

# UC Berkeley

## Recent Work

### Title

Whither India? Ten Lessons Learned from the HIV Epidemic in Africa

### Permalink

<https://escholarship.org/uc/item/8409v33r>

### Authors

Potts, Malcolm  
Walsh, Julia

### Publication Date

2002-12-04

**Whither India?**  
**Ten Lessons learned from the HIV epidemic in Africa**

Malcolm Potts, MB, BChir, PhD  
Bixby Professor, Population and Family Planning  
Bay Area International Group  
School of Public Health, U.C. Berkeley  
pottsmalcolm@yahoo.com  
(510) 642-6915

Julia Walsh, MD, MSc  
Adjunct Professor, International Health and Maternal and Child Health  
School of Public Health, Bay Area International Group, and  
Institute for Human Development U.C. Berkeley  
UCSF/UCB Institute for Global Health  
jwalsh@socrates.berkeley.edu  
(510) 642-1629

Version date: 12/04/2002  
Word count in text (not including abstract, tables or figures): 4,706  
Abstract word count: 240

## **Abstract**

Recent reports show that the HIV epidemic is rapidly spreading in parts of the largest Asian countries, namely India and China. Despite its strong foothold, there are still opportunities to minimize the problems if we apply these ten lessons learned from the HIV epidemic in Africa 1) The needed decisions will be controversial and require involvement of the beneficiaries in all aspects; 2) Focus on cost-effective programs especially those that affect the core transmission groups such as participants in transactional sex, intravenous drug use, and men who have sex with men; 3) Secure the commodities pipeline - adequate supplies of condoms and antibiotics are essential; 4) Invest only in projects that can be brought to scale; 5) Ensure appropriate delegation of needed tasks to optimize the effectiveness of health workers; 6) Reexamine the structure and work of international donors to exploit faster and more efficient ways to channel funds into the most effective programs; 7) Reduce the number of large international meetings. They waste resources; 8) Confront the “shell game” trade-off in the allocation of competing resources for prevention and highly-active antiretroviral therapy; 9) Update evidence-based policies and program efficiently; and finally, 10) Increase national and global budgets now. Large investments at the outset of the epidemic have a greater impact on slowing its progress than at a later stage. By applying these lessons, more effective policies and strategies may be able to stem the tide of this deadly epidemic.

## **Key Words**

Acquired Immunodeficiency Virus, HIV, prevention and control, Africa, India

Over the past two decades, HIV has spread exponentially throughout sub-Saharan Africa. In some countries (Botswana, Lesotho, Swaziland, South Africa, Zimbabwe, and Zambia), one-fifth or more of adults over the age of 15 are now HIV positive. A great many public health interventions designed to slow the spread of HIV have been implemented in Africa, but few have had a significant impact on the spread of HIV.<sup>1,2</sup> The well known fall in prevalence in Uganda seems to be primarily driven by reduction in the number of sexual partners and may be in response to seeing friends and relatives die of a new disease.<sup>3,4,5</sup>

Reported prevalence rates underestimate the enormous impact of HIV because they omit those that have already died of AIDS and do not capture those who will become infected. Zaba estimates that when 20% adults over 15 are HIV positive, then 70% of them will eventually die from HIV/AIDS.<sup>6</sup> Deaths at this level are unprecedented in the history of modern medicine. Asia, and in particular India, shares many of the same risk factors as Africa, including massive poverty, similar patterns of health expenditure<sup>7</sup> (Fig. 1), a weak health infrastructure in many parts of the country, and prevalent high risk sexual behaviors (Table 1).<sup>8</sup> In India, a catastrophe on the level of Africa may be unlikely, but none the less it is prudent to learn from past experience and to ask: can the experience of efforts to control the spread of HIV in sub-Saharan Africa be used to create policies and strategies for slowing the spread of the virus in South East Asia? There is a need to rethink every aspect of HIV prevention including but not limited to the management of donor and government funds, the involvement of the beneficiaries in all aspects of decision making, the allocation of available resources, the roles of non-governmental organizations and the private sector, and the use of scientific evidence in developing policies and

strategies. Every aspect of AIDS prevention must be open to self-criticism, and no activity can be considered sacrosanct.

### **HIV Transmission**

Despite its devastating toll, HIV is in fact a fragile, difficult to transmit, and easily destroyed virus. The empirical data to date suggest that rapid spread occurs primarily in sex workers (CSW), IV drug users (IDU), and men who have sex with men (MSM). In sub-Saharan Africa the reproductive rate of the virus for heterosexual transmission is above one, but in most high income countries it appears to be below one for heterosexual spread. In these latter countries, clusters of heterosexual cases that are primarily driven by bisexual activity and IDU will occur, but may not escalate to a self-sustaining heterosexual epidemic.<sup>2</sup>

HIV entered Asia some years later than Africa and the future course of the epidemic is still difficult to predict in India. India began HIV control programs several years ago, but these must grow much larger, or else, the epidemic in some areas could follow what has taken place in Africa. Table 2 compares the HIV seroprevalence in high and low risk populations at the beginning of South Africa's epidemic that exploded in the 1990s with the levels found currently in India.<sup>9</sup> Figure 2 similarly compares the rapid epidemic spread, but across a twelve year time frame in urban areas.<sup>9</sup> The evidence to date is that the political leadership in India, as in much of Africa, may continue to fail to give a high priority to controlling the epidemic. We also assume that financial resources will remain in short supply. Figure 1 demonstrates that most Sub-Saharan African countries have public health expenditures around \$20 per capita.<sup>7</sup> Porous and inefficient purchasing and distribution systems further deplete supplies.

