

Theme 1 ADF Document: HIV/AIDS and Economic Development in Sub-Saharan Africa

Abstract

This paper discusses the economic impact of HIV/AIDS. It begins by evaluating the strengths and limitations of existing methodologies for measuring the impact of disease burdens generally and of HIV/AIDS in particular. It then traces the overall macroeconomic impact of the disease, followed by an in-depth analysis of its impact on households for both current and future generations, as well as other effects on the economy. Finally, it looks at costs to future generations and concludes with an analysis of the economics of prevention and treatment.

1. INTRODUCTION

The Global Epidemic

It is a tragic irony that almost three decades after the Alma-Ata Declaration elevated health to the status a basic and fundamental human right and explicitly recognized its relationship with economic development, we are witnessing, at the threshold of a new millennium, what may amount to the biggest health and development challenge the world has ever confronted- a disease which UNAIDS correctly notes, is unique in its devastating impact on the social, economic and demographic foundations of development. It is hard to believe that a disease, that was all but unknown barely two decades ago, has - to date - caused the death of 18.8 million people globally, among them 13.7 million from Africa alone. (UNAIDS 1999a).

The number of people infected with HIV in the world already reached an estimated 34 million with about 95 percent living in the developing world and a staggering 70 percent in Sub-Saharan Africa alone. What is more, the rate at which the epidemic is spreading is alarming. In 1999 alone, an estimated 5.4 million people were infected, a number which, when netted off against the estimated number of deaths (2.6 million), still increases the number of people infected worldwide by 2.6 million (UNAIDS 1999a: 3)

Table 1.1 Global Summary of HIV/AIDS Epidemic (December 1999)

<u>People newly infected with HIV in 1999</u>	<u>Total</u>	5.4 million
	Adults	4.7 million
	Women	2.3 million
	Children < 15 years	620,000
<u>Number of people living with HIV/AIDS</u>	<u>Total</u>	34.3 million
	Adults	33.0 million
	Women	15.7 million
	Children < 15 years	1.3 million

<u>AIDS deaths in 1999</u>	<u>Total</u>	2.8 million
	Adults	2.3 million
	Women	1.2 million
	Children < 15 years	500,000
Total number of AIDS deaths since the beginning of the epidemic	<u>Total</u>	18.8 million
	Adults	15.0 million
	Women	7.7 million
	Children < 15 years	3.8 million
<u>Total number of AIDS orphans since the beginning of the epidemic</u>		13.2 million

Source: UNAIDS 2000. Global Summary of the HIV/AIDS Epidemic, end 1999.

The disease has taken on different forms in different parts of the world. In some populations, the epidemic is equally prevalent among men and women, in others, certain vulnerable groups have been disproportionately affected (Anarfi et al. 1997; Orubuloye et al. 1993); in many cases the situation is dynamic and the disease has moved between different sub-populations evolving with time (Essex 1998: 427). Explanations for these distinct patterns are to be found in diverse factors including biology, behavior, gender, geography, culture, poverty, mobility and the interplay between (Moses et al. 1994; J. Oppong 1998).

HIV/AIDS in Africa

The African continent has the highest incidence of HIV/AIDS in the world today with some 23.3 million people infected. While the Global HIV/AIDS prevalence rate is 1.07%, the sub-Saharan African average is 8.57% (UNAIDS 2000:124). Across the continent, regional differences in HIV/AIDS prevalence are considerable, however no country has escaped the virus.

The countries with the highest prevalence rates are in the east, southern and central parts. The very worst affected countries on the Continent – indeed in the world – are in Southern Africa; Botswana has an infection rate of 35.80% and Zimbabwe 25.06% (UNAIDS 2000b; 2000c). In West Africa infection rates are climbing rapidly. Significant differences in rates of infection also exist *within* countries (J. Oppong 1998:437) among different sectors of the population, living in different parts of the country. National prevalence rates therefore, while capturing the overall infection rate of a country, often mask enormous internal differences.

Table 1.2 The African HIV/AIDS Epidemic by country and region

Region / Country	Adult Rate (%)	Orphans Cumulative	Deaths 1999	Total Population
WESTERN AFRICA				
Benin	2.45	22,000	5,600	5,945,000
Burkina Faso	6.44	320,000	43,000	11,633,000

