelae of obstetric causes that fits the definition "a death from any obstetric cause (direct or indirect) occurring one year or more after delivery" is coded as JB62 in ICD-11.

2.2 Measures of maternal mortality used in this report

As indicated in ICD-11 (and previously in ICD-10), only maternal deaths occurring up to 42 days postpartum are considered relevant for the purposes of international reporting and for the calculation of maternal mortality ratios and rates (i.e. late maternal deaths are excluded from the numerator).[14,15]

The number of maternal deaths is the number of maternal deaths in a population during a specified time period, typically one calendar year.

The **maternal mortality ratio (MMR)** is defined as the number of maternal deaths during a given time period per 100 000 live births during the same time period; thus, it quantifies the risk of maternal death relative to the number of live births.

The **maternal mortality rate (MMRate)** is defined and calculated as the number of maternal deaths divided by person-years lived by women of reproductive age in a population. The MMRate captures both the risk of maternal death per pregnancy, and the level of fertility in the population.

In addition, it is possible to calculate the **adult lifetime risk of maternal death** for women in the population, defined as the probability that a 15-year-old girl (in the year of the estimate) will eventually die from a maternal cause. This indicator takes into account competing causes of death *(4)*. The formula for calculating this measure is given in section 3.4.3.

The **proportion maternal (PM)** is the proportion of deaths among women of reproductive age that are due to maternal causes. PM is calculated as the number of maternal deaths in a given time period divided by the total deaths among women aged 15–49 years in that time period.

The definitions of the measures described here are summarized in **Box 2.1**.

Box 2.1 Statistical measures of maternal mortality

- **Maternal mortality ratio (MMR):** Number of maternal deaths during a given time period per 100 000 live births during the same time period *(5)*.
- **Maternal mortality rate (MMRate):** Number of maternal deaths during a given time period divided by person-years lived by women of reproductive age (age 15–49 years) in a population during the same time period *(6)*.
- **Adult lifetime risk of maternal death:** The probability that a 15-year-old girl will eventually die from a maternal cause *(4)*.
- **The proportion of deaths among women of reproductive age that are due to maternal causes (proportion maternal; PM):** The number of maternal deaths divided by the total deaths among women aged 15–49 years *(5)*.

[14] ICD-11, Part 2, section 2.28.5.7: "International reporting of maternal mortality: For the purpose of the international reporting of maternal mortality, only those maternal deaths occurring before the end of the 42-day reference period should be included in the calculation of the various ratios and rates, although the recording of later deaths is useful for national analytical purposes" *(1)*.

[15] Late maternal deaths (coded O96 in ICD-10 and JB61 in ICD-11) and death from sequelae of obstetric causes (coded O97 in ICD-10 and JB62 in ICD-11) are also of interest for national- and international-level analysis but are not reported in this publication.

2.3 Definitions of reporting errors in maternal mortality measurement systems

Incompleteness and misclassification are often referred to collectively or individually as "underreporting". The MMEIG avoids use of the term "underreporting" due to the ambiguity over exactly which issue is being referred to – incompleteness, misclassification, or both. Errors of reporting affect all data and the concepts are defined here in **Box 2.2.**

Box 2.2 Definitions of reporting errors

Misclassification

Misclassification refers to incorrect classification of the underlying cause of death, due either to error in the medical certification of cause of death or error in applying the correct code.

We distinguish between:

- **F– (false negative) =** True maternal death incorrectly classified as a non-maternal death
- **F+ (false positive) =** True non-maternal death incorrectly classified as a maternal death

There are two metrics of misclassification errors:

- **Sensitivity (Se)** is defined as the proportion of correctly classified maternal deaths out of all true maternal deaths.
- **Specificity (Sp)** is defined as the proportion of correctly classified non-maternal deaths out of all true non-maternal deaths.

Incompleteness

Incompleteness refers to incomplete death registration. This can arise due to incomplete identification/registration of individual deaths in each country and/or incomplete coverage of the national registration system within each country.

We distinguish between:

- **U– = Non-maternal deaths not registered in the CRVS system**
- **U+ = Maternal deaths not registered in the CRVS system**

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Pregnant and diabetic patient stands on a height and weight scale as the doctor is checking her measurements [Brazil] © WHO / Panos / Eduardo Martino

Navigation

3 Methods

Previously, the United Nations Maternal Mortality Estimation Inter-Agency Group (MMEIG) have published reports on maternal mortality trends (including estimates up to 2005, 2008, 2010, 2013, 2015, 2017 and 2020) presenting estimates developed with independent advice from the technical advisory group (TAG) of external academic experts *(1-7)*. The methods described here for developing estimates of levels and trends of maternal mortality between 2000 and 2023 build upon the methods used in those previous rounds *(8-10)*.

The MMEIG Bayesian maternal mortality misclassification (BMis) model for CRVS adjustment and the MMEIG Bayesian maternal mortality estimation (BMat) model (described in sections 3.4.1 and 3.4.2, respectively) together provide the most up-to-date maternal mortality estimates for the 2000–2023 timespan. Due to modifications in methodology and data availability, differences between these and previous estimates should not be interpreted as representing time trends. The full database, country profiles and all model specification codes used are available online: https://www.who.int/publications/i/item/9789240108462.

The current methodology is the result of continuous innovation to develop the most robust, internationally comparable estimates with the available data. The main changes to the estimation method in the current round is the development of a modified BMat one-country model for estimating maternal mortality during the COVID-19 pandemic period (2020–2022), as described in section 3.4.2.c.

In previous estimates, the MMEIG only included countries and territories with a population greater than 100 000. This restriction was removed for the current round of estimates, such that this report presents estimates for 195 countries and territories where at least one female death from any cause (aged 15–49) is estimated for each year across the period 1985–2023 by the UNDESA/Population Division's *World population prospects 2024* (WPP 2024). Refer to section 1.3 in Chapter 1 for further information about the MMEIG's approach and work process during the development of the estimates. The country consultation process is described in Annex 1.

3.1 Data inputs for the estimation process

3.1.1 Maternal mortality data sources

The input datasets for the MMEIG estimates include empirical observations from various sources. The adjustments and use of these data vary according to the type of data source. This section provides an overview of the typology the MMEIG uses to categorize and organize its input data.

a. Civil registration and vital statistics (CRVS)

A CRVS system is a national system that involves the routine registration of births and deaths, and the compilation of vital statistics. Civil registration is defined by the United Nations as: "the continuous, permanent, compulsory, and universal recording of the occurrence and characteristics of vital events and other civil status events pertaining to the population as provided by decree, law or regulation, in accordance with the legal requirements in each country" *(11)*.

For the purposes of the MMEIG maternal mortality ratio (MMR) estimates,[17] the CRVS data are operationally defined as the data reported to the WHO Mortality Database *(12)*. The WHO Mortality Database is a compilation of mortality data as reported annually by Member States from their civil registration systems to WHO. Data are provided disaggregated by sex, age group and cause of death. Only medically certified deaths are included; underlying cause of death is reported in accordance with the appropriate *International statistical classification of diseases and related health problems* (ICD) rules and classification *(13)*.[18]

b. Specialized studies on maternal mortality

Specialized studies on maternal mortality generally triangulate information from multiple sources, including, but not limited to, medical records, police

[17] Definitions of all measures are provided in Chapter 2.

[18] Though ICD-11 came into effect on 1 January 2022, ICD-10 was in use for the period of observation in this report. The ICD-10 codes included for the purposes of the MMEIG MMR estimates are the obstetric ("O") codes except for O96 and O97 (late maternal deaths), and A34 (maternal tetanus).

records, surveillance systems, national registries, death certificates, censuses, medical autopsies and administrative reviews to estimate the true number of maternal deaths in a specified geographic area. The design of, and the information provided by, specialized studies vary substantially. Two of the more common examples of specialized studies on maternal mortality are:

- **confidential enquiries into maternal deaths (CEMD)** – "a systematic multidisciplinary anonymous investigation of all or a representative sample of maternal deaths occurring at an area, regional (state) or national level which identifies the numbers, causes and avoidable or remediable factors associated with them" *(14)*; and
- **reproductive-age mortality studies (RAMOS)**, which involve first identifying and then investigating and establishing the causes of all deaths of women of reproductive age in a defined population using multiple sources of data *(15)*.

Occasionally, a country will perform a validation process to evaluate the completeness of reporting and the accuracy of the classification of deaths as maternal or non-maternal in their CRVS. This information is often provided to the MMEIG during the country consultation process (see Annex 1). The results of such validations are considered **specialized studies** and/or **specialized studies within the CRVS** (see **Box 3.1**).

c. Surveys, censuses and other miscellaneous data sources for maternal mortality

The MMEIG also use population-based household surveys including the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS), which use the sisterhood method *(15, 16)* to identify deaths of women of reproductive age and their causes. Additionally, national censuses that collect information on pregnancy-related and/or maternal deaths are included.

Other input data sources not falling into one of the above categories are also included if they meet the eligibility criteria detailed in section 3.1.2 and are then termed "miscellaneous"; a typical example would be **national-level surveillance data** from the country's ministry of health or national statistics office.

3.1.2 Eligibility criteria for maternal mortality input data

To be eligible for inclusion, all sources must:

- report data on maternal deaths occurring between 1985 and 2023 for women of reproductive age (15–49 years) – data sources reporting on a different age range were included if they described the group as women of reproductive age (e.g. aged 10–49 or 15–54 years);
- be nationally representative; and
- provide data on maternal or pregnancy-related deaths according to WHO's definitions or, alternatively, must allow for disaggregation of maternal or pregnancy-related deaths, to align with the WHO definitions.

In addition, there are eligibility criteria specific to different types of data sources:

- **For CRVS**, the usability must be greater than 60%. For a CRVS country year usability is defined as the fraction of all-cause deaths in the country-year for which causes have been assessed in the the CRVS system. It is the product of the completeness of the CRVS and the percentage of deaths with a well defined cause, as follows:

$$\text{ui} = P_i^{(\text{complete})} * (1 - P_i^{(\text{ill})})$$

  where $P_i^{(\text{ill})}$ refers to the proportion of vital registration (VR) deaths with ill defined causes reported and $P_i^{(\text{complete})}$ refers to the estimated completeness of the VR calculated as a proportion of the all-cause deaths which were captured in the VR out of the total number of all-cause deaths estimated by WPP 2024 in the respective country-year.

  Note: During 2020–2022, CRVS observations are only included if they are greater than 95% complete. The required completeness is increased during the period covered by the COVID-19 pandemic to be more conservative in order to account for the potential for reduced CRVS data quality during the pandemic.
- **For specialized studies within the CRVS** (see Box 3.1), there must be an eligible CRVS observation for the corresponding country-year of the specialized study observation.

- **For population-based household surveys**,
  i. sufficient methodological information must be provided to allow sampling variation to be captured in the model, such as standard errors; and
  ii. information on the age distribution of females residing in survey households is required to allow for age standardization to the female population of households at the time of the survey *(17)*.
- **For censuses**,
  i. sufficient methodological information must be provided to describe the derivation of the maternal mortality data reported; and
  ii. preferably, information on the age distribution of females, all-cause mortality and live births are needed to allow for adjustment of the data.

Eligibility does not depend on publication language, publication status/type, or study design, as long as the inclusion criteria are met and sufficient methodological details are reported for data adjustments to be made.

Box 3.1 Specialized studies within the CRVS

A subset of specialized studies – termed by the MMEIG as "specialized studies within the CRVS" – are used to assess the extent of incompleteness and/or misclassification within a CRVS system. These studies either directly validate CRVS data, or provide the number of true maternal deaths for a country-year for which there is an eligible CRVS observation. These studies are used in the MMEIG BMis model to generate CRVS adjustment factors (see section 3.4.1).

3.1.3 Search strategies to identify relevant studies and data inputs

For the purposes of the analysis presented in this report, we included all CRVS data that were submitted to the WHO Mortality Database as of 5 December 2024. Additional CRVS observations that were provided by countries during country consultations, and which were not included in the WHO Mortality Database, were included in the estimates as miscellaneous data sources.

For censuses and government reports, the MMEIG searched the websites of each ministry of health, national statistics office and other relevant national institutions. DHS and MICS surveys were searched and microdata downloaded from their respective websites.

CRVS data is replaced with each update of the estimates, since Member States may amend data submitted in previous years. For other data sources, new eligible studies were appended to the existing data sets used in previous rounds of estimates.

Table 3.1 provides a summary of the number of country-years of maternal mortality data, by type, used to produce maternal mortality estimates in this round, listed by region (alphabetical by SDG region name). A total of 5 727 country-years of data were included, covering the period from 1985 to 2023 (**Table 3.1**). The majority of the country-years came from CRVS systems (54%) and from the Europe and North America region and the Latin America and the Caribbean region (33% and 23%, respectively). It should be noted that the number of country-years is not necessarily equal to the number of records for each data type, as some records reported on extended observation periods (e.g. censuses, DHS and MICS surveys) while others reported on single years (e.g. CRVS).

Table 3.1 Country-years of observation available for a range of sources of maternal mortality data used in generating the 2000–2023 estimates for maternal mortality, by SDG region

SDG region[a]	Input data source					Total number of country years (%)[b]
	Specialized studies	CRVS	Censuses	Population-based surveys	Miscel-laneous	
World	838 (15)	3 083 (54)	52 (1)	1 288 (22)	466 (8)	5 727 (100)
Sub-Saharan Africa	1	92	28	915	27	1 063 (19)
Northern Africa and Western Asia	53	265	1	47	96	463 (8)
Central and Southern Asia	14	203	5	44	87	353 (6)
Eastern and South-Eastern Asia	41	208	12	112	76	449 (8)
Latin America and the Caribbean	253	841	4	163	78	1 339 (23)
Australia/New Zealand	53	69	0	0	0	122 (2)
Oceania (excluding Australia and New Zealand)	0	19	1	7	41	68 (1)
Europe and Northern America	423	1 386	0	0	61	1 8870 (33)

CRVS: civil registration and vital statistics; SDG: Sustainable Development Goal.

[a] For further information, please refer to: https://unstats.un.org/sdgs/indicators/regional-groups

[b] The sum of country-years of data has been rounded to the nearest 1.

3.1.4 Uncertainty associated with maternal mortality data inputs

All observed mortality inputs are subject to random error. The random error may include sampling error (where obtained from surveys), stochastic error (where from a small number of deaths) or non-sampling error (i.e. random errors that may occur at any point during the data-collection process). The MMEIG calculated error variances to account for these errors. Observations with smaller error variances indicate less uncertainty and hence carry a greater weight in determining estimates than observations with large error variances.

3.2 Other data inputs to the model

The MMEIG maternal mortality estimates use data from multiple United Nations agencies, either for the calculation of the MMR (sections 3.2.1–3.2.3) or as covariates in the model (section 3.2.4). Any comments regarding these data should be addressed to the respective agencies.[19]

[19] For UNAIDS mortality estimates: mahym@unaids.org. For live births, all-cause mortality and GFR estimates from *World population prospects 2024*: population@un.org. For deaths from the WHO mortality database: mortality@who.int. For Joint WHO–UNICEF skilled health personnel estimates: mollera@who.int and tasahmed@unicef.org. For World Bank estimates of GDP: esuzuki1@worldbank.org.

3.2.1 Data on all deaths to women aged 15–49 years

For all-cause deaths to women aged 15–49, the UNDESA/Population Division's WPP 2024 was used[20] *(18)*. For 120 countries out of 237 countries that UNDESA estimates for, mortality rates derived from VR or estimates were deemed to be of sufficient quality and reliability to estimate the time series of sex- and age-specific mortality rates. For 117 countries, empirical mortality rates by sex and age were too sparse or of insufficient quality to estimate the complete annual time series of mortality rates. Instead, model life tables were used to estimate the mortality rates by single year of age across the full age range from 0 to 130+ and for the years 1950–2023. Full methodological details, including important information on the assumptions made, can be found in the WPP 2024 methodological report *(19)*.

3.2.2 HIV-related mortality

The MMEIG used estimates of deaths due to HIV from the Joint United Nations Programme on HIV/AIDS (UNAIDS) for countries for which UNAIDS publishes such estimates *(20)*. The current HIV estimates are based on the WPP 2022 all-cause mortality estimates, whereas our model uses the WPP 2024 version. For consistency, the proportion of deaths due to HIV/AIDS was calculated as the UNAIDS 2024 estimate of HIV-related deaths divided by the WPP 2022 all-cause mortality for women aged 15–49, and this percentage was applied to the all-cause mortality total number of deaths from the WPP 2024 estimates to obtain the number of deaths due to HIV.

3.2.3 Live births data

Live births were taken from WPP 2024 *(18)*. Bayesian hierarchical models were used to estimate the annual time series of total fertility and age-specific fertility rates from 1950 to 2024 for all countries. These models incorporated available empirical evidence from vital statistics, population censuses and population-based household surveys. The preferred data source for the estimation of fertility was CRVS systems with national coverage and over 60% completeness. In countries where registration of births is deficient or incomplete, fertility estimates were obtained from population-based household surveys, such as DHS or MICS *(15, 16)*.

3.2.4 Predictor variables in the maternal mortality model

The BMat model uses an annual time series from 1990 to 2019 (prior to the COVID-19 pandemic period) using the following predictor variables.

- Gross domestic product (GDP) per capita is expressed in constant prices with the reference year 2021 and converted by purchasing power parity (PPP) to international dollars. GDP data from the World Bank Group were used for each country *(21)*, and in instances they were supplemented by unofficial estimates derived by the MMEIG using growth rates in previous MMEIG GDP estimates and/or models.
- General fertility rate (GFR) was computed using data on live births and population size (number of women aged 15–49) from WPP 2024 *(18)*.
- Skilled birth attendant (SBA) data consist of time series derived using all available data from population-based national household survey data and countries' routine reporting mechanisms (WHO and UNICEF Joint Skilled Birth Attendant database *(22)*).

For further details related to the predictor variables, please refer to Annex 3.

3.3 Data processing

An upward adjustment of 10% was applied to all observations that were not obtained from CRVS or specialized studies, to account for deaths early in pregnancy that might not have been captured.

[20] Exceptions to using WPP 2024 for all-cause female deaths were: (a) for Australia for the year 2022, CRVS total all-cause deaths to women aged 15–49 were used instead of WPP 2024 estimates, and (b) for Luxembourg, available CRVS total all-cause deaths to women aged 15–49 for the years 1985–2022 were used. This was supplemented by a linear extrapolation to obtain an estimate for 2023; this was done to adjust improbable estimates for these specific country-years within WPP 2024, based on advice from the UNDESA Secretariat.

3.3.1 Converting MMR to proportion maternal (PM)

The PM (the proportion of deaths among women of reproductive age that are due to maternal causes) is preferred over observed MMRs or other summary outcomes because it is less affected by unregistered deaths: deaths to women aged 15–49 that are unregistered would potentially affect the numerator and the denominator of the PM proportionately if causes of death are not unregistered differentially. For each observed PM, the corresponding MMR is calculated based on the WPP 2024 estimates of live births and all-cause deaths among females aged 15–49 for the respective country-period *(18)*.

If only the MMR or the number of maternal deaths was available from a given data source, they were converted into a PM, using estimates of all-cause deaths among females aged 15–49 and live births from WPP 2024. For specialized studies, the reported all-cause deaths are used if present. If these are missing, then the CRVS all-cause deaths are used.

3.3.2 Studies using the sisterhood method

The observed PM obtained from the sisterhood method is standardized according to the age distribution of the female population of respondent households at the time of the survey. This is because the age distribution found when using the sisterhood method is different from that of the general population. Further details are described in an article by Wilmoth et al., 2012 *(9)*.

3.3.3 Studies reporting on pregnancy-related deaths

The available data sources provide calculated PMs according to two definitions: "maternal" or "pregnancy-related" deaths. The MMEIG estimates "maternal" deaths from the PM of "pregnancy-related" deaths, based on the historical assumptions indicating that incidental and/or accidental deaths (i.e. not maternal deaths) comprise 10% of pregnancy-related deaths (excluding HIV-related deaths) in sub-Saharan African countries, and 15% in other low- and middle-income countries. The MMEIG will examine the evidence basis of these assumptions for future estimation rounds.

3.4 Statistical methods

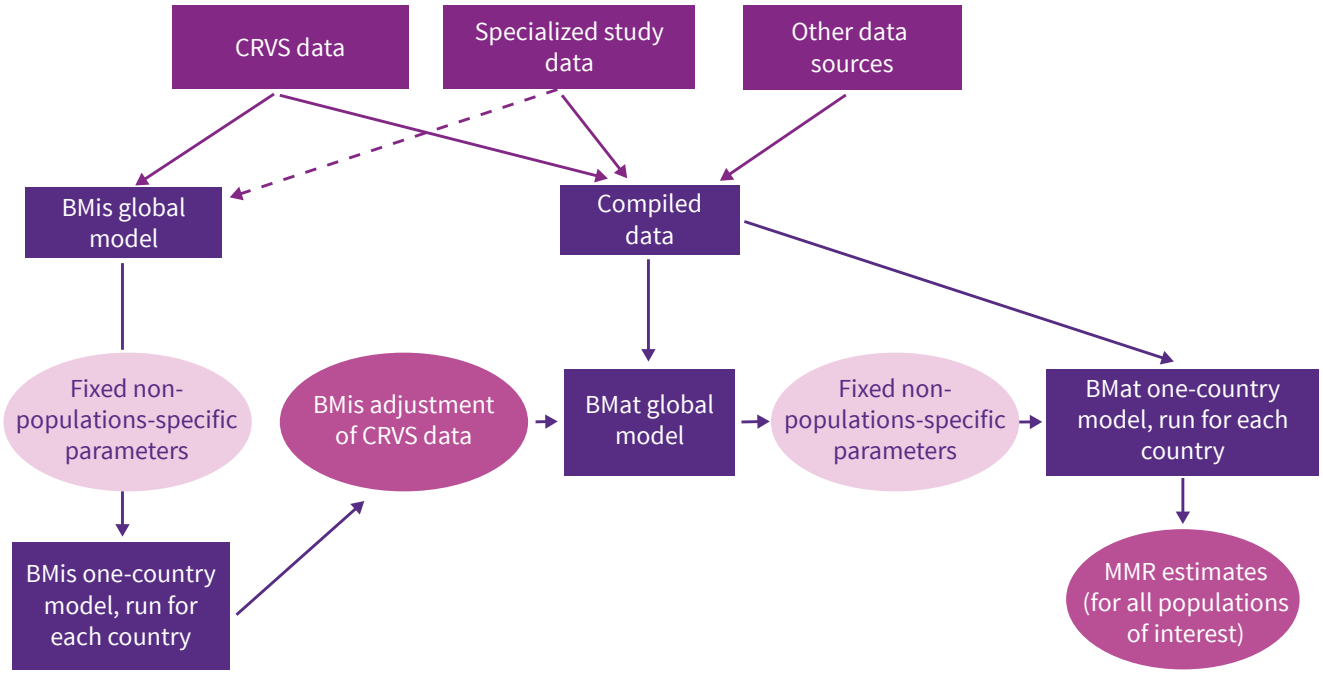
Two models are used, for different purposes.

1. **The BMis model**: For countries with eligible CRVS data (see section 3.1.2), the BMis model is used to account for errors in reporting of maternal death in the CRVS to obtain the BMis adjustment factors.
2. **The BMat model**: For all countries, the BMat model is used to estimate the MMR for each country-year of interest.

These models are broken down into global and "one-country" implementations. Model assumptions are the same for global and one-country models. To estimate the MMR, first the BMis global model is used to obtain the fixed non-population-specific CRVS sensitivity and specificity parameters. Secondly, multiple instances of the BMis one-country model are used to obtain adjustment factors for each country-year of interest. The adjustment factors obtained from the BMis global model and one-country runs are then applied in the BMat global and BMat one-country models. In the next phase, the BMat global model is used to obtain the fixed non-population-specific BMat parameters. In the current round of estimation, the BMat global model was fit using data for non-COVID years only, in order to obtain a counterfactual for non-COVID MMR. Subsequently, for each country, a one-country BMat model (using the default model set-up) was conducted using data for the non-COVID years in order to obtain the country-level estimates for non-COVID years. Finally, a BMat one-country model was run on all the data, including data from the COVID years, using the COVID model set-up, in order to obtain estimates for the COVID years. The estimates for the non-COVID years were obtained from the non-COVID BMat one-country run, while estimates for the COVID years were obtained from the COVID BMat one-country run. The one-country runs were repeated for all countries (see **Fig. 3.1**).

The BMis model is described in section 3.4.1, followed by the description of the BMat model in section 3.4.2, which includes a description of the COVID model specification in section 3.4.2c.

Fig. 3.1 Overview of modelling steps for MMR estimation



Note: the link between specialized study data and the BMis global model is dotted to represent that only some specialized studies are used in BMis (specialized studies within the CRVS).
BMis: Bayesian maternal mortality misclassification model for CRVS adjustment; BMat: Bayesian maternal mortality estimation model; CRVS: civil registration and vital statistics; MMR: maternal mortality ratio.

3.4.1 Bayesian maternal mortality misclassification (BMis) model to account for errors in reporting of maternal death in the CRVS system

Relying on maternal deaths as reported in the CRVS system means there is a potential for error due to unregistered maternal deaths and/or misclassification of the cause of death within the CRVS system (see section 2.3 for definitions of reporting errors). The BMis model produces adjustment factors derived from sensitivity and specificity estimates for all country-years of CRVS data, before the data are included in the BMat model (section 3.4.2).

The BMis model only uses specialized studies within the CRVS as data points. Several variables were tested to predict changes in sensitivity and specificity over time within countries; however, they did not show a significant relationship and thus were not used in the model. The number of country-years of observation available from such studies to use in the model is shown in **Table 3.2**. In this round, an additional 129 country-years were added to BMis input since the previous edition of the estimates.

The model produces a global estimate for sensitivity and specificity for each year of estimation, obtained by fitting the model to the global database of all specialized studies within the CRVS (see **Box 3.1**). For this round, we excluded BMis inputs during the COVID-19 period (2020–2022) to obtain the non-COVID baseline parameters.

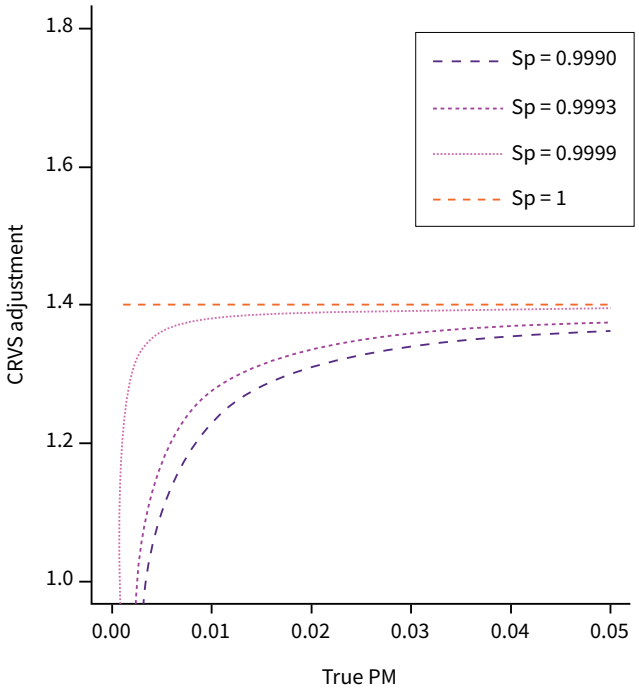
Country-estimates for sensitivity (Se) and specificity (Sp) are obtained in country-specific runs. For a country with specialized studies within the CRVS, the model is fitted to all available data. However, it is rare that a country has data from specialized studies within the CRVS for the entire estimation period. In such instances, Se and Sp values for the years before the earliest observation reference year of a specialized study are modelled to converge backwards to the global Se and Sp estimates within a five-year period. For years after the latest study observation reference year, the point estimates of Se and Sp are kept constant up to the end of the estimation period. For countries without specialized studies within the CRVS, Se and Sp are set to be equivalent to the global estimates.

