

# Highly active anti-retroviral treatment as a bridge towards education for all in sub-Saharan Africa

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## Introduction

HIV/AIDS continues to pose serious challenges to the health and economic development of many low-resource countries. Over the last decade, the impact of HIV/AIDS has been well documented (UNAIDS 2004). The disease is pervasive, affecting all sectors, with severe short- and long-term social, economic, and demographic implications. Recent evidence from sub-Saharan Africa suggests that HIV/AIDS-related morbidity and mortality have been experienced in most sectors including education, health, agriculture, defence, law enforcement, tourism, and private industry (UNAIDS 2001).

Over the past two decades, many low-resource countries have responded to the epidemic by implementing multi-pronged interventions including prevention, treatment, care, and support. Multi-sectoral responses across health and non-health sectors, as well as across public and private sectors are required to build a sustainable response to HIV/AIDS. An increasingly common component of these strategies is the provision of highly active antiretroviral therapy (HAART) to HIV/AIDS patients. There is growing consensus in the international community that HAART, even in low-resource settings, should have the

same level of priority as the prevention of HIV infections. This therapy has become more feasible recently due to declining drug prices and increased donor funding to support the intervention (Kombe & Smith 2003). According to the recent UNAIDS estimate, 6 million people in low-resource countries require anti-retroviral therapy, yet fewer than one in ten has access to treatment (UNAIDS 2004).

The purpose of this article is to call the international community to consider investing in HAART for the education sector. The article reviews and presents the rationale for investing in this sector and argues that investing in teachers will yield substantial benefits and economic savings for countries. In addition, the article uses Zambia to illustrate innovative HAART programmes that are targeting teachers through a small loan programme.

## Recent trends in education and HAART

Increasing access to HIV services as well as education are mutually reinforcing global imperatives currently advocated by health and development communities. Two social revolutions are occurring in low-

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resource countries with high HIV prevalence. The first is the need to increase coverage of HIV/AIDS services to reach those in need through the introduction of HAART. Several global HIV/AIDS initiatives such as the Global Fund on AIDS, Tuberculosis and Malaria, the World Bank's Multi-Country AIDS Programme, the President's Emergency Plan for AIDS Relief or PEPFAR and others, are allowing many low-resource countries to begin providing HAART to people living with AIDS. In addition, two major initiatives are being implemented by the United Nations. The first is the World Health Organization's (WHO) 3 × 5 initiative, which has set ambitious targets to reach 3 million people in low-resource countries with access to HAART by December 2005 and the second are the Millennium Development Goals (MDGs) which have outlined bold targets to achieve universal primary education (ensure that all boys and girls complete a full course of primary schooling) and combat HIV/AIDS (halt and begin to reverse the spread of HIV/AIDS) by 2015.

In tandem with this call to increase the coverage of health services for HIV/AIDS, another revolution is the progress towards universal primary school enrolment. A new orthodoxy in economic development regards education (or human capital) as a vital catalyst for economic growth. Not surprisingly, many developing countries suffer from low school enrolment rates and low stocks of human capital. Education for All (EFA) and the Millennium Development Goals (MDGs) represent global campaigns to improve school attendance and raise the level of human capital in developing countries. In particular, the MDGs call for universal primary education for boys and girls by 2015.

The recent efforts to increase coverage for HIV/AIDS treatment programmes and education converge, and in many ways, the success of one depends on the success of the other. In particular, EFA targets and the MDGs cannot be met if education professionals suffer from a high morbidity and mortality rate due to AIDS. The associated costs of the replacement of sick teachers (sick pay, funeral expenses, and training new instructors) could overwhelm the education sector. Providing HAART to teachers is an inexpensive remedy to protect the supply of teachers, and it is necessary in order to have enough teachers to make the EFA and MDGs targets attainable.

## Should the education sector be targeted to receive HAART?

Many developing countries are committed to providing universal access to ARVs. However, the limitations of current health systems and the availability of funding require a step-by-step approach to scale-up (Bennett and Chanfreau 2005). An ongoing debate continues on whether teachers in many sub-Saharan African countries represent a higher risk of HIV infection than the general population. In sub-Saharan Africa, teachers are primarily male, and in rural areas, male teachers are often separated from their families – which are both characteristics of a high-risk population for HIV infection (World Bank 2002). In Zambia, the mortality rate of teachers due to HIV/AIDS was nearly twice that of the general adult population in 1998 (ACT Africa 2000). In Botswana, Malawi, and Uganda, the HIV prevalence rate for teachers is lower than for the general adult population (Bennell 2003).