Cote d'Ivoire	10.76	420,000	72,000	14,534,000
Gambia	1.95	9,600	1,400	1,266,000
Ghana	3.60	17,000	33,000	19,699,000
Guinea	1.54	30,000	5,600	7,375,000
Guinea-Bissau	2.50	6,100	1,300	1,188,000
Liberia	2.80	31,000	4,500	2,941,000
Mali	2.03	45,000	9,900	10,976,000
Mauritania	0.52	---	610	2,602,000
Niger	1.35	31,000	6,500	10,414,000
Nigeria	5.06	1,400,000	250,000	108,995,000
Reunion	---	---	---	690,000
Senegal	1.77	42,000	7,800	9,251,000
Sierra Leone	2.99	56,000	8,200	4,721,000
Togo	5.98	95,000	14,000	4,515,000
CENTRAL AFRICA				
Burundi	11.32	230,000	339,000	6,587,000
Cameroon	7.73	270,000	52,000	14,704,000
Central African Republic	13.84	99,000	23,000	3,550,000
Chad	2.69	68,000	10,000	7,462,000
Congo	6.43	53,000	8,600	2,867
Congo (DRC)	5.07	680,000	95,000	50,407,000
Equatorial Guinea	0.51	860	120	442,000
Gabon	4.16	8,600	2,000	1,196,000
Rwanda	11.21	270,000	40,000	7,238,000
EAST AFRICA				

Comoros	0.12	---	---	676,000
Eritrea	2.87	---	---	3,717,000
Ethiopia	10.63	1,200,000	280,000	61,123,000
Kenya	13.95	730,000	180,000	29,507
Madagascar	0.15	2,600	870	15,502,000
Mauritius	0.08	---	---	1,149,000
Somalia	---	---	---	9,718,000
Uganda	8.30	1,700,000	110,000	21,209,000
Tanzania	8.09	1,100,000	140,000	32,799,000
SOUTHERN AFRICA				
Angola	2.78	98,000	15,000	12,497
Botswana	35.80	66,000	24,000	1,592,000
Lesotho	23.57	35,000	16,000	2,108,000
Malawi	15.96	390,000	70,000	10,674,000
Mozambique	13.22	310,000	98,000	19,222,000
Namibia	19.54	67,000	18,000	1,689,000
South Africa	19.94	420,000	250,000	39,796,000
Swaziland	25.25	12,000	7,100	981,000
Zambia	19.95	650,000	99,000	8,974,000
Zimbabwe	25.06	900,000	160,000	11,509,000

The main modes of transmission - for adults living with HIV/AIDS – and the behaviors associated with infection - differ considerably across the globe. In Africa, transmission is overwhelmingly heterosexual and vertical transmission is also significant .

Differences in the underlying biology of the virus partially explain geographic disparities in prevalence both globally and within Africa. 'The recognized differences in transmission and virulence of HIV-2, compared with HIV-1, indicate that HIV viruses can have different pathogenic potentials' (Kanki et al. 1999: 68). HIV-2 sub-types 'are less virulent and less transmissible in humans' (Essex 1998:427). In Africa – home to the worst of the epidemic – all ten HIV-1 subtypes have been reported and it has been established that within one population

'HIV-1 subtypes may themselves differ 'in their progression time to AIDS' (Kanki et al. 1999:68). HIV –1B, the strain of the virus that caused the epidemic in North America and Europe is all but absent in sub-Saharan Africa (Essex 1998:427).

Another critical biological factor is that the existence of sexually transmitted diseases (STD's) augments the risk of acquiring HIV/AIDS (UNAIDS 1999c) . According to some estimates there is a four-fold increase; other estimates put the increased risk as high as 20-fold (Sai 1999:9; UNAIDS 1998b). In poorer African countries, with inadequate access to health care, STDs often go untreated.

Estimating the Economic Impact: Potential and limits

In order to fully appreciate the enormity of the crisis unleashed by the HIV/AIDS epidemic in Africa, as elsewhere, it is necessary not only to understand the epidemiology of the disease but to also understand its impact on economic development.

Classical economic theory sees health as the more or less benign product of the development process: wealth leads to improved health. Although this is supported by an apparent correlation between GDP and life expectancy, there is an abundance of evidence suggesting that this relationship is by no means a mechanical one, and that improved health does not always come with high income growth. More recent research has however begun to establish that countries with healthy populations tend to grow faster (particularly in a good policy environment) and that this apparent correlation between health and wealth operates through a number of channels including the effects of improved health on demography, education, the labor market, and investment.

Wealth and health then are intricately and unquestionably related (Hamoudi and Sachs,1999).). Although the nature of this relationship is as yet not quite fully understood, we know that it is a dialectical one and that depending on the overall policy environment , it can either produce a "virtuous circle" in which improved health promotes economic growth , or a "vicious circle" in which poor health and poverty become mutually reinforcing. (Hamoudi and Sachs) and (Bloom et al. 2000a). The G-8, at their Okinawa Summit in June this year, captured this sentiment completely when they declared:

Health is key to prosperity. Good health contributes directly to economic growth Whilst poor health drives poverty.

In terms of methodology, these recent studies have either used macroeconomic growth modeling to establish the relationship between health and economic growth, or have done so by examining the historical record directly. Thus studies by Gallup and Sachs (2000) and others have, by using cross-country measures of malaria prevalence to explain cross-country growth, shown that high malaria prevalence is correlated with low rates of economic growth.

