IV. MORTALITY AND THE DEMOGRAPHIC IMPACT OF HIV/AIDS

The mortality story told by the *2004 Revision* begins in 1950. In the previous half-century, improvements in hygiene, increased knowledge about the transmission of infectious diseases and the introduction of drug-based treatments had brought about rapid reductions in mortality. The world stood on the threshold of a remarkable period of progress that would see the less developed regions make dynamic strides against mortality, narrowing the gap with the more developed world. The picture of that period, however, is not uniformly bright. The HIV/AIDS epidemic, wars and economic stagnation impeded the fight against mortality in some parts of the world, leaving millions of people experiencing mortality conditions that are scarcely better than a half-century ago.

A. MORTALITY

By the 1950s, the more developed regions of the world had reaped the benefits of the earlier advances, reaching a life expectancy at birth (box IV.1) of 66.1 years for both sexes combined in 1950-1955 (table IV.1). Meanwhile, the less developed regions had experienced only the beginnings of improvement. Life expectancy in the less developed regions in 1950-1955 stood at 41.1 years, a full 25 years lower than in the more developed regions.

1. Trends and differentials in life expectancy since 1950

Mortality improvements in the second half of the twentieth century benefited a large proportion of the world population. In the early 1950s, fully 60 per cent of the world's population lived in countries where life expectancy at birth was below 50 years (figure IV.1). By 2000-2005, this proportion had fallen to 10 per cent. Meanwhile, the share of world population living in countries with life expectancy of 70 or higher rose from less than 1 per cent in 1950-1955 to over 50 per cent in 2000-2005.

Today, the more developed regions continue to enjoy better life expectancy on average than the less developed regions. Since 1950, life expectancy in the more developed regions has con-

BOX IV.1. MEASURING MORTALITY: LIFE EXPECTANCY AT BIRTH

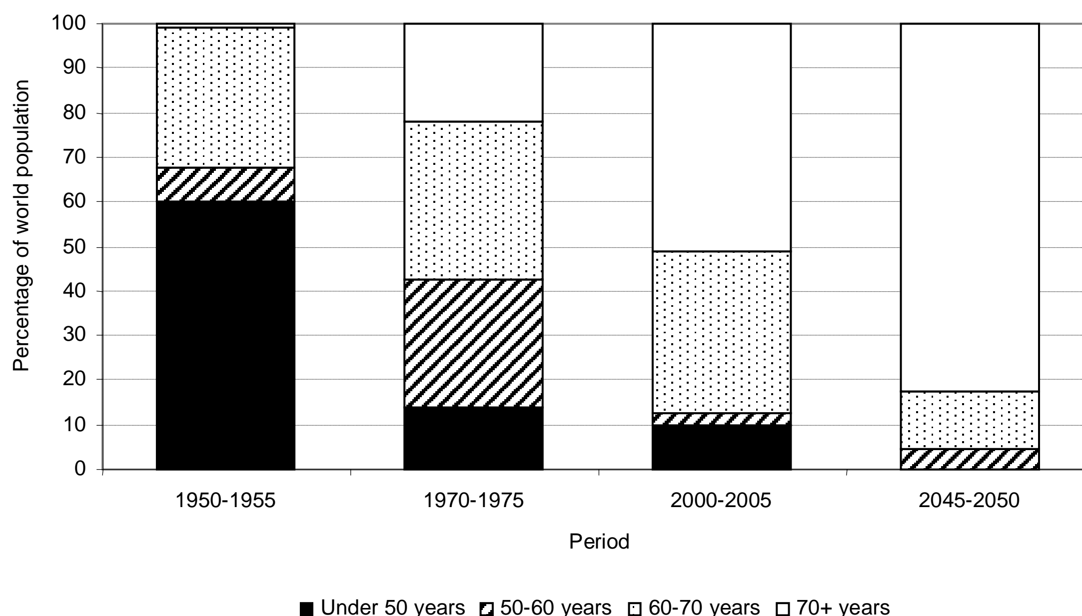
Life expectancy at birth (e_0) is a commonly used measure to summarize mortality conditions for a period of time. In the *2004 Revision*, life expectancy summarizes mortality for 5-year periods. A life expectancy of 75 years for a country in 2000-2005 can be interpreted to mean that if mortality rates observed at each age in the period 2000-2005 were to remain constant, children born in 2000-2005 would live an average of 75 years. In reality, mortality rates do not remain constant and the cohort born in 2000-2005 will have longer or shorter average lives, depending on whether mortality conditions improve or deteriorate. However, life expectancy provides a convenient, standardized measure (unaffected by age structure differences) for comparing mortality over time and across populations.

Life expectancy is often calculated and presented separately by sex. In this report, data on life expectancy are given for both sexes combined except in section A.2, below.

TABLE IV.1. LIFE EXPECTANCY AT BIRTH, BY DEVELOPMENT GROUP AND MAJOR AREA, ESTIMATES AND MEDIUM VARIANT, 1950-1955, 2000-2005, AND 2045-2050

	Life expectancy at birth (years)			*Absolute change*		*Percentage change*	
Development group or major area	*1950-1955*	*2000-2005*	*2045-2050*	*1950-1955 to 2000-2005*	*2000-2005 to 2045-2050*	*1950-1955 to 2000-2005*	*2000-2005 to 2045-2050*
World	46.6	65.4	75.1	18.8	9.7	40.3	14.8
More developed regions	66.1	75.6	82.1	9.5	6.5	14.4	8.6
Less developed regions	41.1	63.4	74.0	22.2	10.6	54.1	16.7
Least developed countries	36.1	51.0	66.5	14.9	15.5	41.3	30.3
Other less developed countries	41.9	66.1	76.3	24.2	10.2	57.7	15.5
Africa	38.4	49.1	65.4	10.7	16.3	28.0	33.2
Asia	41.4	67.3	77.2	25.8	10.0	62.3	14.8
Europe	65.6	73.7	80.6	8.2	6.8	12.5	9.3
Latin America and the Caribbean	51.4	71.5	79.5	20.2	7.9	39.3	11.1
Northern America	68.8	77.6	82.7	8.7	5.2	12.7	6.7
Oceania	60.4	74.0	81.2	13.6	7.2	22.5	9.7

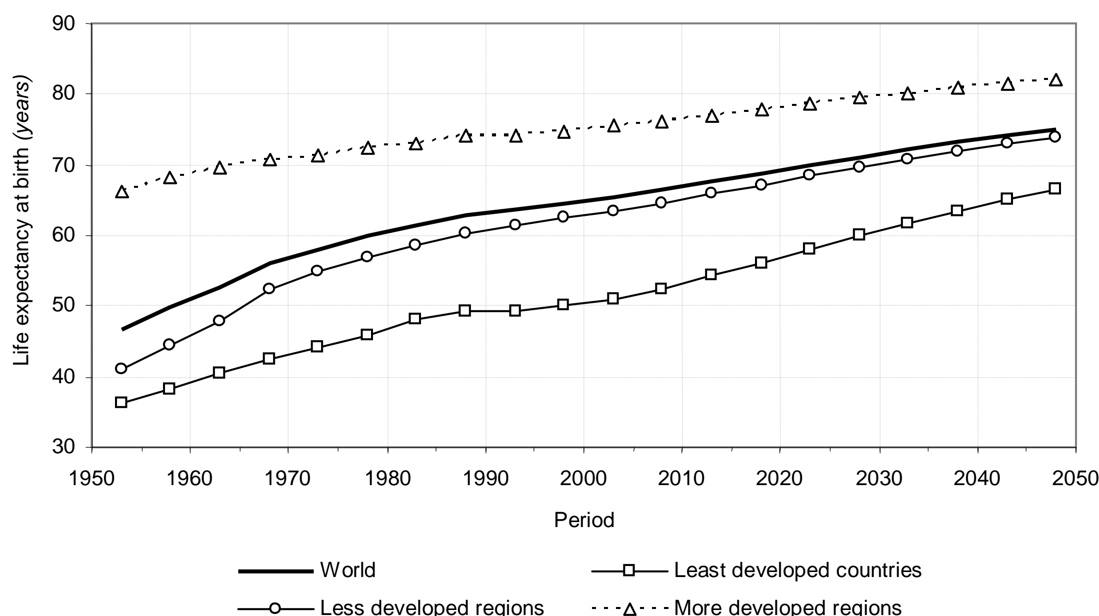
Figure IV.1. Share of world population, by level of life expectancy at birth, estimates and medium variant: 1950-1955, 1970-1975, 1995-2000 and 2045-2050



tinued to increase (table IV.1 and figure IV.2), reaching 75.6 years in 2000-2005. The pace of increase in these regions, however, has slowed. The rapid declines earlier in the century were due primarily to decreases in infectious disease mortality among children and young adults. Once mortality rates in the younger age groups become very low, further increase in life expectancy comes only with progress against the degenerative diseases of old age.

In the less developed regions, progress against infectious diseases had not yet been achieved by mid-century. After 1950, basic health interventions became more widespread throughout the world, and less developed regions were able to

Figure IV.2. Life expectancy at birth, by development group, estimates and medium variant: 1950-2050



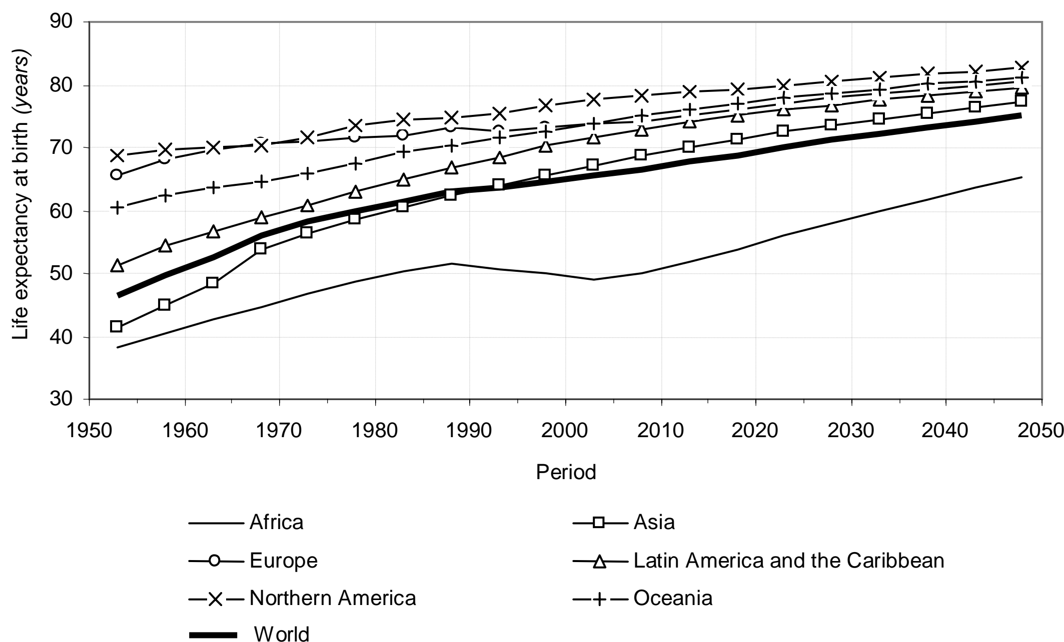
achieve substantial reductions in infectious disease mortality. As a result, life expectancy rose at a fast pace in the less developed regions as a whole, increasing by 22.2 years—more than 50 per cent—between 1950-1955 and 2000-2005, to a level of 63.4 years. Thus, the gap in life expectancy between the less and more developed regions shrank from 25 years in 1950-1955 to 12.2 years in 2000-2005.

The general upward trend in life expectancy masks variations within the less developed regions. For example, the 50 least developed countries, which include 31 countries that are highly affected by HIV/AIDS, currently experience very high mortality relative to the rest of the less developed group. The average life expectancy at birth in the least developed countries was 51.0 years in 2000-2005, more than 15 years below that of the other less developed countries; in 1950-1955, the disparity between these two groups was only about 6 years.

Within the less developed regions, progress differs greatly among the major areas (figure IV.3). Asia and Latin American and the Caribbean experienced steady increases in life expectancy throughout the second half of the twentieth century. Latin America and the Caribbean has had the highest life expectancy among major areas in the less developed regions. From 51.4 years in 1950-1955, life expectancy in Latin America increased to 71.5 years in 2000-2005. The biggest rise among all major areas occurred in Asia, where life expectancy rose from 41.4 years in 1950-1955 to 67.3 years in 2000-2005.

Africa, unlike other major areas, has been experiencing declining life expectancy since the late 1980s. Life expectancy in Africa stood at just 49.1 years in 2000-2005, after reaching 51.5 years in 1985-1990. The only exception has been Northern Africa, with continually rising life expectancy. While the downward trend in the rest of Africa is due in large part to the HIV/AIDS epidemic, other factors have also played a role, including armed conflict, economic stagnation and resurgent infectious diseases such as tuberculosis and malaria. The recent negative trends in Africa have set back progress in reducing mortality by at least 25 years. Not until 2010-2015 are life expectancy levels in Africa expected to return to those last seen in 1985-1990.