Whether or not the HIV prevalence rate for teachers matches that of the general adult population, sub-Saharan African countries have lost thousands of teachers and, in the absence of any intervention, will continue to lose many more in the next 10 years. UNICEF estimates that 860,000 children lost their teacher in 1999 in sub-Saharan Africa (Kelly 2001). In South Africa, the District Education Management Monitoring Information System (DEMMIS) reported a rate of teacher absenteeism annualized at 8% in 2001 (Erskine 2004). Zambia, a country with an HIV prevalence rate of 16%, is projected under current trends to lose 20 million hours of instruction time from 1999 to 2010 (Grassly *et al.* 2003). As student enrolment increases in order to move closer to universal school coverage, there is no excess supply of teachers waiting to replace ill teachers. Planning for these outcomes as well as for protecting future losses is critical for the education sector.

The importance of providing HAART to teachers in the public sector should be considered a priority for national governments. Teachers make up the largest employee group within the public sector in most developing countries (Chapman and Mulkeen 2003; Cohen 2002), including sub-Saharan Africa. As of 1999, there were 2.75 million teachers at primary and

secondary level across sub-Saharan Africa (Bennell *et al.* 2002), Nigeria having the largest number (590,000).

In medium-to-high HIV-prevalence countries, low educational attainment in conjunction with increases in HIV/AIDS lead to a potential downward spiral towards low or even no economic growth (for a review of the HIV/AIDS and economic development literature, see Couderc *et al.* 2003; among multi-country statistical analyses, see Haacker 2002; Over 1992). The importance of human capital for economic growth has become orthodoxy in economic development (Barro 1999; World Bank 1993). The data on educational attainment in sub-Saharan Africa are shocking. The United Nations Population Fund estimates that 45% of children aged 10–14 (37.4 million) will not complete primary school in the year 2000, while 20% of children aged 10–14 (20.8 million) have never attended school (Lloyd and Hewitt 2003) in sub-Saharan Africa. The HIV/AIDS epidemic places the EFA and MDG goals of universal school enrolment further out of reach. Factors in the reduction of the annual growth rate include decreased labour input, crowding out of investment by health expenditure, and a decreased stock of human capital.

The above estimates, however, might underestimate the effect of the epidemic on growth for two reasons. First, human capital has an intergenerational dynamic: the educational attainment of parents is a strong predictor of the educational attainment of their children (Haacker 2002; Hamoudi and Birdsall 2004; McDonald and Roberts 2004). Given the terribly low level of human capital in sub-Saharan Africa, if significant progress is not made on the EFA and MDG goals in the next 5–10 years, the future seeds of low education attainment will be sown. The skilled workers that would bring investment and lift many households out of poverty would not exist. Ultimately, the HIV/AIDS epidemic might create a low-growth development trajectory or “trap” for high HIV-prevalence countries. Second, low educational attainment would continue to drive down the development of “the knowledge economy” – technical experts in medicine, information technology, and other scientific areas (World Bank 2002). Over time, persistent low levels of human capital would deepen the current shortage of medical personnel in high HIV-prevalence countries, which would

make capacity building within the public health infrastructure even more difficult.

### **Is there a window of opportunity?**

In the last 5 years, Ministries of Education across sub-Saharan Africa have planned extensively to deal with the consequences of the AIDS epidemic. With technical help from the UNESCO and the World Bank and financial support from bilateral donors such as the United States Agency for International Development, a large number of sub-Saharan African countries have outlined plans for teacher recruitment, teacher training (including HIV/AIDS prevention) and programmes for orphans and vulnerable children. Despite these best efforts, it is hard to imagine how the gains in educational attainment can continue in the face of the epidemic. Just as HIV/AIDS creates negative consequences for the education sector, the scaling up of HAART does not only give hope to thousands who have not had access to it; but treatment also offers an opportunity to create positive externalities for the education sector.

