Levels & Trends in

Child Mortality

Report 2020

Estimates developed by the UN Inter-agency Group for Child Mortality Estimation

unicef World Health Organization WORLD BANK GROUP

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CHILD SURVIVAL: KEY FACTS AND FIGURES

- Despite dramatic reductions in child and youth mortality over the last 30 years—under-five mortality has dropped by almost 60 per cent since 1990—the global burden of child and youth deaths remains immense. In 2019 alone, 7.4 (7.2, 7.9) million[1] children, adolescents and youth died mostly of preventable or treatable causes.

- In 2019, globally, 70 per cent of deaths among children and youth under 25 years of age occurred among children under 5 years of age, accounting for 5.2 (5.0, 5.6) million deaths. Among under-five deaths, 2.4 million (47 per cent) occurred in the first month of life, 1.5 million (28 per cent) at age 1–11 months, and 1.3 million (25 per cent) at age 1–4 years. An additional 2.2 (2.2, 2.4) million deaths occurred among children and young people aged 5–24 years in 2019, 43 per cent of which occurred during the adolescent period, ages 10–19.

- The global under-five mortality rate fell to 38 (36, 41) deaths per 1,000 live births in 2019 from 93 (92, 95) in 1990 and 76 (75, 77) in 2000 – a 59 (56, 61) per cent and 50 (46, 52) per cent decline, respectively. In 2019, the neonatal mortality rate fell to 17 (17, 19) deaths per 1,000 live births from 37 (36, 38) in 1990 and 30 (30, 31) in 2000 – a 52 (48, 55) per cent and 42 (37, 45) per cent decline, respectively.

- Among children and young people under 25 years of age, the risk of dying was highest in the first month of life, at an average rate of 17 (17, 19) deaths per 1,000 live births globally in 2019. In comparison, the probability of dying after the first month and before reaching age 1 was 11 (10, 12) per 1,000 and the probability of dying after reaching age 1 and before reaching age 5 was 10 (9, 11) per 1,000.

- For children, adolescents and youth aged 5–24 years, the probability of dying is lowest for young adolescents aged 10-14. Meanwhile, the risk of dying at any age 5-24 is lower than for children under 5 years of age. The probability a five-year-old would die before reaching age 10 was 4 (4, 4) deaths per 1,000; the probability a 10-year-old would die before reaching age 15 was 3 (3, 4) deaths per 1,000; the probability a 15-year-old would die before reaching age 20 was 5 (5, 5) deaths per 1,000; and the probability a 20-year-old would die before reaching age 25 was 6 (6, 7) deaths per 1,000. The probability of dying after reaching age 5 and before reaching age 25 was 18 (17, 19) deaths per 1,000 in 2019, down from 31 (31, 33) deaths in 1990.

- The global number of under-five deaths dropped to 5.2 (5.0, 5.6) million in 2019 from 12.5 (12.3, 12.7) million in 1990. On average, 14,000 children died before age 5 every day in 2019 compared to 34,000 in 1990 and 27,000 in 2000. Among the 5.2 million under-five deaths in 2019, 2.8 (2.7, 3.0) million were boys and 2.4 (2.3, 2.6) million were girls.

- About 6,700 newborns died every day in 2019. The global number of neonatal deaths declined from 5.0 (4.9, 5.2) million in 1990 to

2.4 (2.3, 2.7) million in 2019, while neonatal deaths accounted for a larger share of under-five deaths over time due to a faster global decline in mortality among children aged 1–59 months compared to children in their first month of life. In 2019, 47 (45, 49) per cent of all under-five deaths occurred in the neonatal period, up from 40 (39, 41) per cent in 1990.

- Children continue to face widespread regional disparities in their chances of survival. Sub-Saharan Africa remains the region with the highest under-five mortality rate in the world. In 2019, the region had an average under-five mortality rate of 76 (71, 87) deaths per 1,000 live births. That is equivalent to 1 child in 13 dying before reaching age 5. This rate is 20 times higher than that of 1 in 264 in the region of Australia and New Zealand and two decades behind the world average, which achieved a 1 in 13 rate by 1999.

- The persistent and overwhelming burden of deaths among children and youth highlights the urgent need to further accelerate progress in preventing child deaths. Current trends predict that close to 23 million 5-to-24-year-olds and 48 million children under 5 years of age will die between 2020 and 2030. Almost half of these under-five deaths will be newborns whose deaths can be prevented by reaching high coverage of quality antenatal care, skilled care at birth, postnatal care for mother and baby, and care of small and sick newborns.

- In 2019, 122 countries had already achieved an under-five mortality rate below the Sustainable Development Goal (SDG) target of 25 or fewer deaths per 1,000 live births. Those countries should aim to maintain progress and further reduce disparities among their populations. Of the remaining 73 countries, progress will need to be accelerated in 53 to reach the SDG target by 2030. Even more countries are projected to miss the neonatal mortality target by 2030—more than 60 countries will need to accelerate progress to reach the SDG neonatal mortality target on time.

- If all countries reach the SDG child survival targets by 2030, 11 million lives under age 5 will be saved—more than half of them in sub-Saharan Africa.

Introduction

At the time of writing, the novel coronavirus pandemic had reached every region of the world, with millions of infections globally and untold disruptions to nearly every aspect of daily life. Among the many difficult realities underscored by this pandemic and other life-threatening epidemics before it, such as HIV, is the precarious nature of mortality gains. Years of progress brought about by concerted action and resource delivery can be undone by inaction or indirect disruptions to care during a single protracted crisis.

While the extent and severity of the mortality impact of COVID-19 on children and youth is still unknown, the potential of a mortality crisis in 2020 threatens years of remarkable improvement in child and adolescent survival from 1990 to 2019, the period covered in this report. The global under-five mortality rate declined by almost 60 per cent from 93 deaths per 1,000 live births in 1990 to 38 deaths in 2019. Meanwhile, mortality among adolescents aged 10–19 fell from 13 deaths per 1,000 adolescents aged 10 in 1990 to 8 deaths in 2019—a 39 per cent decrease. Even with that progress, some 5.2 million children died before reaching their fifth birthday in 2019 alone. Tragically, many of those children died of preventable or treatable conditions.

Even before COVID-19 captured the world's attention and highlighted just how tenuous mortality decline can be, it was well understood that maintaining progress and saving even more lives would require mobilization of resources and monitoring. That understanding led to the inclusion of child survival goals in numerous global initiatives including the United Nations Global Strategy for Women's Children's and Adolescents' Health (2016-2030)[2] and the Sustainable Development Goals (SDGs).[3] The SDGs call for ending preventable deaths of newborns and children under age 5, with all countries aiming to have a neonatal mortality rate of 12 or fewer deaths per 1,000 live births and an under-five mortality rate of 25 or fewer deaths per 1,000 live births by 2030.

If the child survival targets are to be met on time, resources and policy must be geared toward not only sustaining current rates of decline but also accelerating progress, which would save millions of lives. If the trends from 2010 to 2019 continue, 53 countries will not meet the SDG target on under-five mortality on time—if all countries were to meet that target, 11 million under-five deaths would be averted from 2020 to 2030. Achieving the child survival goals and heading off a reversal of progress in child survival in 2020 will require universal access to effective, high-quality and affordable care and the continued, safe provision of life-saving interventions for women, children, and young people.

While the full extent of the coronavirus pandemic on child and youth mortality is yet to be understood, it is already possible to anticipate the impacts and lay the foundation for tracking and responding to them. If we are to comprehend the true toll of this pandemic on child mortality and to continue to effectively monitor progress toward global goals, it is crucial to understand the prevailing levels and trends in child mortality. Reliable estimates of child, adolescent and youth mortality at the national, regional and global levels are essential for evidence-based policymaking to improve the chances of survival of the world's children in the face of a global pandemic.

In the absence of reliable and continually collected vital registration data—the preferred

source for monitoring vital events—evidence-based estimation of child mortality remains indispensable for monitoring child mortality levels and progress towards child survival goals. The United Nations Inter-agency Group for Child Mortality Estimation (UN IGME) produces estimates of child and adolescent mortality annually, reconciling the differences across data sources and taking into account the systematic biases associated with the various types of data on child and adolescent mortality. This report presents the UN IGME's latest estimates – through 2019 – of neonatal, infant and under-five mortality as well as mortality among children and young adolescents aged 5–14 years. This report also presents the inaugural set of mortality estimates among youth aged 15–24. It assesses progress in the reduction of child, adolescent and youth mortality at the country, regional and global levels, and provides an overview of the methods used to estimate the indicators mentioned above. The estimates and analysis presented in this report provide the foundation for monitoring changes in mortality, including the impact of the COVID-19 pandemic, which itself serves as a call for further disaggregated data as evidence of the differential impact of the virus emerges.

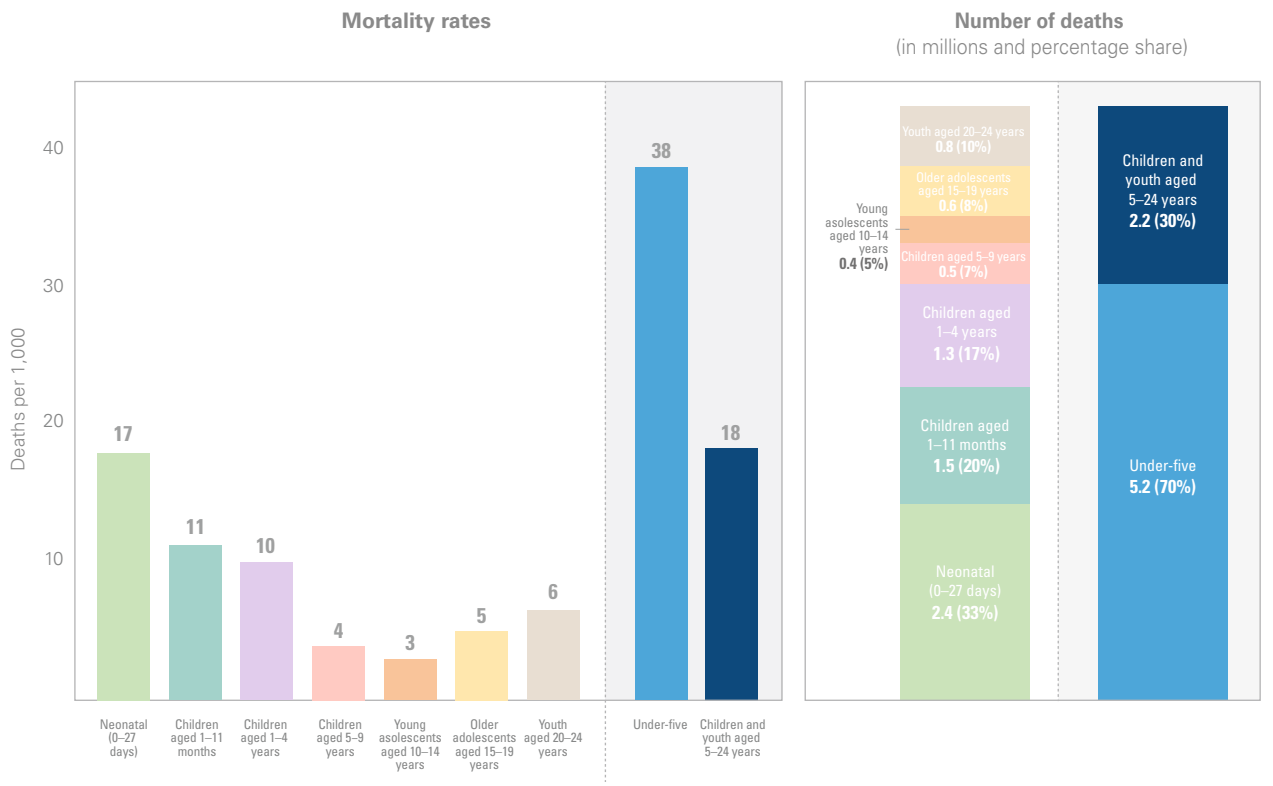
Levels and trends in child mortality

Global progress in reducing child mortality has been remarkable. The global under-five mortality rate has declined by almost 60 per cent since 1990 to 38 deaths per 1,000 live births in 2019. As a result, millions more children survive to adolescence today than they did in 1990 (see Figure 1 and Figure 2).

Against this backdrop of progress, the burden of child deaths remains unconscionable—7.4 million children and young people under the age of 25 died in 2019 alone. Compounding this tragedy, these children and young people died mostly of preventable causes. Some 5.2 million children died before reaching age 5—almost half of those deaths (2.4 million) were among newborns. Among all deaths over age 5, adolescents aged 10–19 accounted for 1 million, children aged 5–9 for 0.5 million and youth aged 20–24 for 0.8 million (see Figure 1 and Figure 2).

While young people and older adolescents face an increasing risk of dying with age, newborns face the greatest risk of dying among children under age five. The age distribution of mortality among children and youth shows that the risk of mortality is highest during the first 28 days of life, the neonatal period, before decreasing for older children and young adolescents (ages 5–14), then increasing with age among youth aged

FIGURE 1 **Global mortality rates and number of deaths by age, 2019**



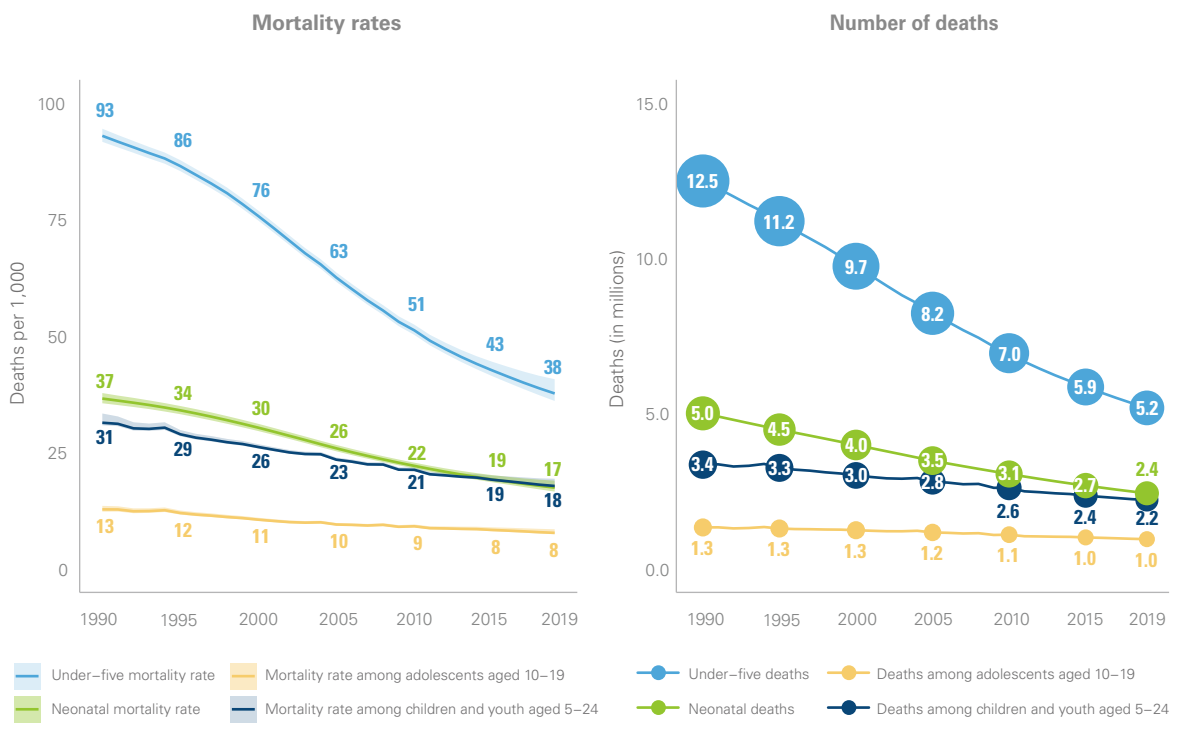
Note: All figures are based on unrounded numbers.

15–24. In 2019, the neonatal mortality rate was estimated to be 17 deaths per 1,000 live births. The probability of dying after the first month and before reaching age 1 was estimated to be 11 per 1,000, and the probability of dying after reaching age 1 and before reaching age 5 was 10 per 1,000. For children and youth over age 5, the probability a five-year-old would die before reaching age 10 was estimated to be 4 deaths per 1,000 children aged 5, while the probability a 10-year-old would die before reaching age 15 was lowest among all 5-year age groups at 3 deaths per 1,000 adolescents aged 10. The probability of dying after reaching age 15 and before age 20 was estimated to be 5 deaths per 1,000 adolescents aged 15, and after reaching 20 and before 25, the probability again increases to 6 deaths per 1,000 youths aged 20 (see Figure 1).

The burden of child deaths is uneven across regions. In 2019, sub-Saharan Africa carried more than half of that burden with 2.8 million under-five deaths (53 per cent), followed by Central and Southern Asia with 1.5 million (28 per cent). The regions of Australia and New Zealand, Eastern and South-Eastern Asia, Northern Africa and Western Asia, Europe and Northern America, Latin America and the Caribbean, and Oceania (excluding Australia and New Zealand) account for the remaining 19 per cent of under-five deaths. Sub-Saharan Africa also bears the brunt of deaths among children and young people older than age 5, accounting for 44 per cent of deaths age 5–24.

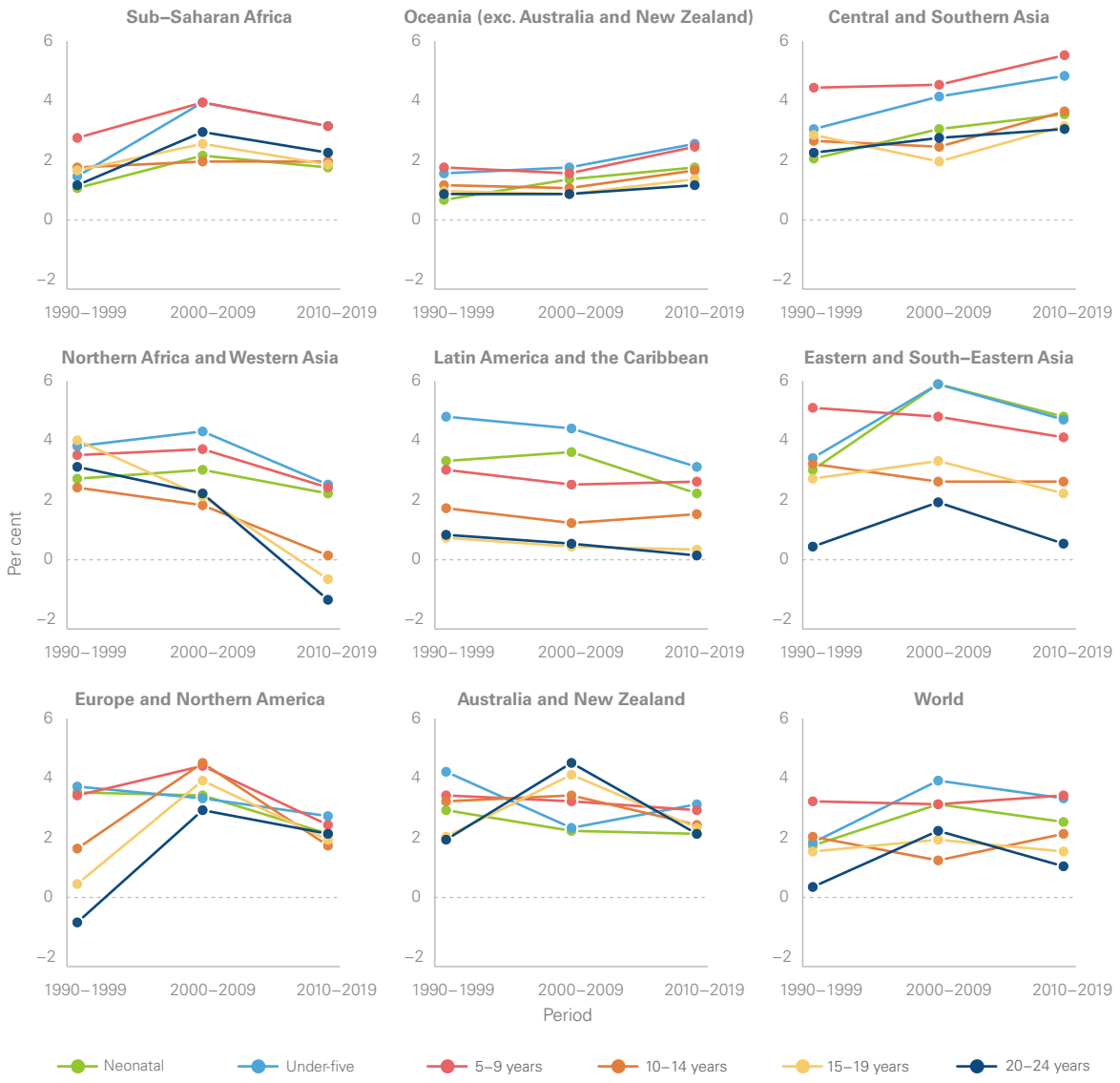
Over the last three decades, the under-five mortality rate declined fastest from 2000 to 2009, while the pace of decline quickened for children and young adolescents in the most recent decade. Globally, the annual rate of reduction (ARR)[4] in under-five mortality doubled from 1.9 (1.7, 2.1) per cent in 1990-1999 to 4.0 (3.7, 4.2) per cent in 2000-2009, before slowing slightly to 3.4 (2.6, 3.9) per cent in 2010-2019 (see Figure 3).[5] The trend in global neonatal mortality followed a similar pattern, increasing from 1.8

FIGURE 2 **Global mortality rates and number of deaths by age, 1990–2019**



Note: All figures are based on unrounded numbers. The solid line in the left panel represents the median estimate and the shaded area represents the 90 per cent uncertainty bound around the median value.

FIGURE 3 **Annual rate of reduction (per cent) in mortality rate by age group and Sustainable Development Goal region in 1990-1999, 2000-2009, 2010-2019[5]**



Note: All calculations are based on unrounded numbers.

(1.5, 2.1) per cent in 1990-1999 to 3.2 (2.8, 3.5) per cent in 2000-2009, then flattening somewhat to 2.6 (1.8, 3.2) per cent for the most recent period. Progress in reducing mortality among children and young adolescents aged 5–14 did not accelerate after 2000 as observed in children under age 5. The ARR for mortality among children aged 5–14 remained fairly flat over the three periods, decreasing slightly between the first two periods from 2.9 (2.5, 3.2) per cent for 1990-1999 to 2.5 (2.2, 2.8) per cent for 2000-2009, before increasing incrementally to 3.0 (2.1, 3.4) per cent for 2010-2019. The pace of decline among older adolescents and youth aged 15–24 follows the pattern of under-five mortality but is slower than for the age group 5–14. Mortality decline in this age group quickened from 0.9 (0.5, 2.0) per cent in 1990-1999 to 2.2 (1.8, 2.5) per cent in 2000-2009, before slowing to 1.3 (0.2, 1.9) per cent in the most recent decade. Regionally, sub-Saharan Africa, along with the regions of Northern Africa and Western Asia and

TABLE 1

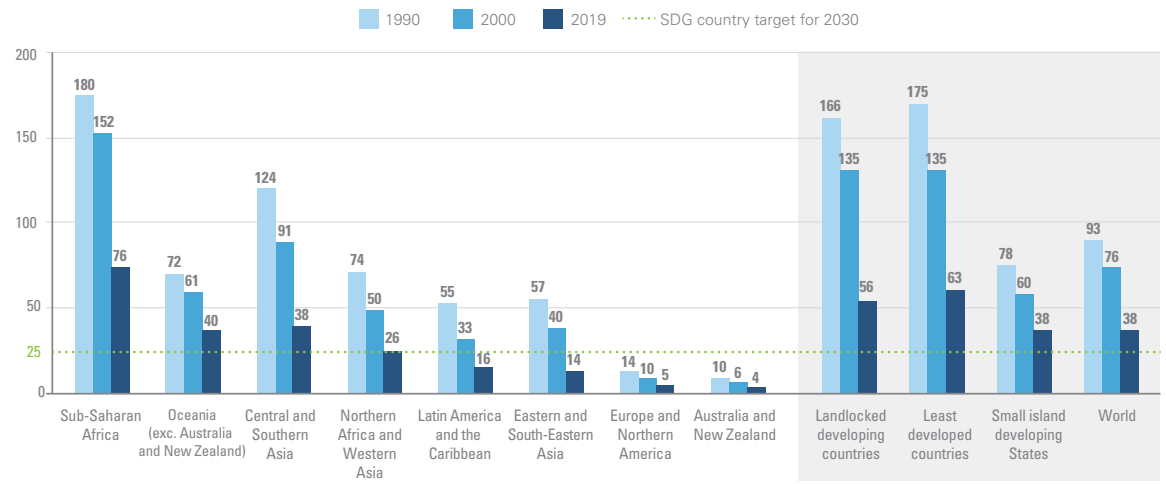
Levels and trends in the under-five mortality rate, by Sustainable Development Goal region, 1990-2019

Region	Under-five mortality rate (deaths per 1,000 live births)							Decline (per cent)	Annual rate of reduction (per cent)			
	1990	1995	2000	2005	2010	2015	2019	1990-2019	1990-2019	1990-1999	2000-2009	2010-2019
Sub-Saharan Africa	180	172	152	125	102	86	76	58	3.0	1.5	4.0	3.2
Northern Africa and Western Asia	74	62	50	40	32	28	26	65	3.7	3.9	4.4	2.6
Northern Africa	84	71	59	48	39	33	29	65	3.6	3.5	4.1	3.2
Western Asia	65	53	42	33	26	24	22	66	3.8	4.2	5.0	1.9
Central and Southern Asia	124	108	91	74	59	46	38	69	4.1	3.1	4.2	4.9
Central Asia	71	73	61	45	32	24	21	71	4.3	1.2	6.4	4.9
Southern Asia	126	109	92	75	60	47	39	69	4.0	3.1	4.1	4.8
Eastern and South-Eastern Asia	57	49	40	29	22	17	14	75	4.8	3.5	6.0	4.8
Eastern Asia	51	45	35	23	15	10	8	85	6.5	3.5	8.4	7.4
South-Eastern Asia	72	58	48	40	33	28	24	66	3.7	4.0	3.9	3.3
Latin America and the Caribbean	55	43	33	26	25	18	16	70	4.2	4.9	4.5	4.7
Oceania	35	33	32	29	25	22	20	44	2.0	1.2	2.3	2.5
Australia and New Zealand	10	7	6	6	5	4	4	60	3.2	4.2	2.3	3.1
Oceania (exc. Australia and New Zealand)	72	66	61	56	51	45	40	44	2.0	1.6	1.8	2.6
Europe and Northern America	14	12	10	8	7	6	5	62	3.3	3.8	3.4	2.8
Europe	15	13	10	8	7	6	5	69	4.1	3.9	4.6	3.8
Northern America	11	9	8	8	7	7	6	42	1.9	3.0	1.3	1.4
Landlocked developing countries	166	155	135	107	83	65	56	66	3.7	1.9	4.9	4.4
Least developed countries	175	158	135	109	89	72	63	64	3.5	2.4	4.3	3.9
Small island developing States	78	69	60	54	78	42	38	51	2.5	2.6	2.2	8.0
World	**93**	**86**	**76**	**63**	**51**	**43**	**38**	**59**	**3.1**	**1.9**	**4.0**	**3.4**

Note: All calculations are based on unrounded numbers.

