

**SEXUALLY TRANSMITTED INFECTIONS:
DRUG MANAGEMENT CONSIDERATIONS
FOR SUB-SAHARAN AFRICA**

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ACRONYMS

AIDS	acquired immunodeficiency syndrome
DFID	Department for International Development [UK]
ESA	Eastern and Southern Africa
FPLM	Family Planning Logistics Management
GUD	genital ulcer disease
HIV	human immunodeficiency virus
LGV	lymphogranuloma venereum
MSH	Management Sciences for Health
NGO	nongovernmental organization
REDSO	Regional Economic Development Services Office
RLI	Regional Logistics Initiative
RPM	Rational Pharmaceutical Management [Project]
RSA	Republic of South Africa
SSA	sub-Saharan Africa
STGs	standard treatment guidelines
STIs	sexually transmitted infections
UD	urethral discharge
UNAIDS	United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
US\$	U.S. dollars
VD	vaginal discharge
WHO	World Health Organization

BACKGROUND AND OBJECTIVES

Background

In 1996, the U.S. Agency for International Development's (USAID's) Regional Economic Development Services Office (REDSO) for Eastern and Southern Africa (ESA) program established the Regional Logistics Initiative (RLI) to strengthen logistics in support of improving the quality of health care in the region. REDSO/ESA asked the Management Sciences for Health Rational Pharmaceutical Management (RPM) Project and the John Snow, Inc., Family Planning Logistics Management (FPLM) Project to collaborate in the RLI. In 1998, an RLI task force was created and charged with launching a network to bring together health care workers and planners in the region and to promote a concerted effort to address common problems. One of the priority concerns that has been identified is securing the supply of drugs required for the treatment of sexually transmitted infections (STIs).

This concern comes at a time when most countries in the region are implementing health sector reforms that affect the organization and finance of services. Indeed, the ability of governments to finance and expand health services in the last two decades has been undermined by unstable economic performance, unprecedented rates of population growth, and the immense cost of coping with infectious diseases. STIs are of particular concern not only because of the high prevalence and incidence rates, but also because of the association with increased vulnerability to human immunodeficiency virus (HIV) infection. Another concern is the increasing rates of resistance to the drugs most commonly used to treat STIs. These factors can only continue to impose significantly on the public health budgets in the coming years.

Objectives

When several countries in a region are afflicted by the same public health problems, it would seem reasonable to identify whether regional solutions are helpful and feasible. This concept is one of the premises underlying the RLI. This paper represents a preliminary effort to structure a dialogue addressing some of the critical issues in the supply management of STI drugs in sub-Saharan Africa (SSA). In an initial attempt to identify the areas where a concerted regional approach can be pursued, this paper sets out to answer the following questions:

1. What drugs are used to treat the selected STIs in the countries examined? How do these uses compare for selected countries in the region?
2. How much does it cost to treat an STI episode? How much variance is seen between countries in the region?
3. How many drugs are needed and how much does it cost to treat STIs in the selected countries? Can an estimate for the aggregate costs be determined?
4. How can countries get the drugs they need at prices they can afford? What are some issues to be considered in regional procurement strategies?

5. What roles can donors play in the fight against STIs? Which organizations are currently involved in drug procurement, distribution, and use for STIs? What important opportunities are there to be addressed?

For the purposes of this paper, the STIs discussed are illustrative and represent the most common and curable conditions in the region (chlamydia, gonorrhea, syphilis, and trichomoniasis). In addition to the specific infections, the main corresponding syndromes (genital ulcer disease and vaginal and urethral discharge) are also addressed. The relative importance of early treatment of HIV for the subsequent prevention of acquired immunodeficiency syndrome (AIDS) is recognized but is not specifically addressed.

For the purposes of this study, six SSA countries within the USAID/REDSO region were selected based on the availability of official standard treatment guidelines for STIs. Further selection criteria included the countries' burden of disease, with specific reference to STIs, and the availability of documents and information required for analysis. The countries selected were Kenya, Malawi, Republic of South Africa (RSA), Tanzania, Uganda, and Zimbabwe.

DISCUSSION

The following section deals in depth with each of the five questions outlined in the Objectives section.

1. What drugs are used to treat the selected STIs? How do these uses compare for selected countries in the region?

The first step in determining the scope of drug management issues for STIs is to identify the drugs used to treat the conditions. Drug use can be described in terms of average actual treatments or ideal standard treatments. The average treatment is based on observed or reported practices and for this reason is more likely to predict actual use. Average treatment is in contrast to the ideal treatment, defined as what should happen if prescribers were to follow a widely recognized or agreed-upon practice for a given context or program. Ideal treatments are published as standard treatment guidelines (STGs). STGs represent systematically developed statements and aim to help practitioners make decisions about appropriate treatments for specific clinical conditions. When the treatment choice is based on a drug formulary or list of essential drugs, the guidelines are a good basis for drug supply and can assist in the standardization and rationalization of prescribing.

For this study, the most recently published or available STGs were used to describe drug use. The treatments for the selected STIs were compared to each other and to an internationally recognized standard, the World Health Organization (WHO) drug treatment recommendations (WHO 1993). For ease of discussion, only first- and second-line treatments were reviewed. Treatments for pregnant women, for those with allergies, and for repeat therapy due to treatment failures were considered as different conditions. Latent syphilis was not considered because it can only be detected by the presence of a reactive serologic test. Late-latent and late-stage syphilis are generally considered noninfectious and are not included in this study.

Observations

Syndromic and Disease-Specific Diagnosis and Treatment Vary from Country to Country

The traditional approach to treatment for STIs is based on the confirmation of the pathogen through laboratory testing. A specific drug treatment for that condition is recommended based on that diagnosis. In response to some of the concerns surrounding the ability to provide appropriate laboratory-confirmed diagnosis and treatment to STI patients in the developing world context, particularly in primary care and because of the high levels of dual pathology, an alternative approach to the traditional etiological diagnostic approach has been developed. This alternative is based on the recognition that there are sets of symptoms and signs that characterize the most common curable STIs, and that many are in fact comorbidities involving more than one pathogen. The identification of syndromes implies that symptoms are fairly consistent and easily recognized. Drug treatment is provided for the most common biological causes of the syndrome rather than for specific, targeted pathogens that would be identified through laboratory testing.

The STGs examined for this review were not completely comparable. Only Kenya has STGs for the four infections and three syndromes addressed in the study. South Africa has an STG for only one of the four infections (syphilis), and Malawi has only two (trichomoniasis and syphilis). In Tanzania, gonorrhoea is treated as a mixed infection. The diseases represented in the syndromes presented in the STGs were not the same across the countries. For most of the countries in this review, the treatment for the syndrome of genital ulcer disease (GUD) includes treatment for both syphilis and chancroid, the most common causes of GUD. According to the Malawi STG, GUD was more likely due to chancroid than to syphilis rather than both equally. However, in Zimbabwe, the syndrome may also be related to herpes, lymphogranuloma venereum (LGV), and granuloma inguinale. Other examples of STIs treated syndromically include vaginal discharge (VD) and male urethral discharge (UD), which may be caused by trichomoniasis, gonorrhoea, chlamydia, or candida. The treatment for UD in Kenya, Malawi, South Africa, and Tanzania aims at treating gonorrhoea and/or chlamydia; in Zimbabwe, UD and VD are to be considered together as symptoms of gonorrhoea, trichomoniasis, and/or chlamydia. Drug treatments vary accordingly. (Annex A indicates which infections and syndromes are covered by each country's STGs.)