Table 3.2 Country-years of observation in the BMis model, by SDG region

SDG region	Country-years of observation
World	656
Sub-Saharan Africa	0
Northern Africa and Western Asia	29
Central and Southern Asia	5
Eastern and South-Eastern Asia	38
Latin America and the Caribbean	144
Australia and New Zealand	53
Oceania (excluding Australia and New Zealand)	0
Europe and Northern America	387

Figure 3.2 shows the relationship between true PM and the estimated CRVS adjustment factors, for different Sp values; this illustrates the effect of Sp on the CRVS adjustment factor. When Sp equals 1, the CRVS adjustment factor equals 1/Se, hence lower Se results in a higher adjustment factor, and conversely higher Se results in a lower adjustment factor. When Sp is less than 1, while keeping Se fixed, the adjustment factor decreases with decreasing true PM. This effect is due to an increasing share of false positive maternal deaths among all deaths, and a decreasing share of false negative deaths, or, in other words, as the true PM decreases, the proportion of non-maternal deaths reported as maternal increases while the proportion of maternal deaths reported as non-maternal decreases.

Fig. 3.2 CRVS adjustment based on the BMis model for different values of specificity, calculated at different levels of true PM when sensitivity is fixed at 0.714[a]



PM: proportion maternal; Sp: specificity.
[a] Based on the CRVS model, it was estimated that 71.4% of maternal deaths were identified correctly in the CRVS.

Figure 3.2 also illustrates that keeping Sp and Se constant in extrapolations in countries with specialized studies within the CRVS, or for countries without any such studies, will result in changing adjustment factors as the true PM changes. The BMis model is described in more detail by Peterson et al. *(10)*.

Further detail on (i) the types of reporting errors encountered in CRVS systems, (ii) summary metrics for reporting errors, and (iii) deriving the sensitivity, specificity and CRVS adjustment factors from the BMis model can be found in Annex 2.

3.4.2 Bayesian maternal mortality estimation (BMat) model

Estimation and projection of maternal mortality indicators was undertaken using the BMat model. This model is intended to ensure that the MMR estimation approach is consistent across all countries but remains flexible in that it:

- is based on covariate-driven trends to inform estimates in countries or country-periods with limited information;
- captures observed trends in countries with longer time series of observations; and
- takes into account the differences in stochastic and sampling errors across observations.

In the BMat model, the MMR for each country-year is modelled as the sum of the HIV MMR (i.e. the portion of MMR that is due to HIV-related maternal deaths) and the non-HIV MMR (i.e. the portion of MMR that is due to non-HIV-related maternal deaths):

$$\text{MMR} = \text{non-HIV MMR} + \text{HIV MMR},$$

where non-HIV-related maternal deaths refer to maternal deaths due to direct obstetric causes or to indirect causes other than HIV/AIDS, while HIV-related maternal deaths are those maternal deaths to women with HIV/AIDS caused by the aggravating effects of pregnancy on HIV/AIDS.

The estimation of the non-HIV MMR and HIV MMR are explained below in sections a and b, respectively.

In the BMat model, the non-HIV MMR is estimated as follows:

$$\text{Non-HIV MMR}(t) = \text{expected non-HIV MMR}(t) * \text{data driven multiplier}(t)$$

The data-driven multiplier *(t)* allows for deviations away from the rate of change in MMR implied by the expected non-HIV MMR, as indicated by country-year-specific data points (*t* = year). For example, if data suggest that the non-HIV MMR decreased (or increased) much faster in year *t* than expected based on covariates, the data-driven multiplier for that year is estimated to be greater (or smaller) than 1. This data-driven multiplier is modelled with a flexible time-series model, which fluctuates around 1, such that the covariates in the regression model determine the estimated change when data are absent.

The BMat model was fitted to all data available in the country (see **Box 3.1**), once adjustments had been made and uncertainty associated with the data points had been incorporated (see section 3.1.4). Observations with smaller error variances are more informative of the true PM and will thus carry a greater weight in determining the estimates as compared with observations with larger error variances.

In countries with high-quality data with little uncertainty, the final BMat estimates closely track the country data and have narrow uncertainty intervals (UIs). However, in the absence of data, or when data are very uncertain, the predictor variables (covariates) play an important role and inform the estimated trend in MMR.

The BMat provides estimates for all countries, using all available information, and inclusion of additional observations for any one country may result in very slight changes to estimates for other countries. For all outcomes of interest, uncertainty was assessed and is reported in terms of UIs.

a. Estimation of expected non-HIV-related maternal deaths

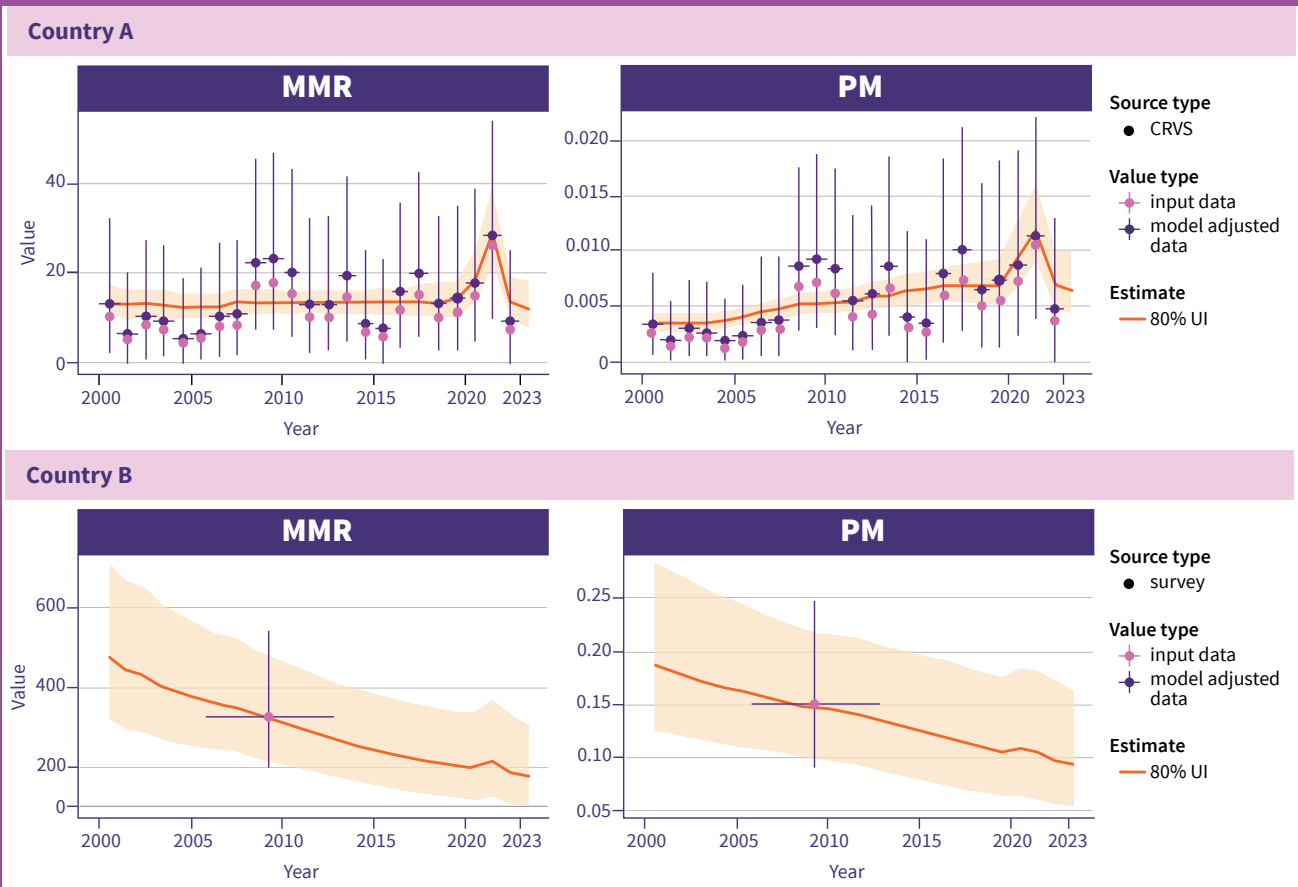
A hierarchical regression model was used to obtain the expected number of non-HIV-related maternal deaths for each country-year, and the associated non-HIV MMR. The model predicts the proportion of deaths to women of reproductive age that are due to maternal causes (PM) using three predictor variables: the GDP per capita, the GFR and the presence of a skilled birth attendant (SBA) as a proportion of live births. These specific predictor variables were chosen from a broader list of potential predictor variables, which fell into three groups: indicators of social and economic development (e.g. GDP, human development index, life expectancy), process variables (e.g. SBA coverage, antenatal care, proportion of institutional births) and risk exposure variables (i.e. fertility level).

Box 3.1 Illustration of the BMat model

The first set of graphs below shows the MMR and PM estimates for Country A – a country with a high-quality CRVS system. The second set of graphs shows MMR and PM estimates for Country B – a country that does not have CRVS data, but has data from one survey (see section 3.1.1 for descriptions of these different data sources).

As shown, the estimated trend line for Country A closely tracks the CRVS data points from 2000–2022. The shaded region around the trend line, which represents the 80% uncertainty interval (UI), remains roughly the same width throughout.

In contrast, Country B has one survey data point available reporting on a seven-year period (2005–2012). A survey samples deaths from a country and consequently contains more uncertainty than other data sources. For the years after 2012, the estimates are based on covariate information.



MMR: maternal mortality ratio (maternal deaths per 100 000 live births); PM: proportion maternal (proportion of deaths among women of reproductive age that are due to maternal causes).

The model is summarized as follows:

$$\log(PM^{NA}) = b_o + b_1\log(\mathrm{GDP}) + b_2\log(\mathrm{GFR}) + \gamma_j + \varphi_k$$

where

PM^{NA} = the expected proportion of non-HIV-related maternal deaths among all non-HIV-related deaths to women aged 15–49 years

GDP = gross domestic product per capita (expressed in constant prices with the reference year 2021 and converted by PPP to international dollars)

GFR = general fertility rate (live births per woman aged 15–49 years)

SBA = proportion of births attended by skilled health personnel

γ_j= random intercept term for country j

φ_k = random intercept term for region k.

For countries with data available on maternal mortality, the expected proportion of non-HIV-related maternal deaths was based on country and regional random effects, whereas for countries with no data available, predictions were derived using regional random effects only. The resulting estimates of the *PM^{NA}* were used to obtain the expected non-HIV MMR through the following relationship:

$$\text{Expected non-HIV MMR} = PM^{NA}*(1-a)*E/B$$

where

a = the proportion of HIV-related deaths to women of reproductive age

E = the total number of deaths to women of reproductive age

B = the number of births.

b. Estimation of HIV-related indirect maternal deaths

For countries with generalized HIV epidemics and high HIV prevalence, HIV/AIDS is a leading cause of death during pregnancy and post-delivery. Furthermore, pooled evidence from community studies suggests that women with HIV infection have an eight times higher risk of pregnancy-related death compared with non-HIV infected women, although this may be offset by lower fertility *(23)*. A retrospective cohort study found an even higher risk, with HIV-positive women having 21 times higher odds of a maternal death compared with women who do not have HIV *(24)*. In places where more than 2% of the pregnant and postpartum population are living with HIV, it is predicted that 12% of all pregnancy-related deaths are attributable to HIV *(23)*. When estimating maternal mortality in these countries, it is, thus, important to differentiate between incidental HIV deaths (non-maternal deaths) and HIV-related indirect maternal deaths (maternal deaths caused by the aggravating effects of pregnancy on HIV) among HIV-positive pregnant and postpartum women who have died (i.e. among all HIV-related deaths occurring during pregnancy, childbirth and puerperium).[21]

The number of HIV-related indirect maternal deaths D^{HIV} is estimated by:

$$D^{HIV} = a*E*v*u$$

where

$a*E$ = the total number of HIV-related deaths among all deaths to women aged 15–49 years

v = the proportion of HIV-related deaths to women aged 15–49 that occur during pregnancy

The value of v can be computed as follows:

$$v = \frac{ckGRF}{[1+c(k\text{-}1)\mathrm{GRF}]}$$

where c is the average exposure time (in years) to the risk of pregnancy-related mortality per live birth (c = 1 for this analysis), and where *k* is the relative risk of dying from HIV/AIDS for a pregnant versus a non-pregnant woman, reflecting both the decreased fertility of HIV-positive women and the increased mortality risk of HIV-positive pregnant women (*k* = 0.3 for this analysis) *(23)*.

u = the fraction of pregnancy-related HIV/AIDS deaths assumed to be HIV-related indirect maternal deaths. The MMEIG/TAG reviewed available study

[21] See definitions in Chapter 2.

data on AIDS deaths among pregnant women and recommended using = 0.3 *(23)*.

For observed PMs, it was assumed that the total reported maternal deaths were a combination of the proportion of reported non-HIV-related maternal deaths and the proportion of reported HIV-related (indirect) maternal deaths, where the latter is given by a^*v for observations with a "pregnancy-related death" definition and a^*v^*u for observations with a "maternal death" definition (see section 2.1 for definitions).

c. Estimation of the MMR during COVID-19 pandemic years

WHO declared the novel coronavirus (COVID-19) a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 and a worldwide pandemic on 11 March 2020. On 5 May 2023, the WHO Director-General announced that WHO no longer considered COVID-19 to be a PHEIC *(25)*. The MMEIG considers the years 2020, 2021 and 2022 to be the "COVID years", where there were substantial and important effects of the pandemic on mortality. The final year of the estimates presented in this report is 2023, which is not considered a COVID year. The three COVID-19 years required a modified approach to MMR estimation, which is described here.

All non-COVID years (2000–2019, inclusive, and 2023) were estimated via the BMat model (default set-up), as described above in this subsection (section 3.4.2). Estimates for the COVID years were obtained subsequently using the full data series, which includes data gathered during the COVID years (2020–2022), and with the modified COVID model set-up. The sequential model fitting was introduced to make sure that estimates for the COVID years did not influence estimates for the non-COVID years.

Input data were available from 90 countries for at least one year between 2020 and 2022, the majority of which were in Europe and Northern America (35 countries) and Latin America and the Caribbean (20 countries). Data were available for 12 countries in Northern Africa and Western Asia, nine countries in sub-Saharan Africa, six countries in Eastern and South-Eastern Asia, four countries in Central and Southern Asia, three countries in Oceania (excluding Australia and New Zealand), and one in Australia and New Zealand.

The approach taken to estimate the MMR for each country during the COVID years in the COVID model set-up was to sum the following two estimates:

i. the counterfactual MMR would have been, in the absence of the COVID-19 pandemic, called the "COVID-free MMR";
ii. the increase in the MMR attributable to the COVID-19 pandemic, called the "COVID MMR".

This is conceptually analogous to the approach used by MMEIG for the HIV/AIDS MMR. The MMR for the COVID years is given by:

MMR COVID years = COVID-free MMR + COVID MMR

COVID-free MMR

We estimated the COVID-free MMR using the default BMat regression-based modelling approach. As above, the BMat model estimates the non-HIV MMR as follows:

Non-HIV-related MMR*(t)* = Expected non-HIV-related MMR*(t)* * Data-driven multiplier*(t)*

For the COVID years, the expected non-HIV MMR was calculated as a linear interpolation of the expected non-HIV MMR between 2019 and 2023.

COVID MMR

The COVID MMR can be interpreted as the deaths that would not have occurred in the absence of the COVID-19 pandemic. The modelling approach for these deaths was as follows:

COVID-maternal deaths $=$ **Total COVID deaths*** m^*u

where

m = the share of all COVID deaths to pregnant and postpartum women, i.e. the share occurring during the maternal risk period, from pregnancy until 42 days postpartum

u = the fraction of COVID deaths to pregnancy and postpartum women that were COVID-maternal deaths, i.e. aggravated by pregnancy or its management. Assuming that all COVID deaths

to pregnant and postpartum women were COVID-maternal deaths, *u* was set equal to 1.

In turn, m was calculated using the GFR as follows:

$$m = \frac{d*\mathrm{GRF}}{(1+(d\text{-}1)*\mathrm{GRF})}$$

where

d = the relative risk of dying from COVID for a pregnant or postpartum woman versus a non-pregnant and non-postpartum woman.

Model fitting was based on estimating *d* for each country-year during the COVID period. Informed by an analysis of empirical data from specialized studies and CRVS data (n = 71), *d* was assigned a prior bell-shaped density from 0.1 to 2.6 with a point estimate of 1.35 (additional details of this analysis are provided in Annex 17). Total COVID deaths were constructed using WPP 2024 estimates of total deaths and COVID deaths *(18)* (see Annex 18). Additional uncertainty was added to each country-year-specific COVID MMR.

d. Estimation of maternal mortality in crisis years

Estimates in WPP 2024 account for deaths related to "crises" due to natural disasters, conflicts and epidemics, because of the potential for substantial increases in death rates during crisis-affected years – a phenomenon described as "mortality shocks" *(19)*. WPP 2024 estimates excess mortality for each country, which is categorized as due to natural disasters (e.g. flooding, cyclones, earthquakes, famines/droughts, tsunami), epidemics (excluding HIV/AIDS[22] and COVID-19), COVID-19,[23] conflicts and battle deaths, and mass killings (including genocide) *(19)*.

Some locations may experience more than one crisis event in a year; in these cases, the excess deaths due to crises (or shocks) are the sum of all deaths attributed to crises *(19)*. Negative crisis deaths were set to zero.

A "crisis year" for the purpose of estimating maternal mortality is defined in the following two ways, and 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 country-year *(18)* and in addition (c) in the five-year period surrounding that year, there are at most two additional crisis years;
- a year previously identified by the United Nations Inter-agency Group for Child Mortality Estimation (UN IGME) as a crisis year for the estimation of child mortality *(26)* (this includes crises in potentially longer periods, i.e. for ongoing crises).

For a country-year that meets the definition of a crisis year, the MMEIG estimates the "crisis-free observed proportion maternal", which is defined as the proportion of maternal or pregnancy-related deaths among the total number of crisis-free deaths to women of reproductive age.[24] 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 *(9)*.

Crisis-related factors may contribute to maternal mortality, but empirical evidence to distinguish maternal deaths from among pregnancy-related

[22] Adult mortality is modelled in the WPP to take into account the prevalence of HIV infection and the coverage of antiretroviral therapy. For countries highly affected by HIV and AIDS, the 2024 revision of the WPP used a model life table to explicitly model the demographic impact of the HIV and AIDS epidemic on the mortality age patterns for 21 countries with generalized HIV epidemics. See the WPP 2024 methodology report for further detail *(19)*.

[23] For the purpose of crisis-year estimation, COVID-19 is estimated separately from other epidemics.

[24] Although by definition PM refers strictly to maternal deaths (and the model is based on this definition), some observed PMs are based on the definition of pregnancy-related deaths (which includes but is not limited to maternal deaths; see definitions in Chapter 2).

deaths in the context of mortality shocks is limited. To reflect the paucity of evidence on the effect of crisis on maternal mortality, UIs for crisis years were widened by multiplying the samples of maternal deaths by values between 0.9 and 1.2.

For further detail on WPP estimation of crisis years, see the WPP 2024 methodology report *(19)*.

3.4.3 Maternal mortality indicators estimated by the model

The immediate outputs of the BMat model were estimates in the form of PMs. These values were then converted to estimates of the MMR as follows:

$$\text{MMR} = \frac{\text{Maternal deaths}}{\text{Live births}},$$

was calculated using PM as:

$$\text{PM} * \frac{\text{Deaths women aged 15-49}}{\text{Live births}}$$

Based on MMR estimates, the annual rate of reduction (ARR) of MMR and the maternal mortality rate (MMRate; the number of maternal deaths divided by person-years lived by women of reproductive age) were calculated. The ARR was calculated as follows:

$$\text{ARR} = \frac{\log\left(\frac{\text{MMR}_{t2}}{\text{MMR}_{t1}}\right)}{t1 - t2} * 100$$

where $t1$ and $t2$ refer to different years with $t1 < t2$..

The MMRate was calculated as follows:

$$\text{MMRate} = \frac{\text{Maternal deaths}}{\text{Women aged 15 - 49}}$$

The MMRate was used to calculate the adult lifetime risk of maternal mortality (i.e. the probability that a 15-year-old girl will eventually die from a maternal cause). In countries where there is a high risk of maternal death, there is also an elevated likelihood of girls dying before reaching reproductive age. For this reason, the lifetime risk of maternal mortality was considered to be conditional on the probability of a girl's survival to age 15. The formula used, shown below, also considers competing causes of death.

$$\text{Lifetime risk of maternal mortality (LTR)} = \text{MMR} * \frac{\text{Live births}}{\text{Women aged 15-49}} * \frac{T_{15} - T_{50}}{l_{15}}$$

Substituting for the MMR gives:

$$\text{LTR} = \frac{\text{Maternal deaths}}{\text{Live births}} * \frac{\text{Live births}}{\text{Women aged 15-49}} * \frac{T_{15} - T_{50}}{l_{15}}$$

which simplifies to:

$$\text{LTR} = \text{MMRate} * \frac{T_{15} - T_{50}}{l_{15}}$$

T_{15} and T_{50} are life-table quantities for the female population during the period in question *(27)*. The ratio $\frac{T_{15} - T_{50}}{l_{15}}$ was taken from life tables that include deaths due to mortality shocks, i.e. the ratio represents the average number of years lived between ages 15 and 50 years among survivors to age 15 years in the presence of the mortality shock. Hence, the lifetime risk in years with mortality shocks represents the risk of dying from a maternal cause in the presence of the mortality shock.

3.4.4 Aggregation of estimates

Regional maternal mortality estimates were computed, according to the United Nations SDG, UNFPA, UNICEF, UNDESA/Population Division, WHO and the World Bank Group regional groupings. The regional aggregate MMR was calculated by aggregating the weighted posterior samples of the country-level estimates, with the median taken as the point estimate, and the 10th and 90th quintiles for the upper and lower UIs. It is important to note that these aggregates are not expected to equal the sums or weighted sums of maternal mortality estimates at the country level.

3.4.5 Key reasons MMR estimates might differ from national statistics

The MMR estimates presented in this report may differ from national statistics collected using equally robust methods. This can occur for several reasons, including:

- **Differences in the denominators used:** International comparability of maternal mortality estimates for the purposes of SDG monitoring is one of the primary aims of the MMEIG. The MMEIG therefore uses common denominators to calculate maternal mortality measures from the model – namely, all-cause deaths for women of reproductive age, and total live births – from the WPP 2024 *(18)*.

- **Differences caused by covariates-based modelling:** Not all data sources reviewed are eligible. Where there are no or few eligible data points, the model estimates are mostly driven by covariates.
- **Adjustment for incomplete and misclassified maternal deaths:** Maternal mortality is misclassified almost everywhere, according to the BMis global sensitivity and specificity estimates. In the current round of estimation, the global sensitivity of CRVS maternal death registration was estimated at 71.4% (UI 22 to 97), while specificity was estimated at 100% (UI 99.5 to 100). This means that 71.4% of true maternal deaths are correctly identified and classified as maternal deaths in the CRVS, and 100% of true non-maternal deaths are correctly classified as non-maternal deaths in the CRVS. However, these estimates of Se and Sp are derived from CRVS systems that are of relatively high quality, meaning that maternal mortality is likely to be vastly underestimated in CRVS input data. To account for this, maternal mortality estimates coming from all data sources that are not specialized studies are adjusted upwards. CRVS adjustment factors are estimated using the BMis model, while all non-CRVS data sources are adjusted upwards by 10%.

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A health care worker provides primary health care to a new mother in the maternity ward [Mongolia] © WHO / Yoshi Shimizu

Navigation

Maternal mortality estimates and trends: 2000 to 2023

4

This chapter presents and describes estimated maternal mortality ratios (MMRs), numbers of maternal deaths, the proportion of maternal deaths among all deaths to women of reproductive age (PM; proportion maternal), and the adult lifetime risk of maternal mortality for 2023.[26] This chapter also presents and examines trends in these indicators between 2000 and 2023 and between 2016 and 2023 (the first half of the SDG era) *(1)*. A total of 195 countries and territories are included in the tables presented in this report and in Annexes 4–16.

The numbers provided are the most accurate point estimates possible given the available data. However, these calculations still contain a level of uncertainty that varies depending on the amount and quality of available data used to produce them. An 80% uncertainty interval (UI), which is included for each of the point estimates presented, means there is an 80% chance that the true value of the indicator falls within the upper and lower bounds of the UI; more information about how to interpret the estimates and UIs is provided in **Box 4.1**.

[26] See Chapter 2 for definitions.

Box 4.1 Accurately interpreting point estimates and uncertainty intervals

All maternal mortality indicators in this report include a point estimate and an 80% uncertainty interval (UI). For those indicators where only point estimates are reported in the text or tables, UIs can be obtained from supplementary material online.[a]

The 80% UIs computed for all the estimates provide the 10th and 90th percentiles of the posterior distributions. This was chosen rather than the more standard 95% UIs because of the substantial uncertainty inherent in maternal mortality outcomes.

Both point estimates and 80% UIs should be taken into account when assessing estimates. Below is one example and how to interpret it:

The estimated 2023 global MMR is 197 (UI 174 to 234).

This means:

- The point estimate is 197 and the 80% UI ranges from 174 to 234.
- There is a 50% chance that the true 2023 global MMR lies above 197, and a 50% chance that the true value lies below 197.
- There is an 80% chance that the true 2023 global MMR lies between 174 and 234.
- There is a 10% chance that the true 2023 global MMR lies above 234, and a 10% chance that the true value lies below 174.

Other accurate interpretations include:

- We are 90% certain that the true 2023 global MMR is at least 174.
- We are 90% certain that the true 2023 global MMR is 234 or less.

The amount of data available for estimating an indicator and the quality of that data determine the width of an indicator's UI. As data availability and quality improve, the certainty increases that an indicator's true value lies close to the point estimate.

a Available at: https://www.who.int/publications/i/item/9789240108462

The new estimates and trends presented in this report supersede all previously published estimates for years that fall within the same time period. Care should be taken to use only these estimates for the interpretation of trends in maternal mortality between 2000 and 2023; due to modifications in methodology and changes in data availability, differences between these and previous estimates should not be interpreted as representing time trends. The full database, country profiles and all model specification codes used are available online.

The results described in this report are the third set of estimates to describe maternal mortality for years that fall within the SDG reporting period. This report is the second to present trends within the SDG period and covers the first eight years of the 15-year period, from the start of 2016 until the end of 2023. Section 4.1 of this chapter presents global-, regional- and country-level estimates for 2023, and section 4.2 presents trends for 2000–2023, in addition to trends disaggregated for 2016–2023.

Annexes 5–15 present the MMR point estimates, range of uncertainty, numbers of maternal deaths and lifetime risk of maternal death in 2023, as well as the trends in the estimates of MMR between 2000 and 2023, and 2016–2023, for WHO, UNICEF, UNFPA, World Bank Group, UNDESA/Population Division and SDG regions.

4.1 Maternal mortality estimates for 2023

Table 4.1 provides 2023 point estimates of maternal mortality indicators, as well as the numbers of maternal deaths, for the world and by United Nations Sustainable Development Goal (SDG) region, subregion and three other groupings classified by the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States: "landlocked developing countries" (LLDCs), "least developed countries" (LDCs) and "small island developing States" (SIDS) The table also presents the range of uncertainty for each MMR point estimate.

The global estimates are discussed in section 4.1.1, the regional estimates in section 4.1.2, and the country-level estimates in section 4.1.3 (with more data provided in Annex 4). **Box 4.2** explains how MMR levels are categorized.

