

Child mortality reduction: a contrasting picture across the world

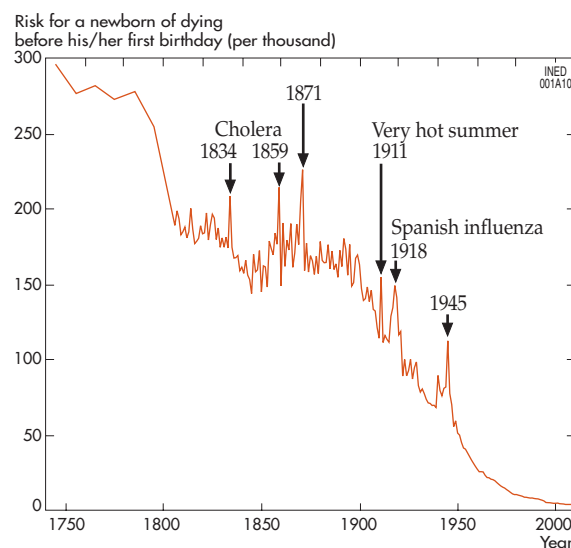
Gilles Pison *

Child mortality has fallen rapidly in recent years. In the world today, seven in every hundred newborns die before their fifth birthday, compared with forty or fifty per hundred in the past. It nonetheless remains high in certain world regions, sub-Saharan Africa in particular. Why is this the case, given that preventive measures are both effective and inexpensive?

According to United Nations estimates, based on the trends observed in recent years, 9.3 million children aged under five will die in 2010 across the world, among whom 6.2 million before reaching age one [1]. In relation to the total number of births (137 million), this signifies that one in every twenty-two children born in 2010 will die before his or her first birthday and that among those who survive their first year, one in forty-three will die in the following four years. Altogether, almost 7% of newborns in 2010 will die before reaching age five.

Most of these deaths are due to inadequate care during pregnancy and childbirth or to treatable or preventable infectious diseases. Although the figures may seem shocking, they in fact testify to immense progress in the fight against child mortality. In the 1950s, more than 20% of children died before age five (16% before age one), and a century ago the figure was probably above 30%. In the mid eighteenth-century France, half of all children died before age five (30% in their first year), and child deaths were so common that practically all families were affected. The loss of a child

Figure 1 - Child mortality in France, 1740-2009



(G. Pison, *Population & Societies*, 463, INED, January 2010)

Sources: [2], [3].

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was an inevitable risk of life whose only remedy was high fertility. Although the means to prevent infant mortality are now at our disposal, not all families have equal access to them. While in the most developed countries, under-five mortality stands at 0.5% or less, it is above 10% in many Southern countries, notably in sub-Saharan Africa.

◆ A spectacular overall decline

From a level of three infant deaths per ten newborns in the eighteenth century, infant mortality in France began to decline in the early nineteenth century, partly thanks to smallpox vaccination, falling from almost 275 per thousand to 185 per thousand in just two decades (Figure 1). It rose again in the mid-nineteenth century due to a worsening of children's living conditions (notably in cities) in the wake of industrial and urban development. The late nineteenth century saw a return to the downward trend in infant mortality, thanks to the Pasteur revolution and to the very first child protection policies. In the twentieth century, infant mortality in France fell to a very low level and by 2009 stood at just 3.6 per thousand [2]. A similar trend has occurred in all northern countries, with rates of 3.1 per thousand in Japan, and 5.7 per thousand in the United States in 2008 [1].

Many Southern countries have followed the same pattern (Figure 2). While the decline began later than in the North, it has occurred more swiftly. In China, for example, it took just 40 years for infant mortality to drop from 200 per thousand to 30 per thousand (from 1950 to 1990), compared with one and a half centuries in France (from 1800 to 1958). This rapid decline in China in the 1950s and 1960s was due in part to a

government health policy to make basic health care accessible to everyone, including populations living in remote rural areas, via the famous army of "barefoot doctors".

In Tunisia, where infant mortality was also high in the 1950s, the decline was equally rapid, but occurred a decade later (Figure 2). While progress slowed down in China in the late 1980s with the shift to a market economy and the growth of inequalities, it continued at a steady pace in Tunisia. In Brazil, infant mortality had already fallen in the first half of the twentieth century and continued to do so afterwards, though less quickly

