

# Implications of AIDS for the South African population age profile

W.D. Myslik,\* A. Freeman and Janina Slawski

The Southern Life Association Limited

## Abstract

*This paper explores the complex interaction of fertility decline and the AIDS epidemic on the demographic structure of South Africa. The consequences of these demographic changes on household structures, employment practices and the national economy are analysed. Particular attention is paid to the impact of such changes on older people, in terms of their role in shouldering the social and financial burden of the epidemic in a family context and the impact on health care and social support systems on which they rely.*

## Introduction

That AIDS will have far-reaching effects into virtually all aspects of African society is undisputed. However, precisely because AIDS impacts on fertility, mortality, sexual behaviour, family structures, productivity, economic planning and more, it has proven extremely difficult to predict *how* these intertwined impacts will actually change our society. This paper looks at the impact that AIDS will have on the demographic structure of the South African population and the socio-economic consequences of those changes, with a particular focus on the implications for the older population.

The broad projections made here are not precise predictions but provide a glimpse of what is to come and offer some insight into ways to manage the potentially devastating impact of the disease.

## The scope of the epidemic

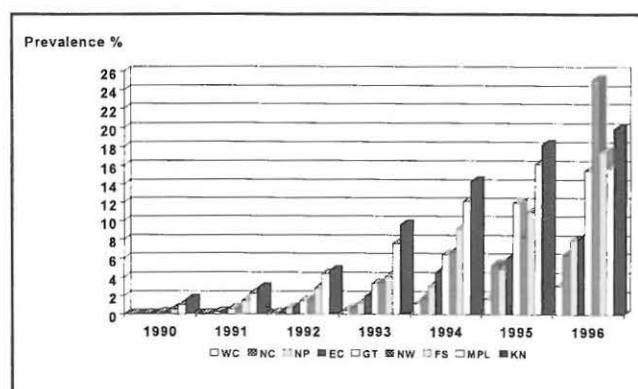
At the end of 1996, it was estimated that approximately 2.4 million South Africans were infected with HIV, a 33% increase from the 1.8 million estimated at the end of 1995 (Department of Health, 1997). This figure represents approximately 6% of all men, women and children in the country. (According to the preliminary 1996 census data, the South African population is estimated to be approximately 37.9 million (Central Statistical Service, 1997).) The majority of HIV infections occur between the ages of 15 and 25 years for women and 20 and 30 years for men. Among sexually-active women in the country, the observed HIV prevalence rate was 14% at the end of 1996. Progressing steadily over time in all provinces, the prevalence of HIV among sexually-active women has already reached or exceeded 20% in two provinces – North-West Province and KwaZulu-Natal (see Figure 1).

At this point, it seems likely that South Africa will follow a course very similar to that being seen in other African countries, lagged by a few years as a result of South Africa's

geographical position and socio-political isolation in the 1980s. Current projections indicate that the epidemic will reach its peak in South Africa in approximately 2005, with nearly 25% of the adult population infected (Southern Life AIDS model).<sup>1</sup> (See Figure 2.)

Figure 1

HIV prevalence in South Africa, by province

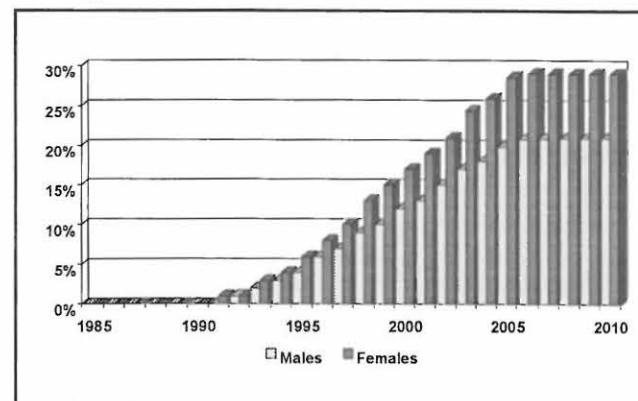


WC	Western Cape	NW	North-West Province
NC	Northern Cape	FS	Free State
NP	Northern Province	MPL	Mpumalanga
EC	Eastern Cape	KN	KwaZulu-Natal
GT	Gauteng		

Source: Department of Health, 1997.

Figure 2

Projected HIV prevalence: South African adults aged 15-59 years



Source: Southern Life AIDS model.