Many high-prevalence HIV/AIDS countries in sub-Saharan Africa are providing free HAART to Ministries of Defence through publicly funded programmes. For example, the Ministry of Defence (MOD) in Ethiopia has implemented a very robust HIV/AIDS programme to prevent and treat HIV/AIDS and related opportunistic infections. The Federal Government of Ethiopia chose the MOD for a number of reasons. First, the country needs healthy soldiers to defend and protect the country. Second, soldiers are at risk of infection and can further transmit the virus, especially in conflict situations. Third, military service is a very dynamic occupation that requires soldiers to be away from their families, and many sexual activities take place whilst on deployment.

It is important to point out that, even as many Ministries of Education in sub-Saharan Africa discuss their human resource needs, few consider HIV/AIDS treatment for teachers as a means to protect their staff. As access to care increases with more affordable treatments and strengthened delivery systems, Ministries of Education have the opportunity to work with

Ministries of Health to plan for increased care. Zambia has begun pilot treatment and has introduced an innovative financing programme for teachers to receive HAART at a subsidized rate. The importance of the treatment of teachers goes beyond cost-benefit analysis; access to HAART for teachers would allow Ministries of Education to respond better to the increasing demand for primary education in order to meet EFA and MDG goals and to maximise the effect of HIV prevention in schools.

### **Providing HAART to teachers results in positive externalities**

There is a lot of debate going on at both national and international levels on whether targeting certain groups for HAART can be justified or, rather, violates human rights to equal access and equitable treatment. For example, the Commission on Human Rights in 2001 and again in 2002 confirmed that access to AIDS medication is a key component of the right to the highest attainable standard of health, enshrined in the Universal Declaration of Human Rights, the International Covenant on Economic, Social and Cultural Rights, and the Convention on the Rights of the Child (UNAIDS 2002).

While we acknowledge that the ongoing debate on targeting is politically sensitive and potentially divisive (Houston 2002), scaling up HAART in the public sector and especially among teachers could garner substantial benefits and fiscal savings. The direct benefits of scaling up treatment among teachers are clear: lower rates of teacher attrition and absenteeism and fewer poorly qualified teachers. There are also other benefits or savings that should be considered. Scaling up care for teachers offers three forms of fiscal savings to the Ministries of Education (Grassly *et al.* 2003). First, many countries provide sick pay in the form of 6 months to 1 year of the teacher's salary; in some high HIV-prevalence countries, as much as 5% of the teaching corps might be on sick leave. Second, Ministries of Education need to replace those teachers, and that cost could be substantial; it is estimated that the replacement of teachers due to the AIDS epidemic would cost Zambia US\$25

million from 2000 to 2010; the cost in Mozambique would be double (World Bank 2002). Third, Ministries of Education usually assume the funeral costs of their late teachers, and in a resource-poor setting, that cost is significant.

Finally, scaling up treatment for teachers offers Ministries of Education an opportunity to catch up in the overall student/teacher ratio and the shortage of qualified secondary school teachers. In many sub-Saharan African countries, the national primary school system has high student/teacher ratios (above 40 students per teacher); in Uganda and Zambia where school fees have been waived, the ratio in some schools has reached 60 students per teacher (Desai 2002; Kirungi 2002). There is also a potential problem with bottlenecks between the primary and secondary level. As primary school enrolments have increased, many national education systems do not have the capacity to absorb these students into the secondary school system. A key dimension of the limited capacity of the secondary level is the relative shortage of qualified secondary school teachers. Scaling up treatment would allow Ministries of Education to plan for the greater demand for secondary school without scrambling to replace highly trained, specialized teachers.

Scaling up treatment not only contributes to the progress towards the goal of universal school attendance but would also strengthen prevention efforts for children (Global Campaign for Education 2004a). Schools act as a major conduit or point of entry for HIV/AIDS prevention, because primary school children have not yet become sexually active and school children, especially girls, face a high risk of infection at ages 15–24 (Carr-Hill *et al.* 2002; Kelly 1999; UNESCO 2004; World Bank 2002). Girls represent a majority of the unschooled, and at ages 15–24, females in many countries have an HIV prevalence rate over 20%, or 2–6 times higher than that of males in the same age cohort (Bennell *et al.* 2002). Furthermore, research in India, Kenya, Botswana, Malawi, and Uganda suggests that school is the most important source of information on HIV/AIDS for girls (Bennell *et al.* 2002; Boler *et al.* 2003). Without universal primary school coverage, the power of school-based prevention programmes as a “social vaccine” (World Bank 2002) is greatly diminished.

