

2010-01-28T19:25:43Z

# Rationing Antiretroviral Therapy for HIV/AIDS in Africa: Efficiency, Equity, and Reality

---

[http://sph.bu.edu/cihd/index.php?option=com\\_content&task=view&id=381&Itemid=617095](http://sph.bu.edu/cihd/index.php?option=com_content&task=view&id=381&Itemid=617095)

*"Downloaded from OpenBU. Boston University's institutional repository."*



Center for International Health and Development  
Boston University

**Rationing Antiretroviral Therapy  
for HIV/AIDS in Africa:  
Efficiency, Equity, and Reality**

Sydney Rosen, Ian Sanne, Alizanne Collier, Jonathon L Simon

Health and Development  
Discussion Paper No. 4  
February, 2004

Center for International Health and Development  
Boston University School of Public Health  
85 East Concord St., 5<sup>th</sup> fl.  
Boston, MA 02118 USA

### Abstract

**Background:** Rationing of access to antiretroviral therapy already exists in sub-Saharan Africa and will intensify as national treatment programs develop. The number of people who are medically eligible for therapy will far exceed the human, infrastructural, and financial resources available, making rationing of public treatment services inevitable.

**Methods:** We identified 15 criteria by which antiretroviral therapy could be rationed in African countries and analyzed the resulting rationing systems across 5 domains: clinical effectiveness, implementation feasibility, cost, economic efficiency, and social equity.

**Findings:** Rationing can be explicit or implicit. Access to treatment can be explicitly targeted to priority subpopulations such as mothers of newborns, skilled workers, students, or poor people. Explicit conditions can also be set that cause differential access, such as residence in a designated geographic area, co-payment, access to testing, or a demonstrated commitment to adhere to therapy. Implicit rationing on the basis of first-come, first-served or queuing will arise when no explicit system is enforced; implicit systems almost always allow a high degree of queue-jumping by the elite. There is a direct tradeoff between economic efficiency and social equity.

**Interpretation:** Rationing is inevitable in most countries for some period of time. Without deliberate social policy decisions, implicit rationing systems that are neither efficient nor equitable will prevail. Governments that make deliberate choices, and then explain and defend those choices to their constituencies, are more likely to achieve a socially desirable outcome from the large investments now being made than are those that allow queuing and queue-jumping to dominate.

**Key Words:** HIV/AIDS, Sub-Saharan Africa, Antiretroviral Therapy, Rationing, Health Economics

S Rosen, A Collier, and JL Simon are at the Center for International Health and Development at Boston University in the U.S. I Sanne directs the Clinical HIV Research Unit at the University of the Witwatersrand in the U.S.

Correspondence to: Sydney Rosen, Center for International Health and Development, Boston University School of Public Health, 85 East Concord St., 5<sup>th</sup> fl, Boston, MA 02118 USA, [sbrosen@bu.edu](mailto:sbrosen@bu.edu).

## 1. Introduction

As the world grapples with the seemingly unstoppable spread of the HIV/AIDS epidemic, a public health experiment of unprecedented scale is taking place in sub-Saharan Africa. Governments of countries spanning the continent from Lesotho to Ghana are initiating large-scale prevention and treatment programs for HIV/AIDS. Drugs, diagnostic tests, clinic and laboratory infrastructure, and training of medical personnel are being paid for by a combination of domestic funds mobilized by African governments and international donor contributions.

While these funds, which reach into the billions of dollars, will pay for antiretroviral therapy for many thousands of HIV-positive Africans, there is almost no chance that African countries will have the human, infrastructural, or financial resources to treat everyone who is in need, especially in the early years of the experiment. National plans for treatment rollout typically call for a specific number of patients to initiate therapy within the first one or two years of the program. Though the target patient numbers are ambitious, they still represent a minority of those who are eligible for antiretrovirals on even the most conservative medical grounds. In Zambia, for example, the first year target for treatment is 10,000 patients; the number of Zambians who have already reached the clinical threshold of fewer than 200 CD4 cells per ml is estimated at 100,000, and thousands more become eligible each year.<sup>(1)</sup> The stated targets and estimated eligible populations shown in Table 1 indicate the degree of rationing that will be necessary in several countries.