\* Address correspondence to

Mr. Wayne D. Myslik, The Southern Life Association Limited, Great Westerford, Rondebosch 7700, South Africa.  
E-mail: wmyslik@iafrica.com

## Socio-demographic impact

The recently released preliminary report of the 1996 census gives us the first data for the entire South African population, including the former homelands. A significant finding of the census suggests that fertility rates have for some years been declining at a rate much faster than previously believed (Central Statistical Service, 1997).

It is now suggested that the national total fertility rate has declined from 4.3 to 3.2 between 1985 and 1995 (CSS, 1997). This represents a significant further decline, following a drop in the African population fertility rates, from 6.5 to 4.6 (a 25% decline) between 1960 and 1990. The evidence indicates, however, that teenage fertility remains high (Caldwell & Caldwell, 1993). The projections and scenarios presented in this paper assume that the 1996 census interpretation of fertility decline is correct, although the accuracy of these figures has been questioned. Even if the census has overestimated fertility decline, the *nature* of the socio-demographic impact of AIDS will remain as presented here. However, the *degree* of the impact would be different.

It has been observed that HIV infection may, for physiological reasons, cause a reduction in fertility of up to 55% in HIV-positive women (Gray, Serwadda, Wawer *et al.*, 1997). It has also been suggested that increased condom use as a response to the epidemic will reduce fertility rates. Thus, the epidemic is likely to increase current trends towards reduced fertility rates.

## Demographic implications

The interaction between AIDS, with its implications for mortality, and declining fertility are extremely complex. Unfortunately, few studies have explored this relationship. While many demographers concerned with development issues have addressed the demographic implications of fertility decline, they have generally overlooked AIDS (Simpson, 1994; Tout, 1989; Caldwell & Caldwell, 1993). A few have projected the population structure in an Africa with declining fertility and *then* questioned the impact of AIDS on society. These studies have not, however, dealt with the impact of AIDS on the population structure itself, or dealt with the interaction between AIDS and fertility decline (Adamchak, 1996).

Adamchak (1996: 3) assesses the impact that declining fertility would be likely to have on an Africa without AIDS.

*Regarding the demographic aspects of ageing we know the following about Africa: The older population will double in population size in approximately 17 years starting in the year 2000. High past and current fertility will increase the number of older people as larger, younger cohorts eventually move into the 60 years and over age group. Declining fertility will increase the proportion of older people. Improved health and living conditions decrease mortality and increase life expectancy which will eventually increase the number and proportion of older people. (Authors' emphasis.)*

Unfortunately, AIDS will set back improvements in health and living conditions, will increase mortality and will significantly decrease life expectancy. Indeed, AIDS could lead to increases in overall adult (15-45 years) mortality rates by five to six times. For the average South African aged 18 in 1996, this could reduce life expectancy from 45 years in an AIDS-free scenario to as low as 32 years.

Equally problematic is the fact that few of the demographers who *are* exploring the impact of AIDS have adequately addressed the issue of fertility decline. This is especially true

in South Africa, where information about the extent of fertility decline has been difficult to obtain.

In her analysis of the impact of AIDS on population and growth in Africa, for example, Brown (1996: 8) argued that:

*The group aged 50-64 ... will be 23% smaller than in a non-AIDS scenario, but the difference will have little bearing on the overall age structure of the population and little impact, on the overall dependency ratio.*

Brown's estimates are for Africa as a whole and do not account for significant changes in fertility over time. In South Africa, however, the declining fertility rate will significantly alter the way in which AIDS impacts the population. Indeed, in a non-AIDS scenario with South Africa's declining fertility, the proportion of old people would be expected to increase significantly. Between 2000 and 2025, the population of people over the age of 60 in all of Africa would be expected to increase by more than 145% in the absence of AIDS (Adamchak, 1996).

The implications of declining fertility, however, go far beyond lowering estimates for the total population published by the Central Statistical Service. Lower fertility, coupled with further reductions in fertility caused by HIV infection and AIDS-related mortality, will have significant impacts on the demographic structure of South Africa.