Since the early 1990s, Ministries of Education across sub-Saharan Africa have incorporated HIV/AIDS in their general education planning. For example, they have needed to account for teachers lost to illness or death in planning, and with the assistance of UNESCO, the World Bank, and the Mobile Task Team on Education from the University of KwaZulu Natal in South Africa, they have done so. There are also concerns about not only prevention programmes for newly trained teachers but also the role of teachers as facilitators of HIV prevention education. In many surveys and interviews, teachers have shared their unease about the lack of training in HIV/AIDS prevention as well as about teaching a subject that is still considered taboo (Bennell *et al.* 2002; Boler *et al.* 2003). Many Ministries of Education have worked with non-governmental organizations and civil society to address school attendance by orphans, 12 million of whom had lost one or both parents in 2003 (UNAIDS 2004). The next section describes the current pilot efforts in scaling up treatment and increasing school coverage in Zambia, and the relationship between the two.

### **Preliminary lessons of providing HAART to teachers: the case of Zambia**

Zambia is one of the few countries that is piloting the provision of HAART to teachers. The Zambian programme is an example that illustrates how low-resource countries can provide HAART to the education sector.

The country has started two major social transformations since 2000. The first revolution involves the scaling up of HAART in response to one of the worst AIDS epidemics in sub-Saharan Africa. According to UNAIDS, 1.1 million adults are HIV-positive, and 140,000 adults require HAART (UNAIDS 2004). Zambia has an HIV adult prevalence rate of 16%, and UNAIDS estimates the cumulative number of AIDS deaths at 130,000 and the number of orphans at 910,000 in 2003. In the initial stages of scaling up, Zambia's Ministry of Health was planning to offer HAART to 10,000 adults by the end of 2004 and to 100,000 adults by the end of 2005 as part of WHO's 3 × 5 programme

(WHO 2004). In 2003, the cost of providing subsidized antiretroviral drugs in the public sector was estimated at approximately US\$277 per patient annually (Kombe and Smith 2003).

The second transformation in Zambia lies in its quest to meet EFA and Millennium Development goals: universal primary school enrolment and improved coverage at the secondary and tertiary levels. In the 1980s and 1990s, primary school enrolment stagnated in the range of 65–75%, primarily due to the lack of government investment during a long series of fiscal crises (Filmer 2002; Grassly *et al.* 2003). In the second half of the 1990s, school fees became a major impediment to school attendance, especially for students from poor households. In 1996, 98% of children aged 9, from households in the top 20% of the income distribution attended school; for the bottom 40% of households, the figure was only 55% (Filmer 2002). In 2002, Zambia cancelled school fees for primary school, and the United Nations Population Division reported that the primary school enrolment rate rose to 81.7% (Desai 2004).

The Ministry of Education has been trying to recover from the effects of the HIV/AIDS epidemic and fiscal tightening as part of structural adjustment programmes. Before the decisions to initiate HAART treatment and cancel school fees, the HIV/AIDS epidemic had a severe impact on the education sector. In 1999, 21% of primary school teachers out of a total of approximately 37,000 were HIV-positive, which nearly matches the prevalence rate of the general population (Grassly *et al.* 2003). Since the late 1990s, the annual rate of teacher mortality due to AIDS has been estimated to be roughly 2% or 800 teachers (Bennell 2003). And, on the basis of more anecdotal reports, the number of annual teacher deaths has been put at 2000 (Loyn 2003). The latter figure nearly equalled the total number of new teachers trained annually. Predictably, teacher absenteeism and the subsequent petitions for sick leave increased in the late 1990s. As a result, the Ministries of Education reduced the length of teacher training from 2 years to 1 with the goal of doubling the number of teachers trained annually (Grassly *et al.* 2003); in 2002, 3600 newly trained teachers were qualified.

