ECONOMIC ASPECTS AND COST PROJECTIONS

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Introduction

Economic considerations can be critically important in guiding the selection of appropriate target groups, in determining the optimal intensity of effort and the effect of interventions at various points in the process of treatment seeking and care and, as a result, in the optimal choice of a strategy in terms of both impact and cost-effectiveness.

In this chapter the economic benefits of STI treatment are outlined, available evidence of the costs of STI detection and treatment examined and general considerations for costings identified.

The Benefits of STI Treatment

Treating STIs in the population will have a number of benefits for both public health and individuals.

The public health benefits include a reduction in the burden of STI and HIV infection in a population and thus a reduction in the likelihood of transmission and attendant treatment costs, together with income losses to the household, community and economy.

The personal gains are those of preventing infertility or Pelvic Inflammatory Disease, (PID), pain, suffering and possibly death. Chlamydia, gonorrhoea and syphilis in particular can have severe consequences. The costs of the effects of untreated STIs are substantial, and are disproportionately borne by women with the most common being PID which can lead to ectopic pregnancy and/or infertility.

Few data exist on the costs of the consequences of STIs in the developing world where infertility in a woman can be a catastrophe, leading to divorce and destitution. Many women become infertile without even realising that they have had PID (Population Reports, 1993) and overall 55-85 per cent of women with untreated PID become infertile. Couples spend considerable amounts of time and money in search of a cure. In Zambia a hospital which offered repairs to eliminate tubal blockages to cure infertility attracted women from as far as away Namibia and Botswana, a high percentage of whom were HIV seropositive (O'Brien, personal communication) .

The benefits of averting a case of HIV are much greater because it is incurable and leads to death usually within six to ten years, often after a prolonged illness. For the purposes of this chapter, therefore, benefits in terms of numbers of both STI and HIV infections averted will be taken into account.

The benefits of STI treatment would be those of STI infections averted and of HIV infections averted and can be estimated as follows:

STIs averted = per cent of the population infected with STI x STI transmission rate x (number of partners while infected - number of partners already infected) = new STI infections.

HIV infections averted = per cent of the population infected with HIV x HIV transmission rate (in the absence of STI) x STI co-factor x (number of partners while infected - number of partners already infected) = new HIV infections.

The STI co-factor is that by which the presence of an STI increases the likelihood of transmission of HIV. The likelihood of risk per exposure to HIV in any sexual contact is normally in the order of 0.1 percent. However, with an STI present the risk per exposure increases. Epidemiological data suggest that this co-factor is in the order of 3-5 overall, but estimates of the co-factor effect, when calculated per exposure, are much higher (Hayes et al, 1995).

Although in theory the benefits in terms of HIV infections averted can be estimated, the actual number of HIV infections averted through the treatment of STIs is very difficult to calculate in practice for a number of reasons. STIs comprise a wide range of illnesses with variable propensities for enhancing HIV transmission. The evidence for GUD is relatively convincing but for other STIs it is less so - what, for example, is the contribution of bacterial vaginosis or candidiasis, or of gonorrhoea? The prevalence of the different diseases vary both by sex and by area. The transmissibility of STIs themselves in a developing country context is not yet well specified. Nor is it clear whether people with asymptomatic infections are as likely to transmit disease as those with symptomatic infections.

The Importance of the Core Group Concept

Many researchers have stressed the importance of the core group concept: an acknowledgement that not everyone in a population incurs the same level of risk. Treatment of an STI in a person with many partners, who is at high risk, will prevent more STIs and HIV infections than the treatment of a person with few partners who is at comparatively low risk. An example is the wife of a man with several partners compared with a female SW with 4-5 partners per day. The wife is probably at the end of the chain of transmission and unlikely to infect anyone other than her husband presumably the source of her infection - whereas the SW, if left untreated, may transmit infection to a large number of clients who will then in turn infect their wives.

Anderson and May describe the likelihood of any given person contracting a disease as a function of the average rates of exposure to infection, of transmission per exposure and of the average duration of infection. Rates and patterns of sexual mixing are very important risk determinants for STIs (Anderson and May, cited in Aral et al, 1996). The spread of STIs in a population will be "driven by spread among highly vulnerable groups of individuals that are characterised by high rates of partner change (often with each other), longer duration of infection often related to poor access to acceptable health care, and highly efficient transmission of infection per exposure, all contributing to high rates of STDs." (Aral et al, 1996).

The term core group is often assumed to be almost synonymous with SW. However its working deflnition bears closer scrutiny. Over and Piot (1996) characterise the core as constituting approximately 2 per cent of the population, being 10 times as sexually active as the non_core and having a new sex partner every five days as opposed to a new partner every 50 days for the non-core. Using this definition the group would clearly include SWs but it might also include male truck drivers, miners who are living away from their families, military men and others who might have approximately one new partner a week. While imprecise, the concept of the core group is nonetheless useful in considering the cost effectiveness of specific interventions.

Over and Piot modelled the impact of interventions in both core and non-core groups, finding that interventions in the core were approximately 10 times more effective. Table 1 summarises their findings with regard to the number of disability adjusted life years (DALYs) saved per case prevented or cured in the core and noncore groups for the main STIs.

Table 1: Disability Adjusted Life Years		
Disease or infection	**DALYs saved: Core**	**DALYs saved: Non-core**
Chancroid	55.6	3.8
Chlamydia	113.5	11.4
Gonorrhoea	120.2	11.6
HIV without ulcers	359.6	54.6
HIV with ulcers	430.2	58.7
Syphilis	396.3	41.1
Source: Over and Piot, 1996		

Over and Piot (1996) also modelled the number of DALYs saved for alternative STI interventions using both “favourable” and “unfavourable” assumptions.

“Favourable” assumptions included that the target group was the non-core group. They estimated that the cost per DALY of condom subsidies and IEC would be US$41 in the non-core, and US$0.13 in the core. The cost per DALY saved by treating the classic STIs was estimated to be over US$50 in the non-core, and less than US$0.56 in the core.

Over and Piot (1996) observe that a policy of targeting the core 'averts 10 times as many cases (of STIs) as would have been averted by a policy directed at the non-core group'. They also note that interventions in the core group will be approximately 10 times more expensive than interventions in the non-core groups. Targeting the core group may result in stigmatising the people in the selected group which may, in turn, exacerbate STI transmission in many settings. They recommend that core group interventions include deliberate measures to reduce stigmatisation - even if this increases expense. For example, one way to reduce stigma might be be to include a broader group than those in the core group. However such a policy of 'dilution of the access group' with non-core groups 'will dramatically reduce the cost-effectiveness of the intervention'. The authors observe that policy makers must take account of the tradeoff between stigmatisation of the core group and reducing the cost effectiveness of the programme (Over and Piot, 1996).

Modelling STI transmission and its impact on HIV incidence involves many uncertainties regarding key parameters. Modelling their different possible values is complex and beyond the scope of this book. The interested reader is referred to Robinson et al (1995), Morris and Kretzschmar (1995), Thomas and Tucker (1996) and Garnett and Anderson (1996) for further discussion of models of sexual behaviour and HIV transmission.

Cost of STI Detection and Treatment: Available Evidence

In assessing the possible cost of reaching people at risk of STIs, it useful to estimate the numbers of people at risk through factors such as age and occupation.