Figure IV.3. Life expectancy at birth, by major area, estimates and medium variant, 1950-2050



Among the more developed regions, aggregate trends for Northern America and Europe have diverged since the 1960s. The two major areas had nearly equal life expectancy in 1965-1970, 70.5 and 70.6 years, respectively. Northern America subsequently experienced continually rising life expectancy, reaching 77.6 years in 2000-2005. Europe, on the other hand, experienced a slowdown in life expectancy increase starting in the late 1960s and stagnating levels in the 1990s. In 2000-2005, Europe's life expectancy stood at 73.7 years. The stagnating trend for Europe as a whole was strongly influenced by severe declines in life expectancy in Eastern Europe, particularly in the Russian Federation and Ukraine, the most populous countries in that region. The remaining regions of Europe had life expectancies in 2000-2005 equal to or higher than that for Northern America. The remaining three countries of the more developed regions, Australia, New Zealand, and Japan, had life expectancies in 2000-2005 of 80.2, 79.0, and 81.9 respectively, well above the averages for Europe and Northern America.

The extremes of life expectancy within the more and less developed regions illustrate the wide disparities that characterize the world mortality situation. In 2000-2005, life expectancy levels among the more developed regions ranged from highs of 81.9 years in Japan, 80.6 years in Iceland and 80.4 years in Switzerland to lows of 65.4 years in the Russian Federation, 66.1 years in Ukraine and 67.5 years in the Republic of Moldova (table IV.2). Several countries that are geographically classified with the less developed regions have very high life expectancy, for example 81.5 years in Hong Kong, China SAR; 80 years in Macao, China SAR and 79.6 years in Israel. At the other end of the spectrum, life expectancy in 2000-2005 was as low as 32.9 years in Swaziland, 36.6 years in Botswana and 36.7 years in Lesotho. In these three countries, the impact of the HIV/AIDS epidemic has lowered life expectancy to a level even lower than that of countries affected by civil strife, such as Sierra Leone (40.6 years) and Angola (40.7 years). In the world's two most populous countries, China (apart from the Hong Kong and Macao, China SARs) and India, life expectancy in 2000-2005 was 71.5 years and 63.1 years, respectively.

TABLE IV.2. TEN COUNTRIES AND AREAS WITH THE HIGHEST AND TEN COUNTRIES AND AREAS WITH THE LOWEST LIFE EXPECTANCY AT BIRTH, BY DEVELOPMENT REGION, 2000-2005

Rank	*Country or area*[a]	*Life expectancy (years)*	Rank	*Country or area*[a]	*Life expectancy (years)*
		A. More developed regions			
Rank	*Highest life expectancy at birth*		*Rank*	*Lowest life expectancy at birth*	
1	Japan	81.9	1	Russian Federation	65.4
2	Iceland	80.6	2	Ukraine	66.1
3	Switzerland	80.4	3	Republic of Moldova	67.5
4	Australia	80.2	4	Belarus	68.1
5	Sweden	80.1	5	Estonia	71.2
6	Italy	80.0	6	Romania	71.3
7	Canada	79.9	7	Latvia	71.4
8	Spain	79.4	8	Bulgaria	72.1
9	France	79.4	9	Lithuania	72.2
10	Norway	79.3	10	Hungary	72.6
		B. Less developed regions			
Rank	*Highest life expectancy at birth*		*Rank*	*Lowest life expectancy at birth*	
1	Hong Kong, China SAR	81.5	1	Swaziland	32.9
2	Macao, China SAR	80.0	2	Botswana	36.6
3	Israel	79.6	3	Lesotho	36.7
4	Martinique	78.7	4	Zimbabwe	37.2
5	Singapore	78.6	5	Zambia	37.4
6	Cyprus	78.5	6	Central African Republic	39.4
7	United States Virgin Islands	78.5	7	Malawi	39.6
8	Guadeloupe	78.3	8	Sierra Leone	40.6
9	Costa Rica	78.1	9	Angola	40.7
10	Chile	77.9	10	Mozambique	41.9

[a] Countries or areas with 100,000 persons or more in 2000.

a. Future prospects for life expectancy

By 2000-2005 the world population had achieved a life expectancy at birth of 65.4 years. The *2004 Revision* assumes that future increases in life expectancy for individual countries will proceed at a pace consistent with recent trends in each country and with models based on historical experience of mortality improvement at various levels of life expectancy. Historically, annual increases in life expectancy have become smaller at higher levels of life expectancy. Therefore, gains in life expectancy over the next half-century are expected to be smaller than those achieved in the past half-century. Overall, a further increase of 9.7 years is projected by 2045-2050 for the world as a whole, compared to 18.8 years between 1950-1955 and 2000-2005 (table IV.1).

The more developed regions are projected to gain 6.5 years of life expectancy by 2045-2050, reaching a level of 82.1 years. In the less developed regions a gain of 10.6 years is projected to bring life expectancy to 74.0 years by 2045-2050. Thus the gap in life expectancy between more and less developed regions is expected to narrow, from 12.2 years in 2000-2005 to 8.1 years in 2045-2050. Within the less developed regions, the least developed countries will continue to be characterized by higher mortality than other less developed countries. Still, a gain of 15.5 years in life expectancy is projected for the least developed countries, bringing this group to a life expectancy of 66.5 years at the end of the projection period, one year higher than the world average today.

All but one of the world's major areas will see smaller gains in life expectancy over the next 45 years than over the previous half-century, similar to the projected worldwide trend. The exception is Africa, where a gain of 16.3 years of life expectancy is projected by 2045-2050, compared to a gain of only 10.7 years between 1950-1955 and 2000-2005. The gain projected for Africa rests on the assumptions that the HIV/AIDS epidemic will be brought under control and that economic and political stability will permit the improvement of health infrastructures in a way that will allow sustained declines in mortality.

2. Differences in life expectancy by sex

In nearly all countries of the world today, female life expectancy at birth is higher than male life expectancy. Globally, females had a life expectancy of 67.7 years in 2000-2005, compared to 63.2 years for males (table IV.3). The female advantage in the more developed regions, 7.4 years in 2000-2005, is considerably larger than the 3.5-year advantage of females in the less developed regions (figure IV.4). The gap between male and female life expectancy is particularly narrow in the least developed countries (1.9 years), where the impact of HIV/AIDS on mortality is estimated to be more detrimental for women than for men. In 2045-2050, the difference between female and male life expectancy for the world is expected to remain close to 5 years in favour of females. The gap is expected to narrow in the more developed regions, continuing trends that have been observed since the 1980s in most of these regions, with the exception of Eastern Europe and Japan. Meanwhile, the sex differential in life expectancy is projected to widen in the less developed regions.

Among major areas, the sex differential in life expectancy is particularly large in Europe, at 8.8 years in 2000-2005 (figure IV.5). The very high sex differentials in countries of the former Soviet Union, as high as 13 years in the Russian Federation, have a strong effect on the European average. Asia, which historically had a very low sex differential in life expectancy, has seen the female advantage increase in recent decades. In Africa, a lessening of the female advantage is projected in the next 5 years or so, followed by a gradual increase to 2045-2050. As in the least developed countries generally, the contraction of the sex differential in Africa is due largely to the larger impact of HIV/AIDS on mortality among women than among men (see section B.3.a, below).

The sex differential in mortality is attributable to a combination of behavioural factors, such as tobacco use and risk-taking behaviour, and genetic factors that appear to advantage women, particularly against ischaemic heart disease (Nathanson, 1984; Pampel, 2002; Waldron, 1985). The female advantage in mortality over the full life course has not been a universal phenomenon, however, in South-central Asia, for example, males had higher life expectancy than females until the late 1970s. Excess female mortality in some parts of the age range was common in many Western countries until the first half of the twentieth century (Tabutin and Willems, 1998). In recent years, a female disadvantage in mortality between ages 1 and 5 continued to be documented in many countries of the less developed regions (United Nations Secretariat, 1998).

TABLE IV.3. LIFE EXPECTANCY AT BIRTH, BY SEX AND DEVELOPMENT GROUP, ESTIMATES AND MEDIUM VARIANT, 2000-2005 AND 2045-2050

	Life expectancy at birth (years)			
	2000-2005		*2045-2050*	
Development group	*Male*	*Female*	*Male*	*Female*
World	63.2	67.7	72.8	77.5
More developed regions	71.9	79.3	79.1	85.0
Less developed regions	61.7	65.2	71.8	76.2
Least developed countries	50.1	52.0	64.9	68.2
Other less developed countries	64.2	68.0	74.1	78.6

Figure IV.4. Difference between female and male life expectancy at birth, by development group, estimates and medium variant, 1950-2050

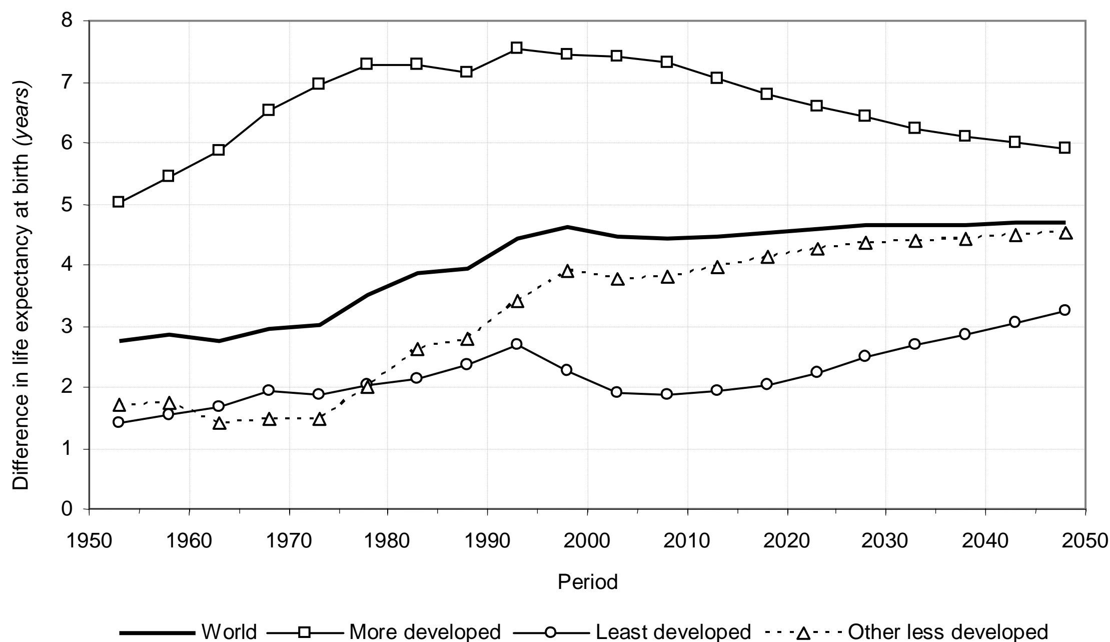
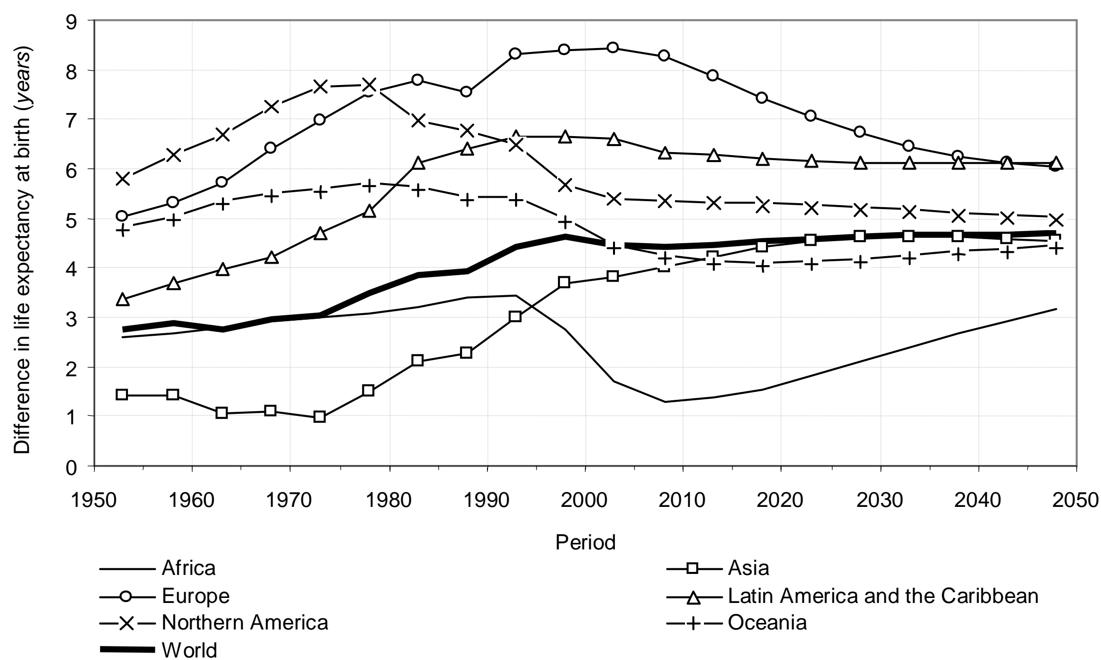


Figure IV.5. Difference between female and male life expectancy at birth by major area, estimates and medium variant, 1950-2050



3. Mortality at young ages

The infant mortality rate and the under-five mortality rate, measured as the number of deaths in a given period before exact age 1 and exact age 5, respectively, per 1000 live births in the same period, are important indicators of development and of the well-being of children. Improvements in infant and child mortality have a large impact on life expectancy and have been responsible for much of the rise in life expectancy around the world. Despite considerable progress since the 1950s in reducing child mortality, however, more than 10 million children under the age of 5 die each year worldwide, largely due to preventable causes. The most common causes of child deaths are diarrhea, pneumonia, measles, malaria, HIV/AIDS, and the underlying cause of undernutrition (Black, Morris and Bryce, 2003; Jones and others, 2003). Neonatal causes such as asphyxia, prematurity, sepsis and tetanus are also important. The reduction of mortality among infants and children is a major component of declared international development goals, including the Millennium Development Goals[1].