Box 4.2 MMR categorization

For the purpose of categorization, the MMR is classified as follows:

- **Very low** if it is **less than 20** maternal deaths per 100 000 live births
- **Low** if it is **less than 100** maternal deaths per 100 000 live births
- **Moderate** if it is **100–299** maternal deaths per 100 000 live births
- **High** if it is **300–499** maternal deaths per 100 000 live births
- **Very high** if it is **500–999** maternal deaths per 100 000 live births
- **Extremely high** if it is **greater than or equal to 1000** maternal deaths per 100 000 live births

4.1.1 Global-level estimates

Globally, an estimated 260 000 (UI 230 000 to 309 000) maternal deaths occurred in 2023, yielding an overall MMR of 197 (UI 174 to 234) maternal deaths per 100 000 live births for the 195 countries and territories covered in this analysis (**Table 4.1**). This corresponds to 712 maternal deaths every day, and approximately 30 maternal deaths per hour or one maternal death every two minutes globally.

For 2023, the global lifetime risk of maternal mortality was estimated at 1 in 272 – this means that for a girl aged 15 years in 2023, there is, on average, a 1 in 272 risk that she will die from a maternal cause. The overall PM was estimated at 8.9% – the proportion of deaths among women of reproductive age that are due to maternal causes.

An estimated 1354 HIV-related indirect maternal deaths occurred in 2023, accounting for less than 1% of all maternal deaths. This corresponds to an MMR for HIV-related indirect maternal deaths of approximately 1 death per 100 000 live births, globally.

Table 4.1 Estimates of maternal mortality ratio (MMR), number of maternal deaths, lifetime risk and proportion of deaths among women of reproductive age that are due to maternal causes (PM), by United Nations Sustainable Development Goal (SDG) region, subregion and other grouping, 2023

SDG region and subregion	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			PM (%)	Lifetime risk of maternal death (1 in)[b]	Number of maternal deaths[c]
	Lower UI	Point estimate	Upper UI			
World	**174**	**197**	**234**	**8.9**	**272**	**260 000**
Sub-Saharan Africa	387	454	572	16.9	55	182 000
Eastern Africa	223	263	317	14.1	93	42 000
Middle Africa	322	415	609	20.5	46	34 000
Southern Africa	113	137	159	2.8	339	1 900
Western Africa	545	691	975	18.6	36	102 000
Northern Africa and Western Asia	61	78	105	6.5	509	9 100
Northern Africa	72	101	146	7.4	370	5 900
Western Asia	38	52	76	5.0	807	3 000
Central and Southern Asia	97	112	134	6.0	410	44 000
Central Asia	17	21	28	1.7	1 560	410
Southern Asia	101	117	140	6.2	399	43 000
Eastern and South-Eastern Asia	53	65	88	2.4	1 384	13 000
Eastern Asia	13	17	22	0.7	7 079	1 800
South-Eastern Asia	89	114	158	3.9	501	12 000
Latin America and the Caribbean	68	77	88	3.5	789	7 200
Caribbean	143	190	289	7.8	296	1 200
Central America	42	49	55	2.5	1 063	1 500
South America	65	77	91	3.3	842	4 400
Oceania (excluding Australia and New Zealand)	116	173	268	6.9	196	550
Melanesia	115	176	275	7.0	193	530
Micronesia	83	126	212	4.4	279	9
Polynesia	54	98	198	6.0	317	8
Australia/New Zealand	2	3	4	0.5	21 248	11
Europe and Northern America	9	11	12	0.5	7 410	1 100
Eastern Europe	7	9	12	0.3	10 302	210
Northern Europe	6	7	10	0.5	10 358	76
Southern Europe	5	6	7	0.5	16 139	66
Western Europe	5	5	6	0.5	14 337	96
Europe	6	7	8	0.3	11 905	450
Northern America	13	16	20	0.8	4 322	650
Small island developing States	155	193	253	8.2	260	2 300
Landlocked developing countries	244	284	343	14.8	95	50 000
Least developed countries	277	313	368	16.1	83	114 000

Note: The countries in each SDG regional grouping can be found online at: https://unstats.un.org/sdgs/indicators/regional-groups. This table only presents data for the 195 countries and territories that met the inclusion criteria for this analysis, i.e. 193 WHO Member States and 2 territories.

[a] MMR estimates have been rounded to the nearest 1.

[b] Lifetime risk has been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

4.1.2 Regional-level estimates

There was considerable variation in the burden of maternal mortality by region, according to the United Nations SDG classification of regions and subregions (**Table 4.1**). This report marks the first time in this series of United Nations MMEIG reports (first published in 2007) that no SDG region had a very high MMR. Sub-Saharan Africa had a high MMR with an MMR point estimate of 454 (UI 387 to 572) per 100 000 live births, and the lifetime risk of maternal death in the region was estimated at 1 in 55. Sub-Saharan Africa alone accounted for approximately 70% of global maternal deaths in 2023, followed by Central and Southern Asia which accounted for almost 17%. The MMR was moderate in two regions – Oceania (excluding Australia and New Zealand) at 173 (UI 116 to 268) and Central and Southern Asia at 112 (UI 97 to 134). Three regions – Northern Africa and Western Asia, Eastern and South-Eastern Asia, and Latin America and the Caribbean – had low MMR. Two regions – Europe and Northern America, and Australia and New Zealand – had very low MMR, with the lowest in Australia and New Zealand at 3 (UI 2 to 4). This corresponds to an estimated lifetime risk of dying from a maternal cause in Australia and New Zealand in 2023 of approximately 1 in 21 248 – almost 400 times lower than the risk in sub-Saharan Africa (1 in 55). The PM in sub-Saharan Africa in 2023 was 16.9% compared with 0.5% in Australia and New Zealand and in Europe and Northern America.

Turning to look in more detail at SDG subregions, Western Africa was the only SDG subregion with a very high MMR in 2023 at 691 (UI 545 to 975) per 100 000 live births and Middle Africa was the only subregion to have a high MMR at 415 (UI 322 to 609) per 100 000 live births. Eight subregions had moderate MMRs in 2023 (from higher to lower): Eastern Africa at 263 (UI 223 to 317), the Caribbean at 190 (UI 143 to 289), Melanesia at 176 (UI 115 to 275), Southern Africa at 137 (UI 113 to 159), Micronesia at 126 (UI 83 to 212), Southern Asia at 117 (UI 101 to 140), South-Eastern Asia at 114 (UI 89 to 158) and Northern Africa at 101 (UI 72 to 146). Four subregions had low MMR (from higher to lower): Polynesia at 98 (UI 54 to 198), South America at 77 (UI 65 to 91), Western Asia at 52 (UI 38 to 76) and Central America at 49 (UI 42 to 55).

In total, six subregions had very low MMR (from higher to lowest): Eastern Asia at 17 (UI 13 to 22), Northern America at 16 (UI 13 to 20), Eastern Europe at 9 (UI 7 to 12), Northern Europe at 7 (UI 6 to 10), Southern Europe at 6 (UI 5 to 7) and Western Europe at 5 (UI 5 to 6). Correspondingly, the lifetime risk of a 15-year-old girl dying from a maternal cause in her lifetime varies significantly between subregions, ranging from 1 in 36 in Western Africa to 1 in approximately 16 000 in Southern Europe.

In 2023, the PM was above 10% in three subregions: Middle Africa (20.5%), Western Africa (18.6%) and Eastern Africa (14.1%). All remaining subregions had a PM below 10%, including six subregions with a PM below 1% (from higher to lowest): Northern America (0.8%), Eastern Asia (0.7%), Northern Europe (0.5%), Southern Europe (0.5%), Western Europe (0.5%) and Eastern Europe (0.3%).

The burden of maternal mortality also varies substantially by income group, which is apparent from the data for the grouping of least developed countries (LDCs). The LDCs are home to 13% of the world's population *(2)*, but these countries accounted for 43.9% of all maternal deaths in 2023. In LDCs, the point estimate for MMR in 2023 was 313 (UI 277 to 368) maternal deaths per 100 000 live births, the lifetime risk of maternal death was 1 in 83, and the PM was 16.1%.

Another grouping of countries is the landlocked developing countries (LLDCs), where approximately 15% of the world's population live *(3)*. The LLDCs accounted for 19.3% of all maternal deaths in 2023. The MMR in LLDCs in 2023 was estimated to be 284 (UI 244 to 343), the lifetime risk of maternal death for a 15-year-old girl in a LLDC was 1 in 95, and the PM was 14.8%.

The third special grouping is the small island developing States (SIDS), comprising 39 states and 18 associate members of United Nations regional commissions, with a combined population of around 65 million people *(4)*. Located in the Caribbean, the Pacific Ocean, the Atlantic Ocean, the Indian Ocean and the South China Sea, the SIDS face unique economic, environmental and social challenges. In 2023, the SIDS had a moderate estimated MMR of 193 (UI 155 to 253), with a 1 in 260 lifetime risk of maternal death, and a PM of 8.2%.

In 2023, the World Bank identified 17 countries and territories that were affected by violent conflict (based on a threshold number of conflict-related deaths

relative to the population) and 20 other countries and territories with high levels of institutional and social fragility (based on indicators measuring the quality of institutions and policies and manifestations of fragility) *(5)*. Collectively, the 37 countries and territories affected by violent conflict and with high levels of institutional and social fragility accounted for 61.4% of maternal deaths in 2023. The MMR for the group of conflict-affected countries and territories was 504 (UI 413 to 674) maternal deaths per 100 000 live births – over double the world MMR, with a 1 in 51 lifetime risk of maternal death and a PM of 18.7%. In the countries and territories experiencing institutional and social fragility in 2023, the MMR was 368 (UI 300 to 473), with a lifetime risk of maternal death of 1 in 79, and a PM of 15.1%.

Finally, the burden of HIV-related indirect maternal deaths[27] in 2023 also varied considerably by region and subregion. **Table 4.2** shows the HIV-related indirect MMR and the number and percentage of HIV-related indirect maternal deaths for the world and by SDG region and subregion and other groupings in 2023. The HIV-related indirect MMR was highest in the region of sub-Saharan Africa (3 per 100 000 live births), while the region of Australia and New Zealand had no HIV-related indirect maternal deaths.

Among subregions, Southern African had the highest HIV-related indirect MMR (8 per 100 000 births). Of the estimated 1354 global HIV-related indirect maternal deaths in 2023, 89.9% were in sub-Saharan Africa and 57.9% of them occurred in the grouping of LDCs. Four subregions, all of them in sub-Saharan Africa, had over 100 HIV-related indirect maternal deaths in 2023 (from highest to lowest number): Eastern Africa (685), Western Africa (275), Middle Africa (147) and Southern Africa (110). Among all subregions in 2023, Southern Africa had the highest proportion of HIV-related indirect maternal deaths as a subset of all maternal deaths (5.8%), followed by Eastern Africa (1.8%). There were no HIV-related indirect maternal deaths in the subregions of Eastern Asia, Micronesia, Polynesia, Northern Europe, Southern Europe, Western Europe or Northern America.

[27] See definitions in Chapter 2.

Table 4.2 Estimates of maternal mortality ratio (MMR), number of maternal deaths and HIV-related indirect maternal deaths, by United Nations Sustainable Development Goal (SDG) region, subregion and other grouping, 2023

SDG region and subregion	MMR point estimate[a]	Number of maternal deaths[b]	Number of HIV-related indirect maternal deaths[c]	HIV-related indirect MMR	Percentage of HIV-related indirect maternal deaths[d] (%)
World	**197**	**260 000**	**1 354**	**1**	**0.6**
Sub-Saharan Africa	**454**	**182 000**	**1 217**	3	0.7
Eastern Africa	263	42 000	685	4	1.8
Middle Africa	415	34 000	147	2	0.5
Southern Africa	137	1 900	110	8	5.8
Western Africa	691	102 000	275	2	0.3
Northern Africa and Western Asia	**78**	**9 100**	**15**	0	0.2
Northern Africa	101	5 900	12	0	0.2
Western Asia	52	3 000	3	0	0.1
Central and Southern Asia	**112**	**44 000**	**18**	0	< 0.1
Central Asia	21	410	2	0	0.5
Southern Asia	117	43 000	17	0	< 0.1

Table 4.2 (continued)

SDG region and subregion	MMR point estimate[a]	Number of maternal deaths[b]	Number of HIV-related indirect maternal deaths[c]	HIV-related indirect MMR	Percentage of HIV-related indirect maternal deaths[d] (%)
Eastern and South-Eastern Asia	**65**	**13 000**	**81**	0	0.6
Eastern Asia	17	1 800	0	0	< 0.1
South-Eastern Asia	114	12 000	81	1	0.7
Latin America and the Caribbean	**77**	**7 200**	**17**	0	0.2
Caribbean	190	1 200	5	1	0.4
Central America	49	1 500	8	0	0.5
South America	77	4 400	5	0	0.1
Oceania (excluding Australia and New Zealand)	**173**	**550**	**2**	1	0.4
Melanesia	176	**530**	2	1	0.4
Micronesia	126	9	0	0	< 0.1
Polynesia	98	8	0	0	< 0.1
Australia and New Zealand	**3**	11	**0**	0	< 0.1
Europe and Northern America	**11**	**1 100**	**3**	0	0.3
Eastern Europe	9	210	2	0	1.1
Northern Europe	7	76	0	0	0.2
Southern Europe	6	66	0	0	0.4
Western Europe	5	96	0	0	0.4
Europe	7	450	3	0	0.7
Northern America	16	650	0	0	< 0.1
Small island developing States	**193**	**2 300**	**11**	1	0.5
Landlocked developing countries	**284**	**50 000**	**390**	2	0.8
Least developed countries	**313**	**114 000**	**785**	2	0.7

Note: The countries in each SDG regional grouping can be found online at: https://unstats.un.org/sdgs/indicators/regional-groups. This table only presents data for the 195 countries and territories that met the inclusion criteria for this analysis, i.e. 193 WHO Member States and 2 territories.

[a] MMR estimates have been rounded to the nearest 1.

[b] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Deaths to HIV-positive women caused by the aggravating effect(s) of pregnancy on HIV.

[d] As a percentage of all (unrounded) maternal deaths.

4.1.3 Country-level estimates

Annex 4 provides 2023 point estimates and uncertainty intervals for each country's maternal mortality indicators (MMR and PM), as well as the estimates for numbers of maternal deaths, lifetime risk of maternal death, and percentage of HIV-related indirect maternal deaths. **Figure 4.1** in this chapter displays a map with countries shaded according to MMR levels in 2023.

For the first time in this series of United Nations MMEIG reports, no countries were estimated to have had extremely high maternal mortality in the most recent year of observation (defined as MMR of over 1000 maternal deaths per 100 000 live births). However, the following nine countries were estimated to have had very high MMR in 2023 (defined as ranging between 500 and 999): Nigeria (993; UI 718 to 1540), Chad (748; UI 493 to 1248), the Central African Republic (692; UI 333 to 1299), South Sudan (692; UI 400 to 1254), Liberia (628; UI 436 to 913), Somalia (563; UI 244 to 1089), Afghanistan (521; UI 339 to 942), Benin (518; UI 393 to 740) and Guinea-Bissau (505; UI 313 to 851). While these countries have the highest point estimates, the width of their UIs vary, and this needs to be taken into account when interpreting the MMR estimates.

Fourteen countries had a high MMR (defined as 300–499), 43 countries had a moderate MMR (defined as 100–299), 129 countries had a low MMR (defined as below 100), and of the latter, 74 had a very low MMR (defined as below 20).

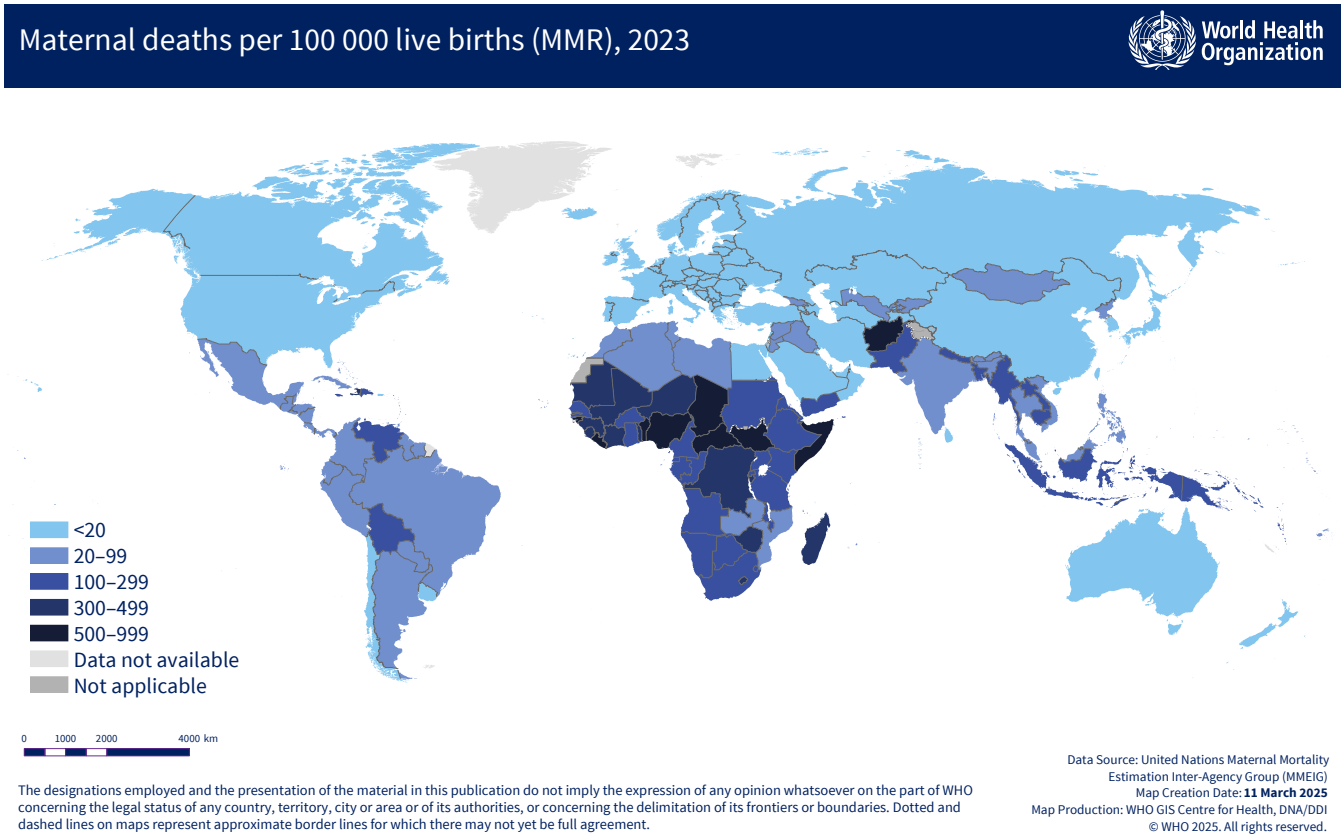
Nigeria had the highest number of maternal deaths and accounted for more than a quarter (28.7%) of all estimated global maternal deaths in 2023, with approximately 75 000 deaths. Three other countries had more than 10 000 maternal deaths in 2023: India (19 000), the Democratic Republic of the Congo (19 000) and Pakistan (11 000) – accounting for 7.2%, 7.2% and 4.1% of global maternal deaths, respectively. Together, these four countries accounted for almost half (47%) of all maternal deaths globally in 2023. Five countries had more than 5000 maternal deaths (but fewer than 10 000) in 2023 (in order from higher to lower; see numbers in Annex 4): Ethiopia, Afghanistan, the United Republic of Tanzania, Indonesia, Chad. A total of 84 countries were estimated to have had 20 or fewer maternal deaths in 2023.

The PM in 2023 was estimated to be highest in Afghanistan (32.8%), followed by Mauritania (28.7%), the Central African Republic (28.4%), Somalia (28.0%), Chad (24.8%), Niger (23.5%), Liberia (23.1%), the Democratic Republic of the Congo (21.7%), Guinea-Bissau (21.5%) and Nigeria (20.1%). The PM was less than 1% in 59 countries in 2023, the majority of which (39 countries) were in Europe and Northern America, followed by six countries in Eastern and South-Eastern Asia, and five countries in Northern Africa and Western Asia.

Regarding the estimated lifetime risk of maternal mortality for a 15-year-old girl, the countries with the highest estimated risk in 2023 were Chad (1 in 24) and the Central African Republic (1 in 24), followed by Nigeria (1 in 25), Somalia (1 in 30) and Afghanistan (1 in 40). The countries with the lowest risk are the Cook Islands (1 in 550 710), Belarus (1 in 96 213) and Norway (1 in 60 475). The lifetime risk of maternal mortality in Chad and the Central African Republic is 23 000 times greater than in the Cook Islands.

The percentage of all maternal deaths that were HIV-related indirect maternal deaths was 10% or greater in three countries in 2023: Eswatini (16.9%), Mozambique (14.7%) and Belarus (10.4%).

Fig. 4.1 Maternal mortality ratio (MMR) estimates, by country, 2023



4.2 Trends in maternal mortality: 2000 to 2023

When interpreting changes in MMRs over time, one should take into consideration that it is easier to reduce the MMR when the level is high than when the MMR level is already low. Furthermore, at very low levels of maternal mortality, a small absolute change in the MMR can appear as a large relative difference. **Negative numbers for changes in the MMR and the annual rate of reduction (ARR) denote increases in the estimates, i.e. a deterioration in maternal mortality.**

Trends in maternal mortality are presented in this report for the 24-year period from 2000 to 2023. With eight years of data from the SDG period now available, this report presents the second round of estimates where it is possible to disaggregate trends for the SDG era and the first time that it is possible to include the mid-point of the SDG period.

4.2.1 Global trends

Trends between 2000 and 2023

Between 2000 and 2023, the global MMR fell by 40.0% from 328 (UI 308 to 352) per 100 000 live births in 2000 to 197 (UI 174 to 234) in 2023 (**Table 4.3**; UIs for 2023 estimates are in **Table 4.1**). The average ARR in the global MMR between 2000 and 2023 was 2.2% (UI 1.4% to 2.8%), meaning that on average, the global MMR declined by 2.2% every year between 2000 and 2023, although progress was uneven during this period. The global number of maternal deaths also fell significantly throughout this period, from 443 000 in 2000 to 260 000 in 2023. The global PM was estimated to be 12.6% in 2000 compared with 8.9% in 2023. Globally, the lifetime risk of a 15-year-old girl eventually dying from a maternal cause reduced by more than half from 1 in 130 in 2000 to 1 in 272 in 2023.

In 2000, there were 6760 HIV-related indirect maternal deaths representing 1.5% of all deaths, and the HIV-related MMR was 5. In 2023, the number of HIV-related indirect maternal deaths had fallen to 1354 deaths, or 0.6% of all maternal deaths, and the MMR was 1.

Table 4.3 Comparison of maternal mortality ratio (MMR) and number of maternal deaths, and percentage change and average annual rate of reduction of MMR, by United Nations Sustainable Development Goal (SDG) region, subregion and other grouping, 2000 and 2023

SDG region and subregion	2000		2023		Overall percentage change in MMR between 2000 and 2023[c] (%)	Average annual rate of reduction (ARR) in MMR between 2000 and 2023 (%)		
	MMR point estimate[a]	Number of maternal deaths[b]	MMR point estimate[a]	Number of maternal deaths[b]		Lower UI	ARR point estimate	Upper UI
World	328	444 000	197	260 000	40.0	1.4	2.2	2.8
Sub-Saharan Africa	748	205 000	454	182 000	39.6	1.1	2.2	2.9
Eastern Africa	665	75 000	263	42 000	60.5	3.2	4.0	4.8
Middle Africa	709	32 000	415	34 000	43.2	0.5	2.5	3.4
Southern Africa	200	2 400	137	1 900	31.5	1.0	1.6	2.6
Western Africa	912	96 000	691	102 000	25.3	−0.5	1.3	2.3
Northern Africa and Western Asia	161	16 000	78	9 100	52.0	2.1	3.2	4.2
Northern Africa	239	11 000	101	5 900	57.9	2.5	3.8	5.1
Western Asia	87	4 300	52	3 000	40.5	0.6	2.3	3.5
Central and Southern Asia	397	171 000	112	44 000	71.8	4.6	5.5	6.2
Central Asia	49	590	21	410	57.7	2.4	3.7	4.8
Southern Asia	405	170 000	117	43 000	71.3	4.6	5.4	6.2
Eastern and South-Eastern Asia	119	37 000	65	13 000	45.1	1.3	2.6	3.5
Eastern Asia	54	11 000	17	1 800	67.7	3.9	4.9	6.5
South-Eastern Asia	230	27 000	114	12 000	50.7	1.6	3.1	4.1
Latin America and the Caribbean	92	11 000	77	7 200	16.8	0.2	0.8	1.3
Caribbean	191	1 500	190	1 200	2.3	−1.9	0.1	1.3
Central America	77	2 700	49	1 500	35.4	1.3	1.9	2.7
South America	88	6 500	77	4 400	13.1	−0.2	0.6	1.3
Oceania (excluding Australia and New Zealand)	274	690	173	550	38.2	0.2	2.1	3.7
Melanesia	284	660	176	530	39.6	0.2	2.2	3.9
Micronesia	194	17	126	9	36.0	0.2	1.9	3.3
Polynesia	101	10	98	8	2.5	−1.8	0.1	1.8
Australia and New Zealand	7	23	3	11	58.0	2.6	3.8	4.9
Europe and Northern America	17	1 900	11	1 100	35.7	1.2	1.9	2.6
Eastern Europe	36	980	9	210	75.4	4.8	6.1	7.4
Northern Europe	11	120	7	76	35.3	0.7	1.9	3.0
Southern Europe	9	130	6	66	30.1	0.7	1.6	2.4

SDG region and subregion	2000		2023		Overall percentage change in MMR between 2000 and 2023[c] (%)	Average annual rate of reduction (ARR) in MMR between 2000 and 2023 (%)		
	MMR point estimate[a]	Number of maternal deaths[b]	MMR point estimate[a]	Number of maternal deaths[b]		Lower UI	ARR point estimate	Upper UI
Western Europe	9	180	5	96	38.2	1.2	2.1	2.9
Europe	19	1 400	7	450	62.7	3.5	4.3	5
Northern America	12	510	16	650	-37.1	−2.3	−1.4	−0.4
Small island developing States	262	3 400	193	2 300	26.8	0.1	1.4	2.3
Landlocked developing countries	705	91 000	284	50 000	59.6	3.1	3.9	4.7
Least developed countries	686	181 000	313	114 000	54.5	2.6	3.4	4.0

Note: The countries in each SDG regional grouping can be found online at: https://unstats.un.org/sdgs/indicators/regional-groups. This table only presents data for the 195 countries and territories that met the inclusion criteria for this analysis, i.e. 193 WHO Member States and two territories.

[a] MMR is rounded to the nearest 1.

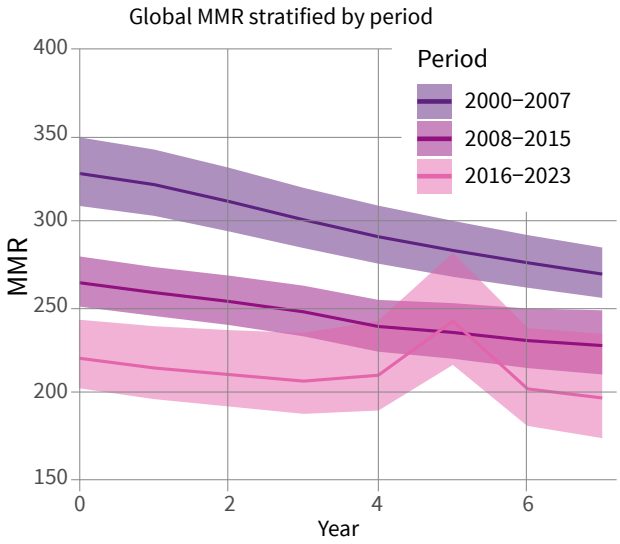
[b] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Overall change for the whole period, data from 1 January 2000 to 31 December 2023.