With particular reference to HIV/AIDS, it is fair to say the initial orientation of academic and policy research was to see the epidemic as a public health problem, not a development one as such. However, there is now general agreement that the relationship between HIV and economic development is, like the relationship between health and wealth generally, a dialectical one: HIV has a trenchant effect on the economy and the economy in turn affects the level and distribution of HIV. There is now a growing body of studies, but by no means a torrent of them, showing the working of this complex relationship mostly in high seroprevalence countries in Africa.

A number of studies, notably, Cuddington (1991) on Tanzania, Kambou, Devarajan and Over (1991) on Cameroon and a third by Myers et al (1991) on Thailand have shown that the economic costs of HIV are colossal. They come in the form of reduced growth, declines in savings and investment rates, and huge health care costs. These and other studies that have come in their wake, have been extremely valuable in improving our appreciation of the threat posed by the epidemic. Even so it is important to acknowledge the limitations in the techniques and methods employed in these studies and the caveats with which their conclusions must be taken.

As Cohen points out, the estimation of the long-term effects of HIV depends in turn on our ability to predict the likely course of the disease. Yet we do not know enough about the epidemiology of the disease to be able to do so with absolute certainty. Nor is the estimation of the effect of HIV on the domestic savings rate and on labor productivity any easier. Indeed, even the widely used measure of disease burdens- the disability-adjusted life years (DALYs) and its various refinements, do not capture the full economic costs of disease especially as they fail to take account of the effects of a disease burden on future generations and even the full measure of indirect costs of today's generation. (Sachs, 2000)

These caveats are not at all meant to suggest that there is less cause for alarm. On the contrary, the real likelihood is that the full economic costs of HIV to economic development in Africa (and elsewhere) are probably underestimated. The caveats are sounded here as a reminder that we don't know everything; that we cannot credit these estimates with the exactitude of microscopes and chemical reagents. At the same time, they are meant to serve as a reminder that there can be no fatalism of inevitability to these estimations of the economic costs of HIV on economic development. The economic impact which they quantify, are potential consequences and effects that can be averted by conscious policy action.

General Macroeconomic Effects

The extraordinary impact of HIV/AIDS on development is attributable to its ability to undermine three main determinants of economic growth, namely physical, human and social capital. (Bonnel 2000) Current estimates suggest that HIV/AIDS has reduced the rate of growth of Africa's per capita income by 0.7 percentage points a year and that for those African countries affected by malaria, growth was further lowered by 0.3 percentage points per year (Bonnel 2000:1). Clearly then, not only is HIV/AIDS having a detrimental effect on the growth of African economies it is reversing the modest gains made in recent times (Over 1992). The effects on growth - at the macro-economic level - are gradual and drawn out over time, partly due to the long incubation period of the virus (Bonnel 2000: Annex 5 : 3).

Broadly speaking we know that poverty, income inequality, labor migration, gender inequality, low levels of education, and a range of context-specific socio-cultural variables and initial health conditions facilitate the spread of HIV/AIDS and are associated with higher prevalence rates (Bonnel 2000)

There is econometric evidence that macroeconomic outcomes are adversely affected by HIV/AIDS (Bonnel 2000:7; Over 1992). The epidemic affects the quality of regulation and the effectiveness of governments as well as a broad range of institutions. The relations between HIV/AIDS and economic development are complicated, for while the disease 'reduces economic growth, economic growth can increase or decrease the spread of the HIV epidemic'. The disease can increase when economic development is associated with inter and intra-national labor migration and investment in large projects (which amplifies local inequalities); and HIV/AIDS can be slowed down if increases in education and employment – particularly female – occur, accompanied by infrastructural developments which facilitate access to health care and safe water (Bonnel 2000:15-16).

HIV/AIDS impacts *physical capital*. The accumulation of physical capital is a function of the savings rate of the economy. It will tend to reduce household saving both in absolute terms and also as a percentage of household income. Moreover, households will likely tend to invest less towards retirement as the expectation of a lower life span takes hold. HIV/AIDS will also impact physical by lowering the volume and uses of domestic savings of governments (Cohen 1992: 4). Budgets are affected by increases in costs associated with treating and caring for AIDS related diseases. Other expenditures, such as pension payments, increase as civil servants are forced to take early retirement. The training of newly hired teachers and health professionals – to replace those lost to the disease - also affects national budgets. Thus, fiscal deficits would tend to worsen generally, as few countries will be able to offset the fiscal cost of the HIV/AIDS epidemic by cutting other expenditures or raising taxes' (Bonnel Annex 5 2000:3). In sum reductions in household and government savings lead to 'less investment, less

productive employment, lower incomes and a slower rate of GNP growth, and possibly a lower level of GNP' (Cohen 1992: 4; Over 1992) leading to reduced long-term economic growth.