It is now recognised that high rates of STIs and of partner change are found among both men and women and in a number of different groups. Groups may be at higher risk because of their occupation, gender, age, or geographical location. Currently, adolescents account for a high percentage of all infections. At the same time some of the highest risk groups, such as female and male SWs, MSM and IDUs, may be socially marginalised and therefore lack access for financial, cultural, or social reasons, to existing services including treatment. Other groups, such as the military, police, students and out-of-school youth are also at high risk but are relatively easily

reached. Figure 10 locates most of the major groups in terms of HIV and STI prevention with regard to two characteristics: degree of risk and degree of accessibility through existing channels.

Costs of Interventions to Prevent STI and HlV Transmission

STI treatment is one of a number of strategies, employed singly or in combination, to slow transmission of HIV. It may be useful therefore, to review costs of those other broader strategies prior to focusing on the costs of STI treatments in particular.

Soderlund et al (1993) and Mills et al (1992) collected data on the costs of slowing HIV transmission through various strategies, including:

• promoting safer sexual behaviour through mass media strategies
• promoting safer sexual behaviour through person-to-person education
• condom social marketing
• provision of STI treatment and prevention services.

A sample of case studies was chosen to reflect these different strategies, where possible from low, low-middle, and uppermiddle income countries. Somé of their findings are reported below (Soderlund et al, 1993). Costs were reported in US dollars and do not take account of client costs.

Costs of Promoting Safer Sexual Behaviour through Mass Media Strategies

Costs of mass media campaigns in the Dominican Republic, Gabon and Hungary were collected. The Dominican Republic and Gabon cases involved mass media campaigns while the Hungary case involved school based education programmes and its costs are therefore closer to those of person-to-person strategies mentioned below. The total cost of mass media programmes aimed at the entire population in the Dominican Republic and Gabon were US$438,677 and US$357,347 respectively, of which US$160,244 and US$210,384 represented costs of radio and television and US$150,300 and US$117,922 were print and other costs. When divided by the entire populations of 7.44 million and 1.1 million respectively the cost per person was US$0.06 and US$0.32. If, for example, the strategies had been targeted primarily at adults and the strategies reached 75 per cent of the target adult population, the costs per person would have been US$0.16, and US$0.87 per person served. The cost of the Hungary programme was US$1.33 per pupil year of education - one hour per month - and the cost consisted mostIy of teachers' salaries.

Costs of Promoting Safer Sexual Behaviour through Person-to-Person Education

Case studies for person-to-person education were chosen from Uganda, Cameroon (Yaounde), Zimbabwe (Bulawayo) and Brazil (Rio de Janeiro). The Uganda project was a workplace education programme aimed at 400,000 employees of 400 companies, whereas the other three projects were aimed at SWs and their partners. The Brazilian project focused specifically on male adolescent SWs. The costs per contact ranged from US$0.47 in Zimbabwe to US$1.89 in Uganda and US$3.73 in Brazil.

Condom Distribution

Two types of condom distribution programmes were costed. The above four projects also distributed condoms in the context of person-to-person education. The costs, per condom distributed, ranged from US$0.10 in Zimbabwe to US$0.70 in Brazil, reflecting the intensity of the strategy needed to reach these marginalised adolescent boys in Rio.

In addition, data were obtained on ten condom social marketing projects, many of which focused on FP rather than being HlVspecific. The total cost in Zaire was US$2 million and in Côte d'lvoire US$268,000. The Zaire project sold 18 million condoms and the Cote d'lvoire project 1.8 million for the cost per condom sold of US$0.11 and US$0.15 respectively. The range of costs per condom sold by the other projects reviewed was US$0.02-US$0.30. As projects progressed, condom sales usually increased while unit costs decreased.

Diagnosis and Screening

Screening for Specific Infections

The fact that many women and men are infected with STIs but have no symptoms has led to a variety of approaches using existing health services, in particular FPCs, ANCs, and/or MCHCs.

Piot and Rowley (1992) estimated the costs of screening for four STIs in women: chlamydia, gonorrhoea, chancroid, and syphilis. The costs ranged from US$0.17 per diagnosis for the clinical diagnosis of chlamydia, gonorrhoea, and chancroid, with sensitivities of 40 per cent, 40 per cent and 80 per cent respectively, to US$1.58 for serological diagnosis of syphilis, and to US$5.08 for antigen detection of chlamydia, or culture of gonorrhoea or chancroid. Culture of chlamydia was the most costIy at US$12.08. The treatment cost per case calculated ranged from US$0.32 for chancroid to US$1.20 for gonorrhoea. However, the authors note that development of drug resistance will change drug costs, costs per case and treatment effectiveness. Indeed, these costs do appear very low.

Another possibility is the presumptive treatment of all women who attend specific health services. Piot and Rowley estimated the costs of presumptive treatment of every woman without diagnosis. At 5 per cent prevalence of the four infections, the cost of presumptive treatment is lower than any other method for syphilis, chlamydia, and chancroid. For gonorrhoea, the cost is lowest for treatment based on clinical diagnosis, but the estimate of effectiveness for those women treated is only 18 per cent compared with 95 per cent for presumptive treatment of all women (Piot and Rowley, 1992).The drugs used have ceased to be effective in many countries because of drug resistance, and these calculations would need to be verified on a local basis.

One possibility would be to add STI screening, diagnosis and treatment to the services of FPCs. Only one study was found which addressed the costs of this, a clinic serving a poor inner-city population in Texas, US. The incremental costs of adding STI services to the clinic were found to represent approximately 16 per cent of the clinic budget, of which testing costs were 65 per cent and treatment costs 35 per cent. The average costs of testing were US$10.77, and of treatment US$65.82. Staff and laboratory costs each accounted for 43 per cent of the total, drugs 6 per cent, and supplies 8 per cent (Begley et al, 1989). A number of other studies are being conducted to investigate the feasibility of adding STI services to FPCs and results should be available within the next few years.

Diagnosis

One key question concerns how much should be spent upon improved diagnostics? What is it worth to improve the syndromic approach for STIs? This depends largely on the extent of both over and under diagnosis.

The extent to which this is a problem for STIs has only begun to be explored. In high prevalence areas there is probably little cause for concern. However in areas where STI prevalence is low, such as rural Bangladesh, the syndromic approach may be very wasteful. Hawkes et al (unpublished) found that approximately 90 per cent of the expenditure on syndromic management of STIs for women reporting vaginal discharge was wasted - virtually none had STIs.

The cost of treatment for STIs is significant: the cost of drugs, health services, and patient and family costs, which may include significant stigma, even divorce and domestic violence. The case can easily be made for looking into improved STI diagnostics. But how much additional expenditure is economically justified and how can this be calculated? Phillips and Phillips-Howard (1996) have proposed a simple formula: it is worth paying up to the cost of treatment minus the percentage of suspected cases confirmed, divided by 100 per diagnosis.

Treatment

Provision of STI Treatment and Prevention Services

The report by Soderlund et al (1993) also compared the costs of STI treatment in three different settings, with two projects targeted at non-core groups, and one at a core group. One project, in Maputo, Mozambique, was integrated within health services, another was a free-standing referral service in Johannesburg, South Africa and the core group project served high-risk female SWs in Nairobi, Kenya. In all three, capital costs were low. A more detailed breakdown of costs is presented in Table 2.