Figure 2 - Child mortality in selected Southern countries

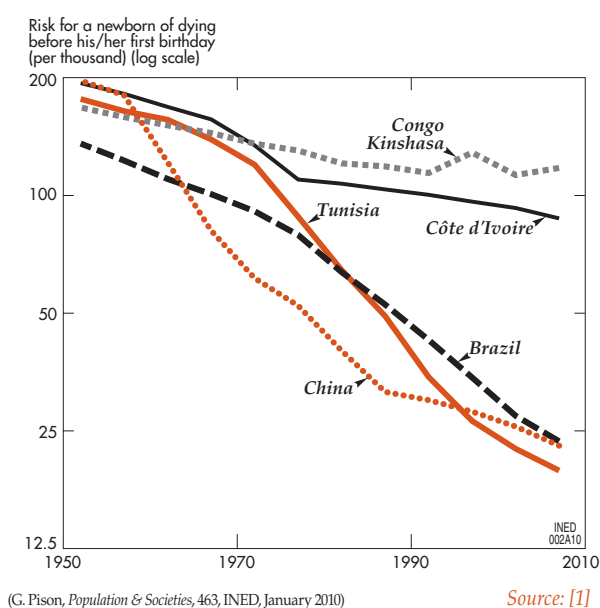
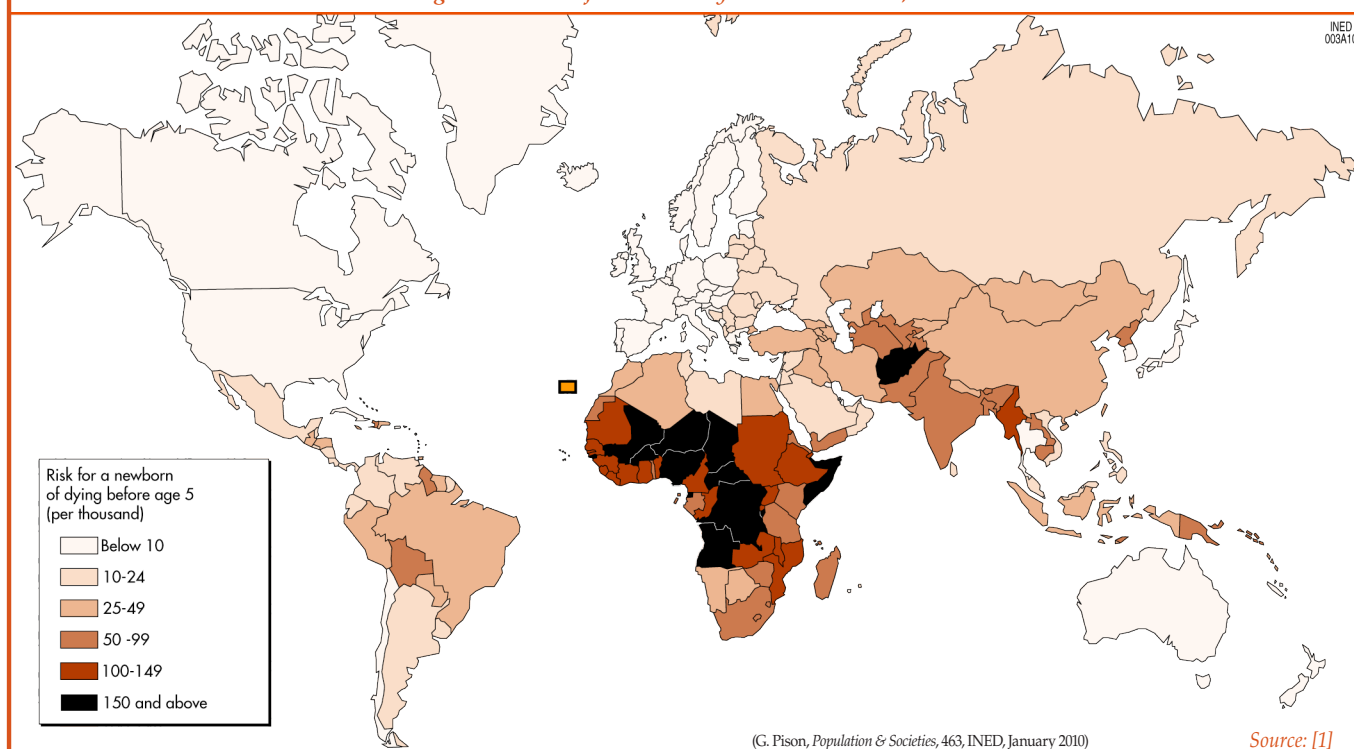


Figure 3 - Under-five mortality across the world, 2010



than in China and Tunisia. Today, infant mortality in these three countries stands at around 20 per thousand, the level observed in France some 40 years ago, in the late 1960s. Deaths from childhood infectious diseases have become extremely rare, but there is still room for progress in reducing neonatal mortality.