HIV/AIDS also has an impact on human capital accumulation. As previously noted, HIV/AIDS affects the most economically active age-groups, thereby reducing both the quantity and quality of available labor (Cohen 1992:16; Seghal 1999: 6). Entire generations of teachers, health workers, civil servants and other skilled and professional people are being lost. Shorter life expectancies are raising the costs of schooling and training, thereby reducing the short-term returns (Bonnel, 2000) Since a significant amount of human capital accumulation takes place within the household, the death or sickness of a parent, particularly a mother, can have a disruptive impact on the inter-generational transmission of knowledge. Moreover, children may be forced to leave school to help replace lost income or production caused by the loss of a parent, as family finances come under increasing strain. Thus the *human capital* of African nations is being eroded and incentives to invest in the education training of replacement labor are being reduced (Bonnel 2000, Annex 5: 4).

HIV/AIDS affects not only a country's physical and human capital, but its social capital as well. The epidemic is eroding social networks and traditional support mechanisms as well as challenging the efficacy of legal and regulatory institutions to respond. The quality of countless lives is being eroded and a generation of children are growing up without the emotional and financial support of their parents (Bonnel 2000: 5).

Although the foregoing assessment of the macroeconomic impact of HIV/AIDS provides a useful summary view of the economic impact of the epidemic. It is perhaps more useful to trace and further explore its impact through some of the context-specific and sectoral transmission modes through which the macroeconomic effects are shaped.

Impact on households

The cost of treatment and lost productivity

It is inadvisable to draw quick general patterns about the socio-impact of the disease in every location. However, there can be no doubt that the most immediate impacts of HIV/AIDS are felt at the individual and household level (Seghal 1999; Over, 1998; Bolinger et al, 1998)

Perhaps the most direct cost to households of HIV/AIDS and the one that is usually measured by cost of illness studies is the cost of treatment and the cost of work time that is lost. There is a wealth of literature on the subject which predictably cite costs including increased expenditures lost income and reallocation of responsibilities within the household. Death brings further expenditures and the death of a mother often increases the probability of the death of her children. On the direct costs themselves, some studies estimate for instance that the cost of treatment and foregone productivity in Tanzania from a single HIV infection is about \$2462-\$5316 in 1985 dollars. High as these costs obviously are, the reality is that there are substantial additional secondary costs. (Sachs, 2000). When note is taken of the fact that most of the countries where the burden of the disease is particularly high are at the same time those with low incomes and a record of slow growth, it becomes clear that the most devastating impact of HIV/AIDS on an afflicted household is to drive it into poverty. The aids affliction itself becomes the cause of household poverty or the further exacerbation of poverty as households are driven into crippling levels of indebtedness and assets are depleted to pay for health care and other basic needs. According to the World Bank, a study of households and people that have become poorer over time showed that illness injury or death was the single most important cause.

An assessment of costs to the family will not be complete without mention of how the disease impacts on the most vulnerable groups within the household, namely widows and orphans

Widows

An analysis of the impacts of the epidemic on young widows, in three districts in Uganda, found that the epidemic contributes to: an increase in female headed households; the feminization of poverty; 'crippling anxiety' over their sero-status and the infection of extended family members by the inherited widow (Topouzis et al. 1994). The profiles and case studies of individual women, clearly highlight the cumulative impacts of the disease and the vicious cycle of poverty that unfolds after the death of a husband in rural Africa.

Orphans

The impact of the disease on individual children depends on a variety of factors, such as their sex and age, the socio-economic status of their families, the number and age of their siblings etc. (Topouzis et al. 1994, Section 2:12). The care of these children often falls on the extended family – over-stretching their limited and declining resources. In many other scenarios, such as the one described by Ayieko in parts of Kenya, children have no caregivers in their households and 'manage their own household activities without the supervision of an adult' (Ayieko 1997: 11). Many children are therefore heading households and are: more likely to be out-of-school, malnourished, less likely to receive health care, and are usually extremely poor. Many end up on the streets where they may be abused and sexually exploited, vulnerable to contracting HIV/AIDS (Ayieko 1997; World Bank 1999:14; UNAIDS 2000:26).

A study of children in three Ugandan districts found that orphaned children generally face the following situations, they may: be uprooted from towns and sent back to the village; run away from home to escape the stigma and poverty; taken out of school and sent to work; or sent to live with relatives or neighbors (Topouzis et al 1994). The impacts of the epidemic on the young people of Africa are clearly devastating. Opportunities for education and prospects of future income are being constrained and poverty – at individual, household and national levels - is on the increase (Bonnel 2000:15).

OTHER ECONOMY-WIDE EFFECTS

HIV/AIDS affects all sectors of the economy (Ainsworth & Over 1994) and the costs that are incurred as a consequence of the disease are not just financial in nature but fundamentally social and psychological (Cohen 1992;). There is no conceivable way of measuring *all* these costs, however it is possible to explore the ways in which the disease affects different economic sectors. In all sectors HIV increases the rates of absenteeism, reduces productivity, imposes additional costs in training and hiring new recruits and increases spending on health care, retirement and death benefits (UNAIDS 2000; Bollinger et al.1999).

