
GLOBAL
PROGRAMME
ON
AIDS

THE COSTS OF HIV/AIDS
PREVENTION STRATEGIES
IN DEVELOPING COUNTRIES



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Executive Summary

Introduction

A cost analysis was undertaken on a sample of projects representing six broad HIV/AIDS prevention strategies in each of four income groupings (low, low middle, upper middle and former socialist economies). The projects were selected on the basis of availability of data, effectiveness and generalizability. Cost data were abstracted from several published studies or solicited directly from project coordinators using a costing questionnaire. Public sector costs only were included in the analysis and all costs were converted to 1990 US dollars for comparability.

Case studies

The costs of programmes to promote safer sexual behaviours through mass strategies are highly variable (US\$ 0.06-0.32 per capita) but total and unit costs are of the same order of magnitude as those of mass media campaigns for diarrhoeal disease control. Economies of scale can be significant and are related to population size. The promotion of safer sexual behaviours and provision of condoms through person-to-person education appear to be more expensive per contact (US\$ 0.47-3.73) but the intensity of contact is likely to be greater. Costs are sensitive to the size and accessibility of the target group.

Where condoms are provided through social marketing, unit costs decline as the project matures. The cost per condom sold (US\$ 0.02-0.30) also depends on market size and the condom sourcing model used, with lower costs to the public sector when private sector partners are also involved. Cost recovery (which has implications for sustainability) and coverage rate (high prices may reduce use while negligible prices may lead to wastage) must be balanced when determining price. Although some programmes with private sector partners have achieved sustainability, many low-income countries are likely to remain reliant on condom donations in the foreseeable future.

The costs per visit for sexually transmitted disease treatment and prevention services are relatively high (US\$ 9.46-10.16). Furthermore, the costs are higher than those reported for primary health care services in developing countries, suggesting that the case studies selected are expensive examples. However, in addition to preventing infection, STD services also cure disease. Although there are no major differences between the costs of horizontal and vertical delivery systems or between syndromic and laboratory-based treatment, the cost data are too scanty to permit firm conclusions.

The prevention of unsafe drug use behaviours through the use of needle exchange and bleach provision programmes is likely to have relatively high unit costs initially, as it takes

time to recruit the target clientele. Costs per client are US\$ 3.21 and US\$ 12.59 for the two projects lasting less than 1 year, and US\$ 2.25 for the project lasting 5 years.

The provision of a safe blood supply is the only example of a strategy where unit costs vary significantly according to the prevalence of HIV infection; high prevalence leads to high blood replacement costs. In low prevalence areas the costs of safety measures to eliminate HIV represent only a small addition to the total costs of blood transfusions. Economies of scale are likely to exist for national blood safety programmes. Although some hospital-based programmes may be cheaper, the quality of the blood supply may not be so high.

Comparison of strategies

Comparisons of programmes that distribute condoms show a broad range of costs per condom distributed (US\$ 0.10-0.70) for person-to-person education, but a narrow range of costs (US\$ 0.02-0.18) for condom social marketing projects that have been operating for 3 years or longer. Programmes that establish an educational contact show increasing costs per contact from mass media programmes (US\$ 0.07-0.41) through person-to-person education (US\$ 0.47-3.73) to needle exchange and bleach provision programmes (US\$ 2.25-12.59). However, the comparison of these measures of effect, which may not reflect the principal aim of the intervention, may be unfair.

Global resource implications

Condom social marketing makes the largest contribution to total costs of HIV/AIDS prevention strategies at both low and high levels of assumed need. Projected total global resource requirements for such strategies at low-estimate levels are US\$ 1500 million and at high-estimate levels US\$ 2900 million per annum. However, assumptions regarding representativeness of selections, accuracy of content and interpretation of reported data, generalizability and replicability of sample interventions, and scaling factors can each have significant effects on the final total.

Conclusion

This cost analysis lays the groundwork for a costing inventory to guide the planning, management and evaluation process at the local, country and international level; allows some estimation of the relative cost-effectiveness of different implementation models for strategies involving condom distribution or education; suggests significant benefit in developing a common measure of outcome using simulation models; and provides the basis for tentative global resource extrapolations, which, when compared with existing expenditure, allows for an estimation of current resource gaps.

1. Introduction

Since AIDS was first described in 1981, the global spread has been so rapid that virtually all countries have been caught off guard. Few national health strategies in the late 1970s made any preparations for such an eventuality. Programmes to stop or slow the spread of HIV infection have had to be implemented rapidly, despite poor knowledge of the dynamics of infection or disease, since it was realized that inroads made into the pandemic at an early stage could lead to massive benefits later on. Slightly more than 10 years later, many such programmes are being evaluated for the first time. Evaluations have concentrated largely on evidence of changes in knowledge, attitudes and behaviour. A few have suggested that programmes may have altered the course of the pandemic, although not in developing countries.

Despite the crucial importance of programme costs in influencing both affordability and cost-effectiveness, very little attention has been paid to costs in these evaluations and there are few reports in the literature concerning the costs of interventions to slow the spread of HIV. This gap in AIDS research will be filled only by a concerted reorientation of evaluative efforts over a number of years, and the overview provided here can do little to rectify the omission. Nevertheless, this document gives some preliminary insight into the costs and outputs of a number of HIV prevention projects which are believed to be reasonably typical. The purpose of the analysis is twofold: firstly, to enable some comparison of costs per common output between projects delivering similar interventions; and secondly, to estimate what it might cost to replicate various interventions throughout low- and middle-income countries (including the former socialist economies). No estimates of cost-effectiveness in terms of HIV prevention have been attempted, although those available in the published literature have been reported where relevant.

Projects were selected to represent six major strategies, namely the:

- promotion of safer sexual behaviours: mass strategies
- promotion of safer sexual behaviours and provision of condoms: person-to-person education
- provision of condoms: social marketing
- provision of STD treatment and prevention services
- prevention of unsafe drug use behaviours: needle exchange and bleach provision programmes
- provision of a safe blood supply.

As most of these strategies are not unique to HIV prevention, supporting cost and effectiveness data are drawn from strategies aimed at other health problems where possible. For each strategy, an attempt was made to identify at least one project from a country in each of the broad income categories into which the World Bank has classified developing countries (i.e., low income, low-middle income and upper-middle income) (World Bank, 1992; see also Annex 1). A fourth category, former socialist Eastern European countries, was added to the World Bank classification for the purposes of this study. Because of the short time-frame of

the research, projects were then selected for follow-up primarily on the basis of availability of data. Additional criteria applied in the selection process included the duration of operation of the project, and the availability of evidence of success in terms of process or outcome measures.

2. Costing methodology

In a few cases, data were available in published form. For most, information was obtained directly from project coordinators by asking them to fill out a questionnaire (see Annex 2) on various aspects of programme costs. Any gaps that remained were filled in by telephone discussion with the individuals concerned. In some cases, where information gaps could not be filled in this way, costs were taken from other projects in countries of similar income level. It was not possible to visit any of the projects to cost activities personally.

The costing principle followed was to include all costs incurred by the providing agency, and exclude all costs falling on clients. In many cases, programmes received free supplies, technical assistance, and premises from foreign aid agencies, government health services, etc. In order to ensure that all provision costs were accounted for and that costs were comparable between projects, these were valued according to local prices and included in the analysis where possible. Where premises had been provided free of charge, they were costed on the basis of a typical annual rent rather than as a capital cost. Premises, staff and equipment that were shared with other programmes were costed on the basis of estimated proportional usage. The costs of external evaluations of project effectiveness were excluded.

Capital expenditures incurred included purchase of buildings, vehicles, major project equipment, office and computing equipment, and training of staff members. Annual figures for capital costs were derived using simple straight line depreciation. The lifetime of buildings was assumed to be 20 years, that of vehicles and equipment 5 years, while the duration of training was assumed to be 3 years.

Expenditures were incurred in different currencies in different years. All costs were converted to US dollars in the year incurred and adjusted to 1990 US dollars using United States consumer price indices. Conversion factors were taken from the International Monetary Fund's *International financial statistics yearbook for 1991* (International Monetary Fund, 1991) and *International financial statistics monthly, September, 1992* (International Monetary Fund, 1992). Consequently, all costs are expressed in constant 1990 US dollars unless otherwise stated.

3. Case studies

3.1 Promotion of safer sexual behaviours: mass strategies

Introduction to the strategy

The sexual transmission of HIV remains by far the most significant route of infection at the global level, being responsible for an estimated 80% of infections in sub-Saharan Africa (Heymann & Edstrom, 1991). Since the outbreak of the pandemic, information, education and communication (IEC) campaigns have been perceived as vital in reducing behaviours that place individuals at high risk of infection. IEC campaigns are of two main types: broad mass-communication strategies with minimal or no targeting according to risk category, and targeted, more intensive strategies aimed at vulnerable groups. The latter are dealt with in section 3.2 which addresses person-to-person education.

While the concern here is to cost the promotion of safer sexual behaviours, AIDS education campaigns usually have slightly broader goals, which include teaching essential facts about HIV, promoting healthy behaviour, reducing anxiety about casual transmission and preventing discrimination against those infected (Schopper, 1990). In projects educating adolescents and pre-adolescents, general sex education is probably also a common adjunct. No published costings of HIV education campaigns could be found and, although there are many descriptions of projects in the literature (Schopper, 1990), and a few describing convincing changes in knowledge and attitudes (e.g., in Mexico, by Sepulveda *et al.*, 1989), evidence of behaviour change as a result of mass campaigns is unconvincing (e.g., Izazola *et al.*, 1988). Furthermore, effectiveness is likely to be a function of the quality of the programme, population characteristics (e.g., literacy, media coverage and susceptibility of the target population), and the availability of complementary services (e.g., condom distribution).

Case studies of selected interventions

There were three case studies in this category. Two, one each from the Dominican Republic and Gabon, cost mass-media approaches at a national level, whereas the third looks at the costs of initiating and implementing a school-based education programme for Budapest, Hungary and its environs.

The Dominican Republic mass media campaign, which began in August 1988, is funded by USAID and administered by AIDSCOM. It is intended that the project run over a period of 4 years initially, during which a phase 1 and a larger phase 2 mass media campaign will be implemented. While it operates primarily in four major cities, the size of the country and the proportion of people in these four cities warrant its classification as a nationwide project. During phase 1 of the project, a total of 86 hours of television time (6 different stations) and 168 hours of radio time (25 different stations) were taken up by programming produced by the project over a period of 8 months.

The Gabon mass education campaign to promote safer sexual behaviours is funded by the French Government and executed by the CACTUS media agency. While its stated aims are primarily to reach sexually active people in the capital city, Libreville, its extensive television, radio and press coverage in such a small country, with no other major cities, makes it in effect a nationwide programme also.

The Sex Education and AIDS Prevention Programme (SEAPP) in Budapest has been operational since 1991 under the direction of staff from the Institute of History of Medicine and Social Medicine, Semmelweis Medical University. There is no official sex or AIDS education initiative in Hungary, and the objective of SEAPP is to train school nurses, doctors and teachers in establishing and implementing an AIDS educational programme for the schools in which they work. The programme targets schoolchildren aged 10-14 years with a 4-year graduated curriculum. During its first operational year (1991-1992 school year) SEAPP held 3-day courses, attended by a total of 140 school nurses, doctors and teachers. In addition, SEAPP organized a 1-day refresher/evaluation workshop for candidates and a 1-day seminar for headteachers stressing the importance of introducing the programme in their schools.

