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Will AIDS lead to a population decline in sub-Saharan Africa?

*Gilles Pison**

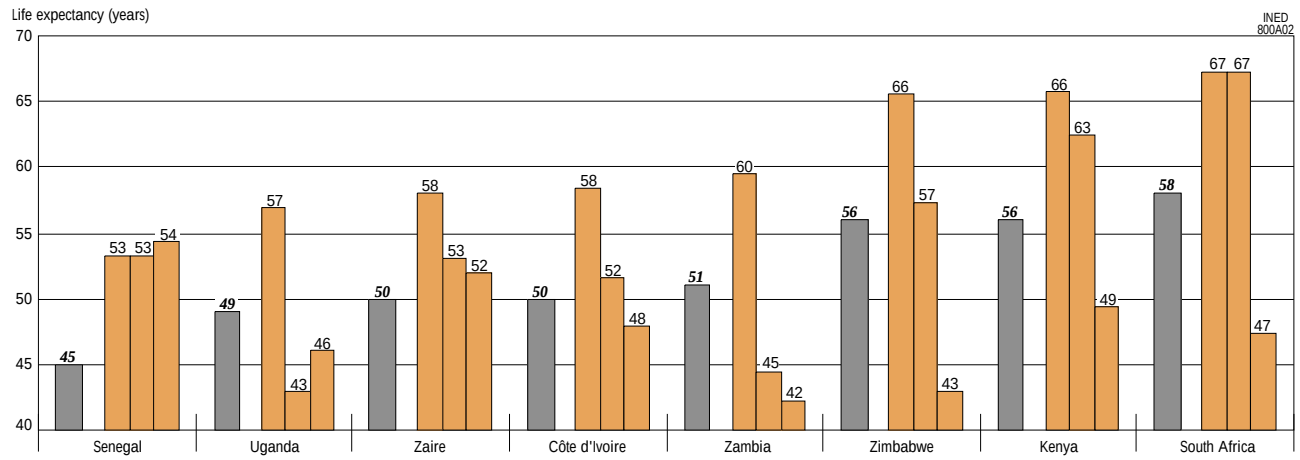
With close to one adult in ten infected with the human immunodeficiency virus (HIV), compared with one in a hundred worldwide, sub-Saharan Africa is by far the region most affected by AIDS. What are the demographic consequences, especially concerning mortality and the number of inhabitants? The epidemic varies greatly from one African country to the next, Southern African countries being affected to the greatest degree: is the reason for this known?

In 1992 the United Nations, which revises its population estimates every two years, took into account the demographic consequences of the AIDS epidemic for the first time [1]. More had been learnt about the epidemic and its characteristics. The increase in the number of deaths it caused had been measured in the countries possessing reliable statistics on deaths and their causes (1). But in the countries most affected by AIDS there are no such tools; measuring overall mortality is already a problem, therefore to try to evaluate mortality due to AIDS is to attempt the impossible. The only way to do so is to make an indirect estimation, which consists of developing epidemiological models based on the characteristics of the disease and the proportion of the population already infected with the virus.

Population projections greatly revised in 1992...

In 1992 the United Nations estimated future changes in the proportion of people infected by making hypotheses on the progress in the fight against the

Figure 1 - Life expectancy at birth in 1980-1985 and projections for 2000-2005 in some sub-Saharan countries



Interpretation: In South Africa life expectancy at birth in 1980-985 (grey) was 58 years. For 2000-2005 (colour), United Nations projections announced 67, 67, and 47 years respectively in their 1990, 1992 and 2000 revisions.