## **Lesson One: The needed decisions will be controversial.**

HIV begins in the core groups of sex workers, IV drug users, and men who have sex with men (Table 1). Mathematical models of HIV and STI transmission demonstrate both the benefits of early intervention and the critical importance of focusing on these core high risk transmission groups (CSW, IDU, and MSM).<sup>10, 11, 12, 13, 14, 15, 16</sup> These groups are outside the political, social, and economic mainstream and are notionally illegal. India remains a traditional society with conservative laws and attitudes. For example, the punishment for homosexuality has hardly changed since it was formulated by the British Parliament in the 19<sup>th</sup> century<sup>17</sup> and it is unlikely to be changed in a society where procreation is considered an obligation. Families fear that the declaration of homosexuality by male members will deprive them of the economic benefit of a dowry. The sex industry in a city such as Mumbai includes bribing the police. Such an environment discourages agencies from working with high-risk groups and leads to distrust of health workers among the group members.<sup>15</sup>

Decision –making bodies can be stymied by controversy. The WHO Global Program on AIDS (GPA) established coordinating committees in every country that included stakeholders from religious, lay and professional communities. It is difficult for broad-based committees to allocate resources to some of the most unpopular groups in society.<sup>1, 18</sup> Attempts to reach a consensus in matters relating to sexual diseases and behaviors are doomed to failure. Yet, particularly at the outset of an epidemic, control of transmission requires targeting those groups most affected.

## **Lesson Two: Focus on Cost-effective Programs**

Public Health often has to choose between a broad holistic approach to overcoming social problems and problems of poverty and a more focused, partly-technology driven solutions. Part of the intellectual effort and political capital used in responding to the HIV epidemic in Africa, was spent emphasizing the correlation between the HIV prevalence, poverty, gender inequalities, and social injustices.<sup>18</sup> While the overwhelming majority of those working in HIV prevention (including these two authors) wholeheartedly endorse efforts to overcome social and economic injustices, it is also important to be objective about the limitations of this approach. While poverty is a cruel burden, it is not always the driving force behind HIV spread. It is notable that Botswana has the highest per capita income, the highest rates of female education amongst many of its neighbors and also has the highest rate of HIV spread. HIV can double its prevalence within high-risk groups in six months, and in the general population in three to five years. Socio-economic change, even in its most rapid form, takes decades to achieve. After more than two decades of effort in Africa, there has been no significant improvement in human rights (indeed some of the most painful abuses of human rights in recent history have occurred there), nor in the economic conditions of the poor. Under the stress of AIDS deaths, many African economies are likely to slip backwards even further. There is no reason to assume the situation in India in the next 20 years will be in any way different. Even if there were the resources and political will to make significant socio-economic improvements, the timing of such changes is such that they are exceedingly unlikely to impact the spread of the virus. In Africa, there has been no reduction in the number of sex workers; and the number of children living on the streets has greatly increased.

The threat of AIDS in both Africa and contemporary India is associated with a high degree of denial by senior political leaders. Paradoxically, as long as the AIDS community highlights poverty as a major cause, then such leaders can avoid committing to obstruct immediate and necessary interventions, such as condom distribution to the unmarried, or clean needle exchange, and claim that only socio-economic change will cure the disease.

We suggest that a targeted approach on core groups is the most appropriate immediate strategy for much of China and India. The cost-effectiveness of interventions aimed at core groups is well established in theory, and confirmed in practice.<sup>16, 18, 19, 20</sup> STD management for sex workers, blood screening, voluntary counseling and testing, STD treatment for the general population, and zidovudine (AZT) or nevirapine (NVP) treatment of seropositive pregnant women<sup>18</sup> (Figures 3 and 4) (Pending publication as of May 2002: Masaki E, Green R, Greig F, Walsh J, Potts M. Cost Effectiveness in HIV Prevention Versus Treatment for Resource Scarce Countries: Setting Priorities for HIV/AIDS Management.

[http://big.berkeley.edu/HIVprev\\_treat.pdf](http://big.berkeley.edu/HIVprev_treat.pdf)) can avert a substantial number of cases at costs that are highly affordable even given the current low commitment of funding for HIV prevention. By contrast, the cost of treating one person for a year (full price drugs), we can prevent almost 50 cases (Figure 4).

### **Lesson Three: Secure the Pipeline**

Throughout the spread of the epidemic in sub-Saharan Africa, too little attention was given to the supply of essential drugs and condoms. In 1999 only 724 million condoms were distributed; that



is roughly equivalent to 4.6 condoms per adult male. It decreased to less than 650 million in the following year<sup>21, 22</sup>; UNFPA estimates that at least \$1 billion is needed for commodities to control AIDS. But despite this growing need, the gap between demand and supplies that can be provided through free or subsidized programs is at its lowest level in five years.<sup>23</sup> Based on the empirical evidence that people will spend up to one percent of their income to buy condoms, then people in Africa are too poor to afford the full cost of \$22 per year for manufacturing, promoting and distributing condoms there. Similar analysis also shows that 95 percent of people in India are too poor to afford the \$10.65 per year (Asian average) (Russell Green, 2001. "Empty Pockets: Estimating Ability to Pay for Family Planning," presented at the International Health Economics Association Third International Conference, July 22 - 25, 2001, University of York, United Kingdom at <http://big.berkeley.edu/research.workingpapers.htm>).

In Africa, many STD clinics do not have any adequate supply of appropriate antibiotics. India has the advantage of a large, competitive, and technically advanced pharmaceutical industry. The governments were pioneers in distributing free or subsidized condoms to low-income users for family planning. This precedent should be extended to antibiotics and other HIV prevention activities. On the whole, implementing agencies tend to emphasize programs to the detriment of commodity budgets. If additional commodities are required, then the international donor community should allocate the needed funds before passing money to implementing institutions.

#### **Lesson Four: Do not invest in projects that cannot be brought to scale**

Confronting a lethal epidemic in a population of India's scale requires developing a battle plan. For example, a comprehensive plan would establish STD treatment, condom distribution and peer education to sex workers in all major cities. Given the resources and need for immediate action, it would be preferable to have larger scale, relatively simple, un-nuanced programs that provide basic services to all rather than sophisticated labor-intensive programs covering a few cities. One lesson to be learnt from the shortcomings of the African experience is that neither the GPA, nor the large agencies such as USAID, nor the national governments ever set in motion a systematic effort to establish basic interventions for all sex workers, men who have sex with men and IV drug abusers in every large city. By contrast, while sex work in Thailand was widespread the Thai police and local officials were successful in threatening to close down brothels unless there was a national policy of 100% condom use.