Methodology

Comparing costs and cost-effectiveness of broadly based education campaigns is fraught with difficulties. Although no published studies costing AIDS IEC campaigns could be found, evaluations of similar campaigns for health issues such as breast-feeding and oral rehydration have been published. Very large variations in component costs and quality of media between countries are typical (Phillips, Feachem, Mills, 1987; Shepherd, Brenzel, Nemeth, 1986). Production costs for an hour of television programming may vary from US\$ 175 to US\$ 50 000 (Eicher *et al.*, 1982). Radio production costs are considerably cheaper, but may still vary two- to threefold between countries (Jamison & McAnany, 1978). Broadcasting costs are often cheap or free to the project in countries with state-run radio and television stations, or where the law requires commercial stations to provide a certain amount of free airtime for educational programmes (e.g., Brazil). At the other end of the spectrum, education campaigns may have to hire advertising space on commercial networks at considerable cost.

In the case of the Dominican and Hungarian programmes a detailed breakdown of costs was available. However, the Gabonese project was contracted out to a media agency, and only total costs (incorporating salaries and overheads) were supplied for each type of media material produced.

For the SEAPP project, the time spent by teachers/nurses in providing sex and AIDS education in schools was estimated and costed. The refresher course run for educators showed that slightly less than half of the educators had been able to implement the curriculum in their schools, mainly because of resistance from other teachers and headteachers. It was therefore assumed, following the headteachers seminar, that half the schools from which educators had been trained implemented the programme, and that there was an average of 375 pupils per school in the age range concerned.

Cost analysis

The costs of the programmes studied are outlined in Table 1. Examining the two mass-media campaigns, it can be seen that the costs per capita are considerably higher for the Gabonese campaign than for the one in the Dominican Republic. Since the total costs of the two programmes are similar, the obvious explanation is the economies of scale resulting from the much larger population in the Dominican Republic. It is impossible to allow for any differing qualities of media material provided, and the large differences in per capita cost between the projects are consistent with findings of other published studies.

Table 1. Annual costs of programmes to promote safer sex behaviours (1990 US\$)

Costs and outputs	AIDSCOM mass media campaign, Dominican Republic (nationwide)	FAC mass media campaign, Gabon (potentially nationwide) ^a	SEAPP school education project, Budapest, Hungary
Capital costs (% of total)	12 933 (4%)	N/A	268 (0.4%)
Recurrent costs	425 744	N/A	63 112
Salaries (% of total)	82 200 (19%)	N/A	56 154 (88%)
Media costs: Radio/television Print/other (% of total)	160 244 150 300 (71%)	210 384 117 922 (92%)	- 604 (1%)
Total costs (100%)	438 677 (100%)	357 347 (100%)	63 380 (100%)
Output	Total population, 7 444 000	Total population, 1 100 000	No. of teachers trained, 140 No. of pupils educated in 1 year, 41 250
Cost per output	Cost per capita, 0.06	Cost per capita, 0.32	Cost per teacher trained, 90.30 Cost per pupil-year of education, 1.33
^a N/A, not available. This project was administered under contract by a private advertising agency which included overheads and salary costs within the total cost for each medium used.			

For the SEAPP project, a cost of US\$ 1.54 per pupil-year of education was calculated. This would provide a 1-hour lesson per class per month for the age range concerned. Making the assumption that the training given to educators lasts for 3 years before they would need a refresher course, costs per pupil-year of education drop to US\$ 1.33. The costs consist almost entirely of salaries, and the major portion of salaries costed is that for teachers/nurses time.

Shepherd, Brenzel and Nemeth (1986) compared the costs of two similar mass education campaigns for diarrhoeal disease control strategies using education on oral rehydration in the Gambia and Honduras. Total costs per annum were US\$ 233 322 and US\$ 422 500 (1990 US\$) respectively, which are of the same order of magnitude as those of the AIDS education campaigns described above.

School-based education campaigns are far more labour intensive than mass-media campaigns, and their costs are likely to be much more predictable in a given country with known salary levels. Once again, no published examples of costs of school AIDS education campaigns were found. The educational component of a school hygiene promotion campaign in Indonesia described by Rohde and Sadjimin (1980) cost US\$ 1.87 (1990 US\$) per pupil year of education, which is similar to that found in the SEAPP project.

The issue of comparability between campaigns concentrating on issues such as breast-feeding and hand-washing on the one hand, and a sensitive topic such as sexual behaviour on the other, needs to be addressed before evidence from the former on cost and effectiveness can be used to shed light on AIDS education campaigns.

3.2 Promotion of safer sexual behaviours and provision of condoms: person-to-person education

Introduction to the strategy

The promotion of safer sexual behaviours and condom provision have formed an integral part of strategies to combat the spread of HIV from the outset of prevention programmes. Person-to-person education programmes, by virtue of the high-intensity contact that they demand, have invariably been directed at certain vulnerable groups where the potential benefit for a given input is perceived to be high. Such targeting, whether it be of groups practising high-risk behaviours, or of groups in high-risk situations (Zwi & Cabral, 1991), is essential if large short- to medium-term gains are to be made on limited budgets. Although the model of Moses *et al.* (1991) on STD treatment, condom use and HIV prevention is oversimplified, it demonstrates the relative benefits of targeted education for behaviour change. The costs per person reached by such strategies are sensitive to a number of factors, including the total number of targeted people, the accessibility of target groups both socially and geographically, and the level of contact established between educators and target groups. The quality of person-to-person education is likely to vary widely between programmes, and is impossible to adjust for when estimating costs. While there is good evidence that person-to-person programmes change levels of knowledge about AIDS and even reported behaviour (World

Health Organization, unpublished document - in preparation) it is still extremely difficult to estimate the effect that knowledge change has on reducing the spread of HIV in developing countries. Data obtained from developed countries are encouraging, but not necessarily applicable to developing countries (Schopper, 1990; Hausser & Paccaud, 1991).

Case studies of selected interventions

Within this approach to HIV prevention, a wide diversity of target groups at varying levels of risk may be found. Three interventions were studied, two aiming fairly broadly at prostitutes, their clients, and other vulnerable groups in Yaoundé, Cameroon, and Bulawayo, Zimbabwe, and the third focusing more narrowly on male adolescent prostitutes in Rio de Janeiro. The fourth case study, a workplace AIDS education project run by the Federation of Ugandan Employers (FUE), targets a much broader and probably more accessible group, and uses video screenings as well as person-to-person interactions to reach its target audience. All projects give figures for the number of condoms distributed, and these allow for some comparison of project costs.

The FUE project began in 1988 with financial assistance from USAID and technical assistance from AIDSCOM. FUE is a non-profit organization with a membership of 140 companies employing a total of approximately 400 000 employees. The project aims to reach all of these with information about HIV/AIDS and to provide condoms to workers at the workplace. Programme implementation consists of training trainers who in turn train peer educators in workplaces. The role of peer educators is to explain and promote safer sex practices to work colleagues, and also to their friends and families, and to act as an accessible source for condoms, which are supplied free of charge. In addition, a film has been made for use in training educators and for screening in workplaces. The project operates in parallel with a similar workplace-based AIDS education programme run by Experiment in International Living (EIL) for non-FUE affiliated workplaces. The programme was described at a World Health Organization (WHO) meeting on effective approaches to AIDS prevention (World Health Organization, in press).

The prostitute peer education project in Yaoundé is funded by USAID and carried out by the AIDS programme of the Cameroon Ministry of Health. It began in November 1989 with the aim of reducing the spread of HIV infection and other STDs among prostitutes and their clients by promoting safer sex and condom use, and by facilitating easy condom purchase. A total of 40 ex-prostitutes have been employed by the project and trained in peer education. In addition to educating other prostitutes and their clients, they purchase condoms from the Population Services International national social marketing programme, and resell them, so there is complete cost recovery for condom supply by the project. The stated target populations for the programme include sex workers in Yaoundé (approximately 7000) as well as their clients, taxi and truck drivers, students, and military employees.

The Pegação Programme was initiated by the Social Health Guidance Unit (Nucleo de Orientação em Saude Social, NOSS) in July 1989 with the objective of reducing the transmission of HIV in the male-to-male sex-work setting in Rio de Janeiro. According to

Cortes (1989), approximately 43% of the estimated 2000 male prostitutes in Rio de Janeiro are HIV-seropositive. The Pegação programme aims at making regular personal contact with male street-working prostitutes between the ages of 11 and 23 years in the city. General health topics are discussed, safer sex practices encouraged and condoms supplied after showing the boys how to use them correctly. Approximately 9000 contacts per year are made by the four project workers and project coordinator. Whilst some written material has been produced and distributed, the project concentrates primarily on personal interaction. Efforts have also been made to facilitate easier access for prostitutes to formal medical services, especially for the treatment of STDs, and to psychological counselling services and legal aid. A number of serial evaluations of knowledge, attitudes and behaviour of the population served by the project have been conducted in association with Rio de Janeiro State University and funded by the WHO Global Programme on AIDS, and results from these should shed light on the effectiveness of the programme once they become available.

The Bulawayo peer education project began in October 1989 as a pilot project under the direction of the Bulawayo City Health Department, the University of Zimbabwe and AIDSTECH/Family Health International. The pilot project was upgraded to a permanent, full-scale project in 1991. It aims to limit the spread of HIV in the city by providing education and condoms to vulnerable subgroups of the population including sex workers and their clients, people in bars, workers, and attenders of STD treatment clinics. All education is performed by peer educators who receive a short initial period of training and attend weekly update workshops thereafter. They are paid a small honorarium for their education work, as well as being reimbursed for all expenses they incur.

Methodology

The Zimbabwe data come from a detailed study of project costs conducted in early 1992 (Forsythe *et al.*, 1992). Data for the other programmes were obtained directly from project coordinators.

The Ugandan, Zimbabwean and Brazilian projects are all supplied with free condoms. A cost for condoms was included at a standard USAID rate (Stover & Wagman, 1992) for the Ugandan and Brazilian projects. For the Zimbabwean project, costs were estimated by the authors using overseas purchase costs and transport costs to Harare.

A number of linked projects are run in parallel to the Yaoundé project, including large-scale workshops run intermittently for prostitutes, and STD treatment facilities; the costs of these are excluded from the analysis. Estimates of capital costs were not supplied, and in most cases these costs are shared with other projects. The use of buildings and vehicles for the prostitutes peer education project itself seems to be minimal, and their exclusion is thus unlikely to affect total costs significantly.

Cost analysis

Costs and outputs of the projects studied are presented in Table 2. Capital costs for the Ugandan project are higher than average, and consist almost entirely of vehicles purchased to enable the visiting of workplaces around the country.

Salary costs for the peer educators and three project supervisors constitute almost the entire expenditure of the Yaoundé prostitutes peer education programme. Training costs are covered largely by the salaries of support staff, which are included in the salary costs in Table 2.

Similarly, salary costs constitute the main component of the costs of the Pegação Programme, as would be expected in such a labour-intensive strategy. While it is not possible to estimate cost-effectiveness of the programme in terms of number of HIV infections prevented, a cost per reported new condom user for the first year of the project can be calculated from the information given at a WHO meeting on effective approaches to AIDS prevention (World Health Organization, report in press) assuming a total of around 2000 male prostitutes in the city. Approximately 1300 prostitutes would appear to have been converted to condom use with all paying clients over the year, yielding a cost of US\$ 25.80 per reported new condom user.