◆ Sub-Saharan Africa lags behind

By contrast, child mortality in some countries remains persistently high or has only fallen very slightly. Examples include Afghanistan, a country at war, and Burma, where the health system is severely underdeveloped (Figure 3). But the countries of sub-Saharan Africa are those where progress in reducing child mortality has been slowest (Figures 1, 2, 3, 4). Although the African continent represents only one-seventh of the world population and one-quarter of all births, it accounts for half the world total of deaths before age five (Figure 5). The situation in North Africa has improved rapidly, as we have seen for Tunisia; it is in sub-Saharan Africa that the problems persist. More than half a century ago, infant mortality was close to 200 per thousand in Asia and sub-Saharan Africa. It has since been reduced five-fold in the former region, but only halved in the latter. One might think that the widening gap between sub-Saharan Africa and the rest of the world is a consequence the AIDS epidemic, particularly severe in this region. Many children are indeed infected at birth or shortly after through mother-to-child transmission of the virus and die at a young

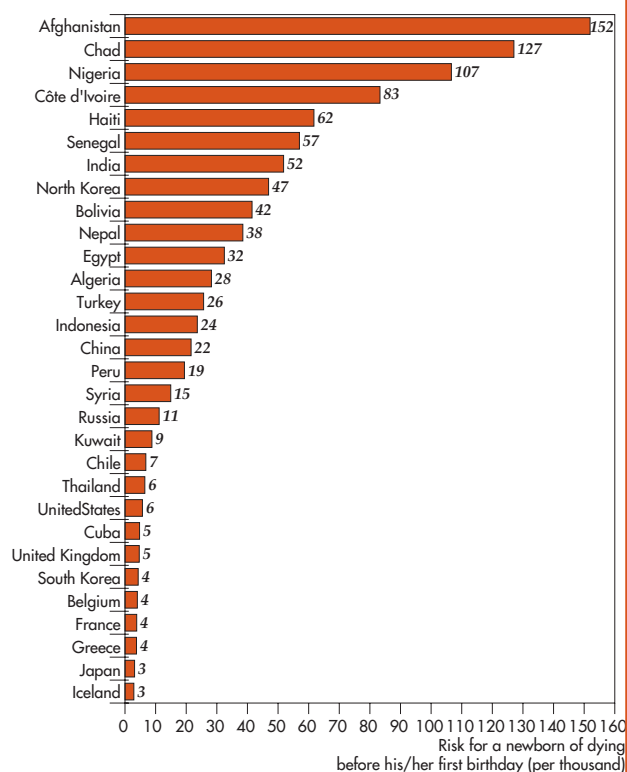
age if left untreated. But not all countries in sub-Saharan Africa are equally affected by AIDS, and even in those with low prevalence of the disease, the decline in child mortality is slow (see Box on page 4).

◆ The drivers of child mortality reduction

The worldwide reduction in child mortality has been achieved through socioeconomic development and progress in health care. Higher agricultural yields and improved transport networks have reduced the risk of famine and famine-related mortality in most regions of the world. Better hygiene and broader access to education have also played a major role. Even in the poorest regions, women's education is always associated with improved health and lower infant mortality since it enables them to make better use of available services.

Health care provision has also improved, both for treatment and prevention. Vaccination, a key preventive tool, has been highly effective in reducing mortality from infectious diseases, the leading cause of child death. Yet many children still die from infections for which vaccines are available, such as measles, whooping cough and neonatal tetanus, which together cause almost a million deaths per year, i.e. one in ten deaths of under-fives in 2004 [4]. Children who survive these diseases are often weakened by them and more liable to succumb to a subsequent infection. Vaccination is one of the simplest and most cost-effective medical procedures in terms of disease prevention and mortality reduction.

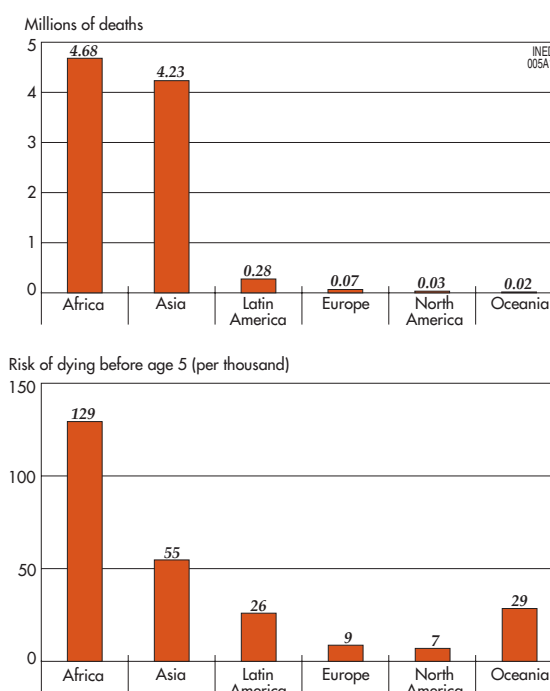
Figure 4 - Infant mortality in selected countries, 2010



(G. Pison, *Population & Societies*, 463, INED, January 2010)

Source: [1].