The issue of sick leave was especially delicate, because the Zambian government, at



AIDS patients in a hospital waiting room in Maputo, Mozambique. REA/Nir Kafri

the behest of the International Monetary Fund (IMF), was implementing public sector reform in order to cut its public sector wage bill and ultimately its fiscal deficit. Although the public administration law only requires teachers to be paid for 3 months at full salary and for the next 3 months at half salary, most administrators provide sick pay of 1 year at full salary, or US\$1500 (Grassly *et al.* 2003). Sick leave costs might have prevented the necessary hiring of new teachers as enrolment ballooned after the elimination of school fees. In February 2004, the start of the school year, the Zambian Ministry of Education sought to hire an additional 9000 teachers, who had been recently trained, to address the explosion in school enrolment. The IMF in effect vetoed their appointment on the grounds that the addition to the public sector payroll would put the wage bill over 8% of GDP, Zambia's fiscal target. Since then, the Nether-

lands has given US\$11 million in bilateral aid to Zambia to hire these teachers and cover back pay owed to retired teachers.

An innovative programme allows teachers to obtain low interest loans to pay for HAART treatment. According to the Ministry of Education, a teacher living with AIDS will apply for a loan to pay for treatment at one of the publicly funded ARV sites. The applicant will provide proof that he/she has been diagnosed with the HIV infection and is eligible for HAART. The application is reviewed and approved by a committee. Once the approval is completed, the teacher receives money either as a lump sum or in instalments. This loan is paid back through monthly deductions from the teacher's salary. This programme has several advantages. First, it allows teachers living with HIV/AIDS to access and pay for HAART. In Zambia, primary school teachers' salaries average US\$1500, which

is almost five times the level of income per capita for the general population (WHO 2004). Second, it also allows the patient to come up with money that can be repaid over a period of time. Third, HAART offers teachers living with HIV/AIDS the potential to lead healthy, active lives despite their HIV-positive status. Teachers may return to being productive members of the work force, and can expect fewer opportunistic infections. Finally, it is hoped that the prospect of receiving HAART will reduce stigma and encourage other individuals to seek voluntary counselling and testing, and this would in turn help reduce the infection rate (Kombe and Smith 2003).

This section briefly presents the costs and benefits of providing HAART to teachers. Kombe and Smith (2003) estimated that the cost of HAART per patient per year was about US\$495. This cost included ARV drugs (57%), monitoring tests such as liver function tests, complete blood count, CD4 count and viral load (36%), and capital, training, and labour (7%). In order to estimate the costs and benefits of providing HAART to teachers, this article applies a rounded figure US\$500 for the annual HAART treatment per teacher (all monetary figures are in US dollars for the year 2002). There are, however, three sources of fiscal savings, from scaling up treatment for teachers: sick pay, the cost of training of new teachers, and funeral expenses, all estimated by Grassly *et al.* (2003). The greatest savings potential is likely to be from sick pay. As noted, Zambian teachers are paid up to a year's salary in sick leave, or US\$1500. Under HAART, some teachers might still have to take sick leave; therefore, the savings per teacher participating in HAART will be assumed to be one-half of a full year's salary or US\$750. The cost of training a new teacher is estimated at US\$500 (equal to the cost of HAART), which includes teacher education and subsequent student teaching monitoring and evaluation. Finally, the Ministry of Education would not have to pay for funeral expenses, which were estimated at US\$176 per teacher. The fiscal savings of keeping a teacher in the workforce thus amount to US\$1,426.

Calculations were of HAART after 11 years (2005–2015) under different repayment regimes for teachers and different levels of HIV prevalence among teachers. It is important to note, however, that while the costs (US\$500 per patient) are annual, the savings are a one-time

occurrence: US\$1,426 per teacher. There are three hypothetical repayment schemes under which teachers would be required to pay half (US\$250), one-quarter (US\$125) or nothing for HAART. Key assumptions made for this analysis are that all teachers eligible for treatment enrol and fully participate in the programme. With access to a government loan to cover the required contribution, such a cost is unlikely to be a significant barrier to care for teachers.

