Evaluation of the Financial Implications of HIV/AIDS for Africa

Mahesh Patel, UNICEF ESARO, Nairobi, January 2000, Draft 1.14

Keywords: HIV/AIDS, economics, cost, Africa

Executive Summary

The AIDS crisis is having a major impact on the situation of women and children in Africa. In collaboration with UNAIDS, UNICEF has developed a strategy for dealing with HIV/AIDS. Programmes are operational in most countries and are rapidly increasing their scope and coverage. For these reasons, it is considered important to obtain an 'order of magnitude' estimate of the costs of an appropriate programmatic response.

HIV/AIDS was being transmitted to about 4 million people annually in Africa by the end of the 1990s. Over that decade it caused a greater number of casualties than all natural and man-made disasters and conflicts combined. The death rate is doubling every 4 years. About 3.5% of the economically active population has already died. It seems increasingly likely that less affected countries are merely at an earlier phase of the epidemic.

Across Africa, the economic costs of AIDS reached 5% of GDP by the end of the decade. These costs have been doubling about every 3 years and are expected to reach 15% of GDP by 2005. By that time, the concept of economic costs may cease to be of great interest. If the epidemic continues unabated, by that time the fabric of society itself may start to disintegrate under this demographic, social and economic onslaught.

An estimate of the costs of several examples of preventive programmes is made. These costs reach around 1% of the GDP of Africa, about $5 billion per annum. This apparently large sum is one eighth the amount of money spent on military action during the Kosovo war.

An investment of 1% of GDP per annum in economic infrastructure, which could increase GDP by 10% within 5 years, would yield an extra-ordinarily high rate of return. This same thinking should apply to the funding of HIV/AIDS prevention in Africa. But the 1997 level of investment on HIV prevention was only 0.03% of GDP of the continent. If the level of investment in prevention is not increased dramatically, economic and social development gains in Africa will be reversed. There is probably no other development investment that is as cost-effective as prevention of HIV.

Introduction

It is in the nature of the AIDS epidemic that incidence and associated financial costs start small and grow exponentially. Countries experiencing this epidemic in its advanced phases are facing alarming financial and social costs. It no longer seems likely that countries currently having low HIV/AIDS incidence rates will escape exponential increases in costs. This short paper constructs an estimate of the economic costs to Africa of the epidemic. It explores selected prevention strategies and programmes and assesses their financial costs. These assessed financial costs of programmes consistent with the UNICEF strategy aimed at the epidemic are compared to previous work on the subject, including useful estimates sponsored by UNAIDS, and explores the reasons for similarities and differences.

The Impact of AIDS

23 million people in Africa are HIV positive, which is 3% of the total population and 8% of the adult population. So far, 14 million people with AIDS have died. This is 1.8% of the total population of Africa and about 3.5% of the economically active population.[1]

Close to half a million people died in 100 days in Rwanda in 1994. The number of deaths every hundred days, from AIDS in Africa, is 50% higher.[2] The death rate from AIDS is inexorably increasing. AIDS is unlike most other fatal diseases in one respect. The number of deaths is still less than the number of active, and inevitably fatal, infectious cases. Most countries are still close to the narrow edge of the exponential curve. Half the population of Africa lives in countries in which the epidemic is still concentrated in high-risk groups and has not yet spread to the general population. Current infections are 4 million per year, doubling every 4 years, over the continent as a whole.

On Monday, 12th January 2000, the United Nations Security Council met to discuss this epidemic. It was the first time a health issue was the theme of such a meeting. Secretary General Kofi Annan concluded his opening statement with the following words:

"…By overwhelming the continent's health services, by creating millions of orphans and by decimating health workers and teacher, AIDS is causing social and economic crises which in turn threaten political stability. In already unstable societies, this cocktail of disasters is a sure recipe for more conflict. And conflict, in turn, provided fertile ground for further infections."

This paper focuses on the economic impact of AIDS and constructs estimates, based on current programme costs, of what a large scale response to this emergency might cost. At first glance, one might expect an economic

---

[1] . About 5% of those who currently have HIV/AIDS are children, so we can assume a roughly similar proportion of deaths, though the true figure might be slightly lower. UNICEF *Executive Board Presentation*, 1999. The term "adult" is defined by the WHO as the population aged 15-49 years in this context..

[2] . The UNICEF HIV/AIDS Task Force has noted that "HIV/AIDS is perhaps the greatest threat to development and peace in Eastern and Southern Africa." *Report of the Eastern and Southern Africa Region HIV/AIDS Task Force.* UNICEF ESARO April 1999.

impact on current GDP of Africa of about 3.5%, as that is the approximate proportion of the economically active population that has died. The relationship between population mortality and economic costs hinges on a number of factors. If Africa were truly composed of 'surplus labour' economies the loss of 3.5% of the adult population would not be expected to produce a proportional decline in economic output. However, in the formal sector, which is often disproportionately responsible for both economic output and AIDS deaths, there is generally a shortage of skilled labour. In the formal sector, mortality of skilled labour would depress overall labour force productivity and have a greater than proportional effect on GDP.