**Table 1: Targets for treatment coverage in selected African countries**

Country	Target # to be on therapy (year)	Estimated # eligible for therapy (year)	% covered when target is reached
Botswana(2;3)	15,000 (2004)	110,000 (2003)	14%
Ghana(4;5)	6,000 (2005)	33,000 (est.) (2001)*	18%
Kenya(6;7)	(2005) <sup>†</sup>		20%
Malawi(8;9)	25,000 (2008)	200,000 (2003)	13%
South Africa(10)	138,000 (2004/05) <sup>‡</sup>	463,000 (2004) <sup>‡</sup>	30%
Uganda(11)	30,000 (2005)	100,000 (2003)	30%
Zambia(12)	10,000 (2004)	100,000 (2003)	10%
Global (WHO's 3 x 5 Initiative)(13)	3,000,000 (2005)	6,000,000 (2003)	50%

\*Estimate equal to 10% of HIV-positive adults as reported by UNAIDS.

<sup>†</sup> Target stated as percentage of eligible population covered only.

<sup>‡</sup>New AIDS cases only.

Rationing of antiretroviral therapy is inevitable. It is already occurring in many African countries and will persist for many years to come. In some countries, explicit policies will be adopted to guide the rationing of treatment. In others, implicit systems for rationing scarce resources will arise spontaneously. Whether explicit or implicit, the rationing systems adopted will vary widely in terms of medical effectiveness, cost, feasibility, economic efficiency, and social equity.

Our contention in this paper is that the chances of achieving a socially desirable outcome from the public health experiment now being launched will be higher if an open public policy debate is conducted and policies selected that make transparent the tradeoffs inherent in any rationing system. To help catalyze that debate, we identify and describe a number of possible

rationing systems and analyze each system on the basis of likely medical effectiveness, cost, feasibility, economic efficiency, and equity.

## 2. Criteria for Rationing

The existence of relatively ambitious targets for HIV/AIDS treatment that still represent only a minority of those in need means that, by definition, rationing of treatment services will occur for at least the initial phase of mass treatment programs. In this section, we describe a number of rationing systems that could be used, or are being used, for allocating treatment resources and limiting coverage so that demand matches supply.

In economic terms, any policy or practice that restricts consumption of a good is a rationing system.<sup>(14)</sup> The purpose of a rationing system is to limit demand so that it matches supply. In the marketplace, price is the basis for rationing: those who can and are willing to pay the market price obtain the resource, while those who cannot or will not pay go without. Non-market goods, such as access to free or subsidized medical care, are rationed in a variety of other ways. These include stated or explicit rationing strategies, which give priority to selected sub-populations or create conditions that favor certain types of patients, and unstated or implicit arrangements, such as queuing, which favor those who arrive first or can wait in line the longest.

In this paper, we will define a rationing system as any use of public resources that prioritizes access to treatment on the basis of any social, economic, cultural, or other non-medical criterion. This is important, as virtually all programs will set medical criteria for access to treatment, such as having a CD4 count lower than 200 cells/ml or an AIDS-defining illness. Our assumption is that even with conservative medical eligibility criteria, demand for treatment will exceed supply. While medical criteria could result in social or economic disparities in access—for example, if access to diagnostic services favors urban households, or if those who reach medical eligibility first represent high risk populations—we will assume that all countries will apply criteria for medical eligibility equally across all HIV-positive persons, in order to focus our attention here on the non-medical bases for rationing.

For purposes of simplification, we have drawn a distinction between explicit and implicit rationing systems. In reality, most systems fall along a continuum between the two extremes, and the systems are not mutually exclusive: all countries will adopt, or end up with, some combination of several different systems. It would not be surprising to find two or three explicit systems plus all four of the implicit systems operating simultaneously.

### *Explicit rationing systems*

In many cases, governments will set explicit criteria for which types of patients should be eligible for antiretroviral therapy first or at lowest cost. The criteria can designate the sub-population to which the eligible patients must belong, or they can create conditions that intentionally give some patients better access than others. Assuming criteria for medical eligibility have been met, possible socioeconomic sub-populations for priority access include:

- **Mothers of new infants (MTCT-Plus):** Rather than face an ever-increasing burden of orphan care and support, many countries are making antiretroviral therapy preferentially available to HIV-positive mothers through testing and treatment at antenatal clinics. The

“MTCT-Plus” initiative, which has been implemented in multiple African countries, is the main example of this strategy.(15)

- **Skilled workers:** African countries face the loss of vast numbers of educated or trained workers, whose skills are vital to maintaining social welfare, sustaining output, and generating economic growth. Human capital can be conserved by giving treatment priority to doctors and nurses, teachers, engineers, judges, police officers, military personnel, and other skilled workers whose contributions are important to economic development or social stability. Both Kenya and Uganda have indicated that they will ration treatment in this way, Kenya to healthcare workers(16) and Uganda to government employees in general.(17)
- **Tertiary students:** Society invests a great deal in the education of tertiary level students, with the expectation that the investment will be repaid through the contributions that highly educated persons make to social and economic development. In the few places where HIV prevalence among university or technical college students has been estimated, it is alarmingly high.(18;19) Targeting these students for access to antiretroviral therapy is one way to preserve society’s investment in higher education.
- **Poor people:** The social justice agenda pursued by some governments and many nongovernmental organizations argues that the poorest members of society, who are least likely to be able to afford private medical care, should have preferential access to publicly-funded treatment programs.(20) Means-testing is a common way to ration social benefits throughout the industrialized world. It can be implemented at the level of the household or the community and calibrated to achieve the desired number of patients.