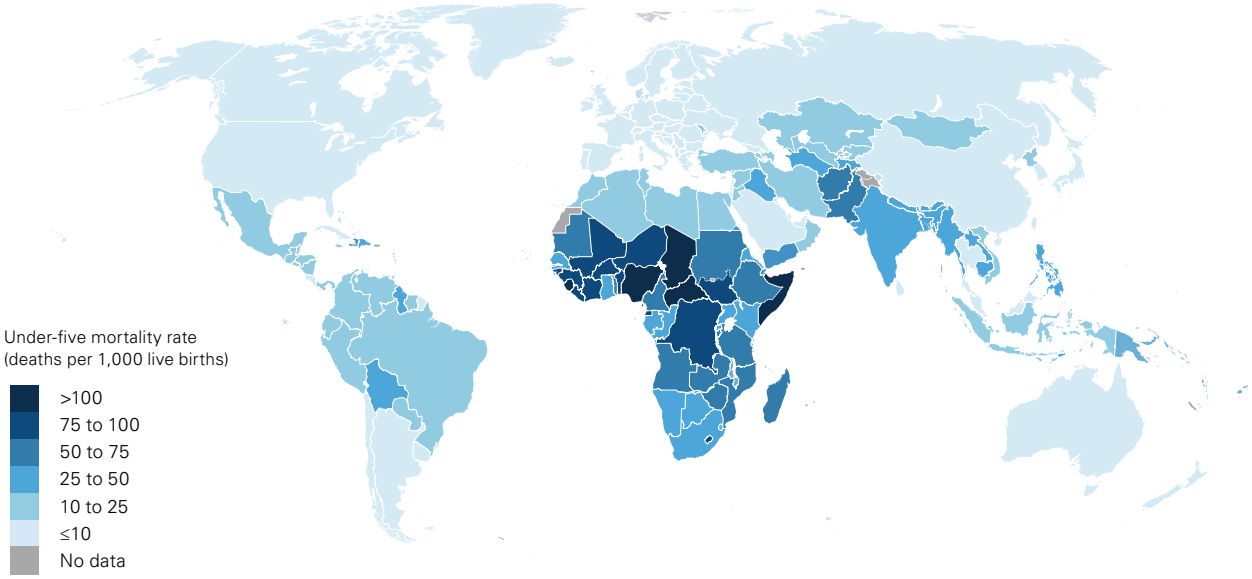
FIGURE 4

Under-five mortality rate (deaths per 1,000 live births) by Sustainable Development Goal region, 1990, 2000 and 2019



Note: All figures are based on unrounded numbers.

MAP 1 **Under-five mortality rate (deaths per 1,000 live births) by country, 2019**



Note: The classification is based on unrounded numbers. This map does not reflect a position by UN IGME agencies on the legal status of any country or territory or the delimitation of any frontiers.

Eastern and South-Eastern Asia followed the world pattern in under-five mortality decline, with the fastest decline from 2000-2009, followed by a slowdown in the most recent period. In comparison, Northern America and Europe, with relatively low levels of mortality, have seen the pace of decline slow with each decade. The regions of Central and Southern Asia and Oceania (excluding Australia and New Zealand) both saw faster decline in under-five mortality from 2010-2019 compared to 2000-2009 (see Figure 3).

Child mortality under age 5

Under-five mortality

Almost everywhere in the world, a child born today has a better chance at surviving to age five than in 1990. The under-five mortality rate was reduced from 93 (92, 95) deaths per 1,000 live births in 1990 to 38 (36, 41) deaths in 2019—a 59 (56, 61) per cent reduction (see Table 1). One in every 11 children died before reaching their fifth birthday in 1990. By 2019, that number was reduced to 1 in 27. Nearly every major SDG[3] region saw the under-five mortality rate decline by at least half since 1990. Moreover, 85 countries, including 34 low- and lower middle-income countries, cut their under-five mortality rate by at least two thirds over the same period. The global burden of under-five deaths dropped to 5.2 (5.0, 5.6) million in 2019 from 12.5 (12.3, 12.7) million in 1990 and 9.7 (9.6, 9.9) million in 2000. On average, 14,000 children under age 5 died every day in 2019, compared to 27,000 in 2000 and 34,000 in 1990. In 1990, more than 50 countries had an under-five mortality rate above 100 deaths per 1,000 live births; by 2019, that number was down to 5.

Despite this global progress, geographic disparity in child survival persists. Children in sub-Saharan Africa continue to face the steepest odds of survival in the world—the under-five mortality rate is estimated at 76 deaths per 1,000 live births in 2019 (see Table 1 and Figure 4). That is equivalent to 1 child in 13 dying before reaching age 5, which is 20 times higher than the rate of 1 in 264 in the region of Australia and New Zealand and 20 years behind the world average, which achieved a 1 in 13 rate by 1999. At the country level, the under-five mortality rates in 2019 ranged from 2 deaths per 1,000 live births to 117 (see Map 1), and the risk of dying before the fifth birthday for a child born in the highest-mortality country was about 70 times higher than in the lowest-mortality country. Sub-Saharan Africa is the region where all five countries with mortality rates above 100 deaths per 1,000 live

TABLE 2 Levels and trends in the number of deaths of children under age five, by Sustainable Development Goal region, 1990-2019

	Under-five deaths (thousands)							Decline (per cent)	Share of global under-five deaths (per cent)		
Region	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2019**	**1990-2019**	**1990**	**2000**	**2019**
Sub-Saharan Africa	3,720	3,933	3,878	3,560	3,212	2,953	2,766	26	29.8	39.8	53.3
Northern Africa and Western Asia	679	565	459	383	343	322	293	57	5.4	4.7	5.7
Northern Africa	380	313	255	219	204	192	173	54	3.0	2.6	3.3
Western Asia	299	252	204	164	139	130	120	60	2.4	2.1	2.3
Central and Southern Asia	4,962	4,351	3,663	2,999	2,350	1,782	1,461	71	39.7	37.6	28.2
Central Asia	111	103	74	56	48	40	34	69	0.9	0.8	0.7
Southern Asia	4,851	4,248	3,588	2,943	2,302	1,742	1,427	71	38.8	36.8	27.5
Eastern and South-Eastern Asia	2,283	1,687	1,239	891	679	524	421	82	18.3	12.7	8.1
Eastern Asia	1,423	1,008	690	430	292	200	143	90	11.4	7.1	2.8
South-Eastern Asia	860	679	549	461	387	324	278	68	6.9	5.6	5.4
Latin America and the Caribbean	641	503	381	288	265	192	169	74	5.1	3.9	3.3
Oceania	18	18	17	17	16	14	13	27	0.1	0.2	0.3
Australia and New Zealand	3	2	2	2	2	2	1	51	0.0	0.0	0.0
Oceania (exc. Australia and New Zealand)	15	15	15	15	14	13	12	22	0.1	0.2	0.2
Europe and Northern America	191	143	112	97	85	74	64	67	1.5	1.1	1.2
Europe	144	103	76	62	53	45	37	75	1.1	0.8	0.7
Northern America	47	40	35	35	32	29	27	42	0.4	0.4	0.5
Landlocked developing countries	1,743	1,752	1,622	1,384	1,169	984	881	49	14.0	16.6	17.0
Least developed countries	3,589	3,538	3,299	2,868	2,499	2,152	1,968	45	28.7	33.8	37.9
Small island developing States	93	82	72	64	95	52	46	50	0.7	0.7	0.9
World	**12,494**	**11,200**	**9,749**	**8,234**	**6,950**	**5,862**	**5,189**	**58**	**100.0**	**100.0**	**100.0**

Note: All calculations are based on unrounded numbers.

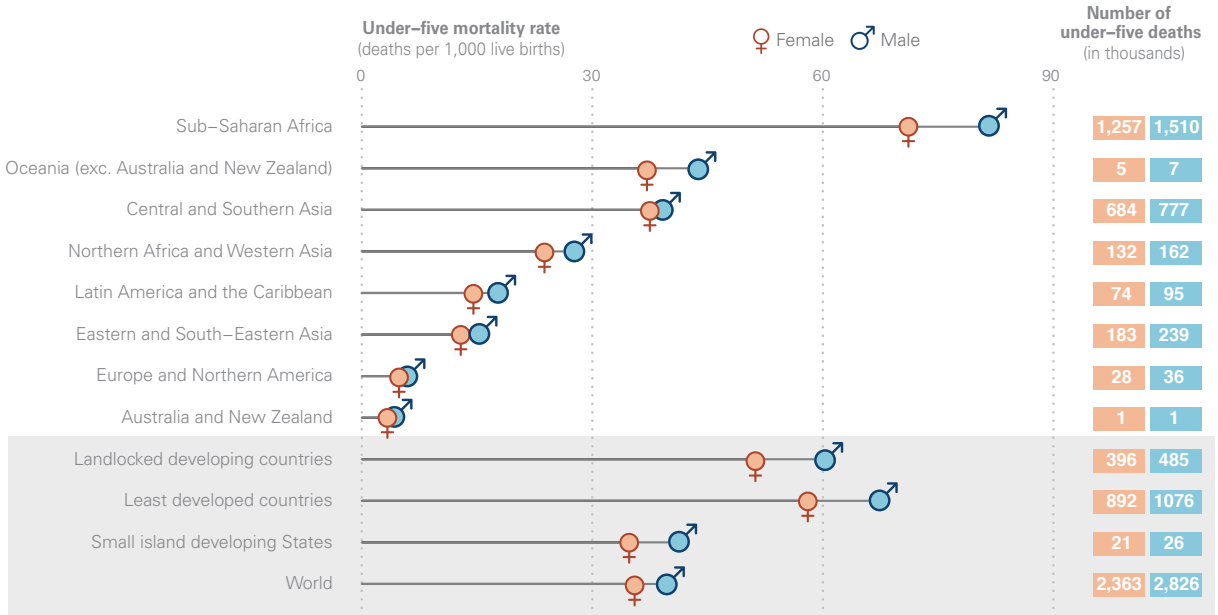
births are located; and where 31 of the 37 'high-mortality' countries (with under-five mortality rates above 50 deaths per 1,000 live births) are found.

The global burden of under-five deaths weighs most heavily on just two regions. About 53 per cent of all under-five deaths in 2019 (2.8 (2.6, 3.1) million) occurred in sub-Saharan Africa, and roughly 1.5 (1.4, 1.6) million children died in 2019 before reaching age 5 in Central and Southern Asia (see Table 2). These two regions alone accounted for more than 80 per cent of the 5.2 million global under-five deaths in 2019, but they only accounted for 52 per cent of the global under-five population.[6] Nearly half (49 per cent) of all under-five deaths in 2019 occurred in just five countries: Nigeria, India, Pakistan, the Democratic Republic of the Congo and Ethiopia. Nigeria and India alone account for almost a third.

Access to life saving interventions is critical to ensuring steady mortality declines in low- and middle-income countries. Globally, infectious diseases, including pneumonia, diarrhoea and malaria, remain a leading cause of under-five deaths, along with preterm birth and intrapartum-related complications. Moreover, malnourished children, particularly those suffering from severe acute malnutrition, are at a higher risk of death from these common childhood illnesses. Access to basic lifesaving interventions such as childbirth delivery care, postnatal care, vaccinations, and early childhood preventative and curative services to address these causes is critical.[7] A recent analysis across 118 low- and middle-income countries (LMICs) showed that severe disruptions to the delivery of basic lifesaving interventions along with increases in wasting could result in millions of additional under-five deaths in as little as six months.[8]

Global progress has been extraordinary but varied greatly across countries and regions. All eight major SDG regions made progress in reducing under-five mortality with annual rates of reduction for the period 1990-2019 ranging from 2.0 per cent in Oceania (excluding Australia and New Zealand) to 4.8 per cent in Eastern and

FIGURE 5 **Under-five mortality rate and number of under-five deaths by sex and Sustainable Development Goal region, 2019**



Note: This figure shows unrounded under-five mortality rates.

South-eastern Asia (see Table 1). The absolute decrease in the under-five mortality rate between 1990 and 2019 among the SDG regions ranged from 6 deaths per 1,000 live births in Australia and New Zealand to 104 deaths in sub-Saharan Africa. The gap between the highest and lowest regional under-five mortality rates has lessened over time from a difference of 171 deaths per 1,000 live births in 1990 to 73 in 2019.

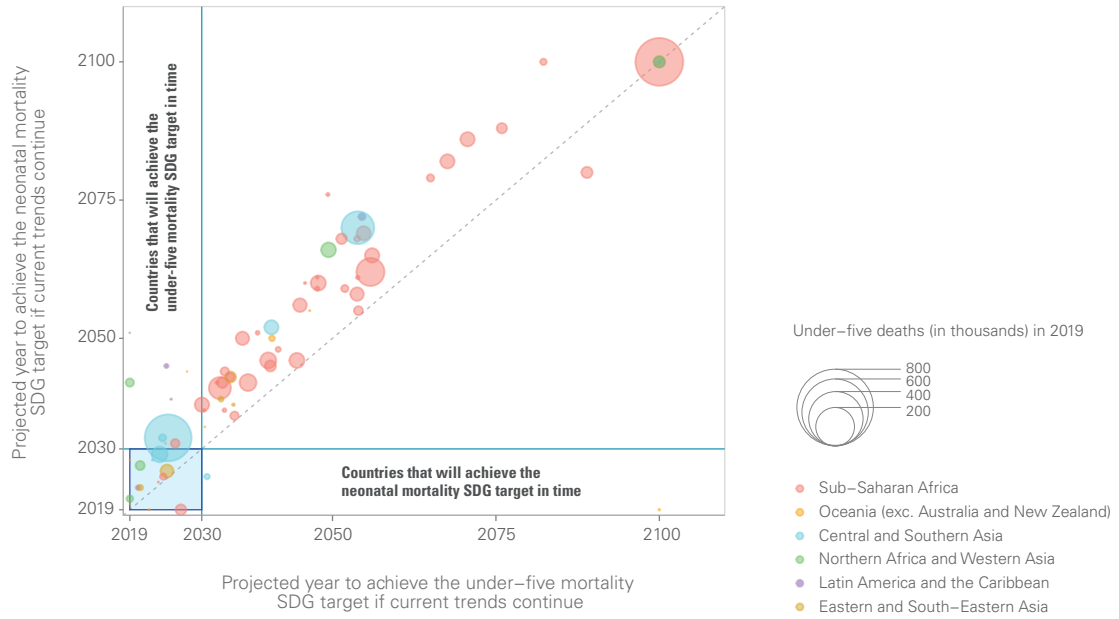
Children in fragile contexts are particularly vulnerable. On average, in 2019, the under-five mortality rate in the 36 countries classified as 'fragile' based on the World Bank definition[9] was almost three times higher than in 'non-fragile' countries. The under-five mortality rate for fragile countries was estimated at 83 (74, 97) deaths per 1,000 live births in 2019, more than double the global average of 38 deaths per 1,000 live births, and nearly 40 per cent of the global under-five deaths in 2019 occurred in fragile contexts. The annual rate of reduction for the last decade (2010-2019) in fragile countries was 25 per cent slower than the world average—2.6 per cent in fragile countries, compared to 3.4 per cent globally.

The high mortality and relatively slow rate of progress in these contexts means that 26 of the 36 countries classified as 'fragile' are at risk of missing the SDG target for under-five mortality by 2030.

Disparities in sex-specific child mortality continue to decline. On average, boys are expected to have a higher probability of dying before reaching age 5 than girls. However, in some countries, the risk of dying before age 5 for girls is significantly higher than what would be expected based on global patterns. These countries are primarily located in Southern Asia and Western Asia. Since 1990, the number of countries showing higher than expected mortality for girls fell from 25 to 7. Overall, the estimated under-five mortality rate in 2019 was 40 (38, 43) deaths per 1,000 live births for boys and 35 (34, 38) deaths for girls. In 2019, an estimated 2.8 (2.7, 3.0) million boys and 2.4 (2.3, 2.6) million girls under 5 years of age died (see Figure 5).

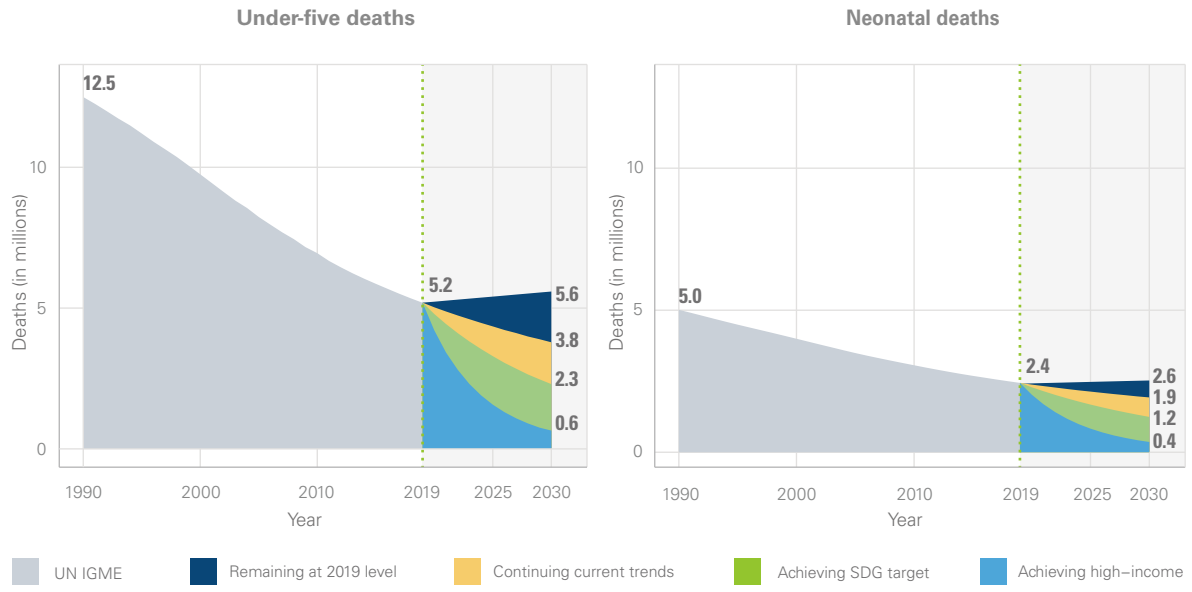
On current trends, 27 per cent of all countries will miss the SDG target on under-five mortality.

FIGURE 6 **Projected year to achieve the SDG target in neonatal mortality and under-five mortality if current trends continue in the countries that have not achieved the SDG targets**



Note: All calculations are based on unrounded numbers. 'If current trends continue' refers to projecting the mortality rate to 2030 based on the annual rate of reduction for the period 2010-2019. See note 10 for further details.

FIGURE 7 **Global under-five deaths, 1990-2019, and projected global under-five deaths for different scenarios, 2019-2030**



Note: The increasing number of deaths in the 'Remaining at 2019 level' scenario is the result of the growing size of the under-five population and the shift of the population share towards high-mortality regions over the next 11 years.

Of 195 countries analysed in this report, 122 have already met the SDG target for under-five mortality, and 20 countries are expected to do so by 2030, if current trends continue.[10] Intensified efforts will be needed in the remaining 53 countries, almost three quarters of which are in sub-Saharan Africa, to reach the 2030 target (see Figure 6). Of these 53 countries, 35 will need to more than double and 23 will need to more than triple their current rate of reduction to meet the SDG target on time. For countries that have already achieved the SDG target, further reductions in mortality can be achieved by eliminating inequities in preventable child deaths across several dimensions including household income,[11] race and ethnicity,[12] and subnational divisions.[13]

Meeting the SDG target on under-five mortality would save the lives of almost 11 million children. On current trends, about 48 million children under 5 years of age will die between 2020 and 2030, half of them newborns (see Figure 7). More than half (57 per cent) of these 48 million deaths will occur in sub-Saharan Africa (28 million) and 25 per cent in Central and Southern Asia (12 million). Meeting the SDG target in the 53 countries where acceleration is required would reduce the number of under-five deaths by 11 million between 2020 and 2030. Concerted and urgent action is needed in the countries that are falling behind. Even more lives could be saved (more than 27 million from 2020 to 2030) if all countries achieved the average under-five mortality level in high-income countries (5 deaths per 1,000 live births in 2019) by 2030. Progress is not guaranteed, of course. If all countries remained at the 2019 level of mortality, 5.6 million under-five deaths would occur in 2030 alone (nearly half a million more deaths than in 2019), and more than 59 million under-five deaths would occur from 2020 to 2030. In this scenario, the increase in deaths is the result of growing under-five populations and the shift of population towards high-mortality regions over the next decade (see Figure 7).

Neonatal mortality

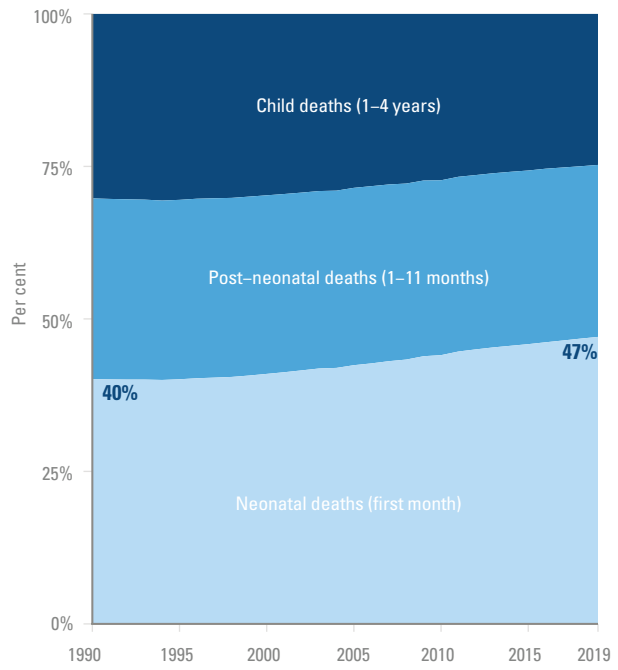
Children face the highest risk of dying in their first 28 days of life. At a global rate of 17 (17, 19) deaths per 1,000 live births and approximately 6,700 neonatal deaths every day in 2019, the neonatal period (the first 28 days of life) is the most vulnerable time for children under age 5. In comparison, the probability of dying after the first month and before reaching age 1 was estimated at 11 deaths per 1,000 and the probability of dying after reaching age 1 and before reaching age 5 was estimated at 10 deaths per 1,000 in 2019 (see Figure 1). Within the neonatal period, the youngest lives are at even greater risk. A recent review showed that about a third of all neonatal deaths occur within the first day after birth, and close to three quarters occur within the first week of life.[14,15]

While remarkable progress has been made in reducing neonatal mortality, it declined more slowly than mortality among those aged 1–59 months. Since 1990, the global neonatal mortality rate declined by 52 per cent to 17 (17, 19) deaths per 1,000 live births in 2019—down from 37 (36, 38) deaths—and the number of neonatal deaths dropped from 5.0 (4.9, 5.2) million in 1990 to 2.4 (2.3, 2.7) million in 2019. However, the neonatal mortality rate declined more slowly than mortality among children aged 1–59 months. The average annual rate of reduction in the neonatal mortality rate was 2.5 (2.3, 2.7) per cent from 1990 to 2019 (see Table 3), a smaller reduction than among children aged 1–59 months with 3.6 (3.3, 3.8) per cent. Across all major SDG regions, the annual rate of reduction from 1990 to 2019 was larger for children aged 1–59 months than for neonates.