Interventions in Africa often involved pilot projects that have not been replicated on sufficient scale to have an epidemiological impact on the spread of HIV. Two lessons can be learned from this experience: First is that most possible interventions, for example, condom distribution and use among sex workers, have already been tested more than once. Additional small-scale studies are not necessarily required in order to establish best practices. Second, it is essential to ask this simple question whenever a pilot intervention is designed: If this intervention is successful, are there resources available to carry it to scale? Obviously a commitment to spend money on an enlarged project is unlikely to be given in advance, but all program managers should be able to make a plausible case as to where they would secure resources for an expanded project. If they cannot do this, the project should not be initiated, however promising it may appear in theory.

India has a great many non-governmental organizations and this is both a strength and a potential weakness. Because NGOs frequently have access to these marginalized target populations and may operate efficiently, their involvement in HIV efforts is essential. However, the worst-case scenario would be one where many NGOs divide the limited resources to create carefully crafted, custom built curricula and fail to achieve any impact on the disease.

The converse, more effective efforts would entail a nation-wide program that can be implemented as a series of 'clone' programs to be put in place by mid-level staff in alliance with the beneficiaries. Estimating the total sum of money available and then allocating it equally across all the needed sites could determine the level of sophistication of such programs. The sums of money pro-rated in this way might be relatively small, but they could still have a significant impact. In retrospect, a similar program in Africa, say in 1985, might have achieved a delay in the spread of HIV.

### **Lesson Five: Ensure appropriate delegation of needed tasks**

In locales where the epidemic has spread beyond the initial high risk groups and heterosexual transmission is rising, then programs providing interventions for the population at large are essential.<sup>14, 24</sup> To reach the hundreds of millions who live in villages, then rural medical practitioners (RMPs) and western-trained physicians and other health professionals, will have to be involved. Many African countries have resisted the non-medical prescription of antibiotics. In India, RMPs often have a formal training in ayurvedic or some other traditional medicine. They are not formally permitted to prescribe antibiotics, although in practice they do so on a large

scale. RMPs have usually been excluded from the national family planning program, which may well help explain its relative failure in rural areas. Given the threat of HIV / AIDS, it is imperative that India consider realigning prescription regulations to more closely parallel China's RMPs and recognize the role of its private sector, which provides the vast majority of the needs of the poor.

### **Lesson Six: Reconsider the structure and work of international donors**

The unusual attributes of the HIV epidemic present a particular challenge to donors. Much of the money that went into Africa in the 1980s came from the GPA supported by governmental donors from North America and Europe. But in some years there was under spending despite the relatively limited resources available. For reasons noted earlier, it was difficult to get ministries of health to focus resources on high risk groups. The Indian government also has a history of under-expenditures in some areas related to health and development. Under-expenditures are particularly harmful because programs need the maximum support and also because residual moneys deter donors from increasing future year allocations.

The majority of the current funding for HIV/AIDS control now rests with the Global Fund for AIDS, Tuberculosis and Malaria. The money available amounts to less than quarter of the annual projected needs for AIDS control.<sup>25, 26</sup> However, with \$2 billion to distribute, the decisions the Fund makes have an enormous impact on the progress of HIV globally.

Concentration on cost-effective programs will have the maximum impact on HIV prevalence (Figures 3 and 4)<sup>13, 16, 18</sup> (Masaki E, Green R, Greig F, Walsh J, Potts M, 2002. Cost

effectiveness of HIV prevention versus treatment strategies for resource scarce countries: setting priorities on AIDS. <http://big.berkeley.edu/research.workingpapers.htm>).

One of the lessons to be learnt from Africa is the need to be able to support non-government programs (NGOs) that collaborate with the government but without permitting a government veto on the transfer of money. But NGOs share some serious weaknesses with the public sector. In Africa, it is common for much less than half the money put into input-based services to reach the field. Support for output-based services should ensure that money follows results.

USAID prepares proposal requests (RFPs) in order to set up HIV programs, as they do in family planning or child survival. Large philanthropic donors continue to receive solicited and unsolicited proposals that they then analyze and act upon. In retrospect, this type of funding was probably inappropriate and consideration should be given to possible innovations in this field. Very detailed RFPs both take time to create, and erode the creativity of the responding agencies that follow the blue print provided as closely as possible. In seeking to get support from foundations, implementing agencies also spend a lot of time guessing what the donor will respond to, rather than putting forward their most creative, beneficiary-driven and evidenced-based ideas. Given the importance of acting with speed and cost-effectiveness in relation to the spread of HIV, an alternative strategy would be for governmental and foundation donors to set achievable goals, specify how much money they wish to allot to this particular area, and then invite the maximum creativity and competition from possible implementing agencies. In this way, the rich experience of agencies in both developing and developed countries would be drawn

upon, the donors work would be greatly simplified, and the second guessing of the donor's goals would be pre-empted.

### **Lesson Seven: Large international meetings waste resources**

Large meetings consume a great deal of the sponsoring organizations time and also cost a great deal in airfares, *per diem*, and the opportunity costs of participants and organizers. The benefit of these meetings in terms of communication of ideas and initiation of new collaborations may be substantial but are hard to document, and must certainly decline with the frequency of the meetings. We strongly suspect that the current full docket of such meetings insures that their incremental benefit are far exceeded by the incremental costs. Finally, there is an important asymmetry in the focus driving the various lobbying blocs that have come to dominate the large international meetings. The HIV-infected understandably want to see resources put into antiretroviral treatment, but there's no countervailing group of lobbyists who will become infected in the next six months who plead for increased investment in prevention.<sup>18</sup> Highly specialized meetings dealing with specific topics, and which focus on science, are likely to remain useful, but the criteria for organizing global or large regional meetings need to become more stringent.

### **Lesson Eight: The resources for prevention and HAART are a shell game**

It is important to remember that there is a built in asymmetry into lobbying concerned for HIV/AIDS prevention and treatment. In the U.S., there are many educated and articulate HIV

infected individuals who benefit from ARVs and form a compelling lobby for extending ARV use to other groups in other countries. By contrast, there is no lobby for prevention of HIV/AIDS by individuals who are likely to become infected in the coming year. In fact, the very groups at greatest risk may be those who are underestimating and denying their own risk of infection. When prevention does succeed, it is impossible to point to an individual and say, "that person is alive because of prevention."<sup>18, 27</sup> Any objective effort to allocate the limited resources available to confront the HIV epidemic in India (and China) will have to take these asymmetries in lobbying into account.