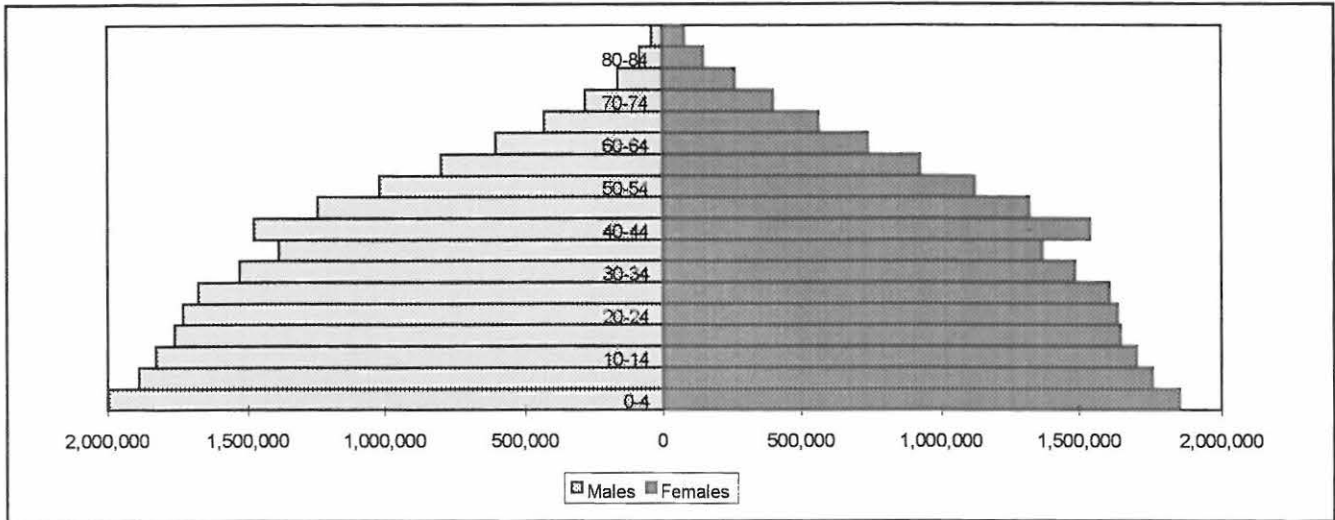
As may be seen in Figure 3, in a non-AIDS scenario, by 2025 the South African population would age significantly, the pyramid becoming increasingly rectangular as the proportion of adults nears the proportion of children. Compare this to the current situation, shown in Figure 4. However, Figure 5 represents the impact of AIDS on the population structure. Significant AIDS-related mortality among women in their twenties and thirties creates a deficit among those groups. The benefits of development and reduced fertility are lost as the proportion of dependent children increases relative to the number of working-age adults.

While AIDS is likely to mitigate the actual growth of the older population, coupled with fertility decline, it is likely to result in a significant change to the demographic structure of the population. In doing so, AIDS can easily change dependency ratios because most AIDS mortality takes place among the economically-active age groups. In an AIDS-free scenario, the overall dependency ratio (the number of children under 15 years and the number of adults over 65 years per 100 working-age adults aged 15-65 years) would be expected to decrease from nearly 63 to 50. The impact of AIDS will be to slow this drop, bringing the ratio to 56 by the year 2025.

Perhaps more significant than the impact on the overall dependency ratio is the distribution of that ratio. The declining fertility rate and increasing infant mortality due to AIDS will reduce the neontic dependency ratio (the number of dependent children per 100 working-age adults) from 55 to 42. The ageing of the population, along with mortality increases in the economically-active age groups, however, will increase the gerontic dependency ratio (the number of dependent older people per 100 working-age adults) from 7 to 13. By 2045 this figure will reach 16. (See Figure 4.)