Worldwide, 57 out of 1000 live-born children died before their first birthdays in 2000-2005 (figure IV.6). This represents a major reduction of the infant mortality rate since 1950-1955, when the rate was 157 per 1000. However, very wide gaps remain between richer and poorer countries. Out of 1000 babies born in the least developed countries, 97 die before reaching age 1. Among their counterparts in the more developed regions, just under eight per thousand die in the first year of life.

Of the world's major areas, Africa stands out for its slow progress in lowering infant mortality (figure IV.7). In the early 1950s, Africa and Asia had similarly high levels of infant mortality, around 180 deaths per 1000 live births. By 2000-2005, infant mortality in Asia had fallen by more than two-thirds, to 54 per 1000. Africa achieved substantial reductions in infant mortality as well, but improvement was much slower than in Asia: in Africa, infant mortality fell by slightly less than half between 1950-1955 and 2000-2005, to 94 per 1000.

Figure IV.6. Infant mortality rate, by development group, 1950-2050

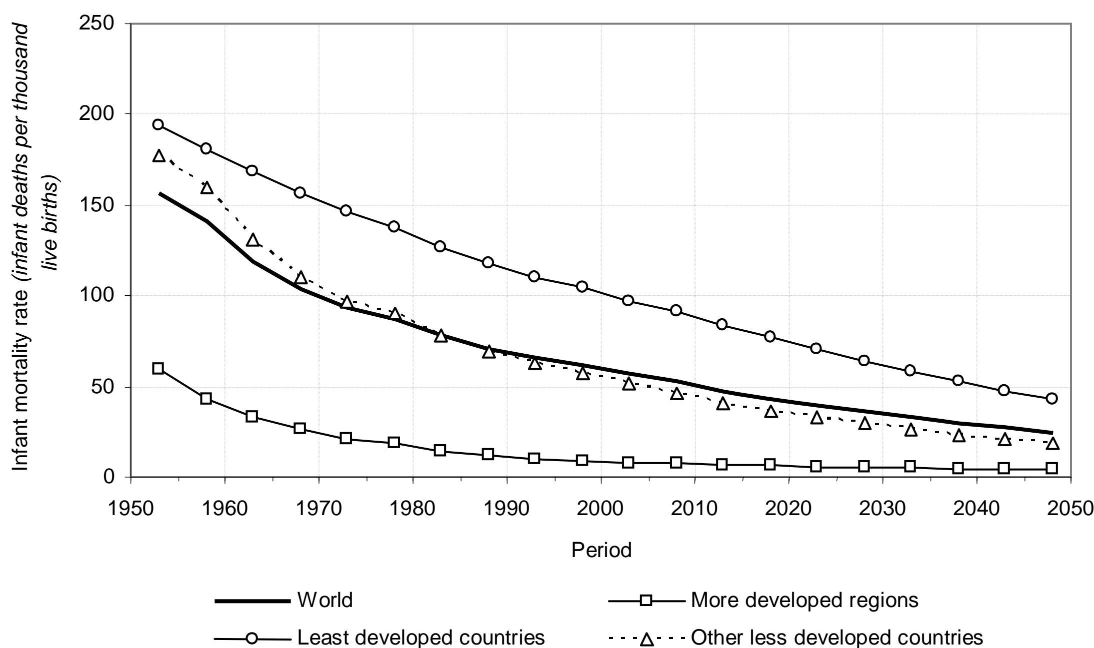
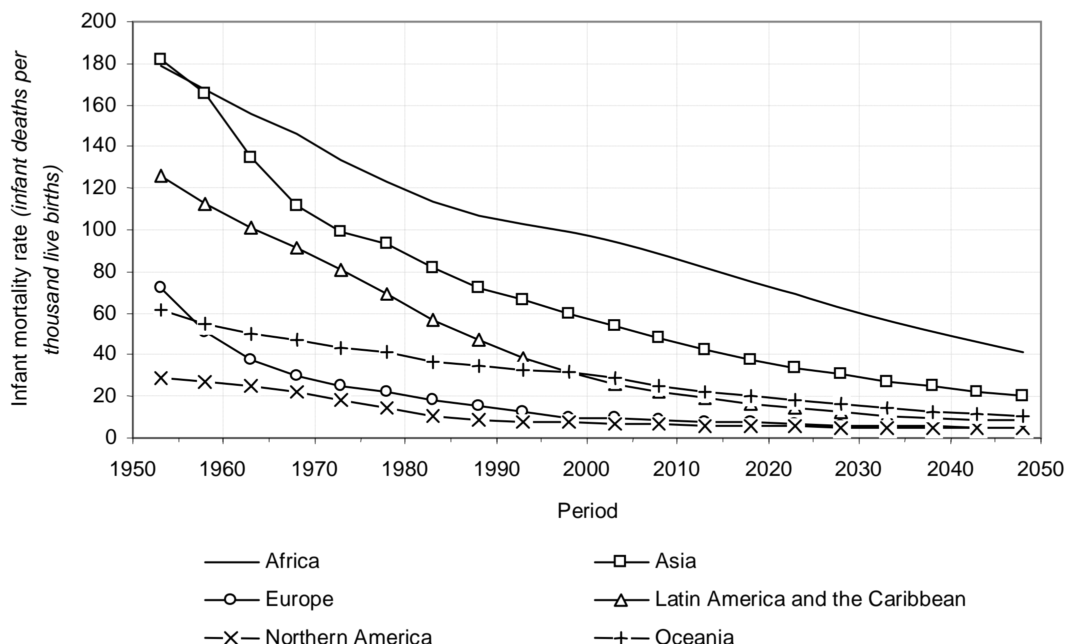


Figure IV.7. Infant mortality rate, by major area, estimates and medium variant, 1950-2050



The under-five mortality rate is a closely watched public health indicator because it reflects the access of children and communities to basic health interventions such as vaccination, to medical treatment of infectious diseases and to adequate nutrition. Under-five mortality remains high in less developed regions and particularly in the least developed countries. In the least developed group, 160 per 1000 children born alive do not reach age 5, compared to 74 per 1000 in other less developed countries and 10 per 1000 in the more developed regions (figure IV.8). Trends by major area are similar to those for infant mortality, with lagging progress in Africa (figure IV.9). Under-five mortality in Africa is more strongly affected by HIV/AIDS than is infant mortality, because most children born with the disease survive past their first birthday but die before age 5.

Projected declines in infant and under-five mortality are contingent upon continued progress against the many risks that threaten children's health. Progress against such risks will likely depend on improvements in women's education, which many studies have shown to be associated with better survival prospects for children, on extension of public health systems to cover the poor and others at risk and on continued national and international commitments to broad-based programs of vaccination.

4. Mortality among adults

Adult mortality is analyzed here using two measures. First, the mortality experience of young and middle-aged adults is examined using a measure denoted by demographers as ${}_{45}p_{15}$, the probability that a 15 year old person will survive to age 60. This measure can be understood as analogous to life expectancy for a given age. That is, it represents the probability that a person of exact age 15 in the given period would survive to age 60 if he or she experienced the mortality rates of that period for 45 years. Second, mortality among the elderly will be measured with ${}_{20}p_{60}$, the probability of a 60-year-old surviving to age 80. The discussion of adult mortality must be qualified with the observation that direct data on adult deaths are lacking in much of the less developed world. In contrast to child mortality, which is relatively well measured through demographic surveys, estimates of adult mortality for less developed countries are often based on model life tables that relate the level of adult mortality to that of child mortality.

Figure IV.8. Under-five mortality rate, by development group, estimates and medium variant, 1950-2050

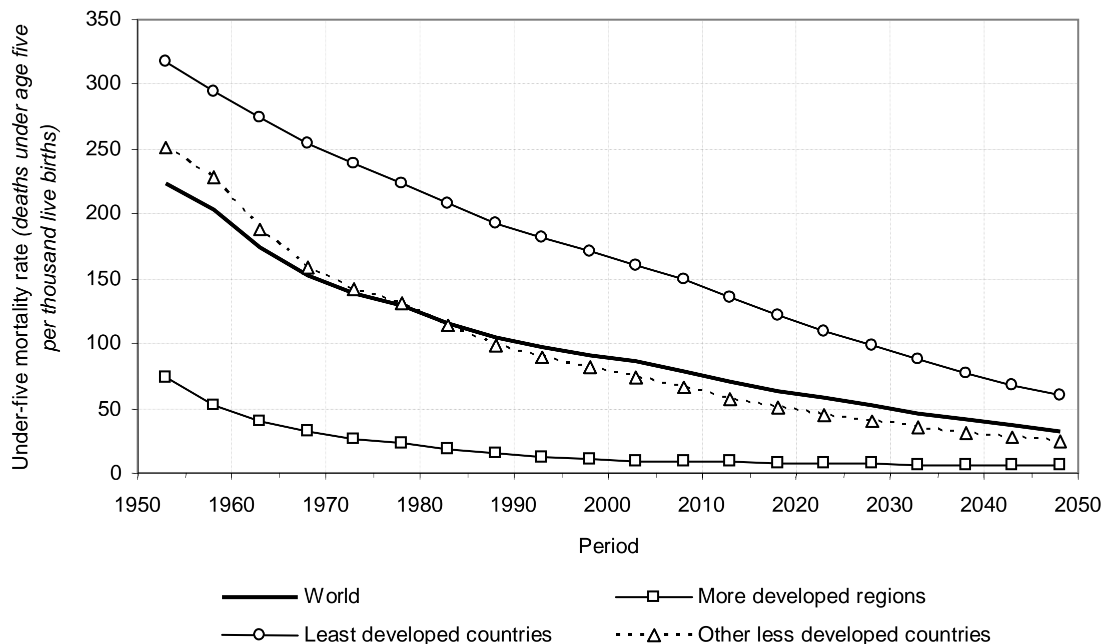
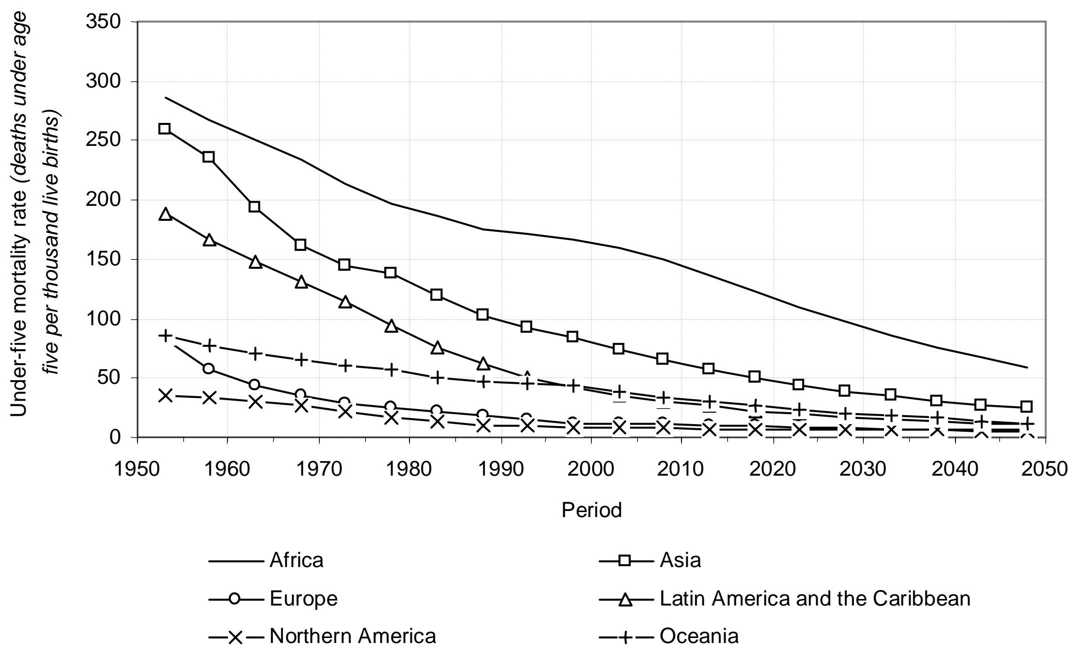


Figure IV.9. Under-five mortality rate, by major area, estimates and medium variant, 1950-2050



Under the mortality conditions of the 2000-2005 period, the chance that someone at 15 years of age would survive to age 60 was 81 per cent (table IV.4) for the world as a whole. Disparities in health and well-being between low- and high-income countries continue into the adult ages. The relative rankings of the development groups for adult mortality correspond to their ranks in child survival and life expectancy: 15-year-olds in more developed regions had a higher probability of survival, 87 per cent, than those in less developed regions, 79 per cent. The least developed countries were particularly disadvantaged, with only 63 per cent of 15-year-olds estimated to survive to age 60 under the mortality conditions of 2000-2005.