There have been micro-economic studies assessing the costs of AIDS in agriculture, in industry, and in different types of private sector enterprises.[3,4] The overall results are broadly similar.[5] Factors tending to increase the impact of AIDS mortality on labour force output (shortage of skilled labour and excess mortality in the formal sector) are roughly balanced by factors which decrease the economic impact of AIDS mortality (low marginal productivity of labour in the rural sector). Output lost due to excess mortality is approximately 3.5%, similar to the percentage of population loss.

If the impact of the epidemic on Africa in financial terms is to be considered, two additional and significant cost categories must be reviewed. These are the effects of HIV/AIDS related absenteeism on labour productivity and the costs of health care.

HIV/AIDS is a debilitating disease associated with prolonged illness. Studies of private sector companies indicate that costs of HIV/AIDS related absenteeism are the single largest AIDS related cost category they face, accounting for 55% of these costs.[6] Five different types of formal sector enterprises were considered in Kenya.[7] Average total AIDS related costs across these five types accounted for somewhat over 3% of revenues, although there is quite a bit of variation. In the informal sector, production loss from absenteeism is probably lower.[8] Across the economy as a whole, a figure of 1% of total costs lost through AIDS-related absenteeism from those

---

[3] . HIV/AIDS bibliography: *An annotated review of research on HIV/AIDS in Zambia*. National AIDS/STD/TB/Leprosy Programme, 1996.

[4] . USAID, AIDSCAP, FHI. *AIDS in Kenya: Socioeconomic impact and policy implications*. 1996.

[5] . Stover J. & Bollinger L. *The economic impact of AIDS*. The Policy Project, March 1999.

[6] . Individual private sector companies do not, of course, directly experience the costs to the economy as a whole of a reduction in the size of the total active labour force, but are acutely aware of disease related absenteeism. In additional to absenteeism private sector companies face costs from reduced labour productivity, job turnover, training and recruitment costs, and health care and burial costs.

[7] . Textiles, light manufacturing and services, wood processing, sugar estate and transportation. Roberts M, Wang'ombe J, & Forsythe S, *Business responses to HIV/AIDS in the African formal sector workplace: Findings of a Kenya needs assessment*. In: Aids In Kenya. FHI, AIDSCAP, 1996.

[8] . In the informal sector, the absence of one person would affect the output of another less than in the formal sector where production relationships are more formally interdependent. The informal sector would also be more flexible in 'making up for lost time' to achieve a target income. Finally, surplus labor concepts may have some applicability.

currently ill is probably a conservative estimate. This brings the total cost to 4.5% of GDP, so far.[9]

The third major cost category considered here is health care costs, the costs of treating and caring for HIV/AIDS patients. Government tax revenues in Africa average about 20% of GDP, with quite significant variation. Government expenditure on health averages about one sixth of this, perhaps 3% of GDP. In countries in a more advanced phase of the HIV/AIDS epidemic, one third to one half of hospital beds are occupied by HIV/AIDS patients. These are high-cost patients. There are also direct household expenditures on treatment, care, and funerals to be considered here as associated costs. A conservative estimate of the total financial cost of health care expenditures associated with care and treatment of AIDS would be at least 1% of GDP.[10]

These three cost categories together, yield a conservative total direct current cost of 4.5%-5.5% of the annual GDP of Africa, depending on whether health care costs are included in this accounting. A more comprehensive and complex 1992 World Bank macro-economic projection forecasted that the costs would reach 5% of the GDP of Africa by the year 2000,[11] about the order of magnitude of this simple estimate.

That same World Bank macro-model forecast that costs would triple in 5 years – the normal cycle of many national Development Plans. By the year 2005 the AIDS epidemic would reduce GNP in Africa by 15%.

Future Costs

Two issues are worth bearing in mind with respect to future costs. Firstly, that the HIV/AIDS epidemic is increasing exponentially and secondly, that different countries are in different phases of experiencing the impact of this epidemic. The result of this tripling of costs across the continent, to 15% of GDP, averages the experiences of those at an advanced stage along with those experiencing only an early phase of the epidemic.

The experiences of countries currently in a relatively advanced phase of the epidemic may offer useful insights to countries still at the thin edge of the exponential curve. The current Namibia Human Development Report estimates that HIV/AIDS cost 9.6% of GDP in 1999 and that this will increase to 16.3% by the year 2001. The doubling time for costs has been steady in Namibia, at about two years, since 1996.

---

[9] . As the majority of those implicated are adults, AIDS mortality and HIV/AIDS related absenteeism decrease total output about twice as much as they decrease output per capita.

[10] . Some economists would argue that increased health expenditures actually increase GDP and that this last category is, strictly, a current year indirect cost. In any longer term framework however, continued overloading of health services would almost certainly affect economic output through the crowding out of curable patients.

[11] . Over M. *The macro-economic impact of AIDS in Sub-Saharan Africa*. AFTPN Technical Working Paper 3. World Bank, Africa Technical Department, Population, Health and Nutrition Division, Washington DC, 1992.