Table 2: Cost of Provision of STI Treatment and Prevention Services

Disease or infection Location	DALYs saved: Non-core: Maputo	DALYs saved: Non-core: Johannesburg	Core: Nairobi
Capital costs	0	6,654	3,346
Recurrent costs	367,600	272,830	67,293
of which Salaries	23,960 (a)	165,624 (59%)	17,194 (24%)
Other costs	343,640 (93%)	10,726 (39%)	50,009 (71%)
Total costs	367,600	279,484	70,684
Number of visits	38,867	27,506	1,276
Cost per visit	9.46	10.16	55.39

(a) Only the salaries of support and administrative staff are included in this figure; clinic staff were included within the 'other' category.

Source: Soderlund et al, 1993.

Costs per visit were similar in the two projects targeting non-core groups, US$9.46 and US$10.16. As predicted by Over and Piot (1996), the core group project involved a wider range of services including free condoms as well as other measures to improve access and takeup, and is thus not directly comparable. Its costs were significantly higher but so were the benefits.

Costs of Passive Case Detection and Treatment

In many countries current practice is to wait for clients with STI symptoms to present for treatment: passive case treatment. The baseline cost for this, according to Mills et al (1992), was US$9.46 per case treated in Maputo and US$10.16 in Johannesburg. A report on STI treatment in Tanzania notes that 'it is never cost effective to seek laboratory conflrmation prior to treatment and in almost all

cases where STI prevalence is higher than 25 per cent, which might reasonably be expected among those seeking treatment for STIs, presumptive treatment is called for' (World Bank, 1992). However, costs of STI treatment are rising. High and rising incidence of drug resistance means that the older and cheaper antibiotics are no longer effe_ctive against the majority of STIs. Given the lack of cheap and reliable diagnostic methods, syndromic treatment is currently the best and most cost-effective option in areas with high STI prevalence. However as the price of the necessary drugs rises, the economic trade-off between the cost of better diagnosis and syndromic management needs to be kept under review. The decisions to be made regarding when to step up to a more expensive but more effective antibiotic can also be estimated with some accuracy.

Table 3 presents the estimated costs per syndromic treatment using various types of antibiotics and shows the significant differences in cost: approximately a factor of 10 between older, cheaper antibiotics and newer options. The range of costs to treat urethral discharge is US$0.83-US$10.45; to treat vaginal discharge, US$1.61-US$14.28; and to treat genital ulcer, US$0.77-US$7.22. These drugs need to be chosen on the basis of local sensitivity, ie by establishing which organisms are resistant to particular drugs.

Table 3: Treatment Costs for Syndromic Diagnosis

Syndrome	Drug Choices	Course of Treatment	Cost (US$)
Urethral Discharge			
For gonorrhoea	Cefixime	400mg by mouth as a single dose	3.00
	Ceftriaxone	250mg IM as a single dose	4.00
	Ciprofloxacin	500 mg by mouth as a single dose	2.25
	Spectinomycin	2g IM as a single dose	5.00 – 8.00
	Kanamycin	2 g IM as a single dose	0.50
	Cotrimoxazole	10 tablets once daily for 3 days	0.40
For chlamydia	Doxycycline	100mg by mouth 2 times daily for 7 days	0.43
	Tetracycline	500mg by mouth 4 times daily for 7 days	0.88
	Erythromycin	500mg by mouth 4 times daily for 7 days	2.45
Range of total cost to treat syndrome			0.83-10.45
Vaginal Discharge			
For gonorrhoea and chlamydia	(see above)		
For trichomoniasis and bacterial vaginosis	Metronidazole	2g by mouth as a single dose	0.05
For candidiasis	Micronazole	200mg vaginally once daily for 3 days	3.78 (b)
	Clotrimoxazole (a)	200mg vaginally once daily for 3 days	0.73
	Nystatin	100,000 U vaginally once daily for 14 days	1.09 (b)
Range of total cost to treat syndrome For vaginitis and cervicitis (c) For vaginitis only (d)			 1.61 – 14.28 0.78 – 3.83

Genital Ulcer			
For syphilis	Benzathine penicillin	2.3 million U IM during one visit	0.40
	Procaine penicillin	1.2 million U IM daily for 10 days	3.22 (e)
For chancroid	Eythromycin	500mg by mouth 3 times daily for 7 days	1.84
	Ciprofloxacin	500mg by mouth as a single dose	2.25
	Ceftriaxone	250mg by IM as a single dose	4.00
	Co-trimoxazole (a)	2 tablets two times daily for 7 days	0.37
For herpes (first episode)	Acyclovir	200mg by mouth 5 times daily for 7 days	38.87 (b)
Range of total cost to treat syndrome (excluding herpes)			0.77-7.22
Lower Abdominal Pain			
For gonorrhoea and chlarnydia	(see above)		
For anaerobic bacteria		Metronidazole 400mg by mouth 2 times daily for 10 days	0.20
Range of total cost to treat syndrome			1.03-10.65

Note: Costs are drawn from several listings and are approximate.
IM = Intramuscularly; U = Units

(a) Trimethoprim, 80mglsulphamethoxazole, 400mg
(b) Average cost calculated from International Drug Prlce Indlcator (175)
(c) Treatment for gonorrhoea. chlamydia, trichomoniasis, bacterial vaghosis,
(d) Treatrnent for trlchomonlasi& bacterlal vaglnosis, and candldlasls
(e) Cost of 12 one-milllon-unit vials of powder supplled by UNICEF (175)

Source: WHOlGPA, cited in Population Reports, 1993.

Recently a number of studies have been published which compare the cost effectiveness of syndromic management with clinical management. Gilson et al (1997) in Mwanza, Tanzania estimated the treatment cost using syndromic management at approximately US$7. This involved working at the rural health centre level, and syndromic management was administered by PHC workers.

LaRuche et al (1995), using more advanced antibiotics in Côte d'lvoire found that the effectiveness of treatment using clinical algorithms in peripheral health centres in Abidjan was approximately 90 per cent. They reported that the average cost of drugs, intramuscular ceftriaxone and oral ciprofloxacin, was US$5.60 per cure, with a maximum of US$10.70. This was at PHC level and diagnosis was without the use of laboratory tests. Adding other associated costs would probably bring the total to about US$8. In Pikine, a low-income suburb of Dakar, Senegal, treatment costs were estimated at US$4.80 for men and US$15.30 for women (van der Veen et al, 1994).

In Malawi, Costello et al (1998) compared the costs and effectiveness of syndromic treatment with those incurred by the national policy of clinical management. They found that the cost of using effective drugs for syndromic management was approximately the same as less effective drugs based on clinical practice. More than half the drugs were wasted, in that 23 per cent were

ineffe_ctive for the condition; 7 per cent were given in ineffective doses or for the wrong duration and 24 per cent were given in overdosage. Thirty per cent of drug costs were wasted through ineffective prescribing, and nearly one third of patients did not receive an effective treatment for their condition. They concluded that more effective syndromic management could be introduced at no extra drug cost.

