

# Population & Societies

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## Mortality between ages 5 and 15

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The mortality of children under age 5, which has fallen substantially across the world in recent years, is a closely monitored indicator of health in a country. But what about the mortality of older children? Drawing on data from a new international database, Bruno Masquelier describes the risks of dying between ages 5 and 15, how they vary across different countries, and the measures that could be taken to reduce mortality in this age group.

The mortality of children under age 5 is closely monitored, notably in the context of the Sustainable Development Goals which aim to end preventable deaths of newborns and children under five years of age by 2030. Impressive progress has been achieved since 1990. The probability for a newborn of dying before its fifth birthday has been more than halved since that year, falling to 39 deaths per 1,000 live births in 2017 at the global level [1]. But what about older children? How does their progress compare with that of the younger age group? Even if over a lifetime the risk of death is generally lowest between the ages of 5 and 15, the probability of dying at these ages provides a good indicator of older children's health, in a period of their life which is decisive for their future and marked by major behavioural changes (such as risk-taking) and physiological transformations (such as puberty). What are the risks of dying at these ages? How do they vary across regions and countries? What are the causes of death, and what are the most effective interventions for accelerating mortality reduction between ages 5 and 15?

### A million deaths in 2017, almost exclusively in low- and middle-income countries

In 2017, at the global level, the risk for a child on its fifth birthday of dying before reaching its fifteenth birthday (probability denoted  ${}_{10}q_5$ ) was 7.2 per 1,000, about five times lower than the risk for a newborn of dying before its fifth birthday (denoted  ${}_5q_0$ ), which stood at 39 per 1,000 [2] (Box).<sup>(1)</sup> Mortality is higher between ages 5 and 10 than between ages 10 and 15. In 2017, the probability of a child dying between its fifth and tenth birthday was 4.4 per 1,000, versus 2.8 per 1,000 between the tenth and fifteenth birthday. Despite these relatively small risks, one million children aged between 5 and 15 died in 2017. By comparison, there were 2.5 million neonatal deaths that year and 2.9 million deaths of children aged between 1 and 60 months [1].

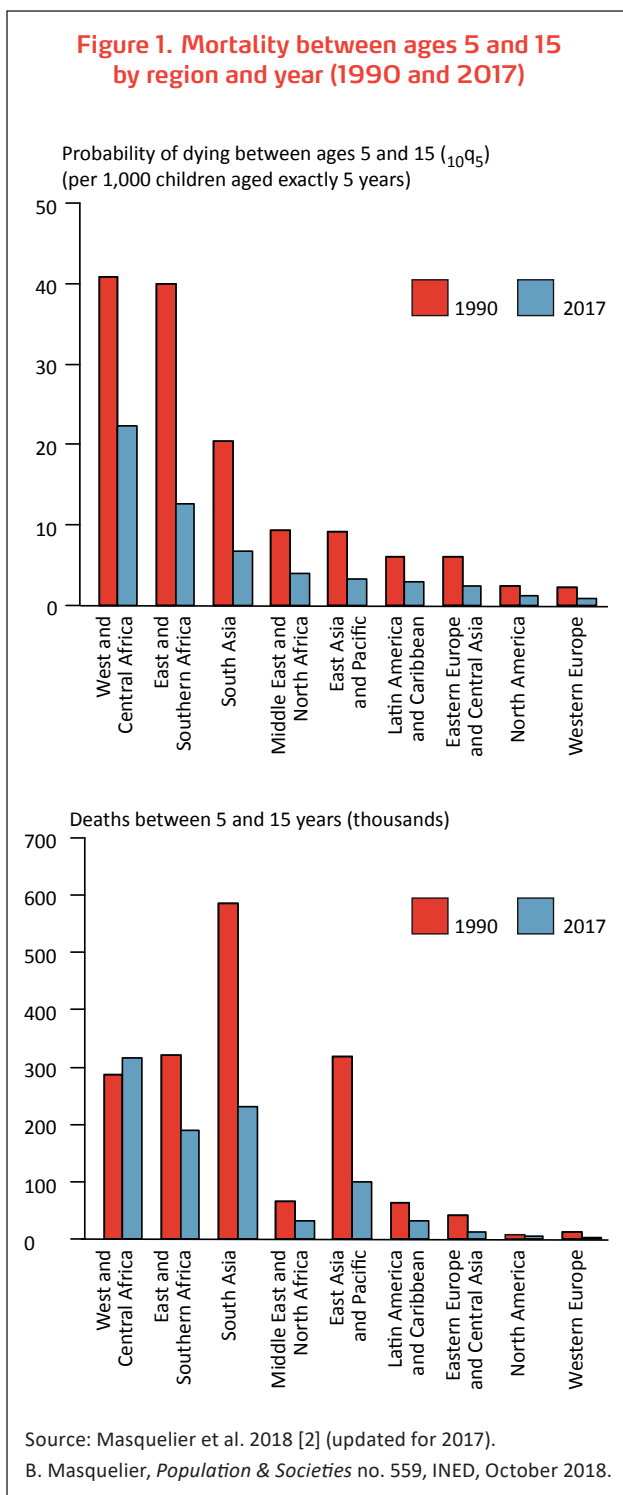
Practically all deaths between ages 5 and 15 occur in low- and middle-income countries (98% in 2017). In the countries of West and Central Africa (22 per 1,000), the probability of dying between these ages is more than 20 times higher than in Western Europe (1 per 1,000) (Figures 1 and 2).