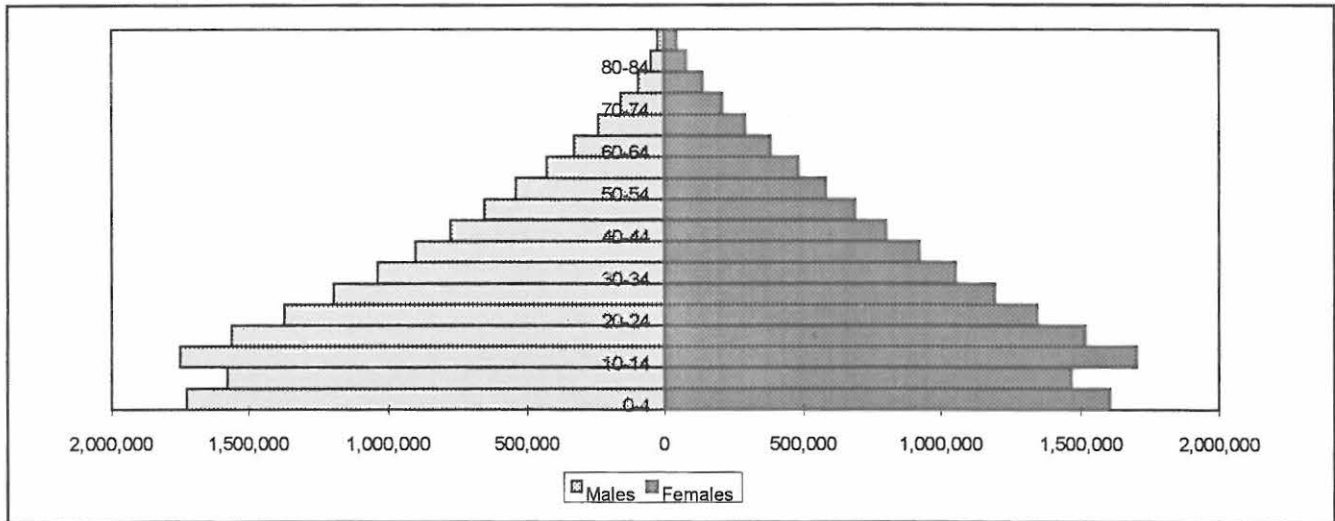
Other ways in which AIDS may impact the population structure of South Africa, though more difficult to predict, include the possibility of increased mortality due to causes other than AIDS. Already in some hospital medical wards in South Africa, 80% of patients are admitted with AIDS-related illnesses. In Zambia, one clinic reports that at least 50% of all consultations involve HIV-related issues (Baggaley, 1997). This burden on the health-care system will in time impact on the availability of adequate care for non-

**Figure 3**  
South African population without AIDS (2025)



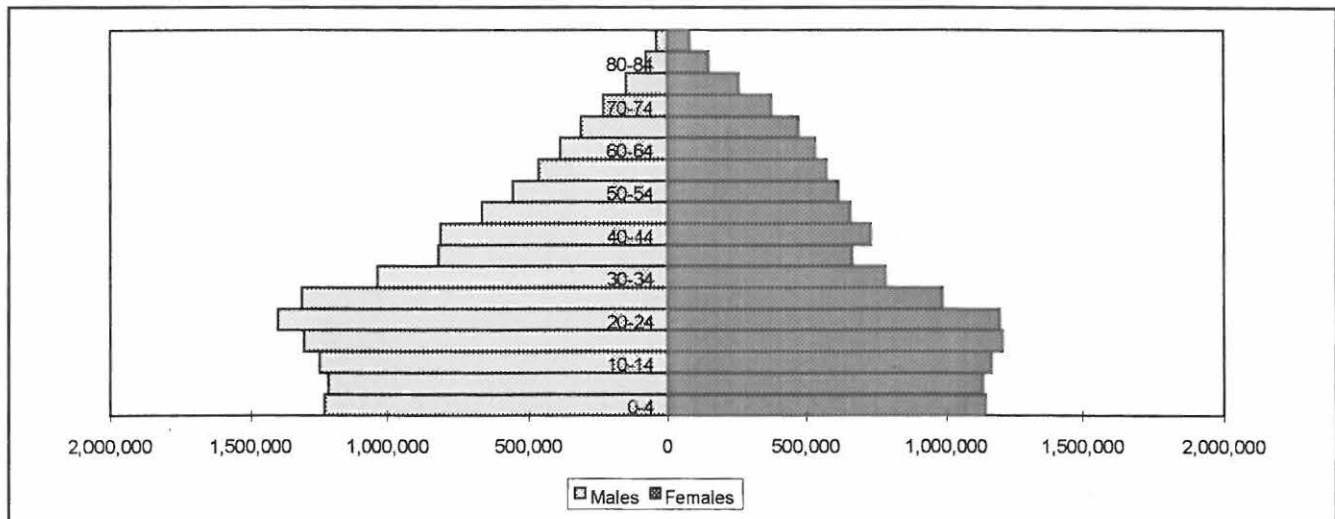
Source: Southern Life AIDS model.

**Figure 4**  
South African population (1997)



Source: Southern Life AIDS model.

**Figure 5**  
South African population with AIDS (2025)



Source: Southern Life AIDS model.

infected people. Moreover, the growth of the AIDS epidemic is closely linked to the growth of the tuberculosis epidemic. Although in South Africa at the peak of the epidemic a significant proportion of TB patients will be HIV positive, the increasing prevalence of TB in the population, and in particular the increase of multiple drug-resistant strains, could increase TB-related mortality among the HIV negative (Glynn, Warndorff, Fine *et al.*, 1997).