Governments as employers and as the custodians of national economies are faced with the mounting and mammoth task of responding to the epidemic, their employees in the civil service, the health sector and education – as we shall see – are being affected, the very same people needed to advance national economic development.

Health Care

Health care systems – on the front-line in coping with the AIDS crisis – are overburdened by the epidemic and the services that African countries can provide are woefully inadequate (UNAIDS 2000; World Bank 1999). For not only is Africa the worst HIV/AIDS affected region, it is also the world's poorest region with the lowest access to and quality of health care . Health care systems are having to deal with increasing numbers of patients with AIDS-related illnesses such as tuberculosis and spending on HIV/AIDS is diverting scarce resources from other major health concerns (UNAIDS 2000: 30; Over 1998). Governments are having to make some harsh choices and are facing trade-offs between: treating AIDS versus preventing new infection; treating AIDS versus treating other illnesses; and spending for health versus spending on other sectors (Bollinger et al. 1999:6).

'In Cote d'Ivoire, Zambia and Zimbabwe, HIV-infected patients occupy 50 to 80 percent of all beds in urban hospitals' and 70% of beds in the Prince Regent Hospital in Bujumbura, Burundi (World Bank 1999: 15; UNAIDS

2000: 29). Not only are beds filling up with AIDS patients but sickness and death is also high among health personnel in some African countries and their skills are hard – sometimes impossible - to replace. A study in the Zambia showed that in one hospital, 'deaths in health care workers increased 13-fold over the 10 year period from 1980 to 1990, largely because of HIV' (UNAIDS 2000: 20).

Education

The education sector, in the hardest hit countries, has been devastated. HIV-related illness takes its toll in a number of ways and teachers, administrators and pupils alike are affected. 'Skilled teachers are a precious commodity in all countries' but in many African countries they are leaving schools and dying at an unprecedented and shocking rate (UNAIDS 2000: 27). The Central African Republic has a third fewer primary school teachers than it needs yet between 1996 and 1998 almost as many teachers died as retired; 85% of them were HIV positive and died on average ten years before the minimum retirement age of 52 (UNAIDS 2000:27). In Zambia, during the first ten months of 1998, 1,300 teachers (equivalent to two-thirds of all new teachers trained annually) were lost to AIDS. The quality of education is undoubtedly affected as class sizes are on the increase and there is evidence that urban-rural disparities in educational access are growing; the psychological damage inflicted is unimaginable.

Sick and dying care-givers take their wards out of school for economic and social reasons (World Bank 1999:15; UNAIDS 2000: 28; Bonnel 2000; Cohen 1999: 6; Over 1998). Girls are more likely to be removed than boys, resulting in: lower female education; more-out-of school youth (who are harder to reach with effective AIDS-prevention programs) putting the health and lives of these same children at risk. In a study of commercial farms in Zimbabwe, where deaths of most farm-workers were attributable to AIDS, '48% of the orphans of primary-age who were interviewed had dropped out of school, usually at the time of their parent's illness or death, and not one orphan of secondary-school age was still in school' (UNAIDS 2000:28). The direct and indirect costs of AIDS on the education sector are immense; both the quantity and quality of services, skills and personnel are being eroded at a time when they are vital.

Agriculture

'Agriculture is the largest sector in most African economies, accounting for a large portion of production and employing the majority of workers' and earnings from agricultural exports pay for essential raw materials and imports necessary for development (World Bank 1999: 16; Whiteside et al.2000: 3). Recognition of the impact of the HIV/AIDS epidemic on African agriculture is growing as is the fact that the costs of the epidemic are 'largely borne by rural communities' (Topouzis 1998: 7). The epidemic affects farm households by depleting both the 'human capital base' - 'through reducing the availability of labor skills and time, and the capital available through remittances or savings, which may disappear or be diverted to cover costs related to sickness and death' (Guerny 2000; UNAIDS 2000; Bollinger et al. 1999; Egal et al. 1999). The resulting impacts invariably affect both agricultural production and food security.

AIDS impacts agricultural production by reducing the area of land under cultivation. If less farm labor is available then more remote fields may be left to fallow and those under cultivation may receive less timely attention for tillage, planting and weeding, resulting in declining yields (UNAIDS 2000; Guerny 2000; Topouzis 1998; Over 1998). Crop varieties are declining and changes in cropping patterns are occurring. Cash crops are abandoned in favor of less labor-intensive subsistence crops (Guerny 2000; UNAIDS 2000; Topouzis 1998). Livestock production is also affected as animals are sold to generate cash or are sacrificed. Surviving households bear the added weight of feeding surviving children and women in particular are faced with the greatest burdens.

Thus the quality and quantity of food is rapidly declining in the hardest hit countries resulting in malnutrition and a reduction in food security. At the macro-economic level changes in the supply and quality of farm labor as well as changes in the supply and demand for agricultural produce, entailed by the epidemic, will alter the relative prices of commodities on local and international markets as well as interest rates and wages (Cohen 1992: 10).