A Wide Selection of Drugs Is Represented in the STGs for the Various Countries in the Region

STGs typically recommend drugs that are listed on national essential drug lists or formularies. These lists or formularies are usually based on criteria that reflect the relative therapeutic importance for public health needs, safety and cost of drugs, and local experience with specific drugs. For these reasons, it may be expected that the lists will not be identical from one program to another. Indeed, actual dosing regimens aside, the number of drugs used in the treatment of the various STIs studied varies significantly among the STGs for the seven infections and syndromes reviewed.

Among the six countries' guidelines for first- and second-line treatments, 23 different drugs are mentioned for the treatment of the seven infections and syndromes of interest. (This may be an underestimate because of the 42 possible scenarios—seven conditions by six countries—comparable information was not available for 13 cases.) The Kenya STGs mentioned the highest number of drugs (18) covering all seven of the diseases and syndromes, and averaging 2.6 drugs per condition. The WHO guidelines contain 14 drugs for all seven conditions (average 2 drugs). Tanzania and Zimbabwe both indicate the use of six drugs for six of the seven conditions. The remaining three countries list between four and six drugs for a more limited range of conditions—Malawi 3 and RSA and Uganda 4, averaging between 1 and 1.5 drugs per disease or syndrome.

Of the drugs mentioned, the most agreement among the STGs occurs for three drugs: benzathine penicillin, doxycycline, and metronidazole (Table 1), which appear in all six countries' STGs. Metronidazole was recommended as the first line of treatment for trichomoniasis in all STGs for that condition, and benzathine penicillin for syphilis, but the treatment options vary considerably for the various conditions among the STGs.

Table 1. Drugs for the Treatment of Selected STIs per Standard Treatment Guidelines

Drugs	Kenya	Malawi	RSA	Tanzania	Uganda	Zimbabwe	WHO
Amoxicillin	X						
Amoxicillin/Potassium clavulanate	X						
Benzathine penicillin	X	X	X	X	X	X	X
Cefixime							X
Ceftriaxone	X						X
Chloramphenicol					X		
Ciprofloxacin	X		X				X
Clotrimazole	X						X
Cotrimoxazole	X			X		X	X
Doxycycline	X	X	X	X	X	X	X
Erythromycin	X		X		X		X
Gentamicin		X				X	
Gentian violet	X			X			
Kanamycin						X	
Metronidazole	X	X	X	X	X	X	X
Miconazole							X
Norfloxacin	X						
Nystatin	X						X
Probenecid	X						
Procaine penicillin	X						X
Spectinomycin	X						X
Tetracycline	X			X	X		X
Tinidazole	X						
Total no. of drugs	18	4	5	6	6	6	14
No. of conditions	7	3	4	6	4	6	7
Av. no. of drugs per condition	2.6	1.3	1.3	1.0	1.5	1.0	2.0

2. How much does it cost to treat an STI episode? How much variance is seen between countries in the region?

In considering the cost of treating an STI episode by following the various countries' STGs, the cheapest is not necessarily the best. Efficacy is above all important and, in the climate of rapid development of resistance to various treatments, the effectiveness of treatments has to be constantly reviewed.

The cost of the drugs should be considered in the selection process. However, the determination of the most cost-effective alternative necessitates a consideration of the total treatment costs. For this study, median unit costs for the drugs listed in the STGs were identified in the *International Drug Price Indicator Guide* (McFadyen 1999) and multiplied by the recommended number of doses and days of treatment to obtain the total (full course) treatment cost. For those countries where multiple treatment options were offered, the most expensive and least costly treatments for a condition were identified to illustrate the potential range of treatment costs. These costs reflect only the cost of the drugs and do not include related medical supplies such as gloves, syringes, and needles, used in the diagnosis and treatment of many of the conditions studied, or condoms. It should be noted that true treatment costs would include these items in addition to drug costs and, as such, different conclusions may be reached about the most costly and least costly treatment options. Results are presented in Table 2 (Annex B contains greater detail).

The difference between the highest and lowest cost treatments for treatment alternatives in one program can be considerable, such as the treatment of urethral discharge in Kenya, where there is a difference of US\$ 3.05 between the high and the low (almost a ninefold increase). Other notable examples include a difference of US\$ 2.75 for the treatment of gonorrhoea and US\$ 2.02 for the treatment of genital ulcer disease in Kenya, and US\$ 4.11 difference for the treatment of syphilis in South Africa.

Differences also exist in costs between countries and the WHO options. For example, the low-cost option for treating early syphilis in the Kenyan STG is US\$ 0.38, compared with US\$ 0.27 for the low-cost WHO option, and US\$ 0.70 per case in Zimbabwe. The WHO version is the cheapest for three of the diseases and syndromes and joint lowest cost for the other four. When looking at the high-cost options, WHO treatments are lower than the overall highest in four cases and equal to the most expensive in the other three cases.

It is important to note that although some drugs may have low unit prices, cost of treatment may be higher due to the number of tablets or doses needed. For example, a standard course of tetracycline to treat chlamydia following WHO guidelines would be US\$ 0.47, whereas for doxycycline, a higher-unit-cost drug, it would be US\$ 0.17.

The need for constant updates on efficacy, particularly in the light of changing resistance patterns, should again be stressed.

Table 2. Lowest and Highest Cost Options for STI Drug Treatment, per Episode (US\$)

Condition	Kenya		Malawi		RSA		Tanzania		Uganda		Zimbabwe		WHO		Overall	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Gonorrhoea	0.18	2.93	—	—	—	—	—	—	0.29	0.34	—	—	0.07	2.93	0.07	2.93
Chlamydia	0.17	2.04	—	—	—	—	0.17	0.35	0.34	0.47	—	—	0.17	0.47	0.17	2.04
Syphilis (early)	0.38	0.53	0.27		0.27	4.38	0.27		0.27		0.70		0.27	0.75	0.27	4.38
Trichomoniasis	0.21		0.04		—	—	0.10		0.05	0.10	0.14		0.04	0.13	0.04	0.21
Genital ulcer disease	0.55	2.57	—	—	4.35		0.74		—	—	0.70*		0.33*	3.68*	0.33	4.35
Urethral discharge	0.35	3.40	0.49		0.24		0.39		—	—	0.50	1.05	0.24	3.40	0.24	3.40
Vaginal discharge	0.38	1.04	—	—	0.28		0.48		—	—	0.64	1.19	0.24**	3.40**	0.24	3.40

Note: Low = Lowest cost option; High = Highest cost option; — = No treatment specified

*Syphilis and chancroid

**Cervicitis

3. How many drugs are needed and how much does it cost to treat STIs in the selected countries? Can an estimate for the aggregate costs be determined?

Although it is recognized that a varying proportion of people will use the private sector depending on country and location, it is useful to look at overall costs from a population perspective, which also helps to put into context the cost of treating a single episode.

As mentioned earlier, in order to obtain the practical needs estimates, it is useful to compare estimates based on standard treatment guidelines with what is known about actual use. Not doing so can over- or underestimate needs, which can have a significant impact on procurement costs. Likewise, actual versus ideal care-seeking behavior should be considered. However, obtaining data on actual use was beyond the scope of this report—all information was derived from published treatment guidelines.

There are two commonly used methods for estimating drug needs: (1) consumption based and (2) morbidity based.

Consumption-based method. In looking at the public sector, a consumption-based estimation requires the availability of accurate records of past consumption. However, the drug management information systems of many developing countries often do not allow for the collection of reliable consumption data, and poor estimates may result. Procurement data, while often more readily available, may also be of questionable accuracy. For these reasons, it is useful to check consumption-based estimates with a second approach based on morbidity and STGs.