Governments can also deliberately create conditions for access to treatment that result in rationing, without specifying particular socioeconomic target populations. Rationing systems of this type that are either being implemented now, have been proposed, or can readily be envisioned, include:

- **Access to and acceptance of testing:** Voluntary counseling and testing (VCT) is typically the entry point into an HIV/AIDS treatment program. Treatment could thus effectively be rationed through deliberate targeting of VCT services or promotion campaigns, such as those now being implemented at antenatal clinics and in some private sector workplaces.
- **Families of existing patients:** It is logical to expect that extending treatment to all HIV-positive members of a household will improve adherence and help maintain household stability. Treatment could be rationed by giving priority to family members of existing patients. An example of this approach is Kenya’s targeting of the spouses of mothers identified at antenatal clinics; a study of the effectiveness of this approach known as “Safeguard the Household” is underway in South Africa.(21)
- **Residents of designated geographic areas:** One obvious way to limit access to treatment is to offer it only to those who reside in specified geographic catchment areas. These areas can be distributed around the country, centered in regions of high HIV prevalence, or concentrated in urban centers or politically important regions. Excluding patients who do not live within the designated areas may not be feasible, but the great majority of patients will not be able to afford the cost of regular transport or permanent

relocation. A possible drawback to geographic targeting is that some patients from outside the catchment area will initiate therapy but then be forced to quit when they can no longer afford transport or accommodation.

- **Ability to co-pay:** If patients are required to contribute even a small share of the cost of treatment, the number who can access therapy is likely to fall dramatically. Governments could in principle match supply and demand by setting and adjusting the level of co-payment required. The obvious outcome is a rationing system that favors the upper socioeconomic tiers of patients. These upper tiers likely include the majority of skilled workers and the country's economic and political leaders. A possible drawback of requiring co-payment is that poorer patients will stop therapy whenever they run out of funds. This is the reason for stopping offered by nearly half of all non-adherent patients in a recent study in Botswana.(22)
- **Commitment to adherence to therapy:** Adherence to treatment regimens has been found to be the most important determinant of the success of antiretroviral therapy at the individual patient level.(23) One way to improve the success of a large-scale treatment program, while at the same time limiting access, would therefore be to restrict therapy to patients who are believed to have the ability and willingness to adhere. Trials of strategies to improve adherence suggest that requiring attendance at pre-treatment clinic visits helps to screen for adherence commitment.(24) It is not clear to what extent this requirement will reduce patient numbers at the national scale, however, and it may therefore not have great potential as a rationing scheme.
- **Lottery:** In principle, a lottery could be held to distribute "slots" in publicly-funded treatment programs. While a lottery is one of the classic forms of rationing and has advantages in terms of equity, it would require knowledge of the HIV status and disease stage of great numbers of people, and it is probably not feasible in any of the affected countries.

#### *Implicit (de facto) rationing systems*

The alternative to specifying explicitly who will have priority access to resources is to allow implicit rationing systems to arise. These can be thought of as the default conditions that will prevail in the absence of deliberate policies.

- **First come, first served:** In the absence of any other requirements, most facilities are likely to treat everyone who is medically eligible, until the supply of drugs, diagnostics, or expertise runs out. Patients who arrive after that happens may be put on a waiting list, sent to another facility, or simply sent away. This approach, which reflects an absolute shortage of treatment "slots," is likely to favor three groups of patients: those who are already paying privately for antiretroviral drugs and shift over to publicly-funded treatment once it is available; those who develop AIDS-related symptoms and come to the facility for treatment of an opportunistic infection; and the few HIV-positive individuals who do not yet have AIDS but have taken the initiative to go for a test and know their own status.
- **Queuing:** One of the most common ways to ration scarce resources is the time-honored, time-consuming tradition of queuing. While some countries create waiting lists that keep track of individuals' places in line, in many African countries the queue is a literal line

outside the clinic door. Such queuing will favor patients whose opportunity cost of time is low and thus are able to wait in line for long periods of time. This group is likely to be dominated by unemployed men and by women who can bring their small children with them. It may penalize farming households, where high seasonal demand for labour may preclude spending time in a health facility queue.