As emphasized, the latest budget available for HIV prevention and treatment is limited. One lesson that is emerging in Africa is that money spent on HAART is money removed from prevention, and vice versa. Initial grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria have allocated 60% of the \$378 million in its first batch of grants in 2002 to support HIV projects.<sup>28</sup> 21 of the 28 countries receiving such grants will use this money to purchase ARVs for people living with AIDS. ARVs are difficult to use and, even at the greatly reduced prices available today, are exceedingly expensive therapies especially when necessary testing monitoring and counseling costs are tabulated; Moreover, "the availability of HAART has resulted in increased rates of unsafe sexual behavior" (per contact HIV transmission rates).<sup>29, 30</sup> Several epidemic models have demonstrated that investments in prevention avert more infections (and deaths) than HAART in developing countries,<sup>10, 13, 16, 18, 31</sup> (Sanderson WC, "The Demographic Impact of HIV Medication Programs," presentation at Population Association of America meeting, Atlanta 2002.)

The current annual cost of ARV treatment combinations such as AZT, NVP, and didanosine (DDI) range from \$360 for generics to nearly \$8,000 in U.S. dollars (Masaki E, Green R, Greig F, Walsh J, Potts M, 2002. Cost effectiveness of HIV prevention versus treatment strategies for resource scarce countries: setting priorities on AIDS.

<http://big.berkeley.edu/research.workingpapers.htm>). The total cost of administering a large-scale HAART program, even if there are further massive reductions in drug prices, will remain beyond the reach of individual and of community subsidy. Nevertheless, there will be intense emotional pressure to mount token subsidized HAART programs. Those who benefit will likely be those most educated and others with access to specialized care. But most HIV positive individuals in India in the next decade are highly unlikely to know their serological status. Many, probably a majority, will live far away from any health infrastructure with the capacity to use ARVs.

The perspective of the public health administrator is likely to be very different from that of a front line health professional confronted with young women and men dying of a disease for which they know life extending therapies exist. Moreover, intense pressure for the use of ARVs will come from lobbying groups in the west, and to a lesser extent in India. But the worrisome example of Thailand experiencing an increase in HIV following a decrease in the HIV prevention budget must shore up our commitment to prevention (De Sam Lazaro F. AIDS challenge in Thailand. Segment on NewsHour with Jim Lehrer, [http://www.pbs.org/newshour/bb/asia/july-dec02/aids\\_10-22.html](http://www.pbs.org/newshour/bb/asia/july-dec02/aids_10-22.html)).



## **Lesson Nine: Update evidence-based policies and programs frequently**

In the 1980s, the scientific evidence that other STDs facilitate the transmission of HIV was not acted on quickly enough. The focus on improving STD clinics and exploring the nature and usefulness of informal health networks to treat STDs had the potential to slow the epidemic in Africa in the 1980s. Up to half the investment made in some African countries in HIV prevention went into safe-guarding the blood supply. There was impeccable evidence that contaminated blood can spread the virus, but the infections of this type have probably never given rise to a self sustaining epidemic and in hindsight, the budgetary decisions made in this field were probably over enthusiastic.<sup>3, 4</sup>

Evidence coming out of Uganda strongly suggests that sexual abstinence and reduction in the number of sexual partners is the major driver behind the falling prevalence of HIV.<sup>3, 4, 5</sup> Islam, Christianity and Hinduism all emphasize certain aspects of sexual abstinence and one lesson from Africa will therefore be to involve faith-based organizations more aggressively in HIV education. As the epidemic takes off in India, attention needs to be given to the increasingly strong evidence that male circumcision retards HIV transmission. In a recent study in Uganda, 30 percent of uncircumcised men became infected from his HIV positive woman partner while none of the circumcised men with an HIV discordant partner.<sup>32</sup> Hindu men who make up the majority of the Indian population are uncircumcised and finding ways to offer circumcision may become an important public health method for retarding transmission of both HIV and STDs.<sup>33, 34</sup>

Gender inequalities are widespread in Africa and probably even more marked in much of India. Many women are not well placed to negotiate condom use with their partners, even though they may know that they are putting themselves at risk of HIV infection. There is a present and urgent need to develop a microbicide that a woman can use secretly to protect herself against HIV infection. The effectiveness of such an intervention would depend upon the use effectiveness (i.e. patient compliance) of the microbicide, not the theoretical effectiveness. There is circumstantial evidence to suggest that compliance with the use of a vaginal method among women may be higher than a condom amongst men, and a plausible case can be made that the effectiveness of these two methods may not necessarily be very far apart.<sup>35</sup>

Unfortunately, the prospects for such a viroicide obtaining U.S.F.D.A. approval in the next decade are dim. In 15 years of active research, only a handful of entities have reached phase III clinical trials and it is highly unlikely that any product will reach the marketplace in less than 7-10 years. A microbicide could play a lifesaving role in India but only if it reaches the market in two to three years. Products will have to be developed in countries such as India or South Africa within a regulatory and ethical framework determined by those countries.<sup>36</sup>

Then India could learn from the African experience and create meaningful evidence-based programs. There is a large unmet need for data on the costs of implementing and scaling up a wide range of both established and innovative prevention interventions. There's also a large deficit of knowledge on consumer willingness to pay for prevention and therapy. While data is collected particularly on costs of training, commodities and other expenditures, it is often not comparable. An extensive, and continually updated database on the costs and effectiveness of the

full range of prevention and treatment options is critical “public good” that the international community ought to be willing to fund at a very high level.

### **Lesson Ten: Increase national and global budgets now**

The investment made in AIDS prevention by governments in the west and developing countries in Africa has been a story of too little too late. At the same time, it is also true that if the modest annual sums of money flowing in the current decade had been available at the beginning of the African epidemic in the 1980s, they would have achieved a great deal more. Large investments to control the epidemic at the outset have a greater impact on slowing its progress than those at a later stage. This simple lesson in epidemiology needs to be understood by external donors, the Indian government and by foundations.