Morbidity-based method. The morbidity-based method requires knowledge of the epidemiological profile of the population being served and their health-seeking behavior, in particular the public sector health services utilization. This method needs accurate data on both population-based epidemiology and health-seeking behavior.

Usually, it is recommended to conduct estimates by both methods and critically evaluate the differences in the results. In the specific case of STIs, this plan presents a problem because of variable patterns of disease incidence in countries with different degrees of diagnostic capability that then result in variation in reporting. Furthermore, as noted, some countries do not report on diseases but rather on the syndrome, and some diseases are more likely than other diseases to be included under some syndromes.

Because neither consumption nor procurement data were available, the estimation exercise for this study relied on published morbidity data for the region. The absence of country-specific incidence and prevalence rates for the various conditions and the absence of STGs for all conditions and syndromes under consideration meant that estimates of the cost to treat STIs in the selected countries could not be made.

In the absence of country-specific epidemiological data, including rate of recurrence, a simple method was used in this paper to obtain comparative estimates for single-episode treatment costs for the region for the specific diseases (syphilis, gonorrhea, chlamydia, and trichomoniasis) based on each country's STGs. For this exercise, the lowest cost alternative was used.

Assumptions are based on existing published information about health services utilization rates in the region and assumptions about the relative stability of these figures. For example, it has been estimated that SSA has one of lowest treatment rates in the world for STIs with reported rates as low as 40 percent of infected people seeking care, and only 65 percent of these actually receiving care (Mayaud et al. 1998). Accordingly, it was assumed that 25 percent of women and 35 percent of men infected with gonorrhea, chlamydia, and trichomoniasis receive treatment. Similarly, it was assumed that 35 percent of infected men and women are treated for primary and secondary syphilis.

Table 3 presents cost estimates for the four conditions under two assumptions about utilization. One assumes treatment levels consistent with past performance as reported in the literature (Gerbase et al. 1998) and the other assumes an ideal situation where 100 percent of the infected population receives treatment. Theoretically, over time, efforts to extend treatment to all infected peoples would continue while the level of infection would decrease.

Using the Kenyan STG least-cost treatment options for each disease, the total cost to treat the proportion of those infected who are estimated to receive treatment in SSA would be US\$ 4.5 million. If 100 percent of new cases were treated the cost is estimated to be over US\$ 10 million more totaling just under US\$15 million. The equivalent figures based on the Uganda STGs are US\$ 4.1 million for the proportion currently treated and US\$ 13.7 million for 100 percent coverage. The WHO treatment protocols offer the lowest cost option for each disease, resulting in comparable figures of just under US\$ 2 million for the current caseload assumption and US\$ 6.5 million for all new cases—less than half of the estimated total costs using the Kenyan or Ugandan STGs.

Translating individual episode treatment costs to population costs highlights the magnitude of the problem of obtaining needed drugs. The question becomes not only one of drug selection but also one of coverage. Deciding to expand diagnostic and treatment services to reach the entire target population is not merely about opening more clinics or improving technical competence. For many countries, this decision necessarily leads to questions about alternative financing, such as cost sharing or promoting the private sector to supply and charge for clinical treatment. The problems raised by such changes are illustrated by the results of one study in Nairobi that reported a 60 percent decline in the attendance at an STD clinic when patients were charged about US\$ 1.75 for diagnosis and treatment, less than half a day's pay for most city households (Moses et al. 1992).

Table 3. Comparative Cost to Treat New Cases of Selected STIs in Sub-Saharan Africa, Based on Country STGs and Under Assumptions of Current Proportion of Those Infected Receiving Treatment and 100 Percent Coverage, 1999

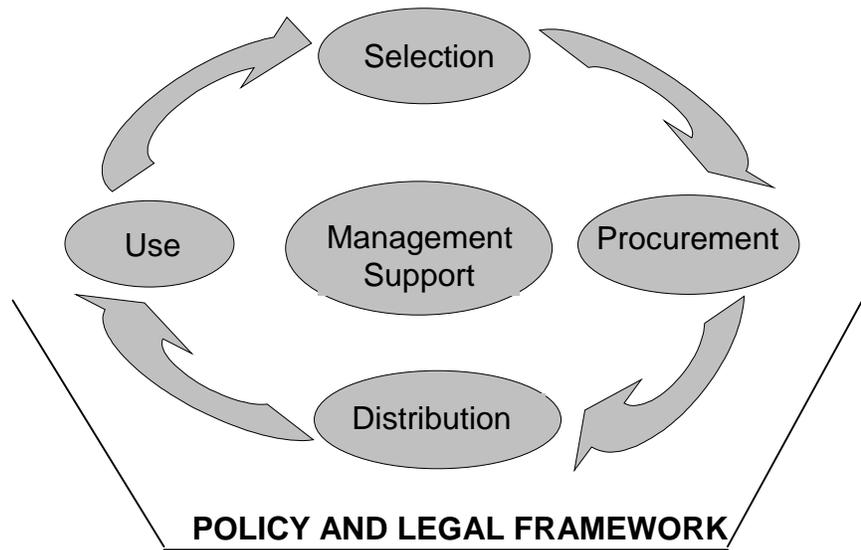
Disease	Estimated no. of new cases (000s)	WHO	Kenya	Uganda	Malawi	RSA	Tanzania	Zimbabwe
		US\$ 000s						
Gonorrhea								
Current proportion	5,229	\$363	\$955	\$1,506	—	—	—	—
100% coverage	17,633	\$1,224	\$3,220	\$5,078	—	—	—	—
Chlamydia								
Current proportion	5,113	\$881	\$881	\$1,761	—	—	\$881	—
100% coverage	17,323	\$2,983	\$2,983	\$5,966	—	—	\$2,983	—
Syphilis (early)								
Current proportion	1,389	\$368	\$522	\$368	\$368	\$368	\$368	\$974
100% coverage	3,969	\$1,052	\$1,492	\$1,052	\$1,052	\$1,052	\$1,052	\$2,782
Trichomoniasis								
Current proportion	10,248	\$385	\$2,180	\$482	\$385	—	\$1,012	\$1,445
100% coverage	34,213	\$1,286	\$7,277	\$1,608	\$1,286	—	\$3,377	\$4,824
Total annual costs								
Current proportion		\$1,997	\$4,538	\$4,117	*	*	*	*
100% coverage		\$6,545	\$14,973	\$13,704	*	*	*	*
Total no. of cases								
Current proportion	21,980							
100% coverage	73,139							

Notes: Figures are based on treatment costs to four decimal places as presented in Annex B.
 — = There are no STGs for this disease in this country. Therefore, no total annual costs are calculated.
 Totals may not add due to rounding.
 * Not applicable

4. How can countries get the drugs they need at prices they can afford? What are some issues to be considered in regional procurement strategies?

Sexually transmitted infections are a regional problem, especially in the light of the HIV/AIDS epidemic. Prompt treatment is one of the few interventions that has been shown to reduce the spread of AIDS and is therefore a public health priority. However, rapidly changing antimicrobial resistance patterns make antimicrobial resistance surveillance and updating STGs in the light of this information a priority.

In terms of thinking through the issues of acquiring needed drugs at affordable prices, the drug management cycle (Figure 1) has to be considered.