Another study, by WHO, found that syndromic management would be two to three times less costIy than clinical diagnosis and three to four times less expensive than laboratory based aetiological diagnosis when all direct costs were taken into account.

Costs of a Large-Scale STI Project: An Example from Mozambique

In Mozambique an effort was made to cost an entire integrated STI/HIV control programme for Maputo province, with a population of 1 million people. The estimated total cost of treatment was US$426,558, excluding capital and staff costs, for an estimated 38,867 patients who would be seen in STI consulting rooms as well as 50,000 pregnant women who would be screened for syphilis (Bastos et al, 1992). The cost was US$10.80 per treatment. The programme also required 20 full-time paramedics, the cost of which is not included in the above total. Estimating their salaries at US$3,000 per year each would bring the overall total to US$486,558 per year, or US$12.52 per person per treatment. The recurrent costs summary are presented in Table 4.

Table 4: Recurrent Costs of EC Funded Maputo Integrated STI Project (a)	
Essential supplies (patient & partners)	
Administrative and secretarial	24,000
Diagnostics	103,622
Therapeutic	88,936
Condom/education	78,000
Needles/syringes	24,000
Laboratory, slides, tubes	24,000
Transport, taxes, distribution (supplies)	38,400
Subtotal	**380.958**
Services	
Telephone	8,400
Fuel	15,600
Subtotal	**24,000**
Maintenance	
Transport	6,000
Buildings	15,600
Subtotal	**21,600**
Grand Total	**426,558**
(a) Excludes staff costs Source: Bastos dos Santos et al, 1992	

It must be noted that these costs reflect a low level of use by the population of only 3.9 per cent per year, or about 8 per cent of the adult population, 15 years or older. Approximately 27 per cent of these costs are fixed or semifixed (salaries, buildings, telephone, fuel), and approximately 15 per cent are related to syphilis screening of pregnant women. Assuming that the facilities could cope with additional demand for STI treatments, the cost of treatment would rise by approximately US$8.50 for each additional person seen and treated. Assuming that the underlying level of STI prevalence was 25 per cent and that each person infected with an STI came for treatment once in the year, the overall expenditure would have to rise significantly. If all cases were to be treated -17 per cent of the adult population - the cost would be 170,000 new cases x US$8.50 or about US$1.5 million. This is a low estimate of the actual costs; coping with the new demand would clearly require additional staff and buildings, but changes might be made in the use of diagnostics or in the drugs used. This estimate also does not include the cost of generating the additional demand through peer education and mass media or of reinfections in those already treated.

Private SectorTreatment

Another set of studies has focused on the situation with regard to STI treatment in the private sector. Trebucq et al (1994) found that men in Yaounde and Douala, the two largest towns of Cameroon, who sought care for urethritis in the private sector paid very high prices for prescriptions and treatment, ranging from US$3.50 to US$110 in one case. The median costs were US$21 in Douala and US$18 in Yaounde, with costs highest when the men had sought care from medical doctors. In all cases, the costs of drugs prescribed were higher than those recommended by WHO for the syndromic management of gonorrhoea and chlamydia infections. Less than three quarters of prescriptions were filled in full.

Crabbé et al (1996) followed up this work in Cameroon and found that men with urethritis who had consulted in the formal sector had paid a median of US$24 and those who had consulted in the informal sector had paid a median of US$10. The sample of men was of a relatively high socioeconomic level and educated, 83 per cent having had secondary school education. The authors point out that in Cameroon during the time of these studies drugs were unavailable in public health centres, so people were obliged to take prescriptions to pharmacies where prices were very high.

These flndings of the high cost of private sector treatment were echoed in another francophone country, Côte d'lvoire, where LaRuche et al (1995) reported that the cost of an effective STI treatment at a pharmacy was US$25-US$36. No similar data were found for anglophone African countries where drug costs are generally lower.

A project in Masaka District, Uganda, is working with private sector practitioners to improve prescribing habits and to encourage the use of syndromic management. A study found that the level of knowledge amongst private practitioners in intervention areas was better than that in control areas and that effective drugs as recommended by the syndromic management guidelines were available. One shortcoming is that in a number of drug outlets, the principal practitioner had been trained in syndromic management but had not shared this information with other staff who might see clients in their absence.

The Issue of Drug Resistance: When to Step up

Another important consideration is resistance of STIs to cheap first-line antibiotics. When is it appropriate to step up to a more expensive but more effective drug? Phillips and Phillips-Howard (1996), drawing on the example of antimalarials, propose the following formula. The switch should

be made from old drug 1 to new drug 2 when Cf (Fl-F2) > Ct2-Ctl where Cf = the cost of failure, Fl and F2 are the failure rates of drugs 1 and 2, and Ctl and Ct2 are the costs of treatment of drugs 1 and 2 respectively.

For example: urethral discharge can be treated with cotrimoxazole at US$0.40, or with ciprofloxacin at US$2.25. Suppose the failure rate with cotrimoxazole has reached 30 per cent, and each failure gives rise to a cost estimated at US$10 in lost wages, revisits and additional treatments, infections of partners, increased risk of HIV transmission, and so on. The alternative is ciprofloxacin at US$2.25, with only a 3 per cent failure rate. In this case it would be worth adopting the new drug since the cost of failure, calculated as Cf (Fl-F2) [10 x 0.27 = 2.70] is greater than the cost of the switch, calculated as Ct2 - Ctl [US$2.25 US$0.40 = US$1.85]. If the percentage of failures rises still further with cotrimoxazole, or the people being treated have a cost of failure higher than US$10, for example, highly sexually active core group members who are more likely to transmit STIs or HIV, it would be even more economically advantageous to make the switch. This result is highly dependent on the cóst of failure and establishing this figure precisely is difficult as it will vary according to the STI being treated, the prevalence of HIV, whether the person being treated is a core group member and so on.

This type of calculation can be used in decisions about other drug combinations for STIs and other infectious diseases. With few exceptions the costs of drugs tend to fall over time and it is important for policy makers and health authorities to remain aware of changing prices and to ensure that fair prices are being paid.

Partner Notification

While there are obvious advantages in persuading partners to present for treatment, there are reasons to question whether, with a limited budget for STI treatment, significant resources should be expended on partner notification.

There are a number of possible methods for partner notification, each with different cost implications. First is counselling of the infected patient on the need to refer the partner for treatment partner referral. This may be accompanied by a card or other reminder to facilitate the process - assisted referral. Experience has shown in some cases that it is preferable for the card not to mention the STI but rather to stress the health protective aspects, especially for syphilis, where the life of an unborn infant may be affected if the partner remains untreated (Jenniskens et al, 1995).

A second form of referral is termed conditional or negotiated referral. In this instance, the patient is given time to notify partners. If they do not present within a given time span, the health services staff take further steps, which may involve a reminder system, to encourage attendance. In areas with wellfunctioning and extensive postal or telephone systems this may be a relatively low cost method.

The third, and most costIy method is provider referral, or active contact tracing which involves field follow-up of patient contacts. This can be done without disclosing the identity of the index patient. It relies on the patient providing the names of partners, and of partners who are most likely to be infected. As noted by Steen et al (1996) the majority of those who are referred are longterm partners of index patients rather than those who are most likely to have infected them. This method involves substantial costs in terms of staff time, vehicle costs and often results in a low yield of high-risk partners.

