

REPORT

Making the World a Healthier Place for Mothers:

Trends and Opportunities for
Action in Maternal Health

INSTITUTE FOR HEALTH METRICS AND EVALUATION CLIENT SERVICES
UNIVERSITY OF WASHINGTON



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This report was prepared by the Institute for Health Metrics and Evaluation. For more data related to maternal health, please visit <https://maternalhealthatlas.org>. For a detailed explanation of the methods used to generate the estimates used in this report, please visit the Global Burden of Disease scientific papers published in *The Lancet*: www.thelancet.com/gbd.

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Contents

| | |
|---|-----------|
| Figures and tables | 4 |
| Acronyms | 5 |
| About | 6 |
| Acknowledgments | 6 |
| Report highlights | 7 |
| Introduction | 9 |
| Drivers of disability from maternal disorders | 11 |
| Trends in disability from maternal disorders | 14 |
| Progress and challenges in maternal mortality | 16 |
| A global target to end maternal mortality | 18 |
| Identifying the leading causes of maternal deaths | 21 |
| Focusing on healthy lives for mothers | 22 |
| How maternal complications vary by age | 26 |
| Spotlight on the US: high income but worsening outcomes .. | 29 |
| The way forward: preventing deaths and disability from maternal conditions | 31 |
| Conclusion | 33 |
| Annex | 35 |
| Maternal disorders defined | 35 |
| References | 36 |

Figures

| | |
|--|-----------|
| Figure 1: Global YLDs from obstructed labor and uterine rupture, 2017..... | 11 |
| Figure 2: Top causes of global maternal YLDs, 1990 and 2017..... | 13 |
| Figure 3: Incidence rate of maternal disorders, by GBD super-region, 1990-2017..... | 15 |
| Figure 4: 30 Countries where over 80% of all maternal deaths occurred in 2017..... | 16 |
| Figure 5: Annual change in rate of deaths from maternal disorders, 1990-2017..... | 17 |
| Figure 6: Global maternal mortality ratio, 1990-2017..... | 18 |
| Figure 7: Maternal mortality ratio, 2017..... | 19 |
| Figure 8: Global death rate from maternal causes, 1990-2017..... | 20 |
| Figure 9: Understanding disability-adjusted life years (DALYs)..... | 22 |
| Figure 10: Maternal DALY rate by World Bank income group, 1990-2017..... | 23 |
| Figure 11: DALY rate of maternal causes by GBD super-region, 2017..... | 24 |
| Figure 12: DALY rate for all maternal causes in sub-Saharan Africa, Equatorial Guinea, and Ethiopia, 1990-2017..... | 25 |
| Figure 13: DALY rate by maternal cause in Ethiopia, 1990-2017..... | 25 |
| Figure 14: Global maternal deaths by cause and by age group, 2017..... | 26 |
| Figure 15: Global maternal YLDs by cause and by age group, 2017..... | 27 |
| Figure 16: Global maternal DALYs by cause and by age group, 2017..... | 28 |
| Figure 17: Maternal causes of death in the US ranked by rate, with percentage change in rate, 1990-2017..... | 29 |

Tables

| | |
|--|-----------|
| Table 1: Global YLDs from obstructed labor and uterine rupture, 1990 and 2017..... | 12 |
| Table 2: Countries with greatest increases in the maternal mortality ratio between 1990 and 2017..... | 19 |

Acronyms

| | |
|--------------|---|
| DALYs | Disability-adjusted life years |
| GBD | Global Burden of Disease |
| IHME | Institute for Health Metrics and Evaluation |
| MMR | Maternal mortality ratio |
| SDG | Sustainable Development Goals |
| UN | United Nations |
| YLDs | Years lived with disability |
| YLLs | Years of life lost |

About IHME

The Institute for Health Metrics and Evaluation (IHME) is an independent global health research organization at the University of Washington School of Medicine that provides rigorous and comparable measurement of the world's most important health problems and evaluates the strategies used to address them. IHME makes this information widely available so that policymakers have the evidence they need to make informed decisions about how to allocate resources to improve population health. For more information about IHME and its work, please visit www.healthdata.org.

About the Global Burden of Disease (GBD)

All data in this report are derived from the GBD study, which is the largest and most comprehensive effort to measure health loss across different places over time. Coordinated by IHME, it draws on the work of more than 4,000 collaborators from 147 countries and territories. The GBD 2017 study was published in November 2018 and covers 359 diseases and injuries, and 84 risk factors. An updated GBD is planned for 2020.

For more information about GBD, please visit healthdata.org/gbd.

About IHME Client Services

This report was made possible by IHME Client Services, a social enterprise within the University of Washington that promotes and provides access to IHME's population health data to private-sector organizations.

To connect with Client Services, please contact services@healthdata.org

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Report highlights

- Maternal disorders have substantial impacts on women that can last the rest of their lives. Improving the conditions and care surrounding pregnancy and childbirth could have worldwide impact for generations.
- The major disabling conditions related to pregnancy are obstructed labor and uterine rupture, maternal hypertension, other maternal disorders, and maternal hemorrhage.
- By world regions, sub-Saharan Africa had the highest rate of disability due to maternal disorders overall in 2017, while Southeast Asia, East Asia, and Oceania had the lowest rate.
- In 2017, over 80% of the world's maternal deaths occurred in only 30 countries, including seven of the world's eight most populous countries.
- Maternal deaths decreased by 37% between 2000 and 2017, compared with 5.6% between 1990 and 2000, likely reflecting increased attention and funding for maternal health sparked by the United Nations' (UN) Millennium Development Goals.
- Many countries are making progress that contributes to the UN Sustainable Development Goal target of fewer than 70 maternal deaths per 100,000 live births globally, but more progress will be needed to attain this goal worldwide.
- Patterns of maternal disorders vary by age. Recognizing the risks associated with different age groups can help improve maternal outcomes.
- The United States has among the highest spending on health care in the world, yet its rate of maternal deaths has been rising.
- Many opportunities exist to improve maternal health and pregnancy outcomes, from increasing access to health care and providing better training for practitioners, to collecting higher-quality data to advance understanding of the conditions affecting mothers.

Introduction

Having a baby should be safe throughout the world. But too many women still die during pregnancy and childbirth, and those who survive may experience painful and long-lasting complications. In most cases, these complications are preventable with adequate health care. Progress has been made over the past few decades in preventing deaths, but less attention has been focused on addressing the conditions that cause disabling illnesses, which may go unrecognized and untreated, especially in lower-income countries. Women who die or experience disability related to pregnancy and childbirth are typically between the ages of 10 and 54, which means they may either die in the prime of life or experience many years of poor health or debilitating conditions.

This report aims to draw attention to maternal disorders and the significant impact they have. Focusing solely on maternal deaths, as some data sources do, misses a whole range of problems that women face after pregnancy, sometimes for many years. The health impact from maternal causes persists for some women for the duration of their lives. This fact alone highlights the opportunity to have an enduring and widespread impact by improving the conditions and care surrounding pregnancy, childbirth, and post-natal care. The decisions made now will echo across decades, borders, and generations.

Efforts to improve women's lives are underway in many countries, some with great success. With a focus on healthy mothers, communities have a better chance of raising healthy children, who then typically stay in school longer and have other positive outcomes - an upward spiral.

Ongoing research aims to help us better understand maternal disorders and the modifiable risk factors contributing to them, as well as ways to improve their management. Knowing more about how to prevent pregnancy-related deaths and disability will ultimately make the world a healthier place.

About maternal disorders

In the Global Burden of Disease (GBD) study, researchers measure the impact of deaths and disability from both direct and indirect causes related to pregnancy, delivery, or medical management of either. Those causes are included in the GBD analysis if they occur during the pregnancy or within one year of the end of pregnancy for women aged 10 to 54 years. Maternal causes include:

- Abortion and miscarriage
- Ectopic pregnancy
- Indirect maternal deaths
- Late maternal deaths
- Maternal deaths aggravated by HIV/AIDS
- Maternal hemorrhage
- Maternal hypertensive disorders
- Maternal sepsis and other maternal infections
- Obstructed labor and uterine rupture
- Other direct maternal disorders

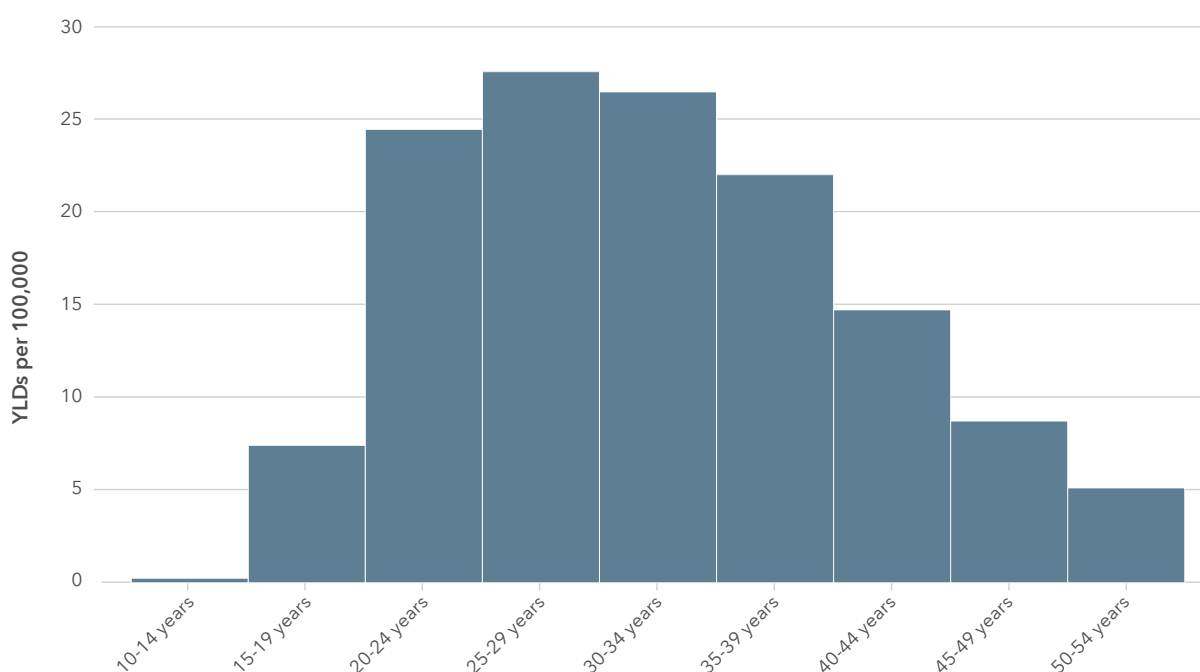
Drivers of disability from maternal disorders

In the GBD study, disability refers to any short-term or long-term loss of health and is measured in years lived with disability, or YLDs. YLDs are a measure of the amount of time people spend with nonfatal diseases and injuries that degrade their health.