Figure 1. Drug Management Cycle

Selection

“Harmonized” STGs and a regional antimicrobial resistance surveillance center are both possible areas for regional cooperation, and their feasibility needs further research. The variation in drug therapies highlights some questions for a more regional approach to rational drug use. There are obvious advantages in consolidating or rationalizing the various STGs. To some extent, it would seem that the WHO guidelines approximate this type of concept. Norms and standards for practice may be transferable from one country to another and from one service area to the other with only modest adaptation for some countries. However, this apparent compatibility may not be the case and before attempting to implement this suggestion it is important to understand the historical and political processes in creating the STGs in each country, as well as the technical and epidemiological aspects.

This regionalization would be particularly useful for supporting long-term treatments for populations in areas of high levels of migration, for example. A concerted effort among countries to harmonize standardized and rationalized treatment guidelines among the countries in the region not only for the treatment of STIs but also for all infections may contribute to managing the spread of resistance to various antimicrobials. In some areas of Tanzania, for example, high rates of resistance to penicillin (50%) and tetracycline (96%) and sensitivity to cotrimoxazole and to ciprofloxacin have been documented (Mayaud et al. 1998).

Implicit in this discussion of standardization is the possible creation of a regional antimicrobial resistance surveillance center that would share information with national STG committees, which could update their STGs as needed.

However, the difficulty of the process for reaching such consensus cannot be underestimated. STG development and maintenance involve a process defined by continual effort that requires significant political commitment. It includes gaining acceptance of the concept among policy

makers, practitioners, and managers and developing a text of the guidelines through wide consultation and consensus building.

Regardless of whether people go to the public or private, formal or informal sectors they need to be offered safe, effective, and affordable treatments. Therefore, a consensus on “correct” treatment, taking cost and effectiveness into account and including local resistance patterns, will ensure maximum equity.

Procurement

Improving procurement systems can result in (1) improved product quality, (2) lower prices, and (3) improved availability through proper quantification and timing of procurements. While strengthening individual country procurement systems will help, more immediate and substantial improvements in the region may be possible by concentrating on improving drug quantification capacity, regional procurement strategies, and information sharing between countries as outlined in the following points:

- Countries typically have low capacity to accurately quantify needs, resulting in inefficient use of both local and donor funds.
- It may be possible for national procurement boards to cooperate on joint tenders via international competitive bidding to ensure maximum advantage of bulk procurement prices. But because most of the drugs are available as generic products, there may be little price advantage in such supranational over national call for tenders.
- Sharing achieved prices between countries would strengthen each country’s negotiating position.
- Similarly, the government-achieved international tender prices on these selected drugs can be publicized widely to strengthen public knowledge of fair prices, which should help to drive down prices in the private sector.

Distribution

Integrated distribution of all drugs and medical supplies is much more cost-effective than creating separate distribution channels for each vertical program in the public sector. In countries where distribution is organized in such a vertical manner, integration can achieve cost savings in buildings, transport, and management costs. In some countries preventing, detecting, and treating STIs are considered components of reproductive health services. In some cases, reproductive health services extend to HIV/AIDS as well.

Use

By standardizing STGs on STI management throughout the region, the teaching and monitoring of “correct” treatment becomes much easier. Standardized educational material can be produced for universities, health professionals, drug sellers, and the general public alike.

According to one study in South Africa, only 65 percent of STI patients received the correct drug treatment (Wilkinson 1999). A variety of reasons can explain why this occurs, including drug availability, knowledge and skills of the practitioners, and a complex of patient health care-seeking behaviors. For this reason, the implementation of STGs requires at least the same degree of planning and commitment as their development.

Implementing the STGs involves coordinating introductory campaigns and training activities for all relevant health care staff in both the public and private sectors, monitoring of practices, and follow-up. If provider skills are similar, training may only be required to introduce clinical, counseling, and management tasks for STI prevention, detection, and treatment. However, ensuring the availability of the recommended drugs in the quantities required is a prerequisite. Drug availability becomes a procurement concern.

5. What roles can donors play in the fight against STIs? Which organizations are currently involved in STI drug procurement, distribution, and use? What important opportunities are there to be addressed?

There are many donors active in the region and in the field of STIs. Many United Nations agencies (UNFPA, UNDP, UNICEF, UNAIDS), the WHO, the World Bank, and various bilateral programs such as the Danish International Development Agency, the UK Department for International Development (DFID), the Norwegian Agency for Development, the Swedish International Development Agency, and the Japanese International Cooperation Agency are involved. Many nongovernmental organizations are also active.

Many organizations do not like to spend money on consumables, so do not see it as their role to purchase drugs. However in 1996–97 and 1997–98 in Uganda, more than half of all public sector drugs were purchased by donors, and more than half of these drugs were for STIs paid for by DFID and the World Bank (Dukes 1999). This massive influx of drugs can in itself cause tremendous problems to weak procurement and distribution mechanisms, undermining the sustainability that donor organizations are seeking to create. This problem is particularly acute in countries where health care responsibilities have recently been decentralized, and capacity at the district level to quantify needs and make procurement plans is insufficiently developed.

From this paper there are five clear areas of priority that could easily and usefully be facilitated by donor funds and technical assistance.

1. Antimicrobial Resistance Surveillance

There is a clear need for capacity building and equipment provision in the setting up of national and regional antimicrobial resistance surveillance centers. Much work needs to be done on this, although a start has been made in Kenya.

2. Promotion of the Harmonization of STGs

The convening of a regional standard treatment meeting for key people on STG committees of all countries in the region to debate a rationalized STG would facilitate the harmonization of STGs and the strengthening of the syndromic treatment protocols.

3. Procurement and Drug Donations

It may be helpful to provide technical assistance for countries or districts to quantify their drug needs in the public sector for procurement according to the STGs. In some cases it may be seen as beneficial to fund the districts or countries to make their procurement plans as long as the assistance is harmonized within the rest of the health sector. However, as mentioned earlier, drug donations or drug supply, such as that funded by the World Bank in Uganda, needs to be sensitively harmonized into the delicate decentralized system by working with the national and district planning levels.

There is a possible need for technical assistance for countries to aggregate district quantified needs and to offer tenders.

There is also a possible need to help publicize the tender prices that have been achieved to other governments or to help publicize prices within countries to strengthen public knowledge of fair prices, which should help to drive down prices in the private sector.

4. Distribution

Donors can help with technical assistance and with the development of integrated distribution of all drugs and medical supplies within the public sector.

5. Use

Funding educational and managerial interventions to improve use according to the new STGs in both the public and private sector, including the informal drug sellers and the patients, is of highest priority.

Different strategies would have to be worked out for physicians, health assistants, nurses, pharmacists, drug sellers, and the patients. Different educational materials need to be developed but probably can have great similarities between countries in the region. Television programs,

radio programs, and posters for public education would also be adaptable for the differing countries of the region. Syllabi and curricula for primary and secondary schools, medical schools, and other health-related colleges need to be developed transregionally. Donors could fund cross-regional conferences and workshops to develop these programs.

There is also the possibility of promoting packaging of drugs according to syndromic treatment, for simplicity of use.

CONCLUSION

Estimates suggest that there were over 73 million new cases of sexually transmitted infections throughout sub-Saharan Africa in 1999. The prompt treatment of STIs has been identified as one of the few ways to reduce the spread of HIV/AIDS—a regional catastrophe from public health, economic stability, and development perspectives.

The treatment of STIs throughout the SSA region varies considerably. First, countries place a different emphasis on the implementation of a syndromic approach to STI treatment. Second, the public sector standard treatment guidelines vary between countries in the region, both in the number of treatment options recommended and in the choice of drugs for the treatment of each infection or syndrome. (The situation may be further obscured by differences in actual treatment between the private and public sectors, and the large variation in the proportions of people who use the private versus the public sector.) At least 23 different drugs are listed in the STGs of the six countries reviewed for this study, averaging between 1 and 2.6 drugs per condition.