In the more developed regions, ${}_{45}p_{15}$ in 2000-2005 stood at 89 per cent in Northern America and 84 per cent in Europe. The European level was about the same as those in Asia and Latin America, despite the higher life expectancy in Europe. The European average is heavily affected by particularly low adult survival in Eastern Europe, where ${}_{45}p_{15}$ for both sexes combined stood at 75 per cent in 2000-2005, lower than the average for less developed regions. Males in Eastern Europe had exceptionally low adult survival, 64 per cent. For females, ${}_{45}p_{15}$ was 87 per cent, resulting in the largest sex differential in adult survival of any world region.

Among the less developed regions, Africa had the lowest adult survival, with ${}_{45}p_{15}$ only 57 per cent in 2000-2005. Adult survival was particularly low in countries ravaged by the HIV/AIDS epidemic; in Swaziland and Botswana, ${}_{45}p_{15}$ was estimated at less than 20 per cent in 2000-2005 (the impact of AIDS on adult survival is discussed at length in section B.3.a, below). In contrast, Hong Kong and Macao SARs of China had the highest ${}_{45}p_{15}$, not only among the less developed regions, but for the whole world: 94 per cent in 2000-2005. For Asia as a whole, ${}_{45}p_{15}$ was 84 per cent for the same period, slightly higher than that in Latin America and the Caribbean (83 per cent).

Because mortality among young and middle-aged adults is already fairly low in most parts of the world, future improvements in ${}_{45}p_{15}$ are projected to be of modest size. Worldwide, ${}_{45}p_{15}$ is projected to rise from 81 per cent in 2000-2005 to 88 per cent in 2045-2050.

In contrast, there is more room for improvement in survival of the elderly, which historically began to improve later than that of children and younger adults (Horiuchi, 1999). In 2000-2005, the probability of survival from age 60 to age 80 was 48 per cent for the world population. In the more developed regions, this measure of elderly survival stood at 56 per cent, while in the less developed regions it was 43 per cent. Large advances in survival of the elderly are anticipated for the coming half-century. Worldwide, ${}_{20}p_{60}$ is projected to rise to 61 per cent by 2045-2050, to 70 per cent in the more developed regions and to 59 per cent in the less developed regions.

TABLE IV.4. PROBABILITY OF SURVIVAL FROM EXACT AGE 15 TO EXACT AGE 60 (${}_{45}p_{15}$) AND FROM EXACT AGE 60 TO EXACT AGE 80 (${}_{20}p_{60}$), BY DEVELOPMENT GROUP AND MAJOR AREA, 2000-2005 AND 2045-2050

	${}_{45}p_{15}$		${}_{20}p_{60}$	
Development group or major area	*2000-2005*	*2045-2050*	*2000-2005*	*2045-2050*
World	0.81	0.88	0.48	0.61
More developed regions	0.87	0.93	0.56	0.70
Less developed regions	0.79	0.88	0.43	0.59
Least developed countries	0.63	0.79	0.34	0.49
Other less developed countries	0.82	0.90	0.43	0.60
Africa	0.57	0.75	0.35	0.50
Asia	0.84	0.92	0.44	0.60
Europe	0.84	0.92	0.52	0.67
Latin America and the Caribbean	0.83	0.90	0.54	0.68
Northern America	0.89	0.94	0.59	0.71
Oceania	0.88	0.93	0.60	0.69

B. THE DEMOGRAPHIC IMPACT OF AIDS

Since 1981, when the first cases of the acquired immunodeficiency syndrome (AIDS) were diagnosed, the world has been facing the deadliest epidemic in recent history. At the end of 2005, 40.3 million people worldwide were living with the human immunodeficiency virus (HIV) (UNAIDS/WHO, 2005). AIDS has become the leading cause of death for adults aged 15 to 59 worldwide (WHO, 2004). The premature death of so many working-age adults has tragic consequences for younger generations; in 2003, 15 million children aged 0 to 17 were orphans because of AIDS (UNAIDS, 2004).

The statistics on HIV/AIDS are already grim, yet the full demographic burden of the disease is still to come. When an individual is infected with HIV, he or she may be asymptomatic for many years, but the virus is replicating and causing the immune system to deteriorate by attacking the crucial CD4+ T immune cells. When the concentration of these immune cells in the blood drops to very low levels, the infected individual becomes highly susceptible to opportunistic infections that are rarely seen in people with healthy immune systems. At this point the individual has progressed to full-blown AIDS (defined as one of a number of opportunistic infections or other clinical conditions that characterize the most advanced stage of HIV disease[2]). The median time from HIV infection to full-blown AIDS is about 9 years for adults in the absence of treatment, although the duration can range from just a couple of years to 15 or more. After progression to full-blown AIDS, the median survival is just one year without medical treatment. Thus HIV/AIDS must be seen as a gathering storm whose full demographic impact in a country will be evident only 10 years or more after the level of HIV prevalence has peaked. While HIV prevalence seems to have crested in some highly affected countries, prevalence is still rising in many others (see section B.2, below; box IV.2).

The detrimental impact of the HIV/AIDS epidemic is more strongly felt in developing countries, where some 92 per cent of those infected with HIV lived at the end of 2003. Sub-Saharan Africa, with 25.8 million HIV-infected people of all ages, remains the worst-affected region (UN-

BOX IV.2. MEASURING THE PREVALENCE OF HIV

The burden of HIV in a population is measured by looking at the prevalence of HIV in the population, that is, the percentage infected with HIV. In theory prevalence can be calculated for any group with the relevant data or estimates, but in practice it is difficult to measure, even in countries with good health statistics. HIV infection produces no symptoms for many years and a large proportion of HIV-positive individuals do not know their HIV status. While more information exists about HIV/AIDS than about many other infectious diseases, the ranges around the estimates of HIV prevalence demonstrate the uncertainty that surrounds measurement of the epidemic (table IV.5).

In countries with generalized HIV/AIDS epidemics, where the primary mode of HIV transmission is heterosexual contact, national prevalence estimates are usually based on surveillance testing of pregnant women at selected antenatal clinics (UNAIDS/WHO, 2005). The reliability of these estimates depends on a number of factors, including whether HIV prevalence among pregnant women is representative of that among non-pregnant women and among men and whether the assumptions made about survival of infected individuals are correct. In addition, selected surveillance sites may not be representative with regard to the national population; for example, rural sites may be underrepresented in the sample. Also, the quality of national surveillance systems varies (Garcia-Calleja and others, 2004; Grassly and others, 2004). Recently, nationally representative household surveys have provided another source of data on HIV infection in some countries, but these surveys are also subject to potential biases. For example, people who are not tested due to absence from the household may be more likely to be HIV-positive (UNAIDS, 2004).

For countries with low-level or concentrated epidemics, prevalence must be estimated for high-risk groups such as intravenous-drug users, sex workers and their clients and men who have sex with men. Estimating both the size of these groups and the prevalence within them entails high levels of uncertainty (Walker and others, 2004).

AIDS, 2004; UNAIDS/WHO, 2005). However, the number of infected people and the number of highly affected countries are rising in Asia and in Latin America and the Caribbean. By the end of 2005, an estimated 8.3 million HIV-positive people lived in East, South-East and South Asia, and an additional 2.1 million lived in Latin America and the Caribbean. Eastern Europe and Central Asia have been experiencing a rapid rise in the number of HIV infections, reaching more than 1.6 million in 2005 (UNAIDS/WHO, 2005).

In the *2004 Revision*, projections taking explicit account of the impact of HIV/AIDS were made for 60 countries, up from 53 in the *2002 Revision*. The 60 countries encompassed 33.7 million of the 35.7 million HIV-infected adults aged 15-49 in the world at the end of 2003, 94 per cent of the total. In 56 of these countries, HIV prevalence in the population aged 15-49 was estimated at 1 per cent or higher at the end of 2003 (table IV.5). The remaining 4 countries—Brazil, China, India and the United States of America—had prevalence below 1 per cent but had large numbers of people infected due to their large population size. Among the countries considered in the *2004 Revision*, 40 are in Africa, 5 in Asia, 12 in Latin America and the Caribbean, 2 in Europe and 1 in Northern America.

TABLE IV.5. COUNTRIES AND AREAS FOR WHICH THE DEMOGRAPHIC IMPACT OF HIV/AIDS IS EXPLICITLY INCLUDED IN THE *2004 REVISION* OF THE OFFICIAL UNITED NATIONS ESTIMATES AND PROJECTIONS, BY MAJOR AREA AND COUNTRY OR AREA, END OF 2003

		Estimated number of HIV-positive persons aged 15-49, end of 2003 (thousands)		*HIV prevalence among persons aged 15-49, end of 2003 (percentage)*	
	Major area, country or area	*Estimate*	*[Low estimate - high estimate]*	*Estimate*	*[Low estimate - high estimate]*
Africa					
1	Angola	220	[88 - 540]	3.9	[1.6 - 9.4]
2	Benin	62	[35 - 110]	1.9	[1.1 - 3.3]
3	Botswana	330	[310 - 340]	37.3	[35.5 - 39.1]
4	Burkina Faso	270	[170 - 420]	4.2	[2.7 - 6.5]
5	Burundi	220	[150 - 320]	6.0	[4.1 - 8.8]
6	Cameroon	520	[360 - 740]	6.9	[4.8 - 9.8]
7	Central African Republic	240	[150 - 380]	13.5	[8.3 - 21.2]
8	Chad	180	[120 - 270]	4.8	[3.1 - 7.2]
9	Congo	80	[34 - 180]	4.9	[2.1 - 11.0]
10	Côte d'Ivoire	530	[370 - 750]	7.0	[4.9 - 10.0]
11	Democratic Republic of the Congo	1 000	[410 - 2 400]	4.2	[1.7 - 9.9]
12	Djibouti	8	[2.1 - 21]	2.9	[0.7 - 7.5]
13	Equatorial Guinea[a]	24	…	11.3	…
14	Eritrea	55	[19 - 150]	2.7	[0.9 - 7.3]
15	Ethiopia	1 400	[890 - 2 100]	4.4	[2.8 - 6.7]
16	Gabon	45	[23 - 86]	8.1	[4.1 - 15.3]
17	Gambia	6	[1.7 - 23]	1.2	[0.3 - 4.2]
18	Ghana	320	[200 - 520]	3.1	[1.9 - 5.0]
19	Guinea	130	[48 - 330]	3.2	[1.2 - 8.2]
20	Guinea-Bissau[a]	31	…	3.8	…
21	Kenya	1 100	[760 - 1 600]	6.7	[4.7 - 9.6]
22	Lesotho	300	[270 - 330]	28.9	[26.3 - 31.7]
23	Liberia	96	[44 - 200]	5.9	[2.7 - 12.4]
24	Madagascar	130	[66 - 220]	1.7	[0.8 - 2.7]
25	Malawi	810	[650 - 1 000]	14.2	[11.3 - 17.7]

TABLE IV.5 (*continued*)

	Major area, country or area	Estimated number of HIV-positive persons aged 15-49, end of 2003 (thousands)		HIV prevalence among persons aged 15-49, end of 2003 (percentage)	
		Estimate	[Low estimate - high estimate]	Estimate	[Low estimate - high estimate]
26	Mali	120	[40 - 380]	1.9	[0.6 - 5.9]
27	Mozambique	1 200	[910 - 1 500]	12.2	[9.4 - 15.7]
28	Namibia	200	[170 - 230]	21.3	[18.2 - 24.7]
29	Niger	64	[34 - 120]	1.2	[0.7 - 2.3]
30	Nigeria	3 300	[2 200 - 4 900]	5.4	[3.6 - 8.0]
31	Rwanda	230	[150 - 350]	5.1	[3.4 - 7.6]
32	Sierra Leone[a]	51	…	1.8	…
33	South Africa	5 100	[4 300 - 5 900]	21.5	[18.5 - 24.9]
34	Sudan	380	[120 - 1 200]	2.3	[0.7 - 7.2]
35	Swaziland	200	[190 - 210]	38.8	[37.2 - 40.4]
36	Togo	96	[61 - 150]	4.1	[2.7 - 6.4]
37	Uganda	450	[300 - 730]	4.1	[2.8 - 6.6]
38	United Republic of Tanzania	1 500	[1 100 - 2 000]	8.8	[6.4 - 11.9]
39	Zambia	830	[680 - 1 000]	16.5	[13.5 - 20.0]
40	Zimbabwe	1 600	[1 400 - 1 900]	24.6	[21.7 - 27.8]
Asia					
1	Cambodia	170	[99 - 280]	2.6	[1.5 - 4.4]
2	China	830	[430 - 1 400]	0.1	[0.1 - 0.2]
3	India	5 000	[2 500 - 8 200]	0.9	[0.5 - 1.5]
4	Myanmar	320	[170 - 610]	1.2	[0.6 - 2.2]
5	Thailand	560	[310 - 1 000]	1.5	[0.8 - 2.8]
Latin America and the Caribbean					
1	Bahamas	5	[3.1 - 8.4]	3.0	[1.8 - 4.9]
2	Barbados	3	[0.7 - 9.1]	1.5	[0.4 - 5.4]
3	Belize	4	[1.2 - 9.8]	2.4	[0.8 - 6.9]
4	Brazil	650	[320 - 1 100]	0.7	[0.3 - 1.1]
5	Dominican Republic	85	[47 - 150]	1.7	[0.9 - 3.0]
6	Guatemala	74	[36 - 120]	1.1	[0.6 - 1.8]
7	Guyana	11	[3.3 - 33]	2.5	[0.8 - 7.7]
8	Haiti	260	[120 - 560]	5.6	[2.5 - 11.9]
9	Honduras	59	[33 - 100]	1.8	[1.0 - 3.2]
10	Jamaica	51	[11 - 40]	1.2	[0.6 - 2.2]
11	Suriname	5	[1.4 - 18]	1.7	[0.5 - 5.8]
12	Trinidad and Tobago	28	[10 - 72]	3.2	[1.2 - 8.3]
More developed countries					
1	Russian Federation	860	[420 - 1 400]	1.1	[0.6 - 1.9]
2	Ukraine	360	[170 - 580]	1.4	[0.7 - 2.3]
3	United States of America	940	[460 - 1 500]	0.6	[0.3 - 1.1]

Source: Report on the Global HIV/AIDS Epidemic 2004, Joint United Nations Programme on HIV/AIDS and World Health Organization (Geneva), July 2004.