In Kenya, GDP in 1999 was estimated as 6.6% lower than it would have been without the HIV/AIDS epidemic. Projections indicate that by 2003 GDP will be 16% lower, a doubling period for costs of about 3 years.

The Implications

The financial costs that countries at a more advanced phase of the epidemic have experienced are frightening. They have forced major revisions of economic development planning and public sector budgets. Indeed, public sector budgets were already decreasing in many countries as one component of macro-economic adjustment programmes. AIDS dramatically increased this tension by putting additional strain on the health sector while decreasing public sector tax revenues.

Currently, ODA across the continent is approximately 5% of GNP.[12] Overall, annual variations in ODA are small. These variations in ODA of a small percentage of GNP pale into insignificance next to the broad impact of HIV/AIDS upon economic development, though their effects on the revenue side of public sector budgets may still be similar in magnitude. The costs of HIV/AIDS are likely to have far greater economic impact on Africa than will variations in ODA.

This macro-economic analysis could be complemented by consideration of some social costs. Africa has about 1 million children with HIV/AIDS. Estimates for the numbers of AIDS orphans are available in only a limited number of countries. But they are expected to reach a total of about 11 million by the end of the year 2000.

These millions of orphans for the most part cannot hope to have normal childhoods or access to the most basic of services because orphanhood has deprived them of the support of parents or has burdened them with adult responsibilities, including the care of both young children and ill adults. AIDS orphans have been shown in many studies to have poorer nutritional status, more frequent and severe illness, a lower rate of access to immunization and other basic preventive services, and higher risk of HIV infection than other children. In many cases, these children are forced into prostitution, military service and other dangerous occupations to ensure their own livelihood and that of younger children who may depend on them. Few countries in the region have in place a legal framework to protect the inheritance and property rights of these children, to say nothing of their right to education, health care and other basic services. These girls and boys are, beyond doubt, society's most vulnerable members.

The average lifespan of an infectious person is about seven years. The doubling period of the epidemic is about five years. This means that on

---

[12] . ODA to Africa was US$ 22 billion in 1990-96, equivalent to 5.0% of GDP per annum in current prices. UNECOSOC/UNECA. *The challenge of financing development in Africa*. Seventh Session of African Ministers of Finance. E/ECA/CM.24/2, 12 April 1999. Addis Ababa, Ethiopia.

average infected people must be infecting at least two others before dying - or perhaps more if they live longer. [13]

As would be expected, life expectancies are falling in several countries. Many causes of this fall in life expectancy have been identified and discussed. Certainly, AIDS is not the only factor involved here. But with the levels of infection and rates of growth that are prevalent, it is quite clear that even if AIDS is not yet considered by all to be the major cause; it soon will be. The only question is, "How soon?"

Prevention Campaigns

It is hard to find any disaster in the whole of the continent which can account for over 2 million deaths per year and which shows such potential for medium term rapid growth, with an incidence-doubling period of four years and cost doubling period of between two to three years. Africa has murderous wars, famines, floods and hurricanes. But even together, these onslaughts of man and nature do not begin to match the ferocity of this young and growing epidemic.

Armed conflict in Africa creates only an average of 200 thousand deaths a year. Countries at peace in Africa spend an average of about 1% of GNP on defense.[14] In a country at war, this expenditure is several times higher, as are the economic costs of damage to infrastructure and collateral. But the casualties of armed conflict do not begin to approach the sheer scale of numbers of casualties of the AIDS epidemic, even if the economic costs of large-scale conflict may be as high, in a few countries.

The average annual costs of the AIDS epidemic have reached 5% of GNP or $36 per capita. Total expenditures on health may average about 3% of GNP, or a bit over $20 per capita. Expenditures on the *prevention* of HIV/AIDS are an insignificant part of that small sum.

Over the period 1996-1997, about $150 million a year was spent on prevention of HIV/AIDS in Africa, 90% of it from external sources.[15,16] *This is $0.20 per capita, about 1% of total health expenditures and equal to less than 0.03% of the GDP of Africa. Expenditure by African governments was one tenth of this, a mere $0.02 per capita, equal to less than 0.003% of the GNP of Africa. This government expenditure of $0.02 per capita was a mere 0.06% of the total current annual economic cost of AIDS to Africa.*

---

[13] . One new infection is needed to replace the dying infected person and one additional new infection is needed to ensure a doubling of the number infected, within the five-year period. As the average infected person lives seven years, the exact figures would be 1.7 persons infected within 5 years and 2.4 persons infected in 7 years.

[14] . Total government expenditure may be 20% of GNP, and expenditure on defense about 6% of that, though these proportions vary widely in individual countries. WB, *WDR*, 1998.

[15] . International Partnership Against HIV/AIDS in Africa. *Resource mobilization for the partnership*. Discussion notes – Draft for UNAIDS Cosponsors, 20/04/99, UNAIDS, Geneva.

[16] . UNAIDS. *Level and flow of national and international resources for the response to HIV/AIDS*, 1996-97. UNAIDS 1999, Geneva.