Globally, the greatest contributor to disability (YLDs) due to pregnancy and childbirth is obstructed labor and uterine rupture, which – as shown in Figure 1 – primarily affects women in their 20s and 30s.

FIGURE 1

GLOBAL YLDs FROM OBSTRUCTED LABOR AND UTERINE RUPTURE, 2017



Obstructed labor is much more common than uterine rupture and can have devastating consequences, including fistula, which is an abnormal opening between the vagina and the bladder or rectum that results in incontinence of urine or stool. Fistula is routinely repaired in high-income countries, but in low-income countries the situation is altogether different. Women may not have access to surgical treatment, or it may be too expensive. In some countries, women do not know fistula is a treatable condition and may believe it is a punishment they must endure. Some live in shame and isolation, thinking they are alone in having this condition and being shunned by their family members. Fortunately,

awareness of fistula, its consequences, and the possibility of treatment is increasing in many low-income countries.

Opportunity: Women who are carefully monitored during pregnancy have a much lower chance of suffering from obstructed labor. And surgical intervention can help both to save mothers during childbirth and to repair damage done by childbirth.

Obstructed labor and uterine rupture has remained the biggest contributor to maternal disability for nearly three decades, although the trend is in the right direction. The rate of years lived with disability due to these causes fell by 37.5% between 1990 and 2017, as seen in Table 1.

TABLE 1

GLOBAL YLDs FROM OBSTRUCTED LABOR AND UTERINE RUPTURE, 1990 AND 2017

| | Number of YLDs | YLD rate per 100,000 population |
|---------------------|-----------------------|--|
| 1990 | 449,260 | 16.8 |
| 2017 | 397,611 | 10.5 |
| Decrease, 1990–2017 | 11.5% | 37.5% |

The second-leading cause of disability for mothers worldwide is maternal hypertension (Figure 2). This includes two main conditions: pre-eclampsia in a pregnant woman who had pre-existing high blood pressure, and high blood pressure that comes on during pregnancy in a woman who did not have high blood pressure before.

Untreated, pre-eclampsia can progress to eclampsia, a condition in which the pregnant woman has life-threatening seizures. However, many women, particularly in low-income countries, do not receive prenatal care or screening for high blood pressure or cannot access services because of cost or distance. Without screening, they may be unaware that they have these conditions until serious symptoms occur, at which point it may be too late.

FIGURE 2

TOP CAUSES OF GLOBAL MATERNAL YLDs, 1990 AND 2017



Opportunity: High blood pressure during pregnancy may cause no symptoms, which makes prenatal care all the more important. At these visits, women’s blood pressure and urine can be tested, and those who need medication or additional monitoring can receive it. Although the causes of maternal hypertension are not completely understood, it is a manageable condition with proper medical care.

Maternal hypertension can have lingering effects on a woman, raising her risk of developing high blood pressure, heart disease, and stroke later in life. Babies, too, can be affected, as pre-eclampsia can result in premature birth or stillbirth. Babies who survive may experience long-term health impacts as well.

Trends in disability from maternal disorders

Women between the ages of 20 and 34 have the highest rates of disability from maternal hypertension. Improvements have been inconsistent over time, with substantial gains for women aged 25-29, but slightly less progress among women aged 20-24 and 30-34. In terms of geography, the 20 countries with the highest rates of disability from maternal hypertension in 2017 were all in sub-Saharan Africa. This pattern has changed very little since 1990.

Among the seven GBD world super-regions, sub-Saharan Africa had the highest rate* of disability due to maternal disorders in 2017, while Southeast Asia, East Asia, and Oceania had the lowest rate. At the country level, YLDs in South Sudan and Uganda were particularly high in 2017, driven largely by obstructed labor. Pakistan stood out among other countries in South Asia for its much higher rate of disability. Among high-income countries, a large portion of the YLD rate from maternal conditions was due to maternal hypertension.

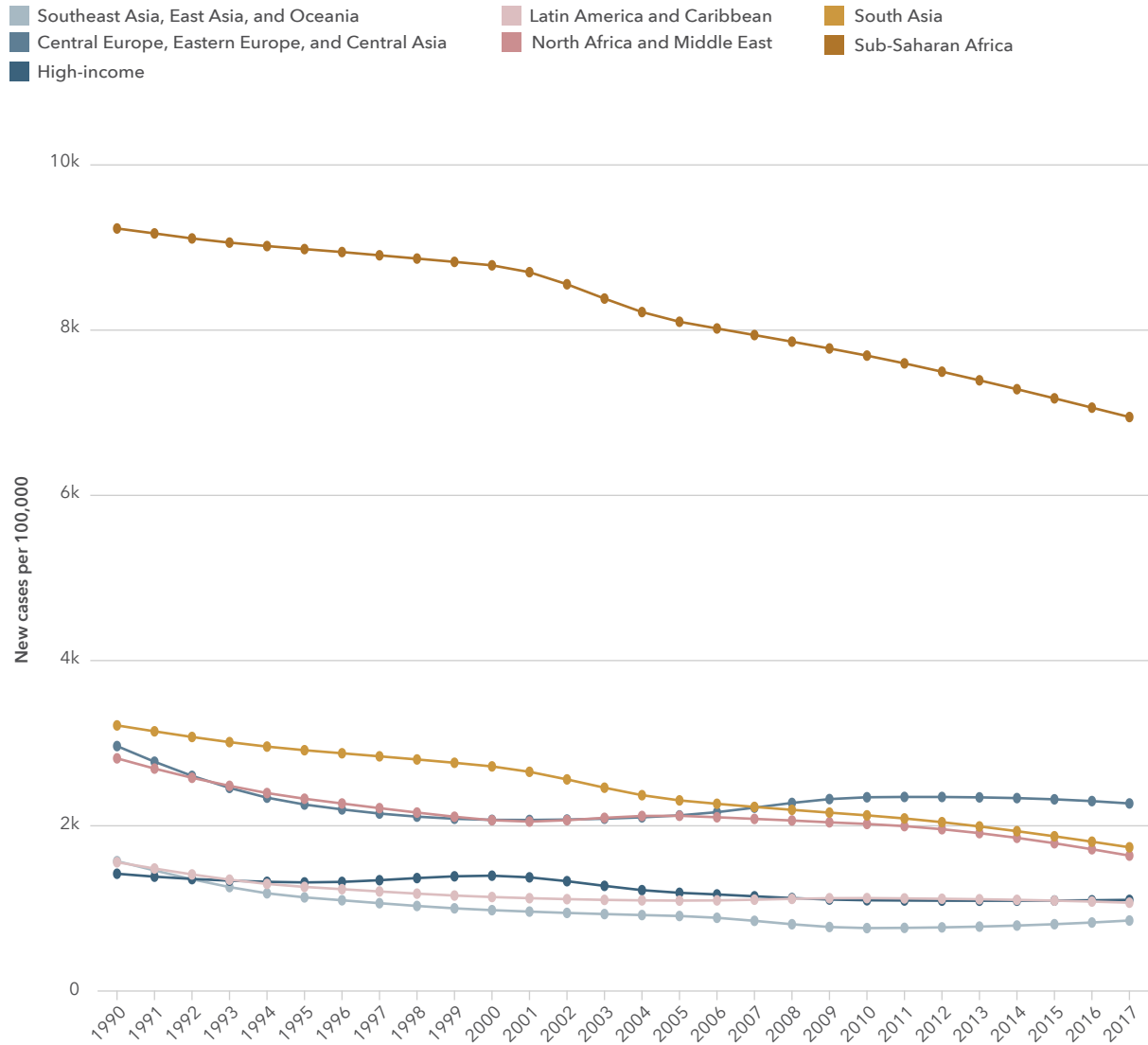
The largest health improvements from 1990 to 2017 for maternal disorders occurred in Bhutan (75.2% decrease in YLDs), Saudi Arabia (73.3%), Bangladesh (72.7%), Yemen (68.0%), and Rwanda (66.4%). The rate of YLDs increased in 14 countries, with the greatest increase in Samoa (38.6%).

While there has been a reduction in the burden of disability, the rate of new cases - or the incidence - of maternal disorders has been relatively steady over time. Figure 3 shows modest improvements in incidence rates in most super-regions, although sub-Saharan Africa has had a slightly steeper decrease, indicating greater gains.