[a] Data for Equatorial Guinea, Guinea-Bissau, and Sierra Leone were not reported in the source publication. The figures given here are estimates by the United Nations Population Division.

1. The distribution of HIV around the world

The number of people infected with HIV is not evenly distributed among the major areas of the world. Sixty-six per cent of HIV-infected people (adults and children) at the end of 2003 were located in sub-Saharan Africa, while this region was home to only 11 per cent of the world's population.

Within sub-Saharan Africa, a smaller group of badly hit countries bears a disproportionate burden of HIV infection (table IV.6). There were 11 countries where HIV prevalence in 2003 was estimated at 10 per cent or more of the adult population aged 15 and over. These countries were home to just 1.8 per cent of the world's population in 2003, yet accounted for over 30 per cent of the world's HIV-infected adults.

TABLE IV.6. ADULT HIV PREVALENCE, YEAR OF PEAK PREVALENCE, AND LEVEL OF PEAK PREVALENCE IN COUNTRIES AND AREAS, BY LEVEL OF PREVALENCE, ESTIMATES AND PROJECTIONS, 2003 AND 2015

	Country or area	*Prevalence (percentage of adults 15 and over)*		*Change between 2003 and 2015*	*Estimated or projected year of peak prevalence*	*Level of peak prevalence (percentage of adults 15 and over)*
		2003	*2015*			
Countries and areas with adult HIV prevalence above 20 per cent						
1	Swaziland	37.4	34.0	-3.4	2003	37.4
2	Botswana	36.2	31.8	-4.4	2002	36.3
3	Lesotho	27.6	24.9	-2.7	2000	28.5
4	Zimbabwe	22.5	21.1	-1.4	1998	23.3
Countries and areas with adult HIV prevalence between 10 per cent and 20 per cent						
1	South Africa	18.8	16.5	-2.3	2004	19.0
2	Namibia	18.7	16.8	-1.9	2003	18.7
3	Zambia	15.4	14.6	-0.9	1997	15.9
4	Malawi	14.3	13.4	-0.9	1998	15.0
5	Central African Republic	13.5	12.3	-1.2	2002	13.5
6	Mozambique	11.5	10.3	-1.3	2003	11.5
7	Equatorial Guinea	11.3	15.3	4.0	2015	15.3
Countries and areas with adult HIV prevalence between 5 per cent and 10 per cent						
1	United Republic of Tanzania	8.8	8.1	-0.7	1997	9.3
2	Gabon	8.1	11.1	3.0	2013	11.1
3	Kenya	8.0	2.9	-5.1	1997	11.1
4	Côte d'Ivoire	7.0	6.8	-0.2	2007	7.5
5	Cameroon	6.9	6.4	-0.5	2001	7.0
6	Burundi	6.1	5.9	-0.2	1993	7.2
7	Liberia	6.0	6.2	0.2	2009	6.9
8	Haiti	5.6	5.1	-0.6	1988	6.5
9	Nigeria	5.4	4.8	-0.6	2000	5.5
10	Congo	5.3	5.2	-0.1	1992	7.3
Countries and areas with adult HIV prevalence between 1 per cent and 5 per cent						
1	Chad	4.8	4.4	-0.4	2001	4.8
2	Rwanda	4.6	4.6	0.0	1993	5.2
3	Ethiopia	4.4	4.9	0.4	2009	5.2
4	Uganda	4.3	1.8	-2.5	1991	12.7
5	Dem. Rep. of the Congo	4.2	4.1	0.0	1995	4.3
6	Burkina Faso	4.2	4.1	-0.1	1991	6.1
7	Togo	4.1	3.8	-0.3	1997	4.6
8	Angola	3.9	3.8	-0.1	2007	4.1

TABLE IV.6 (*continued*)

	Country or area	Prevalence (percentage of adults 15 and over) 2003	2015	Change between 2003 and 2015	Estimated or projected year of peak prevalence	Level of peak prevalence (percentage of adults 15 and over)
9	Guinea-Bissau	3.8	3.0	-0.8	2004	3.8
10	Guinea	3.3	4.4	1.1	2012	4.5
11	Trinidad and Tobago	3.1	3.0	-0.2	2007	3.3
12	Ghana	3.1	2.7	-0.4	2001	3.1
13	Bahamas	3.0	2.7	-0.3	1994	3.7
14	Djibouti	2.9	2.7	-0.2	2007	3.0
15	Eritrea	2.6	2.5	-0.2	1997	3.2
16	Cambodia	2.6	2.5	-0.2	1998	2.9
17	Belize	2.5	3.3	0.8	2012	3.3
18	Guyana	2.5	2.4	-0.1	1991	3.6
19	Sudan	2.3	2.7	0.5	2010	3.0
20	Benin	2.1	1.7	-0.4	1998	2.5
21	Mali	1.9	1.7	-0.3	2001	2.0
22	Sierra Leone	1.8	1.7	-0.1	1997	2.2
23	Jamaica	1.8	1.0	-0.8	2002	1.8
24	Madagascar	1.7	2.2	0.6	2010	2.4
25	Dominican Republic	1.6	1.1	-0.6	1999	1.8
26	Honduras	1.6	1.5	-0.1	1997	1.8
27	Thailand	1.5	0.8	-0.7	1995	2.0
28	Suriname	1.5	1.0	-0.5	2003	1.5
29	Barbados	1.5	1.1	-0.3	1999	1.6
30	Ukraine	1.4	1.3	-0.1	2007	1.5
31	Niger	1.3	1.8	0.5	2011	1.9
32	Myanmar	1.2	0.9	-0.3	2005	1.2
33	Gambia	1.2	0.9	-0.3	2000	1.2
34	Guatemala	1.1	0.6	-0.5	2003	1.1
35	Russian Federation	1.1	1.7	0.6	2010	1.8
Countries and areas with adult HIV prevalence below 1 per cent						
1	India	0.9	0.8	-0.1	2006	0.9
2	United States of America	0.4	0.4	0.0	1990	0.5
3	Brazil	0.4	0.3	-0.1	2003	0.4
4	China	0.1	0.6	0.4	2019	0.6

NOTE: Based on Population Division calculations and *Report on the Global HIV/AIDS Epidemic 2004,* Joint United Nations Programme on HIV/AIDS and World Health Organization (Geneva), July 2004.

Another 21 per cent of HIV-positive adults aged 15 and over lived in the 10 countries where prevalence is between 5 and 10 per cent, while these countries encompassed only 4 per cent of the world population. All of the countries in this group are also in sub-Saharan Africa, with the exception of Haiti.

Countries where prevalence was between 1 and 5 per cent of adults are located throughout the world: in Africa, Asia, Latin America and the Caribbean, and Europe. There are 35 countries in this prevalence bracket. They accounted for 22 per cent of adult infections in 2003 yet contained only 11 per cent of world population.

Four large countries—Brazil, China, India and the United States of America—are important to the world picture of HIV/AIDS even though their adult prevalence was below 1 per cent in 2003.

These four countries contained 45 per cent of world population, and held an estimated 20 per cent of HIV-infected adults.

2. The dynamics of the HIV/AIDS epidemic

The dynamics of the HIV/AIDS epidemic described in the estimates and projections of the *2004 Revision* are fully consistent with the estimates of HIV prevalence in each country in 2003 reported by UNAIDS. The path of the HIV epidemic up to 2003 varied widely across countries (figure IV.10). In Uganda and Kenya, for example, the epidemic spread quickly in the late 1980s and early 1990s, respectively. In both countries, the prevalence of HIV peaked in the 1990s (table IV.6) and has since fallen, with a particularly large drop in Uganda. In contrast, in South Africa and Botswana, the epidemic started later and prevalence climbed very rapidly to levels far above those reached in the eastern African countries. The latest available estimates for Botswana and South Africa show an apparent leveling off of prevalence, but there is no sign yet of an overall national decline in these countries (UNAIDS/WHO, 2004).

Both inside and outside of Africa, many countries are still experiencing rising HIV prevalence (figure IV.11). The future of the epidemic in these countries is highly uncertain. Existing epidemiological models are ill-equipped to project the timing and level of peak prevalence in countries where the epidemic is still increasing, but predications can be made (table IV.6).

The *2004 Revision* assumes that beginning in 2005, changes in behaviour, along with treatment, will reduce the chances of infection. Rates of recruitment into high-risk groups are assumed to decline as well. In light of major expansions in antiretroviral therapy (ART) coverage, survival of individuals receiving ART is assumed to increase at a rate determined by projected levels of ART coverage and efficacy. The epidemic is still expanding, and some countries are expected to see increasing levels of HIV prevalence for several more years. Nevertheless, in 49 of the 60 highly affected countries, HIV prevalence is projected to be lower in 2015 than in 2003 (table IV.6).

3. The demographic impact of AIDS

HIV/AIDS affects population trends through two mechanisms. First, most people infected with HIV die earlier than they would have from other causes of death, resulting in mortality rates that are higher than they would be in a projection that assumes no AIDS (the “No-AIDS scenario”). This higher mortality reduces the size of affected age groups in the medium-variant projection compared to the No-AIDS scenario. Second, when women die of AIDS before the end of their reproductive life span, they have fewer births than are projected in a scenario without AIDS, further reducing the size of the youngest age cohorts.

Empirical evidence for the impact of AIDS on population structures and dynamics remains fragmentary (Blacker, 2004; Heuveline, 2004). Because of the 10-year average lag time between infection and death, data from the 2000 round of population censuses were too early to show a significant impact on population structure from the dramatic increases in HIV prevalence that occurred during the 1990s. Several censuses from Africa, however, did give evidence of rising overall levels of adult mortality in the 1990s, as have a number of population surveys.

Most of the highly affected countries do not have adequate vital registration systems for tracking deaths due to AIDS. Even when vital registration is functioning, deaths related to HIV/AIDS are often attributed to other causes on the death certificate (Groenewald and others, 2005). Despite weaknesses in cause-of-death statistics, mortality data from a few highly affected countries that have relatively good vital registration systems, such as Thailand and South Africa, show increases in overall deaths of young adults consistent with high HIV infection rates in these age groups (Im Em, 2003; Statistics South Africa, 2005). While the available evidence provides confirmation of increased mortality due to AIDS, it does not provide the age- and sex-specific detail necessary for incorporating the impact of the disease into population estimates and projections. Therefore, the United Nations estimates and projects the impact of the disease using an integrated epidemiologic and demographic model. The model is described in detail in chapter VI.