Trends between 2016 and 2023 (the first half of the SDG era)

In the first eight years of the SDG era (**Fig. 4.2**), assessed from the start of 2016 to the end of 2023, the global MMR declined from an estimated 220 (UI 203 to 242) to 197 (UI 174 to 234) maternal deaths per 100 000 live births. This corresponds to a 10.4% reduction and a global average ARR of 1.6% (UI 0.04% to 2.7%). The global lifetime risk of maternal death fell from 1 in 216 in 2016 to 1 in 272 in 2023. The number of HIV-related indirect maternal deaths fell from 2500 in 2016 to 1354 in 2023, representing a slight reduction in the proportion of all maternal deaths indirectly related to HIV – from 0.8% in 2016 to 0.6% in 2023.

Fig. 4.2 Global MMR stratified by five-year time period, 2000–2023



Shaded area indicates 80% uncertainty intervals.

4.2.2 Regional-level trends

Trends between 2000 and 2023

Between 2000 and 2023, MMR declined in all of the SDG regions and also in the three additional groupings of countries. The region of Central and Southern Asia achieved the greatest overall percentage reduction in MMR (71.8%) from 395 (UI 360 to 442) maternal deaths per 100 000 live births in 2000 to 112 (UI 97 to 134) in 2023, as shown in **Table 4.3**. This equates to an average ARR of 5.5% (UI 4.6% to 6.2%). In terms of other SDG regions, between 2000 and 2023, MMR declined by 58.0% in Australia and New Zealand, 52.0% in Northern Africa and Western Asia, 45.1% in Eastern and South-Eastern Asia, 39.6% in sub-Saharan Africa, 38.2% in Oceania (excluding Australia and New Zealand) and 35.1% in Europe and Northern America. The smallest percentage reduction in MMR was in Latin America and the Caribbean at 16.8%, amounting to an average ARR of 0.8% (UI 0.2% to 1.3%).

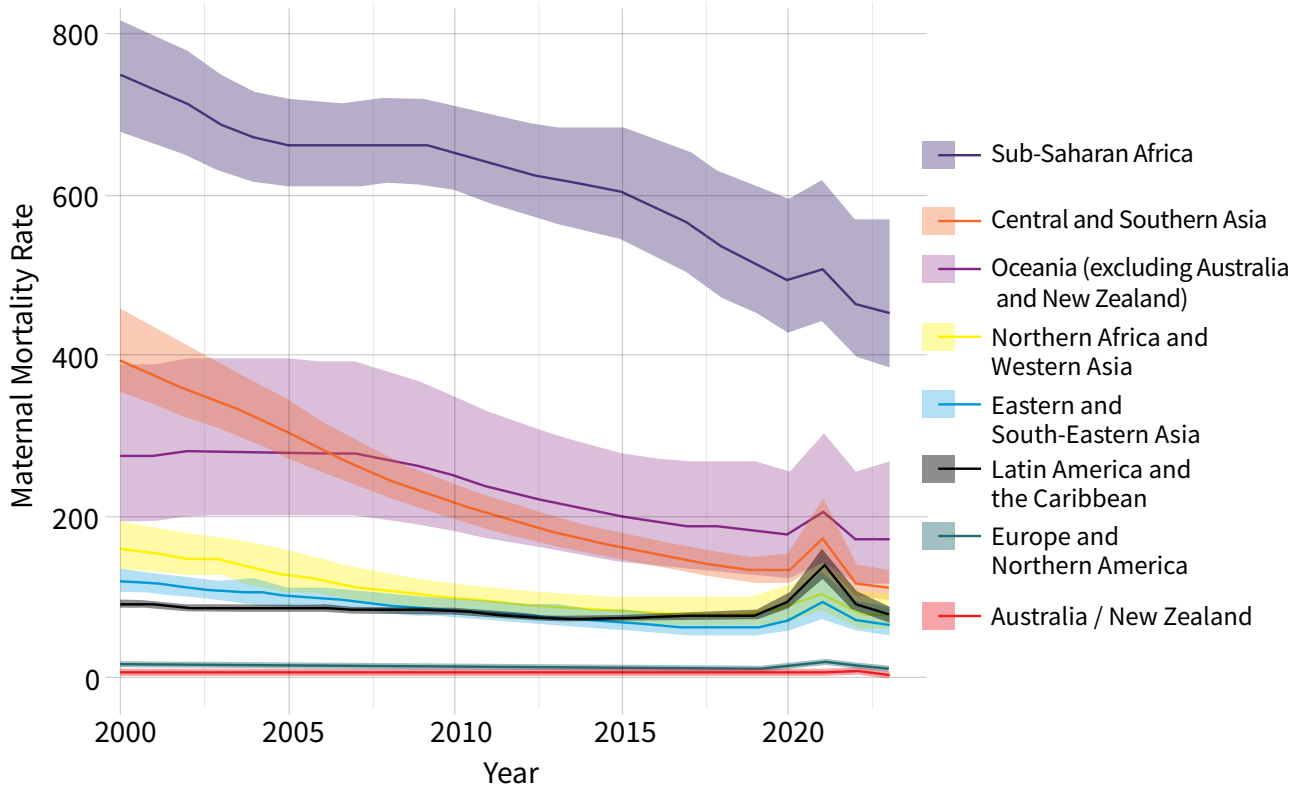
At the subregional level, the greatest percentage change in MMR between 2000 and 2023 was in Eastern Europe with a 75.4% reduction and average ARR of 6.1% (UI 4.8% to 7.4%), followed by Southern Asia with a 71.4% reduction and average ARR of 5.4% (UI 4.6% to 6.2%), and Eastern Asia with a 67.7% reduction and ARR of 4.9% (UI 3.9% to 6.5%).

The greatest reduction in lifetime risk of maternal death during this period occurred in the region of Central and Southern Asia, with a 82.6% fall in risk from 1 in 71 in 2000 to 1 in 410 in 2023. In five regions, the lifetime risk of maternal mortality reduced by more than half: sub-Saharan Africa, Northern Africa and Western Asia, Australia and New Zealand, Eastern and South-Eastern Asia, and Oceania (excluding Australia and New Zealand).

The greatest reduction in PM during this period also occurred in Central and Southern Asia, where it fell by almost two thirds. PM fell by approximately half in Oceania (excluding Australia and New Zealand) and Eastern and South-Eastern Asia, and by approximately one third in Northern Africa and Western Asia. Smaller estimated reductions in PM were observed in Australia and New Zealand, Latin America and the Caribbean, and sub-Saharan Africa.

The MMR reduced by more than half (54.5%) in LDCs from 686 (UI 641 to 734) maternal deaths per 100 000 live births in 2000 to 313 (UI 277 to 368) in 2023, equating to a 3.4% average ARR (UI 2.6% to 4.0%).

Fig. 4.3 MMR estimates by SDG region, 2000–2023



This corresponds to a reduction in the lifetime risk of maternal death from 1 in 30 in 2000 to 1 in 83 in 2023. The MMR in LLDCs reduced by more than half in this period from 705 (UI 643 to 769) maternal deaths per 100 000 live births in 2000 to 284 (UI 244to 343) in 2023 – this is a 59.6% reduction (UI 50.7% to 66.0%), at an average ARR of 3.9% (UI 3.1% to 4.7%). The MMR in SIDS reduced by over one quarter (26.8%) from 262 (UI 230 to 302) in 2000 to 193 (UI 155 to 253) in 2023, corresponding to an average ARR of 1.4% (UI 0.1% to 2.3%).

In conflict-affected countries and territories, as defined by the World Bank, the MMR reduced by 38% from 813 (UI 715 to 913) maternal deaths per 100 000 live births in 2000 to 504 (UI 413 to 674) in 2023, corresponding to an average ARR of 2.1%. In countries and territories of institutional and social fragility, the MMR reduced by 35.6% between 2000 and 2023 from 567 (UI 499 to 655) to 368 (UI 300 to 473) – an average ARR of 1.9%.

The proportion of HIV-related indirect maternal deaths *increased* slightly between 2000 and 2023 in Eastern and South-Eastern Asia, Central and Southern Asia, and in North Africa and Western Asia, while decreasing in all other regions.

Trends between 2016 and 2023 (the first half of SDG era)

In the first half of the SDG era, three regions achieved a significant reduction in the MMR (i.e. the UIs did not cross zero): Australia and New Zealand (50% reduction [UI 37.8% to 59.9%]; average ARR 9.9% [UI 6.8% to 13.0%]), Central and Southern Asia (26.4% [UI 17.2% to 33.0%]; average ARR 4.4% [UI 2.7% to 5.7%]) and sub-Saharan Africa (22.2% [UI 10.6% to 29.6%]; average ARR 3.6% [UI 1.6% to 5.0%]). The MMR stagnated in five regions (i.e. the UIs crossed zero): Northern Africa and Western Asia, Eastern and South-Eastern Asia, Oceania (excluding Australia and New Zealand), Europe and North America and Latin America and the Caribbean (–1.8% [UI –12.9% to 8.0%]; average ARR –0.3% [UI –1.7% to 1.2%]).[28]

Progress between 2016 and 2023 was apparent in the LDCs and LLDCs, with a 25.5% (UI 18.6% to 30.3%) reduction in the MMR and an average ARR of 4.2% (UI 2.9% to 5.2%) in the former, and a 31.2% (UI 23.3% to 37.1%) reduction in the MMR and an average ARR of 5.3% (UI 3.8% to 6.6%) in the latter. However, the MMR stagnated in the SIDS during this period, with a 3.9% (UI –12.0% to 15.5%) reduction in MMR and an average ARR of 0.6 (UI –1.6% to 2.4%).

The PM declined in all regions during the first half of the SDG era, with the largest reduction in sub-Saharan Africa from 19.9% in 2016 to 16.9% in 2023.

In conflict-affected countries and territories, as defined by the World Bank, the MMR reduced by 21.5% from 643 (UI 562 to 763) to 504 (UI 413 to 674) between 2016 and 2023, with an average ARR of 3.5%, and it reduced by 14.5% in countries of institutional and social fragility from 431 (UI 365 to 518) in 2016 to 368 (UI 300 to 473) in 2023, with an average ARR of 2.2%.

Progress in reducing HIV-related indirect maternal deaths was mixed between 2016 and 2023, with declines in the numbers of deaths in four regions: Australia and New Zealand, Europe and North America, Latin America and the Caribbean, and sub-Saharan Africa. The proportion of HIV-related indirect maternal deaths increased modestly during this period in the other four regions: Central and Southern Asia, Eastern and Southeastern Asia, North Africa and Western Asia, and Oceania (excluding Australia and New Zealand).

4.2.3 Country level trends

Trends between 2000 and 2023

In 35 countries, the overall reduction in MMR between 2000 and 2023 was greater than 70%. The largest change in MMR was observed in Belarus with a 94.6% improvement (ARR 12.7%), followed by Bhutan with 85.3% (ARR 8.3%) and Kazakhstan with 83.5% (ARR 7.8%). In 16 countries, the overall difference in MMR between 2000 and 2023 was negative, meaning that the MMR increased in those countries, ranging from –162% (ARR –4.2%) in the Bolivarian Republic of Venezuela to –2.9% in Grenada (ARR –0.1%). The increase in MMR was significant in four countries (i.e. the UIs did not cross zero): Dominican Republic, Jamaica, USA and the Bolivarian Republic of Venezuela. The lifetime

[28] Negative numbers indicate an increase in the MMR and a deterioration in maternal mortality.

risk of maternal mortality declined in all countries between 2000 and 2023 except for nine countries, where it remained stable: Botswana, Canada, Cyprus, Dominican Republic, Gabon, Greece, Portugal, USA and the Bolivarian Republic of Venezuela. The PM increased in 30 countries during that time, including in 14 high-income countries and seven upper-middle-income countries.

Trends between 2016 and 2023 (the first half of SDG era)

In the first half of the SDG era, the overall change in MMR in the countries included in this report ranged from the largest overall reduction of 60.3% in Australia (ARR 13.2%) to the largest increase in mortality: −112.3% in Botswana (ARR −10.7%). The overall difference in MMR was negative in only three countries (Antigua and Barbuda, Botswana and the Bolivarian Republic of Venezuela), meaning that the MMR increased in those countries during the first half of the SDG period. The lifetime risk of maternal mortality decreased in all but 12 countries, including two SIDSs and six LLDCs, during this time. The PM decreased in all but 20 countries between 2016 and 2023.

4.3 COVID-19 pandemic

4.3.1 Global-level estimates

Globally, there were 282 000 maternal deaths in 2020, 322 000 maternal deaths in 2021, and 267 000 maternal deaths in 2022, which equates to a global MMR of 211 maternal deaths per 100 000 live births in 2020, 242 in 2021 and 203 in 2022. The increase in maternal deaths and MMR in 2021 mirrors the global pattern of excess deaths among women aged 15–49 years during the COVID-19 PHEIC (104 000 excess deaths in 2020, 523 000 in 2021 and 63 000 in 2022) *(6)*. The data show that this interruption to the downward trajectory of global MMR was short-lived. In 2022, the global MMR and number of maternal deaths were lower than they had been in the three years immediately prior to the COVID-19 PHEIC. The overall proportion of deaths due to maternal causes (PM) remained stable during the years of the PHEIC.

4.3.2 Regional-level estimates

Figure 4.3 shows the MMR point estimates (the middle line in each colour) and UIs for the eight SDG regions from 2000 to 2023, showing the increase during the COVID-19 pandemic. In 2021, the MMR increased across all World Bank income levels and SDG regions (apart from Australia and New Zealand) compared with the years immediately prior to the pandemic. In 2022, the MMRs returned to levels similar to or below those observed prior to the PHEIC. In Australia and New Zealand, however, a rise in MMR was observed in 2022.

The increase in MMR during this time was significant (i.e. the UIs did not overlap) in only two regions: Latin America and the Caribbean, and Europe and North America. In Latin America and the Caribbean, the MMR increased from 76 (UI 71 to 84) in 2019 to 140 (UI 123 to 164) in 2021. In Europe and North America, the MMR increased from 11 (UI 11 to 12) in 2019 to 19 (UI 17 to 21) in 2021. In the remaining regions there was overlap in UIs between 2019 and 2021, reflecting the uncertainty associated with the MMR estimates in those areas.

The PM increased in one region – Europe and North America – between 2019 and 2021: from 0.6% (UI 0.5% to 0.6%) to 0.7% (0.6% to 0.8%). In all other regions there was overlap in the UIs during this period.

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Pregnant woman at one of her antenatal care visits has her blood pressure checked [Afghanistan].
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Navigation

The road to ending preventable maternal mortality

5

5.1 Progress towards SDG target 3.1: MMR below 70

The first chapter of this report described the recent evolution of the global commitments to reducing maternal mortality, and presented the current global targets and objectives. The key target is SDG target 3.1: "By 2030, reduce the global maternal mortality ratio to less than 70 per 100 000 live births" *(1)*. Successfully reaching this global target depends on the progress achieved in every country, as they work towards their national targets, based on the Ending preventable maternal mortality (EPMM) guidance *(2)* (see **Box 1.1** in Chapter 1). As presented in the previous chapter, the global MMR has come down 40% from 328 maternal deaths per 100 000 live births in the year 2000 to 197 in 2023. While this is a substantial decrease, preventable maternal deaths continue to occur in all settings, and with seven years of observation remaining before 2030 – and the SDG era – comes to a close, the MMR is still clearly very far above the final target of "less than 70".

The previous *Trends in maternal mortality estimates* report, which was published in 2022 and covered the period 2000 to 2020, showed that progress in reducing MMR had stalled in the first five years of the SDG era *(3)*. At the mid-point of the SDG era, in May 2024, a resolution calling for urgent action to "accelerate progress towards reducing maternal, newborn, and child mortality in order to achieve SDG targets 3.1 and 3.2" was adopted at the Seventy-seventh World Health Assembly *(4)*. The resolution recognized that over 80% of countries are unlikely to achieve their MMR target, and called on Member States to take action, laying out a series of suggested steps as described in section 1.1 of this report (see **Box 1.2** in Chapter 1).

This report covers the first eight years of the SDG era in full, including the extraordinary years of the COVID-19 pandemic, as part of the observation period from the start of 2000 to the close of 2023. In 2023, an estimated 260 000 women died from a maternal cause globally. This corresponds to approximately one woman dying every two minutes. With the global MMR in 2023 estimated at 197, reaching the SDG 3.1 target of less than 70 by the year 2030 will require an average annual rate of reduction (ARR) of 14.8% over the seven years of observation remaining (2024–2030). This rate of progress presents an unprecedented challenge, reflecting that during the MDG period (2000–2015), the average ARR was 2.5%, and in the period between 2016 and 2023 the average ARR had decreased to 1.6%.

Successfully achieving an average ARR of 14.8% in the MMR for the remaining years of the SDG period would mean reaching the SDG target of MMR below 70 and averting almost 700 000 maternal deaths between 2024 and 2030. On the other hand, under a scenario where the 2016–2023 global average ARR of 1.6% continues until 2030 without acceleration, the global MMR would be 177 in 2030 – two and a half times higher than the SDG target. Under an alternative scenario, if the ARR continues at the 2000–2023 average (2.2%), the projected MMR would be 169 by 2030 – still more than double the SDG target.

As highlighted by the 2024 World Health Assembly resolution *(4)*, it is crucial that maternal health and survival stay high on the global health and development agenda for the remainder of the SDG era.

5.2 Strategic approaches to improve maternal health

The EPMM strategic framework for policy and programme planning describes some of the drivers of success in reducing maternal mortality, which range from making improvements at the provider and health system level, to implementing interventions aimed at reducing social and structural barriers; details of the strategic framework are outlined in Box 1.1 in Chapter 1 *(2)*. In 2021, five supplementary EPMM coverage targets and 10 milestones that need to be achieved by 2025 were published *(5)*. These targets will be reviewed in 2025 to support countries as they make efforts to accelerate progress towards 2030.

Given the high global burden of postpartum haemorrhage (PPH), and the fact that obstetric haemorrhage is the leading cause of maternal death (see Chapter 1, section 1.4), in October 2023, WHO published the first roadmap to combat PPH, outlining activities, milestones and goals for global research, norms and standards, implementation and advocacy to tackle PPH, with the aim of fast-tracking progress towards SDG target 3.1 between 2023 and 2030 *(6)*. This roadmap has three objectives: (i) align all stakeholders in the field around key priorities and actions required to meet shared goals and objectives, (ii) focus work on key activities to remove duplication

of efforts, (iii) engage stakeholders to urgently advance the PPH work across countries. Through the promotion of collaboration, it is envisaged that the roadmap can advance the maternal and newborn health agenda beyond PPH.

Strengthening maternal health services to include NCD care can also help improve outcomes for women during pregnancy, childbirth, the postnatal period and beyond *(7)*. As well as SDG target 3.4 (to reduce premature mortality from NCDs by one third by 2030), the Global Strategy for Women's, Children's and Adolescent's Health includes a target addressing NCDs under the "survive" pillar: "Reduce by one third premature mortality from noncommunicable diseases and promote mental health and well-being" *(1, 8)*. The development of normative guidance on integrating care for priority NCDs during pregnancy, childbirth and the postpartum period is ongoing. More research, including clinical trials involving consenting pregnant women, is needed to effectively manage and treat NCDs. Women living with chronic medical conditions should receive care that considers their health needs as individuals. An improved understanding of how to integrate care for women with NCDs as they transition from adolescence to adulthood, and as they consider the possibility of potential pregnancy is critical. Optimizing the health of women living with NCDs in pregnancy will require effective management of chronic conditions before, during and after childbirth.

Multisectoral action is essential to target the causes of maternal mortality (see Chapter 1, section 1.4), not only to achieve SDG target 3.1, but also related commitments in SDG 3 (good health and well-being), as well as commitments in SDG 1 (end poverty in all its forms everywhere), SDG 5 (achieve gender equality and empower all women and girls) and SDG 10 (reduce inequalities). As noted in Chapter 1 (section 1.4), there are four areas of determinants of maternal mortality beyond biomedical causes, which need to be addressed through multisectoral action *(9)*.

i. Social determinants of health

The contexts in which women live and work before pregnancy, and during pregnancy, childbirth and the postpartum period, influence their health risks and outcomes *(9)*. Social determinants, such as education, ethnicity, gender, income and race, are strong predictors of maternal mortality and morbidity *(9-12)*. Socially marginalized women and girls are more likely to lack access to care and receive poor-quality care *(13)*. It is crucial to recognize and address the social determinants impeding women's access to and use of sexual and reproductive health (SRH) services. Progress towards achieving universal health coverage (UHC; which is SDG target 3.8) and universal access to SRH services (SDG target 3.7), depends on making high-quality services affordable and available *(14)*. In many countries, SRH services are delivered through primary health care (PHC). The 2018 Declaration of Astana described strengthening PHC as the most inclusive, effective and efficient way to enhance people's health and well-being to achieve UHC and the health-related SDGs *(15)*. In this context, achieving universal access to SRH services requires political commitment, sustainable financing and a coherent strategic approach *(16)*. Universal coverage of quality maternal health services, including for the most vulnerable women and girls, promotes equity and attainment of the right to health.

ii. Harmful gender norms, biases and inequalities

The health of vulnerable groups is often neglected as a result of deep-rooted inequalities in gender and social norms, which can permeate communities, families and interpersonal relationships, impeding women's health- and care-seeking behaviours *(16)*. Within the health system, discrimination and bias can manifest in the advice given, the options offered, and the quality of care made available to service users, resulting in negative experiences and subsequent poor health-seeking behaviours relating to sexual and reproductive health and rights *(17, 18)*. A strong intersectional approach, applying a dignity, human-rights and justice perspective to empowering women, reducing gender-based (and other intersecting forms of) inequality, and eliminating poverty, is essential to improve maternal health outcomes *(19)*. Equity-informed maternal health interventions can help achieve justice in health.

iii. Weak health systems

The health system has a central role in shaping women's experiences and outcomes during pregnancy, childbirth and the postpartum period *(9)*. Access to safe, quality, respectful and affordable SRH care, including maternal health services,

is integral to safeguarding rights and improving trust in institutions and services *(13)*. Weak health systems with (i) insufficient numbers of adequately trained and competent health workers; (ii) shortages of essential medical supplies; and (iii) lack of accountability can result in poor-quality care, including disrespect, mistreatment and abuse, with detrimental effects on those in need. Strengthening health systems to increase the numbers of well trained and well supervised health workers; address shortages of essential medical supplies; and improve accountability to the rights of women and girls, can help achieve universal coverage of high-quality maternal health services for all *(2)*.

iv. External factors causing instability and fragility

Health systems must be able to respond to local needs and meet emerging challenges *(20)*. In 2023, 62% of preventable maternal deaths happened in fragile and conflict-affected settings. Improving health facility capabilities, optimizing the health workforce, and sustainably financing health services can increase the strength and resilience of health systems to external shocks and disruptions, such as climate change, conflict, post-conflict and disaster situations, and pandemics – all of which hamper progress towards global health goals. The EPMM milestones include an imperative that all countries have a preparedness and response plan that promotes maternal and newborn survival and health, with a coordinated mechanism in place for implementation, procurement of emergency supplies, and monitoring of survival and health outcomes *(5)*.

5.3 Key challenges ahead

In the remaining years of the SDG era, there must be a collective commitment to act to mitigate and adapt to the devastating effects of these realities, to improve and protect maternal health. The subsections that follow here discuss in more depth some of the key challenges ahead.

5.3.1 Fragile, conflict-affected and vulnerable settings

Climate hazards, including extreme heat, rising sea levels, floods, drought, windstorms, wildfires, and ambient air pollution, are associated with increased risks of developing complications that lead to adverse maternal outcomes, such as gestational diabetes, hypertensive disorders of pregnancy, anxiety, depression and stress *(21)*. The 10 years from 2015 to 2024 have been the warmest on record globally *(22)*. Populations that are at high risk from the effects of climate hazards are also those with the highest burden of maternal mortality *(23)*. Small island developing States are particularly vulnerable to the impact of climate change as they are highly exposed to extreme weather events.

During climate emergencies, loss of physical infrastructure and unsafe working conditions can impact health system functioning. Extreme heat, flooding and landslides can obstruct access to services for users in need. In November 2023, WHO, UNICEF and UNFPA called on Member States, partners, collaborators and stakeholders to protect the health of women, newborns and children from the impacts of climate change *(24)*. The call for action highlights the need to sustainably strengthen the resilience of health systems, promote cross-sector collaboration, accelerate research and information-sharing on the impact of climate change on maternal, newborn and child health, and prioritize a "whole-of-society" approach *(24)*.

Women of reproductive age living near high-intensity conflicts have higher mortality than women living in peaceful settings *(25, 26)*. Conflicts can have direct effects on maternal health due to violence, and indirect effects due to damaged health infrastructure and services. In terms of indirect effects, the breakdown of health systems in conflict settings can cause a rise in deaths due to complications that could be managed more readily in stable settings. Delivering quality health services is challenging because of damaged infrastructure, lack of trained health workers and a greater need for health services among the population. Furthermore, operational challenges restrict research on maternal health in conflict settings, limiting the capacity to monitor progress.

Finally, forced migration and displacement, whether driven by conflict, climate change or other drivers of fragility, can lead to higher risk of maternal mortality. Large populations may spend decades away from their homes in refugee camps, settlements or other unfamiliar settings where they are highly vulnerable to poor health outcomes. Providing SRH services to refugees, internally displaced people, and others living in humanitarian settings is complex, but

neglecting SRH needs in such settings has serious consequences, including preventable maternal mortality. WHO's High-Priority Health Services for Humanitarian Response (H3 Package) outlines the core SRH services that should be delivered as a minimum during protracted humanitarian emergencies, including a dedicated pregnancy and birth care facility, providing basic emergency obstetric and newborn care, in close alignment with WHO's UHC Compendium and Service Package and Design Implementation (SPDI) tool *(27, 28)*. The Minimum Initial Service Package (MISP) for Sexual and Reproductive Health developed by the Inter-Agency Working Group for Reproductive Health in Crises (IAWG) is a tool that defines which SRH services are most important in preventing morbidity and mortality in humanitarian emergencies *(29)*.

It is essential that strategies to protect maternal health incorporate building health system resilience against climate-related disasters, conflicts and other potential shocks to the system.

5.3.2 The COVID-19 pandemic

The estimates presented in this report include the years of the COVID-19 pandemic and therefore provide the opportunity to assess the impact of COVID-19 on maternal mortality.[30] The MMR rose in 2021 and it is possible that the COVID-19 pandemic contributed to this via two mechanisms: (i) indirect obstetric deaths – where the woman had SARS-CoV-2 infection and died as a result of the interaction between COVID-19 and her pregnant state; and/or (ii) direct obstetric deaths – where disruptions to health services hindered access to and/or quality of care resulting in pregnancy complications that ended in mortality, when they may otherwise have been prevented or managed successfully *(30)*. Several single-country studies have assessed changes in maternal mortality during the COVID-19 pandemic. A 2021 systematic review and meta-analysis, which included three studies on maternal mortality from India and Mexico, found that there was an increase in maternal deaths during the pandemic *(31)*. Similarly, a 2022 systematic review found evidence of excess maternal mortality in four studies from Mexico, Peru, South Africa and Uganda *(30)*.

Input data for the MMEIG Bayesian maternal mortality estimation and misclassification (BMat and BMis) models used for the analysis in this report were available from 90 countries for at least one year between 2020 and 2022; the majority of those countries were in two SDG regions: Europe and Northern America, and Latin America and the Caribbean (see Chapter 2, section 3.4.2c). Furthermore, depending on regional, national and subnational disease-control policies, population vulnerability and health system reliance, not all countries were equally affected by the COVID-19 pandemic in 2020. Different SARS-CoV-2 variants have coexisted throughout the pandemic, and it is plausible that different variants interacted with pregnancy in different ways, the details of which are still unclear.