**When comparing locations, age-standardized rates are used. Age-standardization is a statistical technique for comparing populations with different age structures, in which the characteristics of the populations are statistically transformed to match those of a reference population.*

FIGURE 3

INCIDENCE RATE OF MATERNAL DISORDERS, BY GBD SUPER-REGION, 1990-2017



Progress and challenges in maternal mortality

Globally, deaths associated with pregnancy and childbirth have decreased substantially since 1990, when 325,295 maternal deaths occurred. By 2017, this number was down to 193,639, a remarkable 40.5% decrease, despite a 42% increase in the world population between 1990 and 2017. Most of this decline occurred between 2000 and 2017, likely reflecting increased attention and funding for maternal health sparked by the United Nations' (UN) Millennium Development Goals, one of which focused on improving maternal health by 2015. Maternal deaths decreased by 5.6% between 1990 and 2000, compared with 37% between 2000 and 2017.

Opportunity: In 2017, over 80% of the world's maternal deaths occurred in only 30 countries (Figure 4). These included seven of the eight most populous countries globally: China, India, Indonesia, Brazil, Pakistan, Nigeria, and Bangladesh. Many of the others were in sub-Saharan Africa. This shows that targeted efforts in a relatively small number of countries and cultural contexts can have a massive impact on maternal death rates globally.

FIGURE 4

30 COUNTRIES WHERE OVER 80% OF ALL MATERNAL DEATHS OCCURRED IN 2017

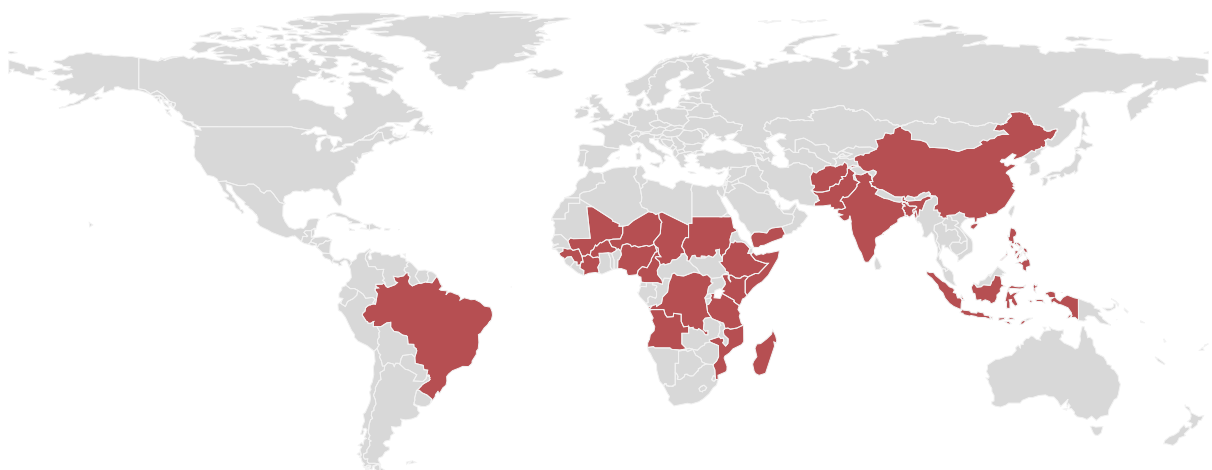
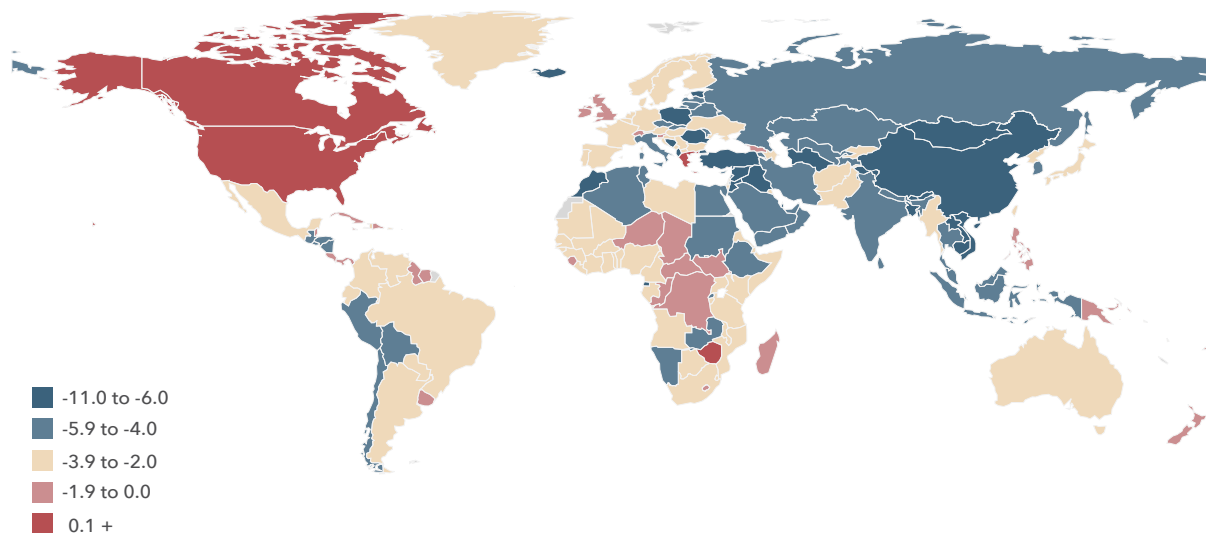


FIGURE 5

ANNUAL CHANGE IN RATE OF DEATHS FROM MATERNAL DISORDERS, 1990-2017



While maternal deaths decreased since 1990 in most countries, a few, including the United States, showed increases in the annualized rate of deaths from maternal disorders (Figure 5). In the US, this trend is thought to be related to women having children at older ages, when the risk of complications is higher. Generally low rates of serious pregnancy complications in the US may actually result in hospital staff being less prepared to handle them when they do occur.¹

Opportunity: The 2018 report *Building US Capacity to Review and Prevent Maternal Deaths*² noted that 60% of US maternal deaths are preventable with appropriate care. As part of that report, some of the steps to reach the right level of appropriate care included:

- Training providers on safe methods and medication during labor induction, including appropriate use of vacuum and forceps during delivery
- Enforcing policies related to obstetric hemorrhage
- Improving the documentation of abnormal test results in pregnant women
- Improving the assessment of risk factors during prenatal visits

A global target to end maternal mortality

The UN's Sustainable Development Goals (SDGs), introduced in 2015, aim to further improve the health of mothers. One of the SDG targets is to reach fewer than 70 maternal deaths per 100,000 live births globally by 2030. This metric is known as the maternal mortality ratio, or MMR. The MMR metric allows the global development community to compare and contrast how different countries are doing in relation to maternal health by taking into account the birth rates in each country. In 1990, globally, 238 women died for every 100,000 live births. Considerable policy attention and funding started to flow toward maternal health in the late 1990s and throughout the 2000s and 2010s, with the UN encouraging countries to achieve strong reductions in MMR. By 2017, MMR globally had decreased by 42%, to 139 deaths per 100,000 live births (Figure 6). While MMR has decreased considerably already, attaining the SDG target will take additional work due to the vast variation between countries. MMR ranged from 1.2 in Iceland to 588 in the Central African Republic in 2017 (Figure 7). That is a 490-fold difference between the two countries. By comparison, the death rates from all causes combined in those countries - 381 deaths per 100,000 population in Iceland and 2,145 deaths per 100,000 in the Central African Republic - varied by just six-fold.