As the global under-five mortality rate declines, deaths are increasingly concentrated in the neonatal period. As a result of the differing paces of decline among neonates and children aged 1-59 months, the share of neonatal deaths among all under-five deaths increased from 40 (39, 41) per cent in 1990 to 47 (45, 49) per cent in 2019 (see Figure 8).

Lower under-five mortality is associated with a larger share of under-five deaths occurring in the neonatal period. The share of neonatal deaths among under-five deaths is still relatively low in sub-Saharan Africa (37 (35, 40) per cent), which remains the region with the highest under-five mortality rate. In Europe and Northern America, which has among the lowest under-five mortality rates of all the SDG regions, 57 (54, 59) per cent of all under-five deaths occur during the neonatal period. An exception is Southern Asia, where the proportion of neonatal deaths is among the highest (63 (61, 65) per cent), despite a relatively high under-five mortality rate (see Table 4).

FIGURE 8 **Distribution of global under-five deaths by age, 1990-2019**



Note: All calculations are based on unrounded numbers.

Unexpectedly high levels of neonatal mortality relative to under-five mortality persist in some countries and regions. Countries can be classified as outlying in the level of neonatal mortality if neonatal mortality deviates significantly from the expected level based on the global relationship of neonatal mortality to under-five mortality across all countries. A few countries, most of which are in Southern Asia, continue to show higher than expected levels of neonatal mortality for their given levels of under-five mortality.

Even with substantial reduction in neonatal mortality levels globally, newborns continue

TABLE 3 **Levels and trends in the neonatal mortality rate, by Sustainable Development Goal region, 1990-2019**

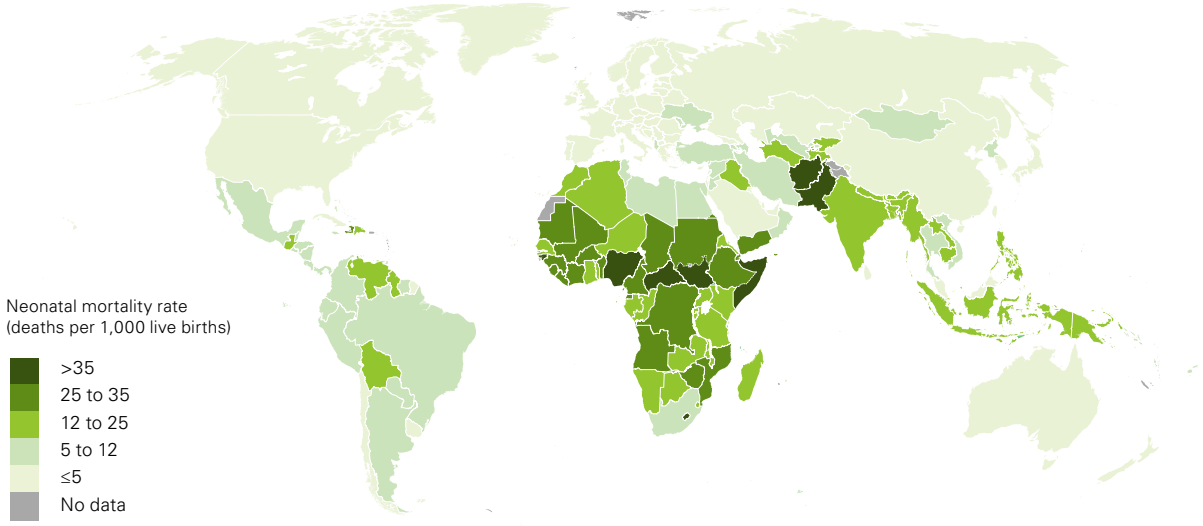
	Neonatal mortality rate (deaths per 1,000 live births)							Decline (per cent)	Annual rate of reduction (per cent)			
Region	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2019**	**1990-2019**	**1990-2019**	**1990-1999**	**2000-2009**	**2010-2019**
Sub-Saharan Africa	45	43	40	36	32	30	27	39	1.7	1.1	2.2	1.8
Northern Africa and Western Asia	30	26	23	20	17	15	14	55	2.8	2.8	3.1	2.3
Northern Africa	33	29	26	23	20	17	16	52	2.5	2.3	2.6	2.5
Western Asia	28	24	20	16	14	12	11	60	3.1	3.3	3.9	2.2
Central and Southern Asia	56	51	45	39	33	28	24	58	3.0	2.1	3.1	3.6
Central Asia	28	29	27	22	17	13	11	61	3.2	0.3	4.1	5.1
Southern Asia	57	52	46	39	34	28	24	57	2.9	2.2	3.0	3.6
Eastern and South-Eastern Asia	28	25	20	15	11	9	7	74	4.7	3.1	6.0	4.9
Eastern Asia	28	25	19	13	8	5	4	86	6.9	3.3	8.9	8.3
South-Eastern Asia	28	24	21	18	16	14	13	55	2.7	2.8	2.6	2.9
Latin America and the Caribbean	22	19	16	13	11	10	9	60	3.1	3.4	3.7	2.3
Oceania	15	14	14	13	12	11	10	32	1.3	0.3	2.0	1.7
Australia and New Zealand	5	4	4	3	3	2	2	49	2.3	2.9	2.2	2.1
Oceania (exc. Australia and New Zealand)	29	28	27	25	23	21	20	33	1.4	0.7	1.4	1.8
Europe and Northern America	7	6	5	4	4	3	3	59	3.0	3.6	3.5	2.2
Europe	8	7	5	4	3	3	3	67	3.9	3.9	4.8	3.0
Northern America	6	5	5	4	4	4	4	35	1.5	2.2	1.1	1.2
Landlocked developing countries	47	45	41	36	31	27	24	49	2.3	1.3	2.7	2.9
Least developed countries	52	47	42	36	32	28	26	51	2.4	2.1	2.7	2.5
Small island developing States	27	25	23	23	22	20	18	32	1.3	1.4	0.8	1.9
World	**37**	**34**	**30**	**26**	**22**	**19**	**17**	**52**	**2.5**	**1.8**	**3.2**	**2.6**

Note: All calculations are based on unrounded numbers.

to face grave differences in their chances of survival across regions and countries. Regionally, sub-Saharan Africa had the highest neonatal mortality rate in 2019 at 27 (25, 32) deaths per 1,000 live births, followed by Central and Southern Asia with 24 (22, 26) deaths per 1,000 live births (see Table 3). A child born in sub-Saharan Africa is 10 times more likely to die in the first month of life than a child born in a high-income country and 12 times more likely to die than a child born in the region of Australia and New Zealand. Across countries, neonatal mortality rates ranged from 1 death per 1,000 live births to 43 deaths in 2019 (see Map 2). The risk of dying for a newborn in the first month of life is about 55 times greater in the highest mortality country than in the lowest mortality country. Even so, regional levels can obscure noteworthy progress in individual countries. For example, Malawi and Rwanda, both in sub-Saharan Africa, are notable for their substantial reductions in neonatal mortality, with an average annual rate of reduction of more than 3 per cent from 1990-2019. Low mortality rates in a variety of countries underscore that with quality care at birth and skilled care and treatment immediately after birth and in the first days of life, millions of preventable neonatal deaths can be averted.

The burden of neonatal deaths is unevenly distributed across regions and countries. Two regions account for almost 80 per cent of all neonatal deaths in 2019; sub-Saharan Africa accounted for 42 per cent of all such deaths and Central and Southern Asia accounted for 37 per cent. Due to a modest decline in the neonatal mortality rate (39 per cent between 1990-2019), coupled with increasing births, sub-Saharan Africa is also the only SDG region to see no decline in the number of neonatal deaths from 1990 to 2019 (see Table 3 and Table 4). In 21 out of 48 countries in sub-Saharan Africa, the

MAP 2 Neonatal mortality rate (deaths per 1,000 live births) by country, 2019



Note: The classification is based on unrounded numbers. This map does not reflect a position by UN IGME agencies on the legal status of any country or territory or the delimitation of any frontiers.

TABLE 4 Levels and trends in the number of neonatal deaths, by Sustainable Development Goal region, 1990-2019

	Number of neonatal deaths (thousands)							Decline (per cent)	Neonatal deaths as a share of under-five deaths (per cent)			
Region	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2019**	**1990-2019**	**1990**	**2000**	**2010**	**2019**
Sub-Saharan Africa	980	1,040	1,071	1,059	1,052	1,039	1,022	-4	26	28	33	37
Northern Africa and Western Asia	282	244	212	191	182	169	157	44	42	46	53	53
Northern Africa	152	130	115	107	108	102	95	38	40	45	53	55
Western Asia	130	114	98	84	74	67	62	52	44	48	53	52
Central and Southern Asia	2,282	2,079	1,836	1,573	1,308	1,061	913	60	46	50	56	63
Central Asia	44	40	32	29	27	21	18	59	40	43	56	53
Southern Asia	2,238	2,039	1,804	1,545	1,281	1,040	895	60	46	50	56	63
Eastern and South-Eastern Asia	1,098	821	625	464	346	265	211	81	48	50	51	50
Eastern Asia	764	536	384	249	155	100	69	91	54	56	53	48
South-Eastern Asia	334	284	241	215	191	164	142	57	39	44	49	51
Latin America and the Caribbean	266	225	184	143	120	106	94	65	41	48	45	56
Oceania	8	8	8	8	7	7	7	13	42	46	47	50
Australia and New Zealand	1	1	1	1	1	1	1	38	49	55	57	62
Oceania (exc. Australia and New Zealand)	6	7	7	7	6	6	6	7	41	44	46	49
Europe and Northern America	98	74	60	53	46	41	36	63	51	53	54	57
Europe	74	53	40	33	28	25	20	73	51	52	52	55
Northern America	24	21	20	20	18	17	16	35	52	55	56	58
Landlocked developing countries	519	524	513	486	457	417	390	25	30	32	39	44
Least developed countries	1,110	1,093	1,057	991	922	860	821	26	31	32	37	42
Small island developing States	33	30	28	27	27	24	22	31	35	39	28	49
World	**5,014**	**4,491**	**3,996**	**3,492**	**3,062**	**2,688**	**2,440**	**51**	**40**	**41**	**44**	**47**

Note: All calculations are based on unrounded numbers.

number of neonatal deaths did not decline from 1990 to 2019, and overall, neonatal deaths have stagnated at about 1 million annually in the region.

Fewer countries are on track to meet the SDG target on neonatal mortality than under-five mortality. If current trends continue, more than 60 countries will miss the target for neonatal mortality (12 or fewer deaths per 1,000 live births) by 2030, while 53 countries will miss the target for under-five mortality (25 or fewer deaths per 1,000 live births) (see Figure 6). Based on current trends, 24 million newborns would die between 2020 and 2030, and 80 per cent of these deaths would occur in sub-Saharan Africa and Southern Asia. Accelerating progress in these approximately 60 countries to achieve the SDG target on neonatal mortality would save the lives of 5 million newborns from 2020 to 2030. If no progress is made and mortality remained at 2019 levels, 2.6 million newborns would die in 2030 alone, and 28 million newborns would die between 2020 and 2030 (see Figure 7).

Almost 90 per cent of countries in sub-Saharan Africa are at risk of missing the SDG target on neonatal mortality. On current trends, 42 of the 48 countries in the region are projected to miss the SDG neonatal mortality target. With modest trends in reducing neonatal mortality and high current levels of neonatal mortality, 27 countries in the region are projected to only meet the SDG target sometime after 2050 (see Figure 6).

If progress in reducing neonatal mortality is to continue during the COVID-19 crisis, it is critical to maintain essential care and services. Most neonatal deaths take place in low- and lower-middle-income countries, where child and maternal lives are dependent on the continued and increased coverage of life saving interventions.[8,16,17] The survival and health of newborns must remain a focus of the international community. The focus should be on maintaining high coverage of quality antenatal care, skilled care at birth, postnatal care for mother and baby, and care of small and sick newborns to address the main causes of neonatal mortality globally. These causes are preterm birth, intrapartum-related complications (birth asphyxia or lack of breathing at birth), infections and birth defects.[8] Safe and widespread delivery of these interventions can avert child deaths indirectly caused by COVID-19 disease through reduced access to essential health services.

Mortality among children and youth aged 5–24

Globally, the risk of dying is lowest for children aged 10-14, and the risk of dying at any age 5–24 is lower than for children under 5 years of age. The probability of dying among children and youth aged 5–24 years was 18 (17, 19) deaths per 1,000 children aged 5 years in 2019. This is about half of the level of the under-five mortality rate in 2019, even though the exposure to the risk of dying is four times as long in the 5–24 age group (see Figure 2 and Figure 9). The pattern of 5-year mortality rates sees falling rates from the peak of risk among children under age 5 through ages 10–14 (when children face the lowest risk) followed by an increase in mortality rates among 15-19-year-olds, then increasing slightly more into the 20–24-year age group (see Figure 9). Even with relatively low rates compared to children under age 5, an estimated 6,100 children and young people aged 5–24 died every day in 2019.

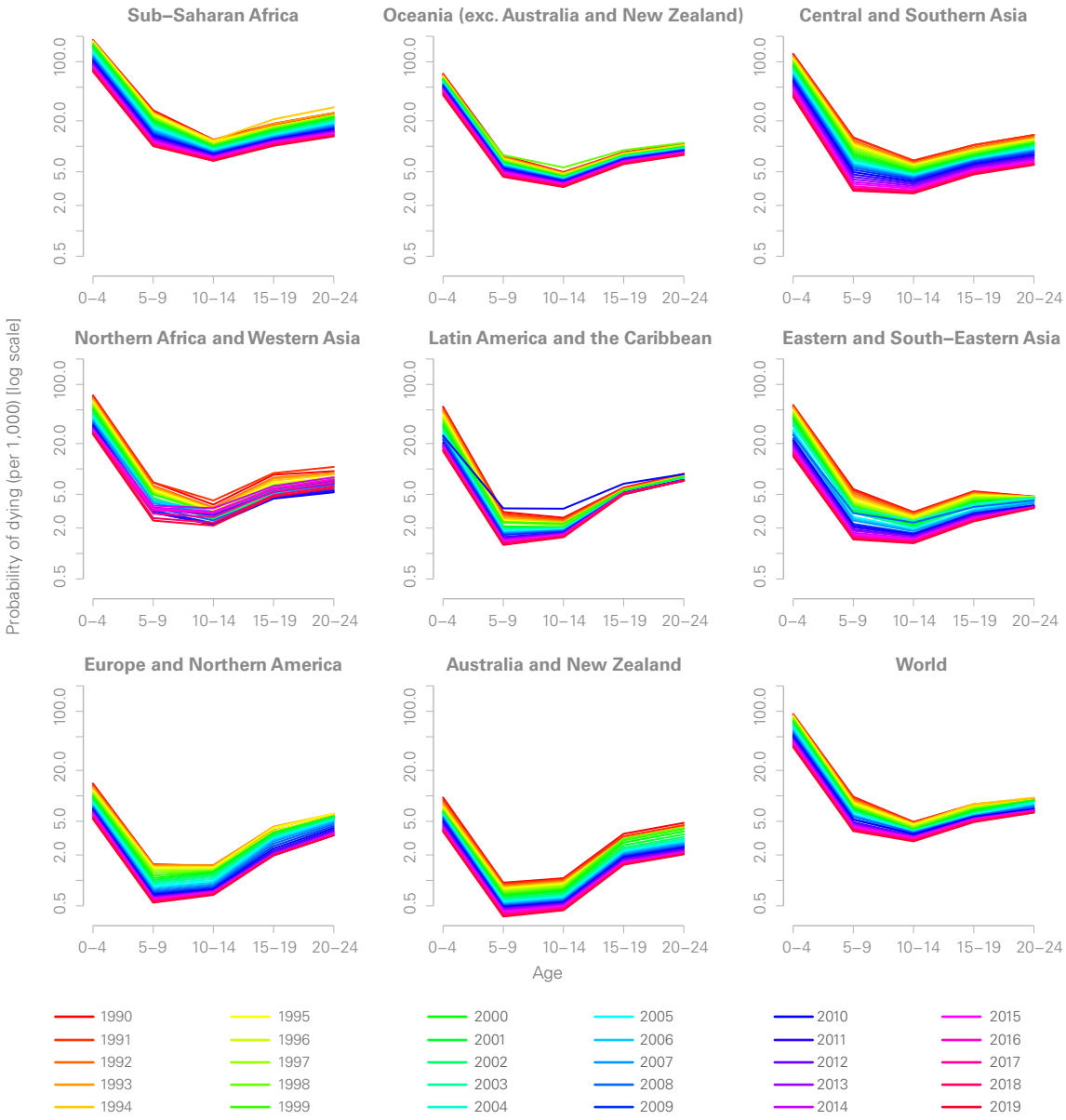
Globally, since 1990, the mortality rate for children and youth aged 5–24 declined by 43 per cent. From 1990 to 2019, the mortality rate for ages 5–24 declined from 31 (31, 33) deaths per 1,000 children aged 5 in 1990 to 18 (17, 19) deaths in 2019, and the number of deaths in this age group dropped by 34 per cent from 3.4 (3.3, 3.6) million in 1990 to 2.2 (2.2, 2.4) million in 2019 (see Table 5 and Table 6). The amount of progress in reducing mortality between 1990 and 2019 decreases with age. From 1990-2019 the age group 5–9 saw the largest decline in mortality rate (61 per cent) followed by 10–14 age group with a 41 per cent decline, 15–19 with a 38 per cent decline, and 20–24 with a 31 percent decline. At the global level, the average annual rate of reduction was 2.0 (1.7, 2.2) per cent from 1990 to

TABLE 5 Levels and trends in mortality among children and youth aged 5–24 and in five-year age groups, by Sustainable Development Goal region, 1990–2019

	Probability of dying among (deaths per 1,000)										Annual rate of reduction 1990-2019 (per cent)				
	Age 5–9		Age 10–14		Age 15–19		Age 20–24		Age 5–24		Age 5–9	Age 10–14	Age 15–19	Age 20–24	Age 5–24
Region	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019					
Sub-Saharan Africa	27	10	12	7	19	10	25	13	79	39	3.4	2.0	2.1	2.2	2.4
Northern Africa and Western Asia	7	2	4	2	9	5	9	6	28	15	3.6	2.0	2.1	1.6	2.2
Northern Africa	8	3	5	2	8	5	10	7	30	16	3.6	2.9	1.5	1.5	2.1
Western Asia	6	2	3	2	9	4	9	5	27	14	3.5	0.9	2.6	1.7	2.2
Central and Southern Asia	13	3	7	3	10	5	14	6	43	16	5.0	3.1	2.8	2.8	3.3
Central Asia	4	1	3	2	5	3	7	4	19	10	3.1	2.1	1.3	2.0	2.0
Southern Asia	13	3	7	3	11	5	14	6	44	17	5.0	3.1	2.8	2.8	3.3
Eastern and South-Eastern Asia	6	1	3	1	5	2	5	3	19	9	4.7	2.9	2.8	1.1	2.7
Eastern Asia	4	1	3	1	5	1	4	2	15	6	5.2	3.4	4.3	1.4	3.4
South-Eastern Asia	9	2	4	2	7	4	8	5	29	14	4.6	2.7	2.0	1.4	2.5
Latin America and the Caribbean	3	1	3	2	6	5	9	7	20	15	3.1	1.8	0.6	0.6	1.0
Oceania	3	2	2	2	5	3	6	4	17	11	1.9	1.5	1.4	1.5	1.5
Australia and New Zealand	1	0	1	0	4	2	5	2	10	4	3.2	3.0	2.9	3.0	3.0
Oceania (exc. Australia and New Zealand)	8	4	5	3	8	6	11	8	32	22	2.0	1.4	1.1	1.1	1.3
Europe and Northern America	2	1	1	1	4	2	5	3	12	7	3.6	2.7	2.3	1.5	2.1
Europe	2	1	2	1	4	2	5	2	12	5	4.1	3.1	2.8	2.5	2.9
Northern America	1	1	1	1	4	3	5	5	12	9	2.1	1.9	1.8	0.3	1.1
Landlocked developing countries	26	7	11	5	18	9	24	11	77	31	4.5	2.7	2.6	2.9	3.2
Least developed countries	27	8	11	6	18	10	23	12	77	35	4.1	2.5	2.1	2.3	2.7
Small island developing States	8	4	5	3	8	5	10	8	30	19	2.7	1.9	1.4	0.9	1.6
World	**10**	**4**	**5**	**3**	**8**	**5**	**9**	**6**	**31**	**18**	**3.2**	**1.8**	**1.7**	**1.3**	**2.0**

Note: All calculations are based on unrounded numbers.

FIGURE 9 **Probability of dying for 5-year age groups among children and youth by Sustainable Development Goal regions, 1990-2019**



Note: Vertical axis is in log scale.

2019 for the age group 5–24. Meanwhile, the age group 5–9 saw the fastest pace of decline among the 5-year age groups 5–24 over that same period (3.2 (3.0, 3.4) per cent) followed by the age group 10-14 at 1.8 (1.0, 2.3) per cent. This was followed by the age group 15-19 at 1.7 (1.4, 1.9) per cent, and the age group 20–24 at 1.3 (0.7, 1.9) per cent. The fastest decade of decline since 1990 was the most recent one (2010-2019) for older children aged 5-9 and young adolescents aged 10-14, while 2000-2009 saw the fastest pace of decline for older adolescents aged 15-19 and youth aged 20-24.

Adolescent mortality, encompassing ages 10–19, declined by nearly 40 per cent since 1990. The probability of dying among adolescents aged

TABLE 6 **Level and trends in number of deaths aged 5–24 and among adolescents aged 10–19 by Sustainable Development Goal regions, 1990-2019**

	Deaths age 5–24 (thousands)				Decline (per cent)	Deaths age 10–19 (thousands)				Decline (per cent)
Region	**1990**	**2000**	**2010**	**2019**	**1990-2019**	**1990**	**2000**	**2010**	**2019**	**1990-2019**
Sub-Saharan Africa	946	1,007	957	971	-3	340	380	383	411	-21
Northern Africa and Western Asia	181	149	128	139	23	77	65	57	61	21
Northern Africa	95	85	72	71	25	39	36	30	30	23
Western Asia	86	64	56	68	21	38	29	26	31	19
Central and Southern Asia	1,175	1,016	818	600	49	453	426	362	275	39
Central Asia	19	20	16	13	32	8	9	7	6	29
Southern Asia	1,157	995	802	587	49	446	417	355	269	40
Eastern and South-Eastern Asia	689	492	357	263	62	311	229	151	111	64
Eastern Asia	402	253	171	110	73	195	125	66	43	78
South-Eastern Asia	287	239	186	153	47	116	104	85	67	42
Latin America and the Caribbean	187	177	239	163	13	81	79	111	70	14
Oceania	8	7	7	7	16	3	3	3	3	15
Australia and New Zealand	3	3	2	2	51	2	1	1	1	52
Oceania (exc. Australia and New Zealand)	5	5	5	5	-10	2	2	2	2	-15
Europe and Northern America	175	167	113	84	52	75	71	42	33	57
Europe	126	125	74	41	67	53	52	26	17	68
Northern America	50	42	38	43	14	22	19	15	15	30
Landlocked developing countries	478	453	366	354	26	169	174	153	156	8
Least developed countries	951	887	851	805	15	338	340	361	353	-5
Small island developing States	28	26	90	21	25	11	11	43	9	24
World	**3,361**	**3,015**	**2,619**	**2,225**	**34**	**1,341**	**1,251**	**1,108**	**963**	**28**

Note: All calculations are based on unrounded numbers.

10–19 was estimated at 8 (7, 9) deaths per 1,000 adolescents aged 10 in 2019, down from 13 (12, 14) deaths per 1,000 in 1990. Between 1990 and 2019, the adolescent mortality rate declined by 39 per cent. While the risk of dying for adolescents is relatively low among all children and youth under age 25, the burden of adolescent deaths has declined only modestly since 1990 due to population dynamics. One million (0.9, 1.1) adolescents died in this age group in 2019, just a 28 percent decline from 1.3 (1.3, 1.4) million deaths in 1990. Globally, about 43 per cent of those who died aged 5–24 were adolescents aged 10–19. (see Table 6).