Figure IV.10. Estimated and projected prevalence of HIV, selected African countries, 1980-2020

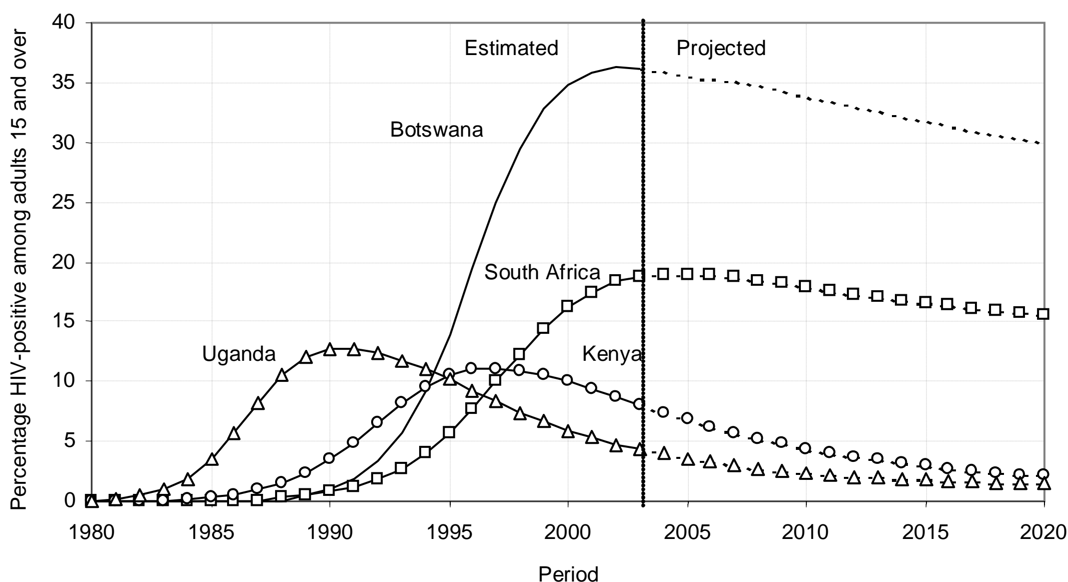
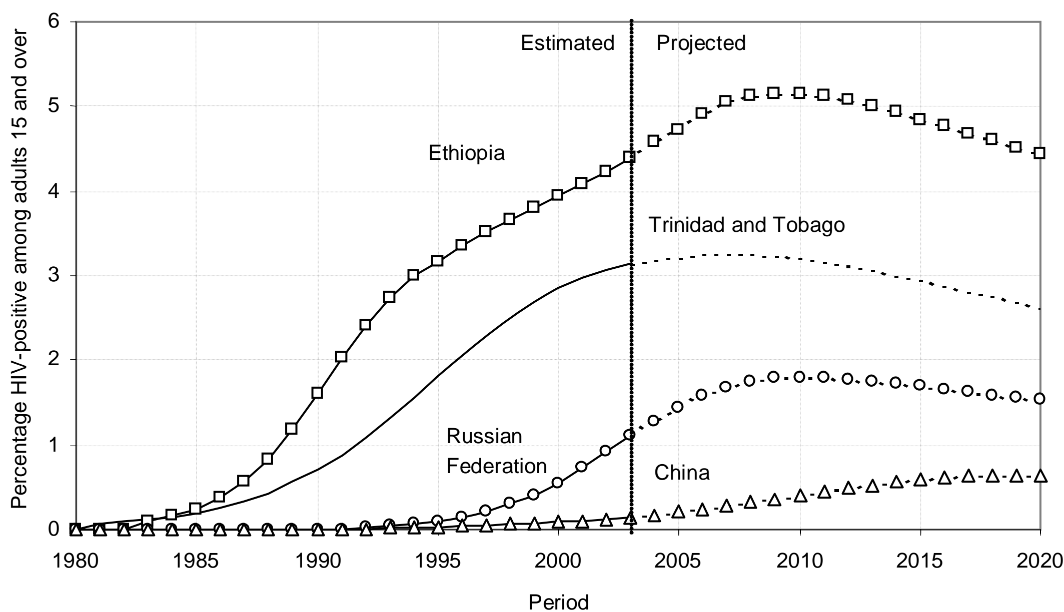


Figure IV.11. Estimated and projected prevalence of HIV, selected countries, 1980-2020



In the *2004 Revision*, the projected long-term impact of HIV/AIDS is somewhat less severe than that projected in the *2002 Revision*. Part of this reduction in impact is due to the incorporation of revised and lower estimates of HIV prevalence for several countries. Another part stems from the assumption that antiretroviral therapy will reach an ever increasing proportion of the persons who need it. As a result, those persons will not only survive longer but will be less infectious. How-

ever, realization of these projections is contingent on sustained commitment by Governments to assure treatment for those infected and to promote preventive measures and behavioural changes among the uninfected.

The *2004 Revision* confirms yet again the devastating toll AIDS is having and will continue to have in terms of increased morbidity, mortality and population loss. In the sections that follow, the demographic impact of AIDS is assessed by looking at time trends in mortality indicators for very highly affected countries and by comparing the *2004 Revision* medium-variant projections to the No-AIDS scenario.

a. The impact on mortality

Even though the prevalence of HIV in the adult population appears to have stabilized in many countries (table IV.6), the impact of HIV/AIDS on mortality will continue to grow for years to come. On average, HIV-infected individuals survive 10 years after infection in the absence of antiretroviral treatment. Thus, the greatest impact of HIV/AIDS on mortality in a country will lag about 10 years behind the peak in prevalence.

Life expectancy in the most affected countries, primarily located in Africa, shows dramatic declines. In the 40 affected countries of Africa (table IV.7), life expectancy declined from 48.2 years in 1990-1995 to 45.7 years in 2000-2005. While life expectancy is projected to begin rising in the 2005-2010 period, this rise will be entirely due to improvements in non-AIDS mortality. 2005-2010 will be the period of maximum impact of AIDS on life expectancy in the group of African countries, 8.6 years. In the other geographic groups of AIDS-affected countries, AIDS has not caused

TABLE IV.7. LIFE EXPECTANCY AT BIRTH IN AFFECTED COUNTRIES AND AREAS, BY MAJOR AREA, ESTIMATES AND MEDIUM VARIANT ("WITH AIDS") AND NO-AIDS SCENARIO ("WITHOUT AIDS"), SELECTED PERIODS 1990-2050

	Life expectancy at birth (years)				
Group of affected countries and areas	*1990-1995*	*2000-2005*	*2010-2015*	*2020-2025*	*2045-2050*
All 60 affected countries and areas					
With AIDS	61.4	62.5	64.6	67.1	73.0
Without AIDS	62.2	64.9	67.5	69.9	74.8
Difference	-0.8	-2.4	-2.9	-2.7	-1.7
Percentage difference	-1.2	-3.7	-4.2	-3.9	-2.3
40 countries and areas in Africa					
With AIDS	48.2	45.7	48.3	52.9	63.4
Without AIDS	50.8	53.6	56.6	60.1	68.0
Difference	-2.6	-7.9	-8.3	-7.2	-4.6
Percentage difference	-5.1	-14.8	-14.6	-12.0	-6.8
5 countries and areas in Asia					
With AIDS	63.7	67.0	69.8	72.1	77.2
Without AIDS	64.0	67.9	71.0	73.5	77.7
Difference	-0.3	-0.9	-1.2	-1.4	-0.6
Percentage difference	-0.5	-1.3	-1.7	-2.0	-0.7
12 countries and areas in Latin America and the Caribbean					
With AIDS	65.5	69.0	71.7	74.1	78.5
Without AIDS	66.5	70.3	72.9	75.1	79.1
Difference	-0.9	-1.3	-1.2	-1.0	-0.6
Percentage difference	-1.4	-1.9	-1.6	-1.3	-0.7
3 more developed countries and areas					
With AIDS	71.5	71.9	73.1	75.3	79.5
Without AIDS	71.8	72.6	74.8	76.7	80.2
Difference	-0.4	-0.7	-1.7	-1.4	-0.7
Percentage difference	-0.5	-1.0	-2.2	-1.8	-0.9

declines in life expectancy, but in 2000-2005 life expectancy was lower than it would have been in the absence of AIDS by 0.9 years in the affected Asian countries, 1.3 years in the affected Latin American and Caribbean countries, and 0.7 years in the affected more developed countries. In the affected Asian countries, the impact of AIDS on life expectancy is not projected to peak until 2020-2025, mainly due to projected continual growth of the epidemic in China.

Differences in life expectancy between the medium variant and the No-AIDS scenario are particularly striking for the groups of countries with the highest HIV prevalence (table IV.8). For the four countries with prevalence higher than 20 per cent, life expectancy in 2000-2005 was 27.2 years lower in the medium variant than in the No-AIDS scenario. In the groups of countries with prevalence between 10 and 20 per cent, the difference was 15.7 years. In both groups, life expectancy plummeted between 1990-1995 and 2000-2005, and the impact of AIDS has not yet reached its projected maximum, which will occur between 2005 and 2015. In the groups with lower HIV prevalence, the impact of AIDS is commensurately lower than in the very high prevalence groups. Nevertheless, both the 5-10 per cent and 1-5 per cent groups experienced declines in life expectancy between 1990-1995 and 2000-2005, due to a combination of increasing AIDS mortality and very slow progress versus non-AIDS mortality.

At the country level, the impact of AIDS on life expectancy varies widely (table IV.9). In Botswana, where HIV prevalence was estimated at 36.2 per cent of the adult population in 2003, life expectancy had fallen from 65.1 years in 1985-1990 to 36.6 years in 2000-2005. Life expectancy is now 32.1 years lower than it would be in the absence of AIDS. The discrepancy is projected to widen to 36 years in 2005-2010 before beginning to fall. Similarly, life expectancy in South Africa has declined from a high of 62.0 years in 1990-1995 to 49.0 years in 2000-2005, 18.0 years lower than estimated in the No-AIDS scenario. The difference will increase to 25 years in 2010-2015 before beginning to ease slightly.

In countries where HIV prevalence rates are lower, AIDS has mainly slowed down the increase in life expectancy. For instance, life expectancy was lower in 2000-2005 than it would have been in the absence of AIDS by 4.0 years in Cambodia, 2.9 years in the Dominican Republic, and 2.0 years in Ukraine. An increase in the impact of AIDS on life expectancy is yet to come in many countries, such as China, where the impact relative to the No-AIDS scenario is projected to rise from a gap of 0.3 years in 2000-2005 to 1.2 years in 2015-2020. Similarly, in the Russian Federation, impact will rise from 0.9 year in 2000-2005 to 3.1 years by 2015-2020.

Gender differentials in the impact of AIDS on mortality vary according to the distribution of infections among men and women. In sub-Saharan Africa, 57 per cent of HIV-infected adults are women (UNAIDS, 2005). In addition, women are infected at younger ages, on average, than men. As a result, AIDS has a greater impact on female life expectancy than on that of males in sub-Saharan Africa. In Malawi, for example, life expectancy for females was estimated to be 19 years lower in 2000-2005 than it would have been in the absence of AIDS; for males, the difference was 15 years. In other regions of the world, the proportion of females among HIV-infected adults is lower than in Africa, and AIDS has a larger relative impact on the mortality of men. However, the proportion of infections among women is growing throughout the world (UNAIDS/WHO, 2005).

AIDS also reshapes the distribution of deaths by age. In a typical population with moderately high mortality, deaths are concentrated among very young children and older adults. For example, in 1985-1990, before the AIDS epidemic spread widely in Southern Africa, deaths in that region exhibited such a pattern (figure IV.12). Adults aged 20 to 49 accounted for only 20 per cent of all deaths. By 2000-2005, a dramatic shift had taken place in the distribution of deaths by age, with nearly 60 per cent of all deaths occurring between the ages of 20 and 49.

TABLE IV.8. LIFE EXPECTANCY AT BIRTH, BY PREVALENCE GROUP OF AFFECTED COUNTRIES AND AREAS, ESTIMATES AND MEDIUM VARIANT ("WITH AIDS") AND NO-AIDS SCENARIO ("WITHOUT AIDS"), SELECTED PERIODS 1990-2050

	Life expectancy at birth (years)				
	1990-1995	*2000-2005*	*2010-2015*	*2020-2025*	*2045-2050*
4 countries and areas with adult HIV prevalence above 20 per cent					
With AIDS	57.2	36.8	38.1	43.4	54.4
Without AIDS	64.6	64.0	66.5	69.3	74.1
Absolute difference	-7.4	-27.2	-28.5	-25.9	-19.6
Percentage difference	-11.5	-42.5	-42.8	-37.4	-26.5
7 countries and areas with adult HIV prevalence between 10 per cent and 20 per cent					
With AIDS	52.0	43.8	43.0	47.9	58.9
Without AIDS	54.9	59.5	62.6	65.5	71.6
Absolute difference	-2.8	-15.7	-19.6	-17.6	-12.7
Percentage difference	-5.2	-26.3	-31.3	-26.9	-17.8
10 countries and areas with adult HIV prevalence between 5 per cent and 10 per cent					
With AIDS	48.9	44.9	48.2	52.8	63.5
Without AIDS	51.7	52.8	55.5	59.1	67.5
Absolute difference	-2.9	-7.9	-7.3	-6.3	-4.0
Percentage difference	-5.5	-15.0	-13.2	-10.7	-5.9
35 countries and areas with adult HIV prevalence between 1 per cent and 5 per cent					
With AIDS	54.5	54.2	56.4	59.6	67.5
Without AIDS	55.4	57.2	60.1	63.0	69.9
Absolute difference	-0.9	-3.0	-3.7	-3.4	-2.5
Percentage difference	-1.6	-5.2	-6.1	-5.4	-3.5
4 countries and areas with adult HIV prevalence below 1 per cent					
With AIDS	65.1	68.4	71.0	73.1	77.9
Without AIDS	65.5	69.2	72.1	74.4	78.4
Absolute difference	-0.4	-0.8	-1.1	-1.3	-0.5
Percentage difference	-0.6	-1.1	-1.5	-1.7	-0.6

The worsening of adult mortality in highly-affected countries can be seen through trends in the probability of surviving from age 15 to age 60 ($_{45}p_{15}$). Among males in Southern Africa, this probability declined from 65 per cent in 1990-1995 to 36 per cent in 2000-2005. For females in the region, the probability of surviving from age 15 to age 60 dropped from 78 per cent to 43 per cent over the same period. Still further declines are projected over the coming decade. In the most highly affected countries of the region, Swaziland, Botswana and Lesotho, $_{45}p_{15}$ will drop to exceptionally low levels over the next decade as the delayed toll mounts from the rapid increases in HIV prevalence that occurred in the 1990s. In Swaziland, $_{45}p_{15}$ is projected to drop to as low as 10 per cent for males in 2005-2010 and 6 per cent for females in 2010-2015. Such large increases in the mortality of younger adults will deplete the cohorts that are in the prime of their working and parental careers, creating the potential for severe shocks to economic and societal structures.