The Macroeconomic Commission on Health urges a major step up in donor funds to confront AIDS and other important diseases, primarily in Africa.<sup>19</sup> There is no doubt that greatly increased budgets are justified, and that they are also achievable, given the size of the world economy.<sup>37</sup>

### **Conclusions**

Given the detailed understanding of the virus, the knowledge about the natural history of HIV/AIDS, and the sound epidemiological predictions that were made in the first half of the 1980s, the failure to mount interventions which have had any demonstrable impact on the spread of the disease in sub-Saharan Africa is one of the greatest – possibly the greatest – failures in the

history of public health. If, as is possible, heterosexual spread reaches similar levels in some parts of India, then the evidence indicates that it would only be possible to slow the spread of the disease if India rapidly implements nationwide programs concentrating on: education about the disease and avoiding multiple sex partners, condom distribution (and needles for IV drug users) and effective treatment for STD.<sup>8, 38, 39</sup>

India also needs to watch the evidence that will come out of Africa on the acceptability and impact of male circumcision and the spread of HIV. At an early stage of the epidemic, as is characteristic of India today, the greatest impact on slowing HIV transmission can be achieved by focusing on core groups. In India this is primarily sex workers, and to a lesser extent the gay community. IV drug use is not an important mode of transmission, although where it does exist, there is impeccable evidence that the provision of clean needles greatly slows transmission. India can benefit from such programs as 275 million people live in cities, the total population is currently just over one billion and half of the population is between 15 to 49 years of age, the peak age for HIV transmission.

It may be difficult to achieve all these changes. But failure to apply the lessons learned in Africa to the situation in India could lead to an utter tragedy.

**Acknowledgements:** We would like to thank Mike Musante, Russell Green, Stephanie Heise, Elliot Marseille and Ndola Prata for their contributions to analysis, editing, and graphical presentation.

**Contributors:** MP conceived the analysis and led the writing of the paper. JAW led the overall data collection and helped write the paper. MP is the guarantor.

**Email correspondence:** Malcolm Potts (pottsmalcolm@yahoo.com)

**Sources of Funding:** Fred H. Bixby Endowment, and grants from the Gates and Hewlett Foundations

**Competing Interests:** None declared

## **References**

- 1 DeCock KM, Mbori-Ngucha D, Marum E. Shadow on the continent: public health and HIV/AIDS in Africa in the 21st century. *Lancet* 2002; 360: 67-72.
- 2 UNAIDS. Report on the global HIV/AIDS epidemic. Switzerland:UNAIDS, July 2002.
- 3 Kilian AH, Gregson S, Ndyabangi B, Walusaga K, Kipp W, Sahlmueller G, et al. Reductions in risk behaviour provide the most consistent explanation for declining HIV-1 prevalence in Uganda. *AIDS* 1999, 13: 391-398.
- 4 Asiimwe-Okiror G, Opio A, Musinguzi J, Madraa E, Tembo G, Caraël. Change in sexual behaviour and decline in HIV infection among young pregnant women in urban Uganda. *AIDS* 1997; 11: 1757-1763.
- 5 Parkhurst JO. The Ugandan success story? Evidence and claims of HIV-1 prevention. *Lancet* 2002; 360: 78-80.
- 6 UNAIDS. Report on the global HIV/AIDS epidemic. Geneva, June 2000.
- 7 World Health Organization. The World Health Report 2001 - Mental Health: new understanding, new hope. Geneva, 2001: 160-167. <http://www.who.int/whr/>
- 8 Hawkes S, Santhya KG. Diverse realities: sexually transmitted infections and HIV in India. *Sexually Transmitted Infections* 2002; 78 Suppl1: i31-9

9 UNAIDS. Epidemiological Fact Sheets. 2002 Update

10 Boily MC, Lowndes C, Alary M. The impact of HIV epidemic phases on the effectiveness of core group interventions: insights from mathematical models. *Sexually Transmitted Infections* 2002; 78 Suppl 1: i78-90.

11 Garnett GP. The geographical and temporal evolution of sexually transmitted disease epidemics. *Sexually Transmitted Infections* 2002; 78 Suppl 1: i14-9.

12 Lowndes CM, Alary M, Meda H, Gnintoungbe CA, Mukenge-Tshibaka L, Adjovi C, et al. Role of core and bridging groups in the transmission dynamics of HIV and STIs in Cotonou, Benin, West Africa. *Sexually Transmitted Infections* 2002; 78 Suppl 1: i69-77.

13 Stover J, Walker N, Garnett GP, Salomon JA, Stannecki KA, Ghys PD, et al. Can we reverse the HIV/AIDS pandemic with an expanded response? *Lancet* 2002; 360:73-7.

14 Blanchard JF. Populations, pathogens, and epidemic phases: closing the gap between theory and practice in the prevention of sexually transmitted diseases. *Sexually Transmitted Infections* 2002; 78 Suppl 1: i183-88.

15 Ward H. Short term interventions are not enough. *Sexually Transmitted Infections* 2002; 78: 80-1.

16 Creese A, Floyd K, Alban A, Guinness L. Cost-effectiveness of HIV/AIDS interventions in Africa: a systematic review of the evidence. *Lancet* 2002; 359: 1635-47.

17 International Lesbian and Gay Association. Situation of Homosexuals in India: report for the Swedish Embassy by a Delhi law firm. September 9, 1997.  
[http://www.ilga.org/Information/asia\\_pacific/situation\\_of\\_homosexuals\\_in\\_indi.htm](http://www.ilga.org/Information/asia_pacific/situation_of_homosexuals_in_indi.htm)

18 Marseille E, Hofmann PB, Kahn JG. HIV prevention before HAART in sub-Saharan Africa. *Lancet* 2002; 359: 1851-1856.

19 Potts M, Anderson R, Boily MC. Slowing the spread of human immunodeficiency virus in developing countries. *Lancet* 1991; 338: 608-613.

20 Moses S, Plummer FA, Ngugi EN, Nagelkerke NJD, Anzala AO, Ndinya-Anchola JO. Controlling HIV in Africa: effectiveness and cost of an intervention in a high-frequency STD transmitter core group. *AIDS* 1991; 5: 407-411.