The cost of treating a single case of an STI also varies considerably, both among the options available within a particular country's STGs (the high-cost treatment being up to 16 times more expensive than the lowest cost alternative) and between the treatments offered for a specific STI in different countries (a similar range exists here).

In the absence of comprehensive and reliable information on epidemiology, treatment coverage, and drug consumption and procurement, it is well nigh impossible to determine country-specific costs for STI treatment. Using regional rates for the incidence of various conditions and country-specific treatment costs, a range of estimates for the cost of treating STIs in SSA can be determined; assuming the current proportion of those infected are treated, costs range from almost US\$ 2.0 million (WHO guidelines) to US\$ 4.5 million (Kenya STGs). If all infected are treated, the range of costs are US\$ 6.5 million to US\$ 15.0 million, respectively.

The adoption of a common regional strategy for addressing STI drug needs could focus on harmonizing standard treatment guidelines, collective procurement (and price sharing), cooperation in a regional antimicrobial resistance surveillance center, and improving adherence to STGs.

A number of multilateral, bilateral, and nongovernmental organizations focus on or incorporate the STI agenda in their activities. This paper suggests that the following areas could be of priority for donor funds and technical assistance: antimicrobial resistance surveillance, promotion of the harmonization of STGs, procurement and drug donations, development of integrated distribution of drugs in the public sector, and funding interventions to improve drug use.

All stages of the drug management cycle would be usefully strengthened by a regional approach, which could be helped by intergovernmental cooperation and facilitated by coordinated donor activity in different countries.

BIBLIOGRAPHY

- Dar es Salaam Urban Health Project (DUHP) and City Medical Office of Health. 1996. *Standard Treatment Guidelines for Main Diseases in Dar es Salaam Based on Essential Drugs*. Dar es Salaam, Tanzania: DUHP.
- Dukes, Graham, John Chalker, et al. November 1999. *Consultancy on the Harmonization of the Pharmaceutical Supply System in Uganda*. Copenhagen: Danish Red Cross/Euro Health Group.
- Gerbase, A. C., J. T. Rowley, D. H. Heymann, S. F. Berkley, and P. Piot. 1998. Global prevalence and incidence estimates of selected curable STDs. *Sexually Transmitted Infections* 7(4): S12–S16.
- McFadyen, Julie E., ed. 1999. *International Drug Price Indicator Guide*. Arlington, VA: Management Sciences for Health.
- Mayaud, P., G. Ka-Gina, and H. Grosskurth. 1998. Effectiveness, impact and cost of syndromic management of sexually transmitted diseases in Tanzania. *International Journal of STD and AIDS* 9: Suppl 1:11–4.
- Ministry of Health, Government of Kenya. November 1994. *Clinical Guidelines for Diagnosis and Treatment of Common Hospital Conditions in Kenya*. Nairobi: Government of Kenya.
- Ministry of Health, Malawi Government. 1993. *Malawi Standard Treatment Guidelines*, 2d ed. Lilongwe: Ministry of Health, Malawi Government.
- Ministry of Health, Pharmaceuticals and Supplies Unit, United Republic of Tanzania. 1997. *Drug Use Guidelines for Primary Health Care Facilities*. Dar es Salaam: Ministry of Health, United Republic of Tanzania.
- Ministry of Health, Republic of Uganda. 1993. *National Standard Treatment Guidelines*. Entebbe: Uganda Essential Drugs Management Programme, Ministry of Health.
- Ministry of Health and Child Welfare, Republic of Zimbabwe. 1994. *Essential Drugs List for Zimbabwe*. Harare: Republic of Zimbabwe.
- Ministry of Health and Child Welfare. 1996. *Management of Sexually Transmitted Diseases, STD Module*. Harare: Zimbabwe Essential Drugs Action Programme, Ministry of Health and Child Welfare, Republic of Zimbabwe.
- Moses, S., F. Manji, J. E. Bradley, N. J. Nagelkerke, M. A. Malisa, and F. A. Plummer. Aug. 22, 1992. Impact of user fees on attendance at a referral centre for sexually transmitted diseases in Kenya. *Lancet* 340(8817): 463–6.

Murray, Christopher J. L., and Alan D. Lopez. 1996. *Global Health Statistics*. Boston: Published by the Harvard School of Public Health on behalf of the WHO and the World Bank.

National Essential Drugs Committee, South Africa Department of National Health. 1996. *Standard Treatment Guidelines and Essential Drugs List*. Pretoria: South Africa Department of National Health.

WHO and UNAIDS. 1999. *Sexually Transmitted Diseases: Policies and Principles for Prevention and Care*. Geneva: WHO/UNAIDS.

Wilkinson, D. October 1999. Public-private health sector partnerships for STD control in developing countries: Perspectives from experience in rural South Africa. *Sexually Transmitted Infections* 75(5): 285.

World Health Organization. 1993. *Recommendations for the management of sexually transmitted diseases*. Geneva: WHO. WHO/GPA/STD/93.1.

Annex A. Drugs Recommended for the Treatment of STIs According to National and WHO Guidelines

Condition	Drug	Kenya (1994)	Malawi (1993)	RSA (1996)	Tanzania (1997)	Uganda (1993)	Zimbabwe (1996)	WHO (1993)
Chlamydia	Doxycycline	X			X	X		X
	Erythromycin	X						
	Tetracycline	X			X	X		X
Gonorrhoea	Chloramphenicol					X		
	Tetracycline					X		
	Doxycycline					X		
	Amoxicillin	X						
	Amoxicillin/Potassium clavulanate	X						
	Probenecid	X						
	Ciprofloxacin							X
	Ceftriaxone	X						X
	Cefixime							X
	Spectinomycin	X						X
	Norfloxacin	X						
	Kanamycin							X
	Erythromycin					X		
	Benzathine penicillin	X	X	X	X	X	X	X
Syphilis	Procaine penicillin	X						X
	Erythromycin			X				
	Doxycycline			X				
	Cotrimoxazole						X	
	Metronidazole	X	X		X	X	X	X
Trichomoniasis	Tinidazole	X						
	Norfloxacin	X						
Urethral discharge (G, C, T)	Amoxicillin	X						
	Amoxicillin/Potassium clavulanate	X						
	Probenecid	X						
	Spectinomycin	X						X
	Ceftriaxone	X						X
	Cefixime							X
	Ciprofloxacin			X				X
	Doxycycline	X	X	X	X		X	X
	Gentamicin		X				X	
	Tetracycline	X						X
	Kanamycin						X	
Cotrimoxazole				X		X		
Erythromycin	X							

Annex A. Drugs Recommended for the Treatment of STIs According to National and WHO Guidelines (cont'd.)