AIDS is also elevating child mortality rates above what would be expected in the absence of the disease. Children who are infected by mother-to-child transmission of HIV have a median survival time of two years. Among children under 5, HIV/AIDS is responsible for 3 per cent of deaths worldwide and 6 per cent in Africa (WHO, 2005b).

Figure IV.12. Percentage distribution of deaths, by age, Southern Africa, 1985-1990 and 2000-2005

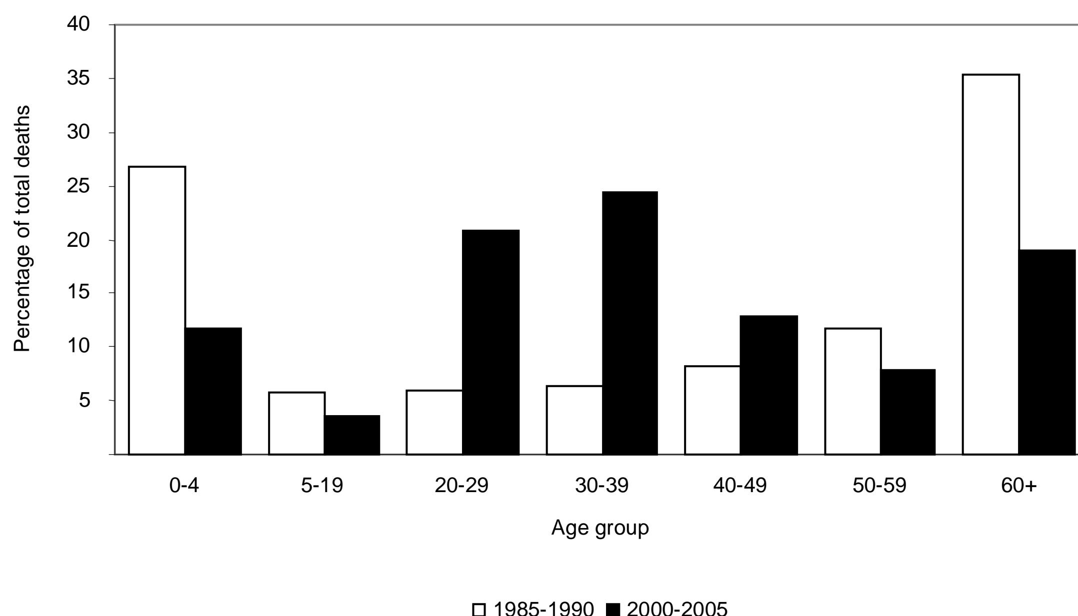


TABLE IV.9. LIFE EXPECTANCY AT BIRTH IN COUNTRIES AND AREAS MOST AFFECTED BY THE HIV/AIDS EPIDEMIC, ESTIMATES AND MEDIUM VARIANT ("WITH AIDS") AND NO-AIDS SCENARIO ("WITHOUT AIDS"), 2000-2005 AND 2015-2020

Major area	*Country or area*	*Life expectancy at birth, both sexes combined (years)*					
		2000-2005			*2015-2020*		
		With AIDS	*Without AIDS*	*Difference*	*With AIDS*	*Without AIDS*	*Difference*
Africa							
1.	Angola	40.7	44.0	-3.3	45.6	49.2	-3.6
2.	Benin	53.8	57.1	-3.3	60.3	62.7	-2.4
3.	Botswana	36.6	68.7	-32.1	38.4	72.1	-33.7
4.	Burkina Faso	47.4	53.1	-5.7	53.0	57.8	-4.8
5.	Burundi	43.5	51.0	-7.5	49.3	55.6	-6.3
6.	Cameroon	45.8	53.6	-7.8	50.3	57.5	-7.2
7.	Central African Republic	39.4	53.4	-14.0	43.4	57.5	-14.1
8.	Chad	43.6	48.6	-5.0	48.2	53.3	-5.1
9.	Congo	51.9	60.2	-8.3	56.5	63.8	-7.3
10.	Côte d'Ivoire	46.0	54.0	-8.0	50.1	58.9	-8.8
11.	Dem. Republic of the Congo	43.1	48.0	-4.9	47.7	52.4	-4.7
12.	Djibouti	52.7	55.6	-2.9	58.0	61.3	-3.3
13.	Equatorial Guinea	43.5	52.2	-8.7	41.7	58.0	-16.3
14.	Eritrea	53.5	57.6	-4.1	60.1	63.5	-3.4
15.	Ethiopia	47.6	52.2	-4.6	51.7	58.2	-6.5
16.	Gabon	54.6	63.0	-8.4	54.5	68.5	-14.0
17.	Gambia	55.5	57.3	-1.8	62.4	63.6	-1.2
18.	Ghana	56.7	61.2	-4.5	61.9	66.3	-4.4
19.	Guinea	53.6	57.0	-3.4	57.2	64.0	-6.8

TABLE IV.9 (*continued*)

Major area	Country or area	Life expectancy at birth, both sexes combined (years)					
		2000-2005			2015-2020		
		With AIDS	*Without AIDS*	*Difference*	*With AIDS*	*Without AIDS*	*Difference*
20.	Guinea-Bissau	44.6	47.7	-3.1	49.8	53.4	-3.6
21.	Kenya	47.0	60.5	-13.5	59.1	63.8	-4.7
22.	Lesotho	36.7	63.9	-27.2	38.6	68.5	-29.9
23.	Liberia	42.5	46.6	-4.1	45.5	52.2	-6.7
24.	Madagascar	55.3	56.8	-1.5	59.0	62.5	-3.5
25.	Malawi	39.6	56.7	-17.1	45.5	62.5	-17.0
26.	Mali	47.8	49.9	-2.1	53.3	55.7	-2.4
27.	Mozambique	41.9	52.6	-10.7	46.1	58.8	-12.7
28.	Namibia	48.6	68.4	-19.8	50.3	72.1	-21.8
29.	Niger	44.3	45.3	-1.0	48.5	50.7	-2.2
30.	Nigeria	43.3	49.0	-5.7	48.2	53.9	-5.7
31.	Rwanda	43.6	48.7	-5.1	48.0	52.6	-4.6
32.	Sierra Leone	40.6	42.7	-2.1	44.7	46.5	-1.8
33.	South Africa	49.0	67.0	-18.0	47.0	70.8	-23.8
34.	Sudan	56.3	58.6	-2.3	59.7	64.1	-4.4
35.	Swaziland	32.9	63.6	-30.7	34.4	68.4	-34.0
36.	Togo	54.2	60.7	-6.5	59.8	65.1	-5.3
37.	Uganda	46.8	56.5	-9.7	58.9	61.5	-2.6
38.	United Republic of Tanzania	46.0	58.0	-12.0	50.4	61.2	-10.8
39.	Zambia	37.4	54.3	-16.9	44.1	59.4	-15.3
40.	Zimbabwe	37.2	63.5	-26.3	41.8	67.4	-25.6
Asia							
1.	Cambodia	56.0	60.0	-4.0	62.4	65.9	-3.5
2.	China	71.5	71.8	-0.3	73.8	75.0	-1.2
3.	India	63.1	64.5	-1.4	68.5	70.0	-1.5
4.	Myanmar	60.1	61.4	-1.3	66.1	67.8	-1.7
5.	Thailand	69.7	73.0	-3.3	74.5	75.9	-1.4
Europe							
1.	Russian Federation	65.4	66.3	-0.9	66.9	70.0	-3.1
2.	Ukraine	66.1	68.1	-2.0	68.9	71.6	-2.7
Latin America and the Caribbean							
1.	Bahamas	69.5	74.8	-5.3	75.5	79.0	-3.5
2.	Barbados	74.9	77.2	-2.3	77.9	79.1	-1.2
3.	Belize	71.9	74.4	-2.5	71.8	76.4	-4.6
4.	Brazil	70.3	71.0	-0.7	74.2	74.8	-0.6
5.	Dominican Republic	67.1	70.0	-2.9	71.6	73.5	-1.9
6.	Guatemala	67.1	69.0	-1.9	71.3	72.6	-1.3
7.	Guyana	62.8	67.2	-4.4	68.3	72.0	-3.7
8.	Haiti	51.5	59.2	-7.7	58.0	65.3	-7.3
9.	Honduras	67.6	71.0	-3.4	71.4	74.1	-2.7
10.	Jamaica	70.7	73.5	-2.8	73.2	75.2	-2.0
11.	Suriname	69.0	71.2	-2.2	72.6	73.8	-1.2
12.	Trinidad and Tobago	69.9	74.9	-5.0	71.8	77.3	-5.5
Northern America							
1.	United States of America	77.3	77.7	-0.4	79.1	79.5	-0.4

In the affected countries of sub-Saharan Africa, under-five mortality in 2000-2005 was 16 deaths per thousand births higher (10.1 per cent) than would have been expected in the absence of AIDS (table IV.10). In the affected countries of Asia and Latin America and the Caribbean, AIDS elevated under-five mortality by about 2 per thousand. The relative impact of this difference is higher in Latin America (6.4 per cent) than in Asia (3.2 per cent) due to the lower level of non-AIDS child mortality in Latin America.

The impact of AIDS on child mortality is strongest in the worst-affected countries (table IV.11). In the countries with prevalence higher than 20 per cent in 2003, AIDS contributed to a substantial increase in under-five mortality over the past decade, from 87 in 1990-1995 to 118 in 2000-2005. Under-five mortality in this group of countries is now 60.0 per cent higher than would be expected in the absence of AIDS. In countries where HIV prevalence was between 10 and 20 per cent, under-five mortality decreased during the 1990s, but was still 24.8 per cent higher in 2000-2005 than estimated in the No-AIDS scenario.

The impact of AIDS on under-five mortality is projected to decline over the coming decades. The lessening impact is due both to the assumption that adult HIV prevalence will decline and to the assumption that mother-to-child transmission of HIV will be reduced sharply in the future by expanded access to preventative treatment. If these conditions are not realized, the impact of AIDS on child mortality could remain far higher than projected in the *2004 Revision*.

TABLE IV.10. UNDER-FIVE MORTALITY, BY AFFECTED COUNTRY AND AREA GROUP AND MAJOR AREA, ESTIMATES AND MEDIUM VARIANT (“WITH AIDS”) AND NO-AIDS SCENARIO (“WITHOUT AIDS”), SELECTED PERIODS 1990-2050

Group of affected countries and areas	*Under-five mortality (deaths under age 5 per 1,000 live births)*				
	1990-1995	*2000-2005*	*2010-2015*	*2020-2025*	*2045-2050*
All 60 affected countries and areas					
With AIDS	113	101	85	70	39
Without AIDS	109	96	81	68	39
Absolute difference	4	6	4	2	0
Percentage difference	3.6	5.8	5.2	3.3	1.3
40 countries and areas in sub-Saharan Africa					
With AIDS	185	174	149	119	63
Without AIDS	174	158	136	111	60
Absolute difference	11	16	13	8	3
Percentage difference	6.1	10.0	9.3	7.2	5.5
5 countries and areas in Asia					
With AIDS	96	76	56	43	24
Without AIDS	95	74	55	43	24
Absolute difference	2	2	1	1	0
Percentage difference	1.6	2.5	2.7	1.8	0.2
12 countries and areas in Latin America and the Caribbean					
With AIDS	62	42	31	23	12
Without AIDS	59	39	30	22	12
Absolute difference	3	2	2	1	0
Percentage difference	4.3	6.4	5.3	5.1	2.4
3 more developed countries and areas					
With AIDS	15	12	11	9	7
Without AIDS	14	12	11	9	7
Absolute difference	1	0	0	0	0
Percentage difference	3.6	3.2	3.2	1.4	0.0

NOTE: Because of rounding, figures on absolute difference and percentage difference may not be entirely consistent.

TABLE IV.11. UNDER-FIVE MORTALITY, BY PREVALENCE GROUP OF AFFECTED COUNTRIES AND AREAS, ESTIMATES AND MEDIUM VARIANT ("WITH AIDS") AND NO-AIDS SCENARIO ("WITHOUT AIDS"), SELECTED PERIODS 1990-2050

	Under-five mortality (deaths under age 5 per 1 000 live births)				
Group of affected countries and areas	*1990-1995*	*2000-2005*	*2010-2015*	*2020-2025*	*2045-2050*
4 countries and areas with adult HIV prevalence above 20 per cent					
With AIDS	87	118	92	58	25
Without AIDS	70	74	59	44	23
Absolute difference	17	44	33	14	2
Percentage difference	24.4	60.0	56.8	33.3	9.8
7 countries and areas with adult HIV prevalence between 10 per cent and 20 per cent					
With AIDS	152	140	115	86	45
Without AIDS	143	112	93	75	42
Absolute difference	9	28	22	11	3
Percentage difference	6.3	24.8	23.9	14.1	6.4
10 countries and areas with adult HIV prevalence between 5 per cent and 10 per cent					
With AIDS	181	178	152	122	63
Without AIDS	171	162	141	114	61
Absolute difference	10	16	12	7	3
Percentage difference	6.0	9.6	8.5	6.5	4.6
35 countries and areas with adult HIV prevalence between 1 per cent and 5 per cent					
With AIDS	156	146	127	106	59
Without AIDS	148	137	120	101	57
Absolute difference	8	9	7	5	2
Percentage difference	5.2	6.3	6.1	4.9	3.8
4 countries and areas with adult HIV prevalence below 1 per cent					
With AIDS	87	67	50	38	21
Without AIDS	86	65	49	38	21
Absolute difference	1	2	1	1	0
Percentage difference	1.7	2.6	2.5	1.7	0.0

NOTE: Because of rounding, figures on absolute difference and percentage difference may not be entirely consistent.

b. The impact on population size and growth

The rising numbers of deaths due to AIDS are expected to result in a reduction of population growth and, in a few countries—Botswana, Lesotho and Swaziland—in a decrease of population size. In most of the other developing countries affected by the epidemic, population growth will continue to be positive because their moderate or high fertility more than counterbalances the rise in mortality.