If current trends persist, 23 million children and youth aged 5–24 years will die between 2020 and 2030, and 44 per cent of those deaths are projected to take place during the adolescent period. Some 9.9 million of those deaths will occur among adolescents aged 10–19 years, and close to 71 per cent of the global deaths at ages 5–24 years from 2020 to 2030 will occur in just two regions: sub-Saharan Africa (10.8 million) and Southern Asia (5.3 million).

Survival chances for children and young people aged 5–24 vary considerably across regions and countries. In 2019, the highest probability of dying for the age group 5–24 years was in sub-Saharan Africa at 39 deaths per 1,000 children aged 5 years, followed by Oceania (excluding Australia and New Zealand) at 22 deaths and Central and Southern Asia with 16 deaths (see Table 5 and Figure 9). Sub-Saharan Africa and Oceania (excluding Australia and New Zealand) have the highest regional mortality rates across all four 5-year age groups in 2019. However, Latin America and the Caribbean replaces Central and Southern Asia with the third highest regional rate among older adolescents aged 15- 19 and youth aged 20–24 (see Table 5 and Figure 9). The

average global probability of a five-year-old dying before reaching age 25 was six times higher in sub-Saharan Africa than in Northern America and Europe. At the country level, the mortality rates for 5-9-year-olds ranged from 0.2 to 16.8 deaths per 1,000 children aged 5. Meanwhile, for 10-14-year-olds, mortality rates ranged from 0.2 to 14.8 deaths per 1,000 adolescents aged 10, for 15-19-year-olds from 0.8 to 24.9 deaths per 1,000 adolescents aged 15, and for 20–24-year-olds mortality rates ranged from 0.8 to 27.9 deaths per 1,000 youths aged 20.

Deaths among children and youth are concentrated in sub-Saharan Africa and Central and Southern Asia. More than 70 per cent of deaths among children and youth aged 5–24 years occurred in sub-Saharan Africa and Central and Southern Asia in 2019. This is up from 63 per cent in 1990, when these two regions also had the highest proportion of deaths in the age group. (see Table 6).

Injury and violence are among the leading causes of death for children, adolescents and youth aged 5-24. Whereas global deaths under age 5 are primarily driven by infectious disease and factors related to neonatal mortality, among older children, adolescents and youth the leading causes of death are injury, including road traffic accidents and drowning, interpersonal violence and self-harm. Sex differences in cause of death emerge during the adolescent period as well. Male death rates tend to be higher for the causes mentioned above along with mortality from collective violence (war/conflict). Meanwhile, maternal conditions become an increasingly important cause of death among young women.[18]

COVID-19 and child survival

The decline in mortality over the last three decades has ensured the survival of millions of children, adolescents and young people, but these lives are now under threat from the global COVID-19 crisis. While initial evidence suggests that direct deaths of children and young people from COVID-19 are limited, that impression is based largely on the early pandemic experience in China, Italy and a few other high-income countries. Insufficient data disaggregated by age, geography and race/ethnicity hampers any attempt to fully assess the COVID-19-related mortality and morbidity in children, adolescents and young people.[19] Continued monitoring of child survival and health with appropriately disaggregated data is essential to early detection and action, were the direct impact of COVID-19 to worsen in low- or middle-income country contexts.

Whereas early evidence pointed to a small direct mortality impact of the pandemic, experience with past epidemics like the 2014 West Africa Ebola outbreak[20, 21, 22] and SARS[23] has shown that indirect effects of an outbreak—for example, medical and food supply chain disruptions, declining utilization and provision of health services, healthcare resource and personnel reallocation—can be severe, sometimes outpacing the direct impact of the outbreak itself. In a recent study, researchers used the LiST model to estimate the potential additional maternal and under-five deaths in 118 low- and middle-income countries (LMICs). They explored three scenarios in which coverage of basic lifesaving interventions is reduced to different extents (10-50 per cent) and for different durations (3, 6, and 12 months) using assumptions based on emerging reports of the supply side and demand side effects of the coronavirus pandemic. Over a six-month horizon, with increases in wasting and 40-50 per cent coverage reduction in basic life-saving interventions like antenatal care, childbirth delivery care, postnatal care, vaccinations, and early childhood preventative and curative services, over 1 million additional children under 5 years of age could lose their lives in just six months.[8]

And, the observed and projected disruptions to these interventions are immense. Hindered delivery of immunization services in at least 68 countries has put an estimated 80 million children under age 1 at increased risk of contracting vaccine preventable diseases.[17] Following abrupt drops in household incomes, disruptions to the supply of affordable, nutritious foods, and interruptions to health, nutrition, and social protection services, an estimated 6.7 million additional children could suffer from wasting in 2020 compared with projections for 2020 without COVID-19. At the same time, these children, primarily located in Southern Asia and sub-Saharan Africa, are at greater risk of death from infectious diseases worsened by malnutrition.[16] Along with disruptions to service and care, COVID-19 exacerbates existing inequalities. This puts the most vulnerable children—those already living in crisis-affected areas or within health-systems that cannot adequately prepare for the potential impacts of the pandemic—at even greater risk.[24]

Inaction on the part of the global community could lead to the deaths of millions of children as a result of the global coronavirus pandemic. If progress is to continue and this devastating mortality crisis is to be averted, timely, accurate, and widespread monitoring of child health and survival must intensify, and commitments and investments from governments and donors must be scaled up.[25]

Conclusion

While the world has made enormous and impressive progress in combating child mortality in the last three decades, it sits at the precipice of a global child mortality crisis brought on by the effects of the novel coronavirus pandemic. Initial estimates of the indirect impact on child mortality suggest substantial reductions in the coverage of life-saving interventions and increases in wasting prevalence could result in more than one million additional under-five deaths in only six months.[8] Even as the global community is shaken by that potential, massive loss of life, the world suffered a loss of life of an even greater scale just last year—5.2 million children died before reaching their fifth birthday in 2019 alone, primarily of preventable or treatable causes. Add to that, the 2.2 million children and young people aged 5–24 who died in 2019, 43 percent of which occurred among adolescents aged 10–19, and the urgent need to accelerate progress toward ending preventable deaths of children and young people is clear. Tragically, the goal of ending preventable deaths is hindered by the tremendous inequities that children face in their chances of survival simply based on where they were born and live. These inequities are exacerbated by crisis, throwing the most vulnerable children into even greater risk.[24] However, by targeting efforts and resources towards the most vulnerable ages, regions, and communities, progress can be accelerated or maintained, even in the face of crisis.

Undeniably, the intensive focus and targeted actions of the global community have paid off with the substantial reductions in mortality for children and young people in the past three decades. Under-five mortality declined by 59 per cent since 1990, while mortality among 5–14-year-olds dropped by 54 per cent and among 15–24-year-olds by 34 per cent.

Despite that progress, the unfinished business of ending preventable child deaths remains. On current trends, 53 countries will not meet the under-five mortality target in time, more than 60 countries will fail to meet the neonatal mortality target on time, and 48 million children are projected to die before reaching age 5 from 2020 to 2030—roughly equivalent to the current population of Spain. If every country met the SDG target on under-five mortality, the lives of 11 million children could be saved between now and 2030. Moreover, children face widely different chances of survival across countries and regions. Close to 75 per cent of countries that need to accelerate progress to reach the SDG target on under-five mortality on time are in sub-Saharan Africa, and more than 80 per cent of under-five deaths occurred in just two regions: sub-Saharan Africa and Central and Southern Asia. Sub-Saharan Africa and Central and Southern Asia also have the highest and third highest regional mortality rates for children and young people aged 5–24.

Attention should be given to the region of sub-Saharan Africa, where mortality rates are highest across all ages and where population increase continues. The region is projected to see 446 million births from 2020-2030, and the under-five population is expected to increase to roughly 199 million by 2030 from 168 million in 2019.[6] Without a quickening in the pace of neonatal mortality decline, the increase in births could lead to further stagnation or even an increase in the burden of neonatal deaths. The rapid growth in births and population requires increased investments in high-impact maternal, newborn and child survival interventions as well as strengthening the health systems that deliver them.

The ever-increasing share of under-five deaths taking place during the neonatal period and decades of slower mortality reduction (compared

to older children) highlight the need for urgent action to save newborn lives. While under-five mortality declined by 59 per cent since 1990, neonatal mortality declined by only 52 per cent over the same period. Additionally, in places like Southern Asia, where the ratio of neonatal mortality to under-five mortality is high given the level of under-five mortality, increased coverage of interventions to save newborn lives should result in substantial progress. Further, reductions in neonatal mortality will require greater investment in building stronger health systems and services as well as improving coverage, quality and equity of care in the antenatal period. It will also require care at birth and in the first week of life; and care for small and sick newborns, which not only saves maternal and newborn lives, it also prevents stillbirths and disability.[26]

Accelerating the reduction in child, adolescent and youth mortality is possible by expanding high-impact preventative and curative interventions that target the main age-specific causes of deaths and the most vulnerable populations. For example, treatment of infectious diseases will require the rapid roll-out of vaccine programs, better nutrition and improved quality of care as well as care-seeking and quality care for the leading causes of death: pneumonia, diarrhoea and malaria. This is critical as infectious diseases disproportionally effect children under 5 years in poorer settings and remain highly prevalent particularly in sub-Saharan Africa. Meanwhile, addressing diarrheal disease should include the provision of safe drinking water, improved sanitation and hygiene, vaccination and treatment with oral rehydration solution and zinc. Newborn deaths should be addressed with skilled personnel attending every birth and making hospital care available in an emergency.

Unfortunately, many of the critical and cost-effective interventions mentioned above, along with hundreds of others, are susceptible to severe disruption due to the COVID-19 crisis. These life-saving interventions must be maintained and even expanded if the world is to head off a global child mortality crisis and accelerate progress in ending preventable child deaths. The numbers in this report should serve as a reminder that even in the face of great threats to child health and survival, progress is possible, but that progress can also be lost without the continued, determined, and cooperative action of the global community.

Country consultation

In accordance with the decision by the Statistical Commission and the United Nations Economic and Social Council resolution 2006/6, UN IGME child mortality estimates, which are used for the compilation of global indicators for SDG monitoring, are produced in consultation with countries.[27] UNICEF and the WHO undertook joint country consultations in 2020. The country consultation process gave each country's Ministry of Health, National Statistics Office or relevant agency the opportunity to review all data inputs, the estimation methodology and the draft estimates for mortality in children under age 5 and mortality among children and young adolescents aged 5–14 years and youth aged 15–24. The objective was to identify relevant data that were not included in the UN IGME database and to allow countries to review and provide feedback on estimates. In 2020, 98 of 195 countries sent comments or additional data. After the consultations, the UN IGME draft estimates for mortality in children under age 5 were revised for 86 countries using new data, and the estimates for mortality in children and young adolescents aged 5–14 or in youth aged 15–24 were revised for 70 countries, given the new data. All countries were informed about changes in their estimates.

Estimating child mortality

This chapter summarizes the methods UN IGME uses to generate mortality estimates for children under age 5, children aged 5–14 years and youth aged 15–24 years.

UN IGME updates its estimates of neonatal, infant, and under-five mortality, as well as mortality among children aged 5–14 years and youth aged 15–24 years, annually after reviewing newly available data and assessing their quality. These estimates are widely used in UNICEF's flagship publications, the United Nations Secretary-General's annual SDG report, and publications by other United Nations agencies, governments and donors.

UN IGME, which includes members from UNICEF, WHO, the World Bank Group and United Nations Population Division, was established in 2004 to advance the work on monitoring progress towards the achievement of child survival goals. Its Technical Advisory Group (TAG), comprising leading academic scholars and independent experts in demography and biostatistics, provides guidance on estimation methods, technical issues and strategies for data analysis and data quality assessment.

Overview

UN IGME follows the following broad strategy to arrive at annual estimates of child mortality:

1. Compile and assess the quality of all available nationally representative data relevant to the estimation of child mortality, including data from

vital registration systems, population censuses, household surveys and sample registration systems;

2. Assess data quality, recalculate data inputs and make adjustments as needed by applying standard methods;

3. Fit a statistical model to these data to generate a smooth trend curve that averages possibly disparate estimates from the different data sources for a country;

4. Extrapolate the model to a target year (in this case, 2019).

To increase the transparency of the estimation process, UN IGME has developed a child mortality web portal, Child Mortality Estimation (CME) Info, available at <www.childmortality.org>. It includes all available data and shows estimates for each country as well as which data are currently officially used by UN IGME. Once new estimates are finalized, CME Info is updated accordingly.

UN IGME applies a common methodology across countries and uses original empirical data from each country. However, it does not report figures produced by individual countries using other methods, which would not be comparable to other country estimates. Applying a consistent methodology allows for comparisons between countries, despite the varied number and types of data sources.

UN IGME estimates are based on nationally available data from censuses, surveys or vital registration systems. UN IGME does not use covariates to derive its estimates but rather, applies a curve-fitting method to empirical data after data quality assessment. Countries often use a single source for their official estimates or apply methods different to those used by UN IGME. The differences between UN IGME and national official estimates are usually not large if the empirical data are of good quality. UN IGME aims to minimize errors for each estimate, harmonize trends over time, and produce up-to-date and properly assessed estimates of child mortality. Because errors are inevitable in data, there will always be uncertainty around data and estimates, both nationally and internationally. To allow for added comparability, UN IGME generates all child mortality estimates with uncertainty bounds.

Data sources

Nationally representative estimates of under-five mortality can be derived from several different sources, including civil registration and sample surveys. Demographic surveillance sites and hospital data are excluded as they are rarely representative. The preferred source of data is a civil registration system that records births and deaths on a continuous basis. If registration is complete and this system functions efficiently, the resulting estimates will be accurate and timely. However, many low- and middle-income countries do not have well-functioning vital registration (VR) systems. Therefore, household surveys such as the UNICEF-supported Multiple Indicator Cluster Surveys, the USAID-supported Demographic and Health Surveys, and periodic population censuses have become the primary sources of data on mortality among children under age 5 and children, adolescents and youth aged 5–24 years. These surveys ask women about the survival of their children and about the survival of their siblings, and it is these reports (or microdata upon availability) that provide the basis of childhood, adolescent and youth mortality estimates for a majority of low- and middle-income countries.

The first step in the process of arriving at estimates of levels and recent trends of child mortality is to compile all newly available data and add the data to the UN IGME database. Newly available data will include recently released vital statistics from a civil registration system, results from recent censuses and household surveys and occasionally, results from older censuses or surveys not previously available.

The full set of empirical data used in this analysis is publicly available from the UN IGME web portal, CME Info <www.childmortality.org>. In this round of estimation, a substantial amount of newly available data has been added to the underlying database for under-five, infant and

neonatal mortality. Data from 44 new surveys or censuses were added for 39 countries and data from vital registration systems or sample vital registration systems were updated for 135 countries. In total, more than 6,400 country-year data points from about 180 series were added or updated. The database, as of August 2020, contains over 18,000 country-year data points from more than 1,600 series across 195 countries from 1990 (or earlier, back to 1911) to 2019. For mortality among children aged 5–14 years, data were calculated from censuses and surveys or vital registration records of population and deaths in the age group. The database for mortality among children aged 5–14 years contains more than 6,800 data points and the database for mortality among children aged 15–24 years contains more than 6,600 data points.

The increased empirical data have substantially changed the UN IGME estimates for some countries from previous editions, partly because the fitted trend line is based on the entire time series of data available for each country. The estimates presented in this report may differ from and are not necessarily comparable with previous sets of UN IGME estimates or the most recent underlying country data.

Whatever the method used to derive the estimates, data quality is critical. UN IGME assesses data quality and does not include data sources with substantial non-sampling errors or omissions as underlying empirical data in its statistical model.

Civil registration data

Data from civil registration systems are the preferred data source for child mortality estimation. The calculation of under-five mortality rates (U5MR, the probability of dying between birth and exactly 5 years of age, expressed per 1,000 live births), infant mortality rates (IMR, the probability of dying between birth and exactly one year of age, expressed per 1,000 live births), mortality rates among children aged 5–14 years (the probability a five-year-old would die before reaching age 15, expressed per 1,000 children aged 5 years) and mortality rates among youth aged 15–24 years (the probability a 15-year-old would die before reaching age 25, expressed per 1,000 youth aged 15 years) are derived from a standard period abridged life table using the age-specific deaths and mid-year population counts from civil registration data. The neonatal mortality rate (NMR, the probability of dying in the first 28 days of life, expressed per 1,000 live births) is calculated with the number of deaths of infants under one month of age and the number of live births in a given year.

For civil registration data (with available data on the number of deaths and mid-year populations), annual observations were initially constructed for all observation years in a country. For country-years in which the coefficient of variation exceeded 10 per cent for children under 5 years or 20 per cent for children aged 5–14 years, deaths and mid-year populations were pooled over longer periods. Starting from more recent years, deaths and population were combined with adjacent previous years to reduce spurious fluctuations in countries where small numbers of births and deaths were observed. The coefficient of variation is defined to be the stochastic standard error of the 5q0 (5q0=U5MR/1,000) or 1q0 (1q0=IMR/1,000) observation divided by the value of the 5q0 or 1q0 observation. The stochastic standard error of the observation is calculated using a Poisson approximation using live birth numbers, given by sqrt(5q0/lb) or similarly sqrt(1q0/lb), where lb is the number of live births in the year of the observation.[28] After this recalculation of the civil registration data, the standard errors are set to a minimum of 2.5 per cent for input into the model. A similar approach was used for neonatal mortality and mortality among children and youth aged 5–24 years.

In previous revisions, UN IGME adjusted vital registration data for incompleteness in the reporting of early infant deaths in several European countries. For more details on the past adjustment, see Notes.[29]

To select country-years for which vital registration data are included for older children, adolescents and youth aged aged 5–24 and to compute adjustment factors in case of incomplete registration, we used a hybrid of the generalized growth balance method (GGB) and the synthetic extinct generation method (SEG), the GGBSEG

method, which is one of several demographic methods known as "death distribution methods"[30] shown to perform better than the GGB and SEG methods in isolation. The GGBSEG method is implemented in the DDM package of the R statistical software.[31] Completeness was estimated for each country for periods between pairs of recent censuses for which an age distribution of the population was available in the Demographic Yearbook.[32] When the estimated completeness was less than 80 per cent, mortality rates derived from vital registration data were excluded from the model fit. When completeness was greater than or equal to 95 per cent, the registration was considered virtually complete and no adjustment was used to adjust mortality estimates upwards. If completeness was between 80 and 95 per cent, we multiplied the inverse of the completeness rate by the number of deaths to obtain adjusted estimates. These adjustments are only applied to mortality data above age 5 as the death distribution methods cannot be applied to estimate completeness of registration of under-five deaths.

Survey data

The majority of survey data on child mortality comes in one of two forms: the full birth history (FBH), whereby women are asked for the date of birth of each of their children, whether the child is still alive, and if not, the child's age at death; and the summary birth history (SBH), whereby women are asked only about the number of children ever born to them and the number who have died (or equivalently, the number still alive).

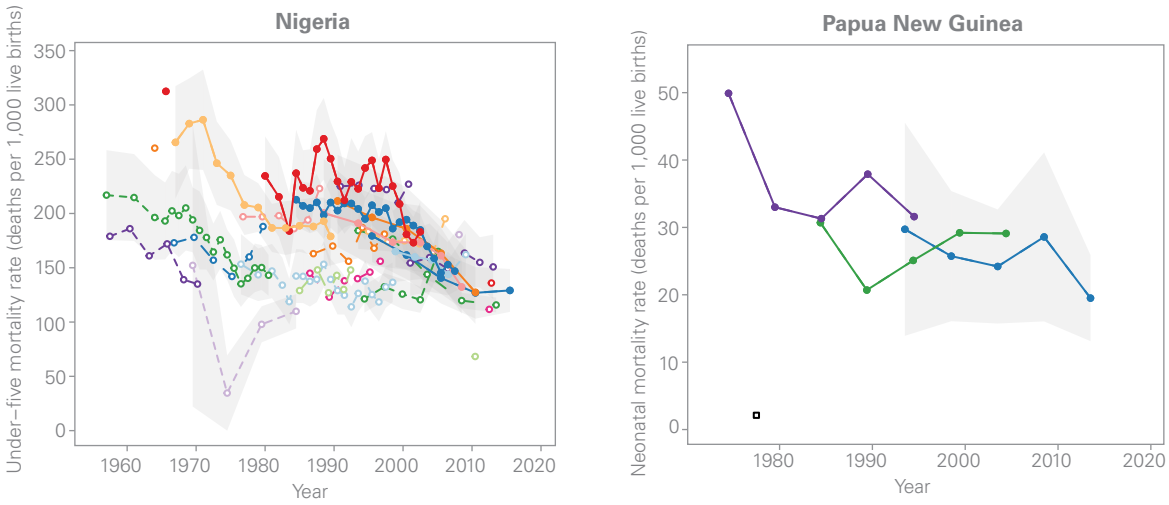
FBH data, collected by all Demographic and Health Surveys and increasingly, by Multiple Indicator Cluster Surveys and other nationally representative surveys, allow for the calculation of child mortality indicators for specific time periods in the past. This enables these survey programmes to publish under-five child mortality estimates for three 5-year periods before the survey; that is, 0 to 4, 5 to 9, 10 to 14, etc,.[33, 34, 35] UN IGME has recalculated estimates for calendar year periods using single calendar years for periods shortly before the survey and gradually increasing the number of years for periods further in the past, whenever microdata from the survey is available. The cut-off points of a given survey for shifting from estimates for single calendar years to two years, or two years to three, etc., are based on the coefficients of variation of the estimates.[36]

Mortality estimates of children aged 5–14 years can also be derived from the FBH module, but the probability of dying among children in this age group (${}_{10}q_5$) is estimated for the period 0–12 years before the survey and divided into periods according to the coefficient of variation of the estimates (< 20 per cent).

In general, SBH data collected by censuses and many household surveys use the woman's age as an indicator of the age of her children and their exposure time to the risk of dying, and employ models to estimate mortality indicators for periods in the past for women ages 25 to 29 through ages 45 to 49. This method is well known but has several shortcomings. Starting with the 2014 round of estimation, the UN IGME changed the method of estimation for SBHs to one based on classification of women by the time that had passed since their first birth. This method has several benefits over the previous one. Firstly, it generally has lower sampling errors and secondly, it avoids the problematic assumption that the mortality estimates derived for each age group of women adequately represent the mortality of the whole population. As a result, it has less susceptibility to the selection effect of young women who give birth early, since all women who give birth necessarily must have a first birth and therefore, are not selected for. Thirdly, the method tends to show less fluctuation across time, particularly in countries with relatively low fertility and mortality. The UN IGME considers the improvements in estimates based on time since first birth worthwhile when compared to the estimates derived from the classification by age of mother. Hence, in cases where the microdata are available, the UN IGME has reanalysed the data using the new method. Due to known biases in the estimation for the 0–4 year period by time since first birth and for the 15–19 and 20–24 age groups of women, these data points are excluded in the estimation model.

Moreover, following advice from UN IGME's TAG, child mortality estimates from SBH were not included if estimates from FBH in the same survey

FIGURE 10 **Empirical child mortality data in Nigeria and Papua New Guinea**



Note: All data available for the country are shown as coloured points, with observations from the same data series joined by lines, and each colour identifying different data sources. Solid points and lines represent data series/observations that were included in the statistical model. Grey bands represent the standard errors of the observations where available or applicable.

were available.[37] SBH data are not used to derive neonatal mortality or mortality among children aged 5–14 years.

Mortality estimates of youth aged 15–24 were derived from the sibling survival histories (SSH). In SSH, women aged 15–49 years are asked to list all their siblings born to the same mother by birth order and to report on each sibling's gender, survival status, current age, if alive, or age at death and years since death, if deceased. Sibling histories have been extensively used to model adult mortality in countries lacking vital registration and to monitor trends in maternal mortality.[38, 39, 40] SSH were used to estimate the probability of a 15-year-old dying before reaching age 25 ($_{10}q_{15}$) for a period of 0–12 years prior to each survey. This period was divided in intervals of various length (6, 4, 3, 2, 1 years) depending on the coefficient of the variation of the estimates.

Adjustment for missing mothers in high-HIV settings

In populations severely affected by HIV/AIDS, HIV-positive children will be more likely to die than other children and will also be less likely to be reported since their mothers will also have been more likely to die. Child mortality estimates will thus be biased downwards. The magnitude of the bias will depend on the extent to which the elevated under-five mortality of HIV-positive children is not reported because of the deaths of their mothers. The TAG developed a method to adjust HIV/AIDS-related mortality for each survey data observation from FBH during HIV/AIDS epidemics (1980–present) by adopting a set of simplified but reasonable assumptions about the distribution of births to HIV-positive women, primarily relating to the duration of their infection, vertical transmission rates, and survival times of both mothers and children from the time of the birth.[41] This method was applied to all direct estimates from FBHs. The model was improved to incorporate the impact of antiretroviral therapies (ART) and prevention of mother to child transmission (PMTCT)[42]. No adjustment was included for HIV-related biases in the age group 5–14, since no method currently exists to estimate the magnitude of this bias in the probability $_{10}q_5$. For mortality at ages 15–24, the vertical transmission of the virus is unlikely to introduce biases in the estimates, as mortality rates relate to the survival of the siblings of adult respondents.