Expenditures on AIDS prevention may be compared to expenditures on famines and defense. The resources mobilized to combat more traditional threats have in the past been quite considerable. A war or famine that killed even 100,000 people would have a high profile in the international press. In countries experiencing war or famine, it is not unusual for emergency funding from donors to constitute several percent of GNP. This level of activity is not visible in response to the HIV/AIDS epidemic.[17] If it were, perhaps the epidemic would already be under control.

<u>Selected Activities Aimed at Preventing AIDS</u>

This paper does not aim to provide a definitive list of the AIDS prevention activities that should be prioritized in Africa. That goal is well beyond the scope of this brief note. The interventions described below were selected in an arbitrary manner. The descriptions of these interventions are provided simply to enable the reader to identify the basis of the cost estimates that follow.[18]

Behavioral change programmes for youths are a type of intervention that is often cited as necessary. As the costs of education are relatively well documented it is relatively easy to work out costs for a school based behavioral change programme targeted at youths. Costs for targeting out of school youths are more difficult to ascertain and would depend very much on the level of programme effort including, for example, purchases of time in the mass media.

Behavioral change strategies targeted at these youths, in and out of school, would probably need to be supplemented by two associated infrastructural elements. Firstly, it is no use teaching 'safe sex' behaviour unless condoms are freely and easily available to all sexually active age groups. This would have to include even youths whose parents consider them too young for sexual activity. Not having a condom is unlikely to stop these youths from having intercourse, but it is likely to place their lives at risk. So a cost estimate for provision of condoms will also be constructed.

Secondly, the transmission rate of HIV is far higher when other sexually transmitted diseases remain untreated. In a general rural population of over 12,000 persons in Tanzania, a randomized trial showed that transmission of HIV/AIDS was reduced by 40% through treatment of STDs.[19]

---

[17] . It should be noted here that Uganda has been an exception to this rule for some time now. Intense and very explicit behavioral change campaigns have been mounted. Interestingly, it would seem that infection rates are now decreasing. UNAIDS. *A measure of success in Uganda*. Case Study, UNAIDS, May 1998.

[18] . Activities targeting sex workers and blood transfusion services, for example, are not covered here.

[19] . Grosskurth H, et al. *Impact of improved treatment of sexually transmitted diseases on HIV infection in rural Tanzania: randomized controlled trial*. The Lancet (1995) V.346, pp530-536. STD treatment was necessary because although health workers were trained to offer condoms, only 0.9% of patients took them.

There is an additional area where preventive action can be effective, and that is stopping mother to child transmission of the infection. This would require testing all mothers and treating and providing counseling to those who are HIV positive. A single dose tablet given to the mother before birth, and to the child after, dramatically reduces the proportion of children born infected with HIV.

Uganda has been mentioned as an African country in which a mobilization against HIV/AIDS has taken place, with some initial indications of success. Most of the above elements are part of their national strategy. An additional, apparently effective element, is the widespread availability of voluntary counseling and testing.[20]

The focus of this short paper is on the prevention of transmission of HIV/AIDS, not on provision of social and economic benefits, or of health care, to individuals who are, often innocently, victims of earlier high-risk behaviour.[21] But there is one group of the innocent afflicted whose acute needs must be considered even though the focus of cost estimates is the prevention of transmission. That group is children orphaned by AIDS. A strategy of micro-finance in kind has been found successful in Eritrea. Eritrean host families for orphans are provided with a camel, a donkey, or a couple of goats, and asked to sign a pact that the earnings from that resource will be used to feed, clothe and school the orphan.[22] In many other settings, it may be necessary to supplement such one-off cash injections with more sustained community support as well as access to institutional care and basic services. Review of policy and legal frameworks to guarantee property rights of orphans as well as access to basic services and other rights are also often needed.

Cost Estimates of Selected Activities aimed at Stopping HIV/AIDS

Approximate costs of the preventive activities described above activities are calculated below. A range of different constructivist and literature based methods have been used in constructing these cost estimates.[23],[24] As

---

[20] . AIDS Information Center. *The impact of volountary counseling and testing; Preliminary findings of the couple study*. Uganda, 1999.

[21] . Methodological issues in determining the optimal balance between expenditures on prevention and cure are treated in: Hey J.D., Patel M.S. *Prevention and cure ? Or: is an ounce of prevention worth a pound of cure?* J Health Econ 2:119-138, 1983.

[22] . Morah E et al. *Evaluation of the orphan reunification project in Eritrea*. In: Patel M. (Ed.) *Special Issue on UNICEF Evaluations*. Eval. & Prog. Planning 1998 (21) 4, 437-48.

[23] . These are all long run average costs for 100% coverage. In the initial years of the programme, coverage would be lower and it is assumed that the resultant savings would be used for the creation of the infrastructure needed to increase future coverage. More detailed descriptions of constructivist costing methodologies may be found in: Patel M.S., *Towards eliminating the social distance between nations*. UNICEF Staff Working Paper No. 5 (pp220), 1989, and in Patel M.S. *The global costs of primary health care: Preliminary blueprint for a world plan of action*. Man and Development 3:105-129, 1981.