The total population of the 60 affected countries in 2005 was 3,990,000 in the medium variant, about 49 million lower than in the No-AIDS scenario (table IV.12). By 2050, the difference between the medium variant and the No-AIDS scenario is projected to increase to 344 million, or 5.8 per cent of the population projected in the No-AIDS scenario. The majority of this difference is attributable to Africa, where the population in affected countries is projected to be 266 million (14.0 per cent) less than in the absence of AIDS. The second largest gap is projected to occur in the 5 affected countries of Asia, whose population is expected to be 62 million lower in 2050 than in the No-AIDS scenario. However, in relative terms, this reduction amounts to only 1.9 per cent of the 2050 population of those Asian countries.

TABLE IV.12. POPULATION SIZE AND AVERAGE ANNUAL RATE OF CHANGE IN AFFECTED COUNTRIES AND AREAS, BY MAJOR AREA, ESTIMATES AND MEDIUM VARIANT ("WITH AIDS") AND NO-AIDS SCENARIO ("WITHOUT AIDS"), 2005-2050

Group of affected countries and areas	*Population size (millions)*			*Average annual rate of change (per cent)*	
	2005	*2025*	*2050*	*2005-2025*	*2025-2050*
All 60 affected countries and areas					
With AIDS	3 990	4 890	5 639	1.02	0.57
Without AIDS	4 040	5 078	5 984	1.14	0.66
Absolute difference	-49	-188	-344	-0.13	-0.09
Percentage difference	-1.2	-3.7	-5.8	-11.1	-13.1
40 countries and areas in Africa					
With AIDS	725	1 099	1 634	2.08	1.59
Without AIDS	761	1 236	1 900	2.42	1.72
Absolute difference	-36	-137	-266	-0.34	-0.13
Percentage difference	-4.8	-11.1	-14.0	-14.2	-7.8
5 countries and areas in Asia					
With AIDS	2 548	2 989	3 149	0.80	0.21
Without AIDS	2 558	3 029	3 211	0.84	0.23
Absolute difference	-10	-40	-62	-0.05	-0.02
Percentage difference	-0.4	-1.3	-1.9	-5.6	-10.4
12 countries and areas in Latin America and the Caribbean					
With AIDS	230	286	323	1.09	0.49
Without AIDS	231	290	330	1.13	0.51
Absolute difference	-2	-4	-7	-0.04	-0.02
Percentage difference	-0.7	-1.5	-2.0	-3.4	-4.1
3 more developed countries and areas					
With AIDS	488	517	533	0.29	0.13
Without AIDS	490	524	543	0.34	0.14
Absolute difference	-2	-7	-10	-0.05	-0.02
Percentage difference	-0.3	-1.4	-1.8	-15.4	-11.6

NOTE: Because of rounding, figures on absolute difference and percentage difference may not be entirely consistent.

The impact of AIDS on the rate of population growth for the 60 affected countries is also projected to be significant (table IV.12). During 2005-2025, AIDS is likely to reduce the expected average annual rate of population change of the countries involved from 1.14 per cent per year in the No-AIDS scenario to 1.02 per cent annually in the medium variant. Among the regional groupings, the largest impact on population growth is projected to occur in the affected countries of sub-Saharan Africa, where population growth of 2.42 per cent in the No-AIDS scenario is projected to be cut to 2.08 per cent in the medium variant.

The effect of AIDS on population growth is even more marked when countries are grouped according to their level of prevalence in 2003 (table IV.13). In the four most affected countries, where adult HIV prevalence was above 20 per cent in 2003, total population in 2050 is projected to be 47.5 per cent lower than in the No-AIDS scenario. Between 2005 and 2025, projected average annual population growth would be 0.32 per cent, compared to 1.80 per cent in the No-AIDS scenario.

TABLE IV.13. POPULATION SIZE AND ANNUAL GROWTH RATE, BY PREVALENCE GROUP OF AFFECTED COUNTRIES AND AREAS, ESTIMATES AND MEDIUM VARIANT ("WITH AIDS") AND NO-AIDS SCENARIO ("WITHOUT AIDS"), 2005-2050

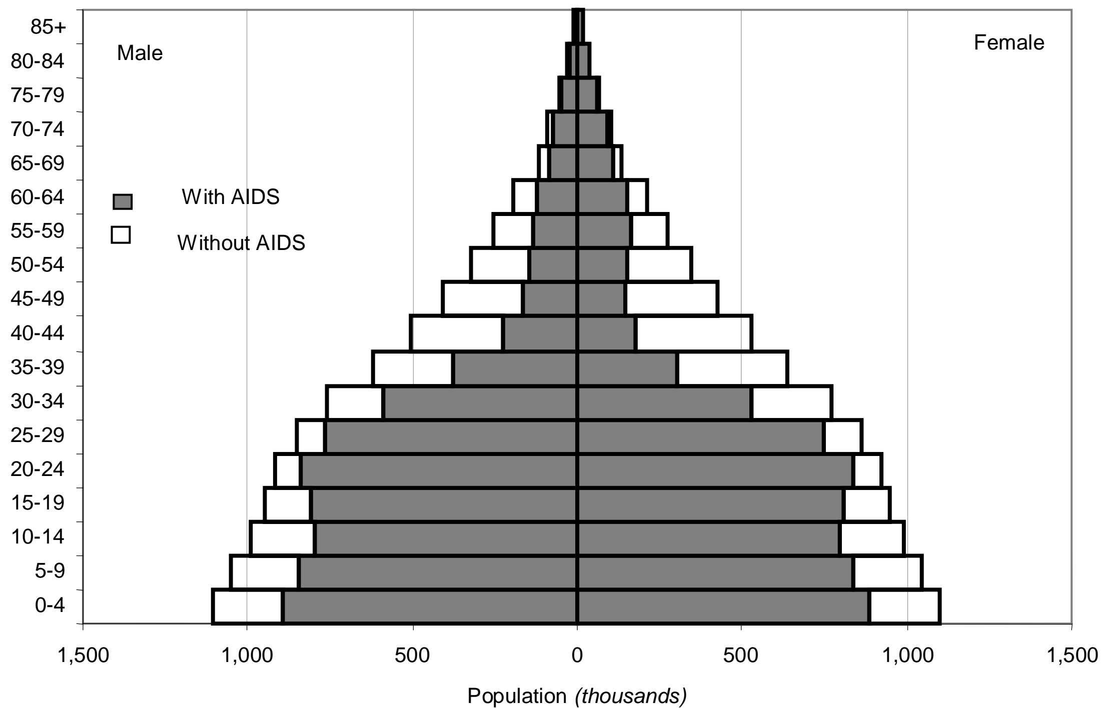
Groups of affected countries and areas	Population size (millions)			Average annual rate of change (per cent)	
	2005	*2025*	*2050*	*2005-2025*	*2025-2050*
4 countries and areas with adult HIV prevalence above 20 per cent					
With AIDS	18	19	20	0.32	0.28
Without AIDS	21	29	38	1.80	1.05
Absolute difference	-3	-11	-18	-1.49	-0.77
Percentage difference	-14.2	-36.3	-47.5	-82.5	-73.7
7 countries and areas with adult HIV prevalence between 10 and 20 per cent					
With AIDS	98	121	149	1.02	0.86
Without AIDS	107	158	219	1.96	1.30
Absolute difference	-8	-38	-70	-0.95	-0.44
Percentage difference	-7.9	-23.8	-31.8	-48.2	-34.0
10 countries and areas with adult HIV prevalence between 5 and 10 per cent					
With AIDS	263	385	534	1.90	1.31
Without AIDS	277	432	621	2.22	1.46
Absolute difference	-14	-47	-87	-0.32	-0.14
Percentage difference	-4.9	-10.9	-14.0	-14.5	-9.7
35 countries and areas with adult HIV prevalence between 1 and 5 per cent					
With AIDS	707	951	1 303	1.48	1.26
Without AIDS	721	1 004	1 411	1.65	1.36
Absolute difference	-14	-54	-109	-0.17	-0.10
Percentage difference	-2.0	-5.3	-7.7	-10.5	-7.5
4 countries and areas with adult HIV prevalence below 1 per cent					
With AIDS	2 904	3 415	3 633	0.81	0.25
Without AIDS	2 914	3 455	3 694	0.85	0.27
Absolute difference	-10	-40	-61	-0.04	-0.02
Percentage difference	-0.3	-1.1	-1.7	-4.7	-7.6

NOTE: Because of rounding, figures on absolute difference and percentage difference may not be entirely consistent.

c. The impact on population age structure

The concentration of AIDS mortality among working-age adults will reshape the age structure of populations in the most highly affected countries, such as Zimbabwe (figure IV.13). The age distribution resulting from the No-AIDS scenario for 2015 is superimposed on the population projected under the medium variant. In the No-AIDS scenario, the population age structure has the pyramid shape typical of populations with moderate to high fertility and mortality. By 2015, AIDS will have caused marked deviations from the pyramidal shape. For instance, the population aged 35 to 59 projected for 2015 in the medium variant is a small fraction of the population that would have been expected in the absence of AIDS. The ratio of men to women in these age groups will be elevated because more women than men die of AIDS in Zimbabwe, and they die at younger ages. The early deaths of so many women, before the end of their reproductive years, will reduce the size of cohorts to be born over the coming decade. The size of child cohorts will be further reduced by the deaths of children infected with HIV through mother-to-child transmission. The reshaping of population structure due to AIDS will have far-reaching effects on household structure, the labour force and other facets of society.

Figure IV.13. Population of Zimbabwe, by sex and age group, medium variant (“with AIDS”) and No-AIDS scenario (“without AIDS”), 2015



4. Uncertainties in projecting the demographic impact of HIV/AIDS

In considering this assessment of the demographic impact of HIV/AIDS, the reader should bear in mind that there is much uncertainty surrounding both the estimated prevalence of the disease in different populations and the path that the epidemic will follow in the future. In addition, more needs to be known about the dynamics of the epidemic itself. For example, it is not certain that the progression from HIV infection to AIDS and from AIDS to death will occur according to the same model schedule in all or even most populations in a geographical region. The rollout of therapies that increase the survivorship of infected persons has just begun in the developing world, and the assumptions made in the *2004 Revision* regarding ART will have to be validated and revised in future assessments, regarding both the additional survival achieved with ART in different settings and the percentage of persons in need of medication who receive it. Similarly, estimates of mother-to-child transmission of HIV will need to be validated in a variety of settings and will need modification as action to prevent such transmission increases.

Another element of uncertainty is the validity of national HIV prevalence estimates. In countries where these estimates are based on surveillance of pregnant women in antenatal clinics, their validity will depend on whether pregnant women are representative of the general population and whether the clinics chosen are representative of the national situation (for example, not overly concentrated in urban areas). Estimates of HIV prevalence in many countries have recently been revised downward by UNAIDS as quality of the surveillance systems improves and as other sources of prevalence estimates, such as population sample surveys, provide additional information, including for the male population.

Despite the uncertainties surrounding any measure of the impact of HIV/AIDS, it is important to underscore that all available evidence points to the same conclusion: the disease is already widespread in many countries and shows few signs of being controlled in others. The list of significantly

affected countries has been increasing steadily since 1990. The estimates and projections discussed in this chapter, which already show a devastating impact of the disease, are based on the assumption that starting in 2005 behaviours will be gradually adopted that reduce the proportion of adults at risk of infection and the chance that sex with an infected person will lead to infection. Governments, the international community and civil society need to continue and strengthen efforts to convince people around the world to adopt these behavioural changes. In addition, it is assumed that treatment interventions, such as those in the 3 by 5 Initiative (WHO, 2005a) and other programs, will extend the survival of infected persons and reduce the level of mother-to-child transmission. If these assumptions are not borne out, the impact of the epidemic could turn out to be worse than anticipated.

NOTES

[1] Specifically, Millennium Development Goal 4 calls for countries to "Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate."

[2] This corresponds to Clinical Stage IV of the WHO staging system for HIV infection and disease in adults and adolescents, intended for settings where laboratory diagnosis is not widely available. Under the AIDS surveillance definition of the US Centers for Disease Control, AIDS can also be defined by a CD4+ T cell count below 200 per millilitre of blood.