Systematic and random measurement error
Data from these different sources require varied calculation methods and may suffer from different errors, such as random errors in sample surveys or systematic errors due to misreporting. Thus, different surveys often yield widely divergent estimates of U5MR for a given time period, as illustrated in Figure 10. In order to reconcile these differences and take better account of the systematic biases associated with the various types of data inputs, the TAG developed an estimation method to fit a smoothed trend curve to a set of observations and to extrapolate that trend to a defined time point, in this case 2019. This method is described in the following section.

Estimation of under-five mortality rates

Estimation and projection of under-five mortality rates was undertaken using the Bayesian B-splines bias-adjusted model, referred to as the B3 model. This model was developed, validated, and used to produce the previous rounds of the UN IGME child mortality estimates, including the previously published round in September 2019.[43,44]

In the B3 model, log(U5MR) is estimated with a flexible splines regression model. The spline regression model is fitted to all U5MR observations in the country. An observed value for U5MR is considered to be the true value for U5MR multiplied by an error multiplier, i.e., observed U5MR = true U5MR * error multiplier, or on the log scale, log(observed U5MR) = log(true U5MR) + log(error multiplier). The error multiplier refers to the relative difference between an observation and the truth with error multiplier equal to 1 (and log(error multiplier) equal to zero) meaning no error.

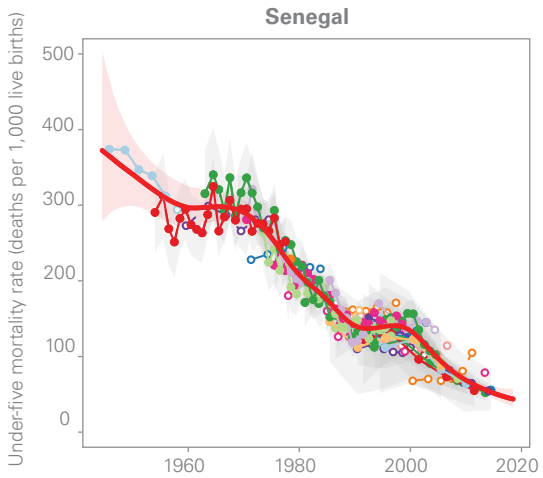
While estimating the true U5MR, properties of the errors that provide information about the quality of the observation or in other words, the extent of error that we expect, are taken into account. These properties include: the standard error of the observation; its source type (e.g., Demographic and Health Surveys versus census); and whether the observation is part of a data series from a specific survey (and how far the data series is from other series with overlapping observation periods). These properties are summarized in the so-called data model. When estimating the U5MR, the data model adjusts for errors in observations, including the average systematic biases associated with different types of data sources, using information on data quality for different source types from all countries.

Figure 11 displays the U5MR over time for Senegal, used here for illustrative purposes.

Compared with the previously applied Loess estimation approach, the B3 model better accounts for data errors, including biases and sampling and non-sampling errors in the data. It can more accurately capture short-term fluctuations in the U5MR and its annual rate of reduction and thus, is better able to account for evidence of acceleration in the decline of under-five mortality from new surveys. Validation exercises show that the B3 model also performs better in short-term projections.

The B3 method was developed and implemented for the UN IGME by Leontine Alkema and Jin Rou New with guidance and review by the UN IGME's TAG. A more complete technical description of the B3 model is available elsewhere.[28]

FIGURE 11 **Empirical under-five mortality data and estimates from the B3 model for Senegal**



Note: The B3 estimates are in red. Ninety per cent uncertainty intervals for the U5MR are given by the pink bands. All data available for the country are shown as coloured points, with observations from the same data series joined by lines. Solid points and lines represent data series/observations that were included for curve-fitting. Grey bands represent the standard errors of the observations where available or applicable.

Estimation of infant mortality rates

In general, the B3 model described above is applied to the U5MR for all countries (except the Democratic People's Republic of Korea where a non-standard method was employed). For countries with high-quality vital registration data (covering a sufficient period of time and deemed to have high levels of completeness and coverage), the B3 model is also used but is fitted to the logit transform of r, i.e., log(r/1-r) where r is the ratio of the IMR estimate to the median B3 estimate of U5MR in the corresponding country-year. This is to restrict the IMR estimate to be lower than the U5MR estimate for any given year. For the remaining countries, the IMR is derived from the U5MR through the use of model life tables that contain known regularities in age patterns of child mortality.[45] The advantage of this approach is that it avoids potential problems with the underreporting of neonatal deaths in some countries and ensures that the internal relationships of the three indicators are consistent with established norms. For Sahelian countries (Burkina Faso, Chad, the Gambia, Mali, Mauritania, the Niger and Senegal) the relationship from model life tables does not apply between infant and child mortality, thus a logit transform of the ratio of IMR/U5MR is used to estimate IMR from U5MR using data from FBHs and a multilevel regression with country-specific intercept.

Adjustment for rapidly changing child mortality driven by HIV/AIDS

To capture the extraordinarily rapid changes in child mortality driven by HIV/AIDS over the epidemic period in some countries, the regression models were fitted to data points for the U5MR from all causes other than HIV/AIDS. UNAIDS estimates of HIV/AIDS under-five mortality were then added to estimates from the regression model. This method was used for 17 countries where the HIV prevalence rate exceeded 5 per cent at any point in time since 1980. Steps were as follows:

1. Compile and assess the quality of all newly available nationally representative data relevant to the estimation of child mortality;

2. Adjust survey data to account for possible biases in data collection and in HIV/AIDS epidemic;

3. Use UNAIDS estimates of HIV/AIDS child mortality[46] to adjust the data points from 1980 onwards to exclude HIV/AIDS deaths;

4. Fit the standard statistical model to the observations to HIV-free data points;

5. Extrapolate the model to the target year; in this case 2019;

6. Add back estimates of deaths due to HIV/AIDS (from UNAIDS);

7. Derive a non-AIDS curve of IMR from the estimated U5MR using model life tables; add the UNAIDS estimates of HIV/AIDS deaths for children under age 1 to generate the final IMR estimates.

Estimation of under-five and infant mortality rates by sex

In 2012, the UN IGME produced estimates of U5MR for males and females separately for the first time.[47] In many countries, fewer sources have provided data by sex than for both sexes combined. For this reason, the UN IGME, rather than estimate U5MR trends by sex directly from reported mortality levels by sex, uses the available data by sex to estimate a time trend in the sex ratio (male/female ratio) of U5MR. Bayesian methods for the UN IGME estimation of sex ratios, with a focus on the estimation and identification of countries with outlying levels or trends, were used. A more complete technical description of the model is available elsewhere.[48]

Estimation of neonatal mortality rates

The NMR is defined as the probability of dying before 28 days, per 1,000 live births. In 2015, the UN IGME method for estimating NMR was updated. The new Bayesian methodology is similar to that used to estimate U5MR and derive estimates by sex. It has the advantage that, compared to the previous model, it can capture data-driven trends in NMR within countries and over time, for all countries. A more complete technical description of the model is available elsewhere.[49]

For neonatal mortality in HIV-affected and crisis-affected populations, the ratio is estimated initially for non-AIDS and non-crisis mortality. After estimation, crisis neonatal deaths are added back on to the neonatal deaths to compute the total estimated neonatal mortality rate. No AIDS deaths are added to the NMR, thereby assuming these deaths only affect child mortality after the first month of life.

Estimation of mortality rates among children aged 5–14 and youth aged 15–24

Since 2017, UN IGME has generated country-specific trend estimates of the mortality in children aged 5–14 years – that is, the probability that a child aged 5 dies before reaching his or her 15th birthday ($_{10}q_5$). For the first time this year, UN IGME has also generated estimates of the mortality in youth aged 15–24 years – that is, the probability that an adolescent aged 15 dies before reaching his or her 25th birthday ($_{10}q_{15}$). The methods used are similar to those used to estimate the U5MR. The B3 statistical model developed for under-five mortality was used to obtain a smooth trend curve in 10q5 as well. In 32 countries and 37 countries, there were not enough data inputs to estimate the probability $_{10}q_5$ and $_{10}q_{15}$ from vital registration, surveys or censuses. For these cases, the probability $_{10}q_5$ and $_{10}q_5$was modelled on the draft estimates of U5MR and an expected relation between mortality in the 0–4 and 5–14 or 15–24 age groups, as observed in countries with sufficient data series. A hierarchical linear regression was used to regress log($_{10}q_5$) or log($_{10}q_{15}$) against log(U5MR) and the coefficients of this regression were used to predict the probability $_{10}q_5$ and $_{10}q_{15}$ between 1990 and 2019 for countries with insufficient data sources. The advantage of this approach is that no model life tables are used (such life tables are based on the historical experience of countries with high-quality vital registration data and do not always adequately reflect mortality age patterns in low- and middle-income countries). A more complete technical description of the model is available elsewhere.[50]

The B3 statistical model was also used to obtain a smooth trend curve in the probability of a 5-year-old dying before age 15 ($_{10}q_5$) and the probability of a 15-year-old dying before age 25 ($_{10}q_{15}$).

It is worth noting that for all non-VR data series, non-sampling biases specific to data series are estimated with the B3 model. We observed that full birth histories from surveys tend to slightly under-estimate mortality in the age group 5–14 when compared to other data series. Sibling histories used to model the probability $_{10}q_{15}$ also tend to under-estimate mortality in the age group 15–24, especially for reference periods that are located further in the past from the survey date. This is likely due to omissions of some deaths or systematic age misstatements. As a result, in countries where the trend in mortality is largely informed by survey data, the final estimates are adjusted upwards and therefore, the final estimated series may fall slightly above the original survey data points.

Estimation of child mortality due to conflict and natural disasters

Estimated deaths from major crises were derived from various data sources from 1990 to the present. Date from natural disasters were obtained from the Centre for Research on the Epidemiology of Disasters' International Disaster Database,[51] with under-five proportions estimated as described elsewhere.[52] Conflict deaths were taken from Uppsala Conflict Data Program/ Peace Research Institute Oslo data sets as well as from reports prepared by the UN and other organizations. Estimated child and youth deaths due to major crises were included if they met the following criteria: (1) the crisis was isolated to a few years; (2) under-five crisis deaths, crisis deaths among children aged 5–14 years or crisis deaths among youth aged 15–24 years were greater than 10 per cent of non-crisis deaths in the age group; (3) crisis U5MR, crisis $_{10}q_5$ or crisis $_{10}q_{15}$ was > 0.2 deaths per 1,000; (4) the number of crisis deaths among children under 5 years, or among those 5–14 or 15–24 years old was > 10 deaths.

These criteria resulted in 22 different crises being explicitly incorporated into the UN IGME estimates for under-five mortality, 54 different crises being incorporated into the mortality estimates among children aged 5–14 years, and 61 different crises being incorporated into the mortality estimates among children aged 15–24 years. Because background mortality rates were relatively low in these age groups, crisis deaths represented a larger share of deaths and thus, more crises met the criteria for inclusion than for under-five mortality. Crisis deaths were included

in the estimates by first excluding data points from crisis years, then fitting the B3 model to the remaining data and adding the crisis-specific mortality rate to the fitted B3 curve. Crisis death estimates are uncertain but presently, no uncertainty around crisis deaths is included in the uncertainty intervals of the estimates. Instead, we assume the relative uncertainty in the adjusted estimates is equal to the relative uncertainty in the non-adjusted estimates; this assumption will be revisited in the near future.

UN IGME has assessed recent humanitarian crises and, based on the scarcity of currently available data and the difficulties of estimating the broader impact of these crises on health systems, decided to hold the estimates constant from the start of the crisis while increasing the uncertainty over the crisis time for three countries: South Sudan, Venezuela (Bolivarian Republic of) and Yemen. Where applicable, direct crisis deaths have been added to the constant trend estimate. UN IGME will review new data, if available, in the next estimation round and revise estimates accordingly.

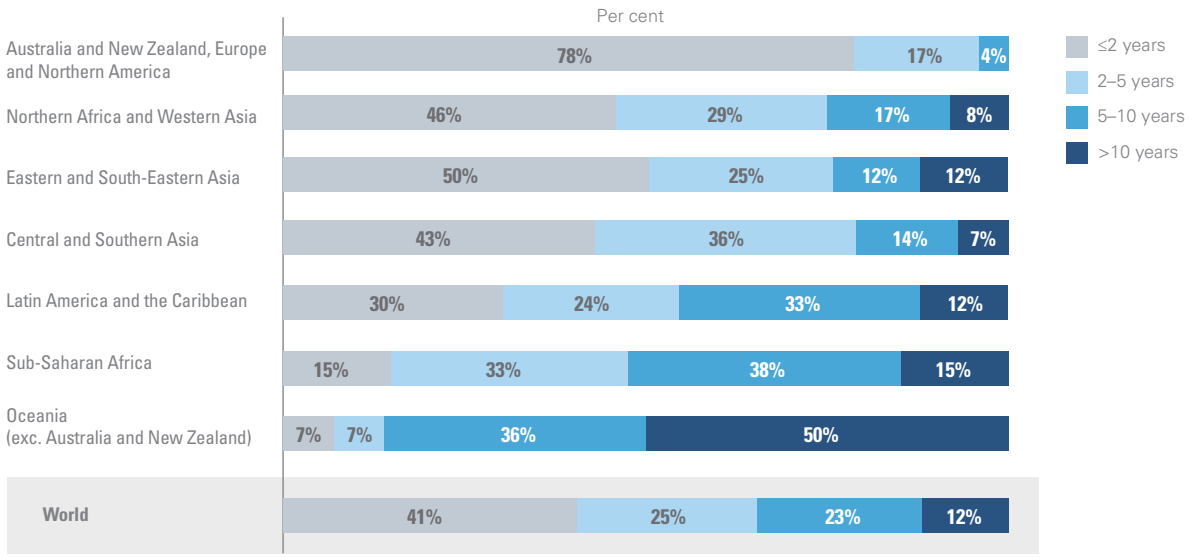
COVID-19

While current evidence indicates the direct impact of COVID-19 on child and youth mortality is limited, indirect effects stemming from strained and under-resourced health systems; limitations on care-seeking and preventative measures like vaccination and nutrition supplements; socioeconomic strain on parents and households resulting from job loss or economic downturns; and stress to children and parents associated with abrupt societal shifts may be substantial and widespread. Moreover, many of these indirect effects may not be apparent for some time after the pandemic recedes and may reverberate for an extended period following the pandemic. The UN IGME is currently assessing the impact of COVID-19 on child and youth mortality for the year 2020 and will incorporate these effects in next year's estimates where applicable.

Estimation of uncertainty intervals

Given the inherent uncertainty in child mortality estimates, 90 per cent uncertainty intervals are used by UN IGME instead of the more conventional 95 per cent intervals. Reporting intervals based on higher levels of uncertainty (i.e., 95 per cent instead of 90 per cent) has the advantage that the chance of not having included the true value in the interval is smaller. The disadvantage of choosing higher uncertainty levels, however, is that intervals lose their utility to present meaningful summaries of a range of likely outcomes if the indicator of interest is highly uncertain. Given this trade-off and the substantial

FIGURE 12 **Distribution of the country extrapolation periods in each Sustainable Development Goal region and the world**



uncertainty associated with child mortality estimates, UN IGME chose to report 90 per cent uncertainty intervals or in other words, intervals for which there is a 90 per cent chance that they contain the true value, to encourage wider use and interpretation of uncertainty intervals.

Extrapolation to common reference year

If the underlying empirical data refer to an earlier reference period than the end year of the period the estimates are reported, UN IGME extrapolates the estimates to the common end year; in this round, to 2019. UN IGME does not use covariates to derive the estimates but uses the past trend in a country and the global trend to extrapolate to the target year. The average extrapolation period in the 2020 round of estimation was 4.5 years for under-five mortality with half of the countries having data points within the past 3.0 years. For more than a third of all countries, the latest available child mortality estimate was more than five years old (Figure 12).

Calculating number of deaths

Under-five, infant and neonatal deaths

A birth-week cohort method is used to calculate the absolute number of deaths among neonates, infants and children under age 5. First, each annual birth cohort is divided into 52 equal birth-week cohorts. Then each birth-week cohort is exposed throughout the first five years of life to the appropriate calendar year- and age-specific mortality rates depending on cohort age. For example, the 20th birth-week cohort of the year 2000 will be exposed to the infant mortality rates in both 2000 and 2001. All deaths from birth-week cohorts occurring as a result of exposure to the mortality rate for a given calendar year are allocated to that year and are summed by age group at death to get the total number of deaths for a given year and age group. Continuing with the above example, deaths from the 20th birth-week cohort of the year 2000 would contribute to infant deaths in year 2000 and 2001. Any deaths occurring among the 20th birth-week cohort of year 2000 after the 20th week in 2001 would contribute to under-five deaths for year 2001 and so forth. Under-five deaths in each calendar year are calculated by summing up all the deaths under age 5 across all age group cohorts in that year. The annual estimate of the number of live births in each country from the World Population Prospects: the 2019 revision[6] is used to calculate the number of deaths.

Deaths among children aged 5–14 years and youth aged 15–24

The absolute number of deaths among those aged 5–14 in a given year and country is calculated using the central death rates of age groups 5–9 and 10–14 years, ${}_5M_5$ and ${}_5M_{10}$, computed from the estimated ${}_5q_5$ and ${}_5q_{10}$. The central deaths rates are then multiplied by the country population estimates for the respective age groups from the World Population Prospects: the 2019 revision[6] to calculate the number of deaths.
A similar approach is used for calculating the number of deaths in the age group 15–24: the estimated ${}_5q_{15}$ and ${}_5q_{20}$ are converted in central death rates ${}_5M_{15}$ and ${}_5M_{20}$ and multiplied by the population estimates.

Notes

1. Values in parentheses indicate 90 per cent uncertainty intervals for the estimates. For relatively low age-specific mortality rates, the median and uncertainty bounds can appear to be the same since age-specific mortality rates are rounded to zero digits in the text.

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3. See <sustainabledevelopment.un.org>.

4. The annual rate of reduction (ARR) in the mortality rates is defined as ARR=log(Mortality ratet2/Mortality ratet1) / (t1 – t2) where t1 and t2 refer to different years with t1< t2.

5. The ARR 2010-2019 for Latin America and the Caribbean is calculated from crisis-free rates due to the effect of the 2010 Haiti earthquake on the regional ARRs. 2010-2019 ARRs this region including crisis are NMR: 2.3 per cent; U5MR: 4.7 per cent; age 5—9: 11.1 per cent; age 10—14: 8.6 per cent; age 15—19: 3.2 per cent; age 20—24: 1.9 per cent.

6. United Nations Department of Economic and Social Affairs Population Division, World Population Prospects 2019, United Nations, New York, 2019.

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10. The annual rate of reduction (ARR) from 2010–2019 is used to project mortality rates at the country level from 2020–2030, with the neonatal mortality rate constrained so as not to exceed the under-five mortality rate. If a country had a negative ARR in 2010–2019 (i.e., an increase in mortality rates in 2010–2019), the rate was held constant at the estimated 2019 value. If a country reached the current lowest observed mortality level among countries with more than 10,000 live births during the projection period, the mortality rate was held constant at that lowest observed level for the remainder of the projection period. Regional aggregates were calculated based on the projected country level estimates. Crisis mortality was removed from the estimates for the calculation of the ARR.

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The UN IGME previously carried out an analysis of the ratio of early neonatal (under seven days) deaths to total neonatal deaths, which showed that several countries, many in Eastern Europe, had significantly lower values than what would be expected, suggesting an undercounting of early infant deaths. The results of this analysis were used as an upwards adjustment of 10 per cent, or 20 per cent to under-five mortality rates across all years for several countries in previous UN IGME reports.

This assessment was revisited in the 2017 estimation round using the latest data and the clear signal of underreporting was no longer apparent across countries. Therefore, the UN IGME has removed these adjustment factors in the estimates for this publication. Going forward, the UN IGME will assemble finer age-specific child mortality data and attempt to determine the current level of underreporting bias in different countries and how that bias has changed over time. This analysis could lead to a different adjustment approach in future estimates.

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Country, regional and global estimates of mortality among children, adolescents and youth under age 25

	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
Country	**U5MR**	Lower bound	Upper bound	**U5MR**	Lower bound	Upper bound	**ARR**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound
Afghanistan	**178**	163	194	**60**	47	75	**3.7**	2.9	4.6	**110**	101	120	**72**	57	89
Albania	**41**	36	46	**10**	9	10	**5.0**	4.5	5.4	**3**	3	4	**0**	0	0
Algeria	**49**	46	53	**23**	23	24	**2.6**	2.3	2.9	**41**	38	44	**24**	23	24
Andorra	**13**	3	50	**3**	1	11	**5.1**	-2.9	12.9	**0**	0	0	**0**	0	0
Angola	**222**	197	251	**75**	35	139	**3.8**	1.6	6.4	**125**	111	141	**93**	43	172
Antigua and Barbuda	**14**	12	16	**7**	5	9	**2.6**	1.3	3.9	**0**	0	0	**0**	0	0
Argentina	**29**	28	29	**9**	9	10	**3.9**	3.7	4.1	**21**	20	21	**7**	7	7
Armenia	**49**	44	54	**12**	9	15	**4.9**	3.9	6.0	**4**	3	4	**0**	0	1
Australia	**9**	9	9	**4**	3	4	**3.2**	3.0	3.4	**2**	2	2	**1**	1	1
Austria	**10**	9	10	**3**	3	4	**3.5**	3.0	4.0	**1**	1	1	**0**	0	0
Azerbaijan	**95**	86	105	**20**	13	32	**5.3**	3.7	6.9	**19**	18	21	**3**	2	5
Bahamas	**23**	22	25	**13**	10	16	**2.1**	1.3	3.0	**0**	0	0	**0**	0	0
Bahrain	**23**	22	24	**7**	5	9	**4.1**	3.3	5.0	**0**	0	0	**0**	0	0
Bangladesh	**144**	140	148	**31**	28	34	**5.3**	5.0	5.7	**513**	498	528	**90**	82	99
Barbados	**18**	17	19	**13**	9	18	**1.2**	0.1	2.4	**0**	0	0	**0**	0	0
Belarus	**15**	15	16	**3**	3	4	**5.3**	5.0	5.7	**2**	2	2	**0**	0	0
Belgium	**10**	10	10	**3**	3	4	**3.7**	3.2	4.3	**1**	1	1	**0**	0	0
Belize	**38**	34	43	**12**	11	14	**3.9**	3.2	4.6	**0**	0	0	**0**	0	0
Benin	**175**	165	186	**90**	77	105	**2.3**	1.8	2.8	**38**	36	41	**37**	32	43
Bhutan	**127**	112	146	**28**	18	44	**5.2**	3.6	6.8	**2**	2	3	**0**	0	1
Bolivia (Plurinational State of)	**122**	115	128	**26**	20	34	**5.3**	4.4	6.3	**29**	27	30	**6**	5	8
Bosnia and Herzegovina	**18**	18	19	**6**	5	7	**3.9**	3.3	4.5	**1**	1	1	**0**	0	0
Botswana	**48**	41	58	**42**	15	87	**0.5**	-2.1	4.0	**2**	2	3	**2**	1	5
Brazil	**63**	59	67	**14**	12	17	**5.2**	4.6	5.9	**233**	217	249	**40**	34	48
Brunei Darussalam	**13**	13	14	**11**	10	13	**0.5**	0.1	1.0	**0**	0	0	**0**	0	0
Bulgaria	**18**	18	19	**7**	6	7	**3.5**	3.2	3.7	**2**	2	2	**0**	0	0
Burkina Faso	**199**	186	212	**88**	64	121	**2.8**	1.7	3.9	**79**	74	84	**65**	47	89
Burundi	**174**	159	192	**56**	37	85	**3.9**	2.4	5.3	**46**	42	50	**24**	16	37
Cabo Verde	**61**	58	63	**15**	12	18	**4.8**	4.2	5.5	**1**	1	1	**0**	0	0
Cambodia	**116**	107	125	**27**	14	50	**5.1**	2.9	7.3	**44**	41	48	**10**	5	18
Cameroon	**136**	127	145	**75**	62	90	**2.1**	1.4	2.7	**69**	64	74	**66**	54	79
Canada	**8**	8	8	**5**	5	5	**1.8**	1.6	2.1	**3**	3	3	**2**	2	2
Central African Republic	**177**	158	198	**110**	64	189	**1.6**	-0.3	3.5	**20**	18	23	**18**	11	31
Chad	**212**	197	229	**114**	86	150	**2.1**	1.2	3.1	**60**	56	65	**73**	56	97
Chile	**19**	19	19	**7**	5	9	**3.5**	2.6	4.4	**6**	5	6	**2**	1	2
China	**54**	49	59	**8**	7	9	**6.6**	6.1	7.2	**1,379**	1,268	1,504	**132**	116	152
Colombia	**35**	33	38	**14**	10	19	**3.2**	2.0	4.5	**31**	29	33	**10**	7	14
Comoros	**124**	110	139	**63**	31	134	**2.4**	-0.3	4.9	**2**	2	2	**2**	1	4
Congo	**90**	79	103	**48**	28	83	**2.2**	0.3	4.0	**8**	7	9	**8**	5	14
Cook Islands	**24**	22	27	**8**	4	13	**4.0**	2.1	5.8	**0**	0	0	**0**	0	0
Costa Rica	**17**	17	17	**9**	8	9	**2.3**	2.1	2.5	**1**	1	1	**1**	1	1
Cote d'Ivoire	**152**	142	163	**79**	63	100	**2.3**	1.4	3.1	**75**	70	81	**70**	56	88
Croatia	**13**	12	13	**5**	4	5	**3.4**	3.0	3.8	**1**	1	1	**0**	0	0