The total cost of the Zimbabwean project is roughly the same as that of the Ugandan project, although capital costs are very low. This is mainly because most premises used are rented, and vehicle usage is minimal. Because of the large number of condoms distributed by the project, condom costs form a major part of total costs (27% compared with 0% for the Yaoundé project). Technical assistance from AIDSTECH constitutes 32% of total costs, and if this is excluded, total costs per annum drop to US\$ 49 320, and cost per condom distributed to US\$ 0.07 per condom.

Only one output indicator — namely, condoms distributed — is common to all four projects. The low costs of the Ugandan and Zimbabwean projects may be partly due to the fact that the peer educators receive minimal pay to do AIDS education work, unlike those in the Brazilian and Cameroonian projects, where they receive a full-time salary. As the peer educators in the first two projects spend only a small portion of their time giving AIDS education — unlike the educators in the other two projects who are full-time employees — it can be considered justifiable not to cost their time fully. The wide difference in costs per condom distributed between the Cameroonian and Zimbabwean projects may also be partly because of the charges levied for condoms distributed in the Cameroon, and hence lower demand. The high costs of the Brazilian project could reflect the sensitivity of costs to the size and accessibility of the target group.

Table 2. Annual costs of projects to promote safer sex behaviours and condom use by person-to-person strategies (1990 US\$)

Costs and outputs	FUE workplace education project, Uganda	Prostitute peer education project, Yaoundé, Cameroon	Pegação Programme, Rio de Janeiro, Brazil	Peer education project, Bulawayo, Zimbabwe
Capital costs (% of total)	18 604 (25%)	0	780 (2%)	307 (0.4%)
Recurrent costs	56 410	203 600	32 770	72 220
Salaries (% of total)	19 548 (26%)	194 500 (96%)	21 032 (63%)	21 363 (30%)
Other (% of total)	36 862 (49%)	9 100 (4%)	11 736 (35%)	50 857 (70%)
Total costs (100%)	75 014 (100%)	203 600 (100%)	33 550 (100%)	72 527 (100%)
Outputs: Condoms distributed	480 000	593 000	48 000	708 000
Other	No. of employee contacts, 53 400	No. of educators working, 40	No. of prostitute contacts, 9 000	No. of contacts, 154 632
Cost per: Condom distributed	0.21	0.34	0.70	0.10
Other output	Cost per employee contact, 1.89	Cost per educator per year, 5090.00	Cost per prostitute contact, 3.73	Cost per contact, 0.47

3.3 Provision of condoms: social marketing

Introduction to the strategy

Social marketing is the application of private-sector marketing techniques to the sale of a consumer product to fulfil a public health or other social need, with retail costs subsidized by donors or government in order to increase access to the product. Condom social marketing programmes encompass the range of tasks from market research, product importation, branded packaging, advertising and promotion (through the mass media, at point of sale, or other means), to distribution (to pharmacies, grocery stores, hotels, bars, etc.) and management. Rather than developing new project structures and distribution channels, social marketing projects strive to work within existing private-sector infrastructures (Stover & Wagman, 1992).

Condom social marketing programmes, initially a component of broader contraceptive social marketing programmes, were designed to make condoms an attractive and affordable form of contraception in developing countries (Altman & Piotrow, 1980; Sherris, Ravenholt, Blackburn, 1985). In the past decade, the focus of these programmes has shifted to disease prevention (AIDS and other STDs) or to general protection against both unwanted pregnancy and disease (Liskin, Wharton, Blackburn, 1990).

Case studies of selected interventions

The sample projects include 3 from low-income countries (Ghana, Indonesia and Zaire) and 7 from low-middle income countries (Bolivia, Ecuador, Mexico, Morocco, Zimbabwe, Dominican Republic and Côte d'Ivoire). Data were not obtained from an upper-middle income country and there do not appear to be any existing condom social marketing projects in the former socialist economies.

Methodology

Detailed cost analyses are presented only for the Population Services International projects in Zaire and Côte d'Ivoire (Mr A. Boner, personal communication). Futures Group data for the remaining countries were abstracted from a review of the costs of contraceptive social marketing programmes implemented through the SOMARC Project (Stover & Wagman, 1992). As the Futures Group does not routinely track costs by method of contraception, the unit cost for each method was estimated by adding condom costs to the method's share of direct expenditures — allocated according to couple-years protected (CYP) — and dividing by the number of CYPs provided by the method. Since 76 condoms are considered equivalent to one CYP, cost per CYP could be converted to cost per condom sold.

The cost analysis is based on public sector expenditures (by international donor agencies and national governments), and no private sector expenses or profits are included. Futures Group calculations include in-country costs and technical assistance but not overheads (e.g.,

overall SOMARC management) that are not directly related to specific country projects. It was assumed that the costs of a condom social marketing project will be similar regardless of whether its aim is disease prevention (Zaire and Côte d'Ivoire) or contraception (all others). The significant difference lies in the measure of effect used and the coverage rate sought.

Cost analysis

The cost analysis (Table 3) demonstrates that most costs are recurrent and capital costs are low. Costs decline significantly as projects mature and begin to level out at 3-5 years (Table 4 and Figure 1). The high costs in the initial years are due to the start-up costs of baseline market research, project design and project launch. Not all of these costs continue into future years of the project and, as the marketing and distribution systems generate more sales each year (Table 5), unit costs decrease. Although the mean cost per condom sold is significantly less in low-income countries (US\$ 0.06) than in low-middle income countries (US\$ 0.15), this may be explained, in part, by the fact that the mean duration of the projects is significantly longer in low-income countries (5 years compared with less than 3 years).

There is considerable variation in costs between projects of similar age, which is attributable to individual country and programme characteristics, including market size and, probably more importantly, the condom sourcing model used. The choice of model depends on existing commercial infrastructures, access to foreign exchange, potential for cost recovery and HIV prevalence levels. One model involves the use of an existing local product. This allows initial donor funds to be used for the advertising, public relations and research activities necessary to fully expand the market, while a partnership with the manufacturer allows a reduction in price and use of an existing distribution network. The second model involves the importation of condoms by a private partner via commercial channels. Indonesia offers an example of this model in which donor funds are used to build the market through advertising and promotion. A third model, which involves initial donation followed by a switch to commercial purchase, has been used in Mexico and is the target model in Ecuador and Morocco. In these countries the only means of building the market initially is through the use of donated commodities, but the aim is a transition to commercial purchase over 3-5 years. The final and most commonly used model in the sample chosen involves donated condoms (Ghana, Zaire, Bolivia, Ecuador, Morocco, Zimbabwe, Dominican Republic and Côte d'Ivoire). Economic conditions or restrictions make it likely that social marketing projects will remain dependent on donations in these countries; however, after 3-5 years the market may be sufficiently developed to allow the implementing agency to take over the costs of marketing activities.

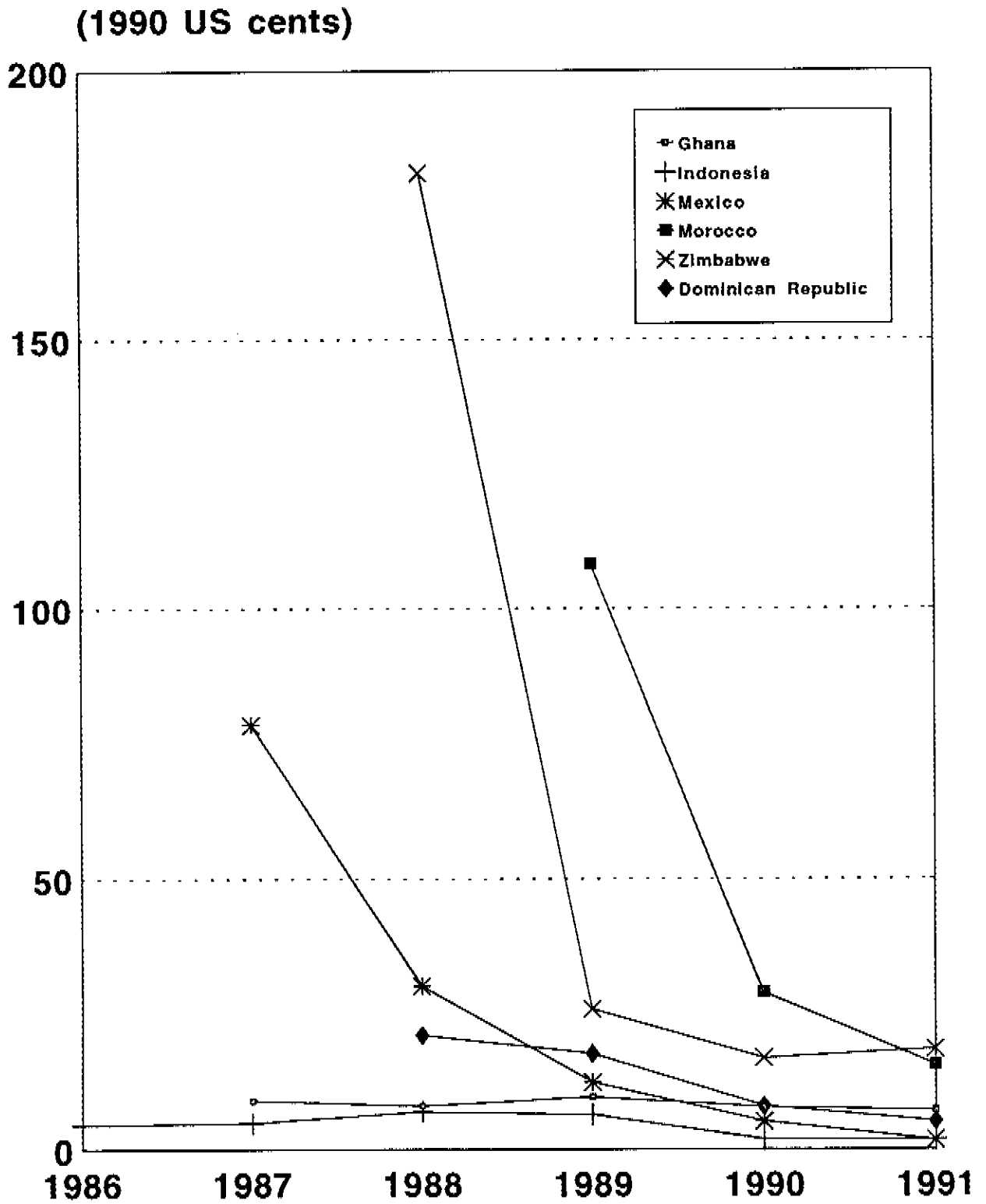
The unit cost of USAID-donated condoms is US\$ 0.0451, which means that no project using these condoms could have a cost per condom sold of less than this figure. Although the number of projects in each category is small, it appears that those countries with a private sector partner willing and able to purchase condoms commercially are able to operate projects at lower costs to the public sector than those countries which must rely on one of the other condom sourcing models.

Table 3. Annual costs of providing condoms through social marketing (1990 US\$)^a

Costs and outputs	Low-income countries				Low-middle income countries						
	Ghana (D)	Indonesia (CP)	Zaire (D)	Bolivia (D)	Ecuador (D)	Mexico (CP)	Morocco (D)	Zimbabwe (D)	Dominican Republic (D)	Côte d'Ivoire (D)	
Capital costs (% of total)			23 865 (1%)							4 681 (2%)	
Recurrent costs			2 043 406							263 719	
Salaries (% of total)			389 622 (19%)							85 724 (32%)	
Other (% of total)			1 653 784 (80%)							177 995 (66%)	
Total costs (100%)			2 067 271 (100%)							268 400 (100%)	
Output: No. of condoms sold			18 301 507							1 828 434	
Cost per condom sold	0.07	0.02	0.11	0.30	0.18	0.02	0.15	0.18	0.05	0.15	
	Mean cost per condom sold, 0.06			Mean cost per condom sold, 0.15							
	Mean duration of project, 5 years			Mean duration of project, 2.9 years							

^a Data for 1991; D, donated condoms; CP, commercially purchased condoms. All projects are contraceptive social marketing programmes except those in Zaire and the Côte d'Ivoire which are for HIV prevention.