Condition	Drug	Kenya (1994)	Malawi (1993)	RSA (1996)	Tanzania (1997)	Uganda (1993)	Zimbabwe (1996)	WHO (1993)
Genital Ulcer	Benzathine penicillin	X		X	X		X	X
	Procaine penicillin	X						X
	Erythromycin	X		X				X
	Cotrimoxazole	X			X		X	X
	Ceftriaxone	X						X
	Ciprofloxacin	X						X
	Gentian violet				X			
	Spectinomycin							X
	Doxycycline	X						X
	Tetracycline	X						X
	Sulphamethoxazole	X						
Vaginal Discharge (T, Cn)	Metronidazole	X		X	X		X	X
	Tinidazole	X						
	Gentian violet	X						
	Nystatin	X						X
	Miconidazole							X
	Clotrimazole	X						X
	Ciprofloxacin			X				X
	Spectinomycin							X
	Kanamycin						X	
	Doxycycline			X	X		X	X
	Tetracycline							X
	Cefixime							X
	Cotrimoxazole				X		X	
Ceftriaxone							X	

Note: G = gonorrhoea, C = chlamydia, T = trichomoniasis, Cn = candida

Annex B. Cost of STI Drugs and Total Drug Treatment According to Country Guidelines (in US\$)

Country	Disease or Syndrome	Tx	Drug	Dose	Unit	Unit Cost (US\$)	Units per Tx	Cost per Drug (US\$)	Total Tx Cost (US\$)
KENYA (1994)	DISEASES								
	Gonorrhea	1	Norfloxacin	800mg	400mg tab	0.0913	2	0.1826	0.1826
			OR						
		2	Amoxicillin	3gm	500mg tab	0.0393	6	0.2358	
			and Amoxicillin/Potassium clavulanate	500mg/125mg	500mg/125mg tab	0.3154	1	0.3154	
			and Probenecid	1gm	500mg tab	0.0510	2	0.1020	0.6532
			OR						
		3	Spectinomycin	2gm	2gm vial	2.4350	1	2.4350	2.4350
			OR						
		4	Ceftriaxone	250mg	250mg vial	2.9250	1	2.9250	2.9250
			OR						
	Chlamydia (nongonococcal urethral discharge)	1	Tetracycline	500mg	250mg tab	0.0084	56	0.4704	0.4704
			OR						
		2	Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.1722
		OR							
	3	Erythromycin	500mg	250mg tab	0.0365	56	2.0440	2.0440	
	Syphilis (early)	1	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	2	0.5300	0.5300
			OR						
	2	Procaine penicillin	0.6MU	3MU vial	0.1880	2	0.3760	0.3760	
	Trichomoniasis	1	Metronidazole	200mg	200mg tab	0.0047	21	0.0987	
			and Tinidazole	2gm	500mg tab	0.0285	4	0.1140	0.2127
	SYNDROMES								
	Genital Ulcer Disease (treat for chancroid and syphilis)	1	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	2	0.5300	
			and Erythromycin	500mg	250mg tab	0.0365	56	2.0440	2.5740
			OR						
		2	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	2	0.5300	
			and Cotrimoxazole	1600mg/320mg	400mg/80mg tab	0.0109	16	0.1744	0.7044
			OR						
		3	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	2	0.5300	
			and Ciprofloxacin	500mg	500mg tab	0.0694	6	0.4164	0.9464
			OR						
		4	Procaine penicillin	0.6MU	3MU vial	0.1880	2	0.3760	
			and Erythromycin	500mg	250mg tab	0.0365	56	2.0440	2.4200
			OR						
		5	Procaine penicillin	0.6MU	3MU vial	0.1880	2	0.3760	
			and Cotrimoxazole	1600mg/320mg	400mg/80mg tab	0.0109	16	0.1744	0.5504
		OR							
	6	Procaine penicillin	0.6MU	3MU vial	0.1880	2	0.3760		
		and Ciprofloxacin	500mg	500mg tab	0.0694	6	0.4164	0.7924	
	Urethral Discharge (treat for gonorrhea and)	1	Norfloxacin	800mg	400mg tab	0.0913	2	0.1826	
			and Tetracycline	500mg	250mg tab	0.0084	56	0.4704	0.6530
			OR						
		2	Norfloxacin	800mg	400mg tab	0.0913	2	0.1826	
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.3548
			OR						
		3	Amoxicillin	3gm	500mg tab	0.0393	6	0.2358	
			and Amoxicillin/Potassium clavulanate	500mg/125mg	500mg/125mg tab	0.3154	1	0.3154	
		and Probenecid	1gm	500mg tab	0.0510	2	0.1020		
		and Tetracycline	500mg	250mg tab	0.0084	56	0.4704	1.1236	
		OR							
4		Amoxicillin	3gm	500mg tab	0.0393	6	0.2358		
		and Amoxicillin/Potassium clavulanate	500mg/125mg	500mg/125mg tab	0.3154	1	0.3154		
		and Probenecid	1gm	500mg tab	0.0510	2	0.1020		
		and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.8254	
		OR							
5		Spectinomycin	2gm	2gm vial	2.4350	1	2.4350		
	and Tetracycline	500mg	250mg tab	0.0084	56	0.4704	2.9054		
	OR								

Annex B. Cost of STI Drugs and Total Drug Treatment According to Country Guidelines (in US\$) (cont'd.)

Country	Disease or Syndrome	Tx	Drug	Dose	Unit	Unit Cost (US\$)	Units per Tx	Cost per Drug (US\$)	Total Tx Cost (US\$)	
KENYA (cont'd)	Urethral Discharge (cont'd)	6	Spectinomycin	2gm	2gm vial	2.4350	1	2.4350		
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	2.6072	
			OR							
		7	Ceftriaxone	250mg	250mg vial	2.9250	1	2.9250		
			and Tetracycline	500mg	250mg tab	0.0084	56	0.4704	3.3954	
			OR							
		8	Ceftriaxone	250mg	250mg vial	2.9250	1	2.9250		
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	3.0972	
	Vaginal Discharge (treat for candida and trichomoniasis)	1	Gentian violet 1%	1gm	1gm	0.0552	3	0.1656		
			and Metronidazole	200mg	200mg tab	0.0047	21	0.0987		
			and Tinidazole	2gm	500mg tab	0.0285	4	0.1140	0.3783	
			OR							
		2	Nystatin cream	1gm	1gm	0.0198	28	0.5544		
			and Nystatin pessary	0.1MU	100,000IU pess	0.0195	14	0.2730		
and Metronidazole			200mg	200mg tab	0.0047	21	0.0987			
and Tinidazole			2gm	500mg tab	0.0285	4	0.1140	1.0401		
		OR								
3		Clotrimazole	100mg	100mg pess	0.0982	6	0.5892			
	and Metronidazole	200mg	200mg tab	0.0047	21	0.0987				
	and Tinidazole	2gm	500mg tab	0.0285	4	0.1140	0.8019			
MALAWI (1993)	DISEASES									
	Syphilis (early)	1	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	1	0.2650	0.2650	
	Trichomoniasis	1	Metronidazole	2gm	250mg tab	0.0047	8	0.0376	0.0376	
	SYNDROMES									
	Urethral Discharge (treat for gonorrhea and chlamydia)	1	Gentamicin	240mg	40mg/ml amp	0.0530	6	0.3180		
and Doxycycline			100mg	100mg tab	0.0123	14	0.1722	0.4902		
S. AFRICA (1996)	DISEASES									
	Syphilis (early)	1	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	1	0.2650	0.2650	
			OR							
		2	Doxycycline	100mg	100mg tab	0.0123	30	0.3690	0.3690	
			OR							
	3	Erythromycin	500mg	250mg tab	0.0365	120	4.3800	4.3800		
	SYNDROMES									
	Urethral Discharge (Men)	1	Ciprofloxacin	500mg	500mg tab	0.0694	1	0.0694		
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.2416	
	Vaginal Discharge	1	Ciprofloxacin	500mg	500mg tab	0.0694	1	0.0694		
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722		
			and Metronidazole	500mg	250mg tab	0.0047	8	0.0376	0.2792	
	Genital Ulceration	1	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	1	0.2650		
			and Erythromycin	500mg	250mg tab	0.0365	112	4.0880	4.3530	
TANZANIA (1997)	DISEASES									
	Chlamydia	1	Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.1722	
			OR							
		2	Tetracycline	500mg	250mg tab	0.0084	42	0.3528	0.3528	
	Syphilis (early)	1	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	1	0.2650	0.2650	
	Trichomoniasis	1	Metronidazole	250mg	250mg tab	0.0047	21	0.0987	0.0987	
	SYNDROMES									
	Genital Ulcers	1	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	1	0.2650		
			and Cotrimoxazole	400mg/ 80mg	400mg/80mg tab	0.0109	8	0.0872		
			and Gentian violet 1%	1gm	1gm	0.0552	7	0.3864	0.7386	
	Urethral Discharge (Men)	1	Cotrimoxazole	2000mg/ 400mg	400mg/80mg tab	0.0109	20	0.2180		
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.3902	
	Vaginal Discharge	1	Cotrimoxazole	2000mg/ 400mg	400mg/80mg tab	0.0109	16	0.1744		
and Doxycycline			100mg	100mg tab	0.0123	14	0.1722			
and Metronidazole			500mg	250mg tab	0.0047	28	0.1316	0.4782		