Estimates for the COVID-19 period should be interpreted with caution. At the end of 2020, COVID-19 vaccines were just beginning to become available. The data for 2020 should be interpreted in the knowledge that these estimates may change in future rounds of calculations, as more data from more settings become available for 2020. Furthermore, the methodology used for estimating maternal mortality during the COVID-19 pandemic relies on several assumptions: first, we assume that the risk of dying from COVID-19 for a pregnant or postpartum woman compared with a non-pregnant or non-postpartum woman is 1.35 (ranging from 1 to 2.6). This range was informed by a subset of data from CRVS systems and specialized studies that were available prior to the 2024 country consultations and mostly came from the two SDG regions of Europe and North America and Latin America and the Caribbean. Moreover, the methods employed by the MMEIG are based on an excess deaths approach, which accounts for both COVID deaths and non-COVID deaths caused by the indirect effects of COVID-19. Due to the data limitations, these methods do not allow us to disaggregate the direct and indirect impacts of the COVID-19 pandemic on maternal deaths, which

[30] The WHO Director-General declared COVID-19 a public health emergency of international concern on 30 January 2020.

would have been valuable information for future preparedness efforts.

The increases seen in the MMR and the numbers of maternal deaths observed during the COVID-19 period appear to have been temporary and limited in nature, as the MMR returned to pre-COVID-19 levels, or even below those levels, in all SDG regions by 2022. However, it is important to note that the MMR estimates during the COVID-19 period are heavily reliant on crisis COVID deaths estimated by WPP 2024 *(32)*, especially for countries with little or no data to inform the estimates. WPP 2024 estimates of crisis COVID deaths are based on WHO estimates of excess COVID-19 deaths, which only estimate for 2020 and 2021, and in which there were substantial regional gaps in data availability. For instance, only 5 out of 47 countries in the African region had any data to estimate excess COVID-19 mortality *(33, 34)*.

5.3.3 Sources of data to measure maternal mortality

Reliable vital statistics on the numbers and distributions of births, deaths and causes of death are essential to identify and address inequalities and track progress towards global health goals. Strong systems for data collection, analysis and disaggregation are crucial to ensure that no one is left behind in the pursuit of the SDGs. Improved measurement systems, metrics and data quality are critical components of all strategies to end preventable maternal deaths *(2)*.

In recent years, a number of countries have made progress in establishing and strengthening CRVS systems as well as implementing alternative means of recording maternal deaths, such as expanding the use of confidential enquiries into maternal death (CEMD) and maternal and perinatal death surveillance and response (MPDSR). Improvements in the quality of data produced by many countries, including correction of errors in maternal death classification, has resulted in better estimation methods that make more optimal use of country-level data to produce the most accurate picture of global maternal mortality. The United Nations MMEIG methodology (see Chapter 3) has evolved to use the available data to develop the highest-quality estimates of maternal mortality.

It is important to note, however, that while the estimates presented in this report can serve as a valuable guide for policy-making and programme planning, many women who die from maternal causes are still not being counted. Extra efforts to improve data collection and record maternal mortality are needed, as highlighted by the broad uncertainty intervals (UIs) associated with the estimates presented in this report. Country-level action must drive improvements in measurement, with governments establishing strong systems to capture data and accurately record causes of death in line with standards for international comparability. At the global level, to enhance international comparability, standardized methods to prevent reporting errors in CRVS data need to be established.

For targeted interventions to improve maternal survival, data disaggregated by the timing of maternal death are needed, including late maternal deaths that occur more than 42 days but less than one year postpartum. These deaths are captured in the ICD-11 grouping of "comprehensive maternal death" *(35)* but incomplete reporting and misclassification of such deaths remains a challenge. Nevertheless, more and more countries are collecting and reporting this information; as of December 2024, among the 147 countries and territories included in this analysis that report CRVS data to the WHO Global Mortality Database, there were 70 (48%) that recorded deaths occurring after 42 days postpartum, i.e. using the ICD-10 codes O96 and/or O97.

The MMEIG's current methodology does not include these deaths for the purpose of international monitoring of maternal mortality, due to challenges in maintaining comparability of estimates between countries. The recording of deaths after 42 days is recommended for national analytic purposes since the Forty-third World Health Assembly (in 1990) approved a recommendation that countries include a checkbox on death certificates to indicate whether a woman was pregnant or had been pregnant within the year preceding her death *(36)*.

Finally, better data on the burden of maternal mortality in a range of different subpopulations within countries are needed to accelerate progress in reducing maternal mortality. While many countries have made progress between 2016 and

2023, national-level data often hide disparities within countries. Data on many marginalized and vulnerable populations are often not available as input for the estimation models, making it impossible to measure the mortality burden and examine trends within specific populations. Disaggregated data are, therefore, critical to develop and implement strategies that address inequities and meet the needs of those most at risk of poor maternal health outcomes. For instance, pregnancy and childbirth complications are among the leading causes of deaths to adolescent girls globally *(37)*. Prioritizing the rights of this population is one aspect of leaving no one behind on the road to ending preventable maternal mortality.

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A father takes care of his new born baby at the maternity ward in a local hospital in Vanuatu.
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Conclusions

Reducing maternal mortality is one of the nine targets of SDG 3: **Ensure healthy lives and promote well-being for all at all ages** *(1).* This report covers the period from the beginning of the year 2000 to the end of 2023, including a separate analysis specific to the first eight years of the SDG period (2016–2023). If the rate of progress in reducing maternal mortality observed in the first half of the SDG era continues in the remaining seven years, then the global maternal mortality ratio (MMR) will still be two and a half times higher than SDG target 3.1, which calls for it to be reduced to **less than 70 maternal deaths per 100 000 live births by 2030**.

The Resolution to **Accelerate progress towards reducing maternal, newborn and child mortality in order to achieve Sustainable Development Goal targets 3.1 and 3.2,** which was adopted at the Seventy-seventh World Health Assembly in May 2024, reiterated global commitments to realize the highest standards of maternal, newborn and child health, and the need to overcome stalled progress towards 2030 targets in the context of conflict, climate change, and the COVID-19 pandemic *(2).*

Four countries accounted for almost half of all maternal deaths in 2023 (in order starting from the highest number): Nigeria, India, the Democratic Republic of the Congo and Pakistan. Nearly all maternal deaths are preventable, whether they result from direct causes, such as postpartum haemorrhage, hypertensive disorders and unsafe abortion, or indirect causes, such as diabetes mellitus, pre-existing hypertensive disorders or maternal infectious and parasitic diseases. The quality, availability, affordability and accessibility of health-care services directly impacts maternal health experiences and outcomes. The 2024 Resolution calls attention to the urgent need to expand coverage and improve the quality of primary health care services, including in fragile settings, as originally set out in the 2018 Declaration of Astana *(2, 3).* Health services delivered through primary health care, with strong referral links to high-quality secondary-level health services, form the cornerstone of universal health coverage, which is foundational for achieving the health-related SDGs *(4).*

Recent years have brought into sharp focus a range of external factors that affect the strength of health systems. Crises, including the COVID-19 pandemic, climate change, economic and political upheaval, and armed conflicts, increase the challenges people face in accessing health services, and women's risks of experiencing adverse maternal health outcomes. While having a direct impact on the health of the population, these crises also threaten the functioning of national health systems, and – when combined with social determinants, such as gender norms and racial biases – impede the delivery of health-care services to those most in need.

In the remaining years of the SDG era, concerted multisectoral action is needed to build resilience in the face of unabating crises that are causing fragility and failures within the health system *(5).* The provision of affordable, high-quality and safe sexual and reproduction health services through strong health systems must be protected, including in fragile and humanitarian settings *(6).* Furthermore, the specific needs of vulnerable populations should be addressed to overcome barriers to service utilization, such as mistreatment and erosion of trust *(7).*

In light of the above, it must be emphasized that this report, which synthesizes the available data to assess progress in reducing maternal mortality to achieve SDG target 3.1, shows one critical piece of information – while progress has been made in reducing maternal mortality, the reduction remains insufficient to meet the global target for MMR by 2030. Despite the challenges of recent years, there have been successes in tackling maternal mortality; for example, in 2023, for the first time since the MMEIG started reporting, no countries had MMR higher than 1000 maternal deaths per 100 000 live births. Another promising development in 2023 was that over a third of countries globally (74) had extremely low MMR, defined as less than 20 maternal deaths per 100 000 live births.

Now is the time for coordinated global, regional, national and community action to reach global maternal health targets. With less than half of the SDG period remaining, whole-of-government and whole-of-society approaches are urgently needed to accelerate progress towards SDG target 3.1, and related commitments in SDGs 1, 3, 5 and 10. Achieving the almost 15% annual rate of reduction in MMR required to meet SDG target 3.1 and avert an estimated 700 000 maternal deaths between 2024 and 2030 presents an unprecedented challenge. Rapid action is needed to safeguard maternal health and end the tragedy of preventable maternal mortality. Women have the right to not only survive pregnancy but thrive in good health.

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Mitike Desta (left) awaits the arrival of their second child. Health extension worker Yeshiwork Belay (right) ensures every mother receives essential care to safeguard both her and her child's well-being [Ethiopia]
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Annexes

Annex 1.
Summary description of the 2024 country consultations

The development of global-, regional- and country-level estimates and trends in morbidity and mortality is one of the core functions of the World Health Organization (WHO). WHO is the custodian agency for Sustainable Development Goal (SDG) indicator 3.1.1 (i.e. maternal mortality ratio, MMR) within the United Nations system, and as such WHO leads the development of updated maternal mortality estimates together with the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), the World Bank Group and the United Nations Department of Economic and Social Affairs, Population Division (UNDESA/Population Division), as members of the United Nations Maternal Mortality Estimation Inter-Agency Group (MMEIG).

In 2001, the WHO Executive Board endorsed a resolution (EB.107.R8) that included the proposal to "establish a technical consultation process bringing together personnel and perspectives from Member States in different WHO regions" *(1)*. A key objective of this country consultation process is "to ensure that each Member State is consulted on the best data to be used" for international estimation and reporting purposes. Since the process is an integral step in the overall maternal mortality estimation strategy, as well as an SDG requirement to consult with national focal points *(2)*,[1] the country consultation process is described here in brief.

The WHO country consultation process entails an exchange between WHO and technical focal person(s)/offices in each Member State, in addition to the territories Puerto Rico and the occupied Palestinian territory, including east Jerusalem.[2] *(3)* It is carried out after the development of preliminary estimates and prior to the publication of final estimates for the period of interest. During the consultation period, WHO invites technical focal person(s)/offices – who have been nominated to speak on behalf of their country about maternal mortality data – to review the MMEIG's input data sources, methods for estimation and the preliminary estimates. The focal person(s)/offices are encouraged to submit additional data that may not have been taken into account in the preliminary estimates.

The 2024 country consultation process for the 2025 round of maternal mortality estimates was initiated with an official communication from WHO to the countries on 15 April 2024. This letter informed them of the forthcoming exercise to estimate maternal mortality for the years 2000–2023 and requested the designation of an official technical focal person (typically within the national ministry of health and/or the central statistics office) to participate in the consultation. These designated officials and also the existing SDG national focal points subsequently, on 18 October 2024, received an invitation to access the WHO Country Consultation Portal, where there was information about the consultation steps and the following documents were available to download: (i) a copy of the official communication from WHO (C.L.20.2024, dated 15 April 2024); (ii) draft MMR estimates and data sources for their country; and (iii) a summary of the methodology used. WHO headquarters and regional offices actively collaborated in identifying technical focal persons through their networks. UNICEF and

[1] National focal points for the SDGs are contact persons within national statistics offices who facilitate discussions with countries in relation to the reporting for SDGs *(2)*.

[2] Puerto Rico is an Associate Member, and the occupied Palestinian territory, including east Jerusalem, is a member in the Regional Committee for the WHO Eastern Mediterranean Region *(3)*.

UNFPA country office focal points were also invited to access the Portal, as were the WHO staff on the multi-country assignment teams (MCATs) for the WHO African Region.

The formal consultation period ran from 18 October 2024 until its official completion on 1 December 2024.

The table below provides a summary of the nominations of designated country WHO officials (technical focal persons for maternal mortality) and country SDG officials (SDG focal points), and numbers of countries providing feedback during the 2024 country consultations, by WHO region.

During the consultation period, new data submitted by countries were reviewed by the MMEIG Secretariat to determine whether they met the inclusion criteria of this global estimation exercise. Eligibility for data inclusion can be found in section 3.1.1 in Chapter 3 of this report.

The inputs received during the 2024 country consultations were added to the input databases. The current estimates are based on 5727 country-years of information.

As in the previous country consultations, the new observations were from civil registration and vital statistics (CRVS) systems, specialized studies and household surveys. However, an increase in the number of other new observations/data points, from various sources of data, shows that countries lacking functioning CRVS systems are increasingly investing in monitoring maternal mortality with empirical data from alternative sources, such as surveillance systems.

WHO region	WHO technical focal persons (number of countries and territories)	SDG focal points (number of countries and territories)	Number of countries and territories interacting during the country consultation
African Region	6	42	8
Region of the Americas	15	28	14
South-East Asia Region	11	10	4
European Region	35	50	20
Eastern Mediterranean Region	21	21	10
Western Pacific Region	18	17	6
Total	**106**	**168**	**62**

Annex 2.

Bayesian maternal mortality misclassification (BMis) model to account for errors in reporting of maternal death in the civil registration and vital statistics (CRVS) system

Relying on maternal deaths as reported in the civil registration and vital statistics (CRVS) system means there is a potential for error due to unregistered maternal deaths and/or misclassification of the cause of death within the CRVS system. Therefore, an adjustment factor is obtained for CRVS data before the data are included in the United Nations Maternal Mortality Estimation Inter-Agency Group (MMEIG) Bayesian maternal mortality estimation (BMat) model (see section 3.4 in Chapter 3 of this report).

The sections of this annex explain:

a. types of reporting errors encountered in CRVS systems;

b. summary metrics for reporting errors; and

c. deriving sensitivity, specificity and CRVS adjustments from the MMEIG Bayesian maternal mortality misclassification (BMis) model.

a. Types of reporting errors encountered in CRVS systems

Definitions of reporting errors are summarized in **Box A2.1** and discussed further below.

Box A2.1 Definitions of reporting errors

► **Misclassification**

Misclassification refers to incorrect classification of the underlying cause of death, due either to error in the medical certification of cause of death or error in applying the correct code.

We distinguish between:

F– (false negative) = True maternal deaths incorrectly classified as non-maternal deaths

F+ (false positive) = True non-maternal deaths incorrectly classified as maternal deaths

There are two metrics of misclassification errors:

- **Sensitivity (Se)** is defined as the proportion of correctly classified maternal deaths out of all true maternal deaths.
- **Specificity (Sp)** is defined as the proportion of correctly classified non-maternal deaths out of all true non-maternal deaths.

► **Incompleteness**

Incompleteness refers to incomplete death registration. This can arise due to incomplete identification/registration of individual deaths in each country and/or incomplete coverage of the national registration system within each country.

We distinguish between:

- **U–** = Non-maternal deaths not registered in the CRVS system
- **U+** = Maternal deaths not registered in the CRVS system

i. Reporting errors within the CRVS system (misclassification)

Within the CRVS system, incorrect reporting of maternal deaths can be attributed to misclassification in two ways, using the following notation:

F+ (false positive) = non-maternal deaths misclassified in the CRVS system as maternal deaths

F– (false negative) = maternal deaths misclassified in the CRVS system as non-maternal deaths.

The remaining deaths are those that have been correctly classified within the CRVS system; these can also be assigned to two groups, using the following notation:

T+ (true positive) = maternal deaths correctly classified in the CRVS system as maternal deaths

T– (true negative) = non-maternal deaths correctly classified in the CRVS system as non-maternal deaths.

The four-box diagram in **Fig. A2.1** summarizes what is correctly classified and what is misclassified in the CRVS system, using the notation provided above.

The observed PM (the proportion of deaths among women of reproductive age that are due to maternal causes) reported in the CRVS is given by:

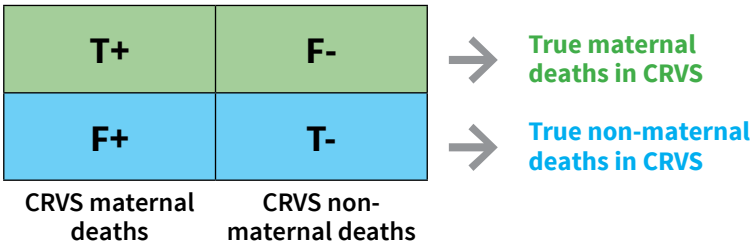
$$\frac{T^{+}+F^{+}}{T^{+}+F^{+}+F^{-}+T^{-}}$$

while the true PM from CRVS data is:

$$\frac{T^{+}+F^{-}}{T^{+}+F^{+}+F^{-}+T^{-}}$$

The MMEIG approach to adjust for this potential difference between true and observed PM is explained in subsections b and c later in this annex.

Fig. A2.1 Four-box diagram of breakdown of the total number of deaths to females of reproductive age as reported in the CRVS, by CRVS maternal-cause-of-death classification



F−: false negative; F+: false positive; T−: true negative; T+: true positive

ii. Deaths that are not reported in the CRVS (incompleteness)

In cases where the CRVS system does not capture all deaths to females of reproductive age (i.e. the CRVS is incomplete), we classify these maternal and non-maternal deaths as missed (unregistered) female deaths. Notation used is as follows:

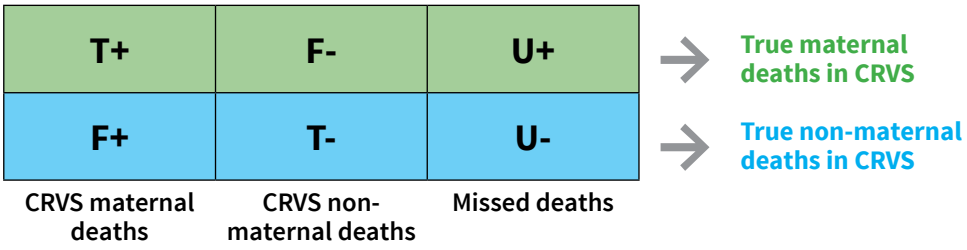
U– = non-maternal deaths not registered in the CRVS system

U+ = maternal deaths not registered in the CRVS system.

We extend the four-box representation to also incorporate these missed maternal (U+) and non-maternal (U–) deaths using a six-box diagram, as shown in **Fig. A2.2.**

More information on the types of errors in maternal mortality measurement and ways to improve measurement are provided in the 2022 WHO publication, *Maternal mortality measurement: guidance to improve national reporting (4)*.

Fig. A2.2 Six-box diagram of breakdown of the total number of deaths to females of reproductive age, by CRVS cause-of-death classification (T/F) and reporting status (U)



F–: false negative; F+: false positive; T–: true negative; T+: true positive; U+: unregistered maternal deaths; U–: unregistered non-maternal deaths

b. Summary metrics for reporting errors

i. Reporting within the CRVS

We summarize the occurrence of misclassification errors in the CRVS into the following two metrics.

Sensitivity (Se) = proportion of correctly classified maternal deaths out of all true maternal deaths

Specificity (Sp) = proportion of correctly classified non-maternal deaths out of all true non-maternal deaths.

When combined, these metrics summarize the ability of the CRVS system to correctly identify a true maternal and true non-maternal death. The formulas, using the notation introduced in the previous section of this annex, are as follows:

- Sensitivity = $\frac{T^{+}}{T^{+}+F^{-}}$
- Specificity = $\frac{T^{-}}{T^{-}+F^{+}}$

The third metric related to reporting errors in the CRVS is the following adjustment factor.

CRVS adjustment factor = adjustment factor associated with CRVS-reported PM, to account for the difference between CRVS-reported PM and true PM.

For country-years with complete CRVS, CRVS adjustment factors can be calculated for all country-years using their respective estimates of Se, Sp and true proportion maternal (true PM), based on the following relationship:

Expected CRVS-reported PM
= Se * true PM + (1 – Sp) * (1 – true PM),

such that the CRVS adjustment factor is given by:

CRVS adjustment factor
= true PM / [Se * true PM + (1 – Sp) * (1 – true PM)].

ii. Reporting in incomplete CRVS systems

Reporting errors related to missed maternal deaths are summarized in terms of the ratio between:

True PM in (PM-in) = the true PM among deaths captured in the CRVS (the true number of maternal deaths in the CRVS divided by the total number of deaths captured in the CRVS), and

True PM out (PM-out) = the true PM among deaths not captured in the CRVS,

such that:

True PM among all deaths =
COM*PM-in + (1-COM)*PM-out,

where COM stands for completeness of the CRVS data (in terms of reporting all deaths to females of reproductive age).

If the ratio (in particular, its upper bound when accounting for uncertainty in the ratio) is greater than 0.95 for all years with CRVS data, we assume that the CRVS is complete in the country (COM = 1). If the ratio is less than 0.95 for one or more years, the completeness is given by the ratio for each individual year (COM = ratio).

For country-years with incomplete CRVS, we investigated the feasibility of estimating the odds ratio of the two PMs, but data were too limited for inference on this ratio. Instead, we assumed that PM-in equals PM-out and accounted for additional uncertainty related to the unknown true ratio when deriving the CRVS adjustment for country-years with incomplete CRVS.

c. Deriving sensitivity, specificity and CRVS adjustments from the BMis model

i. BMis model estimates of sensitivity and specificity

The BMis model obtains estimates of sensitivity and specificity for all country-years with CRVS data. Based on these estimates, corresponding estimates of the adjustment factor for country-years with complete CRVS can be obtained.

For all countries with specialized studies to inform Se and Sp, we model both Se and Sp with a country-specific intercept in the mid-year of their respective observation periods. The country-specific intercept is estimated with a multilevel model, such that estimates for countries with specialized studies are informed by those data, while estimates for countries with limited or no data are informed by data from other countries. Se and Sp values for the remaining years before and after the reference year were obtained through a "random walk" model set-up. In the random walk set-up, point estimates of Se and Sp are kept constant unless country-specific data suggest a change. For countries with specialized studies, the estimates are data driven and informed by the combinations of Se and Sp as indicated by the studies.

We considered predictor variables to capture changes in sensitivity and specificity over time within countries, and differences across countries. The following predictor variables were considered as candidate covariates:

- general fertility rate (GFR);
- gross domestic product (GDP) per capita;
- CRVS completeness (COM);
- proportion of causes of death in the CRVS that are ill defined ("R" codes in CRVS)[1] ***(5)***;
- ICD coding (use of ICD-9 or ICD-10);
- proportion of CRVS deaths that fall under noncommunicable disease causes of death.

However, none of the candidate predictor variables showed a substantively meaningful relationship with the parameters of interest, hence no covariates were used.

ii. BMis model estimates of CRVS adjustment factors

The BMis model was fitted to specialized study data, collected by review, and CRVS data for the corresponding periods. The CRVS yields estimates of sensitivity and specificity based on two scenarios.

- For countries with data from specialized studies, the model is fitted to the data for the years available, and the estimates for the CRVS adjustment in the corresponding years will be consistent with the data. For the years with no data available after the observation period, the sensitivity and specificity are fixed to the value estimated for the most recent year with data. For years with no data available before the observation period, sensitivity and specificity are set to increase or decrease to match the global sensitivity and specificity within a five-year period.
- For countries without specialized studies, the estimates for sensitivity and specificity are equivalent to global estimates of sensitivity and specificity, obtained from fitting the model to the global database (the "envelope" of all specialized studies). The resulting estimates of Se and Sp are constant with time, as global estimates are also constant with time.

Fig. A2.3 shows the relationship between true PM and the estimated CRVS adjustment factors, for specific values of Sp, to illustrate their effect on the CRVS adjustment factor. When Sp = 1, the CRVS adjustment factor = 1/Se, hence lower Se results in a higher adjustment; conversely, higher Se

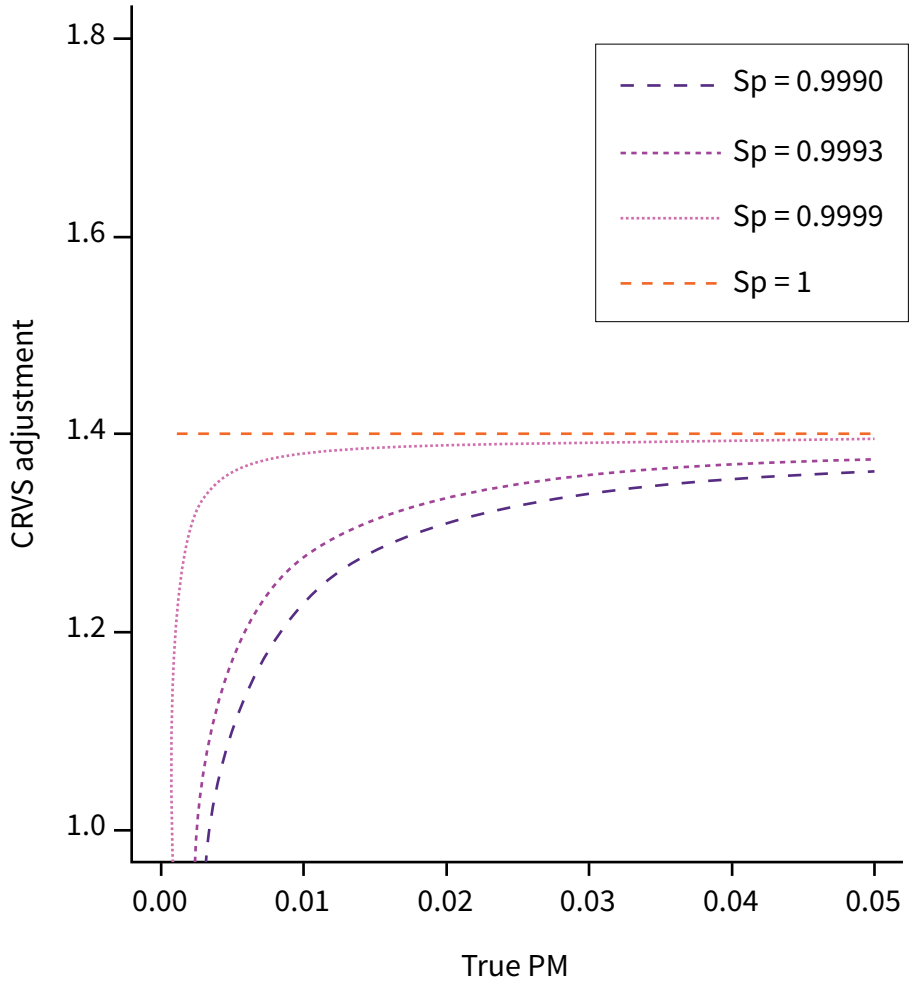
[1] "R" codes R95–R99 in the ICD cover "ill-defined and unknown causes of mortality" ***(5)***.

results in a lower adjustment. When Sp < 1, while keeping Se fixed, the adjustment factor decreases with decreasing true PM. This effect is due to an increasing share of false positive maternal deaths among all deaths, and a decreasing share of false negative deaths, or, in other words, as the true PM decreases, the proportion of non-maternal deaths reported as maternal increases while the proportion of maternal deaths reported as non-maternal decreases.

Fig. A2.3 illustrates that keeping specificity and sensitivity constant in extrapolations in countries with specialized studies, or for countries without any studies, will result in changing adjustment factors as the true PM changes.

The BMis model provides estimates for all countries with CRVS data, using available information from these countries. This implies that inclusion of additional data/observations for any one country (perhaps as a result of this consultation) can potentially result in changes to estimates for other countries – especially those without specialized studies.

Fig. A2.3 CRVS adjustment (displayed on log-scale) based on the BMis model for different values of specificity, calculated at different levels of true PM when sensitivity is fixed at 0.714[a]



PM: proportion maternal; Sp: specificity

a Based on the CRVS model, it was estimated that 71.4% of maternal deaths were identified correctly in the CRVS.

Annex 3.
Methods used to derive a complete series of annual estimates for each predictor variable

A complete series of annual estimates for each of the three predictor variables was obtained or constructed.

Gross domestic product (GDP) per capita is expressed in constant prices with the reference year 2021 and converted by purchasing power parity (PPP) to international dollars. GDP data from the World Bank Group were used for each country *(6)*, and in instances they were supplemented by unofficial estimates derived by the United Nations Maternal Mortality Estimation Inter-Agency Group (MMEIG) using growth rates in previous MMEIG GDP estimates and/or models. A five-year moving average was applied to this GDP series to smooth year-to-year GDP fluctuations.