[24] . It is often necessary to use contructivist estimates as the literature on disease costing often presents only partial costings. It is especially common the only pharmaceutical products are costed. Kikumbih S. S. et al. Consequences of adult HIV infection for outpatient morbidity and treatment costs: a prospective study in a factory clinic in Tanzania. Health Policy Plann 12:234-239, 1997 and Costello Daly C. et al. A cost comparison of approaches

knowledge of the costs of implementing these programmes improves it should be possible to improve on these initial estimates. At the same time, improvements in knowledge should enable cost estimates to be provided for a greater range of activities than those few covered here, and to better select the activities for which cost estimates are required.

Activities to change the behavior of children who are currently attending school are often implemented through the education sector itself. Teaching for behavioral change may require specialist skills which are not currently included in the training of classroom teachers. If every classroom in Africa were to spend a half day per month on learning 'life skills', then implementing this activity would require training and employing one teacher for each 30 already employed. Each of these additional teachers could cover 30 half-day life skills sessions per month. This would increase the salary component of education expenditures by one-thirtieth, or about 3%. If we add in the cost of providing training materials this special education programme would require an increase of about 4% in education sector budgets. This is equivalent to about 0.2% of the GDP of Africa.

Costs of covering out-of-school youths are more difficult to calculate and present in a succinct manner, as many channels of communication and service provision must be used. The mass media, and probably some of the traditional communication strategies, used to reach out of school youths often cannot be targeted precisely, and would frequently benefit the whole population. While media time can be obtained free if only small amounts are needed infrequently, frequent exposure during peak times would tend to require significant funds.

Production of social communication materials is not expensive. Making a TV spot could cost at least $50 thousand. Different spots might need to be produced for English, French, and Arabic speaking regions of Africa. Producing two spots a month in each of three regional centers and dubbing into local languages would cost about $4 million. Broadcasting a one-minute spot costs about $600. Broadcasting six spots a day, similar to the daily frequency of advertisements for soap products or soft drinks, would cost on average about $3.6 thousand a day, $1.3 million a year per country, and $72 million a year across Africa. Radio spots are about a half to a quarter of the cost per minute, but have better population coverage and so should be longer and more frequent. They could cost about $60 million.

Full page spreads in newspapers cost about $3 thousand. If bought twice weekly, in an average of three national newspapers across Africa, this would cost about $50 million each year. Monthly production of one poster per thousand people could cost as little as $10 million. Distribution is relatively expensive and would cost at least another $30 million.

---

to sexually transmitted disease treatment in Malawi. Health Policy Plann 13:87-93, 1998) provide useful, but partial, cost analyses.

Communications strategies for behavioral change cannot rely exclusively on mass media. Traditional channels of communication are much cheaper and would probably cost than $100 thousand per country, or about 5 million across the continent.   Social mobilization strategies require a certain amount of infrastructure and could cost about $250 thousand per country, or almost $15 million across the continent and bring the total cost to about $250 million, or 0.05% of GDP.

In Uganda, voluntary counseling and testing costs about $14 per client. Those attending these services self-select to a certain extent and comprise a useful proportion who are undergoing testing prior to marriage, as well as the expected high risk groups of adults. Covering half the adult population over a five year cycle would cost about $0.70 per capita annually, or 0.1% of GDP.[25]

The above expenditures on media and non-formal channels of communication to reach out-of-school youths, and the voluntary counseling and testing programme described would normally cover the overall population, not just youths.

Unfortunately, motivation to use condoms is lower amongst those who already have HIV/AIDS since they are no longer at risk of catching it. If a good carries very high public health and economic externalities, as is the case with vaccines for infectious diseases such as smallpox, it is normally assumed that the correct price for that commodity is zero. Perhaps a similar conceptual framework should be applied for condoms. That theoretical analysis is beyond the scope of this paper. It may not be practical to distribute condoms for free in Africa. But public distribution outlets such as hospitals, health centers and family planning clinics often supply condoms free-of-charge, and perhaps they could also supply condoms to commercial distributors free-of-charge. These two actions would very significantly reduce the market price of condoms in areas covered by public distribution outlets, and exert a downwards influence on prices, without reducing availability, in areas only covered by commercial distributors.

The price elasticity of demand for condoms probably varies a lot among countries and even within countries. Given the magnitude of the externalities involved, wherever there is any price elasticity at all, prices should perhaps be set to zero, or as close to zero as operationally feasible. If condoms are sold to raise funds to cover even a part of the purchase costs, corresponding and perhaps disproportionate decreases in utilization must be expected. For a public health good that prevents transmission of a fatal infectious and epidemic disease with a technology that is as effective and cheap as a vaccine, the concept of cost-recovery is perhaps inappropriate for all public facilities. Private facilities, supplied condoms for free from public sources, would still have to cover distribution costs. For these reasons, only the total supply cost of condoms is calculated.

---

[25] . About half this sum is the cost of materials for testing. While this costing is based on current costs, it is expected that tests will be significantly cheaper and faster in the future.