Annex B. Cost of STI Drugs and Total Drug Treatment According to Country Guidelines (in US\$) (cont'd.)

Country	Disease or Syndrome	Tx	Drug	Dose	Unit	Unit Cost (US\$)	Units per Tx	Cost per Drug (US\$)	Total Tx Cost (US\$)
UGANDA (1993)	DISEASES								
	Chlamydia	1	Tetracycline	500mg	250mg tab	0.0084	56	0.4704	0.4704
			OR						
	2	Doxycycline	100mg	100mg tab	0.0123	28	0.3444	0.3444	
	Gonorrhea	1	Chloramphenicol	2.5gm	250mg tab	0.0144	20	0.2880	0.2880
			OR						
		2	Tetracycline	500mg	250mg tab	0.0084	40	0.3360	0.3360
			OR						
	3	Doxycycline	100mg	100mg tab	0.0123	28	0.3444	0.3444	
	Syphilis	1	Benzathine penicillin	2.4MU	2.4MU vial	0.2650	1	0.2650	0.2650
	Trichomoniasis	1	Metronidazole	2gm	200mg tab	0.0047	10	0.0470	0.0470
			OR						
		2	Metronidazole	400mg	200mg tab	0.0047	20	0.0940	0.0940
		OR							
3	Metronidazole	200mg	200mg tab	0.0047	21	0.0987	0.0987		
ZIMBABWE (1996)	DISEASES								
	Syphilis	1	Benzathine penicillin and Cotrimoxazole	2.4MU 800mg/ 160mg	2.4MU vial 400mg/80mg tab	0.2650 0.0109	1 40	0.2650 0.4360	0.7010
	Trichomoniasis	1	Metronidazole	400mg	200mg	0.0047	30	0.1410	0.1410
	SYNDROMES								
	Urethral Discharge (Men) (treat for gonorrhea, chlamydia, candida, and trichomoniasis)	1	Kanamycin and Doxycycline	2gm 100mg	1gm vial 100mg tab	0.4364 0.0123	2 14	0.8728 0.1722	1.0450
			OR						
		2	Cotrimoxazole and Doxycycline	4000mg/ 800mg 100mg	400mg/80mg tab 100mg tab	0.0109 0.0123	30 14	0.3270 0.1722	0.4992
			OR						
	Vaginal Discharge	1	Kanamycin and Doxycycline and Metronidazole	2gm 100mg 400mg	1gm vial 100mg tab 200mg	0.4364 0.0123 0.0047	2 14 30	0.8728 0.1722 0.1410	1.1860
			OR						
		2	Cotrimoxazole and Doxycycline and Metronidazole	4000mg/ 800mg 100mg 400mg	400mg/80mg tab 100mg tab 200mg	0.0109 0.0123 0.0047	30 14 30	0.3270 0.1722 0.1410	0.6402
			OR						
		Gonorrhea/Chlamydia	1	Kanamycin and Doxycycline	2gm 100mg	1gm vial 100mg tab	0.4364 0.0123	2 14	0.8728 0.1722
			OR						
2	Cotrimoxazole and Doxycycline		4000mg/ 800mg 100mg	400mg/80mg tab 100mg tab	0.0109 0.0123	30 14	0.3270 0.1722	0.4992	
	OR								
Genital Ulcer Disease (treat for chancroid, syphilis, genital herpes)	1	Benzathine penicillin and Cotrimoxazole	2.4MU 800mg/ 160mg	2.4MU vial 400mg/80mg tab	0.2650 0.0109	1 40	0.2650 0.4360	0.7010	
WHO (1993)	DISEASES								
	Syphilis (early)	1	Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650	0.2650
			OR						
	2	Procaine penicillin G	1.2MU	3MU vial	0.1880	4	0.7520	0.7520	
	Trichomoniasis	1	Metronidazole	2gm	250mg tab	0.0047	8	0.0376	0.0376
			OR						
	2	Metronidazole	500mg	250mg tab	0.0047	28	0.1316	0.1316	
	Gonorrhea	1	Ciprofloxacin	500mg	500mg tab	0.0694	1	0.0694	0.0694
			OR						
		2	Ceftriaxone	250mg	250mg vial	2.9250	1	2.9250	2.9250
			OR						
	3	Spectinomycin	2gm	2gm vial	2.4350	1	2.4350	2.4350	
		OR							
	4	Cefixime (see Note 1)	400mg	200mg					

Annex B. Cost of STI Drugs and Total Drug Treatment According to Country Guidelines (in US\$) (cont'd.)