- **Limited sites:** Most countries will scale up their treatment programs incrementally, at first offering services at only a few facilities before gradually adding more. Botswana, for example, started with just 4 sites in 2002; the number is now 10, and 20 more are planned for 2004.(25;26) For the large numbers of patients who will not live within walking distance of a treatment site, bus or taxi fare will be required for regular trips to the clinic, and each trip will take up a good deal of time. Previous research has found that travel time plays an important role in rationing medical care.(27) Unless transport is subsidized, limiting the number of service sites will effectively ration treatment to those who live nearby and to better-off households that have the resources to travel.
- **Queue jumping:** Finally, in all of these implicit systems, and in some of the explicit ones, there will very often be a high degree of queue jumping, in which those with social, economic, or political influence move to the front of the treatment line. Elites capture a disproportionate share of resources in all countries; in developing countries, where enforcement of rules tends to be weak and informal arrangements common, it is safe to assume that members of the elite who are medically eligible for therapy will find a way to get it. *De facto* rationing on the basis of social or economic position thus occurs. It is the phenomenon of queue jumping that turns what appears to be an equitable, if inefficient, rationing system—queuing—into an inequitable and inefficient approach.

Many other potential criteria for rationing antiretroviral therapy can be imagined. Treatment access could be targeted to young people (because they respond best to the therapy and have the most productive years ahead of them); those with debts (so that the loan default rate does not increase); commercial sex workers (to reduce HIV transmission by suppressing viral load in core risk groups); or income earners (to maintain household welfare). For this paper, we have selected a set of rationing systems that are either in use now; are very likely to develop; or, as in the case of a lottery, help to clarify the issue of rationing in general.

### 3. Evaluating the Systems: Effectiveness, Cost, Feasibility, Efficiency, and Equity

The different approaches to rationing antiretroviral therapy described above will inevitably have very different social and economic consequences for African populations. In this section, we assess the rationing systems' probable outcomes across five domains that capture the most important principles that governments use to evaluate policies and social investments. They are by no means the sole domains of interest, nor should they necessarily be weighted equally. We propose them only as a starting point for thinking about the implications of alternative approaches.

For purposes of this paper, we define the five domains as follows:

- **Effectiveness:** Ratio of successfully treated patients to all treated patients within five years of starting therapy. This is a measure of medical effectiveness. "Successful treatment" can be defined as a fully suppressed viral load, high CD4 count, or another biomedical indicator. We assume that early diagnosis and high adherence both improve

effectiveness; we also assume that patient motivation improves adherence, but level of education and socioeconomic status do not.(28)

- **Cost minimization:** “Savings” per patient treated relative to a high-cost standard. Cost is characterized in this way to maintain internal consistency: a rating of “high” in this domain is desirable, as it is in all other domains. Cost is defined broadly, to include the average of the direct and indirect costs incurred by patients, providers, insurers, and the public health system, beginning with the initial identification of patients and including the costs of managing side effects and treatment failure.
- **Feasibility:** Probability that the human and infrastructural resources needed for implementation will be available. We define an approach as highly feasible if there are no obstacles to carrying it out that appear to be insurmountable under typical conditions in sub-Saharan Africa, with the exception of cost and political acceptability. Cost is captured by the previous domain, while political acceptability will be determined by the ratings the system receives across all domains.
- **Efficiency:** net benefits of the treatment program for human capital accumulation, where human capital is defined as the accumulated skill, knowledge and expertise of workers.(29) This is a measure of economic efficiency intended to capture the probable consequences of the program for long term economic development.
- **Equity:** probability that poor or disadvantaged sub-populations have equal access to HIV/AIDS treatment as wealthier or more advantaged populations. We define “equity” to denote equitable access for all at the current time, not redistribution of resources to redress past injustices.

Table 2 compares each of the main approaches to rationing across these five domains. For purposes of comparison, we have included rationing based on medical criteria in the table.