Three levels of HIV prevalence among teachers are considered. With an initial group of 37,000 primary school teachers and an annual attrition rate of 5% (considered the normal non-AIDS related rate of attrition), if the Ministry of Education adds 4000 teachers per year for 10 years, Zambia would have 55,500 teachers in 2015 – enough to meet the demand for schooling of the primary school-age population in 2015. In the baseline year, all three scenarios of HIV teacher prevalence would be that 2500 teachers (out of roughly 7500 who are HIV positive) would require HAART. Although the numbers for teachers who need HAART in the baseline year might seem high, it is a conservative estimate and accounts for an under-estimation of the number of HIV-positive teachers in Zambia (ACT Africa 2000). The low estimate assumes that 600 teachers would be added to HAART annually so that 8500 teachers, or 15%, will be on HAART in 2015. In the medium estimate, 1200 teachers would be added to HAART annually so that 14,000 teachers, or 25%, will be on HAART in 2015; and finally, in the high estimate, 1200 teachers would be added to HAART annually so that 22,500 teachers, or nearly 40%, will be on HAART in 2015.

Table 1 provides results for costs and savings, building on results from the AIDSTREAT-COST (ATC) model by Abt Associates. The AIDSTREATCOST (ATC) model is used to assist policy-makers to better understand the costs and implications of providing HAART and is often used in the policy and strategic planning process for national and international programmes. More detailed information on the ATC can be found at [www.phrplus.org](http://www.phrplus.org).

The key finding is that scaling up treatment for teachers is a relatively inexpensive policy intervention to protect the teacher corps, especially if teachers contribute towards their own care. Under all HIV prevalence scenarios, at a

TABLE 1. Costs and savings of scaling up HAART for teachers under different repayment plans and HIV prevalence rates, Zambia, 2005–2015

US\$ millions (2002)		Teacher pays. . .		
		US\$250	US\$125	Nothing
Low HAART participation 8,500 teachers 15% in 2015	Cost	15.1	22.7	30.3
	Savings	12.1	12.1	12.1
	Net cost (millions)	3.0	10.6	18.1
Medium HAART participation 14,000 teachers 25% in 2015	Cost	23.4	35.1	46.8
	Savings	20.7	20.7	20.7
	Net cost (millions)	2.7	14.4	26.1
High HAART participation 22,550 teachers 40% in 2015	Cost	34.4	51.6	68.8
	Savings	32.1	32.1	32.1
	Net cost (millions)	2.3	19.5	36.7

TABLE 2. Teacher-years saved and net cost per teacher-year, Zambia, 2005–2015

US\$ (2002)		Teacher pays		
		US\$250	US\$125	Nothing
Low HAART participation 8,500 teachers 15% in 2015	Net cost (millions)	3.0	10.6	18.1
	Teacher-years saved	60500	60500	60500
	Cost per teacher-year	49.65	174.65	299.65
Medium HAART participation 14,000 teachers 25% in 2015	Net cost (millions)	2.7	14.4	26.1
	Teacher-years saved	93500	93500	93500
	Cost per teacher-year	28.86	153.86	278.86
High HAART participation 22,550 teachers 40% in 2015	Net cost (millions)	2.3	19.5	36.7
	Teacher-years saved	137500	137500	137500
	Cost per teacher-year	16.65	141.65	266.65

subsidy of 50% (meaning teachers pay US\$250 annually for HAART), the net cost to the government is very low (between US\$2.6 to US\$4.2 million over the 11 years). If a teacher has to pay US\$125 for HAART, under all HIV prevalence scenarios, the net cost to the government would be between US\$10.6 to US\$19.5 million over the 11 years. Finally, if HAART were free to teachers, under the low estimate of HIV prevalence, the net cost in the entire period is roughly US\$18.1 million; in the medium estimate, US\$26.1 million; and under the high estimate, US\$36.7 million.

Another factor in projecting the net costs of scaling up care for teachers is the value of saving a teacher-year – the average cost of keeping a teacher healthy enough to complete an academic year. Table 2 shows the number of teacher-years saved under the various scenarios. Under the low HIV prevalence, 60,500 teacher-years would be saved; in the medium estimate, 93,500 teacher-years saved; and for the high estimate,

HAART would save 137,750 teacher-years. Table 2 also provides information on the value of one-teacher-year saved under different combinations of teacher repayment and HIV prevalence. At full government subsidy, the net cost is US\$300 per teacher-year saved under low HIV prevalence, US\$279 under a medium level of HIV prevalence and US\$267 under a high HIV prevalence. Therefore, a contribution of US\$250 by teachers for annual HAART treatment would reduce the net cost per teacher to US\$50 or less for all infection rate scenarios. Even if a teacher only pays a quarter of HAART (US\$125), the net cost per teacher-year is relatively low (less than US\$200) at all HIV prevalence levels.