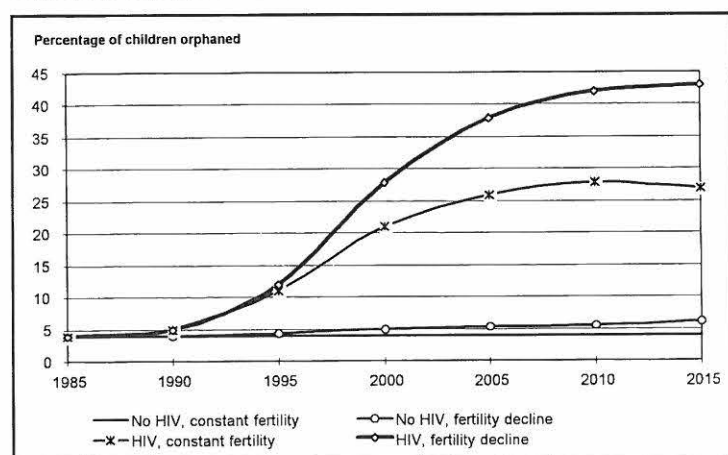
### Orphans

Broad changes in the demographic structure of the population conceal what is, perhaps, one of the most significant impacts of the HIV/AIDS epidemic. Although the neontic dependency ratio may appear to be dropping, an ever-growing proportion of those children will be orphaned by AIDS. It has been projected that in the decade from 1990 to 2000, the number of orphans in Zambia will more than triple (Fylkesnes, Brunborg & Msiska, 1995). Among children aged 15 years and younger, a greater proportion will be aged ten years and over, and thus have a higher cumulative risk of their mother's having died (Gregson, Zhuwau, Anderson & Chandiwana, 1997). The importance of this is staggering. In Uganda, 12% of all children have lost at least one parent (Aspass, 1997). Projections in Zimbabwe suggest that ten years after the epidemic reaches its peak, there will be one orphan for every two economically-active women (Gregson *et al.*, 1997). According to the World Health Organization, by 1995, ten million children had been orphaned by AIDS around the world (Urassa, Ng'weshemi, Isingo *et al.*, 1997). It has been estimated that the combined effects of HIV and reduced fertility could increase maternal orphanhood to over 40% in Zimbabwe (Gregson *et al.*, 1997). (See Figure 6.)

### Impact on household structure

As the AIDS epidemic progresses, there will be an increasing number of children who have lost both parents, and fewer and fewer adults of normal parenting age to care for them. The burden of care will increasingly fall upon the growing proportion of elderly people. Indeed, it has been observed that a maternal grandparent, especially the grandmother, is the most common caretaker of children who have lost even one parent (Urassa *et al.*, 1997). In Zimbabwe, for example, 43% of orphan households are headed by a grandmother (Foster, 1997).

**Figure 6**  
Maternal orphanhood in Zimbabwe



Source: Gregson *et al.*, 1997.

This phenomenon, called "skip-generation parenting," will result in significant changes to the household structure of many families (Foster, 1997). In Uganda, a study of household structures over a six-year period revealed that all forms of extended families have increased, especially extended skipped-generation families, from 6.6 to 9.7% – an increase of 47%. These extended families are most often headed by an older woman (Nakiyingi, Malamba, Kamali *et al.*, 1997).

Adamchak (1996: 7) has pointed out that few studies are available which report on the impact that these changes have had on families.

*The literature, scientific or popular, does not address the dynamics of the older person's plight with AIDS orphans. For example, how do older women support their grandchildren? Are others in the community stepping in to meet family needs? Do these children and their caregivers suffer more frequent and more severe health problems, and greater mortality?*

The plight of orphans and their caretakers is now the subject of an increasing number of studies, some of which are beginning to look at these questions. It has been shown that families that foster children in Kenya are usually below the poverty line (Saoke, Mutemi & Blair, 1996: 51) and in Tanzania that orphan households have more children, are larger and have less favourable dependency ratios (Urassa *et al.*, 1997). This is often because, in addition to the larger number of children, the caretaker in these households is usually elderly. Even within these households, the orphans often suffer.

*The distribution of household resources largely excludes orphans who lose both parents, while at the same time many households rely on the labour of the orphans to generate income. Most of the children in this category reported that they ate less than the rest of the family members or ate in the kitchen after everybody else had finished.* (Saoke, Mutemi & Blair, 1996:45).