Source: United Nations, World Population Prospects, 1990, 1992, 2000 [1]

* *Institut national d'études démographiques.*

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disease. Since the incubation period is very long—it takes ten years for half a group of newly infected people to become ill —and since the epidemic was in constant progression in many countries, most of its demographic consequences remained yet to come. This taking into account of AIDS has led to a more conservative revision of future changes in life expectancy at birth for a number of countries. Thus, life expectancy at birth in Uganda was 49 years in the period between 1980 and 1985. It was estimated at the time that it would reach 57 between 2000 and 2005, whereas the revision of 1992 brought this figure down to 43 years, a decline of six years instead of a progression of eight (Figure 1). Almost the same decline occurred in Zambia: only 45 years life expectancy in 2000-2005 instead of the 60 years forecast in 1990. From the beginning of the 1990s, it was estimated that between 10 and 15% of adults in both these countries were infected with HIV, a world record at the time. For most of the other African countries, even those that were hit by the epidemic early on, such as Zaire, Kenya and Zimbabwe, adjustments made in projections have been smaller, with life expectancy at birth expected to return to, or even exceed, its 1980-1985 level in 2000-2005 after a temporary decline. For the whole of Africa (North Africa included), the new United Nations scenario led to a decline in life expectancy of two years in the projection for 2000-2005: 56 years instead of 58 years, which represented nonetheless a six-year increase compared with the 1980-1985 level.

One of the hypotheses of the 1992 scenario was that the epidemic had reached, or was close to reaching, a plateau in many of the countries or regions affected. As the fight against the disease progressed there was some hope that the trend would be reversed in the following decades and that life expectancy would start to increase again. After having recovered lost ground, life expectancy would have substantially overtaken its 1980-1985 level in 2010-2015 in all of the countries. Scientists did not hide the degree of human tragedy caused by the epidemic, but to those people who feared a reduction or even a disappearance of the African population they answered that it would continue to increase in spite of everything and that this would be the case in all of the countries. The birth rate was still so high on the continent that, even with a sharp increase in mortality, the number of births remained greater than the number of deaths. At most growth would be slowed down: 2 or 3% a year instead of 3 or 4% without the epidemic.

... readjusted again a few years later

In 1994 and 1996, the United Nations renewed the 1992 scenario on the effects of AIDS without making any major changes to it. Subsequently, however, the diagnosis changed. It became apparent in the second half of the 1990s that the epidemic had progressed much more than expected, notably in Southern African countries. The United Nations were forced to greatly revise their projections once again. Thus, compared with the 58 years announced in 1990 and the 56 years announced in 1992, the revised figure for 2000 brought life expectancy at birth for the whole of Africa for the same 2000-2005 period down to only 51 years. From one projection to the next the decline was especially noticeable in Kenya (66, 63 and 49 years), in Côte d'Ivoire (58, 52, 48), in Zimbabwe (66, 57, 43) and in Zambia (60, 45, 42) (Figure 1). But it was in Southern African countries (South Africa, Botswana, Lesotho, Namibia and Swaziland) that the decline was the greatest: from 66 years announced in 1992 (a level much higher than the African average) it dropped to 46 years, as announced in 2000, for the same 2000-2005 period. This spectacular decline in life expectancy is due to increased mortality linked to a record infection rate: it is estimated that 21% of adults aged 15-49 years living in Southern Africa were infected at the end of 2001 [2].

The rapid growth of the epidemic was underestimated for a long time

Why was the rapid spread of the epidemic in Southern African countries not predicted in the 1990s? What had led people to believe ten years ago that the record infection rates observed at the time in Uganda and Zambia could not be exceeded? The answer is that the role of certain biological or social factors where unknown at the time. The infection rate was assumed to be uniform, whereas it turned out to be higher in Africa than elsewhere because of the high frequency of sexually transmitted diseases other than AIDS. It was not known at the time that when a partner has a sexually transmitted disease resulting in genital ulcers, notably syphilis or genital herpes (HSV-2), the HIV transmission rate may be increased by 10 to 100 times and there is one chance in five or in ten of being infected after a single sexual exposure. In a context of sexual relations presenting relatively frequent risks (multiple partners, intercourse with prostitutes and infrequent use of condoms) these diseases have contributed to accelerating the spread of the epidemic [3]. Several social factors have also played an important role in the African epidemic, which were not sufficiently taken into account in the first projections, such as the large communities of migrant male workers sometimes prevented from settling for any length of time in cities—the case in Southern Africa—and who maintain links with rural life. Often engaged in sexual relations with several partners and with prostitutes they have, by their to-ings and fro-ings, contributed to

(1) In France, for instance, the cause-of-death statistics reported 2,785 deaths from AIDS in 1990 out of a total 562,201 deaths (0.5%). AIDS has not prevented the increase of life expectancy at birth, which rose from 76.8 years in 1990 to 79.0 in 2000.

accelerating the spread of the epidemic in rural areas. Another frequent characteristic in African societies is the great age gap between spouses or partners that has also played a role by allowing the virus to be transmitted more rapidly from one generation to another.