Bought in bulk, a condom costs $0.03. Of the total population of Africa, of almost 780 millions, about half are sexually active. Only half of those are male. If 50 condoms per year were supplied to these 200 million sexually active men, with some consuming more and some less, about 10 billion condoms would be needed, at a cost of $300 million.[26] This is a cost of $0.40 per capita, or about 0.06% of the GDP of Africa.

Costs of stopping, or very greatly reducing, mother to child transmission of HIV/AIDS are relatively well defined. Every mother would have to be tested, and those infected would have to be treated. With a crude birth rate averaging about 35 per thousand population, Africa has about 27 million births a year. On average, testing, voluntary counseling and treatment using subsidized AZT used to cost about $22 per pregnant woman. If Nevirapine is used instead, the pharmaceutical costs fall from $75-150 to only $4 per course of treatment. All pregnant women would need to be tested, but only a fraction would need treatment and counseling. Testing would cost about $2 per pregnancy. Average cost could fall to about $6 per pregnant woman, depending on the costs of salaries and counseling, once such a programme was well established. Africa-wide about $200 million would be needed, equal to about $0.25 per capita, or a shade over 0.04% of GDP.

In Tanzania, it was estimated that STD testing, treatment and counseling could be provided for $1 per capita. Tanzania is a low wage country, so the personnel cost components of this figure would have to be revised upwards to derive an average applicable across Africa. A cost of $1.50 per capita would be equivalent to 0.2% of the GDP of Africa, if such a programme was implemented across the whole continent.[27]

A final cost category that could be included as a useful component of a response to the epidemic is that of economic and social support to AIDS orphans. In Eritrea, the micro-credit based support programme requires only a one-off expenditure of $287 per orphan. Eritrea is one of the poorer countries in Africa, so this programme would probably cost more elsewhere, perhaps $350 per orphan, if some efficiency improvements can be envisaged. Africa has to absorb almost 3 million new AIDS orphans a year. Support to all of these through micro-credit schemes would require somewhat over $1 billion per year. As noted above, micro-credit schemes may not be applicable in many settings. Institutional care, even excluding capital costs, is about three times more expensive. Community care would cost something in between. With these upper and lower bounds defined, it may be appropriate to envisage an annual cost of about $2 billion, or 0.4% of the GDP of the continent. These cost estimates do not include any expenditures that would

---

[26] . The WHO estimated that a one-year supply of condoms would cost about $14, similar to the cost of a vaccine, though with the disadvantage that continuous usage is necessary. WHO. *Removing obstacles to healthy development.* Geneva. 1999. The cost figure obtained in this paper is about ten times lower (an average per sexually active adult of 50 condoms per year at $0.03 each = $1.50) and similar to that used by UNAIDS.   Kumaranayake L., Watts C. *Preliminary estimates of the cost of HIV/AIDS prevention for Sub-Saharan Africa*, UNAIDS 1999.

[27] .   As health expenditures average about 3% of GDP, this would require an increase of a bit under 10% in an average health care budget.

be needed to guarantee support to basic services such as health and education as institutional arrangements vary so widely between countries.

<u>A comparison with previous HIV/AIDS prevention cost estimates</u>

The total sum of the above illustrative examples of costs of continent wide projects to prevent transmission of HIV/AIDS is about 1% of the GDP of Africa, a sum of almost $5 billion per annum. This is a very large sum. There is previous work in this area which, using varied methodologies tends to confirm this figure, and there are other estimates which have offered significantly lower cost estimates. Usually, there are identifiable explanations for these lower estimates.

UNFPA estimated resource needs for family planning in sub-Saharan Africa to be $1.2 billion per annum, rising to $3 billion in 2015.   The UNFPA estimate covers only family planning and so does not contradict the findings of this paper. An HIV/AIDS prevention campaign would probably include most of the major cost components of a family planning programme, while adding many new ones, and so would be expected to have significantly higher costs.

A paper produced by Kumaranayake and Watts of the London School of Hygiene and Tropical Medicine for UNAIDS offers an estimate of $1.4 billion per annum for prevention of HIV/AIDS, which is quite similar to the UNFPA estimated resource needs for family planning alone.[28] The figure of $1.4 billion is much lower than the $5 billion estimate provided above. As the Kumaranayake and Watts paper is the most recent estimate commissioned by UNAIDS and may form part of their next funding framework, it is worth examining its basis in some detail.

The main reason for this difference is quite clear. The population coverage on which that estimate is based is derived from a rapid assessment of the *"absorption capacity"* of health systems in sub-Saharan Africa. The costing framework was based on *"target coverage levels … which were felt to be realistically possible to achieve in a five-year period by UNAIDS technical staff"*. (Some of these target coverage levels are presented in Annex 2.) But what can be achieved obviously depends rather strongly on the availability of funding. The Kumaranayake and Watts paper explicitly states that, *"In general, we have not tried to cost levels of implementation that require wholesale changes in infrastructure."* However, a rapid control of the HIV/AIDS epidemic on the emergency basis that Kofi Annan's conclusions implied would be needed, would require and assume that new systems would be set up and additional services should be provided. And a rights based approach to this issue would require that the programme target group should be the whole population, not a part of it.