Given this information, it is important to note that older people often suffer economically in newly developing countries. Urbanization typically results in the loss of traditional familial support systems and a shift from extended to nuclear family structures. At the same time, developing countries rarely have the resources to establish effective systemic support mechanisms such as welfare and pensions. In the light of older persons' burden of caring for families affected by the epidemic, the growth of the gerontic dependency ratio as a result of AIDS will exacerbate these issues (Adamchak, 1996).

Hand-in-hand with an increase in elderly-headed households is an increase in the number of female-headed households as a result of AIDS. This change will intensify the impact of AIDS, creating even greater poverty. African women's difficulties with traditional inheritance laws, particularly where land tenure is involved, have been well documented (Munalula & Mwenda, 1995). In a situation where an increasing number of women are widowed at a young age, and an increasing number of older women are forced to care for grandchildren and other family members, these problems will further entrench the poverty of many African households.

Even in households where there are no orphans or foster children, there will often be a family member who is sick with AIDS. It is traditionally the role of women to care for the ill and AIDS has not proven to be an exception. It has been estimated that at any given time, 21% of Zambian women are caring for someone

with HIV (Macwan'gi, Sichone & Kamanga, 1994). This responsibility reduces the time that a woman may be formally employed, and the time that she is able to work in the fields, to fetch water and to care for other family members.

It is traditionally the role of women in rural African society to provide agricultural labour. However, the burden of caring for orphans, sick relatives, or herself, if she is HIV positive, will reduce a woman's ability to attend to the farm. This burden has forced some women, especially elderly household heads, to shift from labour-intensive cash crops such as maize to less labour-intensive subsistence crops such as cassava (Foster, 1993). In addition to shifts in agricultural practices, the increasing number of female-headed households will also represent an increase in the number of households dependent on informal-sector activities such as trading, as women are disproportionately represented in these sectors.

It is clear, therefore, that the demographic changes created by AIDS will have a significant impact on the socio-economic position of many African families. It is likely that the epidemic will exacerbate existing trends towards the feminization and gerontification of poverty.

### **Economic impact**

While the true magnitude of the impact of AIDS on the South African economy has yet to be evaluated or quantified, it is certain that the economy will not be able to avoid the costs associated with the epidemic, be they borne by the state, the provinces, employers or individuals.

The majority of employers and organizations in South Africa will not yet have seen significant evidence of HIV and AIDS in their workforce. This is not surprising, given the fact that the epidemic in South Africa is at a relatively early stage. Over the next few years, however, companies will witness increasing numbers of people with HIV/AIDS in their workforce, employees leaving work due to AIDS-associated illnesses, and employees dying of AIDS whilst in service. The impact of these latter deaths and disabilities could be dramatic because they will occur in the younger age ranges where, in the past, the incidence of death and disability has been low. Significant increases in mortality have already been observed in other African countries. For example, in Zambia in one firm, mortality rates of the employed had increased to 48 per thousand by 1993 (Chingambo, 1995). It has been predicted that, on average, crude mortality could increase from 2.5 per thousand to 18.3 per thousand (Baggaley, Godfrey-Fausset & Msiska, 1994).

The impact of AIDS will most likely be felt in terms of loss of skilled labour, high labour turnover and decreased productivity. AIDS could result in a 4% reduction in profits for many South African companies. Already in Kenya it is estimated that one in five companies have experienced AIDS-related costs equivalent to 15% of profits (Saoko *et al.*, 1996). It has generally been accepted that most losses in South Africa will occur among unskilled workers who are easy to replace in an economy with high unemployment. Employers elsewhere in Africa, however, have learned that high staff turnover, even among unskilled workers, can have serious implications for productivity. Decisions will have to be made to move towards more capital-intensive systems (thereby reducing the reliance on workers), or to more labour-intensive systems (thereby reducing the impact of any one lost worker). If the decision is made to move away from capital-intensive production because maintaining the skilled labour required to run machinery and equipment is unfeasible, there could be unfortunate implications for South Africa's ability to compete in the global market.

It has been estimated that the GDP of some African countries could be reduced by 14 to 25% by the year 2010 as a result of AIDS (Cuddington, 1993). If South Africa experiences a reduction similar to that of other countries in Africa, the impact of AIDS could reduce growth in GDP to about 2.25%. Other effects on the economy could be a relative loss of business confidence and a resulting possible reduction in foreign investment. A restructuring of the South African economy is needed to overcome structural weaknesses currently limiting the maximum sustainable growth rate to 3-3.5% (e.g. a lack of international competitiveness, an historical misallocation of resources). Through its negative impact on growth, the AIDS epidemic may be expected to exacerbate structural weaknesses in our economy and to put at risk the long-term sustainability of development initiatives adopted by government.