Senegal and Uganda set the example

Although close to one African adult out of fifteen was infected with HIV at the end of 2001 (North Africa included) the importance of the epidemic varies greatly from one country to the next. It tends to follow a North-South gradient (map). In the South are the seven most affected countries (Zambia, Zimbabwe, South Africa, Botswana, Lesotho, Namibia and Swaziland), with proportions of infected adults exceeding 20%. In the North, however, countries have low infection rates. In the Sahelian Band (Senegal, Gambia, Mali, Niger, Chad and Sudan) the rates, although moderate, are not negligible: between 0.5 and 3.6%.

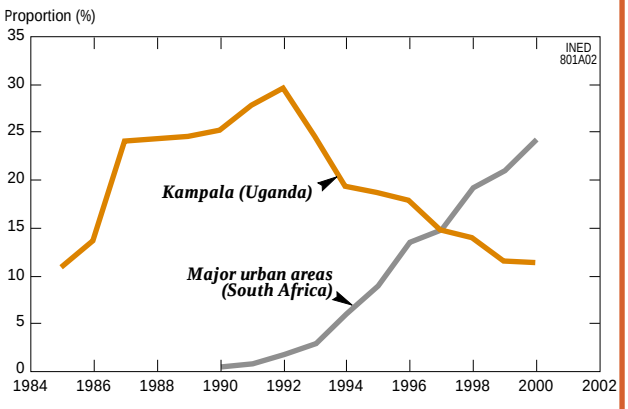
However, in the general progression of the epidemic two countries stand out as exceptions. First is Senegal, which has the lowest rate of infection in sub-Saharan Africa, Madagascar and Mauritius excluded: 0.5%, a rate close to that observed in the region of Ile-de-France. The epidemic has been in the country for a long time but has so far remained very limited. Yet sexual behaviours do not greatly differ from those in the rest of sub-Saharan Africa and condoms are not used here to any greater degree. The only notable difference is that young women start having sexual relations at an older age. In addition the country does not have large communities of single migrant workers, who have also contributed greatly to the spread of the epidemic, as mentioned earlier. Moreover, the frequency of sexually transmissible diseases other than AIDS has remained moderate. Lastly, the State took preventive action very early on. Each one of these factors taken separately would probably not have prevented the epidemic from spreading, but together they have made it possible to contain it.

Uganda is a second exception. Although the infection rate (5% of adults) is ten times higher than in Senegal it has been divided by two or three in ten years (Figure 2). This reversal after the impressive spread of the epidemic in the 1980s and the beginning

Map – Proportion (%) of adults aged between 15 and 49 infected with HIV in Africa, end of 2001

Source: UNAIDS [2].

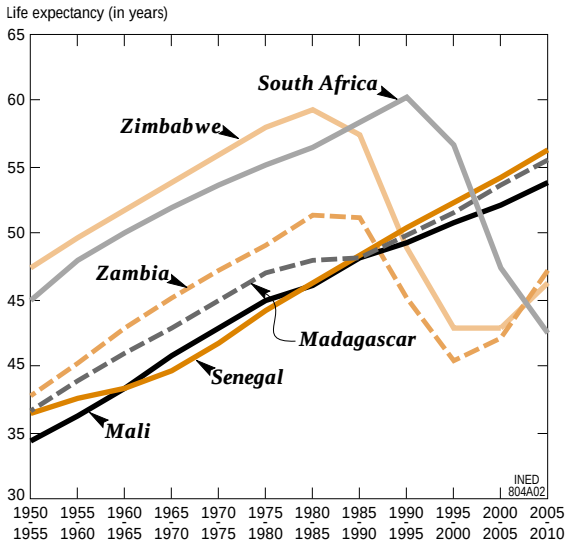
Figure 2 – Proportion of pregnant women infected with HIV in Kampala (Uganda), and in the major cities in South Africa



Note: the proportion of pregnant women infected with HIV estimated by means of serology tests conducted among women attending prenatal care centres is the main source of information on the proportion of infected adults aged between 15 and 49.