21 Shelton JD, Johnston B. Condom gap in Africa: evidence from donor agencies and key informants. *BMJ* 2001; 323: 139.

- 22 United Nations Population Fund Press Release. "Nearly \$1 Billion Needed for Family Planning Supplies and Condoms for HIV/AIDS Prevention, Says UNFPA's Executive Director." May 3, 2001. <http://www.unfpa.org>
- 23 McNeil D. Global War Against AIDS Runs Short of Vital Weapon: Donated Condoms. *New York Times*; October 9, 2002.
- 24 Nagelkerke N, Jha P, de Vlas S, Korenromp EL, Moses S, Blanchard JF, et al. Modelling HIV/AIDS epidemics in Botswana and India: impact of interventions to prevent transmission. *Bull World Health Organ* 2002; 80: 89-96.
- 25 Schwartlaender B, Stover J, Walker N, Bollinger L, Gutierrez JP, McGreevey W, et al. Resource needs for HIV/AIDS. *Science* 2001; 292: 2434-2436.
- 26 Jha P, Mills A, Hanson K, Kumaranayake L, Conteh L, Kurowski C, et al. Improving the health of the global poor. *Science* 2002; 295: 2036-2039.
- 27 Rappouli R, Miller HI, Falkow S. The intangible value of vaccination. *Science* 2002; 297: 937-9.
- 28 The Global Fund to Fight AIDS, Tuberculosis and Malaria. Press Release (May 2002): Global Fund Announces First Grants. <http://www.globalfundatm.org/>
- 29 Katz MH, Schwarcs S, Kellogg T, Klausner J, Dilley J, Gibson S, et al. Impact of highly active antiretroviral treatment on HIV seroincidence among men who have sex with men: San Francisco. *American Journal of Public Health* 2002; 92: 388-394.
- 30 Chen SY, Gibson S, Katz MH, Klausner JD, Dilley JW, Schwarcz SK, et al. Continuing increases in sexual risk behavior and sexually transmitted disease among men who have sex with men: San Francisco, Calif. 1999-2001. *American Journal of Public Health* 2002; 92: 1387.
- 31 Velasco-Hernandez JX, Gershengorn HB, Blower SM. Could widespread use of combination antiretroviral therapy eradicate HIV epidemics? *Lancet* 2002; 2: 487-93.
- 32 Szabo, R, Short RV. "How does male circumcision protect against HIV infection?" *BMJ* 2000; 320: 1592 - 1594.
- 33 Van Dam J, Anastasi M. Male Circumcision and HIV Prevention-- Directions for Future Research. Population Council, June 2000, 29.
- 34 Gray RH, Kiwanuka N, Quinn TC, Sewankambo NK, Serwadda D, Mangen FW, et al. Male circumcision and HIV acquisition and transmission: cohort studies in Rakai, Uganda. Rakai Project Team. *AIDS* 2000; 14: 2371-81.

35 Rosenberg MJ, Davidson AJ, Chen JH, Judson FN, Douglas JM. Barrier contraception and sexually transmitted diseases in women: a comparison of female dependent methods and condoms. *Am J Public Health* 1992; 82: 669-674.

36 The Microbicide Initiative. Mobilization for microbicides: the decisive decade. The Rockefeller Foundation, 2002.

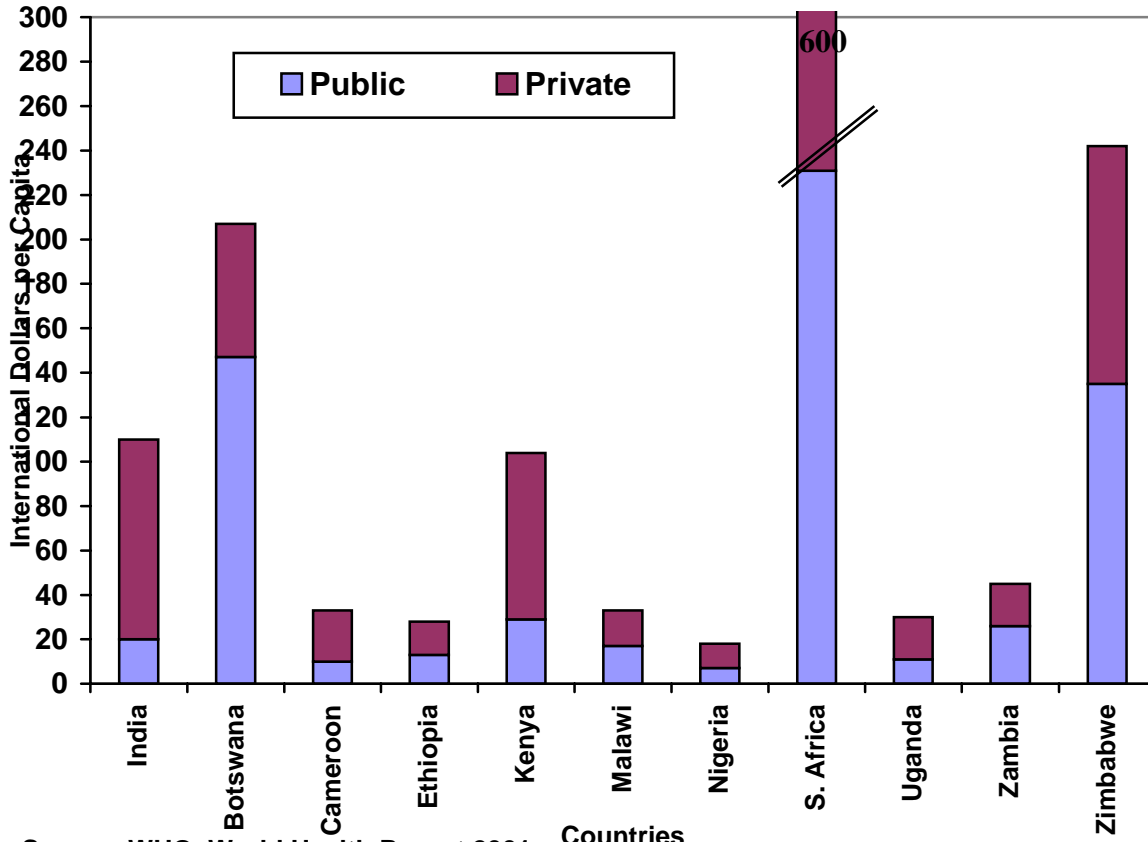
37 Attaran A, Sachs J. Defining and redefining international donor support for combating the AIDS pandemic. *Lancet* 200; 357: 57-61.