Country	Disease or Syndrome	Tx	Drug	Dose	Unit	Unit Cost (US\$)	Units per Tx	Cost per Drug (US\$)	Total Tx Cost (US\$)	
WHO (cont'd.)	Chlamydia	1	Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.1722	
			OR							
	2	Tetracycline	500mg	250mg tab	0.0084	56	0.4704	0.4704		
	SYNDROMES									
	Urethral Discharge (treat for gonorrhoea and chlamydia)	1	Ciprofloxacin	500mg	500mg tab	0.0694	1	0.0694		
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.2416	
			OR							
		2	Ciprofloxacin	500mg	500mg tab	0.0694	1	0.0694		
			and Tetracycline	500mg	250mg tab	0.0084	56	0.4704	0.5398	
			OR							
		3	Ceftriaxone	250mg	250mg tab	2.9250	1	2.9250		
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	3.0972	
			OR							
		4	Ceftriaxone	250mg	250mg tab	2.9250	1	2.9250		
			and Tetracycline	500mg	250mg tab	0.0084	56	0.4704	3.3954	
			OR							
		5	Spectinomycin	2gm	2gm vial	2.4350	1	2.4350		
			and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	2.6072	
		OR								
	6	Spectinomycin	2gm	2gm vial	2.4350	1	2.4350			
		and Tetracycline	500mg	250mg tab	0.0084	56	0.4704	2.9054		
		OR								
	7	Cefixime and Doxycycline or Tetracycline (see Note 2)	400mg	200mg tab						
	Genital Ulcer #1 (treat for syphilis and chancroid)	1	Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650		
			and Erythromycin	500mg	250mg tab	0.0365	42	1.5330	1.7980	
			OR							
		2	Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650		
			and Ciprofloxacin	500mg	500mg tab	0.0694	1	0.0694	0.3344	
			OR							
		3	Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650		
			and Ceftriaxone	250mg	250mg tab	2.9250	1	2.9250	3.1900	
			OR							
		4	Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650		
and Spectinomycin			2gm	2gm vial	2.4350	1	2.4350	2.7000		
		OR								
5		Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650			
		and Cotrimoxazole	800mg/ 160mg	400mg/80mg tab	0.0109	28	0.3052	0.5702		
		OR								
6		Procaine penicillin G	1.2MU	3MU vial	0.1880	4	0.7520			
		and Erythromycin	500mg	250mg tab	0.0365	42	1.5330	2.2850		
		OR								
7		Procaine penicillin G	1.2MU	3MU vial	0.1880	4	0.7520			
		and Ciprofloxacin	500mg	500mg tab	0.0694	1	0.0694	0.8214		
	OR									
8	Procaine penicillin G	1.2MU	3MU vial	0.1880	4	0.7520				
	and Ceftriaxone	250mg	250mg tab	2.9250	1	2.9250	3.6770			
	OR									
9	Procaine penicillin G	1.2MU	3MU vial	0.1880	4	0.7520				
	and Spectinomycin	2gm	2gm vial	2.4350	1	2.4350	3.1870			
	OR									
10	Procaine penicillin G	1.2MU	3MU vial	0.1880	4	0.7520				
	and Cotrimoxazole	800mg/ 160mg	400mg/80mg tab	0.0109	28	0.3052	1.0572			
	OR									
Genital Ulcer #2 (treat for syphilis and granuloma inguinale)	1	Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650			
		and Cotrimoxazole	800mg/ 160mg	400mg/80mg tab	0.0109	56	0.6104	0.8754		
		OR								
	2	Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650			
		and Tetracycline	500mg	250mg tab	0.0084	56	0.4704	0.7354		
		OR								
3	Benzathine penicillin G	2.4MU	2.4MU vial	0.2650	1	0.2650				
	and Doxycycline	100mg	100mg tab	0.0123	14	0.1722	0.4372			
	OR									

Annex B. Cost of STI Drugs and Total Drug Treatment According to Country Guidelines (in US\$) (cont'd.)

Country	Disease or Syndrome	Tx	Drug	Dose	Unit	Unit Cost (US\$)	Units per Tx	Cost per Drug (US\$)	Total Tx Cost (US\$)	
WHO (cont'd.)		4	Procaine penicillin G and Cotrimoxazole	1.2MU 800mg/ 160mg	3MU vial 400mg/80mg tab	0.1880 0.0109	4 56	0.7520 0.6104	1.3624	
			OR							
		5	Procaine penicillin G and Tetracycline	1.2MU 500mg	3MU vial 250mg tab	0.1880 0.0084	4 56	0.7520 0.4704	1.2224	
			OR							
		6	Procaine penicillin G and Doxycycline	1.2MU 100mg	3MU vial 100mg tab	0.1880 0.0123	4 14	0.7520 0.1722	0.9242	
			OR							
	Vaginal Discharge- Cervicitis (treat for gonorrhea and chlamydia)	1	Ciprofloxacin and Doxycycline	500mg 100mg	500mg tab 100mg tab	0.0694 0.0123	1 14	0.0694 0.1722	0.2416	
			OR							
		2	Ciprofloxacin and Tetracycline	500mg 500mg	500mg tab 250mg tab	0.0694 0.0084	1 56	0.0694 0.4704	0.5398	
			OR							
		3	Ceftriaxone and Doxycycline	250mg 100mg	250mg tab 100mg tab	2.9250 0.0123	1 14	2.9250 0.1722	3.0972	
			OR							
		4	Ceftriaxone and Tetracycline	250mg 500mg	250mg tab 250mg tab	2.9250 0.0084	1 56	2.9250 0.4704	3.3954	
			OR							
		6	Spectinomycin and Doxycycline	2gm 100mg	2gm vial 100mg tab	2.4350 0.0123	1 14	2.4350 0.1722	2.6072	
			OR							
		7	Spectinomycin and Tetracycline	2gm 500mg	2gm vial 250mg tab	2.4350 0.0084	1 56	2.4350 0.4704	2.9054	
			OR							
		8	Cefixime and Doxycycline or Tetracycline (see Note 2)	400mg	200mg tab					
			OR							
	Vaginal Discharge- Vaginitis (treat for trichomoniasis, candida, Gardnerella sp., and bacterial vaginosis)	1	Metronidazole and Nystatin	2gm 0.1MU	250mg tab 100,000IU pess	0.0047 0.0195	8 14	0.0376 0.2730	0.3106	
			OR							
		2	Metronidazole and Clotrimazole	2gm 100mg	250mg tab 100mg pess	0.0047 0.0982	8 5	0.0376 0.4910	0.5286	
			OR							
		3	Metronidazole and Nystatin	500mg 0.1MU	250mg tab 100,000IU pess	0.0047 0.0195	28 14	0.1316 0.2730	0.4046	
			OR							
		4	Metronidazole and Clotrimazole	500mg 100mg	250mg tab 100mg pess	0.0047 0.0982	28 5	0.1316 0.4910	0.6226	
		OR								
5		Miconazole and Metronidazole options (see Note 3)	200mg	100mg						
		OR								

SOURCES: McFadyen, Julie E., ed. 1999. *International Drug Price Indicator Guide*. Arlington, VA: Management Sciences for Health.

Medical Economics Company, Inc. 2000. *Red Book*. Montvale, NJ: Medical Economics Company.

Ministry of Health, Government of Kenya. November 1994. *Clinical Guidelines for Diagnosis and Treatment of Common Hospital Conditions in Kenya*. Nairobi: Government of Kenya.

Ministry of Health, Malawi Government. 1993. *Malawi Standard Treatment Guidelines*, 2d ed. Lilongwe: Ministry of Health, Malawi Government.

Ministry of Health, Pharmaceuticals and Supplies Unit, United Republic of Tanzania. 1997. *Drug Use Guidelines for Primary Health Care Facilities*. Dar es Salaam: Ministry of Health, United Republic of Tanzania.

Ministry of Health, Republic of Uganda. 1993. *National Standard Treatment Guidelines*. Entebbe: Uganda Essential Drugs Management Programme, Ministry of Health.

Ministry of Health and Child Welfare. 1996. *Management of Sexually Transmitted Diseases, STD Module*. Harare: Zimbabwe Essential Drugs Action Programme, Ministry of Health and Child Welfare, Republic of Zimbabwe.

National Essential Drugs Committee, South Africa Department of National Health. 1996. *Standard Treatment Guidelines and Essential Drugs List*. Pretoria: South Africa Department of National Health.

WHO and UNAIDS. 1999. *Sexually Transmitted Diseases: Policies and Principles for Prevention and Care*. Geneva: WHO/UNAIDS.

NOTES: Tx = treatment, MU = megaunit, IU = international unit, NA = not available

Note 1: Cost for cefixime is not available in the *International Drug Price Indicator Guide*. (Red Book 2000 Average Wholesale Price USA is \$3.75 per tablet.)

Note 2: Cost for cefixime is not available in the *International Drug Price Indicator Guide*. Cefixime/doxycycline and cefixime/tetracycline treatment combinations are therefore not included in comparative treatment cost analysis.

Note 3: Cost for miconazole is not available in the *International Drug Price Indicator Guide*. The alternative miconazole/metronidazole treatment combinations are therefore not included in comparative treatment cost analysis. (Red Book 2000 Average Wholesale Price USA is \$1.69 per vaginal tablet.)