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

	Sex-specific under-five mortality rate (deaths per 1,000 live births)				Infant mortality rate (deaths per 1,000 live births)		Number of infant deaths (thousands)[a]		Neonatal mortality rate (deaths per 1,000 live births)		Number of neonatal deaths (thousands)[a]		Probability of dying among children aged 5–14 years (per 1,000 children aged 5)		Number of deaths among children aged 5-14 (thousands)[a]		Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15)		Number of deaths among youth aged 15–24 (thousands)[a]	
	1990		2019																	
Country	**Male**	**Female**	**Male**	**Female**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**
Afghanistan	182	173	64	57	120	47	76	56	74	36	48	43	18	4	7	5	50	31	12	26
Albania	45	37	10	9	35	9	3	0	13	8	1	0	6	2	0	0	8	4	1	0
Algeria	54	45	25	22	42	20	35	20	23	16	19	16	9	3	7	3	11	6	6	4
Andorra	15	11	3	3	9	3	0	0	7	1	0	0	3	1	0	0	9	3	0	0
Angola	233	210	80	69	131	50	76	63	53	28	32	35	47	16	17	16	71	32	16	20
Antigua and Barbuda	15	13	7	6	11	6	0	0	8	4	0	0	3	2	0	0	14	6	0	0
Argentina	32	26	10	8	25	8	18	6	15	6	11	5	3	2	2	1	9	8	5	6
Armenia	53	44	13	11	42	11	3	0	22	6	2	0	3	2	0	0	7	4	0	0
Australia	10	8	4	3	8	3	2	1	5	2	1	1	2	1	0	0	8	3	2	1
Austria	11	8	4	3	8	3	1	0	5	2	0	0	2	1	0	0	8	3	1	0
Azerbaijan	101	89	22	18	76	18	16	3	33	11	7	2	6	3	1	0	9	6	1	1
Bahamas	25	22	13	12	20	11	0	0	14	7	0	0	5	3	0	0	12	17	0	0
Bahrain	24	22	7	7	20	6	0	0	15	3	0	0	4	2	0	0	6	5	0	0
Bangladesh	147	140	33	29	100	26	355	74	64	19	232	56	24	7	69	21	24	12	51	36
Barbados	20	16	14	11	16	12	0	0	12	8	0	0	3	2	0	0	10	6	0	0
Belarus	17	13	4	3	12	2	2	0	8	1	1	0	4	1	1	0	11	4	2	0
Belgium	11	9	4	3	8	3	1	0	5	2	1	0	2	1	0	0	8	3	1	0
Belize	42	35	13	11	31	11	0	0	18	8	0	0	5	3	0	0	9	11	0	0
Benin	182	167	96	84	106	59	24	25	46	31	11	13	42	20	6	6	29	22	3	5
Bhutan	132	122	31	26	89	24	2	0	42	17	1	0	19	7	0	0	30	12	0	0
Bolivia (Plurinational State of)	128	115	28	23	84	21	20	5	41	15	10	4	12	4	2	1	23	10	3	2
Bosnia and Herzegovina	20	16	6	5	16	5	1	0	11	4	1	0	3	1	0	0	6	4	0	0
Botswana	52	44	45	38	36	32	2	2	17	18	1	1	19	6	1	0	38	15	1	1
Brazil	69	57	16	12	52	12	193	36	25	8	94	23	4	2	14	7	13	14	39	46
Brunei Darussalam	15	12	13	10	10	10	0	0	6	6	0	0	5	2	0	0	14	4	0	0
Bulgaria	21	16	7	6	15	6	2	0	8	3	1	0	4	2	0	0	8	5	1	0
Burkina Faso	206	191	92	83	99	54	40	40	46	26	19	20	37	17	10	10	37	16	6	6
Burundi	182	166	61	52	105	40	28	17	40	21	11	9	58	21	9	7	60	18	6	4
Cabo Verde	65	56	16	13	47	13	1	0	20	9	0	0	6	2	0	0	9	6	0	0
Cambodia	124	108	30	23	85	23	32	8	40	14	15	5	32	5	8	2	37	8	6	2
Cameroon	144	127	81	69	84	50	43	45	40	26	21	24	32	23	11	16	31	30	7	15
Canada	9	7	5	4	7	4	3	2	4	3	2	1	2	1	1	0	7	5	3	2
Central African Republic	184	169	116	104	115	81	13	13	52	40	6	7	30	14	2	2	45	35	2	4
Chad	222	202	120	107	112	69	33	45	52	33	16	22	49	26	9	12	47	35	5	11
Chile	21	17	8	6	16	6	5	1	9	5	3	1	3	1	1	0	8	5	2	1
China	56	51	8	7	42	7	1,070	113	30	4	745	64	7	2	145	32	9	4	222	66
Colombia	39	31	15	12	29	12	26	9	18	7	16	5	5	2	4	2	26	11	18	10
Comoros	131	117	68	58	87	48	2	1	50	30	1	1	17	8	0	0	24	9	0	0
Congo	96	85	52	44	59	35	5	6	27	19	2	3	30	8	2	1	54	16	3	2
Cook Islands	25	23	8	7	20	7	0	0	13	4	0	0	5	2	0	0	17	9	0	0
Costa Rica	19	15	9	8	14	8	1	1	9	6	1	0	3	2	0	0	6	8	0	1
Cote d'Ivoire	164	140	87	71	104	59	52	53	49	33	25	30	28	25	10	17	31	26	7	14
Croatia	14	11	5	4	11	4	1	0	8	3	0	0	3	1	0	0	8	3	1	0

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
Country	**U5MR**	Lower bound	Upper bound	**U5MR**	Lower bound	Upper bound	**ARR**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound
Cuba	**14**	12	15	**5**	4	6	**3.3**	2.6	4.0	**2**	2	3	**1**	1	1
Cyprus	**11**	11	12	**2**	2	3	**5.5**	4.2	6.7	**0**	0	0	**0**	0	0
Czechia	**12**	12	12	**3**	3	3	**4.6**	4.4	4.9	**2**	2	2	**0**	0	0
Democratic People's Republic of Korea	**43**	34	56	**17**	14	22	**3.2**	3.2	3.2	**18**	14	23	**6**	5	8
Democratic Republic of the Congo	**185**	167	205	**85**	54	129	**2.7**	1.2	4.2	**282**	255	311	**291**	187	440
Denmark	**9**	9	9	**4**	3	4	**3.0**	2.7	3.3	**1**	1	1	**0**	0	0
Djibouti	**118**	101	137	**57**	34	94	**2.5**	0.7	4.3	**3**	2	3	**1**	1	2
Dominica	**16**	15	18	**35**	32	42	**-2.6**	-3.3	-2.2	**0**	0	0	**0**	0	0
Dominican Republic	**60**	56	64	**28**	19	41	**2.6**	1.3	3.9	**13**	12	13	**6**	4	8
Ecuador	**54**	49	59	**14**	13	15	**4.6**	4.2	5.1	**16**	15	18	**5**	4	5
Egypt	**86**	82	90	**20**	14	29	**5.0**	3.7	6.2	**158**	151	166	**52**	37	75
El Salvador	**60**	54	65	**13**	8	21	**5.2**	3.6	6.8	**10**	9	11	**2**	1	2
Equatorial Guinea	**178**	157	201	**82**	49	135	**2.7**	0.9	4.5	**3**	3	3	**4**	2	6
Eritrea	**153**	140	167	**40**	24	67	**4.6**	2.8	6.3	**14**	13	15	**4**	3	7
Estonia	**18**	17	18	**2**	2	3	**6.9**	6.3	7.4	**0**	0	0	**0**	0	0
Eswatini	**67**	60	76	**49**	33	74	**1.1**	-0.4	2.5	**2**	2	2	**1**	1	2
Ethiopia	**200**	186	215	**51**	42	62	**4.7**	4.0	5.4	**432**	402	465	**178**	146	216
Fiji	**29**	25	34	**26**	23	29	**0.4**	-0.3	1.1	**1**	1	1	**0**	0	1
Finland	**7**	6	7	**2**	2	3	**3.6**	3.2	3.9	**0**	0	0	**0**	0	0
France	**9**	9	9	**4**	4	5	**2.4**	2.2	2.6	**7**	7	7	**3**	3	3
Gabon	**92**	79	106	**42**	27	68	**2.7**	1.0	4.3	**3**	3	4	**3**	2	4
Gambia	**167**	151	186	**52**	43	61	**4.0**	3.3	4.8	**7**	6	8	**5**	4	5
Georgia	**48**	43	53	**10**	8	11	**5.5**	4.9	6.2	**4**	4	5	**1**	0	1
Germany	**9**	8	9	**4**	4	4	**2.8**	2.6	2.9	**7**	7	7	**3**	3	3
Ghana	**127**	120	134	**46**	37	57	**3.5**	2.7	4.3	**73**	69	77	**40**	32	50
Greece	**10**	10	11	**4**	3	4	**3.5**	3.1	4.0	**1**	1	1	**0**	0	0
Grenada	**22**	21	24	**17**	13	20	**1.0**	0.3	1.8	**0**	0	0	**0**	0	0
Guatemala	**80**	75	85	**25**	19	31	**4.1**	3.2	5.0	**28**	27	30	**10**	8	13
Guinea	**231**	216	247	**99**	83	119	**2.9**	2.3	3.5	**67**	62	71	**44**	37	53
Guinea-Bissau	**221**	197	248	**78**	49	120	**3.6**	2.1	5.2	**10**	9	11	**5**	3	8
Guyana	**60**	54	67	**29**	18	47	**2.5**	0.8	4.2	**1**	1	1	**0**	0	1
Haiti	**145**	135	155	**63**	48	84	**2.9**	1.9	3.8	**37**	35	40	**17**	13	23
Honduras	**58**	54	63	**17**	11	25	**4.3**	2.9	5.7	**11**	10	12	**3**	2	5
Hungary	**17**	17	18	**4**	3	4	**5.3**	4.9	5.8	**2**	2	2	**0**	0	0
Iceland	**6**	6	7	**2**	1	3	**4.1**	3.1	5.1	**0**	0	0	**0**	0	0
India[b]	**126**	122	131	**34**	31	38	**4.5**	4.1	4.9	**3,420**	3,307	3,541	**824**	738	913
Indonesia	**84**	80	88	**24**	20	29	**4.3**	3.7	5.0	**393**	375	413	**115**	97	139
Iran (Islamic Republic of)	**56**	52	61	**14**	9	23	**4.8**	3.1	6.5	**103**	95	112	**21**	13	35
Iraq	**53**	49	58	**26**	20	33	**2.5**	1.6	3.4	**34**	32	38	**29**	22	37
Ireland	**9**	9	10	**3**	3	4	**3.5**	3.0	4.1	**0**	0	1	**0**	0	0
Israel	**12**	11	12	**4**	3	4	**4.0**	3.8	4.2	**1**	1	1	**1**	1	1
Italy	**10**	9	10	**3**	3	3	**3.9**	3.6	4.2	**5**	5	6	**1**	1	2
Jamaica	**30**	26	36	**14**	8	24	**2.7**	0.7	4.7	**2**	2	2	**1**	0	1

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Country	Sex-specific under-five mortality rate (deaths per 1,000 live births)				Infant mortality rate (deaths per 1,000 live births)		Number of infant deaths (thousands)[a]		Neonatal mortality rate (deaths per 1,000 live births)		Number of neonatal deaths (thousands)[a]		Probability of dying among children aged 5–14 years (per 1,000 children aged 5)		Number of deaths among children aged 5-14 (thousands)[a]		Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15)		Number of deaths among youth aged 15–24 (thousands)[a]	
	1990		2019																	
	Male	Female	Male	Female	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019
Cuba	15	12	6	5	11	4	2	0	7	2	1	0	4	2	1	0	11	5	2	1
Cyprus	12	10	2	2	10	2	0	0	6	1	0	0	2	1	0	0	6	3	0	0
Czechia	14	11	4	3	10	3	1	0	7	2	1	0	2	1	0	0	7	4	1	0
Democratic People's Republic of Korea	47	39	19	15	33	13	14	5	21	10	9	3	8	4	3	1	15	9	7	4
Democratic Republic of the Congo	194	177	91	78	119	66	186	229	42	27	67	97	37	22	36	55	46	37	30	63
Denmark	10	8	4	3	7	3	0	0	4	3	0	0	2	1	0	0	5	2	0	0
Djibouti	125	110	62	52	92	48	2	1	49	31	1	1	26	13	0	0	43	27	1	0
Dominica	18	15	39	34	13	31	0	0	10	28	0	0	4	3	0	0	6	6	0	0
Dominican Republic	64	56	31	25	46	23	10	5	24	19	5	4	7	3	1	1	13	13	2	2
Ecuador	59	48	16	12	42	12	13	4	22	7	7	2	7	3	2	1	14	10	3	3
Egypt	85	86	21	19	63	17	116	45	33	11	62	29	11	4	16	9	12	7	13	13
El Salvador	64	55	15	12	46	11	8	1	22	7	4	1	8	3	1	0	27	24	3	3
Equatorial Guinea	187	168	88	76	120	60	2	3	48	29	1	1	35	16	0	1	40	25	0	1
Eritrea	166	139	46	35	94	30	8	3	35	18	3	2	41	7	3	1	51	22	2	1
Estonia	20	15	3	2	14	2	0	0	10	1	0	0	5	1	0	0	14	4	0	0
Eswatini	73	61	54	45	51	39	2	1	21	18	1	1	11	13	0	0	30	25	0	1
Ethiopia	213	187	56	45	119	37	263	129	59	28	134	99	79	11	113	31	92	17	83	40
Fiji	31	26	28	23	24	22	1	0	12	11	0	0	11	5	0	0	16	10	0	0
Finland	7	6	3	2	6	2	0	0	4	1	0	0	2	1	0	0	8	5	1	0
France	10	8	5	4	7	4	6	3	4	3	3	2	2	1	2	1	8	3	7	2
Gabon	98	85	47	38	60	31	2	2	31	20	1	1	18	12	0	1	23	15	0	1
Gambia	177	158	56	47	82	36	4	3	46	27	2	2	33	10	1	1	39	19	1	1
Georgia	53	42	11	8	41	9	4	0	25	5	2	0	4	2	0	0	9	7	1	0
Germany	10	7	4	3	7	3	6	3	3	2	3	2	2	1	2	1	6	3	7	2
Ghana	135	119	51	41	80	34	46	30	42	23	25	20	25	11	10	8	30	15	9	9
Greece	11	10	4	3	9	3	1	0	6	2	1	0	2	1	0	0	7	3	1	0
Grenada	24	21	18	15	18	15	0	0	12	11	0	0	5	4	0	0	11	6	0	0
Guatemala	86	74	27	22	59	21	21	9	28	12	10	5	13	4	3	1	20	15	4	6
Guinea	239	223	105	93	137	64	40	29	61	30	19	14	44	19	8	7	34	31	4	9
Guinea-Bissau	232	210	85	72	131	52	6	3	63	35	3	2	42	16	1	1	46	24	1	1
Guyana	67	53	33	25	46	24	1	0	30	19	1	0	5	5	0	0	14	17	0	0
Haiti	153	136	68	57	100	48	26	13	39	25	10	7	28	11	6	3	41	18	5	4
Honduras	63	53	19	15	45	14	8	3	22	9	4	2	9	4	1	1	18	10	2	2
Hungary	19	15	4	3	15	3	2	0	11	2	1	0	3	1	0	0	8	3	1	0
Iceland	7	6	2	2	5	2	0	0	3	1	0	0	3	0	0	0	7	3	0	0
India[b]	122	131	34	35	89	28	2,401	679	57	22	1,579	522	21	5	447	136	24	10	407	246
Indonesia	90	77	26	21	62	20	287	97	31	12	143	60	14	5	61	24	13	10	48	46
Iran (Islamic Republic of)	56	56	15	13	44	12	79	18	25	9	46	13	14	3	23	4	23	10	25	11
Iraq	57	49	28	23	42	22	27	24	26	15	17	17	10	4	5	4	11	10	4	7
Ireland	10	8	4	3	8	3	0	0	5	2	0	0	2	1	0	0	6	2	0	0
Israel	12	11	4	3	10	3	1	1	6	2	1	0	2	1	0	0	5	3	0	0
Italy	11	9	3	3	8	3	5	1	6	2	4	1	2	1	1	0	6	3	6	2
Jamaica	34	27	15	12	25	12	2	1	20	10	1	0	5	3	0	0	13	9	1	0

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
Country	**U5MR**	Lower bound	Upper bound	**U5MR**	Lower bound	Upper bound	**ARR**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound
Japan	**6**	6	6	**2**	2	3	**3.3**	3.1	3.4	**8**	8	9	**2**	2	2
Jordan	**36**	34	38	**16**	12	21	**2.9**	1.8	3.9	**4**	4	5	**3**	3	4
Kazakhstan	**52**	47	57	**10**	10	11	**5.5**	5.2	5.9	**20**	18	22	**4**	4	4
Kenya	**101**	95	108	**43**	32	59	**2.9**	1.8	4.0	**100**	94	107	**64**	47	87
Kiribati	**95**	82	110	**51**	30	87	**2.2**	0.3	4.1	**0**	0	0	**0**	0	0
Kuwait	**17**	17	18	**8**	7	9	**2.7**	2.4	3.1	**1**	1	1	**0**	0	0
Kyrgyzstan	**65**	58	73	**18**	17	19	**4.4**	3.9	4.8	**9**	8	10	**3**	3	3
Lao People's Democratic Republic	**153**	141	166	**46**	34	60	**4.2**	3.2	5.3	**27**	25	29	**8**	6	10
Latvia	**17**	16	18	**4**	3	5	**5.3**	4.5	6.2	**1**	1	1	**0**	0	0
Lebanon	**32**	29	36	**7**	4	14	**5.2**	2.9	7.6	**2**	2	3	**1**	0	2
Lesotho	**85**	77	95	**86**	59	124	**0.0**	-1.3	1.3	**5**	5	6	**5**	3	7
Liberia	**263**	241	287	**85**	66	108	**3.9**	3.0	4.8	**25**	23	27	**13**	10	17
Libya	**42**	36	49	**12**	7	18	**4.4**	2.8	6.2	**5**	5	6	**1**	1	2
Lithuania	**15**	14	16	**4**	3	4	**4.9**	4.4	5.3	**1**	1	1	**0**	0	0
Luxembourg	**9**	8	9	**3**	2	4	**4.0**	3.0	4.9	**0**	0	0	**0**	0	0
Madagascar	**157**	147	169	**51**	40	64	**3.9**	3.1	4.7	**77**	72	83	**43**	34	54
Malawi	**243**	229	257	**42**	27	61	**6.1**	4.8	7.6	**100**	94	106	**26**	17	38
Malaysia	**17**	16	17	**9**	8	9	**2.3**	2.1	2.5	**8**	8	8	**5**	4	5
Maldives	**86**	78	94	**8**	7	9	**8.4**	7.8	8.9	**1**	1	1	**0**	0	0
Mali	**230**	216	244	**94**	76	117	**3.1**	2.3	3.8	**91**	86	97	**74**	60	91
Malta	**11**	11	12	**7**	6	9	**1.7**	0.8	2.5	**0**	0	0	**0**	0	0
Marshall Islands	**49**	42	58	**32**	20	51	**1.5**	-0.2	3.3	**0**	0	0	**0**	0	0
Mauritania	**118**	106	130	**73**	38	140	**1.7**	-0.6	4.0	**9**	8	10	**11**	6	20
Mauritius	**23**	22	24	**16**	15	18	**1.2**	0.9	1.6	**1**	0	1	**0**	0	0
Mexico	**45**	42	49	**14**	13	16	**4.0**	3.6	4.4	**109**	101	117	**31**	28	35
Micronesia (Federated States of)	**55**	44	69	**29**	12	72	**2.1**	-0.9	5.1	**0**	0	0	**0**	0	0
Monaco	**8**	7	9	**3**	2	5	**3.2**	1.8	4.5	**0**	0	0	**0**	0	0
Mongolia	**108**	100	118	**16**	15	16	**6.7**	6.4	7.0	**8**	7	8	**1**	1	1
Montenegro	**16**	16	17	**2**	2	3	**6.8**	6.0	7.5	**0**	0	0	**0**	0	0
Morocco	**79**	74	85	**21**	16	28	**4.5**	3.5	5.5	**57**	54	62	**15**	11	19
Mozambique	**243**	224	264	**74**	52	109	**4.1**	2.8	5.3	**141**	130	153	**82**	57	119
Myanmar	**115**	105	126	**45**	31	63	**3.2**	2.0	4.5	**130**	120	143	**42**	29	59
Namibia	**72**	66	80	**42**	25	77	**1.8**	-0.2	3.7	**4**	3	4	**3**	2	5
Nauru	**60**	36	99	**31**	17	56	**2.3**	-0.6	5.2	**0**	0	0	**0**	0	0
Nepal	**140**	131	149	**31**	24	41	**5.2**	4.3	6.1	**99**	93	105	**17**	13	23
Netherlands	**8**	8	8	**4**	4	4	**2.5**	2.3	2.7	**2**	2	2	**1**	1	1
New Zealand	**11**	11	11	**5**	4	5	**3.0**	2.5	3.5	**1**	1	1	**0**	0	0
Nicaragua	**66**	62	72	**17**	15	19	**4.8**	4.2	5.3	**10**	9	11	**2**	2	3
Niger	**329**	307	351	**80**	51	125	**4.9**	3.3	6.4	**137**	129	147	**82**	52	127
Nigeria	**210**	196	223	**117**	92	152	**2.0**	1.1	2.8	**848**	792	903	**858**	675	1,118
Niue	**13**	8	22	**23**	10	58	**-1.9**	-5.6	1.7	**0**	0	0	**0**	0	0
Norway	**9**	8	9	**2**	2	3	**4.4**	4.0	4.7	**0**	0	1	**0**	0	0
Oman	**39**	34	44	**11**	10	13	**4.2**	3.6	4.8	**3**	2	3	**1**	1	1