38 Ramasundaram S, Allaudin K, Charles B, Gopal K, Krishnamurthy P, Poornalingam R, et al. HIV/AIDS control in India - Lessons learned from Tamil Nadu. WHO Commission on Macroeconomics and Health, June 2001.

39 Commission on Macroeconomics and Health. Modeling the HIV/AIDS epidemics in India and Botswana: the effect of interventions (paper #4, working group 5). <http://www.cmhealth.org/wg5.htm>

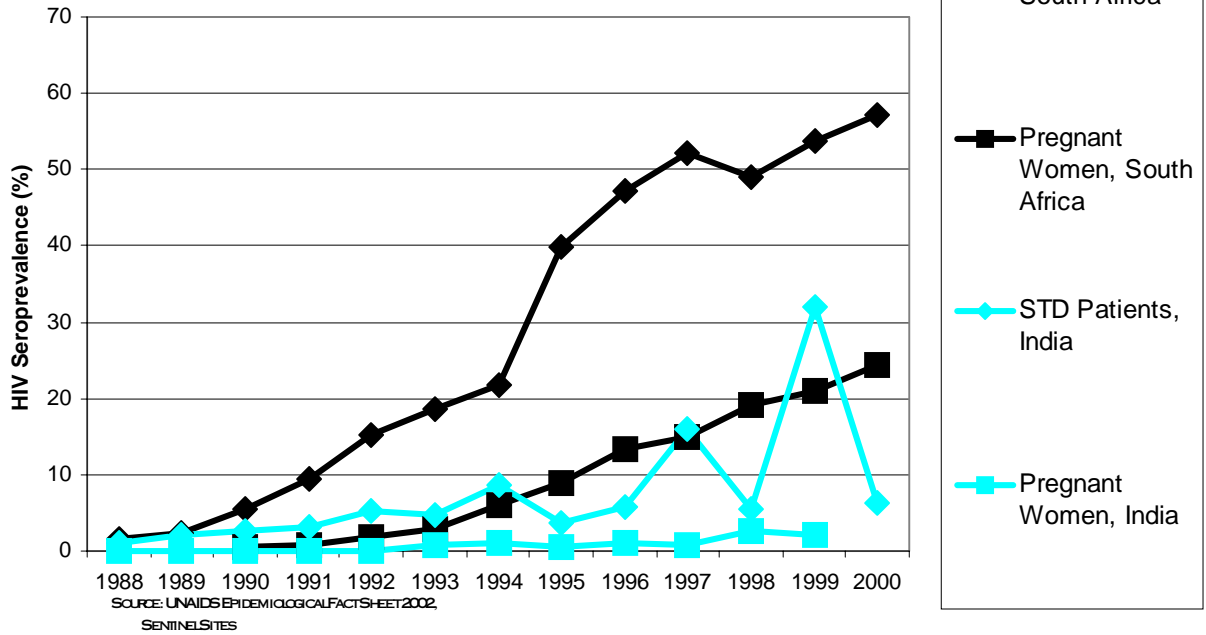


Figure 1: 1998 Public vs. Private Health Expenditure per Capita

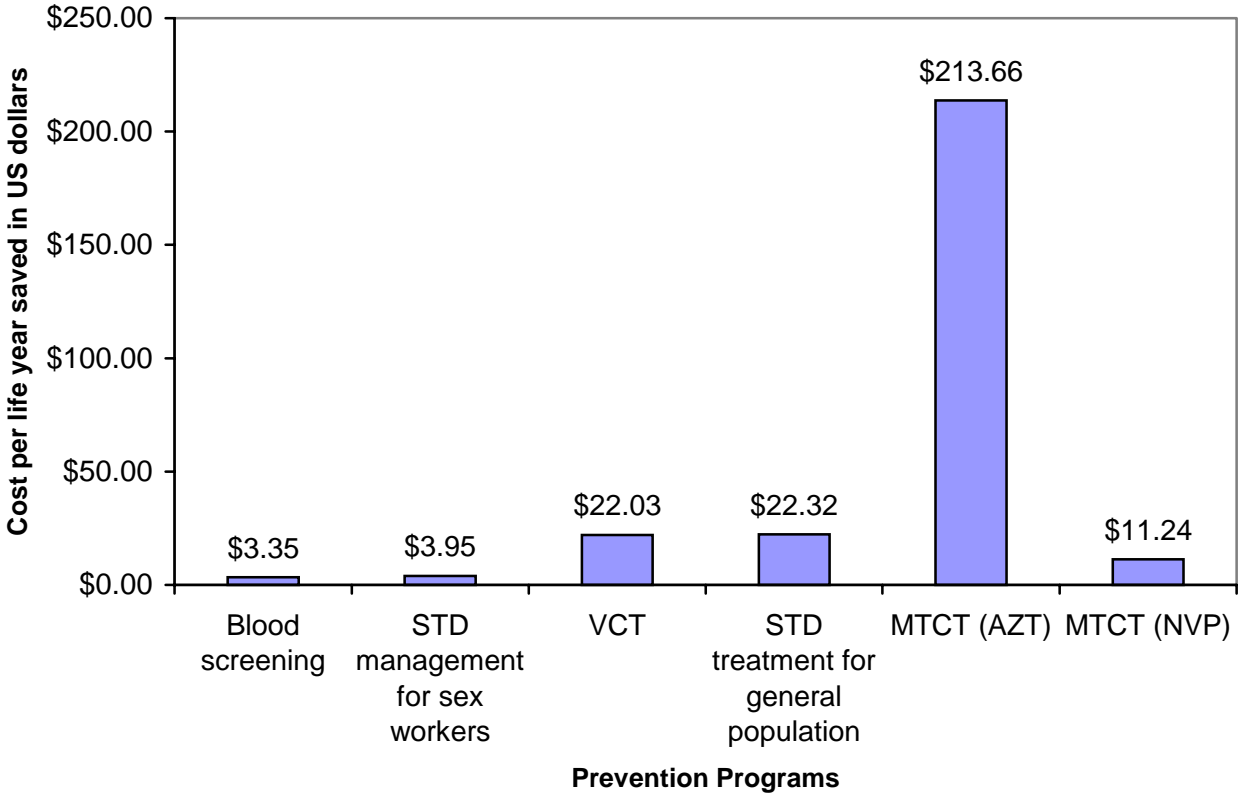


Source: WHO, World Health Report 2001.