For some components, the Kumaranayake and Watts paper clearly underestimates absorption capacity. For MTCT, that paper aims, by the end

---

[28] . Kumaranayake L., Watts C. *Preliminary estimates of the cost of HIV/AIDS prevention for Sub-Saharan Africa*, UNAIDS 1999.

of a five-year period, to cover with testing only 10% of pregnant women in urban areas and only 5% of pregnant women in rural areas. The estimate of total costs of prevention of MTCT in Africa used earlier in this paper obtained a total cost, for 100% coverage of births, of $500 million. The corresponding estimate used by Kumaranayake and Watts is $12 million for sub-Saharan Africa. This is surely an error. Dividing $12 million between 36 countries would yield about $300,000 per country. That is hardly enough to do more than hold a few workshops and hire a few staff. The United Nations Foundation is funding pilot MTCT demonstration projects in 7 countries with a total of $3 million, or about $400,000 per country. A programme that aimed at population coverage, or even a significant percentage of the population, would require at least an order of magnitude more resources than would a pilot project.

Similarly, the Kumaranayake and Watts paper provides an estimate of US$70 million for expenditure on mass media. This would be less than $2 million per country. Mass media can absorb large amounts of money relatively easily as publicity activities can easily be scaled up. Behaviour change is a central objective of most HIV/AIDS prevention programmes. Mass communication strategies, usually heavily reliant on mass media, conventionally form a centerpiece of these programmes. Adequate funding is this area is surely essential.

An earlier 1993 estimate by the Global Programme on AIDS indicated that an annual expenditure of US$ 2.5 billion would be needed to halve the number of new infections over a 7 year period.[29] The level of prevalence of HIV/AIDS was considerably lower when that estimate was made and this may be part of the explanation for its relative modesty. More seriously, in view of the progress of the epidemic since 1993, it may be considered that 7 years is somewhat too long to wait for a significant reduction in transmission. Halving transmission now would not even reduce it to its 1993 level. This paper envisages a rather more urgent and intense campaign.

There are a number of other estimates that tend to confirm the findings of this paper. This estimate of US$ 5 billion is between the medium and high estimates provided by an earlier study by the Futures Group International, which estimated that annual costs of prevention could be as high as $6.90 per capita, equivalent to somewhat more than 1% of per capita income in Africa.[30,31]

---

[29] . GPA. *Effective prevention could halve new HIV infections*. Global AIDS News. Global Programme on AIDS. 1993; 3.

[30] . Janowitz B., Measham D., West C. *Issues in financing of family planning services in sub-Saharan Africa*. Family Health International, 1999.

[31] . Stover J. & Way P.O. *Impact of interventions on reducing the spread of HIV in Africa: computer simulation applications*. Afr J Med Pract, 1995; 2 (4) 110-119.

The figure of 1% of GDP is also identical to the cost for 100% population coverage in Africa presented in a 1996 comprehensive costing model published by Broomberg, Söderlund and Mills, again prepared for UNAIDS.[32]

Financing Prevention Campaigns

This cost estimate is a large sum. To set that sum in context, some comparisons may be helpful. The WHO Global Strategy for Health for All by the Year 2000 recommended that 5% of GDP be spent on health.[33] Universal Primary Education would probably cost Africa an extra 3% of GDP. Annual expenditure on defense in Africa, of about 1% of GDP, is almost $6 billion per year.

Even 1% of GDP is a huge sum for African governments to provide from domestic resources. This might be 7% of public sector revenues in many countries. But if external donors were to provide the full amount, ODA to Africa would have to increase by only about 10%, an increase of $5 billion. If the epidemic were seen to deserve the scale of emergency response that is accorded to wars and famines, this level of resource commitment could perhaps be found. Donor commitments too may be usefully set in context. NATO spent over $ 40 billion on military action during the Kosovo war. Through the Marshall Plan for reconstruction of the battered European economies after the Second World War, the USA spent a total of $12 billion. Factoring in inflation at about 5% over 50 years, this is equivalent to an expenditure, in current prices, of about $120 billion. The then U.S. Secretary of State, George Catlett Marshall, received the Nobel Peace prize for this effort in 1953.

Expenditures of this order of magnitude have been justified by extreme circumstances, in emergency situations and for major social goals. The HIV/AIDS epidemic may well qualify to be considered as such.

Conclusions

If an investment of 1% of GDP could increase GDP by 10% within 5 years, there would be little discussion by Ministers of Finance whether this recurrent expenditure was worthwhile. In the case of expenditures on HIV prevention to avoid a decrease of GDP by an additional 10% five years later, the decision framework is identical and unambiguous.

Whichever comparison is used, the economic investment criterion of the 'payback' period, the humanitarian appeal to donors, or the moral imperative of African governments to defend their people against what is perhaps the

---

[32] . Broomberg J., Söderlund N. & Mills A. Economic analysis at the global level: a resource requirement model for HIV prevention in developing countries. Health Policy 39 (1996) 45-65. This estimate incorporates some non-linearities, so lower coverage levels are disproportionately cheaper.