FIGURE 6
GLOBAL MATERNAL MORTALITY RATIO, 1990-2017

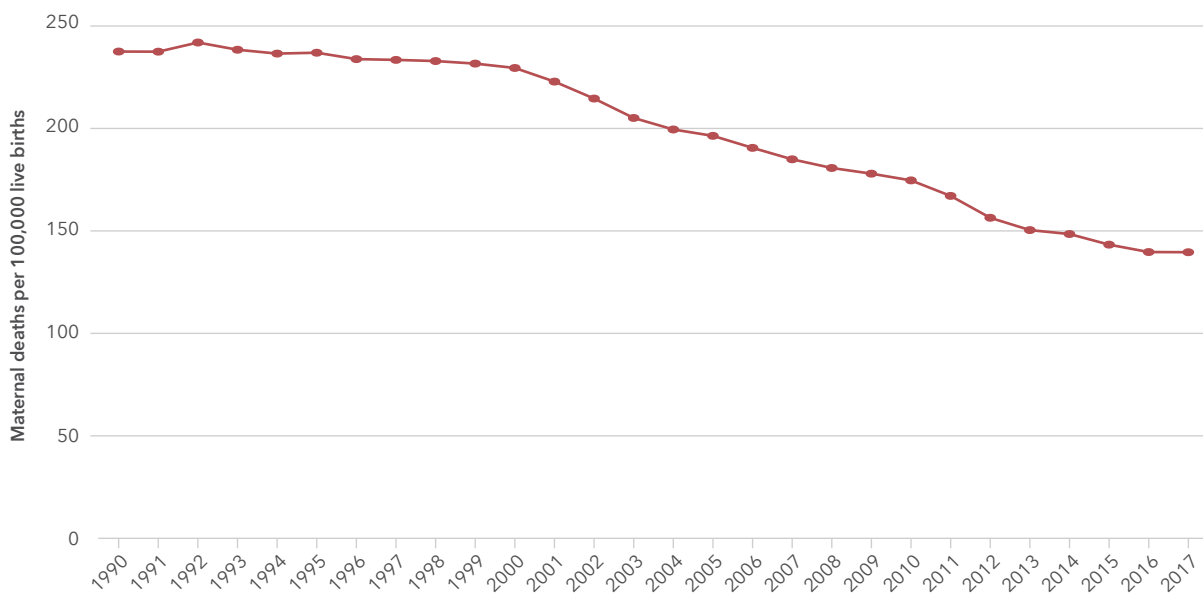
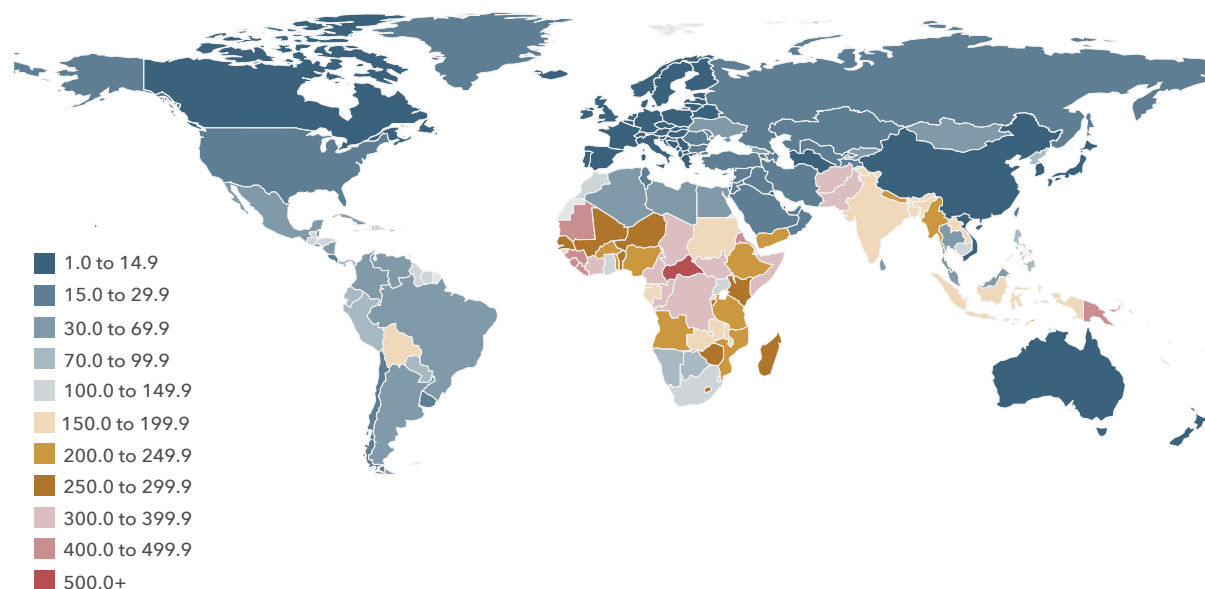


FIGURE 7

MATERNAL MORTALITY RATIO, 2017



Of the 195 countries and territories studied in the GBD 2017 study, 107 already had an MMR less than 70 (global target) in 2017. However, 32 had less than 1% annualized improvement in MMR from 1990 to 2017, and another 32 had increases in MMR over the same period, among them the US and Canada (Table 2).

TABLE 2

COUNTRIES WITH GREATEST INCREASES IN THE MATERNAL MORTALITY RATIO BETWEEN 1990 AND 2017

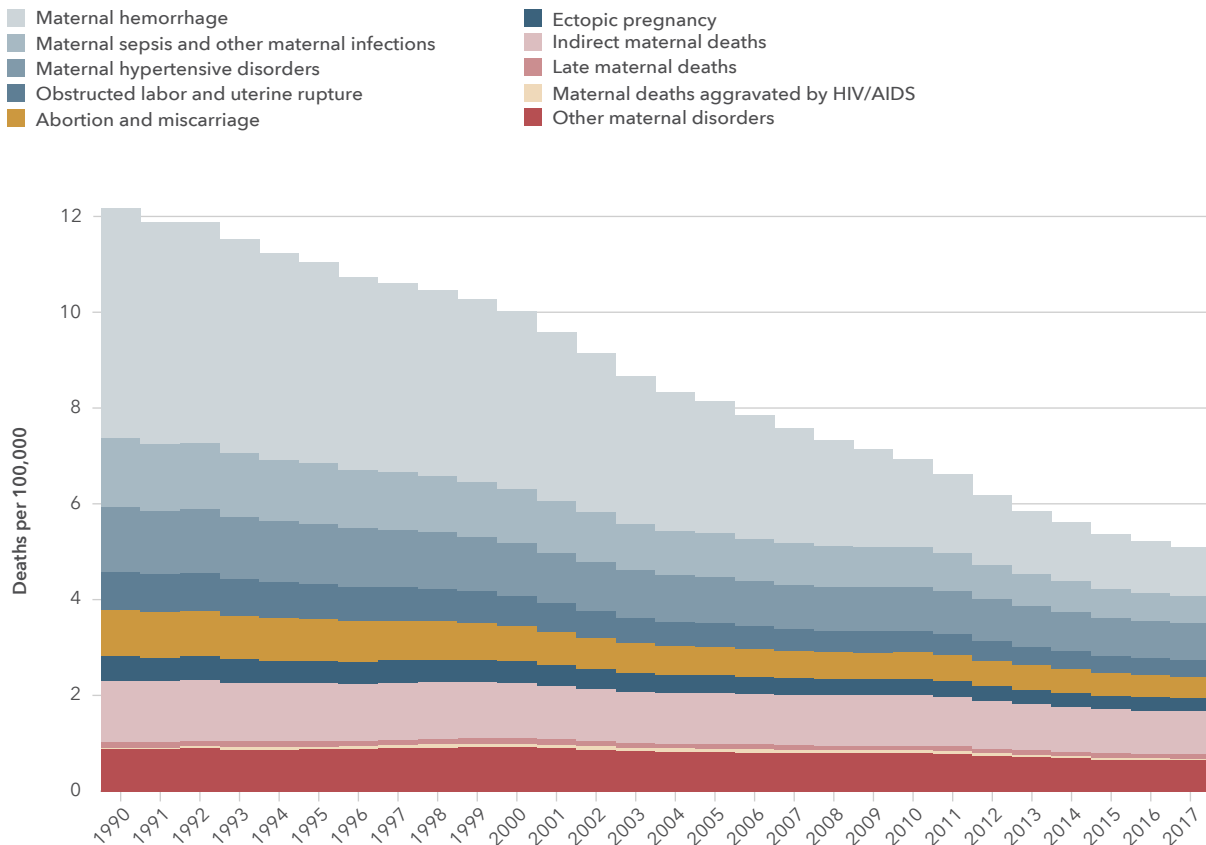
| Country | Annual % change in rate of maternal deaths per 100,000 live births, 1990-2017 |
|----------------------------------|---|
| Dominica | 3.4% |
| American Samoa | 3.0% |
| United States | 2.8% |
| Jamaica | 2.7% |
| Guam | 2.6% |
| Belize | 2.6% |
| Saint Vincent and the Grenadines | 2.5% |
| Grenada | 1.8% |
| Canada | 1.8% |
| Zimbabwe | 1.4% |

Estonia had the greatest improvement, with a decrease of 9.3% in the annualized rate of change in MMR between 1990 and 2017. China and Iraq were also among the top five countries in terms of improvement in MMR, with decreases of 7.2% and 7.1% , respectively.

Opportunity: Countries that have made substantial gains in decreasing MMR provide models to learn from when exploring strategies to accelerate progress in other countries. In the 2017 Goalkeepers Report,³ Kesete Admasu, former minister of health of Ethiopia, explained some of the elements that went into efforts to drive down MMR in his country. One of the biggest changes was encouraging women to deliver their children in facilities. It took a great deal of work to adapt public health messages to different cultural contexts within the country and then to implement the changes that community members suggested. “Now, religious leaders go to the health facility, so that a safer birth doesn’t mean a birth divorced from people’s culture,” wrote Admasu. “We also designed a new stretcher just for pregnant women. We opened maternity waiting homes where women in their third trimester can stay close to the facility while they wait to go into labor.”

FIGURE 8

GLOBAL DEATH RATE FROM MATERNAL CAUSES, 1990-2017



Identifying the leading causes of maternal deaths

Globally, the leading cause of maternal deaths was maternal hemorrhage from 1990 to 2017, although it also showed the greatest decline over this period, indicated by the large but narrowing light blue band in Figure 8. Death rates from maternal hemorrhage are especially high in lower-income countries, where rates of maternal deaths are also higher overall.

Opportunity: Tactics for preventing and treating maternal hemorrhage include identifying women at risk sooner, encouraging women to give birth at a health care facility or with a skilled attendant for active management of labor, and developing low-cost interventions that help reduce bleeding.⁴

Another major cause of deaths related to pregnancy and delivery is maternal sepsis,^{5,6} which results from a bacterial infection that occurs during or after pregnancy. The risk of sepsis is increased by other adverse events during pregnancy or childbirth, such as miscarriage, premature delivery, obstructed labor, or retained placenta after birth. However, the outcome depends greatly on whether a woman has access to health care.

Opportunity: Maternal sepsis can be identified typically when a woman begins to suffer from a fever during or after pregnancy. Sepsis can be effectively treated, usually with intravenous antibiotics. In terms of prevention, handwashing is critical for both the mother and her birth attendants or health care providers to prevent the spread of bacteria. Women who have just given birth can also decrease their risk by bathing regularly. It follows that in parts of the world where clean water is not readily available, the risk of sepsis is higher.