Since 1990, mortality has fallen slightly faster in sub-Saharan Africa than in the rest of the world, but as population growth is very rapid, this region accounts for an increasing share of global deaths. In 2017, more than half of all deaths between the ages of 5 years and 15 years

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(1) Estimates up to the year 2017 are presented here. They are updated annually and are available at [www.childmortality.org](http://www.childmortality.org)

**Figure 1. Mortality between ages 5 and 15 by region and year (1990 and 2017)**



(55%) occurred in sub-Saharan Africa and one-third (34%) in West and Central Africa. More than half were concentrated in just seven countries: India, Nigeria, the Democratic Republic of Congo, Ethiopia, Pakistan, China, and Niger.

### A slower decline than among children under 5

In countries with long time-series of vital statistics data, we observe that mortality between ages 5 and 15 has

evolved differently from under-five mortality over time, with the former initially decreasing faster than the latter and then more slowly. In France, for example, the probability of dying between ages 5 and 15 fell at an annual rate of 2.3% between 1850 and 1950, versus 1.4% for under-five mortality. Between 1950 and 2015, the rates of progress increased, but the 0–5 age group (4.1%) now outpaced the 5–15 age group (3.1%). Trends appear to be similar in low- and middle-income countries. After an initial phase of faster mortality reduction at ages 5–15, they have now entered the second phase, with the 0–5 age group taking the lead.

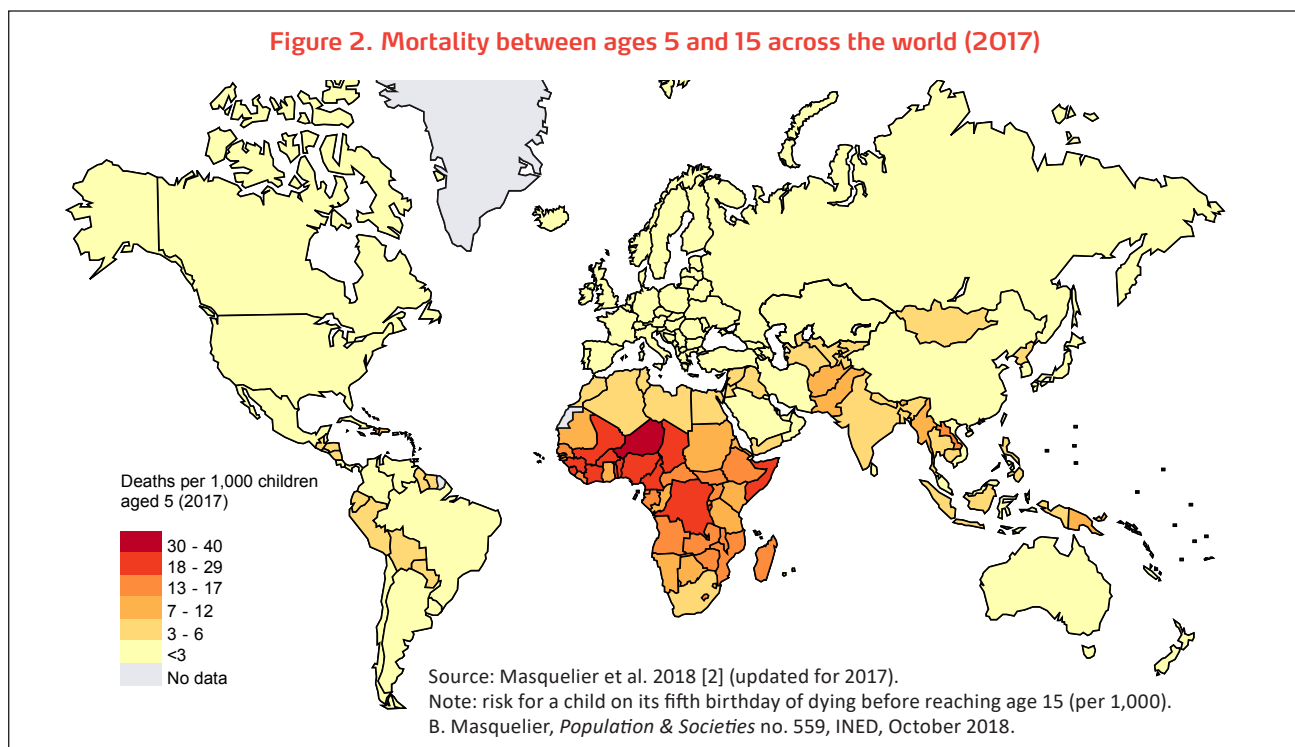
At the global level, between 1990 and 2017, the risk of dying between ages 5 and 15 fell by 52%. Annual deaths in this age group have fallen from 1.7 million to 0.9 million. However, mortality between ages 5 and 15 has fallen more slowly than between 0 and 5 years, especially over the recent period, decreasing by 2.7% per year since 2000, versus 4.1% for the 0–5 age group.