These figures offer several important points on the relationship between HAART and education. Newly trained teachers are able to complement the stock of current teachers to cover burgeoning schools instead of replacing teachers too sick to work. It is estimated that Zambia will have 2.2 million children of primary school age

by 2015 (ACT Africa 2000; Grassly *et al.* 2003). In order to achieve a student/teacher ratio of 40:1, Zambia would need a primary school teaching corps of 55,000, and without access to treatment, the AIDS epidemic completely undermines that goal. Scaling up treatment for teachers is likely to make the difference in reaching the EFA and MDG targets of universal primary school coverage.

Furthermore, a HAART programme for teachers remains viable even under the stress of extraordinary HIV prevalence (in the high estimate used in this article, 40% of teachers will be on HAART in 2015). If Zambia hires as many more teachers as assumed in the projection and pays them US\$1500 annually over the period 2005–2015, the total wage bill for primary school teachers would be US\$763.8 million for the 11 years. With a teacher contribution of US\$250, even with a high HIV rate for teachers, the Zambian programme's net cost is minuscule (US\$2.1 million) compared with the total payroll. If teachers on HAART contribute US\$125 towards their care, the net cost of US\$19.5 million for the 11 years would only represent 2.6% of the total payroll. Even under the most expensive case (full public subsidy for HAART), the net cost of US\$36.7 million equals 4.8% of teacher salaries from 2005–2015. The figure is relatively large in light of recent public sector reform efforts in Zambia, but it is not monstrous. A remarkably high HIV prevalence sub-population (40% for teachers) does not render HAART cost-prohibitive.

It is important to note that other social benefits that represent positive outcomes are not included in the above tables. Scaling up treatment would keep experienced teachers alive and would be likely to have a positive effect on quality of education and student achievement in basic skills. Studies indicate that many developing countries, like Zambia, have been effective in getting students into the classroom (school enrolment), but not as effective in maintaining or improving quality of education (student achievement) (Global Campaign for Education 2004b; OECD 2003). Only 25% of Zambian children in school read at a level of minimum proficiency in grade six (age 12) (Ministry of Education 1999). Furthermore, scaling up treatment prevents siphoning off professionals to government administration or to other areas of

the economy. Finally, scaling up treatment for teachers strengthens the "social vaccine" – HIV prevention – because more children, especially girls, are exposed to an HIV prevention curriculum and communication relating to behavioural change.

There are, however, some potential problems with scaling up care for teachers. It is important to note that the cost-benefit analysis is preliminary and does not account for all key variables. The fiscal savings from pensions to the spouses of deceased teachers is potentially large, but pensions were not included in the cost-benefit analysis. Furthermore, no public health human resources component is factored in the analysis; the stress of a HAART programme for teachers might impact more on limited health personnel than even on fiscal resources within the health sector. The projections of the costs and savings from the HAART programme for teachers constitute a first approximation. A simulation model would allow some parameters to vary in order to capture different contingencies not accounted for in Tables 1 and 2. For example, a percentage of HIV-positive teachers will not respond to HAART and will not survive; and it is unclear whether or not the associated costs of those teachers' deaths are substantial. In addition, the effect of the cost of teachers' contribution towards their own care and the participation rate of teachers in the HAART programme could be incorporated into a simulation model.

Other questions arising are if teachers pose a threat in terms of spreading the disease in school or if they are receiving adequate prevention education within their own training. The issue of sex between teachers and students (and for that matter, between students) is a very delicate subject, and the safety of girls at school has become an important issue in many Ministries of Education across sub-Saharan Africa, including Zambia. Many teachers across the continent have also expressed concern that they do not have the appropriate training to teach an HIV prevention curriculum (Bennell *et al.* 2002). Perhaps the biggest issue is filling rural teaching posts, because the scaling up of care would force HIV-positive teachers to remain in urban areas for treatment. A small bonus to teachers willing to teach in rural areas might be enough incentive to cover rural schools.