[33] . An analysis of the feasibility and appropriateness of this overall funding level for the core HFA/2000 Goals may be found in: Patel M.S. *An economic evaluation of "Health for All"* Health Policy Plann 1:37-47, 1986.

greatest threat they have ever faced, the conclusion is the same and inescapable. The financial costs of insufficient action have already far exceeded the costs of prevention. It is as certain as mathematics that that cost, already approximating to 5% of GDP, will double to 10% of GDP over the next few years as those already HIV-positive sicken and die. Costs will rise to 15% of GDP in five years, unless action is taken now.[34]

Emergency widespread mobilization of governments and populations, even at a cost of 1% of GDP is an appropriate, indeed essential, response level. If mortality levels across Africa continue to increase exponentially for another 5 years the whole concept of costing the disease will become irrelevant. At that level of prevalence and costs, AIDS will constitute a continent wide natural disaster.

The bubonic plague, which was only fatal in 30%-75% of cases, cast Europe into the Dark Ages, from which it took 180 years to recover. Catastrophes of this magnitude are still possible.

For governments in Africa whose countries are in an advanced phase of the epidemic, and even for those whose countries are still experiencing the epidemic in its early phase, silence and inaction are no longer affordable.

Disclaimer

The focus of this paper has been on the financial costs of the HIV/AIDS epidemic and the costs of preventing transmission. A number of essential supplementary measures related to policy development, legal frameworks, rights issues and care are covered in the official 'Report of the UNICEF ESAR Task Force on HIV/AIDS', UNICEF Eastern and Southern Africa Regional Office, Nairobi, April 1999, but have not been subject to cost calculations in this paper. While policy development and assurance of appropriate legal frameworks are not high cost activities they are important ones. Care of HIV infected persons, is a high cost activity. This paper covers only a limited number of the categories of costs that could be considered and does not attempt to provide a comprehensive coverage of this issue.

Acknowledgements

---

[34] . On average, a new infection will die in somewhat over 5 years, in Africa. So action taken now could achieve a very significant reduction in prevalence within 5 years.

Annex 1: Summary and background data

Summary table of costs and programmes

Approximate costs of some examples of prevention activities

Programmes	% of GDP	$p.c.	$ Mill.
Behavioral change education in schools	0.20	1.50	1,000
Info-communication incl. out-of-school	0.05	0.40	250
Voluntary counseling and testing	0.10	0.70	500
STD testing and treatment	0.20	1.50	1,000
Condoms	0.06	0.40	300
Mother to child transmission	0.04	0.25	200
AIDS orphans	0.40	3.00	2,000
"Total"	*1.05*	*7.75*	*5,250*

Notes: The costs obtained are indicative and rounded off to show orders of magnitude. Exact equivalence of percentage and dollar figures has been sacrificed in order to avoid imputation of an illusory precision.

The selection of activities is not intended to represent a prioritization of activities and actual costs of any activity from vary from country to country as well as according the implementation strategy chosen and intensity of implementation.

Table of background data used for calculations

Population of Africa (millions)	777
GDP (US$ billions)	518
GDP p.c. (US$)	666
ODA (as % of GDP)	9
ODA (US$ billions)	46
ODA p.c. (US$)	59
HIV/AIDS cases (currently alive, millions)	23
AIDS deaths (millions)	14
Children with AIDS (alive, millions)	1
Children orphaned (1 or 2 parents, mill.)	10
Annual number of infections (millions)	4

Sources: UNAIDS, UNECA, UNICEF and WHO Statistical Reports.

Annex 2: Comparison of costs and coverage

A partial and preliminary comparison of goals and costs between Patel (1999) and the paper "Preliminary estimates of the cost of HIV/AIDS prevention for Sub-Saharan Africa" by Lilani Kumaranayake and Charlotte Watts.

K&W medium estimates	*$B*	*$B*	*Patel*

In and out of school youths:
    PE 50%, SE 80%
	0.4	1.0	In school youths:
			    all in school: PE, SE, TE

Mass media:
    50% of out of school youth
	0.07	0.25	Mass media and other modes:
			    100% of out of school youth

STI services:
    30% coverage
	0.21	1.0	STI services:
			    100% access and coverage

Condom provision:
    social marketing
	0.47	0.3	Condom provision:
			    free to market

Voluntary counseling and testing:
    5% sexually active pop. p.a.
	0.09	0.5	Voluntary counseling and testing:
			    10% sex. active pop. p.a.

Mother to child transmission:
    10% urban, 5% rural pregnancies
	0.012	0.2	MTCT:
			    all pregnancies

Sex workers	0.09		
Blood transfusion services	0.15		
		2.0	Orphan micro-credit and care

-

Total: US $ billions	**1.37**	**5.25**	

-

Kumaranayake and Watts do not present details of how costs for individual interventions were calculated. Their paper lists only three generic references. Therefore it has not been possible to provide an in-depth analysis of the sources of differences between these cost figures, other than in terms of differences in strategy and coverage. It would appear that the greatest part of the difference in total costs obtained is due to differences in target population coverage and intensity of programme effort. A smaller residual can be attributed to differences in programmes included and strategies envisaged.