### A majority of deaths are avoidable

The pace of mortality decline is linked to the diseases that cause the deaths, which vary from one age group to another and evolve over time. We know little about the distribution of deaths by cause at ages 5–15 due to a lack of data, but we can make estimates using epidemiological models, such as those used by the Global Burden of Disease Study (GBD) [4]. Accidents and non-communicable diseases (cancers, cardiovascular diseases, etc.) cause a larger share of deaths between ages 5 and 15 (49% in 2016) than among the under-fives (17%). It is this latter age group, therefore, that has benefited most from the decrease in mortality from communicable diseases (diarrhoea, respiratory infections, malaria, etc.). But infections are nonetheless an important cause of death at older ages. Diarrhoeal diseases, lower respiratory tract infections, and other infections such as measles and meningitis account for 28% of deaths between ages 5 and 15, malaria and other tropical diseases 11%, tuberculosis and AIDS 9%. Unintentional injuries such as drowning and falls cause 14% of deaths, and road traffic accidents 9% [4].

It should be possible to accelerate the decline in mortality from communicable diseases and from accidents through prevention or effective medical care, without the need for advanced medical techniques [5]. As a large majority of children aged 5–15 attend school, a package of health services can be effectively delivered through the school system. Deworming, insecticide-treated net promotion, and healthy lifestyle education (notably accident prevention), along with vaccination and school meals programmes, are just some examples of potential school-based health interventions [5].

Figure 2. Mortality between ages 5 and 15 across the world (2017)



### Increasing excess male mortality

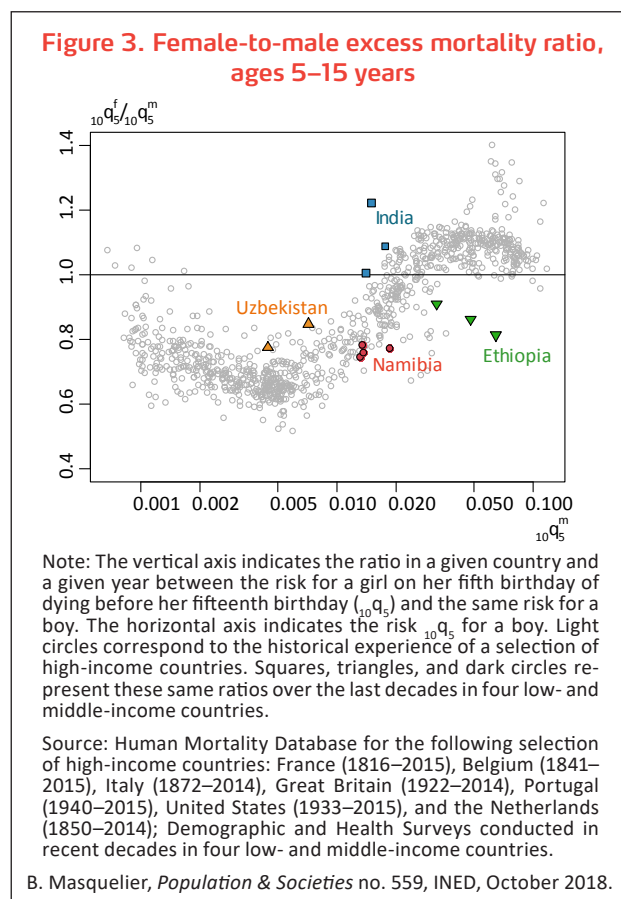
Deaths from external causes, notably road traffic accidents and drowning, are more frequent among boys than girls, but excess male mortality varies over time and across countries (Figure 3). When mortality between ages 5 and 15 is high (above 20–30 per 1,000), girls’ risks of dying are greater than those of boys, but this sex inequality is reversed as mortality levels decline and the share of mortality from external causes increases. Female excess mortality at ages 5–15 is especially pronounced in India, reflecting the sex discrimination to which girls and women are subjected from birth. In Ethiopia, on the other hand, boys’ mortality rates are higher than girls’, perhaps due to higher mortality from external causes than elsewhere. The situations in Uzbekistan and Namibia are more similar to the historical experience of high-income countries (Figure 3).