The maternal death rate from sepsis decreased from 1.43 deaths per 100,000 population in 1990 to 0.56 in 2017, a 61% decline. Much of this improvement is attributed to better hygiene and effective antibiotics.

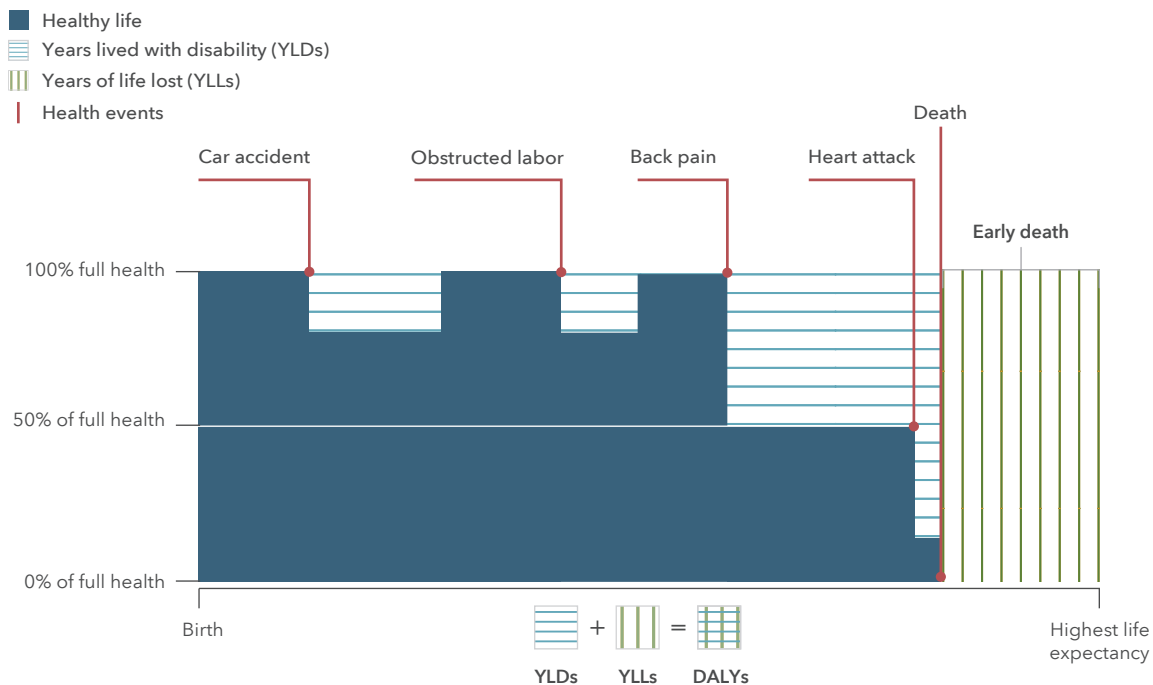
Declining fertility rates are a major driver of decreases in maternal deaths, and as shown in Figure 8, mortality rates from most individual causes lessened over time as well. Overall, these decreases were large enough to offset increases related to population growth (more births, and therefore more chances for a maternal death) and a greater number of women giving birth at older ages.

Focusing on healthy lives for mothers

One aim of the GBD study is to make results comparable across countries, age groups, and time. This is done by using disability-adjusted life years, or DALYs. DALYs are the sum of years lost to premature death and years lived with illness and injury. One DALY represents one lost year of healthy life (Figure 9).

FIGURE 9

UNDERSTANDING DISABILITY-ADJUSTED LIFE YEARS (DALYs)

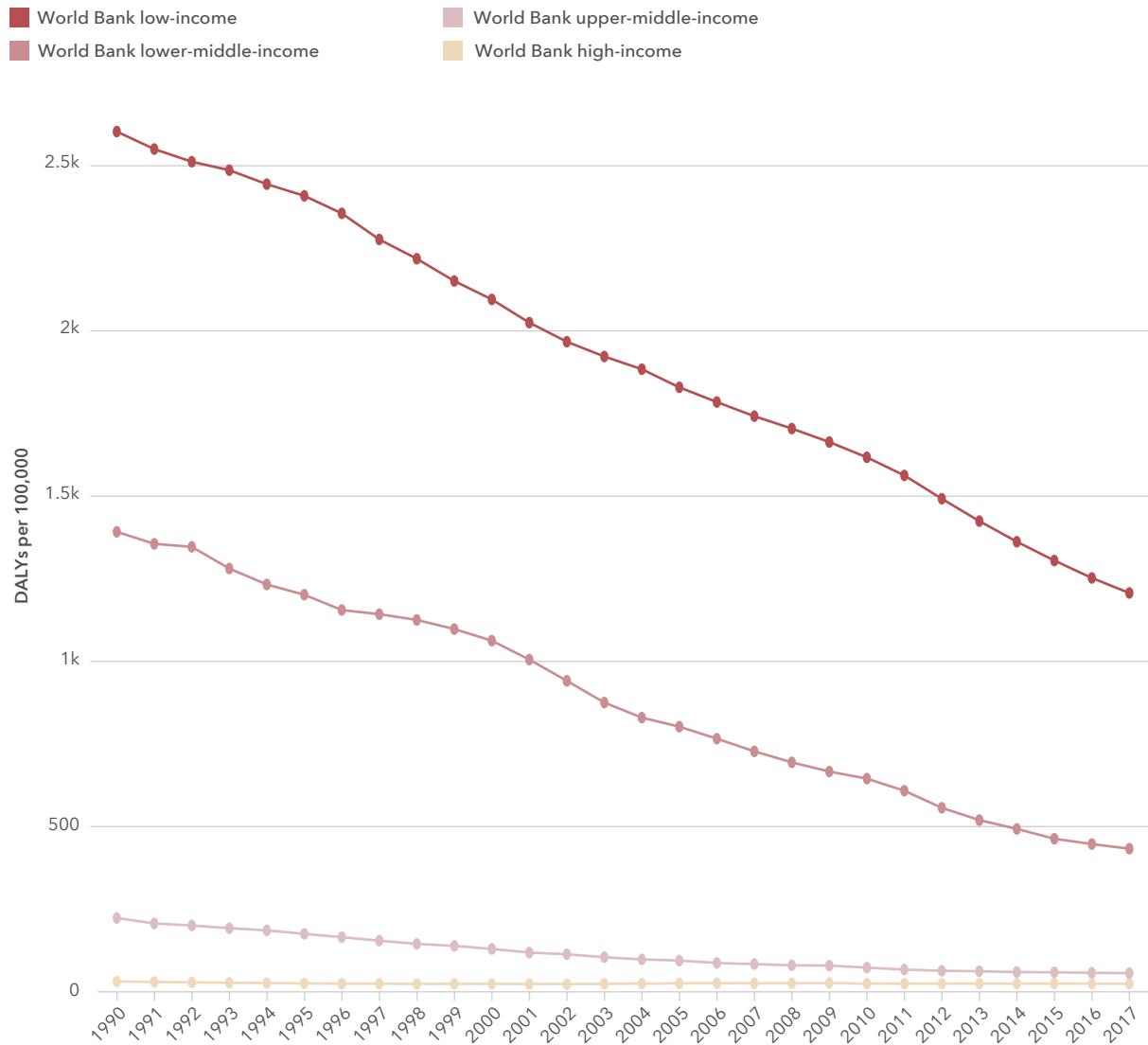


The DALY metric reveals which conditions are responsible for the greatest total health loss in a region or country, allowing policymakers to focus population health efforts more effectively. We have seen an overall improvement in the health and longevity of women since 1990, with declines in the rate of maternal disease burden in all but a handful of countries. Economic status is a useful lens through which to observe the pattern of progress in maternal health. Maternal DALY rates stratified by countries' economic status are visible in Figure 10.

Since 1990, more dramatic gains in reducing maternal disease burden have been made overall in low-, lower-middle-, and upper-middle-income countries. By comparison, improvements in maternal health in high-income countries have been slower. A main factor contributing to this phenomenon is the substantial decrease in maternal deaths in the lower-income countries.

FIGURE 10

MATERNAL DALY RATE BY WORLD BANK INCOME GROUP, 1990-2017



Looking at the seven GBD super-regions, the highest DALY rates due to maternal disorders are in sub-Saharan Africa and the second highest in South Asia (Figure 11). Some countries have made substantial improvements since 1990, including China, which had a 90% absolute decrease in the rate of overall burden of disease due to maternal disorders between 1990 and 2017. While the rate of DALYs due to maternal disorders in sub-Saharan Africa is the highest of the regions, country efforts within the region are evident.