During the period of the COVID-19 pandemic, a moving average was obtained excluding the COVID years (2020–2022) to obtain the COVID-free BMat parameters, in order to mitigate potential impacts of the pandemic affecting the non-COVID MMR estimates.

General fertility rate (GFR) estimates were computed from data on live births and the population size (number of women aged 15–49 years), from the UNDESA/Population Division's 2024 revision of *World population prospects (7)*.

Skilled birth attendant (SBA)[1] coverage *(8, 9)* data consist of time series derived using all available data from health surveys and countries' routine reporting mechanisms, which are compiled in a database jointly maintained by WHO and UNICEF *(10)*. This database is primarily compiled for SDG reporting purposes. Jointly, UNICEF and WHO are co-custodians of "SDG indicator 3.1.2: Proportion of births attended by skilled health personnel" and collaborate actively in the compilation and harmonization of this database. As part of the regular consultations with countries by the custodians of the SDG indicator, UNICEF leads an annual process during which countries are consulted on each value and data source that goes into this database.

Using this database as an input, annual series were estimated for all countries and territories by fitting a multilevel time series (AR1) model, with time as the sole predictor for the logit (or log-odds) of SBA. The model included region- and country-specific intercepts and slopes.

[1] The definition of this SBA coverage indicator was updated in a joint statement (and full background document) in 2018 *(8)*, but the data used for the estimates presented in this present publication are based on application of the previous (2004) definition/joint statement *(9)*, which was still in effect for most of the period from 2000 to 2020.

Annex 4.[1]

Estimates of maternal mortality ratio (MMR), number of maternal deaths, lifetime risk, percentage of HIV-related indirect maternal deaths and proportion of deaths among women of reproductive age that are due to maternal causes (PM), by country and territory, 2023

Country and territory	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	% of HIV-related indirect maternal deaths	PM point estimate and range of uncertainty interval (UI: 80%)		
	Lower UI	MMR point estimate	Upper UI				Lower UI (%)	PM point estimate (%)	Upper UI (%)
Afghanistan	339	521	942	7 600	40	< 0.1	21.4	32.8	59.4
Albania	3	7	13	2	10 999	0.4	0.2	0.5	1.0
Algeria	46	62	87	570	633	0.1	4.4	6.1	8.4
Andorra	4	11	22	0	10	< 0.1	0.3	0.8	1.7
Angola	117	183	286	2 500	106	1.9	7.7	12.1	18.9
Antigua and Barbuda	19	35	55	0	2	< 0.1	0.7	1.2	2.0
Argentina	26	33	41	170	2	0.6	1.1	1.4	1.8
Armenia	15	19	30	7	3	0.7	1.2	1.6	2.4
Australia	2	2	3	7	28	0.1	0.3	0.5	0.6
Austria	4	6	11	5	13	< 0.1	0.3	0.5	1.0
Azerbaijan	12	18	29	22	3	0.1	0.7	1.1	1.7
Bahamas	50	76	130	3	1	2.5	1.1	1.6	2.8
Bahrain	12	17	25	3	3	< 0.1	1.2	1.6	2.4
Bangladesh	82	115	167	4 000	381	< 0.1	5.1	7.1	10.3
Barbados	18	35	56	1	1	3.0	0.7	1.4	2.2
Belarus	1	1	2	1	96	10.4	0.0	0.0	0.1
Belgium	3	4	5	4	21	< 0.1	0.2	0.3	0.4
Belize	39	67	111	5	733	2.4	2.4	4.1	6.8
Benin	393	518	740	2 500	44	0.2	13.1	17.3	24.7
Bhutan	30	47	69	5	1	0.6	1.2	1.9	2.7

[1] Estimates have been computed to ensure comparability across countries, thus they are not necessarily the same as official statistics of the countries, which may use alternative rigorous methods. Countries included in all tables presented in this report (195 countries) are WHO Member States (except Niue due to there having been some years when no deaths occurred to women aged 15–49 in the country), plus Puerto Rico, a WHO Associate Member, and the occupied Palestinian territory, including east Jerusalem (a member in the Regional Committee for the WHO Eastern Mediterranean Region).

Country and territory	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	% of HIV-related indirect maternal deaths	PM point estimate and range of uncertainty interval (UI: 80%)		
	Lower UI	MMR point estimate	Upper UI				Lower UI (%)	PM point estimate (%)	Upper UI (%)
Bolivia (Plurinational State of)	98	146	243	380	271	0.2	3.9	5.8	9.6
Bosnia and Herzegovina	3	6	10	2	14	0.1	0.2	0.3	0.5
Botswana	96	155	268	95	225	7.0	4.6	7.5	12.9
Brazil	52	67	88	1 700	1	< 0.1	2.0	2.6	3.4
Brunei Darussalam	25	36	52	2	1	< 0.1	1.1	1.6	2.3
Bulgaria	3	6	9	3	13	0.4	0.1	0.2	0.4
Burkina Faso	155	242	367	1 800	102	0.4	5.7	8.8	13.4
Burundi	251	392	611	1 800	57	0.2	9.8	15.3	23.9
Cabo Verde	22	40	65	3	1	1.5	1.3	2.3	3.8
Cambodia	96	137	239	500	295	0.4	3.9	5.5	9.6
Cameroon	196	258	359	2 500	89	< 0.1	9.7	12.8	17.8
Canada	8	12	18	42	6	0.1	0.5	0.8	1.2
Central African Republic	333	692	1299	1 700	24	< 0.1	13.7	28.4	53.3
Chad	493	748	1248	6 100	24	0.3	16.3	24.8	41.3
Chile	7	10	13	17	9	< 0.1	0.3	0.5	0.6
China	11	16	21	1 400	7	< 0.1	0.4	0.6	0.8
Colombia	45	59	76	420	1	0.2	2.5	3.2	4.2
Comoros	103	179	308	44	151	< 0.1	5.5	9.5	16.4
Congo	144	241	453	460	104	6.4	6.0	10.0	18.8
Cook Islands	0	0	0	0	550	< 0.1	0.0	0.0	0.0
Costa Rica	19	24	28	13	3	0.6	1.0	1.2	1.4
Côte d'Ivoire	237	359	568	3 600	67	0.7	8.0	12.1	19.2
Croatia	2	3	4	1	27	< 0.1	0.1	0.2	0.3
Cuba	29	35	42	33	2	0.3	1.4	1.7	2.0
Cyprus	8	14	25	2	5	< 0.1	1.0	1.9	3.5
Czechia	2	3	4	2	31	0.2	0.1	0.2	0.3
Democratic People's Republic of Korea	38	67	114	230	933	< 0.1	1.3	2.3	4.0

Country and territory	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	% of HIV-related indirect maternal deaths	PM point estimate and range of uncertainty interval (UI: 80%)		
	Lower UI	MMR point estimate	Upper UI				Lower UI (%)	PM point estimate (%)	Upper UI (%)
Democratic Republic of the Congo	283	427	775	19 000	41	0.3	14.4	21.7	39.4
Denmark	3	4	5	2	20	< 0.1	0.3	0.4	0.5
Djibouti	80	162	337	39	265	2.6	2.1	4.3	8.9
Dominica	22	36	61	0	2	< 0.1	1.0	1.6	2.8
Dominican Republic	86	124	185	250	369	0.7	4.6	6.7	9.9
Ecuador	48	55	66	150	1	0.3	2.7	3.2	3.8
Egypt	11	17	23	410	2	0.5	1.0	1.5	2.0
El Salvador	25	39	63	39	1	1.2	1.0	1.6	2.6
Equatorial Guinea	103	174	309	95	140	< 0.1	4.7	8.0	14.1
Eritrea	176	291	483	290	94	0.4	8.8	14.6	24.1
Estonia	3	5	9	1	17	1< 0.1	0.1	0.3	0.5
Eswatini	72	118	209	35	304	16.9	1.9	3.1	5.5
Ethiopia	128	195	332	8 000	126	0.7	7.7	11.7	20.0
Fiji	20	30	47	5	1	3.3	0.7	1.1	1.7
Finland	5	8	14	3	11	< 0.1	0.4	0.6	1.0
France	6	7	10	47	9	0.6	0.5	0.7	0.9
Gabon	134	233	424	160	120	4.1	7.3	12.7	23.2
Gambia	245	354	504	290	72	1.4	9.9	14.3	20.3
Georgia	13	20	27	9	3	0.5	0.8	1.2	1.6
Germany	3	4	5	26	21	0.2	0.2	0.3	0.5
Ghana	155	234	344	2 100	133	1.7	5.0	7.6	11.2
Greece	3	5	8	4	20	0.6	0.3	0.4	0.7
Grenada	29	48	95	1	1	< 0.1	1.0	1.7	3.3
Guatemala	82	94	106	350	436	0.2	4.6	5.2	5.9
Guinea	337	494	764	2 400	47	0.4	11.7	17.2	26.6
Guinea-Bissau	313	505	851	330	53	0.8	13.3	21.5	36.2
Guyana	59	75	103	13	554	1.0	2.5	3.2	4.4
Haiti	218	328	569	850	118	0.3	7.8	11.7	20.3
Honduras	37	47	62	110	830	0.6	2.3	2.9	3.8

Country and territory	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	% of HIV-related indirect maternal deaths	PM point estimate and range of uncertainty interval (UI: 80%)		
	Lower UI	MMR point estimate	Upper UI				Lower UI (%)	PM point estimate (%)	Upper UI (%)
Hungary	8	12	18	10	7	< 0.1	0.4	0.6	1.0
Iceland	1	3	6	0	22	0.3	0.1	0.3	0.6
India	73	80	87	19 000	645	< 0.1	3.4	3.8	4.1
Indonesia	93	140	235	6 300	377	0.7	3.0	4.5	7.5
Iran (Islamic Republic of)	10	16	22	190	4	0.8	0.7	1.0	1.4
Iraq	41	66	116	770	465	< 0.1	3.3	5.4	9.5
Ireland	3	4	5	2	20	0.6	0.2	0.3	0.4
Israel	1	2	4	4	15	1.2	0.3	0.6	1.0
Italy	5	6	9	25	16	0.3	0.4	0.5	0.7
Jamaica	96	130	175	43	600	1.2	2.7	3.6	4.9
Japan	2	3	4	23	35	< 0.1	0.1	0.2	0.3
Jordan	24	31	41	73	1	< 0.1	3.0	3.9	5.2
Kazakhstan	7	10	14	39	3	< 0.1	0.5	0.7	1.1
Kenya	106	149	211	2 200	209	1.4	6.8	9.6	13.6
Kiribati	34	80	152	3	403	< 0.1	1.4	3.3	6.3
Kuwait	5	8	12	4	9	0.1	0.6	0.8	1.3
Kyrgyzstan	33	42	55	63	881	0.5	2.6	3.3	4.3
Lao People's Democratic Republic	75	112	182	180	356	0.4	3.5	5.2	8.4
Latvia	13	19	28	3	4	3.8	0.5	0.7	1.0
Lebanon	11	15	21	14	3	0.2	1.1	1.4	2.0
Lesotho	298	478	725	270	78	4.6	4.2	6.8	10.2
Liberia	436	628	913	1 100	40	0.2	16.0	23.1	33.6
Libya	23	59	154	74	856	0.7	1.1	2.9	7.4
Lithuania	5	8	12	2	12	0.9	0.2	0.3	0.5
Luxembourg	7	11	19	1	6	0.2	0.9	1.4	2.5
Madagascar	326	445	652	4 500	55	0.3	12.4	17.0	24.9
Malawi	153	225	352	1 500	113	1.5	9.5	14.0	21.8
Malaysia	24	26	34	120	2	0.9	1.2	1.4	1.8
Maldives	22	32	50	2	1	< 0.1	3.3	4.7	7.4
Mali	268	367	498	3 500	49	0.6	12.9	17.7	24.0
Malta	4	8	14	0	11	0.4	0.3	0.6	0.9

Country and territory	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	% of HIV-related indirect maternal deaths	PM point estimate and range of uncertainty interval (UI: 80%)		
	Lower UI	MMR point estimate	Upper UI				Lower UI (%)	PM point estimate (%)	Upper UI (%)
Marshall Islands	72	155	348	1	241	< 0.1	2.0	4.2	9.5
Mauritania	263	381	561	660	58	0.1	19.8	28.7	42.3
Mauritius	44	66	105	8	1	5.9	1.2	1.8	2.9
Mexico	32	42	50	860	1	0.6	1.5	2.0	2.4
Micronesia (Federated States of)	56	129	302	3	283	< 0.1	2.0	4.7	11.0
Monaco	2	5	12	0	10	< 0.1	0.9	1.9	4.4
Mongolia	27	41	58	26	1	0.1	1.5	2.3	3.3
Montenegro	3	6	10	0	11	0.5	0.2	0.4	0.7
Morocco	51	70	94	440	700	0.1	3.5	4.8	6.5
Mozambique	68	99	174	1 300	203	14.7	4.6	6.7	11.7
Myanmar	124	185	311	1 700	281	0.7	3.6	5.3	8.9
Namibia	91	139	223	110	225	4.3	4.1	6.2	10.0
Nauru	119	273	639	1	117	< 0.1	2.1	4.9	11.4
Nepal	99	142	234	820	332	< 0.1	3.8	5.4	8.9
Netherlands (Kingdom of the)	3	4	6	7	18	0.3	0.3	0.4	0.6
New Zealand	4	7	9	4	9	0.1	0.3	0.5	0.7
Nicaragua[d]	45	60	77	80	741	0.4	3.2	4.3	5.5
Niger	227	350	563	3 800	47	0.1	15.2	23.5	37.7
Nigeria	718	993	1540	75 000	25	0.2	14.6	20.1	31.2
North Macedonia	1	3	5	0	29	0.2	0.1	0.2	0.3
Norway	1	1	2	1	60	< 0.1	0.1	0.1	0.2
occupied Palestinian territory, including east Jerusalem[e]	9	16	26	24	1	< 0.1	1.4	2.5	4.1
Oman	9	13	19	11	3	0.4	1.6	2.3	3.5
Pakistan	107	155	241	11 000	177	0.1	8.0	11.6	18.1
Palau	38	89	209	0	753	< 0.1	0.7	1.7	4.0

Country and territory	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	% of HIV-related indirect maternal deaths	PM point estimate and range of uncertainty interval (UI: 80%)		
	Lower UI	MMR point estimate	Upper UI				Lower UI (%)	PM point estimate (%)	Upper UI (%)
Panama	30	37	43	26	1	1.5	2.2	2.7	3.1
Papua New Guinea	119	189	307	480	178	0.4	4.5	7.2	11.8
Paraguay	42	58	81	80	708	0.6	2.8	3.9	5.4
Peru	40	51	62	280	1	0.2	2.0	2.6	3.1
Philippines	64	84	119	1 500	636	0.1	2.4	3.2	4.5
Poland	1	2	3	5	58	< 0.1	0.1	0.1	0.1
Portugal	9	15	24	13	5	0.5	0.7	1.0	1.7
Puerto Rico	7	11	19	2	11	< 0.1	0.5	0.8	1.3
Qatar	2	4	6	1	14	0.5	0.5	0.9	1.4
Republic of Korea	3	4	5	9	43	< 0.1	0.3	0.3	0.4
Republic of Moldova	13	19	27	6	3	4.1	0.4	0.6	0.9
Romania	7	12	18	21	6	0.8	0.4	0.6	0.9
Russian Federation	6	9	15	120	9	< 0.1	0.2	0.2	0.4
Rwanda	158	229	373	910	125	0.9	7.9	11.5	18.7
Saint Kitts and Nevis	36	74	118	0	1	< 0.1	1.2	2.4	3.8
Saint Lucia	26	44	77	1	1	< 0.1	0.9	1.6	2.8
Samoa	46	101	233	6	277	< 0.1	2.8	6.1	14.1
San Marino	3	8	16	0	15	< 0.1	0.3	0.8	1.7
Sao Tome and Principe	42	75	138	5	368	< 0.1	2.5	4.5	8.3
Saudi Arabia	5	7	11	40	5	0.1	0.6	1.0	1.5
Senegal	173	237	365	1 300	112	0.2	10.6	14.6	22.4
Serbia	8	11	16	6	7	0.2	0.4	0.6	0.8
Seychelles	26	42	64	1	1	< 0.1	1.2	1.9	3.0
Sierra Leone	249	354	537	920	74	0.5	11.1	15.7	23.8
Singapore	4	6	11	3	17	0.3	0.3	0.5	0.8
Slovakia	3	4	7	2	17	0.1	0.1	0.3	0.4
Slovenia	2	3	6	1	23	0.1	0.2	0.3	0.6

Country and territory	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	% of HIV-related indirect maternal deaths	PM point estimate and range of uncertainty interval (UI: 80%)		
	Lower UI	MMR point estimate	Upper UI				Lower UI (%)	PM point estimate (%)	Upper UI (%)
Solomon Islands	65	123	231	26	236	< 0.1	3.8	7.2	13.6
Somalia	244	563	1089	4 400	30	< 0.1	12.1	28.0	54.1
South Africa	92	118	137	1 400	409	5.8	1.8	2.3	2.7
South Sudan	400	692	1254	2 300	42	0.6	10.7	18.5	33.6
Spain	2	3	4	9	38	0.5	0.2	0.2	0.3
Sri Lanka	15	18	25	59	3	0.1	1.3	1.6	2.2
Saint Vincent and the Grenadines	32	56	87	1	1	< 0.1	0.8	1.4	2.2
Sudan	159	256	415	4 300	91	0.2	9.1	14.6	23.7
Suriname	54	84	121	9	566	3.1	2.2	3.5	5.0
Sweden	3	4	6	4	18	< 0.1	0.3	0.4	0.6
Switzerland	4	5	8	5	14	0.2	0.5	0.7	1.0
Syrian Arab Republic	11	20	38	110	1	0.1	0.9	1.7	3.1
Tajikistan	8	14	25	38	2	0.5	0.7	1.3	2.3
Thailand	26	34	49	200	2	7.0	0.6	0.8	1.1
Timor-Leste	125	192	288	59	190	0.2	5.5	8.4	12.6
Togo	219	349	526	1 000	73	0.7	6.6	10.5	15.8
Tonga	30	67	156	2	527	< 0.1	2.0	4.5	10.5
Trinidad and Tobago	40	54	69	9	1	< 0.1	1.0	1.4	1.8
Tunisia	23	36	53	60	1	0.4	1.6	2.5	3.6
Türkiye	11	15	22	160	4	< 0.1	1.1	1.5	2.2
Turkmenistan	2	5	8	7	8	< 0.1	0.2	0.3	0.6
Tuvalu	75	170	409	0	185	< 0.1	2.4	5.5	13.2
Uganda	116	170	298	2 900	127	2.2	7.5	10.9	19.1
Ukraine	9	15	25	32	9	5.3	0.2	0.3	0.5

Country and territory	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	% of HIV-related indirect maternal deaths	PM point estimate and range of uncertainty interval (UI: 80%)		
	Lower UI	MMR point estimate	Upper UI				Lower UI (%)	PM point estimate (%)	Upper UI (%)
United Arab Emirates	2	3	4	3	29	< 0.1	0.3	0.5	0.9
United Kingdom of Great Britain and Northern Ireland	6	8	12	57	8	< 0.1	0.4	0.6	0.8
United Republic of Tanzania	192	276	429	6 500	78	2.2	10.6	15.2	23.6
United States of America	13	17	21	610	4	< 0.1	0.6	0.8	1.0
Uruguay	11	15	20	5	5	1.6	0.5	0.6	0.8
Uzbekistan	18	26	40	250	1	0.5	1.5	2.2	3.3
Vanuatu	38	100	265	9	270	< 0.1	2.8	7.3	19.3
Venezuela (Bolivarian Republic of)	148	227	371	970	234	< 0.1	5.7	8.7	14.3
Viet Nam	31	48	69	660	1	0.7	1.5	2.3	3.4
Yemen	71	118	212	1 600	182	0.2	6.7	11.1	19.9
Zambia	61	85	126	590	277	9.0	4.2	5.9	8.6
Zimbabwe	236	358	484	1 800	78	5.1	6.2	9.4	12.8

PM: proportion of deaths among women of reproductive age (15–49 years) that are due to maternal causes (expressed as a percentage).

[a] MMR has been rounded to the nearest 1.

[b] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Lifetime risk has been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[d] Nicaragua has reported forthcoming data; should this data affect the current estimates, the report will be updated accordingly. Nicaragua continues to strengthen its health information system and has adopted the Búsqueda intencionada y reclasificación de muertes maternas (BIRMM) which may allow for future classification as a specialized study on maternal mortality to improve the country's estimates..

[e] This document was prepared using WHO's policies and terminology. UNICEF, UNFPA and UNDESA/Population Division refer to this territory as "the State of Palestine". The World Bank Group refers to this territory as "West Bank and Gaza", which includes east Jerusalem insofar as data permit.

Annex 5.[1]

Estimates of maternal mortality ratio (MMR), number of maternal deaths, lifetime risk and proportion of deaths among women of reproductive age that are due to maternal causes (PM), by World Health Organization (WHO) region, 2023

WHO region	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	PM point estimate (%)
	Lower UI	MMR point estimate	Upper UI			
African Region	376	442	560	178 000	57	16.6
Region of the Americas	52	59	66	7 800	1090	2.7
South-East Asia Region	86	96	112	33 000	542	4.2
European Region	10	11	13	1 100	6490	0.6
Eastern Mediterranean Region	135	167	218	33 000	200	12.4
Western Pacific Region	30	35	42	5 300	2891	1.4
World	**174**	**197**	**234**	**260 000**	**272**	**8.9**

PM: proportion of deaths among women of reproductive age (15–49 years) that are due to maternal causes (expressed as a percentage).

A list of WHO Member States in each of the six WHO regions can be found at https://www.who.int/countries/ (filter by region)

[a] MMR has been rounded to the nearest 1.

[b] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Lifetime risk has been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[1] For countries included, refer to footnote "1" for Annex 4.

Annex 6.[1]

Trends in estimates of maternal mortality ratio (MMR), by WHO region, 2000, 2005, 2010, 2015, 2020 and 2023

WHO region	MMR[a] point estimate						Average ARR in MMR between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
African Region	727	642	631	586	479	442	2.2	1.5	3.5	39.6
Region of the Americas	70	65	62	57	73	59	0.8	1.4	-0.1	16.9
South-East Asia Region	365	280	203	146	120	96	5.8	6.1	5.1	73.6
European Region	25	21	16	13	15	11	3.5	4.1	2.2	55.2
Eastern Mediterranean Region	378	302	239	198	191	167	3.6	4.3	2.0	56.0
Western Pacific Region	73	59	49	40	37	35	3.1	3.9	0.9	51.2
World	**328**	**283**	**253**	**228**	**211**	**197**	**2.2**	**2.4**	**1.6**	**40.0**

ARR: annual rate of reduction.

Negative numbers in the last four columns indicate percentage increase in MMR.

A list of WHO Member States in each of the six WHO regions can be found at https://www.who.int/countries/ (filter by region)

[a] MMR has been rounded to the nearest 1.

[1] For countries included, refer to footnote "1" for Annex 4.

Annex 7.[1]

Estimates of maternal mortality ratio (MMR), number of maternal deaths, lifetime risk and proportion of deaths among women of reproductive age that are due to maternal causes (PM), by United Nations Children's Fund (UNICEF) region, 2023

UNICEF region and subregion	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	PM point estimate (%)
	Lower UI	MMR point estimate	Upper UI			
East Asia and Pacific	54	66	88	14 000	1 352	2.4
Europe and Central Asia	10	11	13	1 100	6 455	0.6
Eastern Europe and Central Asia	13	16	19	830	4 053	0.7
Western Europe	5	6	7	250	14 283	0.5
Latin America and Caribbean	68	77	88	7 200	786	3.5
Middle East and North Africa	38	46	61	4 600	884	4
North America	13	16	20	650	4 322	0.8
South Asia	103	120	144	43 000	382	6.3
Sub-Saharan Africa	383	447	561	187 000	55	16.9
Eastern and Southern Africa	218	251	298	51 000	102	12.3
West and Central Africa	510	629	848	135 000	36	19.5
World	**174**	**197**	**234**	**260 000**	**272**	**8.9**

PM: proportion of deaths among women of reproductive age (15–49 years) that are due to maternal causes (expressed as a percentage).

Countries in each UNICEF region are listed at: https://data.unicef.org/regionalclassifications/

[a] MMR has been rounded to the nearest 1.

[b] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Lifetime risk has been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[1] For countries included, refer to footnote "1" for Annex 4.

Annex 8.[1]

Trends in estimates of maternal mortality ratio (MMR), by UNICEF region, 2000, 2005, 2010, 2015, 2020 and 2023

UNICEF region	MMR[a] point estimate						Average ARR in MMR between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
East Asia and Pacific	119	101	86	70	72	66	2.6	3.6	-0.2	44.5
Europe and Central Asia	25	21	16	14	16	11	3.5	4.1	2.2	55.0
Eastern Europe and Central Asia	41	33	24	19	22	16	4.1	5.1	2.2	61.1
Western Europe	9	8	7	7	8	6	1.9	2.1	1.6	35.2
Latin America and Caribbean	92	85	81	74	94	77	0.8	1.5	-0.2	16.9
Middle East and North Africa	101	77	62	53	60	46	3.4	4.2	1.9	54.1
North America	12	13	14	17	22	16	-1.4	-2.2	0.9	-37.1
South Asia	415	318	229	173	145	120	5.4	5.8	4.4	71.2
Sub-Saharan Africa	744	658	643	593	485	447	2.2	1.6	3.5	40.3
Eastern and Southern Africa	627	502	465	379	261	251	4.0	3.4	5.2	60.0
West and Central Africa	861	811	808	787	693	629	1.4	0.7	2.8	27.9
World	**328**	**283**	**253**	**228**	**211**	**197**	**2.2**	**2.4**	**1.6**	**40.0**

ARR: annual rate of reduction.

Negative numbers in the last four columns indicate percentage increase in MMR.

Countries in each UNICEF region are listed at: https://data.unicef.org/regionalclassifications/

[a] MMR has been rounded to the nearest 1.

[1] For countries included, refer to footnote "1" for Annex 4.

Annex 9.[1]

Estimates of maternal mortality ratio (MMR), number of maternal deaths, lifetime risk and proportion of deaths among women of reproductive age that are due to maternal causes (PM), by United Nations Population Fund (UNFPA) region, 2023

UNFPA region	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	PM point estimate (%)
	Lower UI	MMR point estimate	Upper UI			
Arab States	98	133	184	14 000	257	10.1
Asia and the Pacific	89	102	120	58 000	603	4.6
East and Southern Africa	233	276	352	61 000	88	13.5
Eastern Europe and Central Asia	15	18	22	670	2981	1.2
Latin American and Caribbean	68	77	88	7 200	786	3.5
Non-UNFPA list[d]	8	10	11	1 200	8287	0.5
West and Central Africa	538	669	920	114 000	36	18.9
World	**174**	**197**	**234**	**260 000**	**272**	**8.9**

PM: proportion of deaths among women of reproductive age (15–49 years) that are due to maternal causes (expressed as a percentage).
Countries in each UNFPA region are listed at: https://www.unfpa.org/worldwide

[a] MMR is rounded to the nearest 1

[b] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Lifetime risk has been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[d] The countries and territories in this category are not included among the countries listed in UNFPA regions (i.e. they do not have UNFPA country offices/programmes): Australia, Austria, Bahrain, Belgium, Brunei Darussalam, Bulgaria, Canada, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Faroe Islands, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands (Kingdom of the), New Zealand, Norway, Poland, Portugal, Puerto Rico, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Seychelles, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America.

[1] For countries included, refer to footnote "1" for Annex 4.