Experience with these different approaches has been mixed at best. A study in Nigeria found that nearly half of 156 patient referred partners (47 per cent) attended for treatment, whereas home visits to 56 patients yielded only four attendances (7 per cent) (Asuzu et al, 1984). In Zimbabwe experience with partner referral was less good, with 22 per cent of patient referred partners attending, while experience with field visits was better with a further 17 per cent presenting for treatment (Winfield and Latif, 1985). In Kenya, nearly half of all partners given a referral card by their pregnant partner attended for treatment with many mentioning that they had come from concern for their unborn baby. The card did not mention syphilis (Jenniskens et al, 1995).

Various types of coercion have been attempted. For example, staff in a Kenyan clinic withheld AN cards, without which women cannot give birth in public facilities, from women identified as having syphilis until they brought their partners for treatment. Other clinics similarly refused to treat these women and the numbers of infected women who were treated declined (Jenniskens et al, 1995). It is likely that many sought treatment in the private sector where requirements for partner notiflcation were considerably more relaxed. Denial of care to an infected, symptomatic person, and in particular to a pregnant women who has attended a facility for treatment, probably drives them to seek less effective, more expensive care in the informal or private sector. Coercion and denial of treatment raise serious ethical issues and should be discouraged.

Partner referral can be costIy and ineffective. Experience has shown that partner referral can cost four to eight times as much per case as treating the index case. The trade-off is stark. Should available resources be spent on pursuing reluctant partners who fail to attend when encouraged to do so, or on attempting to identify and treat infected core group members? It seems likely that the marginal or incremental cost per case of finding reluctant partners is much higher than those of either treating existing symptomatic patients, or of providing services for core group members.

Costs of Intensified Strategies for Hard- and Easy-to-Reach Groups

Working with hard-to-reach groups may involve additional expenditure, for example on the mobilisation and outreach required to gain acceptability and credibility for a programme.
Additional expenditure will also arise when making STI interventions more effective in attracting risk-group members through the provision of more services or by making existing services more appropriate or accessible. As Over and Piot (1996) point out, these additional expenditures are still likely to be more cost effective than a similar level of expenditure on interventions for the general population, given the high rates of STIs and likelihood of transmission amongst the target groups which they address.

Holmes et al (1996) observe that among female SWs near the US naval station in Subic Bav. the Philippines, there was a group which was termed 'the core of the core' - the one third of the SWs who had experienced at least one episode of gonorrhoea in the previous five months. Treating this group would have treated 87 per cent of those actually infected and thus demonstrates how selective screening, perhaps including the partners of clients as well as clients of infected SWs, could be made more cost-effective.

A number of STI interventions have been targeted at SWs, mostIy female. An intervention in the Pumwani area in Nairobi, Kenya, which provided condoms and STI treatment cost approximately US$70,000 per year for 1,000 SWs. Given that this represents one entire year's care, which could easily include seven treatments, plus condom provision, the cost per person is less than it appears3.
The selective mass treatment programme for gonorrhoea in SWs in Subic Bay (conducted in 1967) found that although gonorrhoea prevalence fell among SWs, it quickly returned to higher levels as

prevalence rates did not fall among their US servicemen partners. Thus, a selective mass treatment programme contributed nothing further to gonorrhoea control (Holmes et al, 1996).

A DFID funded project in India supports the establishment of roadside clinics to provide information and education, condom promotion and appropriate STI treatment to truck drivers and their assistants. The clinics provide syndromic treatment to a mostIy male clientele. The cost of treatment is estimated at Rs74, approximately £1.50, of which drugs cost RsS0. The cost per case treated is estimated at Rs87-Rs93 with 80-85 per cent of patients cured after one visit. This cost includes both fixed and recurrent costs estimated at Rs7,000 per year: of which Rs3,000 is for the doctor's salary, Rs1,500 for an assistant, and Rsl,000 for other running costs including the amortisation of capital costs. The total cost of building and equipping each clinic is estimated at Rs6,000 (£120). These costs compare with the costs of conventional medical treatment of Rs100-Rs300 per case using clinical diagnosis plus laboratory tests (ODA, 1995).

Condom promotion was undertaken among the military in Ghana with a lively poster campaign. This programme, called 'Combat readiness: condom readiness' managed to raise awareness of condoms through a campaign which was supported by high ranking military personnel and which included articles in military publications, posters and T-shirts made available through the armed forces own outlets, messes, canteens and bars. Condoms were sold at a very low price, about 2.7 per cent of the price of a bottle of beer. Condom sales rose by a factor of about seven. Contributing factors to success included appropriate language and style for the military audience, and ease of access. No cost data were available on this project (Apeagyei et al, undated).

Cost of Intensified Intervention through Existing Health Services

The Mwanza Intervention Trial is a good example of the potential beneflts that can be achieved through the intensification and improvement of existing health services. STI control was integrated into both the urban and rural PHC system and the intervention was designed to be both sustainable and replicable. Using locally adapted syndromic management guidelines, medical assistants and rural medical aides now carry out initial examinations and prescribe treatment. Drugs are dispensed immediately, health education provided, including the offer of condoms and the encouragement of partner notification through the use of contact tracing cards. Health workers have received three week training courses in which they were taught to diagnose and treat the most common STIs. The course included a week of classroom teaching followed by two weeks of supervised practical work in a clinic. Key features of the programme included the control of drugs and monthly supervision to ensure that they were not being sold to patients; repeated training on the use of flowcharts and public education programmes to promote prompt treatment (AIDS Action, 1994). Factors Affecting the Cost of Interventions

Because the costs of health promotion and other types of intervention vary greatly from one place to another, and from one intervention to another, it is not possible to make useful generalisations about the costs of interventions and health promotion costs in particular. It is especially dangerous to attempt to generalise about the costs of any particular intervention on the basis of one or two examples.

Costs vary because of two types of factor: those related to characteristics of the country and those related to the intervention itself. For example, economies of scale will be possible in certain countries with high population density, high urbanisation or only one main language. They will also be possible for certain types of intervention such as mass media, but not for others such as those involving faceto-face interaction.

Cost-effectiveness of syndromic treatment: the example of the Mwanza intervention Trial

An intensified programme of strengthening STI treatment at PHC facilities demonstrated HIV incidence over two years of 1.2 per cent in the intervention community compared with 1.9 per cent in comparison communities - a 40 per cent reduction. In the catchment population of about 75,000 sexually-active adults, an estimated 254 HIV infections were thus averted. The cost of the intervention was US$ 10.15 per person treated, of which USS2.11 was for drugs; the cost per HIV infection averted was us $217.62. Given that the average age of persons in whom HIV infection was averted was 28, the cost per DALY was approximately US$ 10 - this compares favourably with such interventions as tuberculosis (TB) treatment, measles immunisation and vitamin A supplementation. The Mwanza Intervention Trial has thus proved to be cost effective in comparison with other health interventions (Gilson et al, 1997).

Economy of Scale

Since the end of the tríal, the intervention has been extended, without the necessity of new capital investments, from the 25 original health units to all comparison communities and to many other health facilities in the general region. A total of 150 health facilities are now covered.