Figure 1. Cost per condom sold by contraceptive social marketing programmes (1986-1991)



Additional issues to be considered in the cost analysis of condom social marketing projects are the effect of price on per capita sales and the potential for cost recovery. The price of condoms (expressed as a proportion of a daily wage) accounts for a large proportion of the variation in sales (per capita) across programmes (Romer & Hornik, 1991). This suggests that price must be kept as low as possible to generate sufficient demand amongst target consumers while at the same time allowing some form of cost recovery if sustainability and self-sufficiency are to be achieved, as is the mandate of some programmes. Some of the social marketing projects reviewed are currently self-sufficient or soon will be. The Indonesian DuaLima Red condom project (using commercially purchased products) became operationally self-sufficient in 1990 and requires no sales support at current levels. All costs associated with the product are covered by commercial firms. Some indirect SOMARC and USAID expenditures remain, however, and were included in the cost analysis. Similarly, the Mexican project became operationally self-sufficient in 1990 when it became capable of covering all marketing and operating costs. The only additional expenses were the donated commodities (although the first commercial purchase was made in 1991) and technical assistance. The Moroccan project is expected to be self-sufficient by 1993. It does therefore appear possible, assuming that the results of condom social marketing for contraceptive use can be applied to that for disease prevention, for some countries to implement projects that can be free of public subsidy within a period of approximately 5 years (Stover & Wagman, 1992). However, it is unlikely that most low-income countries will be able to become self-sustaining in the foreseeable future. Furthermore, cost recovery, volume of sales and wastage rates (which are likely to vary according to condom sale price) must all be carefully considered in project planning and management.

3.4 Provision of STD treatment and prevention services

Introduction to the strategy

Conventional sexually transmitted diseases (CSTDs), a classification which excludes HIV infection, represent a significant disease burden in many societies and rank among the top 10 most important health problems in developing countries in terms of years of healthy life lost (Over & Piot, 1990). Factors contributing to high incidence and (more easily measured) prevalence include:

- demographic and urbanization trends (e.g., a high proportion of young, sexually active adults in cities, men often outnumbering women, and a group of prostitutes who have a high number of sexual contacts)
- insufficient access to, or acceptability of, existing health services
- self-medication, inadequate treatment and antimicrobial resistance
- other infrastructural factors such as lack of adequately trained staff, poorly maintained laboratory equipment, interruptions in supplies, and the absence of an effective partner notification system.

The magnitude of the disease burden associated with CSTDs is significantly increased when their interaction with HIV is considered. High-risk behaviour (e.g., unprotected sexual

intercourse with multiple partners) can lead to both CSTDs and HIV. Conventional STDs can, moreover, facilitate the transmission of HIV. Infection with HIV can, through its adverse effect on the immune system, alter the frequency, natural history and response to treatment of CSTDs (Laga, Nzila, Goeman, 1991).

Because of these synergistic interactions and the similarities in behavioural risk factors, target populations and effective behavioural interventions, AIDS and CSTD control programmes should be integrated. Their combination should increase their cost-effectiveness, impact and sustainability (World Health Organization, 1990). The promotion of early diagnosis and treatment of CSTDs will decrease CSTD prevalence and thereby reduce HIV incidence. Similarly, the promotion of condom use (as discussed in section 3.3) will decrease CSTD incidence and thereby reduce HIV incidence.

Fransen, Van Dam and Piot (1991) describe the two main intervention strategies used for a combined CSTD/AIDS approach as: (i) health promotion and (ii) appropriate management of patients with CSTDs. The aims of health promotion for the primary prevention of HIV/CSTD infection are:

- reduction of the number of sex partners
- promotion of safer sex practices including condom use (considered in sections 3.2 and 3.3).

Health-seeking behaviour should also be promoted as an effective secondary prevention measure relevant to the early detection and efficient treatment of CSTDs. In this section, however, discussion will focus on the management of CSTDs as a strategy to prevent transmission of HIV, and will not address the issue of promoting health-seeking behaviour.

Ideally, a patient management strategy should include:

- the establishment of simple diagnostic criteria for each CSTD
- the development, acceptance and distribution of guidelines for STD management
- the establishment of simple systems for screening, voluntary testing, diagnosis and treatment of CSTDs
- the establishment of systems for the provision of diagnostic supplies, antibiotics and training and/or retraining of health personnel
- the establishment of an effective partner notification system.

Case studies of selected interventions

The three projects selected offer examples of three different types of interventions:

- horizontally structured (i.e., integrated into existing primary health care infrastructures - Maputo City and Province, Mozambique)

- vertically structured (i.e., referral centres or facilities organizationally independent of conventional primary health care services - Johannesburg, South Africa)
- those targeted towards a specific group at increased risk (prostitutes in the Pumwani area of Nairobi, Kenya).

Methodology

The cost data for both of the low-income country examples (Mozambique and Kenya) were taken from existing published studies (Bastos dos Santos, Folgosa, Fransen, 1992 and Moses *et al.*, 1991), while data on the upper-middle income country example (South Africa) were obtained directly from an individual involved in the operation of the clinic (Dr C. Evian, personal communication).

Staff training was appropriately costed in the Kenyan example but neglected in the Mozambican case study. This is regrettable as the intervention in Mozambique represents a good example of the use of pre-consultation counselling, syndromic patient management strategies and a partner notification system in an existing primary health care setting, all aspects of which require significant staff training before implementation. The study also excluded programme planning and management and research costs. Recurrent costs were more uniformly costed in the three studies.

Cost analysis

The cost analysis (Table 6) shows that capital costs are relatively low as building and equipment requirements are basic (though it should be noted that rent is included as a recurrent cost for all three projects). The bulk of recurrent costs consists of salaries and supplies (especially diagnostic supplies, antibiotics and condoms).

The measure of output used in these case studies is the number of episodes managed, which includes consultations during which no STD was diagnosed or treated but which would have provided an opportunity for counselling. In addition to this process measure of output, the Mozambican study documented both a general decline in the number of referrals and a specific decline in the number of unnecessary referrals for gonococcal urethritis. The Kenyan study used a simple model to calculate the cost per case of HIV infection prevented with variables including:

- number of resident prostitutes (500)
- proportion of prostitutes HIV-seropositive (80%)
- average number of clients per day (4)
- proportion of clients HIV-seropositive (10%)
- HIV transmission efficiency (1% - range 0.2 to 2%)
- efficacy of condoms in preventing HIV transmission (90%).

The cost per case of HIV prevented was found to vary from US\$ 8.00 to US\$ 12.00 with 80% and 50% condom use respectively. The impact of the programme, as measured by this model, is predominantly through the use of condoms, although the major cost of the programme is the provision of services to diagnose and treat conventional STDs. The authors argue, however, that without effective and accessible health services, it is unlikely that the women would be as receptive to the programme's efforts in health education and condom promotion.

The cost per episode managed is around US\$ 10.00 regardless of whether the programme is horizontally or vertically structured, but the data are inadequate to compare horizontally and vertically structured programmes or syndromic patient management and laboratory diagnosis based treatment. Although these costs per person contacted are relatively high, STD control programmes cure disease as well as prevent HIV infection. Also, comparison of the case studies with available data on the costs of primary health care in developing countries (World Bank, unpublished document) suggests that the case studies are expensive examples.

Table 6. Annual costs of providing STD treatment and prevention services (1990 US\$)

Costs and outputs	Maputo City and Province, Mozambique (horizontal)	Nairobi, Kenya (targeted)	Johannesburg, South Africa (vertical)
Capital costs (% of total)	0 (0%)	3 346 (5%)	6 654 (2%)
Recurrent costs	367 600	67 293	272 830
Salaries (% of total)	23 960 (7%)	17 194 (24%)	165 624 (59%)
Other (% of total)	343 640 (93%)	50 099 (71%)	107 206 (39%)
Total costs (100%)	367 600 (100%)	70 684 (100%)	279 484 (100%)
Outputs: No. of visits	38 867		27 506
Cost per visit	9.46		10.16

3.5 Prevention of unsafe drug use behaviours: needle exchange and bleach provision programmes

Introduction to the strategy

The principal primary HIV prevention measure for injecting drug users is drug abuse treatment. This intervention has significant limitations as an HIV prevention measure: methadone treatment modalities are opiate-specific and do not eliminate the injection of other drugs, such as cocaine, cyclizine and metamfetamine; the risk of relapse among programme entrants is high; methadone treatment programmes do not reduce the risk of HIV infection among those injecting drug users who are unable or unwilling to enter treatment programmes (especially recent initiates to drug injecting practices); and the creation or expansion of treatment programmes is expensive and requires several years to accomplish (Lampinen, 1991). Moreover, significant costs may be associated with the implementation of drug abuse treatment as the principal approach to the primary prevention of HIV transmission among injecting drug users.

Alternative or complementary approaches may be equally or more effective. Prevention strategies for injecting drug users unable or unwilling to enter drug abuse treatment programmes include education on the need to eliminate needle-sharing, instruction in disinfecting contaminated injection equipment, and bleach distribution and needle exchange programmes.

Community-based outreach educators can supplement treatment or reach those who have no history of enrolment in drug abuse treatment programmes or who relapse following enrolment. Furthermore, outreach offers the advantage of relative cheapness and flexibility as an interim measure in a framework with an ultimate goal of treatment and recovery (Newmeyer, 1989 and Lampinen, 1991). Each interaction with a client provides an opportunity for risk-reduction education and offers the potential of screening for other infections associated with unsafe injection and sexual practices (e.g., hepatitis or syphilis) and referral to other agencies for case management (e.g., STD treatment) in an otherwise hard-to-reach target population.

Case studies of selected interventions

Cost data were obtained for only two projects (Kathmandu, Nepal, and Ljubljana, Slovenia) illustrating the prevention of unsafe drug use behaviours in one developing and one former socialist country respectively. In order to complement this limited information, the costs of the longest-running needle exchange programme in North America (Tacoma, WA, USA) were also studied. The case studies include a mixture of needle exchange, bleach distribution and risk-reduction education (community-based outreach for Kathmandu and Tacoma; static centre-based with a 24-hour hotline for Ljubljana). Target populations are variable in size with estimations of 15 000 injecting drug users in the Kathmandu Valley (1985 data, Mr A. Peak, personal communication), 1500 in Slovenia (1992 data with no data specifically for Ljubljana, Mr V. Flaker, personal communication) and 3000 in Pierce County,

WA, USA (Hagan *et al.*, 1991). Legal, political and local community reactions have thwarted expansion of all the projects.

Methodology

The principal difficulty in comparing the costs of preventing unsafe drug use behaviours is establishing an appropriate measure of output. Self-reporting of needle-sharing is not always reliable; objective laboratory measures of sharing are awkward and expensive; and enrolment of non-exchanging drug users is difficult as there is a confounding influence of high-risk behaviours in convenience samples drawn from hepatitis or STD clinics (Hagan *et al.*, 1991). The numbers of needles and syringes exchanged may drop with a successful outreach project as clients reduce or stop needle-sharing, use effective disinfection techniques for contaminated injection equipment, or enter drug treatment programmes; hence the cost per unit of effect may rise as the project becomes more effective. Determining the number of injecting drug users reached in a given period requires either rough estimates based on survey data or the individual identification of all clients reached to eliminate double counting. However, the former is difficult and the latter removes the anonymity often required for a successful intervention project. Consequently, the measure used for these case studies is the total number of client contacts in a given period, although in practice repeated contacts may be needed to develop the trusting relationship required to encourage behaviour change. All measures are likely to underestimate programme output as they do not include the indirect effect an outreach interaction may have on contacts of the primary client.