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Country	Sex-specific under-five mortality rate (deaths per 1,000 live births)				Infant mortality rate (deaths per 1,000 live births)		Number of infant deaths (thousands)[a]		Neonatal mortality rate (deaths per 1,000 live births)		Number of neonatal deaths (thousands)[a]		Probability of dying among children aged 5–14 years (per 1,000 children aged 5)		Number of deaths among children aged 5-14 (thousands)[a]		Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15)		Number of deaths among youth aged 15–24 (thousands)[a]	
	1990		2019																	
	Male	Female	Male	Female	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019
Japan	7	6	3	2	5	2	6	2	3	1	3	1	2	1	3	1	5	3	9	3
Jordan	38	34	17	14	30	13	4	3	20	9	3	2	5	3	1	1	8	6	1	1
Kazakhstan	58	45	12	9	44	9	17	4	23	5	9	2	6	3	2	1	14	7	4	2
Kenya	107	96	47	39	65	32	64	47	28	21	28	31	17	10	12	14	23	16	11	17
Kiribati	102	89	55	46	69	40	0	0	35	22	0	0	15	9	0	0	22	16	0	0
Kuwait	19	16	9	7	15	7	1	0	10	5	0	0	6	2	0	0	12	6	0	0
Kyrgyzstan	71	59	20	16	54	16	7	3	24	12	3	2	6	3	1	0	12	6	1	1
Lao People's Democratic Republic	161	144	50	41	105	36	19	6	47	22	9	4	42	8	5	1	28	12	2	2
Latvia	19	15	4	3	13	3	0	0	8	2	0	0	6	1	0	0	15	6	1	0
Lebanon	34	31	8	7	27	6	2	1	20	4	2	0	10	2	1	0	22	5	1	1
Lesotho	92	78	93	79	68	68	4	4	39	43	2	2	16	9	1	0	30	28	1	1
Liberia	276	249	91	78	175	62	16	10	59	32	6	5	39	16	2	2	61	29	2	3
Libya	45	38	13	10	36	10	5	1	21	6	3	1	8	4	1	1	10	10	1	1
Lithuania	17	13	4	3	12	3	1	0	8	2	0	0	4	1	0	0	12	6	1	0
Luxembourg	10	8	3	2	7	2	0	0	4	1	0	0	2	0	0	0	10	2	0	0
Madagascar	165	149	55	46	96	36	48	31	39	20	20	18	38	18	13	13	31	23	7	13
Malawi	254	231	46	37	141	31	59	19	50	20	21	12	38	12	10	6	41	19	7	7
Malaysia	18	15	9	8	14	7	7	4	8	5	4	2	5	3	2	1	11	7	4	4
Maldives	91	80	8	7	63	7	1	0	39	5	0	0	9	2	0	0	13	5	0	0
Mali	238	221	99	88	120	60	48	48	67	32	28	26	40	22	10	13	36	22	6	8
Malta	12	10	8	6	10	6	0	0	8	5	0	0	1	1	0	0	5	3	0	0
Marshall Islands	54	45	35	28	39	26	0	0	19	15	0	0	9	6	0	0	16	13	0	0
Mauritania	125	110	79	67	71	50	6	7	46	32	4	5	19	7	1	1	31	23	1	2
Mauritius	26	20	18	14	20	14	0	0	15	10	0	0	3	2	0	0	8	8	0	0
Mexico	49	41	15	13	36	12	87	27	22	9	54	19	5	3	11	6	12	12	20	26
Micronesia (Federated States of)	59	50	32	26	43	25	0	0	25	16	0	0	10	6	0	0	17	12	0	0
Monaco	9	7	3	3	6	3	0	0	4	2	0	0	2	1	0	0	6	3	0	0
Mongolia	120	96	18	14	77	13	5	1	30	8	2	1	12	3	1	0	15	9	1	0
Montenegro	18	15	2	2	15	2	0	0	11	1	0	0	3	1	0	0	6	3	0	0
Morocco	84	74	23	19	62	18	45	12	36	14	26	9	10	3	6	2	13	8	7	5
Mozambique	252	234	79	70	162	55	94	61	62	29	37	32	58	15	23	13	38	31	10	19
Myanmar	122	107	49	40	81	36	91	33	47	22	54	21	29	5	31	5	27	9	23	9
Namibia	77	67	46	39	49	31	3	2	28	19	1	1	15	11	1	1	27	21	1	1
Nauru	65	55	34	28	47	26	0	0	29	20	0	0	11	6	0	0	17	12	0	0
Nepal	140	139	33	28	97	26	69	14	58	20	43	11	27	5	14	3	20	10	7	7
Netherlands	9	7	4	4	7	3	1	1	5	3	1	0	2	1	0	0	5	2	1	1
New Zealand	12	10	5	4	9	4	1	0	4	3	0	0	3	1	0	0	11	4	1	0
Nicaragua	72	61	19	15	51	14	8	2	23	10	3	1	7	3	1	0	20	10	2	1
Niger	331	326	84	76	133	47	57	49	55	24	24	26	64	30	16	22	40	27	6	12
Nigeria	220	199	124	110	124	74	509	548	50	36	209	270	38	21	104	119	38	19	68	73
Niue	15	12	26	21	12	20	0	0	7	13	0	0	3	5	0	0	8	11	0	0
Norway	10	8	3	2	7	2	0	0	4	1	0	0	2	1	0	0	6	3	0	0
Oman	42	35	13	10	31	10	2	1	17	5	1	0	6	3	0	0	10	6	0	0

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
Country	**U5MR**	Lower bound	Upper bound	**U5MR**	Lower bound	Upper bound	**ARR**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound
Pakistan	**139**	134	145	**67**	58	78	**2.5**	2.0	3.1	**595**	574	618	**399**	343	465
Palau	**35**	30	41	**17**	9	34	**2.5**	0.1	4.9	**0**	0	0	**0**	0	0
Panama	**31**	27	34	**15**	8	27	**2.5**	0.3	4.6	**2**	2	2	**1**	1	2
Papua New Guinea	**85**	77	93	**45**	32	62	**2.2**	1.1	3.4	**13**	12	15	**10**	7	14
Paraguay	**45**	41	50	**19**	10	39	**2.9**	0.5	5.1	**6**	6	7	**3**	1	5
Peru	**80**	76	85	**13**	11	16	**6.2**	5.5	7.0	**54**	51	57	**8**	6	9
Philippines	**57**	53	61	**27**	21	36	**2.5**	1.5	3.5	**113**	106	121	**60**	45	79
Poland	**17**	17	18	**4**	4	5	**4.7**	4.6	4.9	**10**	10	10	**2**	2	2
Portugal	**15**	14	15	**4**	3	4	**4.8**	4.5	5.0	**2**	2	2	**0**	0	0
Qatar	**21**	20	22	**7**	6	7	**4.0**	3.5	4.5	**0**	0	0	**0**	0	0
Republic of Korea	**15**	15	16	**3**	3	3	**5.4**	5.2	5.7	**10**	10	11	**1**	1	1
Republic of Moldova	**33**	29	39	**14**	11	19	**2.9**	1.7	4.0	**3**	2	3	**1**	0	1
Republic of North Macedonia	**36**	35	37	**6**	5	7	**6.1**	5.6	6.5	**1**	1	1	**0**	0	0
Romania	**31**	30	32	**7**	7	7	**5.1**	5.0	5.3	**10**	10	11	**1**	1	1
Russian Federation	**22**	21	22	**6**	6	6	**4.6**	4.4	4.7	**45**	44	46	**11**	10	11
Rwanda	**150**	141	160	**34**	20	60	**5.1**	3.1	7.0	**48**	45	51	**13**	8	23
Saint Kitts and Nevis	**30**	28	33	**15**	11	22	**2.4**	1.1	3.6	**0**	0	0	**0**	0	0
Saint Lucia	**22**	21	23	**22**	20	26	**-0.1**	-0.6	0.4	**0**	0	0	**0**	0	0
Saint Vincent and the Grenadines	**24**	22	25	**15**	11	18	**1.7**	0.8	2.5	**0**	0	0	**0**	0	0
Samoa	**30**	26	34	**15**	10	22	**2.4**	1.0	3.7	**0**	0	0	**0**	0	0
San Marino	**14**	11	18	**2**	1	3	**7.3**	4.7	9.8	**0**	0	0	**0**	0	0
Sao Tome and Principe	**108**	95	122	**30**	18	49	**4.4**	2.7	6.1	**0**	0	1	**0**	0	0
Saudi Arabia	**44**	37	53	**7**	5	9	**6.5**	5.3	7.8	**25**	21	30	**4**	3	5
Senegal	**139**	132	146	**45**	35	58	**3.9**	3.0	4.7	**43**	41	45	**25**	19	32
Serbia	**28**	27	29	**5**	4	7	**5.7**	5.0	6.4	**4**	4	4	**0**	0	1
Seychelles	**16**	15	18	**14**	11	19	**0.5**	-0.5	1.5	**0**	0	0	**0**	0	0
Sierra Leone	**260**	240	281	**109**	91	132	**3.0**	2.3	3.7	**49**	45	53	**28**	23	33
Singapore	**8**	7	8	**3**	2	3	**3.8**	3.4	4.3	**0**	0	0	**0**	0	0
Slovakia	**15**	14	15	**6**	5	6	**3.2**	3.0	3.4	**1**	1	1	**0**	0	0
Slovenia	**10**	10	11	**2**	2	2	**5.5**	5.0	6.0	**0**	0	0	**0**	0	0
Solomon Islands	**38**	34	44	**20**	13	29	**2.3**	0.9	3.8	**0**	0	1	**0**	0	1
Somalia	**178**	148	217	**117**	60	235	**1.5**	-0.7	3.6	**59**	49	72	**72**	37	145
South Africa	**57**	51	64	**34**	31	39	**1.8**	1.2	2.3	**64**	57	72	**41**	36	46
South Sudan	**250**	207	294	**96**	39	194	**3.3**	0.7	6.5	**62**	52	73	**37**	15	74
Spain	**9**	9	9	**3**	3	3	**3.7**	3.4	4.0	**4**	4	4	**1**	1	1
Sri Lanka	**22**	21	22	**7**	6	9	**3.9**	3.2	4.6	**8**	8	8	**2**	2	3
State of Palestine	**44**	41	48	**19**	14	28	**2.9**	1.6	4.1	**4**	4	4	**3**	2	4
Sudan	**131**	121	141	**58**	43	78	**2.8**	1.7	3.9	**106**	98	114	**78**	57	105
Suriname	**45**	38	53	**18**	12	27	**3.2**	1.6	4.6	**1**	0	1	**0**	0	0
Sweden	**7**	7	7	**3**	2	3	**3.4**	3.2	3.7	**1**	1	1	**0**	0	0
Switzerland	**8**	8	8	**4**	4	4	**2.5**	2.0	2.9	**1**	1	1	**0**	0	0
Syrian Arab Republic	**37**	33	40	**22**	12	28	**1.8**	0.8	3.8	**16**	15	18	**9**	5	12
Tajikistan	**102**	93	112	**34**	22	53	**3.8**	2.2	5.3	**21**	19	23	**9**	6	15

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Country	Sex-specific under-five mortality rate (deaths per 1,000 live births)				Infant mortality rate (deaths per 1,000 live births)		Number of infant deaths (thousands)[a]		Neonatal mortality rate (deaths per 1,000 live births)		Number of neonatal deaths (thousands)[a]		Probability of dying among children aged 5–14 years (per 1,000 children aged 5)		Number of deaths among children aged 5-14 (thousands)[a]		Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15)		Number of deaths among youth aged 15–24 (thousands)[a]	
	1990		2019																	
	Male	Female	Male	Female	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019
Pakistan	143	136	72	63	107	56	460	332	64	41	284	248	14	8	39	41	22	12	44	49
Palau	39	32	19	15	30	16	0	0	19	9	0	0	7	4	0	0	16	17	0	0
Panama	34	27	16	13	26	13	2	1	18	9	1	1	5	3	0	0	11	9	1	1
Papua New Guinea	90	80	48	41	62	36	10	8	34	22	5	5	14	8	2	2	21	15	2	3
Paraguay	49	41	21	17	36	17	5	2	22	11	3	2	7	3	1	0	16	11	1	1
Peru	84	76	14	12	57	10	38	6	28	6	19	4	10	3	5	2	20	7	9	3
Philippines	62	51	30	24	40	22	81	47	19	13	39	29	8	4	13	9	14	9	18	18
Poland	19	15	5	4	15	4	9	1	11	3	6	1	3	1	2	0	9	5	5	2
Portugal	16	13	4	3	12	3	1	0	7	2	1	0	4	1	1	0	11	3	2	0
Qatar	23	19	7	6	18	6	0	0	11	3	0	0	4	1	0	0	7	3	0	0
Republic of Korea	17	14	3	3	13	3	9	1	7	2	5	1	4	1	3	0	9	3	8	2
Republic of Moldova	37	29	16	13	27	12	2	0	19	11	2	0	5	3	0	0	13	7	1	0
Republic of North Macedonia	38	33	7	6	32	5	1	0	17	4	1	0	3	1	0	0	5	3	0	0
Romania	34	28	8	6	24	6	8	1	16	3	5	1	5	2	2	0	9	5	3	1
Russian Federation	25	18	6	5	18	5	38	9	11	3	22	5	5	2	11	3	14	7	27	10
Rwanda	158	141	37	31	92	26	29	10	41	16	13	6	62	9	14	3	70	15	10	4
Saint Kitts and Nevis	33	27	17	14	25	13	0	0	19	10	0	0	5	3	0	0	9	16	0	0
Saint Lucia	24	20	24	20	18	20	0	0	12	13	0	0	4	3	0	0	11	9	0	0
Saint Vincent and the Grenadines	26	22	16	13	20	13	0	0	13	9	0	0	4	5	0	0	9	14	0	0
Samoa	32	27	16	14	25	13	0	0	16	8	0	0	6	4	0	0	12	9	0	0
San Marino	15	12	2	2	12	1	0	0	7	1	0	0	3	1	0	0	9	2	0	0
Sao Tome and Principe	114	101	33	27	69	23	0	0	26	14	0	0	21	6	0	0	25	18	0	0
Saudi Arabia	47	42	7	6	36	6	20	3	22	4	12	2	6	2	3	1	15	12	5	6
Senegal	145	132	49	41	71	33	22	18	40	22	13	12	34	10	8	5	25	19	4	6
Serbia	30	26	6	5	24	5	3	0	17	3	2	0	3	1	0	0	6	3	1	0
Seychelles	18	15	15	13	14	12	0	0	11	9	0	0	4	3	0	0	9	11	0	0
Sierra Leone	271	248	115	103	154	81	29	20	52	31	10	8	51	22	6	4	61	52	5	8
Singapore	8	7	3	2	6	2	0	0	4	1	0	0	2	1	0	0	6	2	0	0
Slovakia	16	13	6	5	13	5	1	0	9	3	1	0	3	1	0	0	7	4	1	0
Slovenia	11	9	2	2	9	2	0	0	6	1	0	0	2	1	0	0	9	3	0	0
Solomon Islands	42	35	21	18	31	17	0	0	15	8	0	0	7	4	0	0	14	10	0	0
Somalia	186	170	123	111	107	74	36	47	45	37	15	24	38	25	7	12	67	43	9	14
South Africa	62	52	37	31	44	28	50	32	20	11	22	13	8	5	7	6	21	20	15	20
South Sudan	257	243	101	91	148	62	37	24	64	39	16	15	53	21	8	6	69	38	7	8
Spain	10	8	3	3	7	3	3	1	5	2	2	1	2	1	1	0	8	2	6	1
Sri Lanka	24	20	8	6	19	6	7	2	13	4	5	1	8	2	3	1	28	4	9	1
State of Palestine	47	42	21	18	36	17	3	2	22	11	2	2	6	3	0	0	10	7	0	1
Sudan	138	122	63	53	82	41	68	55	42	27	36	37	26	8	16	9	52	27	21	24
Suriname	49	40	20	16	39	16	0	0	21	11	0	0	5	3	0	0	15	8	0	0
Sweden	8	6	3	2	6	2	1	0	3	1	0	0	1	1	0	0	5	4	1	0
Switzerland	9	7	4	4	7	4	1	0	4	3	0	0	2	1	0	0	9	3	1	0
Syrian Arab Republic	39	34	23	19	30	18	13	8	16	11	7	5	10	10	4	3	15	17	4	5
Tajikistan	110	94	38	30	81	30	17	8	31	15	7	4	7	1	1	0	11	5	1	1

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Country	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
	U5MR	Lower bound	Upper bound	U5MR	Lower bound	Upper bound	ARR	Lower bound	Upper bound	Under-five deaths	Lower bound	Upper bound	Under-five deaths	Lower bound	Upper bound
Thailand	**37**	35	39	**9**	8	11	**4.9**	4.0	5.4	**40**	38	43	**6**	6	8
Timor-Leste	**175**	157	194	**44**	26	74	**4.7**	2.9	6.5	**5**	5	6	**2**	1	3
Togo	**144**	134	156	**67**	54	83	**2.7**	1.9	3.4	**22**	20	24	**17**	14	21
Tonga	**22**	19	27	**17**	12	22	**1.0**	-0.2	2.3	**0**	0	0	**0**	0	0
Trinidad and Tobago	**30**	25	36	**18**	8	41	**1.9**	-1.2	4.7	**1**	1	1	**0**	0	1
Tunisia	**55**	49	63	**17**	16	18	**4.1**	3.6	4.6	**12**	11	14	**3**	3	4
Turkey	**74**	69	79	**10**	9	11	**6.9**	6.4	7.4	**103**	97	111	**13**	12	15
Turkmenistan	**80**	70	91	**42**	30	59	**2.2**	1.0	3.4	**10**	9	12	**6**	4	8
Tuvalu	**53**	44	64	**24**	13	45	**2.8**	0.5	5.0	**0**	0	0	**0**	0	0
Uganda	**182**	172	193	**46**	35	60	**4.8**	3.8	5.7	**148**	139	157	**74**	56	97
Ukraine	**19**	17	22	**8**	8	9	**2.9**	2.5	3.4	**13**	12	15	**4**	3	4
United Arab Emirates	**17**	14	19	**7**	6	9	**2.7**	2.0	3.5	**1**	1	1	**1**	1	1
United Kingdom	**9**	9	9	**4**	4	4	**2.7**	2.5	2.9	**7**	7	7	**3**	3	3
United Republic of Tanzania	**165**	156	175	**50**	38	69	**4.1**	3.0	5.1	**175**	165	186	**103**	78	141
United States of America	**11**	11	11	**6**	6	7	**1.9**	1.7	2.1	**44**	43	45	**25**	24	27
Uruguay	**23**	22	23	**7**	7	8	**4.1**	3.8	4.3	**1**	1	1	**0**	0	0
Uzbekistan	**72**	64	82	**17**	14	21	**4.9**	4.3	5.5	**51**	45	57	**12**	10	15
Vanuatu	**35**	29	42	**26**	16	43	**1.1**	-0.8	2.9	**0**	0	0	**0**	0	0
Venezuela (Bolivarian Republic of)	**30**	29	30	**24**	20	30	**0.7**	0.0	1.4	**16**	16	17	**13**	10	15
Viet Nam	**51**	47	56	**20**	16	25	**3.3**	2.4	4.0	**99**	91	107	**32**	26	40
Yemen	**126**	118	135	**58**	35	95	**2.6**	1.0	4.4	**75**	70	80	**50**	30	82
Zambia[c]	**179**	169	191	**62**	49	78	**3.7**	2.9	4.5	**63**	59	67	**38**	30	48
Zimbabwe	**77**	70	84	**55**	41	72	**1.2**	0.2	2.2	**28**	26	31	**24**	18	32

Estimates of mortality among children, adolescents and youth under age 25 by Sustainable Development Goal region[d]

Sub-Saharan Africa	**180**	177	184	**76**	71	87	**3.0**	2.5	3.2	**3,720**	3,647	3,804	**2,766**	2,558	3,139
Northern Africa and Western Asia	**74**	73	76	**26**	23	30	**3.7**	3.1	4.1	**679**	664	696	**293**	260	342
Northern Africa	**84**	81	86	**29**	25	35	**3.6**	3.0	4.2	**380**	368	393	**173**	147	209
Western Asia	**65**	63	67	**22**	18	28	**3.8**	2.9	4.5	**299**	289	310	**120**	99	153
Central Asia and Southern Asia	**124**	121	127	**38**	36	41	**4.1**	3.8	4.3	**4,962**	4,845	5,086	**1,461**	1,356	1,576
Central Asia	**71**	67	76	**21**	18	25	**4.3**	3.6	4.7	**111**	104	118	**34**	30	41
Southern Asia	**126**	123	130	**39**	36	42	**4.0**	3.8	4.3	**4,851**	4,734	4,976	**1,427**	1,322	1,541
Eastern and South-Eastern Asia	**57**	54	60	**14**	13	16	**4.8**	4.4	5.1	**2,283**	2,172	2,414	**421**	390	466
Eastern Asia	**51**	47	55	**8**	7	9	**6.5**	6.0	7.0	**1,423**	1,313	1,550	**143**	127	163
South-Eastern Asia	**72**	70	74	**24**	22	28	**3.7**	3.3	4.1	**860**	837	887	**278**	252	318
Latin America and the Caribbean	**55**	53	56	**16**	15	18	**4.2**	3.9	4.4	**641**	623	661	**169**	160	183
Oceania	**35**	33	38	**20**	16	26	**2.0**	1.1	2.8	**18**	17	20	**13**	11	17
Australia and New Zealand	**10**	9	10	**4**	4	4	**3.2**	3.0	3.4	**3**	3	3	**1**	1	2
Oceania (exc. Australia and New Zealand)	**72**	67	78	**40**	31	54	**2.0**	1.0	3.0	**15**	14	17	**12**	9	16
Europe and Northern America	**14**	14	14	**5**	5	5	**3.3**	3.2	3.4	**191**	189	193	**64**	62	66
Europe	**15**	15	16	**5**	5	5	**4.1**	4.0	4.1	**144**	142	146	**37**	36	37
Northern America	**11**	11	11	**6**	6	7	**1.9**	1.7	2.1	**47**	46	48	**27**	26	29
Landlocked developing countries	**166**	162	170	**56**	52	63	**3.7**	3.4	4.0	**1,743**	1,705	1,786	**881**	823	982
Least developed countries	**175**	172	178	**63**	59	71	**3.5**	3.1	3.8	**3,589**	3,534	3,655	**1,968**	1,846	2,216
Small island developing States	**78**	75	81	**38**	34	45	**2.5**	1.9	2.9	**93**	90	96	**46**	41	55
World	**93**	**92**	**95**	**38**	**36**	**41**	**3.1**	**2.8**	**3.3**	**12,494**	**12,320**	**12,698**	**5,189**	**4,970**	**5,600**

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Country	Sex-specific under-five mortality rate (deaths per 1,000 live births) 1990 Male	1990 Female	2019 Male	2019 Female	Infant mortality rate (deaths per 1,000 live births) 1990	2019	Number of infant deaths (thousands)[a] 1990	2019	Neonatal mortality rate (deaths per 1,000 live births) 1990	2019	Number of neonatal deaths (thousands)[a] 1990	2019	Probability of dying among children aged 5–14 years (per 1,000 children aged 5) 1990	2019	Number of deaths among children aged 5-14 (thousands)[a] 1990	2019	Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15) 1990	2019	Number of deaths among youth aged 15–24 (thousands)[a] 1990	2019
Thailand	41	33	10	8	30	8	33	5	20	5	22	4	6	4	7	3	16	13	19	12
Timor-Leste	182	167	48	40	131	38	4	1	55	20	2	1	25	8	0	0	22	27	0	1
Togo	153	135	72	61	89	46	14	12	43	25	7	7	34	13	4	3	25	18	2	3
Tonga	20	24	15	18	19	14	0	0	10	7	0	0	3	2	0	0	7	8	0	0
Trinidad and Tobago	33	28	19	16	27	16	1	0	20	12	1	0	4	2	0	0	11	11	0	0
Tunisia	59	52	18	15	43	14	9	3	28	12	6	2	7	3	1	1	9	8	1	1
Turkey	76	71	11	9	55	9	77	11	33	5	46	7	9	2	12	3	28	4	30	6
Turkmenistan	89	70	48	36	65	36	8	5	27	24	4	3	7	4	1	0	13	10	1	1
Tuvalu	57	49	26	22	42	20	0	0	28	16	0	0	10	5	0	0	16	11	0	0
Uganda	194	170	51	41	107	33	89	54	39	20	34	33	29	14	15	18	48	27	16	25
Ukraine	21	17	9	8	17	7	11	3	12	5	8	2	4	2	3	1	12	6	8	3
United Arab Emirates	18	15	8	7	14	6	1	1	8	4	0	0	3	2	0	0	7	5	0	1
United Kingdom	10	8	5	4	8	4	6	3	4	3	3	2	2	1	1	1	6	3	5	3
United Republic of Tanzania	171	159	54	47	100	36	108	75	40	20	44	43	28	11	20	19	28	18	14	20
United States of America	12	10	7	6	9	6	37	22	6	4	23	15	2	1	9	6	10	8	37	34
Uruguay	25	20	8	6	20	6	1	0	12	4	1	0	3	2	0	0	8	9	0	0
Uzbekistan	80	64	20	15	59	16	42	11	31	10	22	7	7	4	4	2	11	8	4	4
Vanuatu	38	32	28	24	29	22	0	0	16	11	0	0	7	5	0	0	13	11	0	0
Venezuela (Bolivarian Republic of)	32	27	26	22	25	21	14	11	13	15	7	8	4	3	2	2	12	26	5	12
Viet Nam	59	43	23	17	37	16	71	25	23	10	45	17	11	3	18	4	14	7	20	9
Yemen	131	120	62	54	88	44	54	38	43	27	27	23	19	13	7	9	15	25	3	15
Zambia[c]	188	171	66	57	107	42	38	27	36	23	13	15	27	11	6	6	49	22	8	8
Zimbabwe	83	70	59	50	50	38	18	17	25	26	9	11	13	12	4	5	22	24	5	7

Estimates of mortality among children, adolescents and youth under age 25 by Sustainable Development Goal region[d] (continued)