FIGURE 11

DALY RATE OF MATERNAL CAUSES BY GBD SUPER-REGION, 2017

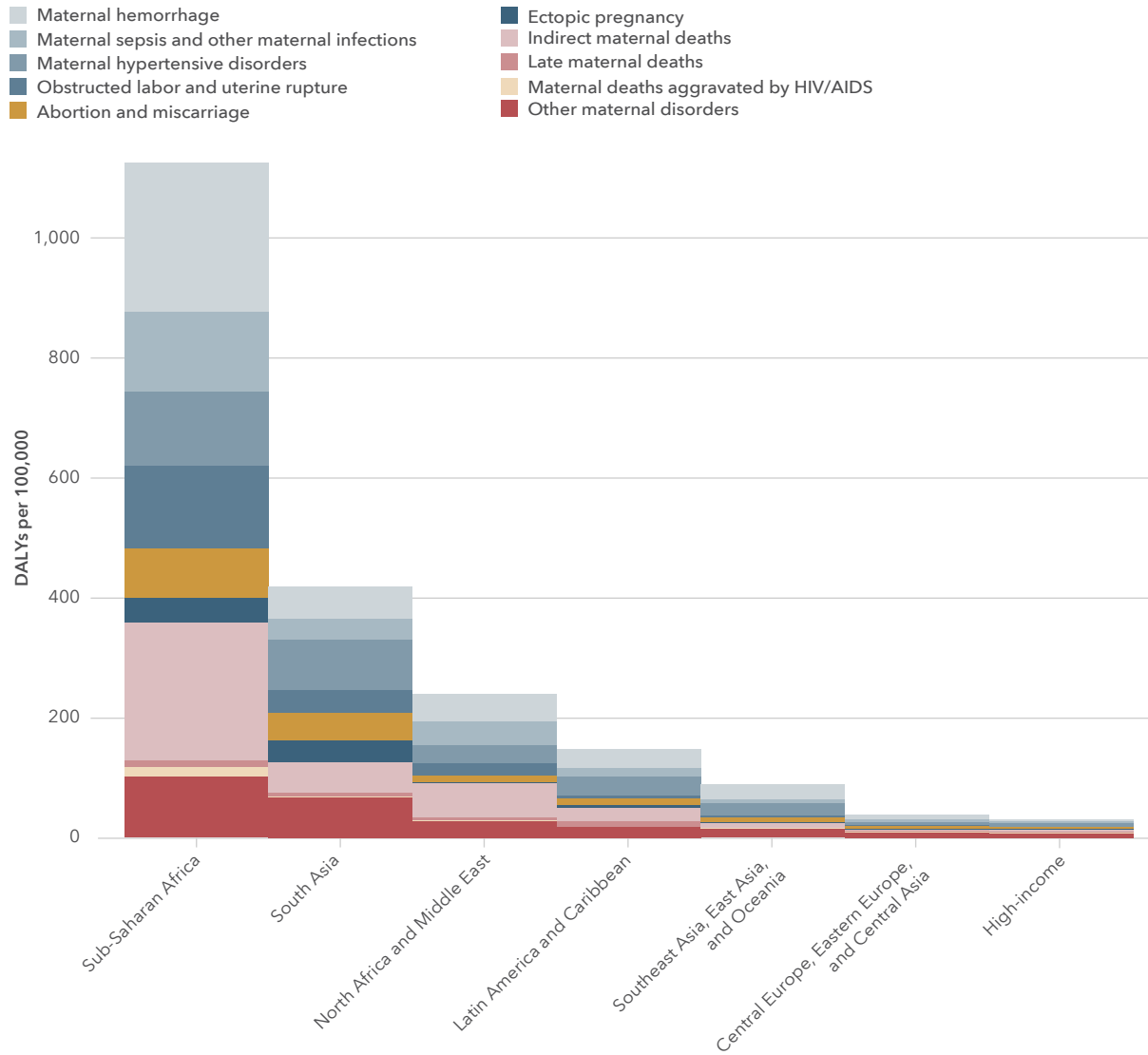


Figure 12 highlights progress in sub-Saharan Africa as a whole and for two exemplar countries: Ethiopia and Equatorial Guinea. Ethiopia’s efforts are clearly evident, with a 75% absolute decrease in the rate of maternal DALYs between 1990 and 2017, and Equatorial Guinea’s progress was even greater, with an 83% decrease. It is important to note, however, that the rate of decrease for sub-Saharan Africa includes the decrease in both countries, and Ethiopia is very populous. Figure 13 provides a more detailed breakdown of Ethiopia’s maternal burden by displaying DALYs by cause. Continued progress in countries such as these where overall burden is high will continue to make a global impact in the effort to save more women. At the same time, other countries – including the US – have experienced relatively large increases in maternal disease burden.

FIGURE 12

DALY RATE FOR ALL MATERNAL CAUSES IN SUB-SAHARAN AFRICA, EQUATORIAL GUINEA, AND ETHIOPIA, 1990-2017

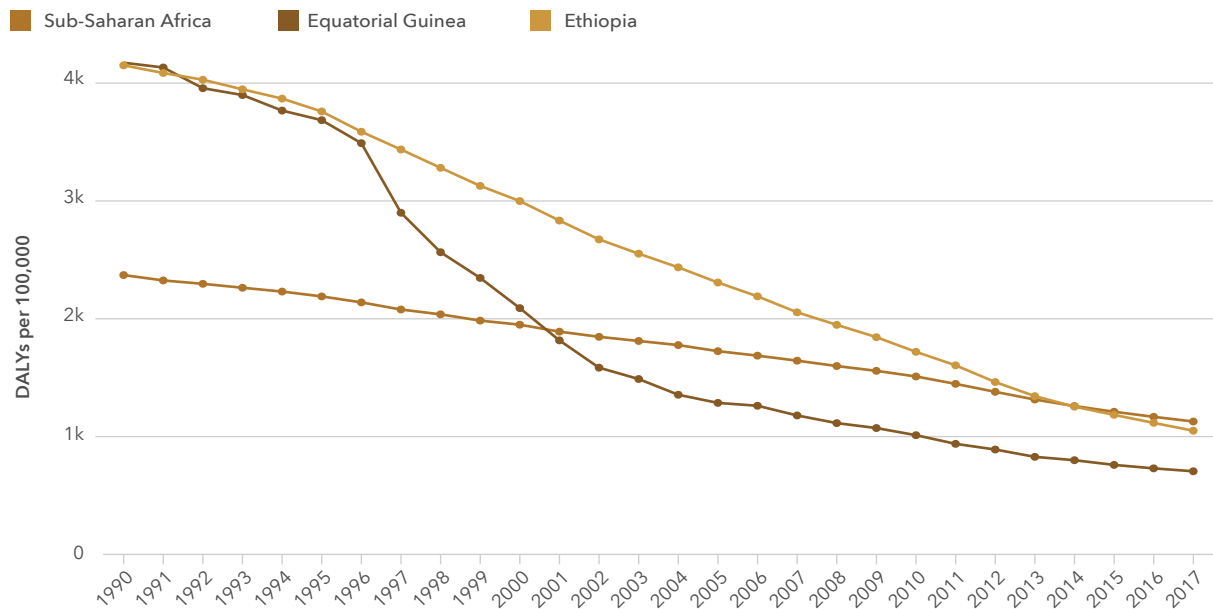
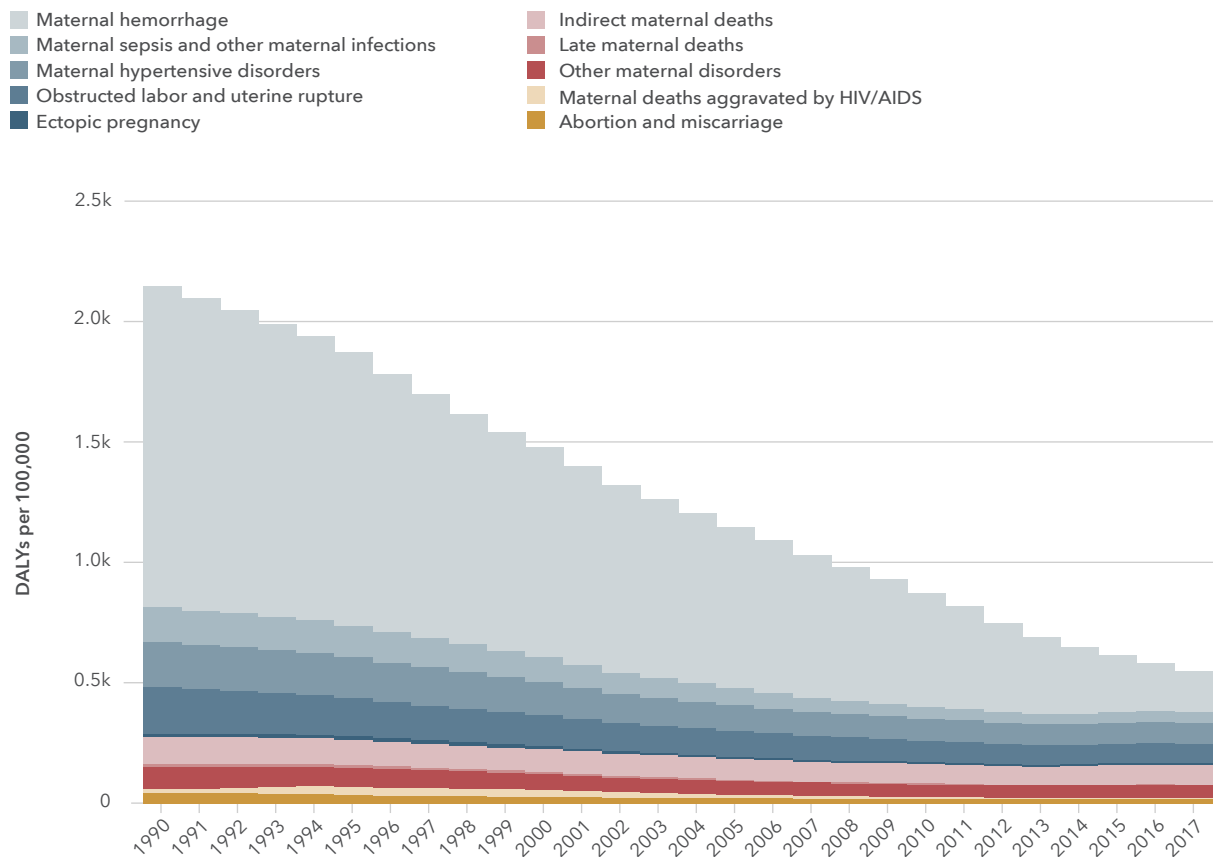