**Table 2: Comparison of rationing systems**

- high
- ◉ moderate
- low

<b>Rationing system</b>	<b>Effectiveness</b> <i>(medical effectiveness)</i>	<b>Cost Minimization</b> <i>(savings per patient treated)</i>	<b>Feasibility</b> <i>(ease of implementation)</i>	<b>Efficiency</b> <i>(human capital preservation)</i>	<b>Equity</b> <i>(equitable access)</i>
Medical eligibility (e.g. CD4<200)	Moderate: Limits treatment to those already sick, of whom many will be too sick to save; could favor those who were infected earliest, who may be highest risk. ◉	Moderate: Requires only one clinic visit to establish eligibility, but maintains need to treat initial opportunistic infections. ◉	Moderate: Requires access to diagnostic services. May not sufficiently reduce patient numbers. ◉	Low: No targeting on human capital basis. ◉	Moderate: All HIV+ individuals equally eligible, but favors those who have access to diagnostic services, who may be wealthier or urban. ◉
Mothers of new infants	Moderate: Patients are likely to be motivated to succeed, but loss to follow up may be high as some patients will not yet be medically eligible for treatment when baby is born. ◉	Moderate: Relies on existing antenatal clinic infrastructure, but tests large numbers of people per medically eligible patient. ◉	High: Already in place under MTCT-Plus. ●	High: Reduces societal burden of orphan care and promotes parental investment in future human capital. ●	Low: Excludes men; excludes women who have not recently given birth. ○
Skilled workers	High: Patients are in a structured environment and likely to place a high value on ability to work. ●	High: Tightly defined population; many employers already provide some medical facilities. ●	High: Already being implemented by many employers. ●	High: Preserves critical skills needed to maintain development. ●	Low: Treats the elite; excludes the poor, unemployed, unskilled. ○
Tertiary students	Moderate: Patients are likely to be motivated and in a structured environment, but adherence has been low for this age group(34) and students who graduate may be lost to follow up. ◉	High: Tightly defined population; can rely on institutions' existing have medical facilities. ●	High: Institutions already have medical facilities and patients live nearby. ●	High: Preserves critical skills needed to maintain development. ●	Low: Treats the elite; excludes those without access to tertiary education. ○
Poor people	Moderate: Adherence has been variable in pilot projects.(35) Little experience with large scale delivery to poor communities. ◉	Low: Requires geographically dispersed services to areas with least existing infrastructure. ○	Moderate: Some capacity for means testing may already exist, but fraud is likely. Infrastructure may not be adequate in poorest areas. ◉	Low: Targets relatively economically unproductive subpopulations. ○	Moderate: Extends access to subpopulations that would not otherwise have it, but excludes middle and upper socioeconomic tiers. ◉
Access to and acceptance of testing	Moderate: Could favor more motivated patients. ◉	Moderate: Requires no additional action to identify patients. ◉	High: Some early successes with VCT campaigns suggest feasibility. ●	Moderate: Favors target populations for VCT campaigns, who may or may not be efficient populations to treat. ◉	Moderate: Favors some but does not exclude others. ◉
Families of current patients	High: Promotes early diagnosis, minimizes drug sharing, encourages adherence and support within families. ●	Moderate: Requires little additional action to identify patients. ◉	Moderate: Easy to implement if family is nearby; difficult for migrants. ◉	Moderate: No targeting of human capital but sustains households as economic units. ◉	Low: Gives more resources to families that already have some access. ○

<b>Rationing system</b>	<b>Effectiveness</b> <i>(medical effectiveness)</i>	<b>Cost Minimization</b> <i>(savings per patient treated)</i>	<b>Feasibility</b> <i>(ease of implementation)</i>	<b>Efficiency</b> <i>(human capital preservation)</i>	<b>Equity</b> <i>(equitable access)</i>
Residents of designated geographic areas	Moderate: Ensures patient proximity to services, but patients may interrupt or stop treatment when they must leave the catchment area. ○	High: Minimizes total infrastructure costs. ●	Moderate: Easy to establish, but difficult to prevent excluded patients from migrating into catchment areas. ○	Moderate: Could be targeted to economically important areas, but no targeting within catchment areas. ○	Moderate: Equal access for everyone in catchment areas, but excludes everyone outside catchment areas. ○
Ability to co-pay	Moderate: Co-payment may increase motivation to adhere, but many patients will stop treatment when own funds run short. ○	Moderate: Cost to public sector is reduced, but cost to patients is higher. ○	High: Easy to implement and already underway in many places. ●	High: Reaches employed persons; extends public resources to allow more patients to be treated. ●	Low: Excludes those too poor to pay. ○
Demonstrated commitment to adhere	High: Limits treatment to those most likely to adhere. ●	Moderate: Procedure for demonstrating adherence has additional cost. ○	Moderate: Requires procedure for demonstrating commitment be widely available. May not sufficiently reduce patient numbers. ○	Moderate: Could target more motivated patients. ○	High: Equal access to all potential patients. ●
Lottery	Low: Random sample across all adherence and motivation levels. ○	Low: Would require new infrastructure and administrative capacity to run. ○	Low: Could result in a widely dispersed and diverse patient population. Requires that all potential patients be identified. ○	Low: No targeting on human capital basis. ○	High: Everyone has an equal chance of being chosen. ●
First come, first served	Low: Favors those who are already sick; could favor those who were infected earliest, who may be highest risk. ○	High: Requires no additional action to identify patients. ●	High: Default; requires little action. ●	Low: No targeting on human capital basis. ○	High: Everyone has access. ●
Queuing	Moderate: Favors those who are already sick but could target most motivated. ○	High: Requires no additional action to identify patients. ●	High: Default; requires little action. ●	Low: Favors patients with low opportunity cost of time (e.g. those who are unemployed) and wastes time of those who participate. ○	High: Everyone has access. ●
Limited sites	Moderate: Ensures patient proximity to services, but distant patients may stop treatment when they can no longer afford transport. ○	High: Minimizes infrastructure needs and requires no additional action to identify patients. ●	High: Default; requires little action. ●	Moderate: Sites could be located in economically important areas, but treatment will not be targeted on human capital basis. ○	Low: Excludes those too poor to pay for transport or who live in remote areas. ○
Queue jumping	High: Likely to target very motivated patients. ●	High: Requires no additional action to identify patients. ●	High: Default; requires little action. ●	Moderate: Favors elite; could preserve human, social, or political capital. ○	Low: Treats the elite; those who already have resources obtain more. ○