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Over the last decades, the international community has focused on the health of children under the age of five, while older children and young adolescents have received little attention, even though this age group represents one-sixth of the world population. This time of life corresponds to a critical period of cognitive development during which individuals also adopt behaviours that will have life-long repercussions on their health. It is important to broaden our perspective beyond the first five years of life and to evaluate the health and mortality of young

people aged between 5 and 15. While mortality rates are relatively low, there are around one million deaths in this age group each year – almost 2,500 per day. Most of these deaths could be avoided if appropriate prevention and

Figure 3. Female-to-male excess mortality ratio, ages 5–15 years



### Box. Estimating child mortality between ages 5 and 15 years

In most low- and middle-income countries, civil registration and vital statistics systems are not sufficiently complete to provide timely and accurate child mortality rates. Until recently, mortality at ages 5–15 received little attention, and estimates were often obtained using mortality models by extrapolating on the basis of mortality at ages 0–5. A research team working for the United Nations Inter-agency Group for Child Mortality Estimation (UN IGME)<sup>(a)</sup> has recently compiled a broad database of mortality measurements drawn from a wide range of sources to estimate mortality between ages 5 and 15 [2].

Four types of data sources are used:

1. *Vital statistics*, which are the ideal source for measuring mortality. In this study, they could only be used for 87 countries, covering 23% of the global population aged between 5 and 15 years. In the other countries, a large share of deaths is not recorded, or statistics are lacking.
2. *Sample-based registration systems*. In several countries, such as India and Bangladesh, vital statistics data are not complete at the national level, but high-quality estimates are provided by sample vital registration systems.
3. *National surveys*, such as the Demographic and Health Surveys (DHS) or the UNICEF Multiple Indicator Cluster Surveys (MICS). In these surveys, a sample of women aged 15 to 49 are asked about the children they have had, the date of birth of each one, their vital status, and age at death if deceased.
4. *Censuses*. Questions on recent deaths in the household are asked in the censuses of certain countries. The responses can be used to calculate mortality rates, but the estimates are often erratic due to under-reporting of deaths, age misreporting, and errors in the enumeration of populations at these ages (under- or over-enumeration).

Based on data from these various sources, a statistical model was used to produce smoothed trends [3]. The model takes account of data errors due, for example, to more frequent under-reporting of deaths which occurred in the more distant past. It also projects trends up to a very recent period, even for countries whose most recent data are several years old. The model provides uncertainty intervals to gauge the plausibility of the estimates obtained. In Niger, for example, mortality between ages 5 and 15 is very high, with an estimated 39 deaths per 1,000 children aged 5 in 2017. However, as few surveys are available for this country, the uncertainty interval around this estimate is very large. There is a 90% chance that the actual risk of dying in Niger is between 25 per 1,000 and 58 per 1,000.<sup>(b)</sup>

(a) The UN IGME group is coordinated by the United Nations Children's Fund (UNICEF) and includes the WHO, the United Nations Population Division, and the World Bank.

(b) For the sake of clarity, we do not specify the uncertainty intervals here, but they are important for comparing countries or regions.

healthcare policies were implemented. The enormous variations in the risk of dying between ages 5 and 15 – from 0.5 per 1,000 in Luxembourg to 39 per 1,000 in Niger – illustrate just how much progress can still be made in this area.

### References

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### Abstract

Across the world, around one million children aged between 5 and 15 years died in 2017. For a child on its fifth birthday, the risk of dying before reaching its fifteenth birthday is 7.2 per 1,000. This is five times lower than the risk for a newborn of dying before age 5 (39 per 1,000). Mortality between ages 5 and 15 halved between 1990 and 2017, and most deaths in this age group now occur in low- and middle-income countries. In 2017, one-third of all deaths were concentrated in West and Central Africa, where the probability of dying at these ages is more than 20 times higher than in Western Europe.

### Keywords

child mortality, deaths between ages 5 and 15, causes of death, infectious diseases, death from external causes, male excess mortality, world.