Considerations for Costing under All Strategies

A number of additional points regarding the cost of interventions should be considered. First, given the low level of take-up of existing services, and the high level of STI prevalence in most developing countries, almost any intervention will involve additional costs. There are probably some economies to be made and some wasteful practices taking place, but generally such savings will be minimal. Additional investment will clearly be required in order to make any impact on the current situation.

Second, earlier'upstream' intervention in the treatment seeking process will bring in additional patients for treatment and make an impact on overall prevalence levels but this early intervention will also give rise to greater demand and thus to higher treatment costs as well as additional benefits. It is essential that this additional demand is provided for before it is generated - so that rising expectations can be met.

Third is the importance of setting achievable coverage targets together with the marginal cost implications of these targets. As more and more hard-to-reach groups are targeted, the costs per person reached will rise, because they live in more remote areas, are reluctant to come for treatment, or are more vulnerable and fearful of identification or stigmatisation. Similarly, the marginal additional - cost per person of reaching 70 per cent of FP or AN attenders will be much lower than reaching 90 per cent. A mass treatment programme which reached 70 per cent of the population would be much more feasible than one which attempted to achieve 95 per cent coverage. The money used to reach the additional 25 per cent of the population could probably best be used elsewhere - unless it is known that the 25 per cent engage in high-risk behaviour or have partners who do.

A fourth consideration is the balance which will exist between fixed and variable costs. Fixed costs include the costs of staffing, equipping and maintaining a building. Variable costs, consisting mostIy of recurrent costs such as drugs and other consumables, change with the volume of service provided. The costs of some types of intervention, such as a radio or television campaign, would remain the same whether they were addressing 1 million or 10 million people. Expanding the

provision of existing services to meet demand or to improve the provision of STI care through such services will mainly be a question of providing additional funds for variable costs, up to the point at which existing staff and facilities need to be augmented to cope with demand. New clinics or other initiatives will require an investment in fixed costs as well, although some of these costs might be borne by the private sector. It is difficult to generalise about the percentage of costs which are fixed and which variable. In two similar hospitals in neighbouring districts of Zambia, the percentage of fixed costs was 33 per cent in one hospital, and 57 per cent in the other, largely because of very different patterns of drug use, nearly five times higher in one hospital than in the other. At three rural health centres where provision of drugs was limited to low cost essential ones, fixed costs, mostIy salaries, accounted for 75 per cent of the total cost of a treatment. The actual percentage of fixed and variable costs needs to be adjusted to local circumstances and in accordance with actual cost data.

Who Should Pay?

A critical issue in relation to STI treatment is that of who should bear the cost of detecting and treating STIs. Over and Piot (1966) point out that since STIs are transmissible, preventing or treating a single case of STI brings benefits which go well beyond the treatment of that individual in terms of the benefits to those who would otherwise have been infected. They refer to these as 'dynamic benefits', which are 'externalities' in economic terms and thus constitute a failure of the market mechanism, which in turn justifies government intervention to subsidise STI control.

In support of the argument that government should be involved in subsidising STI treatment, Aral et al (1996) make an interesting comment on the distribution of costs and responsibilities for preventing and treating STIs, as follows. “Whether the emphasis is on the acquisition of infection by all susceptible individuals in the community or on the transmission of infection from a relatively small number of infected individuals has important implications for the distribution of costs and beneflts of prevention across the population.... If the emphasis is on prevention of acquisition, the whole population incurs the financial costs of interventions and the intangible costs of undergoing preventive behaviour change; they also receive the benefits of avoiding acquisition of infection. If the emphasis is on prevention of transmission, the members of the highest risk groups of susceptible and infected persons incur the major cost of behaviour change, while the members of the general population still receive the benefit of avoiding acquisition and avoiding future public health costs. Thus everyone should still incur the financial cost of implementing interventions.”

Over and Piot (1996) point out that it is politically unpopular to deliver services to socially marginal populations and that 'it is ironic that decision-makers who avoid these populations because they are concerned only about the health of their mainstream constituency could better protect that constituency from STIs by spending ... on programs targeted at socially marginalised populations who are especially vulnerable to infection'.

Fees for Service

Finally, even if governments do subsidise the provision of STI treatment, it is likely, in many settings, that patients will be asked to bear some of the cost. If this is the case, careful thought must be given to the implications of charging for STI treatment or preventive measures.

It is often said that a charge should be “nominal” but what does this really mean? In Britain a charge of approximately US$8.40 is made for a prescription on the National Health Service, although many people are exempt- including those on income support, children, the elderly and the chronically ill. It is a level of fee which is considered to be fair but to discourage frivolous use, and

when it is raised every so often there is much consternation and comment in the press. Nevertheless this 'nominal' charge represents approximately 0.04 per cent of the mean GNP per person of the UK of about US$19,000, where income distribution is relatively equal. In the UK, the top 20 per cent of the population by income has 44 per cent of the wealth, and the lowest 20 per cent has 4.6 per cent. In Kenya, with a per person mean GNP of US$280, the top 20 per cent has 62 per cent of the wealth and the lowest 20 per cent, 3.4 per cent - a mean per person income of only US$48. Much of the income of the lowest part of the population is in the form of goods and services which are produced and consumed on the farm, and thus not traded for cash so the poor's cash income is considerably lower, perhaps as little as US$12. Out of this they must pay for essentials such as school fees, consumables including soap, cooking oil, candles, transportation, clothing, agricultural inputs - in addition to medical fees.

If the same principle of a nominal fee of 0.04 per cent of mean GNP per person were applied in Kenya, the corresponding fee level would be US$0.12. This would be nominal for the middle classes, but for the lowest 20 per cent income group, whose mean income per person is only US$48, and of which as little as or US$12 is in cash, even this nominal fee could represent nearly 1 per cent of their cash income - the equivalent of a fee of US$190 in Britain. So in setting the level of even nominal fees it is extremely important to keep in mind the unequal distribution of income and the needs and ability to pay of the lowest income groups.

If the price of the most appropriate provider is set too high, the incentive to use sub-standard providers will increase.

The municipal referral STI clinic in Nairobi began to charge a substantial fee for services in 1990. This was added to an existing charge already paid at a first consultation prior to referral to a clinic. These fees amounted to as much as US$2 over and above the costs incurred throúgh transport, lost wages, etc and led to a massive decline in use of STI services. Among men, the mean monthly attendance decreased by 40 per cent after fees were introduced. In women the reduction was 65 per cent (Moses et al, 1992).

Clearly the introduction of user charges and the possible resultant decline in attendance - similar experiences have been reported in Ghana, Mozambique, Zaire and Zimbabwe - may result in increasing numbers of untreated STIs and HIV.

If fees are to be introduced, they should be initiated carefully and only once people have begun to appreciate and use services. In any case, consideration must be given to the ability to pay of lower-income groups, including women and adolescents, so as maintain their use of essential services.

The cost of care is one of the most important factors determining health seeking behaviour of patients with STIs. If large numbers of patients with STIs are unable to access adequate treatment because of high user fees, a significant adverse impact on HIV transmission can be envisaged. Thus there are strong public health grounds for advocating the treatment of STIs without charge as is often done for TB.