Cost analysis

The cost analysis (Table 7) demonstrates several interesting points. Capital costs are low and in the case of the Tacoma project represent staff training and the purchase of equipment (e.g., cellular phones) and a vehicle for outreach. The Nepalese project relies on street-based outreach on foot, while the Slovenian project uses a rented flat for most interactions. Supplies (e.g., needles and syringes for exchange) and, above all, salaries constitute the bulk of recurrent costs, since one-to-one community-based outreach is labour intensive and requires committed staff trained in both risk-reduction education and crisis intervention.

The costs per client contact are quite variable (US\$ 2.25-12.59) though this may reflect differences in the duration of the projects. The Tacoma Needle Exchange has been in operation for 5 years while the Kathmandu Sterile Needle Exchange and the Stigma Project in Ljubljana had been operational for only 1 year and 5 months respectively at the time data were collected. Unit costs are likely to decrease with project maturity as new social networks are reached and the client base is expanded.

Table 7. Annual costs of preventing unsafe drug use behaviours through risk-reduction education, needle exchange and bleach provision programmes (1990 US\$)

Costs and outputs	Kathmandu Sterile Needle Exchange, Kathmandu Valley, Nepal	Project Stigma, Ljubljana, Slovenia	Tacoma Needle Exchange, Tacoma, WA, USA
Capital costs (% of total)	0 (0%)	0 (0%)	6 009 (4%)
Recurrent costs	7 333	18 889	140 517
Salaries (% of total)	3 567 (49%)	13 575 (72%)	97 813 (67%)
Other (% of total)	3 766 (51%)	5 314 (28%)	42 704 (29%)
Total costs (100%)	7 333 (100%)	18 889 (100%)	146 526 (100%)
Output: No. of client contacts	2 287	1 500	65 000
Cost per client contact	3.21	12.59	2.25

3.6 Provision of a safe blood supply

Introduction to the strategy

It has been estimated that as many as 10% of those who are HIV-positive in sub-Saharan Africa acquired their infection through contaminated blood transfusions (Watson-Williams *et al.*, 1992). While many countries have now instituted adequate screening procedures to prevent transmission by this route, often with foreign financial and technical assistance, there remains some doubt about the cost-effectiveness of this strategy for AIDS prevention.

Comparison of the cost-effectiveness of screening blood for HIV with other prevention strategies (e.g., condom promotion) presents a number of problems. Firstly, the costs of HIV screening are a relatively small component of the costs of blood collection, processing and transfusion, and are easily lost in other larger expenditures. Most other HIV prevention strategies are self-contained vertical programmes where all or most of the costs can be safely attributed to HIV prevention alone, or separate accounts are maintained. Secondly, the

provision of blood which has not been screened for HIV in anything but extreme emergencies is unlikely to be ethically or legally feasible for most blood transfusion services in countries even where HIV prevalence is low. A more realistic choice is between providing safe blood or no blood at all. The option of stopping blood transfusion altogether is unlikely to be acceptable to medical practitioners, however.

Case studies of selected interventions

Two of the three projects analysed are examples of national, centralized blood transfusion services (Uganda and Zimbabwe), the third is a hospital-based service (Monze Hospital, Zambia). Uganda and Zambia are classified as low-income countries, while Zimbabwe ranks as a low-middle income country (World Bank, 1992).

The Ugandan blood transfusion service was set up in its current form in 1987 with the assistance of the European Economic Community AIDS Task Force, and operates a centralized blood collection, testing and distribution service from Kampala, together with four regional blood centres. Prior to this, existing blood transfusion services had largely disintegrated because of the combined effects of civil war and the AIDS pandemic. As a result, capital costs since 1987 have formed a high proportion of the costs of a unit of blood (24% for the financial year 1990-91). By April 1990, the service was processing 12 000 units of blood per month, approximately 50% from voluntary donors and 50% from the relatives of patients. It intends to supply an estimated requirement of 36 000 units annually. HIV prevalence rates amongst the donor population in 1989-90 were between 15% and 20% (Beal *et al.*, 1992).

In contrast to the Ugandan blood transfusion service, the Monze Hospital blood transfusion service provides blood only for hospital inpatients. There is a centralized blood transfusion service in Zambia, but it does not cover rural areas. In the hospital service, blood donors are mainly recruited from patient relatives, so recruitment and collection costs are low. Similarly, since blood is only usually collected when required, storage and transportation costs are negligible. This has the disadvantage, however, that blood is not usually available for emergency transfusions. Unlike the Ugandan and Zimbabwean services, blood is not screened for hepatitis B and syphilis, so laboratory processing costs involve only the costs of screening for HIV. A total of 2109 transfusions were administered over the period May 1990 to May 1992 (i.e., an average of 1054 per year), with each patient receiving an average of 1.45 units of blood, yielding a total of approximately 1500 units of blood transfused per year.

The Zimbabwe Blood Transfusion Service is the longest standing and most comprehensive of the three studied. It consists of the amalgamated Harare and Bulawayo blood transfusion services, and produces an estimated 60 000 units of blood per year. It is a nongovernmental, non-profit organization, which receives most of its income from the sale of blood to hospitals.

Methodology

Costs for the Ugandan programme were obtained from Watson-Williams *et al.* (1992). Costs for the Monze Hospital service are taken from unpublished preliminary data (S. Foster and A. Buve, personal communication). As those data did not include overhead costs, a figure of US\$ 5 per unit was added to cover these for the purpose of this analysis. Costs for the Zimbabwe Blood Transfusion Service were obtained from its annual report for 1991 (Zimbabwe Blood Transfusion Service, 1991), and directly from the service manager.

In order to estimate national resource requirements for the operation of a central blood transfusion service, information is required on per capita blood needs. The large difference in blood usage between countries (as indicated by the data from the Zimbabwean and Ugandan services) suggests that level of usage depends more upon the quantity that the central blood bank is able to supply than on need. Because of the longer duration of operation in Zimbabwe, it was assumed that the Zimbabwean usage level is a more realistic one, and the Ugandan cost per capita has been scaled-up to reflect per capita blood use at the Zimbabwean rate.

Cost analysis

The costs of HIV safety (Table 8) would appear to vary considerably. The Ugandan costs (total per unit produced and HIV safety per unit produced) are highest partly because of the high capital costs incurred in setting up the programme from scratch in 1987, and partly because of the high HIV seroprevalence in the donor population. While the total cost per unit in Zimbabwe is higher than in Monze Hospital, Zambia, the cost of HIV safety is considerably lower. The costs of HIV safety in Zimbabwe are less than one third of those of the Ugandan programme, and less than half of those of the Monze Hospital service. This difference is due mainly to the substantially lower HIV seroprevalence amongst Zimbabwean donors. Economies of scale and the low cost of bulk testing in Zimbabwe are also likely to reduce the overall cost.

Models estimating the cost-effectiveness of blood safety programmes under different scenarios of HIV prevalence and screening policy are presented in Annex 3. They are based on Ugandan and Zambian data and illustrate the sensitivity of both HIV safety costs and costs per case of HIV prevented to donor HIV prevalence rates. Using the second model described (i.e., the one applied to the Monze Hospital data), it can be calculated that if donor prevalence in Zimbabwe was also 20%, the cost of HIV safety would rise to US\$ 11.50 per unit, emphasizing the contribution of the costs of replacing infected blood to total HIV safety costs in high prevalence situations.

Table 8. Annual costs of providing a safe blood supply (1990 US\$)

Costs and outputs	Uganda (national)	Monze Hospital, Zambia (hospital-based)	Zimbabwe (national)
Cost per unit of blood produced	51.6	20.9	34.5
Cost of HIV safety per unit of blood produced	13.3	9.1	3.9
Counselling	-	-	0.21
HIV screening	5.7	5.1	2.1
Confirmatory tests	-	-	0.23
Replacement of infected blood	7.6	4.0	1.3
Donor HIV-seroprevalence	20%	20%	3.8%
No. of units produced per year	11 410	1 500	60 000
No. of units produced per capita of population (for national programmes only)	7 per 10 000 population	-	61 per 10 000 population
Cost of HIV safety per capita of population (assuming blood usage at Zimbabwean rate)	0.078	-	0.024

The main factors affecting the costs of providing safe blood for transfusion in developing countries would appear to be:

1. The prevalence of HIV in blood donors, which is dependent on the prevalence in the general population, and the way in which donors are recruited. In countries where HIV prevalence is high, the cost of replacing infected blood — which has to be destroyed — constitutes the main cost of HIV safety. The cost of HIV safety may thus be more dependent on the total cost of collection and processing than on the cost of HIV antibody testing itself. The cost reductions that could be made by recruiting low-prevalence donor populations would thus appear to be considerable. Unfortunately no-one has attempted to cost the extra effort that would be needed to recruit such low-prevalence donors. Similarly, there has been no estimation of the cost or effectiveness of education programmes to induce clinicians to make less use of blood transfusions, or of any adverse clinical consequences that might result from such policies. As a result, screening for HIV remains the only blood safety strategy for which there has been sufficient evaluation to permit reasonable analysis.
2. Whether donors themselves are tested, necessitating pre- and post-test counselling and possibly contact follow-up, or whether blood is tested anonymously and disposed of if infected. None of the case studies from developing countries have costed counselling and follow-up of infected donors, but data from the USA (Eisenstaedt & Getzen, 1988) suggest that it would considerably increase the cost of HIV safety, and would not be feasible in poorer countries. The effects of different testing and counselling scenarios on the costs that might be incurred per HIV case prevented are incorporated into the model presented in Annex 3.
3. Whether blood for transfusion is collected by individual hospitals for their own use when needed, or by a centralized blood transfusion service which then distributes it to the periphery. The relative costs of these two approaches may vary depending on the geography of the country concerned, availability of skilled technical staff, and rural/urban differences in HIV seroprevalence. There may also be significant differences in the quality of blood produced.
4. The size of the blood transfusion service, as economies of scale are possible.

4. Comparison of strategies

The HIV prevention strategies reviewed are all types of intervention that are fairly widely accepted and frequently implemented. It is highly unlikely and undesirable that any single strategy would be implemented exclusively. Nevertheless, absolute resource constraints mean that regional, national and international decision-making bodies often have to choose between strategies or packages of strategies. Economic evaluation is just one of the tools that can be used in defining priorities. There are a number of problems, however, in comparing costs between countries and interventions. Financial exchange rates are often a poor reflection of the real value of inputs, especially labour, in developing countries. Relative difficulties in accessing target groups because of geography, and political and social structures also have significant influence on costs.

For sound economic evaluation, data are needed on both the costs and the effects of interventions. The current absence of effectiveness measures renders rigorous comparisons between different strategies impossible. In fact, comparisons of cost data on their own might be construed as irresponsible, in that readers might assume equal effectiveness, and therefore deduce that the cheapest strategy is best. It is currently possible to make only rough comparisons across strategies in terms of process indicators, such as cost per condom distributed and cost per person reached by educational campaigns. Examples of such comparisons are shown in Tables 9 and 10.