FIGURE 13

DALY RATE BY MATERNAL CAUSE IN ETHIOPIA, 1990-2017

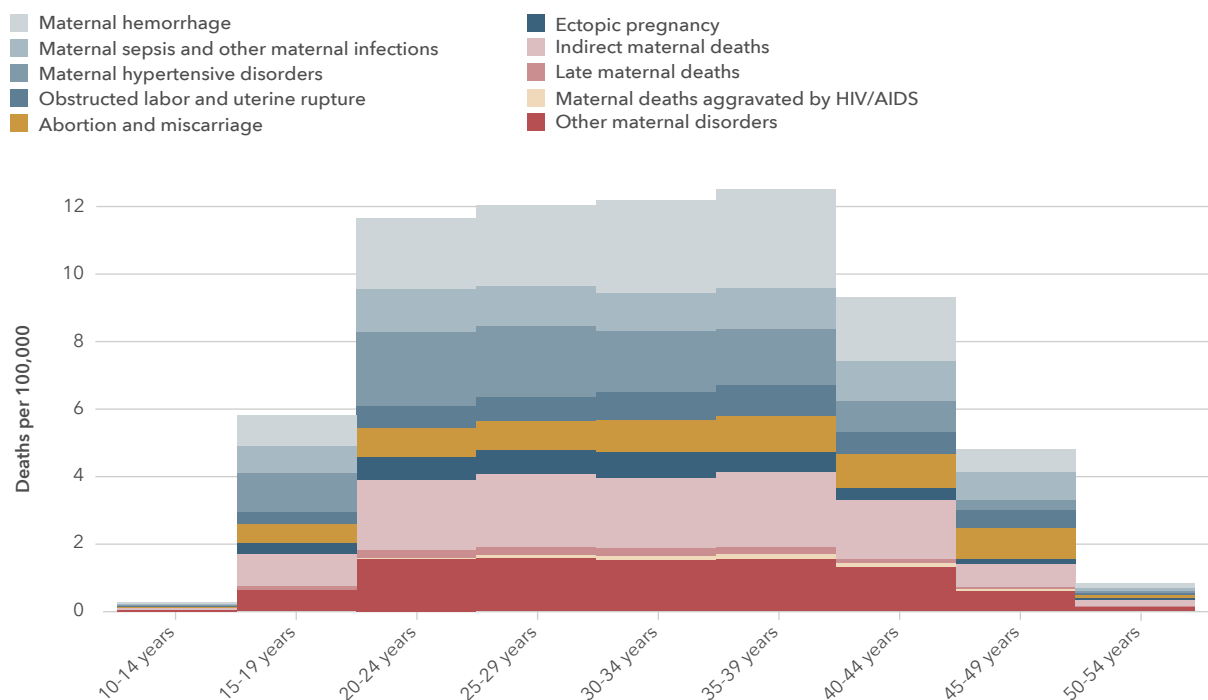


How maternal complications vary by age

In terms of rates of death, disability (YLDs), and total health loss (DALYs) due to maternal disorders, the overall patterns by age groups are similar. In 2017, the death rate from maternal causes was highest in the 35 to 39 age group, while the rate of disability (YLDs) due to maternal causes was greatest in ages 25 to 29. Maternal DALY rates were highest among women between the ages of 20 and 39, with a fairly steep decline in those over 40.

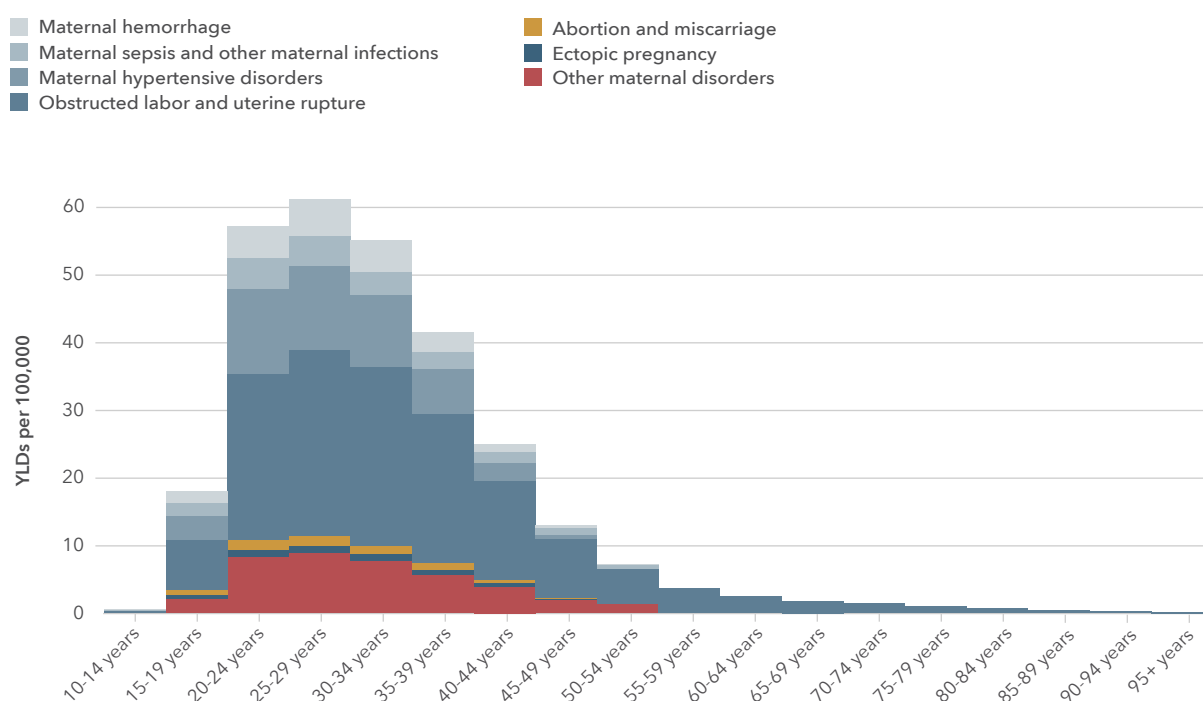
Looking more closely at maternal death rates (Figure 14), the leading causes in women and girls under 25 in 2017 were maternal hypertension, indirect maternal deaths, and maternal hemorrhage. For ages 25 to 39 years, the top causes were maternal hemorrhage, indirect maternal deaths, and maternal hypertension. For the 40 to 44 group, maternal hemorrhage, indirect maternal deaths, and other maternal disorders were the top three. For women 45-49 years, the leading causes were abortion and miscarriage, maternal sepsis, and indirect maternal deaths. And among ages 50 to 54 the top three were indirect maternal deaths, maternal hemorrhage, and other maternal disorders.

FIGURE 14
GLOBAL MATERNAL DEATHS BY CAUSE AND BY AGE GROUP, 2017



Globally, disability (YLDs) from maternal causes begins in the 10-14 age group and can affect women throughout the rest of their lives. As seen in Figure 15, obstructed labor and uterine rupture was the leading cause of disability throughout all age groups and the only cause contributing to ill health extending into ages beyond 55. In women ages 15 to 39, maternal hypertension was the second-leading cause, and other maternal disorders was third. For women ages 40 to 44, other maternal disorders is second and maternal hypertension ranked third. In the 45 to 54 age groups, maternal sepsis was third.

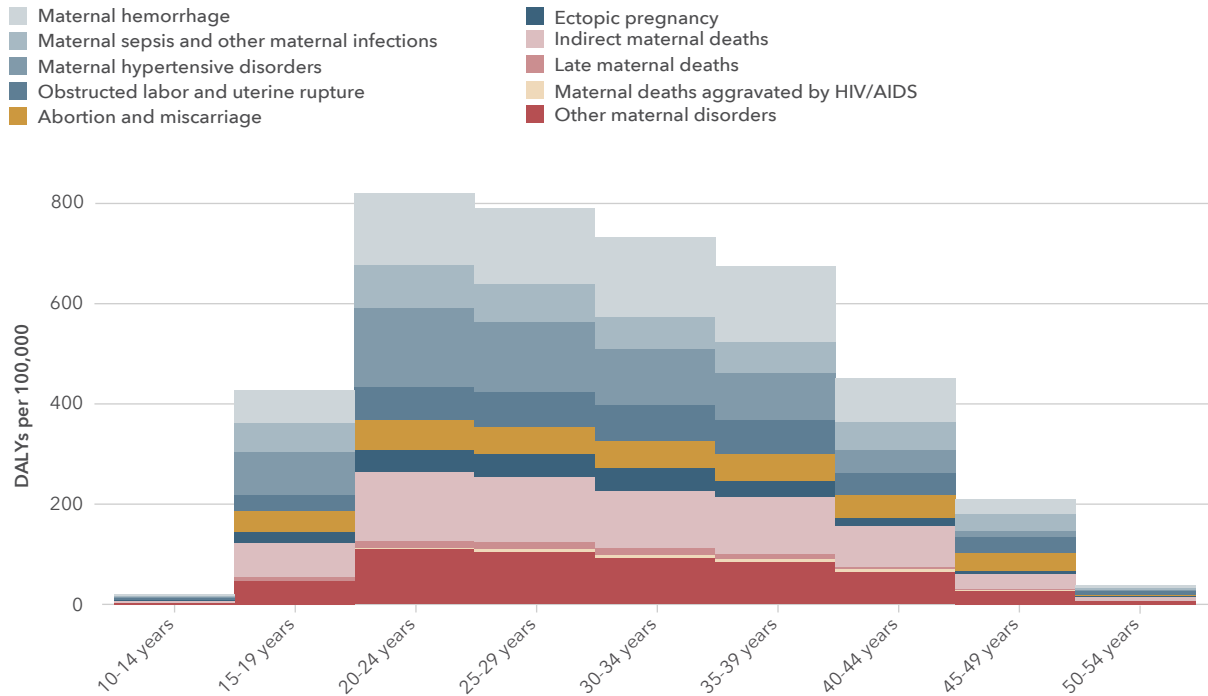
FIGURE 15
GLOBAL MATERNAL YLDs BY CAUSE AND BY AGE GROUP, 2017



Combining death and disability into DALYs (Figure 16), the three conditions causing the highest rates of healthy life lost for women ages 10 to 39 (in varying order within each 5-year age grouping: 10-14, 15-19, etc.) were maternal hemorrhage, maternal hypertension, and indirect maternal deaths. The one exception to this was in the 10-14 age group, where obstructed labor and uterine rupture was in the top three leading causes and maternal hypertension was not. For women ages 40 to 44, maternal hemorrhage was first, followed by indirect maternal deaths and other maternal disorders. In the 45 to 49 age group, abortion and miscarriage were number one, followed by maternal sepsis, and finally obstructed labor and uterine rupture. Among women ages 50 to 54, obstructed labor was first, indirect maternal deaths second, and other maternal disorders third.