**Figure 2: Median HIV Seroprevalence in India and South Africa: Urban Areas**

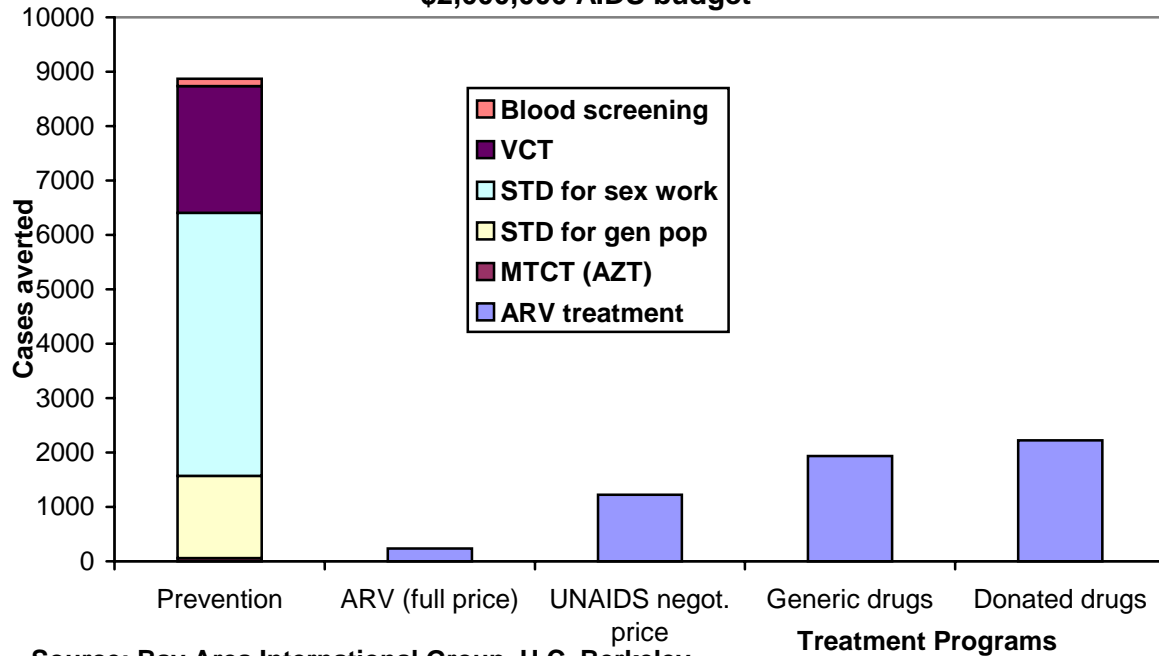


**Figure 3: Cost per life year saved as a result of HIV prevention programs**



Source: Bay Area International Group, U.C. Berkeley.

**Figure 4: Number of cases averted versus treated with a \$2,000,000 AIDS budget**



Source: Bay Area International Group, U.C. Berkeley.

**Table 1: Risk factors for HIV transmission in India, Sub-Saharan Africa (SSA), and three selected SSA countries**

	India	SSA	Kenya	Malawi	Zimbabwe
2002 Gross Nat Income/ cap (purchasing power parity) <sup>1</sup>	2340	1540	1010	600	2550
2002 Infant Mortality Rate (/1000) <sup>1</sup>	68	91	74	104	65
2002 Total Fertility Rate <sup>1</sup>	3.2	5.6	4.4	6.5	4.0
2002 % Pop 15-65 years <sup>1</sup>	60	53	15	15	33.7
2002 Life exp (years) <sup>1</sup>	63	49	48	38	38
2002 % urban <sup>1</sup>	28	30	20	20	32
Female literacy <sup>5</sup>	46.4	54.6	77.3	47.6	85.5
Public expenditure on Health % of GDP 1999 <sup>2</sup>	5.4	5.6	7.8	6.3	8.1
Sex with un-regular partner in last year <sup>3,4</sup>	11.8 (3.2-23.4)	-	47	33	41
Males					
Females	2 (0.1-14.6)	-	22	9	14
Condom use at sexual intercourse with non-regular partner <sup>3,4</sup>	51.2 (17.5-84)	-	44	39	70
Males					
Females	39.8 (0-77.1)	-	16	29	43
HIV prevalence (end of 2001) <sup>1,6</sup>	0.8	9	15	15	33.7

**Table 2: HIV Prevalence Comparisons between India and South Africa in 2000**

<b>Risk Factor (level of risk)</b>	<b>Region in India 2000</b>	<b>Prevalence (%)</b>	<b>Region in South Africa</b>	<b>Prevalence (%)</b>
Commercial Sex Worker (HIGH)	Agra Baina Vellore	11.0 20.0 58.3	Natal (1997)	50.3
Injection Drug Users (HIGH)	Bishnupur Churachandpur Imphal	41.4 68.4 48.8	-	-
STD patients (HIGH)	Mumbai (1-2) Aurangabad Belgaum	40.0 - 64.4 20.0 27.3	Johannesberg	21.5 (females) 15.8 (males)
	<b>Major urban areas:</b>		<b>Major urban areas:</b>	
	Mumbai (1-4)	2.0 - 3.3	Eastern Province	1.9
	New Delhi (1-2)	0.3	Gauteng	4.1
			Natal	9.3
			Western Province	.6
Pregnant Women (LOW)	<b>Outside major urban areas:</b>		<b>Outside major urban areas:</b>	
	Chennai	1.3	Mpumalanga	2.4
	Churachandpur	5.3	North Western Prov.	2.2
	Guntur	4.0	Northern Cape	1.1
	Hyderabad (1-2)	.5 - 1.9	Northern Province	1.8
	Namakkal	6.5	Orange free state	4.3
	Tuensang	4.9		

Source: UNAIDS Epidemiological Fact Sheets 2002

N.B. No data available for MSM in India and South Africa and for IDU in South Africa