Table 9. Costs of programmes that distribute condoms (1990 US\$)

Intervention	Range of costs per condom distributed
Person-to-person education and condom distribution	0.10-0.70
Condom social marketing^a	0.02-0.18
^a For programmes operating for 3 years or longer.	

The degree to which process indicators reflect the relative effectiveness of different interventions, is open to question. In condom distribution, for example, social marketing programmes appear to be cheaper, but it is not known whether or not the condoms reach vulnerable groups effectively. Furthermore, person-to-person condom distribution provides the opportunity for an educational component which is included in the cost per condom distributed. However, people may be more likely to use condoms that they buy as a result of condom social marketing than those that are distributed for free. Unfortunately, no data are available on levels of condom usage for each of the strategies shown in Table 9.

Table 10. Costs of programmes that establish an educational contact (1990 US\$)

Intervention	Cost or range of costs per educational contact established
Mass media programmes^a	0.07-0.41
School education programmes^b	0.15
Person-to-person education	0.47-3.73
Preventing unsafe drug use behaviours	2.25-12.59
^a Assuming that 50% of the total population is reached by the campaign at least once a year. ^b Assuming that children have 9 educational sessions per year.	

Similarly, the intensity of an educational contact via the mass media and at a personal level is very different, and likely to affect behaviour differently. Overall impact is dependent on the relative risk of the person contacted, and this clearly differs widely between the general public, prostitutes, injecting drug users and schoolchildren. True numbers for educational contacts made by the mass media campaigns described are unknown, and the quantity and quality of information transferred is likely to be very variable.

5. Global resource implications of HIV/AIDS prevention strategies

5.1 Introduction

This section provides indicative calculations of the possible resource implications of extending the HIV/AIDS prevention activities described in the previous section to all developing countries, assuming the absence of existing expenditure. The general approach has been to derive formulae to project resource requirements for what are regarded as appropriate extensions of programmes to other countries. Resource requirements per project were obtained from cost data described in the case studies. Cost extrapolation was confined within the per capita country groupings as defined by the World Bank (World Bank, 1992) (i.e., data from programmes in low-income countries were used in extrapolating to all other low-income countries, etc.), except where it was not possible to obtain data on representative programmes for all income groupings.

The global costs suggested here should be treated with a great deal of caution. A major limitation of this exercise concerns the generalizability of the particular examples analysed. Since they were selected on the basis of data availability, rather than representativeness or cost-effectiveness, they do not necessarily represent accurately the programmes that might be

appropriate to other countries and regions. Although some strategies are likely to be broadly similar across countries (e.g., those adopted for blood safety or STD programmes), others may differ substantially (e.g., mass media campaigns, or person-to-person education strategies).

A second limitation lies in the formulae used for the hypothetical extension of these programmes. Determination of the need for these programmes is extremely difficult, since the data on the underlying problems they are trying to address (e.g., STD prevalence in the case of STD control programmes), or programme effectiveness, or both, are usually inadequate. The formulae used here should therefore not be interpreted as indicators of need, but rather as fairly crude approximations for determining the nature and size of programmes that might be replicated in other countries, should resources be available.

A third problem concerns the extrapolation of programme costs to other countries. It is obvious that factor costs, and hence programme costs, will differ substantially between countries, even where programmes are similar. Additionally, exchange rates are an imperfect means of conversion of real costs, with the result that direct extrapolation of the dollar costs of programmes could be very inaccurate. However, in the absence of detailed evidence on differences in factor costs between countries, there was no choice but to rely on the direct application of dollar costs.

Given these shortcomings, high and low estimates of global resource requirements have been made, incorporating high and low estimates for interventions where there was particular uncertainty about scaling-up factors, or where the strategy made a particularly large contribution to total costs.

5.2 Methodology

Countries falling into the low-income, low-middle income and upper-middle income categories in the *World Development Report 1992* (World Bank, 1992 — see Annex 1) were included in all calculations. The small island states falling into these categories were also included. Unless otherwise specified, all demographic and other data were derived from the *World Development Report 1992* (World Bank, 1992) and the *1990 Demographic Yearbook* (United Nations, 1992).

5.2.1 Promotion of safer sexual behaviours: mass strategies

Mass media programmes

Programme costs: The Dominican Republic case study was used for programme costs for all countries.

Extrapolation method: The number of programmes required for each country was calculated on the basis of total size of the population living in urban areas, since it was assumed that these would constitute the main targets of mass media programmes. Since single mass media

programmes can reach large audiences, it was assumed that those countries with an urban population of 500 000 to 10 million would require 1 programme, that countries with populations of 10-50 million would require 2 additional programmes (a total of 3), and that countries with urban populations greater than 50 million would require a further programme for each additional 50 million urban dwellers.

Training of school educators

Programme costs: The costs per student year covered were derived from the case study in Hungary.

Extrapolation method: It was assumed that the programme would be applied to all secondary school pupils in all countries. Costs per student year were multiplied by total number of secondary school pupils to give global annual costs. The numbers of secondary school pupils were calculated from data on secondary school attendance given in the *World Development Report 1992* (World Bank, 1992) and from demographic data supplied by the World Bank for use in the 1993 report (personal communication).

5.2.2 Promotion of safer sexual behaviours and provision of condoms: person-to-person education

Programme costs: The case study from Rio de Janeiro was used to describe the costs of a programme directed at male prostitutes for all income groupings, while the case study from Cameroon was used for the costs of programmes aimed at female prostitutes, again for all income groupings.

Extrapolation method: Global costs reflect the sum of projected costs for programmes directed at both male and female prostitutes. Projection was based on the assumed number of programmes that would be required for cities of different sizes. High and low estimates were derived on the basis of different assumptions as to the numbers of programmes that would be required for small cities (see below).

High assumptions

<i>City size</i>	<i>No. of programmes</i>	
	For males	For females
Small (0.1 to 1 million)	0.25	0.25
Medium (1 to 2 million)	1	1
Large (2 to 5 million)	2	2
Very large (>5 million)	3	3

Low assumptions

City size	No. of programmes	
	For males	For females
Small (0.1 to 1 million)	0	0.25
Medium (1 to 2 million)	1	1
Large (2 to 5 million)	2	2
Very large (>5 million)	3	3

5.2.3 Provision of condoms: social marketing

Programme costs: The cost per condom sold was calculated using the mean of costs from 3 case studies (Ghana, Indonesia, and Zaire) for low-income countries, and from 7 case studies (Bolivia, Côte d'Ivoire, Dominican Republic, Ecuador, Mexico, and Zimbabwe) for middle and upper-middle income countries.

Extrapolation method: Total costs were derived by multiplying costs per condom sold by projected numbers of condoms that should be sold across all countries. High and low estimates were derived on the basis of different assumptions as to the proportion of the sexually active male population that should be targeted for condom sales. The high estimate assumed that 30% of males aged 15-44 years should be targeted, and that 52 condoms per year should be purchased by each, while the low estimate used a figure of 15% of males in the same age category. However, certain low-incidence countries, namely Afghanistan, China, Indonesia, Jordan, Islamic Republic of Iran, Malaysia, Mongolia, Republic of Yemen and Syrian Arab Republic, were assumed to require a coverage of only 10% in the same male population at both high and low assumptions.

5.2.4 Provision of STD treatment and prevention services

Programme costs: The costs per STD episode managed were derived from the case study of the STD programme in Mozambique for the low and low-middle income groups, while the case study of an STD programme in South Africa was used to derive costs per episode for upper-middle income countries.

Extrapolation method: The projections were based on a calculation of the numbers of cases of all STDs that might be treated by STD services in all countries, and multiplying these by the cost per episode managed, derived as above. The number of incident cases of STDs was derived from available data for CSTD incidence in adults aged 15-44 years in low-income developing countries (Over & Piot, 1990), which were assumed to apply to all countries. Incidences for all CSTDs were summed, and multiplied by the urban adult populations in the same age range. The expected number of cases treated was derived by multiplying expected

incident cases by a proportion of incident cases likely to receive treatment (50% in low-income, and 80% in middle and upper-middle income countries).

5.2.5 Prevention of unsafe drug use behaviours: needle exchange and bleach provision programmes

Programme costs: The costs of the programme to be projected were derived from the case study of the programme in Tacoma, WA, USA. This was chosen in preference to the developing country data since it had been running longest, had the most accurate data, and because the costs per client contact were in a range similar to those in the developing country case studies.

Extrapolation method: Since there are no estimates of the prevalence of injecting drug use, projections were based on the assumption that one programme would be required for each city with a population of 1 million or more. African countries were excluded from the calculation, since it was assumed that the problem is either negligible or absent in most countries on that continent.

5.2.6 Provision of a safe blood supply

Programme costs: The costs of the Zimbabwe Blood Transfusion Service were used as the basis of a model constructed to predict the effect of different levels of HIV prevalence on the costs of blood safety programmes. Prevalence levels of 1%, 5% and 10% were used to represent low-, medium- and high-prevalence situations. Zimbabwe was assumed to be at medium prevalence.

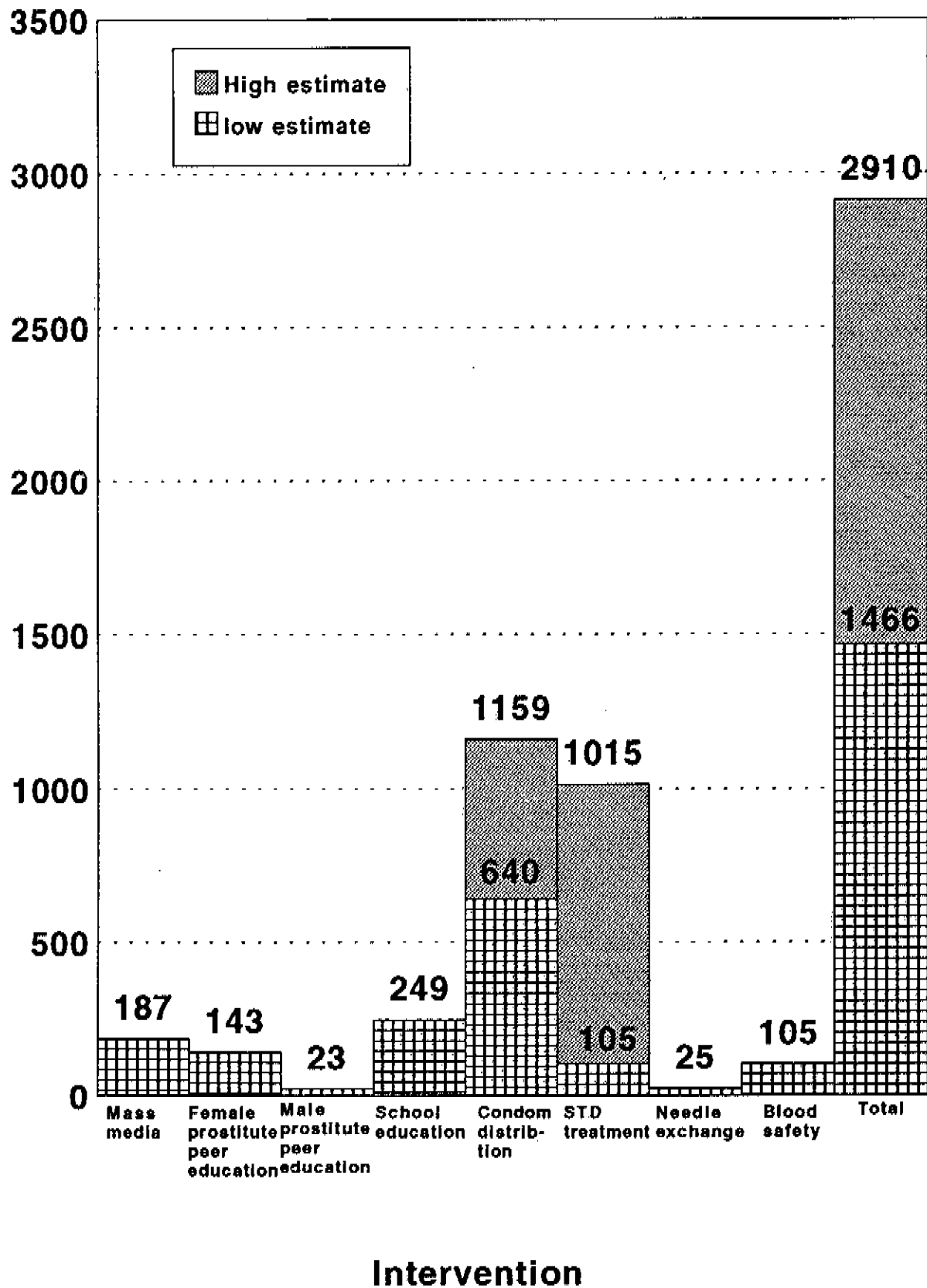
Extrapolation method: The costs derived as above were divided by the population of Zimbabwe to give per capita costs of blood safety. This was then multiplied by the populations of all countries included to give global costs.