Examples of screening: syphilis, gonorrhoea and chlamydia

Syphilis

Syphilis is particularly common and dangerous for both mother and infant. In Kenya approximately 5 per cent of pregnant women have syphilis; in rural Tanzania, 10 per cent of AN attenders (Mayaud et al, 1995). Syphilis can lead to complications of pregnancy and pose dangers for the

unborn child. In Zambia, 19 per cent of miscarriages and 42 per cent of stillbirths may be attributable to syphilis, while congenital syphilis contributes as much as 30 per cent to perinatal mortality (Temmerman et al, unpublished). In a population based study in Malawi, 26 per cent of stillbirths, 11 per cent of neonatal deaths, 5 per cent of postnatal deaths and 8 per cent of infant deaths were attributable to active maternal syphilis infection (McDermott et al, 1993, cited in Jenniskens et al, 1995).

In Kenya, syphilis seroprevalence among AN attenders was approximately 5.3 per cent in 1991. In a project involving testing for syphilis and referral of positive results to an STI clinic, the cost per person tested and treated was estimated as US$2.50 per client. Eleven out of 291 - 3.8 per cent - were found to be infected, making the cost of detecting one case US$66. Unfortunately, the authors report that only about half of the women were screened, and of those screened and found positive only one out of 11 women received treatment. The actual cost per case of congenital syphilis prevented was US$730. Reasons for failure to receive adequate treatment included failure to return to the clinic or to attend the referral clinic. Some women were denied treatment at the referral clinic because they had been re-tested with expired tests which gave false negative results (Temmerman et al, unpublished). Following this unsuccessful programme, a new initiative was undertaken to provide 'one-stop' detection and treatment of syphilis. In this second programme, nearly all the women were treated successfully along with about half of their partners who presented for treatment (AIDS Action, 1994).

Another project in Kenya involved the decentralisation of syphilis prevention to nurses in ANCs. In this sample, 6.5 per cent of women, a total of 860, were seroreactive of whom 751 - 87 per cent were treated appropriately, including half their partners. Total recurrent costs of the programme in nine clinics serving approximately 13,000 women were about US$20,000: approximately US$1.50 per woman screened, US$26 per treated case, and US$48 per case of congenital syphilis averted. The authors also estimated costs at different syphilis seroprevalence levels. At 15 per cent, the cost per averted case of congenital syphilis would be US$10, and at 1 per cent, US$70. The decentralised method, compared with the former system in Nairobi, reduced the cost per averted case more than tenfold (Jenniskens et al, 1995).

In Zambia, an attempt was made to cost a syphilis screening programme. An estimated US$600 in materials costs per 1,000 women was expected. If staff-time costs were added and assuming that the two tests per attender, plus the treatment of seroreactive women and the two thirds of their spouses who would agree to attend, would require the equivalent of one nurse or similar staff, the cost would rise by approximately US$ 1,500 to around US$2,100. The treatment cost was estimated at US$1, and the cost per adverse outcome - likely to be 7 spontaneous abortions, 19 perinatal deaths, and 14 syphilitic infants per 1,000 births was US$12. Including staff costs this would rise to US$42 (Hira et al, 1990). If the actual cost of the rapid plasma reagin was closer to the US$0.60 estimated by a project in Mozambique, then the overall cost of screening in Zambia would rise significantly to US$1,600, excluding staff costs, and US$3,100 including staff costs. If all of the 327,000 women who had a child in Zambia in 1990, the date of the last census, had been screened, the cost would have been in the order of US$2.76 million.

Gonorrhoea and Chlamydia

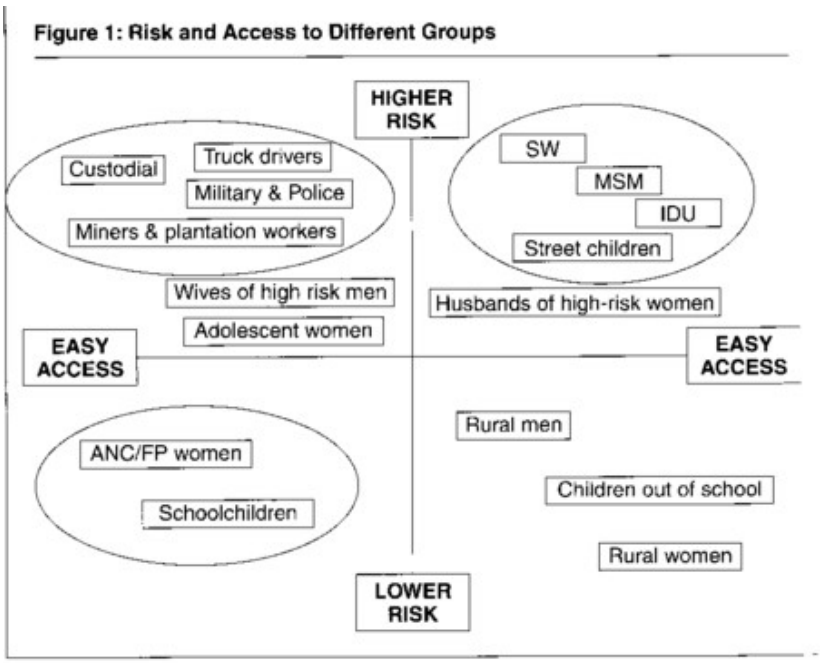
Chlamydia and gonorrhoea cause considerable morbidity and mortality in both developing and industrialised countries. A study in Canada on the cost of finding chlamydial infections estimated the probability of occurrence of different complications of chlamydia. The probability of PID was estimated as 14 per cent, symptomatic cervicitis 20 per cent and asymptomatic cervicitis 66 per cent. Of those with PID, the likelihood of infertility was estimated as 15 per cent and ectopic

pregnancy 5.5 per cent. Treatment costs of these conditions were estimated as Can$4,196 for a hospitalised case of PID, Can$572 for an ambulatory case (average Can$1,478), ectopic pregnancy as Can$3,879, and infertility as Can$3,916 (Estany et al, 1989).

Several projects have addressed the issues of screening for gonorrhoea and chlamydia. Mayaud et al (1995), working in Tanzania, found that risk assessment and other screening options for chlamydia and gonorrhoea did not work well. Of the 964 AN attenders in the study, 39 per cent had an STI, 10 per cent had syphilis and 8 per cent had either gonorrhoea or chlamydia. The authors found that the costs of laboratory screening for gonorrhoea and chlamydia were high and only mass treatment of all pregnant women achieved high levels of sensitivity. However, as only 8.4 per cent of the women were infected with chlamydia or gonorrhoea, the cost per true case treated was high, at US$2 1.40.

In Martinique, chlamydia prevalence was estimated at 27 per cent of AN attenders. The authors estimated the costs of diagnosis and therapy for the complications of chlamydia - diagnosis and therapy for chlamydia-related conjunctivitis and pneumonia in children, and salpingitis in women - at US$1.2 million, which included US$110 for neonatal conjunctivitis, US$300 for pneumonia on an out-patient basis or US$2,600 for inpatients, and US$5,000 for salpingitis. The cost of cell culture for chlamydia was estimated at US$32. The cost of treatment of a pregnant woman and of her partner with erythromycin was estimated at US$20 per person. The cost of screening all pregnant women, approximately 6,000 annually, with culture and treating both the women and their partners was estimated to be US$250,000. This gives a benefit:cost ratio of 4.8:1, a cost per woman screened of US$42 and a cost per case detected in the women of US$153. The authors concluded that screening for chlamydia in this population was cost effective (Chout et al, 1995). They also cite a previous study which reported that taking cultures from pregnant women was cost effective if the prevalence of infection was greater than 14.8 per cent (Nettleman and Bell, 1991, cited in Chout et al, 1995).