Figure 5 - Under-five mortality by continent, 2010



(G. Pison, *Population & Societies*, 463, INED, January 2010)

Source: [1].

◆ Making better use of vaccination

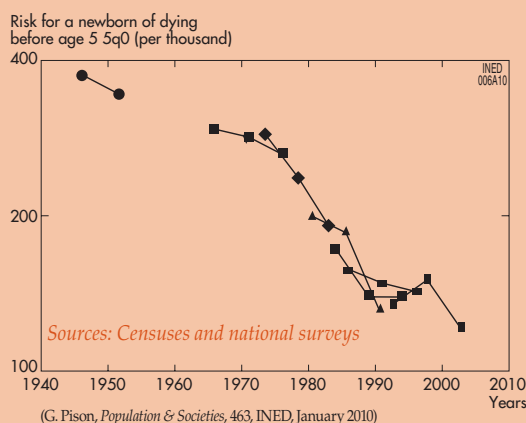
There is no doubt that economic development will eventually bring down child mortality in the regions where it remains high. But progress could be achieved more quickly, notably by ensuring that the protective potential of existing vaccines is fully exploited. In other words, maximum benefits should be drawn from their beneficial non-specific effects, such as those associated with the BCG or measles vaccines, while avoiding any adverse non-specific effects, such as those associated with the DTP or hepatitis B vaccines (1). Vaccination

Box

The case of Senegal

In the early 1950s, almost four in ten children in Senegal died before their fifth birthday, but by the early 2000s the proportion had fallen to just one in ten (Figure 6). The pattern of mortality decline over the period is uneven. It began slowly in the 1950s and 1960s because the vast majority of the population lived in rural areas with limited access to the health infrastructures (hospitals, dispensaries) located mainly in towns and cities.

Figure 6 - Under-five mortality in Senegal since the end of the Second World War



Child mortality fell more rapidly in the 1970s and 1980s thanks to nationwide vaccination campaigns against childhood diseases. Even though only half of all children were actually vaccinated, the effect on mortality was considerable. In the Bandafassi region, before measles vaccination, one child death in four after the age of one month was due to the disease [5]. Child vaccination from the late 1980s reduced the share of measles deaths in total child mortality to just 3%, even though only half of all children were vaccinated. Child deaths from all causes fell immediately by 40%, a sharper drop than the expected decrease obtained simply by subtracting all deaths from the diseases targeted by the vaccines (measles, pertussis, tetanus, etc.).

Progress was halted in the 1990 due to a slowing down of vaccination efforts and an upturn in malaria mortality with the emergence of drug-resistant strains. The AIDS epidemic is not a major factor in this country as its prevalence is low (fewer than 1% of adults were infected with HIV in 2005). Renewed vaccination efforts, notably via national vaccination and vitamin A distribution days and the organization of specific measles vaccination campaigns, led to further progress in the early 2000s.

coverage should also be increased. Given that vaccination is such an effective protection against disease, it is difficult to understand why not all children on the planet are vaccinated. Cost is not an issue. On the contrary, vaccination costs are often low and, in the poorest countries, are covered by international organizations. The main reasons for this situation are inadequate focus on prevention and poor organization.

Certain vaccines, such as the measles and BCG vaccines, have beneficial non-specific effects. By stimulating the immune system, they help to reduce child mortality from other diseases, such as diarrhoea and malaria, for which vaccines are not yet available [6]. Other vaccines, on the other hand, such as DTP (combine vaccine against diphtheria, tetanus, pertussis) or the hepatitis B vaccine have adverse non-specific effects, among girls especially. They are effective in that they protect vaccinated children against these specific diseases, but in regions where mortality is still high and where the diseases they protect against (pertussis, tetanus, hepatitis B) are not responsible for large numbers of child deaths, they increase female child mortality for reasons that are as yet unknown, probably again linked to the immune system

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ABSTRACT

Across the world, one newborn in twenty-two dies before his or her first birthday, and among those who survive, a further one in forty-three dies over the next four years. Altogether, almost 7% of newborns die before the age of five. The inequalities in child mortality between countries are vast. While in the most developed countries, under-five mortality has plummeted, and now stands at 0.5% or less, it is above 10% in many southern countries, notably in sub-Saharan Africa. Many children still die of infectious diseases that could be prevented by vaccination, one of the simplest and most cost-effective medical procedures in terms of disease prevention and mortality reduction.