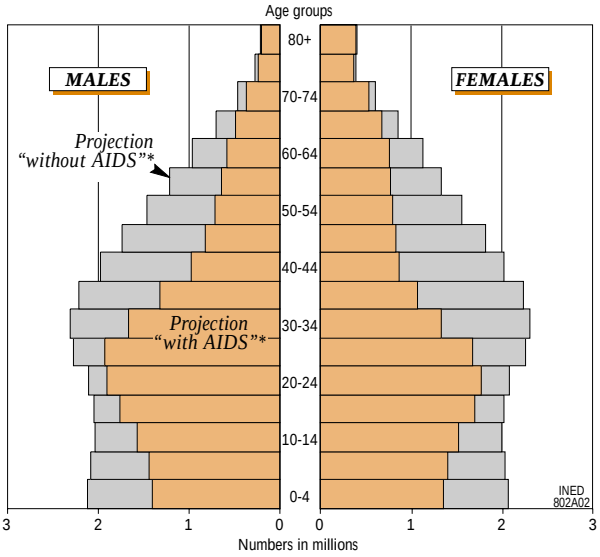
Sources: UNAIDS/WHO, working group for the global monitoring of HIV/AIDS.

Figure 3 – Changes in life expectancy at birth in several African countries between 1950 and 2000 and projections until 2010



Source: United Nations, World Population Prospects, 2000 Revision [1]

Figure 4 – Age Pyramid in South Africa in 2020



** The projection "with AIDS" takes into account the impact of the AIDS epidemic, the projection "without AIDS" simulates what the population would have been if the epidemic had not taken place.*

Source: US Census Bureau [4].

of the 1990s is due to the success in the fight against sexually transmitted diseases and to changes in behaviour fostered by the magnitude of the crisis and by the colossal efforts made in the areas of education and prevention during the last fifteen years, notably those aimed at young people. This has resulted in this country being a model of success in the fight against the epidemic.

Demographics affected for a long time to come

One of the consequences of the epidemic will have been to upset the mortality map of sub-Saharan Africa: the countries that were lagging behind ten or fifteen years ago, such as Senegal and most of the countries of Western Africa, now find themselves in the lead with life expectancies of more than 50 years, whereas on the contrary, countries of Eastern and Southern Africa, which used to be in the lead, currently find themselves at the bottom of the league with the lowest life expectancies (Figure 3).

Another consequence is that the age structure of the population will be deeply affected for a long time. Like all regions in the world, Africa will experience population ageing (a decline in the proportion of young people followed by an increase in the number of old people) due to fertility decline. One might expect the deaths of many adults to increase the proportion of elderly people in towns and villages, with the risk of premature ageing of the population. In fact, the opposite is occurring: there are still relatively few elderly people and the population includes many children (half the population is under 18). Excess mortality among adults is tending, for the time being, to reinforce the proportion of children in the population and therefore to make it younger. In addition, adults who die prematurely reduce the potential number of elderly people for future decades. In fact, the AIDS epidemic is not accelerating population ageing but delaying it (Figure 4).

On the other hand, the total African population will be smaller than it would have been without the epidemic. However, it will continue to grow and could reach 1.4 billion inhabitants in 2025, according to the United Nations, or 70% more than the 840 million today. The difference with the figure of 1.6 billion announced in 1990 is not only due to increased mortality. Fertility, which has started to decline in Africa, has done so earlier and at a faster pace than expected ten years ago. In some countries hard hit by the epidemic and where fertility has already declined substantially (South Africa and Botswana), the population is likely to stagnate and even to fall for several years. In the other countries, although the population is not expected to decline, its growth will be much slower than projected. In spite of its demographic vitality, Africa will have paid a heavy tribute to the AIDS epidemic.

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