5.3 Results

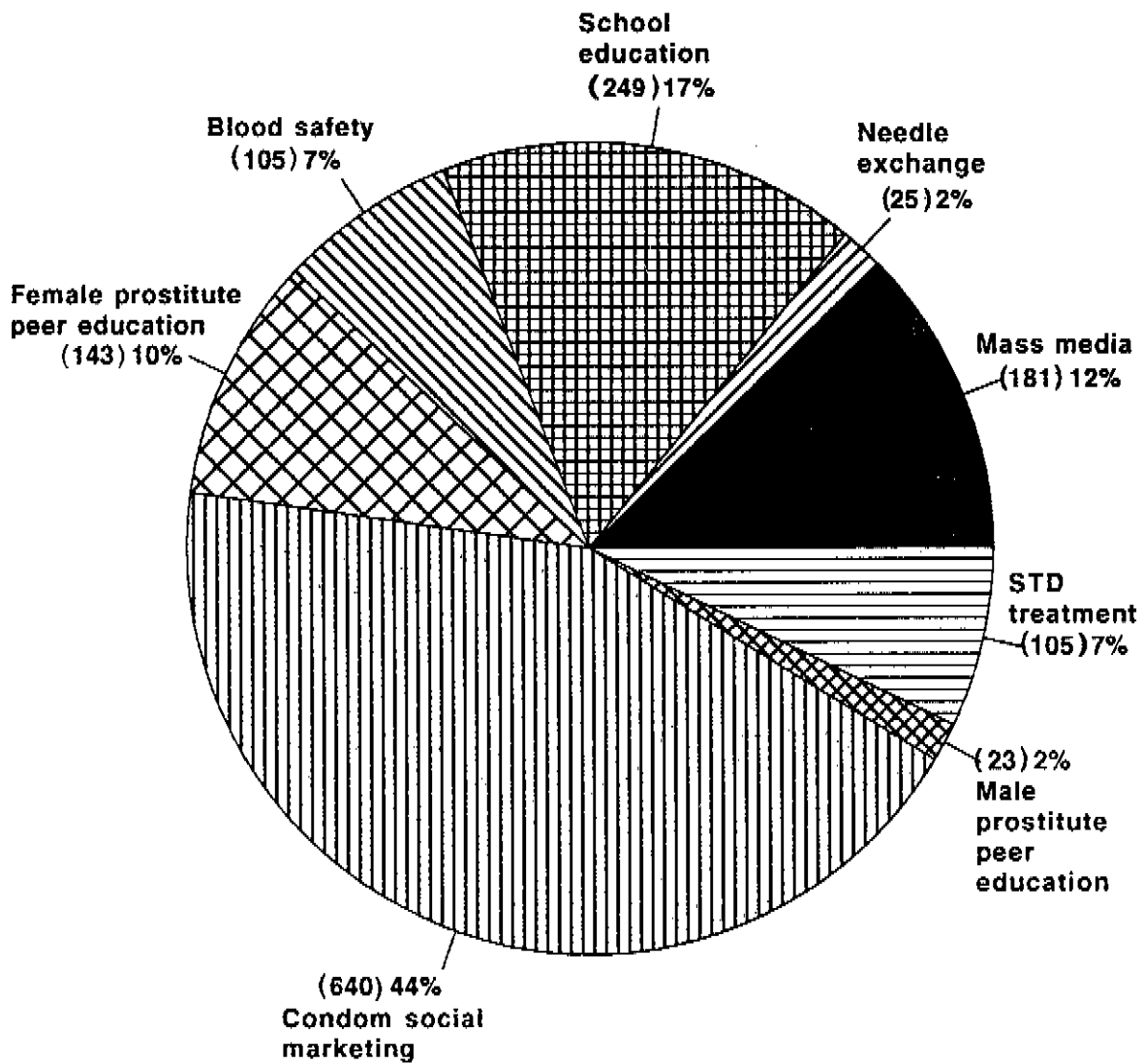
The estimated global resource requirements for HIV prevention in developing countries, broken down by type of intervention, are presented in Figure 2. Condom social marketing is the major contributor to total costs and accounts for 44% of total costs at low levels of assumed need (52 condoms per year for 15% of sexually active males) and 40% of total costs at high levels of assumed need (52 condoms per year for 30% of sexually active males). The major variation in relative contribution to total costs is shown by STD treatment and prevention services, which increase from 7.2% of total costs on the low estimates, to 35% on the high estimates. This is attributable to the substantial difference in low and high estimates of STD incidence (1% and 8.1% per year respectively). Using low cost assumptions, school education programmes and person-to-person education strategies are relatively important

Figure 2. Global resource requirements for HIV prevention in developing countries

(1990 US\$ millions)

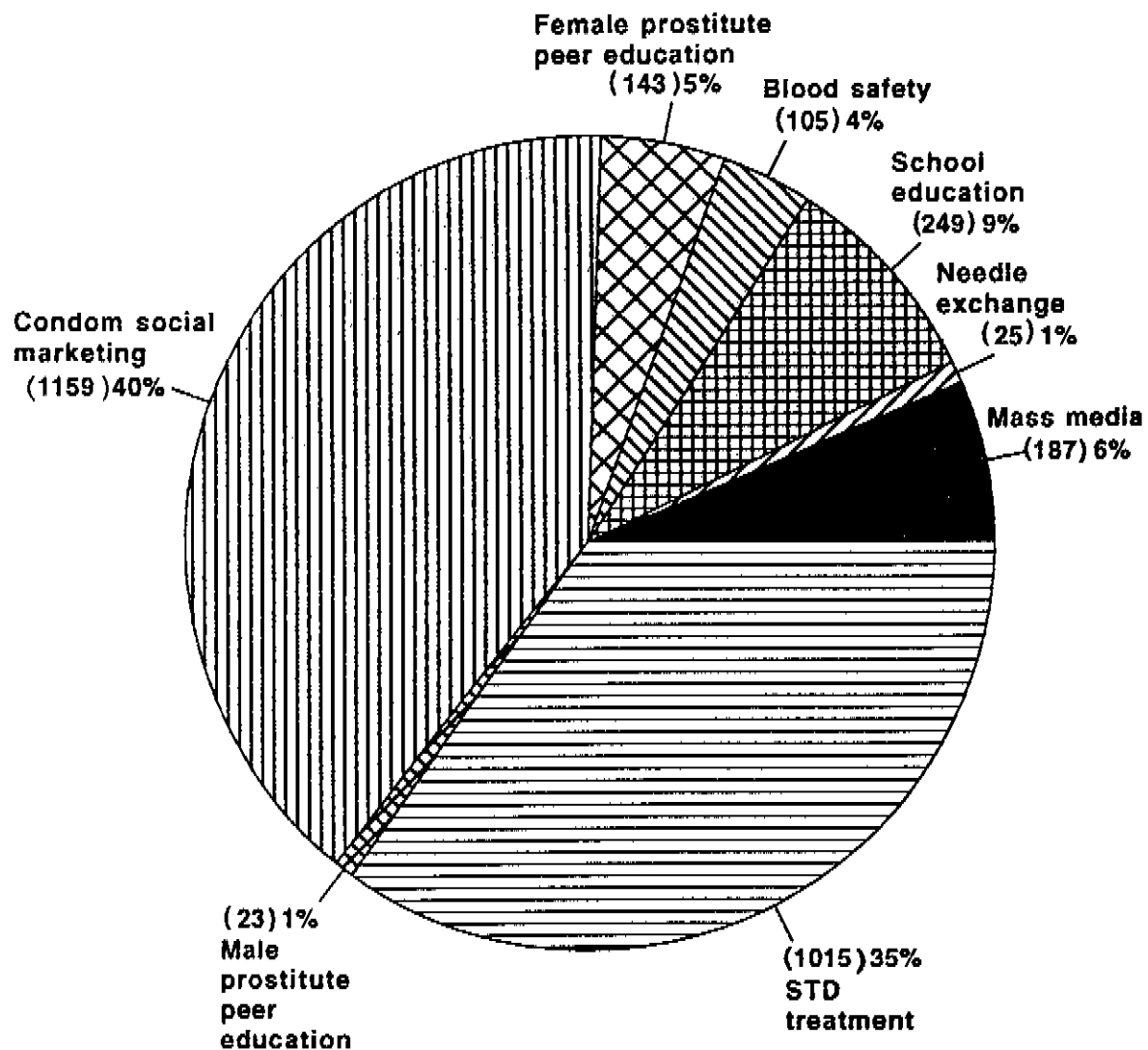


**Figure 3. Relative contributions of strategies to total costs
(low STD and condom social marketing estimates)**



Note: Assuming STD incidence, 1.0% per year; condom coverage needed, 15% (high incidence) and 10% (low incidence) of sexually active men (each needing 52 condoms per year). Figures in bracket indicate absolute cost in 1990 US\$ (millions). Total cost, US\$ 1466 million.

**Figure 4. Relative contributions of strategies to total costs
(high STD and condom social marketing estimates)**



Note: Assuming STD incidence, 8.1% per year; condom average needed, 30% (high incidence) and 10% (low incidence) of sexually active men (each needing 52 condoms per year). Figures in brackets indicate absolute cost in 1990 US\$ (millions). Total cost, US\$ 2810 million.