As long as countries like Zambia cannot afford to offer treatment to all people living with AIDS, a HAART-programme for primary school teachers presents a series of difficult moral questions: why should teachers be the first in line for HAART? If teachers receive HAART, why not other public sector employees, namely the military, health sector personnel, high-level bureaucrats and politicians, who can make similar claims of government need? Why should anyone from the public sector be privileged over the average citizen? The rationing or targeting of HAART has been a controversial issue since inception of ART programmes in many low-resource countries. Many policy-makers argue that human rights promotion and protection is central to the response to HIV/AIDS. Denying the rights of people living with HIV, and those affected by the epidemic, imperils not only on their well-being, but life itself (UNAIDS 2002). This article is not proposing that teachers be placed at the front of the line for HAART, but that the social magnitude of education provides several reasons for policy-makers to plan to protect the teaching corps from the AIDS epidemic. The role of education in economic development and social cohesion places teachers in a special class within the public sector. No developing country would be able to train enough teachers to replace those fallen to the epidemic, and the disruption of the AIDS epidemic on the primary school system will only worsen unless the teaching corps is protected.

Education has a special place in the public sector, because the education sector is responsible for producing the skilled young people to supply the current and future workforce. The expansion of HAART coverage requires a larger corps of health workers, namely doctors, nurses, pharmacists, laboratory technicians, and midwives. In some high HIV-prevalence countries, the human resources deficit is dire. Despite potential bottlenecks at the secondary and university levels, developing countries require a larger pool of skilled young people to meet the increasing labour demand in the health sector. Finally, the fear that a HAART programme for teachers might crowd out treatment for others is mitigated by teacher contributions to the cost of their own care. The fiscal savings and the teacher contributions offer additional resources that could be used to expand HAART coverage to other HIV-patients.

## Conclusions and the way forward

This article has outlined the mutual benefits of providing care for teachers and Ministries of Education as a means to improve HIV/AIDS outcomes and educational goals. Countries coping with HIV impacts that are also focused on improving educational outcomes will need to plan accordingly, and strategic planning tools and approaches often used for HIV policy planning can be useful for other ministries experiencing HIV impacts. In order to further progress for HIV/AIDS and education initiatives the following points are critical to consider. First, the moral imperative for increasing access to HAART in developing countries is clear, yet the introduction of HAART has important implications for the education sector as well. Second, the provision of HAART to teachers can be an efficient approach to protect the teaching corps, the largest group of employees in the public sector. Although HAART seems expensive in a low-resource environment, the death of a teacher is very costly for the Ministry of Education, which often pays sick leave and ultimately the funeral expenses for its sick teachers. When the expense of training new teachers to replace them is included in the total cost, HAART actually becomes less of a fiscal burden than previously thought.

Third, if schools are to become an effective setting for HIV prevention or “the social vaccine”, children have to be attending school. In many ways, schools are the front line of the fight against the HIV/AIDS epidemic, and low levels of primary school attendance undermine HIV prevention efforts dramatically. The rate of primary school enrolment is an indicator that is often ignored by public health officials, but progress towards universal primary school coverage has major implications for the future of the epidemic, especially in high HIV-prevalence countries. In particular, schools are the primary source of information about HIV/AIDS for girls.

Finally, scaling up HAART to teachers helps ensure that a high HIV-prevalence country like Zambia has enough teachers to make the EFA and MDGs targets attainable. If countries like Zambia could reach the EFA and MDGs targets, a virtuous cycle of development could

follow. With an adequate number of teachers, levels of education attainment and human capital can rise and build a foundation for larger economic growth; higher levels of human capital will allow the health sector, the rest of the public sector and information economy to have the high-skilled workers that they need; and finally, higher school enrolment will strengthen schools as the key point of entry in prevention efforts, especially for girls. The size and role of the education sector make scaling up HAART for teachers an

appropriate and necessary part of a comprehensive strategy against the AIDS epidemic.

In summary, it is critical that the global initiatives for HIV/AIDS and education be considered together and that, in so far as they are mutually reinforcing, strategic planning processes and resultant programmes consider the opportunities and outcomes that each initiative offers. Future progress in the global HIV/AIDS response and the education movement depends on it.

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