There are several limitations to the analysis presented in Table 2. First and foremost, we do not “know” the outcomes of the strategies described above, because most of them have not yet been tried (or, if tried, not evaluated). Prior experience in delivering health care in sub-Saharan Africa strongly suggests that some of our assumptions and ratings are correct. We are very confident, for example, that an implicit rationing system based on queuing will result in queue-jumping, and therefore be highly inequitable. We are also confident that targeting skilled workers will maintain labour productivity and therefore promote economic efficiency. Our ratings of many of the other systems, in contrast, are largely speculative. We do not know, for example, the efficiency of using “demonstrated commitment to adhere” as a rationing criterion. We can reason that it will target relatively motivated patients, who may in turn represent the more productive members of society, but this is no more than speculation. The purpose of the ratings is to catalyze debate, not provide a “right” answer.

A second limitation involves the domains we selected for evaluation. We chose five that we believe capture the key considerations in designing an HIV/AIDS treatment program. We omitted a potential sixth domain, the impact of the rationing system on HIV transmission, because we do not believe we have sufficient data or experience even to speculate. We also did not account for potential interactions among the domains. Cost and feasibility are clearly related, for example: at some level of cost, any system could be considered feasible. While medical effectiveness clearly influences cost, the reverse might also hold: greater spending on adherence support, for example, could lead to a higher proportion of successfully treated patients. At a different level, many would argue that social equity is essential to sustainable economic development, and that efficiency and equity cannot therefore be separated. While we recognize that these relationships exist, neither data nor experience allow us to address them here.

#### **4. Conclusions: Efficiency, Equity, Reality**

During the initial months of existing antiretroviral therapy programs in sub-Saharan Africa, widespread reluctance to be tested for HIV or enroll in treatment programs has greatly limited patient numbers.(30;31) This phenomenon, for as long as it persists, may prevent demand from exceeding supply, and no rationing will be necessary. There will surely be some situations, however, in which patients demanding access to care will overwhelm available resources. Even under the most optimistic scenarios for reaching universal coverage, there will be a period of at least several years when treatment is scarce. In the absence of an explicit rationing system, implicit rationing, accompanied by a high level of queue-jumping, is bound to arise.

Rationing of medical care is not a new phenomenon, nor is by any means limited to developing countries. Waiting lists, whether for specific procedures, organs for transplant, or experimental treatments are common in North America and Europe. Many state governments in the United States are explicitly limiting access to more expensive AIDS drugs.(32) The HIV/AIDS crisis in Africa is simply bringing the need for rationing into stark relief.

Decisions about rationing will be made at multiple levels of the healthcare system. International funding agencies have already begun to express their priorities through the amounts and conditions of their grants. Ministries of health will set policies that reflect national priorities, followed by district and local departments of health. Even individual healthcare workers, such as nurses at clinics where antiretroviral drugs are available but

scarce, will be forced to ration access to patients who meet the clinic's or their own criteria.(33)

There is no single rationing system, or combination of systems, that will be optimal for all countries at all times. Table 2 makes the tradeoff between economic efficiency and social equity unmistakably clear: all of the rationing systems that rate high in terms of efficiency rate low in terms of equity. African societies will place different weights on the values inherent in goals such as "equity" and "efficiency." South Africa's national plan, reflecting the country's political culture, emphasizes the social justice definition of equity. Other countries, especially those without a tradition of social action, are likely to value efficiency more highly.