Annex 10.[1]

Trends in estimates of maternal mortality ratio (MMR), by UNFPA region, 2000, 2005, 2010, 2015, 2020 and 2023

UNFPA region	MMR[a] point estimate						Average ARR in MMR between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Arab States	263	221	182	147	149	133	3.0	3.9	1.4	49.8
Asia and the Pacific	290	226	166	127	117	102	4.6	5.5	2.3	65.0
East and Southern Africa	602	499	475	401	291	276	3.4	2.7	4.8	54.5
Eastern Europe and Central Asia	37	31	26	21	23	18	3.1	3.8	1.8	51.1
Latin American and Caribbean	92	85	81	74	94	77	0.8	1.5	-0.2	16.9
Non-UNFPA list[b]	15	13	12	11	14	10	2.0	2.2	1.8	37.1
West and Central Africa	913	846	848	831	732	669	1.4	0.7	2.7	27.8
World	**328**	**283**	**253**	**228**	**211**	**197**	**2.2**	**2.4**	**1.6**	**40.0**

ARR: annual rate of reduction.

Negative numbers in the last four columns indicate percentage increase in MMR.

Countries in each UNFPA region are listed at: https://www.unfpa.org/worldwide

[a] MMR has been rounded to the nearest 1.

[b] The countries and territories in this category are not included among the countries listed in UNFPA regions (i.e. they do not have UNFPA country offices/programmes): Australia, Austria, Bahrain, Belgium, Brunei Darussalam, Bulgaria, Canada, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Faroe Islands, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands (Kingdom of the), New Zealand, Norway, Poland, Portugal, Puerto Rico, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Seychelles, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America.

[1] For countries included, refer to footnote "1" for Annex 4.

Annex 11.[1]

Estimates of maternal mortality ratio (MMR), number of maternal deaths, lifetime risk and proportion of deaths among women of reproductive age that are due to maternal causes (PM), by World Bank Group region and income group, 2023

World Bank Group region and income group	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	PM point estimate (%)
	Lower UI	MMR point estimate	Upper UI			
Region						
East Asia and Pacific	54	66	88	14 000	1	2.4
Europe and Central Asia	10	11	13	1 100	6	0.6
Latin America and Caribbean	68	77	88	7 200	789	3.5
Middle East and North Africa	38	47	61	4 700	879	4
North America	13	16	20	650	4	0.8
South Asia	103	120	144	43 000	382	6.3
Sub-Saharan Africa	383	448	561	187 000	55	16.9
Income group[d]						
Low income	298	346	421	88 000	66	18.2
Lower middle income	198	235	299	151 000	187	10.2
Upper middle income	49	57	71	17 000	1	2.3
High income	9	10	11	1 300	7	0.6
World	174	197	234	260 000	272	8.9

PM: proportion of deaths among women of reproductive age (15–49 years) that are due to maternal causes (expressed as a percentage).

Countries in each World Bank Group region are listed at: https://www.worldbank.org/en/where-we-work

Countries in each World Bank Group region and income group are listed at: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

[a] MMR is rounded to the nearest 1

[b] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Lifetime risk has been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[d] World Bank income classification data are not available for the Bolivarian Republic of Venezuela, and therefore that country is excluded from the income groups.

[1] For countries included, refer to footnote "1" for Annex 4.

Annex 12.[1]

Trends in estimates of maternal mortality ratio (MMR), by World Bank Group region and income group, 2000, 2005, 2010, 2015, 2020 and 2023

World Bank Group region and income group	MMR[a] point estimate						Average ARR in MMR between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Region										
East Asia and Pacific	119	101	86	70	72	66	2.6	3.6	-0.2	44.5
Europe and Central Asia	25	21	16	14	16	11	3.5	4.1	2.2	55.0
Latin America and Caribbean	92	85	81	74	94	77	0.8	1.5	-0.3	16.8
Middle East and North Africa	103	78	63	54	60	47	3.4	4.3	1.9	54.4
North America	12	13	14	17	22	16	-1.4	-2.2	0.9	-37.1
South Asia	415	318	229	173	145	120	5.4	5.8	4.4	71.2
Sub-Saharan Africa	744	658	643	593	486	448	2.2	1.6	3.5	40.3
Income group[b]										
Low income	747	636	566	491	396	346	3.4	2.8	4.4	53.7
Lower middle income	433	362	322	291	251	235	2.7	2.7	2.6	46.2
Upper middle income	97	87	76	61	67	57	2.3	3.1	0.2	41.2
High income	16	14	12	11	14	10	2.1	2.3	1.8	38.2
World	328	283	253	228	211	197	2.2	2.4	1.6	40.0

ARR: annual rate of reduction.

Negative numbers in the last four columns indicate percentage increase in MMR.
Countries in each World Bank Group region are listed at: https://www.worldbank.org/en/where-we-work
Countries in each World Bank Group region and income group are listed at: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

[a] MMR has been rounded to the nearest 1.

[b] World Bank income classification data are not available for the Bolivarian Republic of Venezuela, and therefore that country is excluded from the income groups.

[1] For countries included, refer to footnote "1" for Annex 4.

Annex 13.[1]

Estimates of maternal mortality ratio (MMR), number of maternal deaths, lifetime risk and proportion of deaths among women of reproductive age that are due to maternal causes (PM), by United Nations Department of Economic and Social Affairs, Population Division (UNDESA/Population Division) region and subregion, 2023

UNDESA/Population Division region and subregion	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	PM point estimate (%)
	Lower UI	MMR point estimate	Upper UI			
Africa	**351**	**410**	**513**	**189 000**	**66**	**16.3**
Eastern Africa	223	263	317	42 000	93	14.1
Middle Africa	322	415	609	34 000	46	20.5
Northern Africa	72	101	146	5 900	370	7.4
Southern Africa	113	137	159	1 900	339	2.8
Western Africa	545	691	975	102 000	36	18.6
Asia	**83**	**93**	**109**	**61 000**	**643**	**4.5**
Central Asia	17	21	28	410	1	1.7
Eastern Asia	13	17	22	1 800	7	0.7
South-Eastern Asia	89	114	158	12 000	501	3.9
Southern Asia	101	117	140	43 000	399	6.2
Western Asia	38	52	76	3 000	807	5
Europe	**6**	**7**	**8**	**450**	**11 905**	**0.3**
Eastern Europe	7	9	12	210	10 302	0.3
Northern Europe	6	7	10	76	10 358	0.5
Southern Europe	5	6	7	66	16 139	0.5
Western Europe	5	5	6	96	14 337	0.5
Latin America and the Caribbean	**68**	**77**	**88**	**7 200**	**789**	**3.5**
Caribbean	143	190	289	1 200	296	7.8
Central America	42	49	55	1 500	1 063	2.5

[1] For countries included, refer to footnote "1" for Annex 4.

UNDESA/Population Division region and subregion	MMR[a] point estimate and range of uncertainty interval (UI: 80%)			Number of maternal deaths[b]	Lifetime risk of maternal death[c] (1 in)	PM point estimate (%)
	Lower UI	MMR point estimate	Upper UI			
South America	65	77	91	4 400	842	3.3
Northern America	**13**	**16**	**20**	**650**	**4 322**	**0.8**
Oceania	**56**	**82**	**127**	**560**	**646**	**5.5**
Australia and New Zealand	2	3	4	11	21 248	0.5
Melanesia	115	176	275	530	193	7
Micronesia	83	126	212	9	279	4.4
Polynesia	54	98	198	8	317	6
Small Island Developing States[d]	**155**	**193**	**253**	**2 300**	**260**	**8.2**
Landlocked Developing Countries[e]	**244**	**284**	**343**	**50 000**	**95**	**14.8**
Least Developed Countries[f]	**277**	**313**	**368**	**114 000**	**83**	**16.1**
World	**174**	**197**	**234**	**260 000**	**272**	**8.9**

PM: proportion of deaths among women of reproductive age (15–49 years) that are due to maternal causes (expressed as a percentage).

Countries in each UNDESA/Population Division region are listed at: https://unstats.un.org/unsd/methodology/m49/ (select "Geographic regions" or "Other regions")

[a] MMR is rounded to the nearest 1.

[b] Numbers of maternal deaths have been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[c] Lifetime risk has been rounded according to the following scheme: < 100 rounded to nearest 1; 100–999 rounded to nearest 10; 1000–9999 rounded to nearest 100; and ≥ 10 000 rounded to nearest 1000.

[d] Antigua and Barbuda, Bahamas, Barbados, Belize, Cabo Verde, Comoros, Cuba, Dominican Republic, Fiji, Grenada, Guinea-Bissau, Guyana, Haiti, Jamaica, Kiribati, Maldives, Mauritius, Micronesia (Federated States of), Papua New Guinea, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Seychelles, Singapore, Solomon Islands, Suriname, Timor-Leste, Tonga, Trinidad and Tobago, Vanuatu.

[e] Afghanistan, Armenia, Azerbaijan, Bhutan, Bolivia (Plurinational State of), Botswana, Burkina Faso, Burundi, Central African Republic, Eswatini, Ethiopia, Kazakhstan, Kyrgyzstan, Lao People's Democratic Republic, Lesotho, Malawi, Mali, Mongolia, Nepal, Niger, Paraguay, Republic of Moldova, North Macedonia, Rwanda, South Sudan, Tajikistan, Turkmenistan, Uganda, Uzbekistan, Zambia, Zimbabwe.

[f] Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sudan, Timor-Leste, Togo, Uganda, United Republic of Tanzania, Vanuatu, Yemen, Zambia.

Annex 14.[1]

Trends in estimates of maternal mortality ratio (MMR), by UNDESA/Population Division region and subregion, 2000, 2005, 2010, 2015, 2020 and 2023

UNDESA/ Population Division region and subregion	MMR[a] point estimate						Average ARR in MMR between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Africa	**675**	**596**	**579**	**531**	**443**	**410**	**2.2**	**1.7**	**3.3**	**39.6**
Eastern Africa	665	522	500	415	274	263	4.0	3.2	5.8	60.5
Middle Africa	709	674	635	556	485	415	2.5	1.8	3.6	43.2
Northern Africa	239	184	135	106	116	101	3.8	5.4	0.6	57.9
Southern Africa	200	297	303	182	136	137	1.6	0.6	2.5	31.5
Western Africa	912	842	846	842	748	691	1.3	0.6	2.5	25.3
Asia	**267**	**208**	**153**	**117**	**108**	**93**	**4.6**	**5.5**	**2.4**	**65.2**
Central Asia	49	40	31	25	27	21	3.7	4.4	2.2	57.7
Eastern Asia	54	40	32	26	20	17	4.9	4.9	5.2	67.7
South-Eastern Asia	230	196	173	140	136	114	3.1	3.4	2.4	50.7
Southern Asia	405	309	222	167	141	117	5.4	5.9	4.3	71.3
Western Asia	87	71	60	55	56	52	2.3	3.0	1.0	40.5
Europe	**19**	**16**	**12**	**10**	**11**	**7**	**4.3**	**4.7**	**3.5**	**62.7**
Eastern Europe	36	27	18	13	15	9	6.1	6.9	4.5	75.4
Northern Europe	11	11	9	8	11	7	1.9	2.1	1.9	35.3
Southern Europe	9	7	7	7	8	6	1.6	1.9	1.0	30.1
Western Europe	9	8	7	6	6	5	2.1	1.9	2.5	38.2
Latin America and the Caribbean	**92**	**85**	**81**	**74**	**94**	**77**	**0.8**	**1.5**	**-0.3**	**16.8**
Caribbean	191	169	190	184	193	190	0.1	0.3	-0.5	2.3
Central America	77	67	62	54	67	49	1.9	2.3	1.3	35.4
South America	88	84	77	71	96	77	0.6	1.5	-0.7	13.1
Northern America	**12**	**13**	**14**	**17**	**22**	**16**	**-1.4**	**-2.2**	**0.9**	**-37.1**
Oceania	**128**	**132**	**117**	**95**	**88**	**82**	**2.0**	**2.1**	**1.7**	**36.7**
Australia and New Zealand	7	6	6	6	6	3	3.8	1.1	9.9	58.0

[1] For countries included, refer to footnote "1" for Annex 4.

UNDESA/ Population Division region and subregion	MMR[a] point estimate						Average ARR in MMR between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Melanesia	284	289	258	202	180	176	2.2	2.4	1.7	39.6
Micronesia	194	183	170	155	147	126	1.9	1.6	2.5	36.0
Polynesia	101	95	96	104	110	98	0.1	-0.3	0.9	2.5
Small Island Developing States[b]	**262**	**238**	**227**	**204**	**203**	**193**	**1.4**	**1.7**	**0.6**	**26.8**
Landlocked Developing Countries[c]	**705**	**591**	**523**	**430**	**332**	**284**	**3.9**	**3.3**	**5.3**	**59.6**
Least Developed Countries[d]	**686**	**565**	**516**	**439**	**344**	**313**	**3.4**	**3.0**	**4.2**	**54.5**
World	**328**	**283**	**253**	**228**	**211**	**197**	**2.2**	**2.4**	**1.6**	**40.0**

ARR: annual rate of reduction.

Negative numbers in the last four columns indicate percentage increase in MMR.

Countries in each UNDESA/PD region are listed at: https://unstats.un.org/unsd/methodology/m49/ (select "Geographic regions" or "Other regions")

[a] MMR has been rounded to the nearest 1.

[b] Antigua and Barbuda, Bahamas, Barbados, Belize, Cabo Verde, Comoros, Cuba, Dominican Republic, Fiji, Grenada, Guinea-Bissau, Guyana, Haiti, Jamaica, Kiribati, Maldives, Mauritius, Micronesia (Federated States of), Papua New Guinea, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Seychelles, Singapore, Solomon Islands, Suriname, Timor-Leste, Tonga, Trinidad and Tobago, Vanuatu.

[c] Afghanistan, Armenia, Azerbaijan, Bhutan, Bolivia (Plurinational State of), Botswana, Burkina Faso, Burundi, Central African Republic, Eswatini, Ethiopia, Kazakhstan, Kyrgyzstan, Lao People's Democratic Republic, Lesotho, Malawi, Mali, Mongolia, Nepal, Niger, Paraguay, Republic of Moldova, North Macedonia, Rwanda, South Sudan, Tajikistan, Turkmenistan, Uganda, Uzbekistan, Zambia, Zimbabwe.

[d] Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sudan, Timor-Leste, Togo, Uganda, United Republic of Tanzania, Vanuatu, Yemen, Zambia.

Annex 15.[1]

Trends in estimates of maternal mortality ratio (MMR), by United Nations Sustainable Development Goal (SDG) region, subregion and other grouping, 2000, 2005, 2010, 2015, 2020 and 2023

SDG region, subregion and other grouping	MMR[a] point estimate					Average ARR in MMR between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR between 2000 and 2023 (%)
	2000	2005	2010	2015	2020				
Sub-Saharan Africa	**748**	**663**	**653**	**604**	**493**	**2.2**	**1.5**	**3.6**	**39.6**
Eastern Africa	665	522	500	415	274	4.0	3.2	5.8	60.5
Middle Africa	709	674	635	556	485	2.5	1.8	3.6	43.2
Southern Africa	200	297	303	182	136	1.6	0.6	2.5	31.5
Western Africa	912	842	846	842	748	1.3	0.6	2.5	25.3
Northern Africa and Western Asia	**161**	**128**	**99**	**83**	**88**	**3.2**	**4.5**	**0.8**	**52.0**
Northern Africa	239	184	135	106	116	3.8	5.4	0.6	57.9
Western Asia	87	71	60	55	56	2.3	3.0	1.0	40.5
Central and Southern Asia	**395**	**301**	**215**	**161**	**136**	**5.5**	**6.0**	**4.4**	**71.8**
Central Asia	49	40	31	25	27	3.7	4.4	2.2	57.7
Southern Asia	405	309	222	167	141	5.4	5.9	4.3	71.3
Eastern and South-Eastern Asia	**119**	**100**	**85**	**69**	**71**	**2.6**	**3.6**	**-0.1**	**45.1**
Eastern Asia	54	40	32	26	20	4.9	4.9	5.2	67.7
South-Eastern Asia	230	196	173	140	136	3.1	3.4	2.4	50.7
Latin America and the Caribbean	**92**	**85**	**81**	**74**	**94**	**0.8**	**1.5**	**-0.3**	**16.8**
Caribbean	191	169	190	184	193	0.1	0.3	-0.5	2.3
Central America	77	67	62	54	67	1.9	2.3	1.3	35.4
South America	88	84	77	71	96	0.6	1.5	-0.7	13.1
Oceania (excluding Australia and New Zealand)	**274**	**279**	**251**	**199**	**178**	**2.1**	**2.3**	**1.6**	**38.2**

[1] For countries included, refer to footnote "1" for Annex 4.

SDG region, subregion and other grouping	MMR[a] point estimate					Average ARR in MMR between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR between 2000 and 2023 (%)
	2000	2005	2010	2015	2020				
Melanesia	284	289	258	202	180	2.2	2.4	1.7	39.6
Micronesia	194	183	170	155	147	1.9	1.6	2.5	36.0
Polynesia	101	95	96	104	110	0.1	-0.3	0.9	2.5
Australia and New Zealand	**7**	**6**	**6**	**6**	**6**	**3.8**	**1.1**	**9.9**	**58.0**
Europe and Northern America	**17**	**15**	**13**	**12**	**15**	**1.9**	**2.1**	**1.6**	**35.1**
Eastern Europe	36	27	18	13	15	6.1	6.9	4.5	75.4
Northern Europe	11	11	9	8	11	1.9	2.1	1.9	35.3
Southern Europe	9	7	7	7	8	1.6	1.9	1.0	30.1
Western Europe	9	8	7	6	6	2.1	1.9	2.5	38.2
Northern America	12	13	14	17	22	-1.4	-2.2	0.9	-37.1
Small island developing States[b]	**262**	**238**	**227**	**204**	**203**	**1.4**	**1.7**	**0.6**	**26.8**
Landlocked developing countries[c]	**705**	**591**	**523**	**430**	**332**	**3.9**	**3.3**	**5.3**	**59.6**
Least developed countries[d]	**686**	**565**	**516**	**439**	**344**	**3.4**	**3.0**	**4.2**	**54.5**
World	**328**	**283**	**253**	**228**	**211**	**2.2**	**2.4**	**1.6**	**40.0**

ARR: annual rate of reduction.

Negative numbers in the last four columns indicate percentage increase in MMR.

Countries in each SDG region are listed at: https://unstats.un.org/sdgs/indicators/regional-groups

[a] MMR has been rounded to the nearest 1.

[b] Antigua and Barbuda, Bahamas, Barbados, Belize, Cabo Verde, Comoros, Cuba, Dominican Republic, Fiji, Grenada, Guinea-Bissau, Guyana, Haiti, Jamaica, Kiribati, Maldives, Mauritius, Micronesia (Federated States of), Papua New Guinea, Puerto Rico, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Seychelles, Singapore, Solomon Islands, Suriname, Timor-Leste, Tonga, Trinidad and Tobago, Vanuatu.

[c] Afghanistan, Armenia, Azerbaijan, Bhutan, Bolivia (Plurinational State of), Botswana, Burkina Faso, Burundi, Central African Republic, Eswatini, Ethiopia, Kazakhstan, Kyrgyzstan, Lao People's Democratic Republic, Lesotho, Malawi, Mali, Mongolia, Nepal, Niger, Paraguay, Republic of Moldova, North Macedonia, Rwanda, South Sudan, Tajikistan, Turkmenistan, Uganda, Uzbekistan, Zambia, Zimbabwe.

[d] Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sudan, Timor-Leste, Togo, Uganda, United Republic of Tanzania, Vanuatu, Yemen, Zambia.

Annex 16.[1]

Trends in estimates of maternal mortality ratio (MMR), by country and territory, 2000, 2005, 2010, 2015, 2020 and 2023

Country and territory	MMR[a] point estimate						Average ARR in MMR[b] between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR[c] between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Afghanistan	1	1	893	741	634	521	4	4	4	62
Albania	15	12	9	9	7	7	4	4	3	56
Algeria	123	87	82	79	97	62	3	3	3	50
Andorra	14	13	12	10	48	11	1	2	-1	23
Angola	659	462	321	249	195	183	6	7	4	73
Antigua and Barbuda	37	33	31	30	35	35	0	2	-3	7
Argentina	58	57	55	39	40	33	2	3	3	43
Armenia	40	32	28	25	43	19	3	3	3	51
Australia	7	5	5	6	5	2	5	1	13	65
Austria	7	6	6	7	6	6	0	0	1	8
Azerbaijan	46	40	28	21	21	18	4	5	3	61
Bahamas	51	70	79	83	84	76	-2	-3	0	-45
Bahrain	25	20	18	16	7	17	2	3	-0	35
Bangladesh	523	378	275	204	152	115	7	7	7	79
Barbados	46	44	42	37	39	35	1	1	1	23
Belarus	20	9	3	1	2	1	13	18	3	95
Belgium	8	7	6	5	4	4	3	3	3	51
Belize	78	60	41	47	88	67	1	3	-4	16
Benin	529	514	607	606	578	518	0	-1	2	6
Bhutan	324	186	107	68	51	47	8	10	4	85
Bolivia (Plurinational State of)	287	242	196	166	218	146	3	4	1	50
Bosnia and Herzegovina	11	9	8	7	7	6	3	4	1	46
Botswana	136	166	228	141	98	155	-1	-0	-11	-14
Brazil	69	71	66	63	85	67	0	1	-1	3
Brunei Darussalam	48	43	40	39	39	36	1	1	1	22

[1] For countries included, refer to footnote "1" for Annex 4.

Country and territory	MMR[a] point estimate						Average ARR in MMR[b] between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR[c] between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Bulgaria	19	13	9	7	9	6	5	6	3	71
Burkina Faso	524	467	404	328	334	242	4	3	4	55
Burundi	860	685	614	525	441	392	3	3	4	55
Cabo Verde	110	75	61	46	56	40	4	6	2	63
Cambodia	476	323	234	166	164	137	6	7	2	72
Cameroon	678	629	562	417	316	258	4	3	6	63
Canada	9	11	11	11	17	12	-1	-2	0	-32
Central African Republic	1	1	1	981	1	692	3	3	5	54
Chad	1	1	1	1	877	748	2	0	6	40
Chile	33	27	22	14	12	10	5	6	4	70
China	56	42	34	26	20	16	5	5	6	70
Colombia	95	82	76	70	94	59	2	2	2	37
Comoros	476	373	305	237	198	179	4	5	3	62
Congo	509	385	382	284	247	241	3	4	1	53
Cook Islands	0	0	0	0	0	0	5	5	5	68
Costa Rica	36	31	29	26	34	24	2	2	2	31
Côte d'Ivoire	378	492	592	505	447	359	0	-2	4	5
Croatia	8	7	6	4	5	3	4	4	3	59
Cuba	48	43	44	41	40	35	1	1	2	28
Cyprus	12	10	10	11	87	14	-1	0	-2	-17
Czechia	7	5	4	3	3	3	4	5	2	58
Democratic People's Republic of Korea	129	78	77	72	66	67	3	4	1	47
Democratic Republic of the Congo	585	613	601	545	489	427	2	1	3	31
Denmark	9	8	7	5	4	4	4	4	5	59
Djibouti	501	315	243	210	192	162	5	6	3	68
Dominica	61	54	50	63	47	36	3	0	4	44
Dominican Republic	76	83	92	102	121	124	-2	-2	-2	-65
Ecuador	123	94	80	64	91	55	4	4	2	55
Egypt	53	41	32	24	31	17	5	5	4	68
El Salvador	48	34	34	43	48	39	1	1	2	19
Equatorial Guinea	406	312	259	222	196	174	4	4	3	58

Country and territory	MMR[a] point estimate						Average ARR in MMR[b] between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR[c] between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Eritrea	741	567	498	413	334	291	4	4	4	61
Estonia	27	15	8	6	6	5	7	10	5	82
Eswatini	361	529	752	283	102	118	5	2	8	68
Ethiopia	870	754	619	401	244	195	7	5	9	78
Fiji	47	44	40	37	34	30	2	2	3	35
Finland	7	8	8	7	9	8	-0	0	-1	-9
France	9	9	9	9	9	7	1	1	3	23
Gabon	178	175	144	239	194	233	-1	-2	-1	-30
Gambia	810	707	632	527	400	354	4	3	5	56
Georgia	43	53	41	30	30	20	3	2	5	54
Germany	7	6	5	5	4	4	3	3	3	47
Ghana	472	390	363	310	253	234	3	3	3	49
Greece	4	3	4	5	7	5	-1	-2	0	-36
Grenada	46	40	43	46	51	48	-0	0	-1	-3
Guatemala	166	153	127	112	102	94	3	3	2	44
Guinea	951	843	750	642	528	494	3	3	3	49
Guinea-Bissau	1	956	698	631	603	505	4	5	3	63
Guyana	171	166	141	117	109	75	4	3	6	57
Haiti	440	355	398	364	346	328	1	1	1	27
Honduras	82	73	72	57	57	47	3	2	2	43
Hungary	14	13	13	13	18	12	1	0	2	16
Iceland	7	5	5	4	12	3	3	3	2	53
India	362	277	188	129	101	80	7	7	6	78
Indonesia	311	268	242	190	184	140	4	4	4	56
Iran (Islamic Republic of)	43	33	27	22	34	16	4	4	4	63
Iraq	146	118	107	86	63	66	4	4	4	56
Ireland	8	6	6	5	6	4	3	4	2	53
Israel	9	4	3	3	3	2	5	7	3	71
Italy	11	8	8	8	8	6	2	2	3	39
Jamaica	82	81	94	100	126	130	-2	-1	-3	-59
Japan	9	7	6	5	4	3	5	4	7	65
Jordan	61	53	48	41	41	31	3	3	4	50
Kazakhstan	58	38	22	13	18	10	8	10	4	84
Kenya	206	178	210	203	184	149	1	0	4	27
Kiribati	119	104	102	90	89	80	2	2	2	33
Kuwait	11	10	9	8	33	8	2	3	-0	31
Kyrgyzstan	72	74	71	58	55	42	3	2	3	43

Country and territory	MMR[a] point estimate						Average ARR in MMR[b] between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR[c] between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Lao People's Democratic Republic	609	458	305	180	132	112	8	8	5	82
Latvia	34	27	22	22	21	19	3	3	3	45
Lebanon	24	17	15	15	27	15	2	3	-0	40
Lesotho	413	549	1	594	529	478	-1	-3	1	-19
Liberia	786	619	712	784	664	628	1	0	1	22
Libya	71	66	71	76	71	59	1	-1	3	15
Lithuania	16	13	10	10	8	8	3	3	3	52
Luxembourg	18	17	17	13	6	11	2	2	2	35
Madagascar	638	540	500	474	447	445	2	2	1	32
Malawi	506	283	517	354	256	225	4	2	5	55
Malaysia	37	31	29	30	29	26	2	2	1	30
Maldives	94	54	49	41	48	32	5	6	4	67
Mali	741	577	558	490	405	367	3	3	4	51
Malta	13	11	9	7	10	8	2	4	2	31
Marshall Islands	251	234	212	184	178	155	2	2	2	37
Mauritania	644	536	499	469	413	381	2	2	2	42
Mauritius	43	43	53	61	58	66	-2	-2	-1	-53
Mexico	56	52	50	43	61	42	1	2	0	25
Micronesia (Federated States of)	204	188	184	182	150	129	2	1	4	35
Monaco	10	5	11	5	24	5	3	4	1	50
Mongolia	144	99	71	52	47	41	6	7	3	72
Montenegro	11	8	7	7	15	6	3	3	1	48
Morocco	271	196	140	100	81	70	6	7	4	74
Mozambique	547	301	305	216	123	99	8	6	10	82
Myanmar	375	312	259	222	198	185	3	4	2	54
Namibia	384	344	531	307	143	139	5	2	8	64
Nauru	278	328	297	253	309	273	0	1	-1	3
Nepal	480	344	297	236	153	142	6	5	6	72
Netherlands (Kingdom of the)	13	10	6	5	4	4	5	6	3	67
New Zealand	11	11	10	8	8	7	2	2	1	34
Nicaragua[d]	213	124	96	81	87	60	5	6	3	71
Niger	845	764	621	473	388	350	4	4	4	59
Nigeria	1	1	1	1	1	993	1	0	2	14
North Macedonia	11	7	5	4	7	3	6	7	5	75