Business

HIV/AIDS impacts the business sector by 'increasing expenditures and reducing revenues' (World Bank 1999:16). Many industries are facing up to increased levels of absenteeism and are having to recruit replacement labor as their staff fall sick and die; in turn incurring costs in recruitment, training, health-care, medical insurance, sickness and burial payments (Seghal 1999; Cohen 1992: 5; Bloom 1999a; Bloom 1999b). In a recent survey of businesses in thirty African countries, 'time lost to AIDS related sickness' followed by 'healthcare costs' were ranked as the two main impacts of the epidemic on their workforce and business operations (Bloom et al 2000b).

A specific example of the impacts of the epidemic is provided by the case of a sugar estate in Kenya which calculated the cost of the epidemic as follows:- 'absenteeism (8000 days of labor lost due to sickness between 1995 and 1997 alone), lower productivity (a 50% drop in the ratio of processes sugar recovered from raw cane between 1993 and 1997) and higher overtime costs for workers obliged to work longer hours to fill in for sick colleagues' (UNAIDS 2000:31).

Ultimately, resources available to firms – savings - for financing 'capital expenditure' and for expanding will be reduced; the very viability of many firms on the continent is in question. Not only are labor supplies changing, but demands for certain products are likely to be affected as consumers re-prioritize and allocate more of their income to health expenditure (Cohen 1992: 11).

Some sectors are clearly more vulnerable than others to the vicissitudes of the epidemic. Labor intensive industries (for example transport) and those requiring migrant labor (such as mining) are the worst affected as well as sectors employing highly skilled labor since their employees are harder to train and recruit and are fewer in number. For example, Malawi is suffering from losses of skilled water engineers who are very difficult to replace (Topouzis 1998: 25). In these circumstances, the design, construction and maintenance of dams, roads, schools, public health centers, irrigation systems, power stations etc. will be affected given the losses in skilled human resources. Indeed, it has been suggested that a high disease burden – say from malaria or HIV/AIDS- may have adverse indirect effects the rate of technological advance. This is because technological advance depends very much on the level of education and the skills of the labor force. Indigenous innovation and the adaptation of foreign technologies will also depend on the availability of a core of highly skilled scientists and engineers. In an environment that is heavily impacted by disease and where the level of human capital will, as we have noted, tend to be lower, such skills will typically be absent. Moreover, to the extent that technological advancement comes from the direct investment of high technology foreign firms, the very process of technological diffusion may be affected if such investments are deterred by the prevalence of disease. (Sachs, 2000)

National economies are clearly at greatest risk when their principal foreign exchange earning sectors are affected by the disease, for example there is evidence from Kenya that the government's delay in establishing a national prevention policy was driven by the fear of losing its valuable tourist industry (Cohen 1992: 11).

COSTS POSTPONED

Demographic Impact

Health in general can affect economic performance through its impact on demography. Shorter life expectancy from HIV/AIDS prevalence will tend to inhibit investments in education and human capital accumulation, and where a greater proportion of the population becomes dependent, that is, consumes more resources than it produces, the rates of savings and capital investment and therefore of economic growth will be affected. (Kelly and Schmidt, 1996) HIV/AIDS has a devastating impact on the demographic profile of infected nations and reduces the size of the economically active population 'Projections from the US Census Bureau indicate that by 2003 Botswana, South Africa and Zimbabwe will be experiencing negative population growth' and that several

other countries - including 'Malawi, Swaziland, Namibia and Zambia will see their population remain constant' a situation which until recently was believed to be improbable (Bonnel 2000, Annex 5: 2). While demographic projections vary in predicting the effects of the epidemic on population growth, there is general agreement that there will be a decrease in annual population growth in the region by 2010 (World Bank 1999: 13). In some countries, life expectancy has plummeted and is continuing to do so (Logie 1999). Between 1990 and 1995, out of eighteen Sub-Saharan countries which experienced 'declining' or 'stagnating' life expectancy rates, all but one (Togo) were undergoing a 'generalized' HIV/AIDS epidemic (World Bank 1999). In Botswana - Africa's most economically successful nation in recent years - 'a regional leader in literacy and healthcare' - life expectancy at birth will be cut *in half* over the next 10 to 12 years, from perhaps 65 years down to about 33, entirely as a result of HIV/AIDS (Essex 1999: 1). Hard won gains in development (achieved in recent decades) are fast unraveling.

As we have already noted, HIV/AIDS affects the most productive members of societies, therefore increasing the dependency ratio. More young children and older people – those less economically productive and more in need of care – are being supported by decreasing proportions of economically active adults (Cohen 1992: 2; Bollinger et al. 1999).