One of the most important initiatives of the government is the restructuring of the health system to provide health care to all people. The impact that AIDS will have on government finances through the reduction in economic growth and the direct impact that the epidemic will have on health expenditures will make this goal extremely difficult to reach. It is entirely likely that the health needs of the elderly will be among the most severely affected by this burden.

The social welfare initiatives of the government will also be affected. The pressure on finances, coupled with demographic changes caused by high mortality among the working population, will make funding systemic support systems such as pensions far more difficult. Survival on South Africa's social old-age pension of R470 a month in 1997 is already extremely difficult. Economic pressures will make it difficult to increase the pension in line with the rate of inflation, or in line with the increasing financial burdens experienced by pensioners who must care for sick adult children and orphaned grandchildren.

Public-sector support systems will not be affected alone. Companies which have offered group life insurance, benefits on death in service, or ill-health retirement to their members are likely to face a notable increase in the number of death claims submitted to their group life scheme. The increased costs resulting from AIDS could have a serious impact on the sustainability of these employee benefits. Already, dramatic increases in the cost of providing group risk benefits such as group life and disability insurance have been seen in countries to the north of South Africa. In Zimbabwe, 75% of death and disability claims are AIDS-related, translating to a four-times increase in the cost of providing these benefits. Similarly, in Malawi the cost of providing group life cover increased five times between 1987 and 1995.

Companies in South Africa will have to consider increasing the employee contribution to such schemes, or reducing the level of benefit. Fewer companies will be able to offer such benefits and fewer people will be able to afford the contributions, or the level of benefit will be decreased.

In the absence of AIDS, medical aid claims of older members are usually cross-subsidized by younger members. When there are numerous AIDS cases, while older members will continue to be cross-subsidized in terms of their normal claims, they are cross-subsidizing the AIDS claims of the younger members. This raises questions of equity and fairness, particularly in schemes that have been in existence for some time, and older members with longer durations of membership have had, in the past, to cross-subsidize the claims of previous older members. For some, especially older members and pensioners, the overall shift upwards in the contribution rate will make benefits, including medical aid, unaffordable.

Older workers, who have traditionally relied on such employee benefits to support them or their families after their death or disability, will now have to turn to their own savings for these needs. The result will be increasing levels of poverty among older people, and especially among the growing proportion of older women who must shoulder the social and financial burdens imposed by AIDS.

The United Nations Development Programme uses the Human Development Indicator (constructed from life expectancy at birth, adult literacy rate, mean years of schooling and per capita income) to assess the impact that AIDS has had on several other African countries. It has been estimated that HIV/AIDS has set back development by as much as ten years in Zambia, eight years in Tanzania and seven years in Rwanda. Kenya, Malawi, Uganda and Zimbabwe lost between three and five years in the same period. It is entirely likely that South Africa will follow a similar path.

## Conclusion

Through its impact on individual lives, family structures, business profitability and government spending, AIDS has the potential to set South African development back by nearly a decade. If the burden of illness and death falls mainly on people of working age, the burden of carrying on supporting sick adults and children will fall on the elderly. These fundamental impacts on the roles of older people in South African society must be considered as we plan the social and economic future of the country.

South Africa is in the fortunate position of having a relatively sophisticated economy with many resources and the experience of other African countries from which to learn. If the lessons of countries such as Uganda, Kenya, Zambia and Zimbabwe are heeded, South Africa may yet prepare itself for the effects of this epidemic.

## Note

1. The Southern Life AIDS model, upon which all projections in the paper are based, is calibrated to the Actuarial Society of South Africa AIDS model. The model projects the ante-natal prevalence of AIDS up to and including the 1996 Department of National Health ante-natal survey results (published in 1997). A median term of AIDS infection to death of ten years is assumed.