Country and territory	MMR[a] point estimate						Average ARR in MMR[b] between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR[c] between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Norway	5	6	4	2	2	1	6	6	6	76
occupied Palestinian territory, including east Jerusalem[e]	59	52	42	26	20	16	6	5	5	73
Oman	19	18	17	15	32	13	2	2	2	33
Pakistan	419	316	240	202	178	155	5	5	3	65
Palau	119	105	96	79	117	89	1	3	-2	26
Panama	64	57	56	48	74	37	2	2	3	43
Papua New Guinea	323	326	289	221	194	189	3	3	2	43
Paraguay	207	194	136	64	69	58	6	8	0	72
Peru	115	103	86	71	75	51	4	3	4	56
Philippines	127	118	117	104	88	84	2	1	2	35
Poland	7	4	3	2	3	2	7	9	3	78
Portugal	9	8	10	11	14	15	-2	-1	-3	-59
Puerto Rico	22	20	18	15	11	11	3	3	5	50
Qatar	11	11	8	6	6	4	5	5	4	65
Republic of Korea	15	11	8	6	12	4	6	6	7	75
Republic of Moldova	38	26	20	20	29	19	3	4	1	51
Romania	45	30	23	18	16	12	6	6	5	74
Russian Federation	51	38	23	15	19	9	7	8	6	82
Rwanda	885	465	393	292	252	229	6	8	3	74
Saint Kitts and Nevis	143	102	92	76	80	74	3	4	0	47
Saint Lucia	83	55	56	46	43	44	3	4	0	46
Samoa	93	87	92	108	114	101	-0	-1	1	-10
San Marino	14	12	8	8	46	8	3	4	-1	45
Sao Tome and Principe	180	181	170	128	92	75	4	2	7	58
Saudi Arabia	20	15	11	8	11	7	4	6	1	62
Senegal	581	488	436	357	252	237	4	4	5	61
Serbia[f]	16	13	13	13	16	11	2	1	3	32
Seychelles	45	50	50	46	51	42	0	-0	2	6
Sierra Leone	1	1	1	730	422	354	7	5	8	79
Singapore	17	14	10	8	13	6	4	5	4	64

Country and territory	MMR[a] point estimate						Average ARR in MMR[b] between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR[c] between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Slovakia	8	7	5	5	4	4	3	4	2	46
Slovenia	7	6	7	5	12	3	3	2	6	54
Solomon Islands	166	161	148	146	131	123	1	1	2	26
Somalia	1	1	1	784	655	563	3	3	4	51
South Africa	175	279	226	150	118	118	2	1	2	32
South Sudan	1	1	776	1	729	692	4	1	12	59
Spain	5	5	4	4	4	3	2	2	3	43
Sri Lanka	39	32	26	22	23	18	3	4	3	54
Saint Vincent and the Grenadines	68	55	59	59	57	56	1	1	-1	17
Sudan	645	506	370	298	273	256	4	5	2	60
Suriname	282	202	134	115	94	84	5	6	4	70
Sweden	5	5	5	5	5	4	1	1	2	27
Switzerland	9	8	7	6	5	5	2	2	3	41
Syrian Arab Republic	31	21	19	24	23	20	2	2	2	34
Tajikistan	58	36	26	20	25	14	6	7	5	76
Thailand	49	40	37	34	36	34	2	2	-0	30
Timor-Leste	796	648	439	305	257	192	6	6	6	75
Togo	496	434	497	470	398	349	2	0	4	29
Tonga	100	92	85	79	74	67	2	2	2	34
Trinidad and Tobago	76	60	54	50	35	54	2	3	-1	29
Tunisia	56	49	44	40	40	36	2	2	1	35
Türkiye	32	27	23	19	19	15	3	3	4	55
Turkmenistan	25	15	9	6	5	5	8	9	4	82
Tuvalu	237	230	213	169	206	170	2	2	0	28
Uganda	475	417	304	299	209	170	5	3	6	65
Ukraine	32	27	21	17	18	15	3	4	2	53
United Arab Emirates	8	4	3	3	6	3	5	7	3	71
United Kingdom of Great Britain and Northern Ireland	12	12	10	9	14	8	2	2	2	31
United Republic of Tanzania	568	350	486	433	160	276	3	2	5	52
United States of America	12	13	15	17	22	17	-1	-2	1	-38

Country and territory	MMR[a] point estimate						Average ARR in MMR[b] between 2000 and 2023 (%)	Average ARR in MMR between 2000 and 2015 (%)	Average ARR in MMR between 2016 and 2023 (%)	Overall change in MMR[c] between 2000 and 2023 (%)
	2000	2005	2010	2015	2020	2023				
Uruguay	23	20	17	16	20	15	2	3	1	35
Uzbekistan	42	39	34	31	29	26	2	2	2	38
Vanuatu	133	127	114	109	107	100	1	1	1	26
Venezuela (Bolivarian Republic of)	86	93	110	136	207	227	-4	-3	-5	-162
Viet Nam	83	69	62	58	51	48	2	2	2	41
Yemen	241	181	144	135	135	118	3	4	2	50
Zambia	340	264	332	154	99	85	6	5	9	75
Zimbabwe	405	454	567	428	380	358	0	-1	2	8

ARR: annual rate of reduction.

Negative numbers in the last four columns indicate percentage increase in MMR.

[a] MMR has been rounded to the nearest 1.

[b] Average ARR for the whole period, data from 1 January 2000 to 31 December 2023..

[c] Overall change for the whole period, data from 1 January 2000 to 31 December 2023.

[d] Nicaragua has reported forthcoming data; should this data affect the current estimates, the report will be updated accordingly. Nicaragua continues to strengthen its health information system and has adopted the Búsqueda intencionada y reclasificación de muertes maternas (BIRMM) which may allow for future classification as a specialized study on maternal mortality to improve the country's estimates..

[e] This document was prepared using WHO's policies and terminology. UNICEF, UNFPA and UNDESA/Population Division refer to this territory as "the State of Palestine". The World Bank Group refers to this territory as "West Bank and Gaza", which includes east Jerusalem insofar as data permit.

[f] Data for Serbia do not include data for Kosovo (United Nations Security Council Resolution 1244 [1999]).

Annex 17.
Analysis of the relative risk of dying from COVID-19 for a pregnant or postpartum woman versus a non-pregnant and non-postpartum woman

Terminology and inputs related to the COVID-19 pandemic

In this report, the years 2020–2022 are referred to as the **"COVID years"**.

"COVID-maternal deaths" are maternal deaths that are deemed to be attributable to the COVID pandemic, i.e. deaths that "would not have occurred if there were no COVID pandemic".

The approach taken to estimate the maternal mortality ratio (MMR) during the COVID years (2020–2022) is to sum the following two estimates:

a. the counterfactual of what a country's MMR would have been, in the absence of the COVID-19 pandemic, called the "COVID-free MMR"; and
b. the increase in the MMR attributable to the COVID-19 pandemic, called the "COVID MMR".

Consistent with other years, the source of the mortality estimates is the 2024 revision of *World population prospects* (WPP 2024) *(7)*. WPP 2024 reports total deaths as well as an estimate of COVID-19 crisis deaths for all countries, from 2020 to 2022.

The WPP method for calculating total deaths during the COVID years differed between countries according to the quality of the input data source. Please refer to the WPP source documentation for further methodological details *(11)*.

- *For countries without high-quality mortality data*, the MMEIG used WPP's published estimates of total deaths and COVID deaths. COVID-free deaths are obtained by subtracting COVID deaths from total deaths.
- *For countries with high-quality mortality data*, the MMEIG applied a linear interpolation to total deaths between 2019 and 2023 to obtain the COVID-free deaths. We obtained the COVID deaths as the difference between total deaths and the COVID-free deaths.

Results: analysis of the relative risk parameter using observed data

The figures in this annex illustrate the available data from specialized studies and CRVS systems and the relationship between the model-based predictions of COVID MMR and the estimated values in specialized studies and CRVS data. **Figure A17.1** shows estimates of the ratio of COVID MMR from observed data relative to a COVID-free MMR prediction.

Fig. A17.1 Estimates of the ratio between the observed COVID MMR and predicted COVID-free MMR

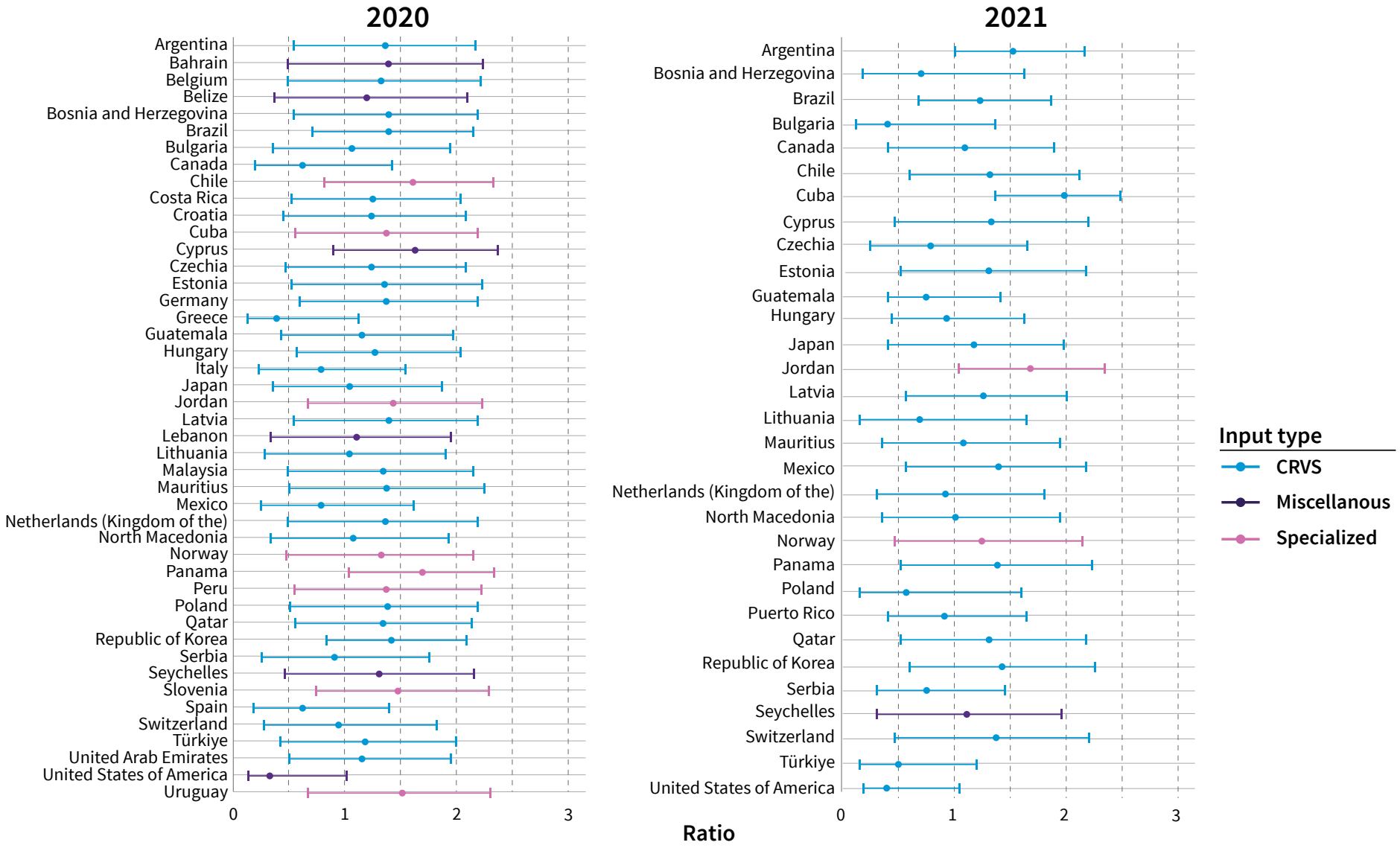


Figure A17.2 shows estimates of *d* obtained from specialized studies and other (CRVS) data. Generally, *d* estimates obtained from specialized studies were higher compared with the estimates from CRVS data. For all the data combined, the 50th percentile of *d* was at 0.99, and the 25th percentile and 75th percentile were 0.61 and 1.42, respectively. For specialized studies, the 50th percentile of *d* was 1.77, while the 25th percentile and 75th percentile were 1.67 and 1.93, respectively.

The MMEIG attempted to select a prior for *d* that allows for the range of values suggested by the data, where *d* is between 0.1 and 2.6. In other words, to use a density such that values of *d* estimated from CRVS data as well as from specialized studies have non-zero probability.

To achieve this, the MMEIG used a density that was symmetric around 1.35 in the interval (between 0.1 and 2.6), where the density's 25th percentile is in between the 25th and 50th percentile of all the data, and the density's 75th percentile is in between the 50th and 75th percentile of the data from specialized studies, as shown in **Fig. A17.3**.

Fig. A17.2 Histograms of estimates of d obtained from specialized studies (left) and other (CRVS) data (rights)

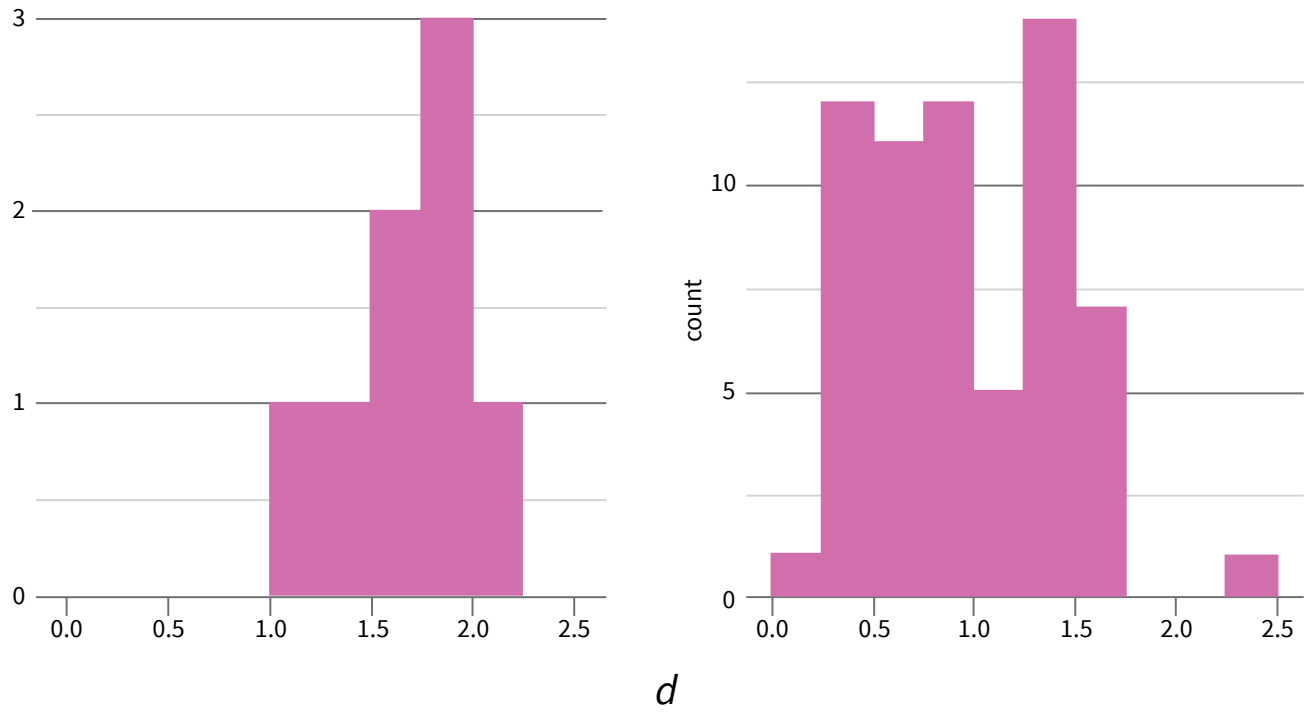
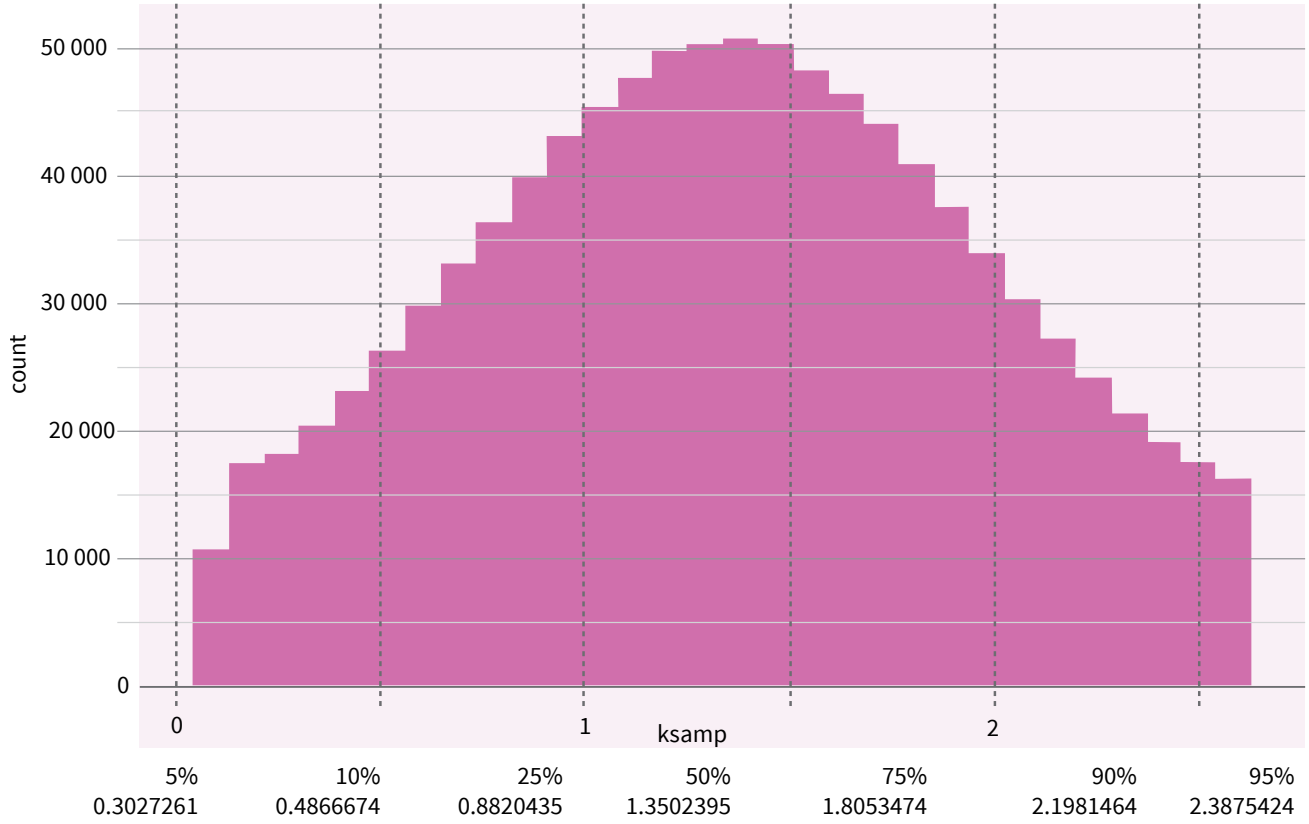


Fig. A.17.3 Information on density used for d: density plot (top) and percentiles (bottom)



Annex 18.

Maternal mortality ratio (MMR) and proportion of deaths among women of reproductive age that are due to maternal causes (PM) by Sustainable Development Goal (SDG) region, subregion and other grouping, 2019–2022

SDG region and subregion	MMR[a] point estimate (UI 80%)				PM (%)[b] point estimate (UI 80%)			
	2019	2020	2021	2022	2019	2020	2021	2022
World	207 (189–235)	211 (190–242)	242 (217–281)	203 (182–237)	9.4 (8.6–10.6)	9.2 (8.3–10.5)	9.2 (8.2–10.6)	8.8 (7.9–10.3)
Sub-Saharan Africa	517 (455–615)	493 (430–596)	508 (442–618)	462 (398–571)	18.3 (16.1–21.8)	18 (15.7–21.8)	17.5 (15.2–21.3)	16.7 (14.3–20.6)
Eastern Africa	304 (264–357)	274 (239–326)	295 (255–354)	251 (217–304)	15 (13.1–17.7)	14.3 (12.5–17)	14.2 (12.3–17.1)	13.2 (11.3–15.9)
Middle Africa	512 (411–701)	485 (384–677)	498 (389–708)	437 (338–633)	22.2 (17.8–30.4)	22.8 (18–31.7)	21.7 (16.9–30.8)	18.9 (14.6–27.3)
Southern Africa	137 (122–153)	136 (119–153)	214 (166–282)	144 (120–167)	2.5 (2.3–2.8)	2.5 (2.2–2.8)	3.4 (2.6–4.5)	2.8 (2.3–3.3)
Western Africa	764 (632–994)	748 (609–996)	745 (601–1011)	712 (565–976)	20.7 (17.1–26.9)	20.3 (16.5–27)	19.6 (15.8–26.6)	19.1 (15.1–26.2)
Northern Africa and Western Asia	80 (65–104)	88 (70–115)	104 (83–138)	82 (63–110)	6.8 (5.5–8.9)	7 (5.6–9.1)	7.3 (5.8–9.7)	6.5 (5.1–8.8)
Northern Africa	102 (76–141)	116 (86–163)	132 (96–193)	106 (74–156)	7.8 (5.8–10.8)	8.1 (6–11.4)	8.3 (6–12.1)	7.6 (5.3–11.2)
Western Asia	54 (41–79)	56 (44–77)	71 (55–99)	53 (41–76)	5.2 (3.9–7.6)	5.2 (4–7.1)	5.7 (4.4–7.9)	4.8 (3.7–6.9)
Central and Southern Asia	132 (118–150)	136 (121–157)	181 (149–234)	121 (107–144)	6.6 (5.9–7.6)	6.8 (6.1–7.9)	7.1 (5.9–9.2)	6.3 (5.6–7.6)

SDG region and subregion	MMR[a] point estimate (UI 80%)				PM (%)[b] point estimate (UI 80%)			
	2019	2020	2021	2022	2019	2020	2021	2022
Central Asia	23 (20–27)	27 (22–33)	29 (23–37)	23 (18–29)	1.7 (1.5–2)	1.9 (1.6–2.4)	2 (1.6–2.6)	1.7 (1.4–2.2)
Southern Asia	137 (123–157)	141 (126–164)	189 (155–245)	126 (111–151)	6.8 (6.1–7.8)	7 (6.2–8.1)	7.3 (6–9.4)	6.5 (5.7–7.8)
Eastern and South-Eastern Asia	63 (53–79)	71 (59–95)	93 (73–131)	72 (59–94)	2.8 (2.4–3.5)	2.9 (2.4–3.8)	3.2 (2.5–4.6)	2.6 (2.2–3.4)
Eastern Asia	21 (17–26)	20 (16–25)	21 (16–27)	19 (14–24)	1.1 (0.9–1.4)	0.9 (0.7–1.1)	0.9 (0.7–1.1)	0.8 (0.6–0.9)
South-Eastern Asia	125 (100–165)	136 (108–187)	175 (132–257)	127 (102–173)	4.5 (3.6–5.9)	4.7 (3.7–6.4)	5.1 (3.9–7.6)	4.3 (3.4–5.8)
Latin America and the Caribbean	76 (71–84)	94 (86–105)	140 (123–164)	93 (81–109)	3.8 (3.5–4.1)	3.9 (3.6–4.4)	4.6 (4.1–5.5)	3.9 (3.5–4.6)
Caribbean	191 (150–272)	193 (151–277)	248 (197–354)	192 (148–279)	7.8 (6.1–11.1)	7.7 (6–11.1)	8.1 (6.4–11.6)	7.5 (5.8–10.9)
Central America	53 (47–57)	67 (57–80)	104 (74–154)	52 (45–62)	2.8 (2.5–3)	2.7 (2.3–3.3)	3.7 (2.6–5.4)	2.5 (2.1–2.9)
South America	75 (69–83)	96 (87–109)	142 (126–164)	101 (85–125)	3.6 (3.3–4)	4 (3.6–4.6)	4.6 (4.1–5.3)	4.1 (3.4–5.1)
Oceania (excluding Australia and New Zealand)	182 (127–268)	178 (124–257)	206 (144–303)	174 (119–255)	7.7 (5.4–11.3)	7.6 (5.3–11)	7.7 (5.4–11.3)	6.8 (4.6–10)
Melanesia	185 (126–275)	180 (123–263)	209 (144–311)	175 (117–261)	7.8 (5.3–11.6)	7.7 (5.3–11.2)	7.8 (5.3–11.5)	6.8 (4.6–10.1)
Micronesia	143 (95–231)	147 (96–242)	166 (109–276)	141 (93–238)	4.8 (3.2–7.8)	5 (3.3–8.3)	5.3 (3.5–8.9)	4.9 (3.2–8.3)
Polynesia	105 (58–211)	110 (62–206)	109 (62–209)	107 (60–204)	6.5 (3.6–13.1)	6.5 (3.7–12.3)	6.6 (3.7–12.5)	6.4 (3.6–12.3)
Australia and New Zealand	6 (5–7)	6 (5–6)	5 (4–6)	7 (5–10)	0.5 (0.4–0.6)	0.5 (0.4–0.6)	0.4 (0.4–0.5)	0.6 (0.4–0.9)
Europe and Northern America	11 (11–12)	15 (13–17)	19 (17–21)	14 (12–15)	0.6 (0.5–0.6)	0.6 (0.6–0.7)	0.7 (0.6–0.8)	0.6 (0.5–0.7)
Eastern Europe	10 (9–13)	15 (12–22)	18 (13–27)	11 (9–15)	0.3 (0.3–0.4)	0.4 (0.3–0.6)	0.4 (0.3–0.6)	0.3 (0.2–0.4)
Northern Europe	8 (7–9)	11 (10–12)	11 (9–13)	12 (10–14)	0.6 (0.5–0.6)	0.8 (0.7–0.8)	0.8 (0.6–0.9)	0.8 (0.7–1)
Southern Europe	6 (6–7)	8 (7–9)	9 (8–10)	9 (7–12)	0.5 (0.4–0.5)	0.5 (0.5–0.6)	0.6 (0.5–0.7)	0.6 (0.5–0.8)

SDG region and subregion	MMR[a] point estimate (UI 80%)				PM (%)[b] point estimate (UI 80%)			
	2019	2020	2021	2022	2019	2020	2021	2022
Western Europe	6 (5–7)	6 (5–7)	6 (6–7)	6 (6–7)	0.5 (0.5–0.6)	0.5 (0.5–0.6)	0.6 (0.5–0.6)	0.6 (0.5–0.7)
Northern America	17 (15–19)	22 (19–26)	30 (26–33)	20 (17–23)	0.8 (0.7–0.9)	0.9 (0.7–1)	1 (0.9–1.2)	0.8 (0.7–1)
Small island developing States	201 (167–252)	203 (169–258)	247 (206–314)	199 (164–256)	8.6 (7.2–10.8)	8.6 (7.2–11)	8.8 (7.4–11.2)	8.1 (6.7–10.5)
Landlocked developing countries	343 (300–399)	332 (291–390)	350 (304–416)	298 (259–355)	16.2 (14.2–18.9)	16.4 (14.4–19.3)	15.8 (13.8–18.8)	14.4 (12.5–17.2)
Least developed countries	363 (326–414)	344 (309–396)	369 (330–430)	317 (282–370)	17.3 (15.6–19.7)	17.3 (15.6–19.9)	16.8 (15–19.5)	15.5 (13.9–18.2)

The countries in each SDG regional grouping can be found at: https://unstats.un.org/sdgs/indicators/regional-groups; but data are only included in this table for the 195 countries and territories that met the inclusion criteria for this analysis, i.e. 193 WHO Member States and 2 territories.

[a] MMR estimates have been rounded to the nearest 1.

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[1] All references were accessed on 1 April 2025.

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