Not only is adult mortality increasing - as a result of the epidemic - but infant and child mortality has increased as well. Countries with high adult HIV/AIDS prevalence rates – such as Zambia and Kenya have also experienced a 'steep rise in child mortality' primarily due to vertical transmission (UNAIDS 1999: 22; Wekesa 2000). In fact 'a child born in Zambia or Zimbabwe today is more likely than not to die of AIDS' (World Bank 1999: 5). To date the epidemic has left 13.2 million orphans globally – currently 95% of the world's AIDS orphans live in Africa. In the worst affected countries, such as Zimbabwe, AIDS has orphaned 7% of *all* children under the age of 15 (UNAIDS 2000: 27).

Significantly more women than men are living with HIV infection in sub-Saharan Africa (UNAIDS 1999a: 15). Social, economic and cultural factors as well as biological and economic conditions mean that women are disproportionately affected. The interplay of these factors and the nature and extent of gender inequality clearly differ contextually (C. Oppong 1995; Hamblin & Reid 1991). A key consideration is the difference in age patterns of HIV infection for men and women. Women tend to become infected younger for both biological and cultural reasons and for every 10 African men infected, between twelve and thirteen women are infected (UNAIDS 1999a). In most African societies more men have extramarital partners than women (Caldwell 1993: 818; C. Oppong 1995: 42) and women are generally less informed about the potentially negative consequences of unprotected sex and/or are often unable to negotiate their sexual relations (UNAIDS 1999b).

Women may be forced into transactional sex through economic necessity and a real or perceived lack of market employment opportunities (UNAIDS 1999b). For example, in Ghana, in the early 1980's, the difficult economic situation created a substantial exodus of economic refugees who migrated temporarily into high HIV/AIDS prevalence regions and indulged in high-risk activities (J. Oppong 1998: 447; Anarfi et al 1997). Many of those who left the country were women. At the start of the epidemic in Ghana in 1996, *all* reported cases of HIV were female with a history of travel outside the country.

Migration then is undoubtedly an important factor in the spread of HIV/AIDS. Labor migration – with its resulting concentration of individuals in urban areas, the 'relaxation of social norms' and the adoption of risky behaviors - is associated with an increased risk of HIV/AIDS infection (Cohen 1992: 2; Seghal 1999: 5). Apart from the Ghanaian example there are countless others, such as the mines and commercial farms of Southern Africa with their concentrations of single men and widely available commercial and casual sex.

Changes in the numbers and composition of populations - as a result of HIV/AIDS - undoubtedly affect the ways in which societies are organized as well as the ways in which priorities are set for coping with the crisis.

Nonetheless, 'while it is inevitable that massive rises in death among young, economically active adults will effect national economies, it is not easy to isolate or measure that effect' (UNAIDS 1999a: 17; Bollinger et al.

1999:7). The relationship between the epidemic and economic performance is a complex one, best illustrated by studying specific economic sectors and groups within populations.

The tremendous economic burden of HIV/AIDS and associated diseases is thus not limited to the current generation alone. "In essence, a high disease burden in a poor society can create a poverty trap, in which both disease and impoverishment are reproduced from one generation to the next" (Sachs, 2000) Typically, cost-of-illness studies or monetary loss calculations of DALYs do not capture this intergenerational consequence.

THE ECONOMICS OF PREVENTION AND TREATMENT

The old saying 'Prevention is better than cure' has a ring of self-evident truth which underpins the very logic of traditional cost/benefit analysis. Yet, as Cohen points out, it is by no means clear yet that Africa has embraced this wisdom in the area of public policy towards HIV/AIDS. This is to some extent understandable. With Ministries of Finance constantly preoccupied with severe constraints on resources and their implications for macroeconomic stability, it is not easy to appreciate the tremendous longer-term benefits of investments made today in HIV/AIDS prevention. Yet this is the challenge of priority setting and economic management. The indications are that even if we focused on the narrowest interpretation of the economic cost of HIV/AIDS, that is, direct treatment costs plus lost output, the return on investment is huge by any standards. A 1991 study on Thailand estimates that the return on such investment is as high as seventeen times.

There is not much information currently available on the relative cost and likely impact of various interventions in different socio-economic settings. Attempts at estimating the cost of prevention programs are fraught with at least two problems: the first is to obtain available data on the cost of current programs, and the second, to scale up the costs of these programs. Because of low coverage of most national programs in Africa, even where cost data are available, they are derived from individual projects of facilities usually operating on a small scale. Consequently, some cost estimation attempts are based on modeling techniques (Kumaranayake and Watts, 2000) which are helpful, but like all models, have their limitations.