Sub-Saharan Africa	189	171	82	71	108	52	2,259	1,907	45	27	980	1,022	38	17	543	482	43	23	403	489
Northern Africa and Western Asia	77	71	28	24	55	20	505	233	30	14	282	157	11	5	80	47	18	11	100	92
Northern Africa	87	80	31	27	61	23	277	137	33	16	152	95	12	5	46	24	18	12	48	47
Western Asia	68	62	24	20	49	18	228	97	28	11	130	62	9	4	34	23	18	10	52	45
Central Asia and Southern Asia	122	126	39	37	88	32	3,540	1,206	56	24	2,282	913	19	6	609	214	24	11	566	386
Central Asia	79	63	23	18	59	18	91	30	28	11	44	18	7	3	8	4	12	7	11	8
Southern Asia	124	128	40	38	90	32	3,449	1,176	57	24	2,238	895	20	6	602	210	24	11	555	377
Eastern and South-Eastern Asia	60	54	15	13	43	12	1,730	349	28	7	1,098	211	9	3	302	84	10	6	387	178
Eastern Asia	53	48	8	7	40	7	1,104	121	28	4	764	69	7	2	155	35	9	4	247	75
South-Eastern Asia	78	66	27	22	52	20	625	228	28	13	334	142	14	4	147	49	15	9	141	103
Latin America and the Caribbean	59	50	18	15	43	14	509	144	22	9	266	94	6	3	60	29	15	12	127	133
Oceania	38	33	22	18	27	16	14	11	15	10	8	7	6	4	3	2	11	7	5	4
Australia and New Zealand	11	8	4	3	8	3	2	1	5	2	1	1	2	1	1	0	8	4	3	1
Oceania (exc. Australia and New Zealand)	77	67	44	37	54	32	12	10	29	20	6	6	13	8	2	2	19	14	2	3
Europe and Northern America	16	12	6	5	12	5	159	54	7	3	98	36	3	1	42	15	9	5	133	68
Europe	17	13	5	4	13	4	120	31	8	3	74	20	3	1	33	9	9	4	93	32
Northern America	12	10	7	6	9	5	40	23	6	4	24	16	2	1	9	6	10	7	40	36
Landlocked developing countries	174	158	60	51	100	39	1,070	619	47	24	519	390	36	12	267	158	42	19	211	197
Least developed countries	182	167	67	58	108	45	2,255	1,420	52	26	1,110	821	37	13	543	351	41	22	409	454
Small island developing States	83	73	41	35	56	30	67	36	27	18	33	22	13	6	12	7	18	13	16	14
World	**95**	**90**	**40**	**35**	**65**	**28**	**8,715**	**3,904**	**37**	**17**	**5,014**	**2,440**	**15**	**7**	**1,639**	**874**	**17**	**11**	**1,722**	**1,351**

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Estimates of mortality among children, adolescents and youth under age 25 by UNICEF region[d]

	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
Region	**U5MR**	Lower bound	Upper bound	**U5MR**	Lower bound	Upper bound	**ARR**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound
Sub-Saharan Africa	**178**	175	182	**76**	70	86	**3.0**	2.5	3.2	**3,826**	3,752	3,910	**2,844**	2,636	3,218
West and Central Africa	**196**	190	203	**95**	84	111	**2.5**	2.0	2.9	**2,020**	1,957	2,086	**1,836**	1,627	2,155
Eastern and Southern Africa	**162**	158	166	**55**	51	64	**3.7**	3.2	4.0	**1,806**	1,765	1,854	**1,009**	929	1,166
Middle East and North Africa	**65**	63	67	**22**	19	26	**3.8**	3.1	4.2	**545**	532	561	**219**	191	261
South Asia	**130**	127	133	**40**	37	43	**4.0**	3.8	4.3	**4,748**	4,632	4,872	**1,406**	1,300	1,518
East Asia and Pacific	**57**	54	60	**14**	13	16	**4.8**	4.4	5.1	**2,301**	2,190	2,432	**435**	404	480
Latin America and Caribbean	**55**	53	56	**16**	15	18	**4.2**	3.9	4.4	**641**	623	661	**169**	160	183
North America	**11**	11	11	**6**	6	7	**1.9**	1.7	2.1	**47**	46	48	**27**	26	29
Europe and Central Asia	**31**	30	32	**8**	8	9	**4.6**	4.3	4.8	**386**	376	397	**88**	83	95
Eastern Europe and Central Asia	**46**	45	48	**11**	11	13	**4.8**	4.5	5.1	**328**	318	339	**70**	65	77
Western Europe	**11**	10	11	**4**	4	4	**3.5**	3.4	3.6	**58**	57	58	**19**	18	19
World	**93**	**92**	**95**	**38**	**36**	**41**	**3.1**	**2.8**	**3.3**	**12,494**	**12,320**	**12,698**	**5,189**	**4,970**	**5,600**

Estimates of mortality among children, adolescents and youth under age 25 by World Health Organization region[d]

	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
Region	**U5MR**	Lower bound	Upper bound	**U5MR**	Lower bound	Upper bound	**ARR**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound
Africa	**176**	172	180	**74**	68	84	**3.0**	2.5	3.2	**3,700**	3,627	3,782	**2,717**	2,504	3,075
Americas	**43**	42	44	**13**	13	14	**4.0**	3.8	4.2	**688**	671	708	**197**	187	211
Eastern Mediterranean	**103**	100	105	**46**	42	53	**2.8**	2.3	3.1	**1,371**	1,342	1,405	**815**	743	932
Europe	**31**	30	31	**8**	8	9	**4.6**	4.4	4.8	**387**	377	398	**89**	84	96
South-East Asia	**119**	116	122	**32**	29	35	**4.5**	4.2	4.8	**4,629**	4,514	4,752	**1,105**	1,018	1,201
Western Pacific	**52**	48	55	**11**	10	12	**5.3**	4.8	5.7	**1,715**	1,604	1,842	**264**	241	295
World	**93**	**92**	**95**	**38**	**36**	**41**	**3.1**	**2.8**	**3.3**	**12,494**	**12,320**	**12,698**	**5,189**	**4,970**	**5,600**

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Estimates of mortality among children, adolescents and youth under age 25 by UNICEF region[d] (continued)

Region	Sex-specific under-five mortality rate (deaths per 1,000 live births)				Infant mortality rate (deaths per 1,000 live births)		Number of infant deaths (thousands)[a]		Neonatal mortality rate (deaths per 1,000 live births)		Number of neonatal deaths (thousands)[a]		Probability of dying among children aged 5–14 years (per 1,000 children aged 5)		Number of deaths among children aged 5-14 (thousands)[a]		Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15)		Number of deaths among youth aged 15–24 (thousands)[a]	
	1990		2019																	
	Male	Female	Male	Female	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019
Sub-Saharan Africa	187	169	81	70	107	52	2,326	1,962	45	27	1,016	1,059	38	16	559	491	43	23	424	513
West and Central Africa	205	187	101	88	114	63	1,199	1,238	48	31	519	616	37	21	258	306	38	25	172	257
Eastern and Southern Africa	171	153	60	51	99	39	1,127	724	43	24	497	443	38	12	301	186	48	22	252	255
Middle East and North Africa	67	63	23	20	50	18	417	181	28	12	235	123	11	4	74	39	15	10	71	72
South Asia	127	132	41	39	92	33	3,370	1,157	59	25	2,193	882	20	6	579	205	24	11	530	366
East Asia and Pacific	60	53	15	13	43	12	1,744	360	28	7	1,106	218	9	3	305	87	10	6	392	183
Latin America and Caribbean	59	50	18	15	43	14	509	144	22	9	266	94	6	3	60	29	15	12	127	133
North America	12	10	7	6	9	5	40	23	6	4	24	16	2	1	9	6	10	7	40	36
Europe and Central Asia	33	28	9	7	25	7	310	76	14	4	174	47	4	2	54	17	11	5	136	48
Eastern Europe and Central Asia	50	42	13	10	37	10	262	60	21	6	144	36	6	2	41	13	15	6	88	31
Western Europe	12	9	4	3	9	3	48	16	6	2	30	11	2	1	13	4	7	3	48	16
World	**95**	**90**	**40**	**35**	**65**	**28**	**8,715**	**3,904**	**37**	**17**	**5,014**	**2,440**	**15**	**7**	**1,639**	**874**	**17**	**11**	**1,722**	**1,351**

Estimates of mortality among children, adolescents and youth under age 25 by World Health Organization region[d] (continued)

Region	Sex-specific under-five mortality rate (deaths per 1,000 live births)				Infant mortality rate (deaths per 1,000 live births)		Number of infant deaths (thousands)[a]		Neonatal mortality rate (deaths per 1,000 live births)		Number of neonatal deaths (thousands)[a]		Probability of dying among children aged 5–14 years (per 1,000 children aged 5)		Number of deaths among children aged 5-14 (thousands)[a]		Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15)		Number of deaths among youth aged 15–24 (thousands)[a]	
	1990		2019																	
	Male	Female	Male	Female	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019	1990	2019
Africa	184	166	80	69	105	51	2,255	1,879	45	27	983	1,014	37	16	542	473	41	22	399	478
Americas	47	39	15	12	34	11	548	168	18	7	290	110	5	2	69	36	13	11	167	170
Eastern Mediterranean	106	100	49	43	76	36	1,020	648	44	25	598	458	13	7	136	101	21	14	152	181
Europe	33	28	9	7	25	7	311	77	14	4	175	48	4	2	54	17	11	5	137	48
South-East Asia	117	120	32	31	84	26	3,263	912	53	20	2,090	679	20	5	636	194	22	10	572	362
Western Pacific	54	49	12	10	40	9	1,315	218	27	6	875	130	7	2	202	53	9	5	295	111
World	**95**	**90**	**40**	**35**	**65**	**28**	**8,715**	**3,904**	**37**	**17**	**5,014**	**2,440**	**15**	**7**	**1,639**	**874**	**17**	**11**	**1,722**	**1,351**

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Estimates of mortality among children, adolescents and youth under age 25 by World Bank region[d]

	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
Region	**U5MR**	Lower bound	Upper bound	**U5MR**	Lower bound	Upper bound	**ARR**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound
East Asia and Pacific	**57**	54	60	**14**	13	16	**4.8**	4.4	5.1	**2,301**	2,190	2,432	**435**	404	480
Europe and Central Asia	**31**	30	32	**8**	8	9	**4.6**	4.3	4.8	**386**	376	397	**88**	84	96
Latin America and the Caribbean	**55**	53	56	**16**	15	18	**4.2**	3.9	4.4	**641**	623	661	**169**	160	183
Middle East and North Africa	**65**	63	67	**22**	19	26	**3.8**	3.1	4.2	**548**	535	563	**220**	193	263
North America	**11**	11	11	**6**	6	7	**1.9**	1.7	2.1	**47**	46	48	**27**	26	29
South Asia	**130**	127	133	**40**	37	43	**4.0**	3.8	4.3	**4,748**	4,632	4,872	**1,406**	1,300	1,518
Sub-Saharan Africa	**179**	175	183	**76**	70	86	**3.0**	2.5	3.2	**3,823**	3,750	3,908	**2,843**	2,635	3,217
Low income	**183**	179	187	**68**	62	78	**3.4**	2.9	3.7	**2,359**	2,311	2,416	**1,509**	1,391	1,730
Lower middle income	**124**	122	127	**49**	46	54	**3.2**	2.9	3.5	**7,151**	7,021	7,291	**3,074**	2,866	3,391
Upper middle income	**55**	53	57	**13**	13	14	**4.9**	4.6	5.1	**2,804**	2,692	2,935	**542**	517	582
High income	**13**	13	13	**5**	5	5	**3.3**	3.1	3.4	**179**	175	185	**63**	61	66
World	**93**	**92**	**95**	**38**	**36**	**41**	**3.1**	**2.8**	**3.3**	**12,494**	**12,320**	**12,698**	**5,189**	**4,970**	**5,600**

Estimates of mortality among children, adolescents and youth under age 25 by United Nations Population Division region[d]

	Under-five mortality rate (U5MR) with 90 percent uncertainty interval (deaths per 1,000 live births)									Number of under-five deaths with 90 percent uncertainty interval (thousands)[a]					
	1990			2019			Annual rate of reduction (ARR) (per cent) 1990-2019			1990			2019		
Region	**U5MR**	Lower bound	Upper bound	**U5MR**	Lower bound	Upper bound	**ARR**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound	**Under-five deaths**	Lower bound	Upper bound
More developed regions	**13**	13	13	**5**	5	5	**3.3**	3.2	3.4	**202**	200	204	**68**	66	69
Less developed regions	**103**	101	105	**41**	39	45	**3.2**	2.9	3.3	**12,292**	12,119	12,496	**5,121**	4,903	5,533
Least developed countries	**175**	172	178	**63**	59	71	**3.5**	3.1	3.8	**3,589**	3,534	3,655	**1,968**	1,846	2,216
Excluding least developed countries	**88**	86	89	**34**	32	37	**3.3**	3.0	3.5	**8,700**	8,532	8,889	**3,150**	2,949	3,445
Excluding China	**116**	114	117	**46**	44	50	**3.2**	2.9	3.3	**10,913**	10,775	11,073	**4,989**	4,770	5,399
Sub-Saharan Africa	**180**	177	184	**76**	71	87	**3.0**	2.5	3.2	**3,720**	3,647	3,804	**2,766**	2,558	3,139
Africa	**163**	160	167	**70**	65	79	**2.9**	2.5	3.2	**4,100**	4,026	4,184	**2,940**	2,735	3,317
Asia	**90**	88	92	**27**	26	29	**4.1**	3.9	4.3	**7,544**	7,386	7,722	**2,003**	1,898	2,136
Europe	**15**	15	16	**5**	5	5	**4.1**	4.0	4.1	**144**	142	146	**37**	36	37
Latin America and the Caribbean	**55**	53	56	**16**	15	18	**4.2**	3.9	4.4	**641**	623	661	**169**	160	183
Northern America	**11**	11	11	**6**	6	7	**1.9**	1.7	2.1	**47**	46	48	**27**	26	29
Oceania	**35**	33	38	**20**	16	26	**2.0**	1.1	2.8	**18**	17	20	**13**	11	17
World	**93**	**92**	**95**	**38**	**36**	**41**	**3.1**	**2.8**	**3.3**	**12,494**	**12,320**	**12,698**	**5,189**	**4,970**	**5,600**

Definitions

Under-five mortality rate: Probability of dying between birth and exactly 5 years of age, expressed per 1,000 live births.
Infant mortality rate: Probability of dying between birth and exactly 1 year of age, expressed per 1,000 live births.
Neonatal mortality rate: Probability of dying in the first 28 days of life, expressed per 1,000 live births.
Probability of dying among children aged 5–14 years: Probability of dying among children aged 5–14 years expressed per 1,000 children aged 5.
Probability of dying at age 15–24 years: Probability of dying among youth aged 15–24 years expressed per 1,000 adolescents aged 15.

Note: Upper and lower bounds refer to the 90 per cent uncertainty intervals for the estimates. Estimates are generated by the United Nations Inter-agency Group for Child Mortality Estimation to ensure comparability; they are not necessarily the official statistics of United Nations Member States, which may use alternative rigorous methods.
a. Number of deaths are rounded to thousands. A zero indicates that the number of deaths is below 500. Unrounded number of deaths are available at <www.childmortality.org> for download.
b. The most recent national official estimates of neonatal, infant and under-five mortality rates in India are from the India Sample Registration System with a rate of 23, 32 and 36 deaths per 1,000 live births, respectively, in the year 2018.
c. The most recent national official estimates of neonatal, infant and under-five mortality rates in Zambia are from the 2018 Zambia Demographic and Health Survey (2018 ZDHS) with a rate of 27, 42 and 61 deaths per 1,000 live births, respectively, in the 5-year period before the survey.
d. The sum of the number of deaths by region may differ from the world total because of rounding.

Country, regional and global estimates of mortality among children, adolescents and youth under age 25

Estimates of mortality among children, adolescents and youth under age 25 by World Bank region[d] (continued)

	Sex-specific under-five mortality rate (deaths per 1,000 live births)				Infant mortality rate (deaths per 1,000 live births)		Number of infant deaths (thousands)[a]		Neonatal mortality rate (deaths per 1,000 live births)		Number of neonatal deaths (thousands)[a]		Probability of dying among children aged 5–14 years (per 1,000 children aged 5)		Number of deaths among children aged 5-14 (thousands)[a]		Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15)		Number of deaths among youth aged 15–24 (thousands)[a]	
	1990		2019																	
Region	**Male**	**Female**	**Male**	**Female**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**
East Asia and Pacific	60	53	15	13	43	12	1,744	360	28	7	1,106	218	9	3	305	87	10	6	392	183
Europe and Central Asia	33	28	9	7	25	7	310	76	14	4	174	47	4	2	54	17	11	5	136	48
Latin America and the Caribbean	59	50	18	15	43	14	509	144	22	9	266	94	6	3	60	29	15	12	127	133
Middle East and North Africa	67	63	23	20	50	18	419	182	28	12	236	124	11	4	75	39	15	10	72	73
North America	12	10	7	6	9	5	40	23	6	4	24	16	2	1	9	6	10	7	40	36
South Asia	127	132	41	39	92	33	3,370	1,157	59	25	2,193	882	20	6	579	205	24	11	530	366
Sub-Saharan Africa	187	169	81	70	107	52	2,324	1,961	45	27	1,015	1,058	38	16	558	491	43	23	424	512
Low income	191	174	73	62	109	48	1,444	1,081	48	27	656	609	42	15	363	272	48	25	282	343
Lower middle income	125	123	51	47	86	37	4,943	2,311	50	24	2,929	1,516	20	8	907	476	23	12	797	625
Upper middle income	58	51	14	12	43	11	2,179	459	26	7	1,338	280	8	3	333	111	11	8	520	312
High income	14	12	5	5	11	4	148	54	7	3	91	36	3	1	36	15	8	5	122	70
World	**95**	**90**	**40**	**35**	**65**	**28**	**8,715**	**3,904**	**37**	**17**	**5,014**	**2,440**	**15**	**7**	**1,639**	**874**	**17**	**11**	**1,722**	**1,351**

Estimates of mortality among children, adolescents and youth under age 25 by United Nations Population Division region[d] (continued)

	Sex-specific under-five mortality rate (deaths per 1,000 live births)				Infant mortality rate (deaths per 1,000 live births)		Number of infant deaths (thousands)[a]		Neonatal mortality rate (deaths per 1,000 live births)		Number of neonatal deaths (thousands)[a]		Probability of dying among children aged 5–14 years (per 1,000 children aged 5)		Number of deaths among children aged 5-14 (thousands)[a]		Probability of dying among youth aged 15–24 years (per 1,000 adolescents aged 15)		Number of deaths among youth aged 15–24 (thousands)[a]	
	1990		2019																	
Region	**Male**	**Female**	**Male**	**Female**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**
More developed regions	15	12	6	5	11	4	168	57	7	3	103	38	3	1	45	16	9	5	145	73
Less developed regions	105	100	43	39	71	31	8,548	3,847	40	19	4,911	2,403	17	7	1,594	858	19	12	1,577	1,278
Least developed countries	182	167	67	58	108	45	2,255	1,420	52	26	1,110	821	37	13	543	351	41	22	409	454
Excluding least developed countries	89	86	35	32	63	26	6,291	2,425	38	17	3,800	1,580	13	6	1,051	506	16	10	1,168	824
Excluding China	119	113	49	43	79	34	7,477	3,735	43	21	4,166	2,339	19	8	1,449	825	23	14	1,355	1,212
Sub-Saharan Africa	189	171	82	71	108	52	2,259	1,907	45	27	980	1,022	38	17	543	482	43	23	403	489
Africa	171	155	75	65	99	48	2,535	2,043	43	26	1,132	1,117	33	15	590	506	37	21	451	536
Asia	90	88	28	26	65	23	5,498	1,652	41	16	3,510	1,187	14	4	945	321	15	9	1,005	609
Europe	17	13	5	4	13	4	120	31	8	3	74	20	3	1	33	9	9	4	93	32
Latin America and the Caribbean	59	50	18	15	43	14	509	144	22	9	266	94	6	3	60	29	15	12	127	133
Northern America	12	10	7	6	9	5	40	23	6	4	24	16	2	1	9	6	10	7	40	36
Oceania	38	33	22	18	27	16	14	11	15	10	8	7	6	4	3	2	11	7	5	4
World	**95**	**90**	**40**	**35**	**65**	**28**	**8,715**	**3,904**	**37**	**17**	**5,014**	**2,440**	**15**	**7**	**1,639**	**874**	**17**	**11**	**1,722**	**1,351**

Regional Classifications

The regional classifications that are referred to in the report and for which aggregate data are provided in the statistical table are Sustainable Development Goal regions (see below). Aggregates presented for member organizations of the United Nations Inter-agency Group for Child Mortality Estimation may differ and regional classifications with the same name from different member organizations (e.g., "Sub-Saharan Africa") may include different countries.

Whether a country belongs to the group of Least developed countries (LDC), Landlocked developing countries (LLDC) and/or Small island developing States (SIDS) is indicated in the brackets after the country name.

Sub-Saharan Africa

Angola (LDC), Benin (LDC), Botswana (LLDC), Burkina Faso (LDC, LLDC), Burundi (LDC, LLDC), Cabo Verde (SIDS), Cameroon, Central African Republic (LDC, LLDC), Chad (LDC, LLDC), Comoros (LDC, SIDS), Congo, Côte d'Ivoire, Democratic Republic of the Congo (LDC), Djibouti (LDC), Equatorial Guinea (LDC), Eritrea (LDC), Eswatini (LLDC), Ethiopia (LDC, LLDC), Gabon, Gambia (LDC), Ghana, Guinea (LDC), Guinea-Bissau (LDC, SIDS), Kenya, Lesotho (LDC, LLDC), Liberia (LDC), Madagascar (LDC), Malawi (LDC, LLDC), Mali (LDC, LLDC), Mauritania (LDC), Mauritius (SIDS), Mozambique (LDC), Namibia, Niger (LDC, LLDC), Nigeria, Rwanda (LDC, LLDC), Sao Tome and Principe (SIDS), Senegal (LDC), Seychelles (SIDS), Sierra Leone (LDC), Somalia (LDC), South Africa, South Sudan (LDC, LLDC), Togo (LDC), Uganda (LDC, LLDC), United Republic of Tanzania (LDC), Zambia (LDC, LLDC), Zimbabwe (LLDC)

Northern Africa and Western Asia

Northern Africa

Algeria, Egypt, Libya, Morocco, Sudan (LDC), Tunisia

Western Asia

Armenia (LLDC), Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, State of Palestine, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen (LDC)

Central and Southern Asia

Central Asia

Kazakhstan (LLDC), Kyrgyzstan (LLDC), Tajikistan (LLDC), Turkmenistan (LLDC), Uzbekistan (LLDC)

Southern Asia

Afghanistan (LDC, LLDC), Bangladesh (LDC), Bhutan (LLDC), India, Iran (Islamic Republic of), Maldives (SIDS), Nepal (LDC, LLDC), Pakistan, Sri Lanka

Eastern and South-Eastern Asia

Eastern Asia

China, Democratic People's Republic of Korea, Japan, Mongolia (LLDC), Republic of Korea

South-Eastern Asia

Brunei Darussalam, Cambodia (LDC), Indonesia, Lao People's Democratic Republic (LDC, LLDC), Malaysia, Myanmar (LDC), Philippines, Singapore (SIDS), Thailand, Timor-Leste (LDC, SIDS), Viet Nam

Latin America and the Caribbean

Antigua and Barbuda (SIDS), Argentina, Bahamas (SIDS), Barbados (SIDS), Belize (SIDS), Bolivia (Plurinational State of) (LLDC), Brazil, Chile, Colombia, Costa Rica, Cuba (SIDS), Dominica (SIDS), Dominican Republic (SIDS), Ecuador, El Salvador, Grenada (SIDS), Guatemala, Guyana (SIDS), Haiti (LDC, SIDS), Honduras, Jamaica (SIDS), Mexico, Nicaragua, Panama, Paraguay (LLDC), Peru, Saint Kitts and Nevis (SIDS), Saint Lucia (SIDS), Saint Vincent and the Grenadines (SIDS), Suriname (SIDS), Trinidad and Tobago (SIDS), Uruguay, Venezuela (Bolivarian Republic of)

Oceania

Australia and New Zealand

Australia, New Zealand

Oceania (excluding Australia and New Zealand)

Cook Islands (SIDS), Fiji (SIDS), Kiribati (LDC, SIDS), Marshall Islands (SIDS), Micronesia (Federated States of) (SIDS), Nauru (SIDS), Niue (SIDS), Palau (SIDS), Papua New Guinea (SIDS), Samoa (SIDS), Solomon Islands (LDC, SIDS), Tonga (SIDS), Tuvalu (LDC, SIDS), Vanuatu (LDC, SIDS)

Europe and Northern America

Northern America

Canada, United States of America

Europe

Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, Republic of Moldova (LLDC), Romania, Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Republic of North Macedonia (LLDC), Ukraine, United Kingdom of Great Britain and Northern Ireland

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The UN IGME's independent Technical Advisory Group, comprising leading academic scholars and independent experts in demography and biostatistics, provides technical guidance on estimation methods, technical issues and strategies for data analysis and data quality assessment.

The UN IGME updates its child mortality estimates annually after reviewing newly available data and assessing data quality. This report contains the latest UN IGME estimates of child mortality at the country, regional and global levels. Country-specific estimates and the data used to derive them are available at <www.childmortality.org>.

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