FIGURE 16

GLOBAL MATERNAL DALYs BY CAUSE AND BY AGE GROUP, 2017



Opportunity: Understanding what may cause death or disability at different ages may help women and providers prevent and treat these causes earlier. According to an article in *JAMA*¹ in 2019, the California Medical Quality Care Collaborative, based at Stanford University, took the age of mothers into account in recommending best practices for health care providers. One example is teaching providers to recognize that maternal hemorrhage will present itself differently in women at different ages. “The physiology of pregnancy can make it much harder to recognize when a patient is in trouble,” Dr. Barbara Levy, vice president of health policy at the American College of Obstetricians and Gynecologists told *JAMA*. “Young healthy women don’t show us classic signs of bleeding.”

High income but worsening outcomes

In general, higher-income countries have more resources to devote to health care and disease prevention, and their populations have a lower burden of diseases classified as communicable, maternal, neonatal, and nutritional. These conditions are largely preventable with vaccines, routine health care, and sufficient high-quality food, or can be effectively treated with medications such as antibiotics, or higher-intensity interventions when needed, such as blood transfusions.

In the US, spending on health care is among the highest in the world: in 2016, the average per person spending exceeded \$10,000.⁷ However, after holding relatively steady from 1990 to 1998 (with the lowest point in 1992, at 13.7 deaths per 100,000 live births), MMR in the US began to increase, up to a high of 32.1 in 2015. The rate of disability from maternal disorders has decreased slightly, from 5.2 YLDs per 100,000 population in 1990 to 3.9 in 2017, but maternal DALYs have increased over the same period, driven by the higher death rates and therefore more years of life lost.

Figure 17 illustrates that in terms of individual maternal causes, increases in death rates occurred between 1990 and 2017 for other maternal disorders, late maternal deaths, indirect maternal deaths, maternal hypertension, maternal sepsis, obstructed labor and uterine rupture, and maternal deaths aggravated by HIV/AIDS.

FIGURE 17
MATERNAL CAUSES OF DEATH IN THE US RANKED BY RATE, WITH PERCENTAGE CHANGE IN RATE, 1990-2017

| | 1990 rank | 2017 rank | Percentage change |
|---|-----------|-----------|-------------------|
| Other maternal disorders | 1 | 1 | 108.1% |
| Abortion and miscarriage | 2 | 5 | -17.3% |
| Late maternal deaths | 3 | 2 | 77.0% |
| Maternal hypertensive disorders | 4 | 4 | 36.4% |
| Maternal hemorrhage | 5 | 7 | -16.6% |
| Indirect maternal deaths | 6 | 3 | 236.3% |
| Ectopic pregnancy | 7 | 8 | -54.4% |
| Maternal sepsis and other maternal infections | 8 | 6 | 38.5% |
| Obstructed labor and uterine rupture | 9 | 9 | 79.1% |
| Maternal deaths aggravated by HIV/AIDS | 10 | 10 | 150.6% |

Opportunity: Identifying the underlying factors contributing to worsening maternal health outcomes in the US can help improve care and create policies that address and reverse worrisome trends. The major factors are disparities in income and access to the highest-quality health care. Women who cannot afford health care or insurance may have pregnancy complications that go unrecognized or untreated. Nutrition during pregnancy can also be compromised if women cannot afford adequate healthy food. Education level and race may contribute to health disparities as well. And women who become pregnant at older ages or who have chronic co-morbidities such as obesity are at much higher risk for adverse outcomes.

Preventing deaths and disability from maternal conditions

Making pregnancy and childbirth safer is an attainable goal: many maternal conditions are preventable or treatable. Better nutrition and access to quality health care during pregnancy have a considerable positive influence on maternal health. Ensuring that mothers all over the world can receive prenatal and postpartum care, as well as give birth in a safe place with skilled attendants, will help reduce the burden of maternal disorders.

A number of interventions⁸ are being successfully implemented in high-income settings to improve health during pregnancy and delivery. One of these is called “safety bundles,” which consist of protocols for health care professionals to address specific causes of maternal health loss. For example, a hospital might conduct a patient risk assessment and have a trained team and a supply kit ready to handle maternal hemorrhage.

Quantitative risk assessments also may help patients receive more appropriate care. Instead of estimating a woman’s blood loss, a nurse might weigh blood-soaked sponges to gather more reliable data, for example.

A more challenging but important area to address are issues that disproportionately affect racial and ethnic minorities. These include higher rates of certain health conditions – for example, black women in the US are more likely to experience obesity, diabetes, and high blood pressure. Women from minority groups may be more likely to deliver babies at lower-quality health facilities, increasing the risk of complications for themselves and their babies.

Data collection in general is important for maternal health. Surveillance systems can help pinpoint which deaths or other adverse events could have been preventable, so that standards of care can be improved. Having more data on births, deaths, and complications that occur in lower-income countries can help reveal trends and disparities both among and within countries. This, in turn, could allow policymakers to better target funding and interventions.

Research is currently underway to identify the specific modifiable risk factors that contribute to maternal disorders. Researchers intend to develop these risk analyses over time and bring them into the GBD study as the evidence warrants. The goal is for this new information to guide resource allocation, development of medical technologies and interventions, and ultimately, promote further improvements in maternal health.

Conclusion

Substantial strides have been made in maternal health over the last three decades, but there are still multiple opportunities for further improvement, particularly for conditions that cause long-term disability. Most maternal disorders are treatable if women have access to appropriate prenatal care, skilled birth attendants, and post-natal follow-up. Medications and surgical interventions that are routinely used in high-income countries can prevent long-term complications following pregnancy and childbirth, and these could be made more readily available in lower-income countries.

Since the majority of deaths from maternal conditions occur in a relatively small number of countries, targeted efforts in these places could make a big difference. Countries that have made tremendous progress, like Ethiopia, can be used as models to guide others in developing new strategies to improve outcomes for mothers that will work within their cultural context.

Health care providers can be better trained to assess warning signs of pregnancy complications and to document their findings. Awareness of the types of issues that are likely to occur in women of different ages – and what those complications will look like – is also important. Low-cost tools for hemorrhage and other emergencies that can be used in low-resource settings are being developed, and further opportunity exists in this realm as well.

There is increasing awareness that complex social problems such as income inequality and racial disparities have spillover effects on disease prevention, treatment, and prognosis. Making sure all mothers have access to services, proper nutrition during pregnancy, skilled birth attendants, and post-natal care will go a long way toward making pregnancy safer worldwide.

On the research side, gathering more data, especially from low-income countries, will help illuminate which countries or subnational areas are doing well and which are being left behind. The ability to determine how specific modifiable risk factors affect pregnancy outcomes can help prevent deaths and disabling illnesses.

Improving health for mothers will have a lasting impact on their lives and the lives of their children and will change the world for the better.

Annex

Maternal disorders defined

| Maternal disorder | Definition |
|--|--|
| Abortion and miscarriage | Induced abortion by a health care provider or as a complication of a miscarriage. |
| Ectopic pregnancy | When the fertilized egg implants somewhere other than the uterus, most commonly in the fallopian tubes. |
| Indirect maternal deaths | Deaths due to pre-existing conditions made worse by pregnancy. |
| Maternal deaths aggravated by HIV/AIDS | Deaths where the cause of death is pregnancy aggravated by HIV/AIDS. |
| Maternal hemorrhage | Any hemorrhage during pregnancy, of any volume, or postpartum hemorrhage with blood loss of at least 500 mL (just over two cups). |
| Maternal hypertensive disorders (includes severe pre-eclampsia and eclampsia) | High blood pressure during pregnancy in women who did not already have hypertension, or pre-eclampsia in women with pre-existing hypertension. |
| Maternal sepsis | Any infection, or complication from an infection, experienced by a mother. |
| Obstructed labor and uterine rupture | Ruptured uterus, prolonged labor greater than 24 hours, baby's head is too large to travel through the pelvis, or baby is born in a breech position (bottom-first) requiring an intervention like a C-section. |
| Other direct maternal disorders | All other direct maternal disorders, including anemia in pregnancy, gestational diabetes, and embolism. |
| Other maternal infections | Any infection, or complication from an infection, experienced by a mother. |

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