Because access to antiretroviral drugs is a matter of life or death for AIDS patients, the choice of rationing systems matters deeply. African governments can take one of two courses: ration deliberately, on the basis of explicit criteria, or allow implicit rationing to prevail. Implicit rationing is unlikely to maximize social welfare, nor does it allow for transparency and accountability in policy making. We believe that the magnitude of the experiment now underway, and the importance of the resource allocation decisions to be made, call for public policy analysis and debate in the countries affected. In the absence of such processes, decisions about access to treatment will be made arbitrarily and will, most likely, result in inequity and inefficiency—the worst of both worlds.

In the end, the distribution of treatment resources in African countries will reflect a combination of explicit and implicit approaches to rationing. Our premise in this paper is that governments that make deliberate choices, and then explain and defend those choices to their constituencies, are more likely to achieve a socially desirable return from the large investments now being made than are those that allow queuing and queue-jumping to dominate. Countries that promote an open policy debate have the opportunity to ration antiretroviral therapy in a manner that sustains both economic development and social cohesion—in the age of AIDS, the best of both worlds.

## Acknowledgements

Funding for the research presented in this paper was provided by the South Africa Mission of the U.S. Agency for International Development through the Child Health Research Project, G/PHN/HN/CS, Global Bureau, USAID, under the terms of Cooperative Agreement No. HRN-A-00-96-90010-00, the Applied Research on Child Health (ARCH) Project, and by the South Africa Mission of USAID through Cooperative Agreement No. 674-A-00-02-00018 to Right to Care. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development. The funding agency did not influence the conduct or outcomes of the analysis or exercise any editorial control over this paper.

## Contributors

All authors contributed to developing the ideas presented in this paper and edited the manuscript. S Rosen drafted the manuscript.

## Conflict of Interest

I Sanne is the Chief Executive Officer of Right to Care, a not-for-profit organization in South Africa that provides treatment to HIV/AIDS patients.

## References

1. Kombe G, Smith O. The costs of anti-retroviral treatment in Zambia. Technical report no 29. Bethesda, MD: The Partners for Health Reformplus Project, Abt Associates Inc, 2004.
2. Stiglitz JE. *Economics of the Public Sector, Second Edition*. New York: Norton, 2004.
3. Mitka M. MTCT-Plus program has two goals: end maternal HIV transmission + treat mothers. *JAMA* 2002; **288**: 153-4.
4. Joint Inter-Agency Coordinating Committee (JICC), Republic of Kenya. Kenya National Proposal to Address and Reduce the Impact of HIV/AIDS, Tuberculosis and Malaria. Proposal to the Global Fund to Fight AIDS, TB and Malaria, Round 2, 2002. Available from: <http://www.theglobalfund.org/search/portfolio.aspx?countryID=KEN>.
5. Uganda receives \$37 million in U.S. AIDS funding, plans to provide antiretrovirals to government workers. *Kaiser Daily HIV/AIDS Report*, February 4, 2004. Available from: <http://www.kaisernetwork.org>.
6. Stremlau J, Nkosi N. The AIDS toll on South Africa's colleges. *The Boston Globe* 2001 Jan 9.
7. Kelly MJ. Challenging the challenger: understanding and expanding the response of universities in Africa to HIV/AIDS. Washington DC: ADEA Working Group on Higher Education, The World Bank, 2004.
8. Zambia: MSF says rural poor lack access to AIDS drugs. *IRINNews* 2004 Jan 28. Available from: [www.irinnews.org/aidssfp/asp](http://www.irinnews.org/aidssfp/asp).
9. National Institute of Allergies and Infectious Diseases. CIPRA awards as of September 30, 2003. Safeguard the Household: Comprehensive Research. Available from: <http://www.niaid.nih.gov/daids/cipra/award-r03.htm>.
10. Weiser S, Wolfe W, Bangsberg D, Thior I, Gilbert P, Makhema J et al. Barriers to antiretroviral adherence for patients living with HIV infection and AIDS in Botswana. *J Acquir Immune Defic Syndr* 2003; **34**:281-8.
11. De Olalla G, Knobel H, Carmona A, Guelar A, Lopez-Colomes JL, Cayla JA. Impact of adherence and highly active antiretroviral therapy on survival in HIV-infected patients. *J Acquir Immune Defic Syndr* 2002; **30**: 105-10.
12. Hosseinipour MC, Kazembe PN, Sanne IM, van der Horst CM. Challenges in delivering antiretroviral treatment in resource poor countries. *AIDS* 2002; **16 Suppl 4**:S177-S187.
13. Attawell K, Mundy J. Provision of antiretroviral therapy in resource-limited settings: a review of experience up to August 2003. London: DFID Health Systems Resource Centre for WHO and the UK's Department for International Development, 2003.