## References

- Adamchak, D.J. 1996. Population ageing: gender, family support and the economic condition of older Africans. *Southern African Journal of Gerontology*, 5(2): 3-8.
- Aspass, H.R. 1997. AIDS and orphans in Uganda: a geographical and gender interpretation of household resources. Unpublished. The Socio-Demographic Impact of AIDS in Africa Conference, Durban, February 3-6.
- Baggaley, R. 1997. Personal communication. Milbank Clinic, Lusaka, June 4.
- Baggaley, R., Godfrey-Fausset, P. & Msiska, R. 1994. Impact of HIV infection on Zambian businesses. *British Medical Journal*, 309: 1549-50.
- Brown, L.R. 1996. *The potential impact of AIDS on population and economic growth rates*. Washington, DC: International Food Policy Research Institute.
- Caldwell, J.C. & Caldwell, P. 1993. The South African fertility decline. *Population and Development Review*, 19(2): 225-262.
- Central Statistical Service. 1997. *Preliminary estimates of the size of the population of South Africa*. Pretoria: Central Statistical Service.
- Chingámbo, L.J. 1995. The impact of HIV/AIDS on various sectors. In: Chingámbo, L.J., Mwanza, K., Kalyalya, D.H., Phiri, M.F. & Kunkhuli, S.W.M. *The socio-economic impact of HIV/AIDS on selected sectors and industries in Zambia*. Lusaka: Swedish International Development Agency, World Health Organisation, and Ministry of Health of the Republic of Zambia, pp. 8-42.
- Cuddington, J.T. 1993. Modelling the macroeconomic impact of AIDS in Tanzania. *World Bank Economic Review*, 7(2): 173-189.
- Foster, S. 1993. *Cost and burden of AIDS on the Zambian health care system*. London: School of Hygiene and Tropical Medicine.
- Foster, G. 1997. Children rearing children: a study of child-headed households. Unpublished. The Socio-Demographic Impact of AIDS in Africa Conference, Durban, February 3-6.
- Fylkesnes, K., Brunborg, H. & Msiska, R. 1995. Zambia update: The HIV/AIDS situation – and future demographic impact. Unpublished. Lusaka: Epidemiology and Research Unit, Zambia National AIDS/STD/TB and Leprosy Programme.
- Glynn, J.R., Warndorff, D.K., Fine, P.E.M., Msiska, G.K. & Pönningshaus, J.M. 1997. Interactions between HIV and tuberculosis in a rural area of Malawi. Unpublished. The Socio-Demographic Impact of AIDS in Africa Conference, Durban, February 3-6.
- Gray, R., Serwadda, D., Wawer, M., Sewankambo, N. et al. 1997. Reduced fertility in women with HIV infection: a population based study in Uganda. Unpublished. The Socio-Demographic Impact of AIDS in Africa Conference, Durban, February 3-6.
- Gregson, S., Zhuwau, T., Anderson, R.M. & Chandiwana, S.K. 1997. HIV-1 fertility change in rural Zimbabwe. Unpublished. The Socio-Demographic Impact of AIDS in Africa Conference, Durban, February 3-6.
- Macwan'gi, M., Sichone, M. & Kamanga, P.N. 1994. *Women and AIDS in Zambia*. Lusaka: Ministry of Health, National AIDS Prevention and Control Programme.
- Munalula, M.M. & Mwenda, W.S. 1995. Case study: women and inheritance law in Zambia. In: Hay, J. & Stichter, S. (Eds) *African women south of the Sahara*. Harlow: Longman, pp. 93-100.
- Nakiyingi, J.S., Malamba, S.S., Kamali, A., Carpenter, L.M., Nunn, A.J. & Whitworth, J.A.G. 1997. Household composition and the HIV-1 epidemic in a rural Ugandan population. Unpublished. The Socio-Demographic Impact of AIDS in Africa Conference, Durban, February 3-6.
- Saoko, P., Mutemi, R. & Blair, C. 1996. Another song begins: children orphaned by AIDS. In: Forsythe, S. & Rau, B. (Eds) *AIDS in Kenya: socioeconomic impact and policy implications*. New York: US Agency for International Development, AIDSCAP, Family Health International, pp. 45-64.
- Simpson, E.S. 1994. *The developing world*. Essex: Longman.
- South Africa (Republic). Department of National Health. 1997. *Summary of the seventh national HIV survey of women attending ante-natal clinics of the public health service in South Africa, October/November 1996*. Pretoria: Department of Health.
- Tout, K. 1989. *Ageing in developing countries*. New York: Oxford University Press.
- Urassa, M., Ng'weshemi, J.Z.L., Isingo, R., Kumogola, Y. & Boerma, J.T. 1997. Orphanhood, child fostering and the AIDS epidemic in rural Tanzania. Unpublished. The Socio-Demographic Impact of AIDS in Africa Conference, Durban, February 3-6.