Figure 1: Risk and Access to Different Groups



Factors affecting cost of interventions

Characteristics of Countries or Intervention Areas

- Overall size and distribution of the population: population size will reflect the possibility of economies of scale. A mass media intervention aimed at a population of 3 million will cost more per person, other things being equal, than one aimed at 30 million. Population distribution is also a key parameter: if the population is primarily urban or grouped in other ways - for example in refugee camps or agricultural areas - they will be reached more easily than if they are scattered throughout the country.
- Population density: the density of the population throughout the county has major implications for interventions. A country such as Bangladesh with very high population density has approximately 8,000 people living within a 1 kilometre radius of any given fixed point in a fertile area and many more in a city, whereas in rural Zambia or Mali, the flgure is in the region of 200 people within the same radius. If the fixed costs of driving a lorry to a speciflc point in rural Zambia to distribute condoms were distributed over 200 people, the cost per person would be in the order of 40 times higher than a similar intervention in Bangladesh. Additionally, people would be expected to walk further and therefore would have to value the intervention more to make use of it, whereas in Bangladesh effective distribution can be done on foot or on bicycle. The Bangladesh Rural Advancement Committee (BRAC) project made use of workers on foot to distribute contraceptives but this would not be possible in most of Africa (Foster, 1990).
- Degree of urbanisation: this will determine the costs of reaching people with any given intervention, since it is usually the case that health and education services, newspapers, radio and television are more accessible, even to poor people, in urban areas. Urban areas are also more densely populated and have better infrastructure making distribution and transport costs lower.
- Infrastructure development: costs will be higher where basic infrastructure such as roads, telephones and public transportation is poor. Time spent travelling or waiting for a telephone line is increased and productivity reduced as a result. In some developed urban areas, such as Bangkok, traffic congestion consumes large amounts of time as people travel to and from work and on work-related business.
- Number of languages spoken in the country: costs of mass media and other types of campaign will be higher if posters, educational materials, radio broadcasts and television spots have to be prepared in several languages. A country such as Tanzania, where Swahili is spoken throughout, will have a major advantage over Zambia where at least three or four main languages are spoken.
- General education and literacy levels: another factor affecting costs will be literacy levels especially among women and adolescents. If low literacy makes print material unfeasible and face-to-face interventions essential, costs will be correspondingly higher. Also, expenditure on printed media will have limited benefits.
- Access to mass media such as radio, television, and newspapers: in many countries access to modern means of communication is limited either by low levels of ownership of radios or inability to purchase the batteries required to keep radios working. Furthermore, women's access to radio is often limited by men's control over this resource. Television and newspapers reach only a small fraction of the population in most African countries but are nonetheless very influential and help to form opinion among policy makers and elites.
- Degree of development of health services, and density of provision: in some countries, largely as a result of other factors listed here, health service provision is thin, requiring people to travel long distances to receive even basic health care. In such countries, rural Zambia is an example, providing even a basic health centre which serves a small, scattered population is a major problem for the government, and the costs per person served are very

high. In this situation, the trade-off is between providing a more extensive service but at a greater distance from the population, or providing a very basic service at a number of points nearer the population. People in such areas must therefore value any given service much more highly in order to make the effort to use it. Unfortunately the difficulties of supplying such remote points with essential consumables and equipment often result in wasted journeys and undermine client confidence in the service.

- Salary levels: in some countries medics and paramedics are paid relatively well and in others they are paid extremely poorly. Thus an intervention which relies heavily on health workers will be cheaper in a country with low wage levels. However it must be remembered that low wage levels do not reflect their true scarcity value. In fact, since migration and the 'brain drain' are likely to be problematic in such situations, remaining staff are likely to be severely overworked. The low financial cost of their time may be a very poor reflection of the economic value of the time they have to spend on a given intervention. Paradoxically the true value of their time is probably higher than that of better paid colleagues in richer countries. It is important therefore not to overload staff further with unimportant or unproductive tasks.

Characteristics of the Intervention

Costs of interventions vary for a number of other reasons, mostly unrelated or indirectly reláted to the country context. These include the following:

- Development costs: costs of producing and developing health promotion materials vary depending on whether adequate expertise, for example artists, script writers, health promotion specialists, graphic artists and printers, is available locally or whether expertise has to be imported. Factors such as the number of languages in which materials have to be produced and literacy levels will also affect development costs significantly.
- Costs of training: salary, transport and materials costs, hotel accommodation and per diem rates will affect the costs of training. In some countries competition for the attention of scarce trained health staff by different projects has meant that it has become customary to have training seminars in luxury hotels and to offer attractive incentives to encourage participation. Higher-level health staff can usually choose which workshops and seminars to attend with those which pay the highest per diem being the most popular. More affordable models involve training local staff nearer to their duty posts, with reimbursement of travel costs and provision of basic food and drink.
- Costs of local staff: peer educators and trainers for face-to-face work. In some countries local people have been selected and trained as peer educators at low cost. Remuneration is in the form of an incentive of the equivalent of approximately U$5 monthly. While this is a small amount of money, and ensures a better level of cooperation, it can add up to a considerable amount when the number of peer educators required is taken into account. In a district with 1,000 villages this would require US$5,000 per month, a total of US$60,000 per year.
- Costs of radio or television broadcast time: these are often related to ownership of the media, either public or private, with some, but not all, broadcast authorities willing to offer subsidised or free prime-time slots for health promotion messages. Free slots may also be offered at times when few people will be listening or watching and may therefore have limited impact.
- Costs of printing: these very depending on the demand for, and size of, the local printing industry. There may be little or no competition, with government printers having a monopoly with long turnaround time and poor quality.

- Costs of expansion from pilot interventions or small scale projects: the example of peer educators demonstrates the difficulties of scaling up from smallscale pilot or trial intervention to a larger area in order to achieve higher rates of coverage. The cost of producing an impact through face-to-face interventions is significant and there are virtually no economies of scale to be achieved. It is important therefore that efforts are targeted appropriately.

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Notes:

1 “This information was previously published in Adler M., Foster S., Grosskurth H., Richens J., and Slavin H. (1998) Sexually Transmitted Infections: Guidelines for Prevention and Treatment. UK Department for International Development, Health and Population Occasional Paper”.

2 In this book costs provided in various references are quoted in their original currencies, unadjusted either for inflation or for exchange rate fluctuations, in view of the fact that costs in general are highly variable from one setting to another, for example the US and Zambia. and that exchange rates have been extremely variable, especially those which were originally costed in local African currencies. However, current costs and projections are made in 1996 UK Sterling whith conversion from the US dollar at US$1.50 = UK£1 where appropriate.

3 In general seven treatments per year would be higher than average. Interventions of this nature would need to obtain information about how other people are reinfected. Depending on this information, it could have major implications for the cost effectiveness of mass treatment.