14. Stucky C. Botswana upbeat about its efforts to give people with AIDS a life. *The Sunday Independent* 2003 Nov 30.
15. Dor A, Gertler P, Van Der GJ. Non-price rationing and the choice of medical care providers in rural Cote d'Ivoire. *J Health Econ* 1987;**6**:291-304.
16. Orrell C, Bangsberg DR, Badri M, Wood R. Adherence is not a barrier to successful antiretroviral therapy in South Africa. *AIDS* 2003;**17**:1369-75.
17. Biz/ed economics glossary. Available at: <http://bized.ac.uk/glossary/econglos.htm>. Accessed on February 9, 2004.
18. Kilewo C, Massawe A, Lyamuya E, Semali I, Kalokola F, Urassa E et al. HIV counseling and testing of pregnant women in sub-Saharan Africa: experiences from a study on prevention of mother-to-child HIV-1 transmission in Dar es Salaam, Tanzania. *J Acquir Immune Defic Syndr* 2001;**28**:458-62.
19. Maman S, Mbwapo J, Hogan NM, Kilonzo GP, Sweat M. Women's barriers to HIV-1 testing and disclosure: challenges for HIV-1 voluntary counselling and testing. *AIDS Care* 2001;**13**:595-603.
20. Increased number of low-income HIV-positive people, high price of Fuzeon creating care 'rationing.' *Kaiser Daily HIV/AIDS Report*, January 13, 2004. Available from: <http://www.kaisernetwork.org>.
21. Loewenson R, McCoy D. Access to antiretroviral treatment in Africa. *BMJ* 2004; **328**: 241-42.
22. UNAIDS. Stepping back from the edge: the pursuit of antiretroviral therapy in Botswana, South Africa and Uganda. Geneva: UNAIDS, 2004.
23. Sakyi-Addo K. Ghana gives free antiretrovirals to AIDS victims. *Reuters Health Information* 2004 Jan 22.
24. UNAIDS. Epidemiological fact sheets on HIV/AIDS and sexually transmitted infections: Ghana. Geneva: UNAIDS, 2004.
25. Kemp J, Aitken JM, LeGrand S, Mwale B. Equity in health sector responses to HIV/AIDS in Malawi. Equinet Discussion Paper Number 5, Regional Network for Equity in Health in Southern Africa, 2003.
26. South African Ministry of Health. Operational plan for comprehensive HIV and AIDS care, management and treatment for South Africa. Pretoria: Ministry of Health, 2003.
27. The Uganda Country Coordinating Mechanism for the Global Fund for AIDS, TB and Malaria. Scaling up of Anti-Retroviral Therapy (ART) and Orphan and Other Vulnerable Children (OVC) Interventions within the framework of existing and proposed national strategic frameworks and plans in Uganda. Proposal to the Global Fund to Fight AIDS, TB and Malaria, Round 3, 2003. Available from: <http://www.theglobalfund.org/search/portfolio.aspx?countryID=UGD>.
28. UNAIDS. Technical and operational recommendations to achieve "3x5". Draft report from the WHO/UNAIDS Zambia Consultation, November 18-21, Lusaka, Zambia. Geneva: UNAIDS, 2004.
29. Sanne I, Ive P, McIntyre J, Gray G, Mohapi I, Wood R et al. Successful antiretroviral therapy clinical research in South Africa. 1st International AIDS Society Conference on HIV Pathogenesis and Treatment, Buenos Aires, 2001 July 7-11, Abstr No. 321.
30. Livesley N, Morris C. Antiretroviral therapy in a primary care clinic in rural South Africa. *AIDS* 2003;**17**:2005-6.

**Center for International Health and Development  
Health and Development Discussion Paper Series**

HDDP 1. Shifting the Burden of HIV/AIDS. Sydney Rosen and Jonathon Simon. May 2002.

HDDP 2. The Retail Market for Bednets in Kenya: How Well Is It Working? Bruce Larson and Sydney Rosen. Nov 02.

HDDP 3. Why do Nigerian manufacturing firms take action on AIDS? Sydney Rosen et al.. Jan 03.

HDDP 4. Rationing antiviral therapy for HIV/AIDS in Africa: efficiency, equity, and reality. Sydney Rosen, Ian Sanne, Alizanne Collier, and Jonathon Simon. Feb 2004.