A major cost estimation exercise is currently underway by one of the working groups established by the WHO Commission on Macroeconomics and Health which should help provide hopefully reliable guides to reinvigorated national programs. The working group is working at costing HIV/AIDS programs found in Sub-Saharan Africa and will also include an estimation of costs associated with highly active antiretroviral treatment (HAART). Although some have cast doubt on its current feasibility. (Panos, 2000). Accordingly it will cost the following prevention programs:

1. Youth-focused programs (in and out of school)
2. Sex Worker programs
3. Strengthening of public sector condom distribution
4. Condom social marketing, male condom only
5. Strengthening STD services
6. Workplace programs
7. Voluntary counseling and testing (VCT)
8. Strengthening blood transfusion services
9. Programs to reduce mother-to-child transmission (MTCT), including VCT
10. Mass media campaigns

It will also cost the following care and treatment programs:

1. Palliative care
2. Clinical Management of Opportunistic illnesses (OI)
3. Prevention of OI – Prophylaxis
4. Home-based care
5. Care for children
6. Support for Orphans
7. Support for people living with HIV/AIDS (PLWA) including psycho-social support, counseling and networks
8. Treatment – Highly active antiretroviral treatment (HAART)

These and other studies currently underway at the Center for International Development at Harvard should go some way in helping to determine among other things, how much drug combination treatments would cost if they were available at marginal cost production rather than full patent protected prices. National prevention and care programs will also have to go beyond HAART to explore the possibilities for applying other treatments for opportunistic infections such as TB. Preliminary indications show, predictably, that the cost of scaled up prevention and care programs will cost multiples of what countries are spending now from their own resources plus what is available from international sources.

Finance & Equity

Resources invested in African countries, research institutions and industry ought to be 'drastically increased' (Piot 1998: 1845; Jha et al. 2000). As the Secretary General of the United Nations, Kofi Annan, noted, 'donors - the OECD countries - must make more resources available to fight the epidemic.'

At the global level, the 'ultimate challenge for HIV research will be the development of an effective and affordable vaccine. Nevertheless, there is much that can be done at the present time to ensure that the extraordinary scientific progress achieved, in the prevention and treatment of HIV/AIDS, is equitably distributed worldwide (ibid.). The research and development based pharmaceutical industry charges as high prices as the market can bear; their purpose is to maximize profit (Myhr 2000). African countries cannot afford patented (brand-name) drugs and ironically these same drugs are usually more expensive on the African Continent than in wealthier parts of the world. Drugs that are no longer patented may face generic competition and the evidence points to the fact that generics are cheaper (Myhr 2000: 4). Therefore, it is critical that generic drugs are introduced early and that they are widely available and affordable. The pressure is on pharmaceutical companies to face up to their moral obligation and governments (and all concerned parties) to reverse the inequitable pricing and distribution of life-saving drugs.

National Response

At the national level the response should be inclusive, 'such that the epidemic is taken into account when planning or implementing programs in *[all]* sectors that are affected by and *[impact]* on the HIV/AIDS epidemic (Tarantola 1998: 9). Therefore, national policies ought to be multi-pronged and all ministries should be involved, from health and education to planning and infrastructural development.

The fundamental causes of HIV/AIDS need to be addressed if the epidemic is to be effectively challenged. Long-term structural policy reforms, aimed at combating gender inequality and the economic and social vulnerability of women will be of paramount importance in this endeavor. There is considerable scope for intervention at various levels: the individual, the child, the household and the community (Seghal 1999: 7). Households have to participate in economic growth if they and their communities are to rise out of poverty, 'this means addressing

the legal or social constraints which adversely affect the capacity of seropositive individuals from participating in economic activities' (Bonnell 2000: 17; Bollinger et al. 1999).

Governments have much to learn from experiences gained in other African countries and the challenge is to 'incorporate...effective interventions into comprehensive national [programs] (World Bank 1999:18). For example, studies have shown that a combination of voluntary counselling and testing, condom social marketing, peer education and the treatment of sexually transmitted diseases can 'change behaviors and reduce the risk of HIV' (World Bank 1999:17).

CONCLUSION

In spite of the weaknesses and limitations in existing methodologies and models for measuring the economic impact of disease burdens generally and of the impact of HIV/AIDS in particular, there is sufficient evidence that the overall economic impact of the epidemic is devastating. Indeed the indications are that current estimates based on traditional cost-of-illness studies underestimate the economic impact of the disease.

A full quantification of the overall economic effects of HIV/AIDS on African economies will need to take account of the direct economic effects of adult HIV/AIDS on labor productivity, the economics of childhood HIV/AIDS. It should also take account of changes in household behavior attributable to the disease, as well as changes due to the very risk of HIV/AIDS. Thirdly, it should measure the economic effects at the national level, including effects on the fiscal situation and therefore on the stability of the macroeconomic environment, and effects on enterprise productivity and investments as well as related externalities flowing from lost skills. When all this is done faithfully, the probability is that the economic impact of HIV/AIDS will add up to a lot more than the annual loss of GDP of 2% estimated by the World Bank.

Judging from the sheer scale of these costs, it is clear that the return on investment in scaled up efforts at prevention would be enormous. What is required is a comprehensive program for total national mobilization, backed by scientific and technological knowhow, significantly enhanced levels of international donor support and improved access to drug therapies. Finally AIDS research, including, especially, research by African scientists and institutions ought to be given the highest priority.

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