**Figure 5. Total cost of interventions by income group
(low STD and condom social marketing estimates)**

(1990 US\$ millions)

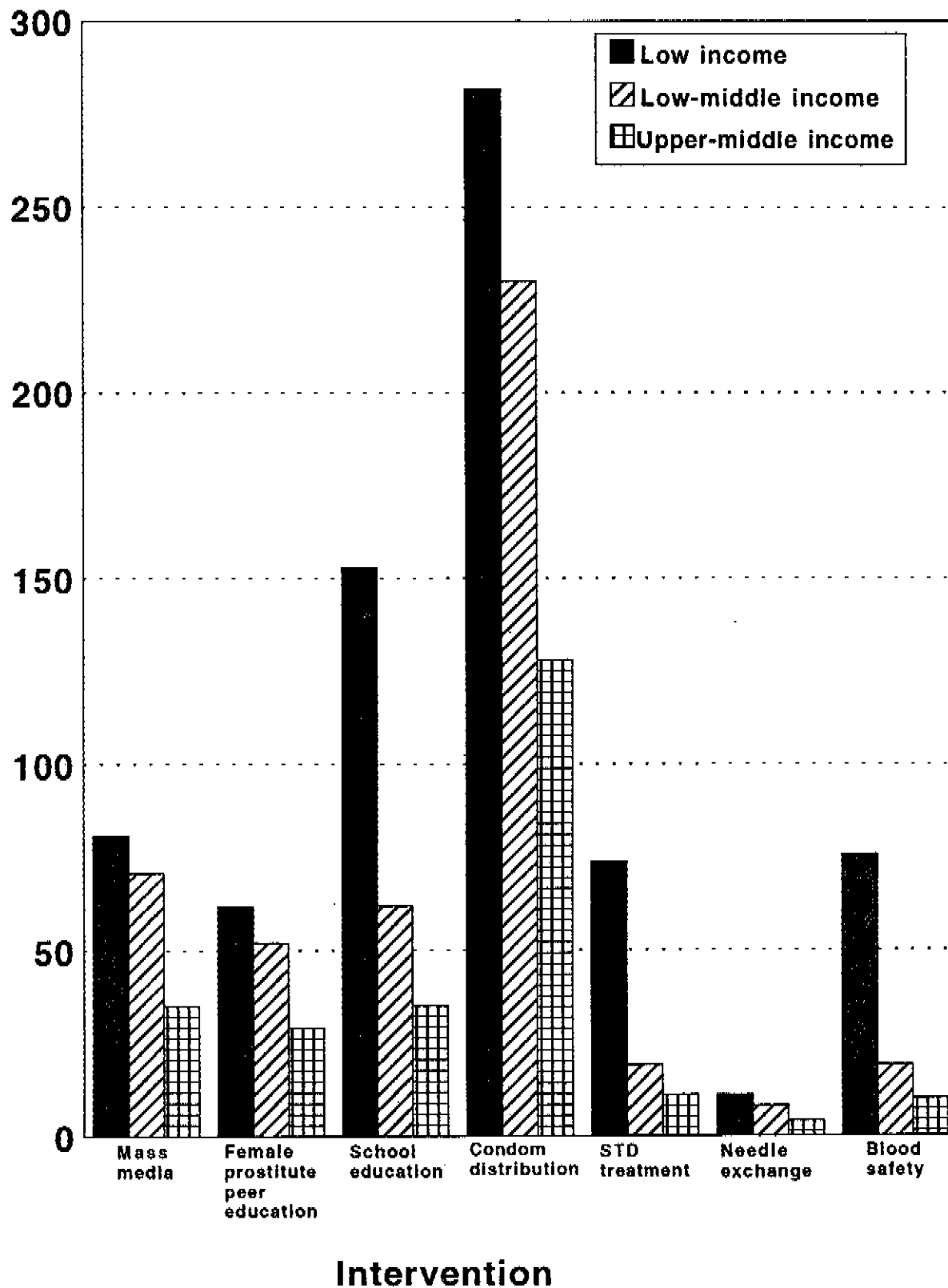
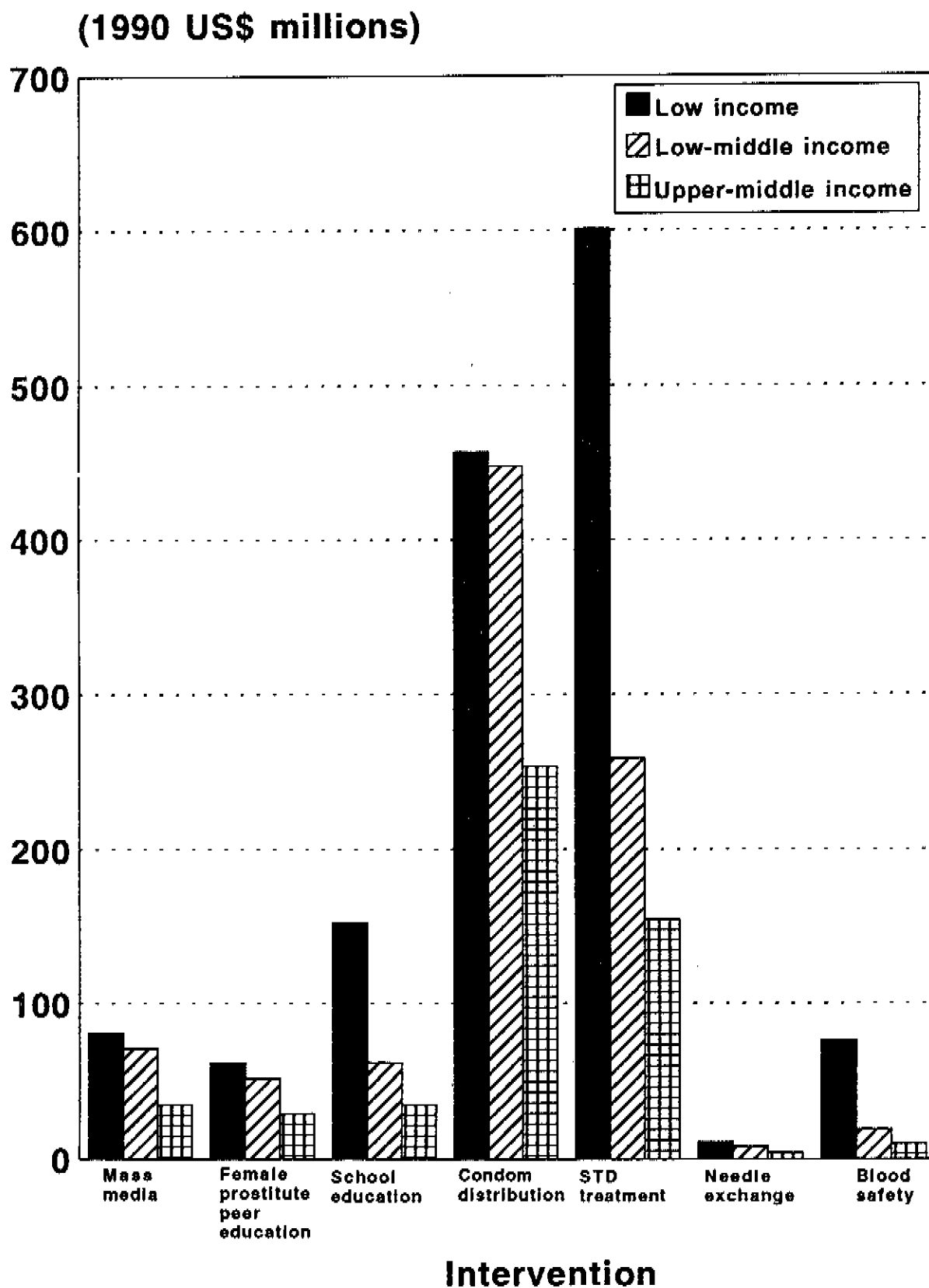


Figure 6. Total cost of interventions by income group (high STD and condom social marketing estimates)



contributors to total cost. Needle exchange/bleach provision and blood safety programmes remain relatively unimportant contributors to total costs using both low and high estimates. Global resource requirements range between US\$ 1500 million and US\$ 2900 million. Figures 3 and 4 show the relative contributions of strategies to total cost for low and high cost estimates.

The global resource requirements broken down by income grouping are shown in Figures 5 and 6. Low-income countries are shown to account for the greatest share of total costs. However, this reflects the population size of the constituent countries and not any differences in relative HIV prevalence between income groups.

If Europe and the former socialist economies are excluded from the analysis, total global cost estimates drop by 14.4% under the high cost assumptions, and 13.7% under the low cost assumptions. Detailed results of the global extrapolations are presented in Annex 4.

6. Conclusion

The evaluation of most HIV prevention projects has involved the collection of data on process indicators of effect since the determination of the ultimate outcome of interventions (i.e., the numbers of cases of HIV infection prevented) remains methodologically a difficult task. In addition, costing is seldom part of evaluation. Calculations of the relative cost-effectiveness of different interventions are thus, for the most part, not possible and as a result decisions to implement specific interventions have relied on factors other than their relative cost-effectiveness. Although it can be argued that these strategies should not be provided in isolation, owing to either additive or synergistic effects, the relative allocation of resources at the margin between strategies remains dependent on some estimation of value for money. The development of reliable estimates of cost-effectiveness of different strategies must therefore be regarded as an urgent priority at this stage.

While this exercise has focused on costs, and has been conducted in the absence of comparable measures of effect across programmes, it does make some useful initial contributions to the debate on resource allocation in this area. This cost analysis lays the groundwork for the development of a costing inventory to guide the planning, management and evaluation of HIV prevention projects at both the local, national and international level. For instance, a nongovernmental organization interested in implementing a person-to-person education programme might use information to provide some estimation of total costs and of how costs might vary according to inputs. The inclusion of a requirement for the collection of costs in all project evaluations would also allow programme planners and managers to make more rational decisions in attempts to increase programme efficiency or initiate programme expansion.

When used in conjunction with process indicators of effect, cost data also allow for estimation of the relative cost-effectiveness of different implementation models for similar strategies. In this instance, it is possible to provide a limited comparison of different

strategies which have in common either condom distribution or educational contacts. Process measures of effect may not reflect the principal aim of the intervention, however. For example, although the number of condoms distributed was used with person-to-person education, it was not an end in itself and was a supplementary or complementary component of an educational encounter. A comparison with condom social marketing, which measures success by numbers of condoms sold, may therefore be very unfair.

It is unlikely in the foreseeable future that direct measures of effect will be available for ongoing evaluation. What seems more feasible, and an invaluable bridging device in developing cost-effectiveness data on prevention strategies, is the use of simulation models to translate various process measures of effect into a common outcome measure. As more data on behavioural change and transmission dynamics accumulate, these new findings could be used to further refine the model. Although such models are based on a hierarchy of assumptions, when combined with cost data they should enable comparison of cost-effectiveness across and within broad strategies.

The global resource implications derived from cost estimates of selected interventions should be interpreted with caution. Assumptions regarding representativeness of selections, accuracy of content and interpretation of reported data, generalizability and replicability of sample interventions, and scaling factors, can individually have significant effects on the final total; taken together, the assumptions magnify errors in the estimates. Nevertheless, the global extrapolations provide a useful starting point for discussion of global requirements if HIV prevention strategies are to be broadly implemented. They also allow comparison with existing expenditure and hence estimation of current resource gaps.

This attempt to cost HIV prevention strategies is therefore a step in the direction of developing a body of literature that complements existing information on prevention strategies and should, if further developed, provide a useful resource for those involved in the planning, management and evaluation of such strategies.

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 - b. The costs of contraceptive social marketing programs implemented through the SOMARC project. *SOMARC Occasional Papers (no. 16)*. The Futures Group (Washington, DC).
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Annex 1

World Bank country classification

Income group	Subgroup	Sub-Saharan Africa		Asia		Europe and Central Asia		Middle East and North Africa		
		East and Southern Africa	West Africa	East Asia and Pacific	South Asia	Eastern Europe and Central Asia	Rest of Europe	Middle East	North Africa	Americas
Low-income	Large			China	India					
	Small	Burundi Comoros Ethiopia Kenya Lesotho Madagascar Malawi Mozambique Rwanda Somalia Sudan Tanzania Uganda Zaire Zambia	Benin Burkina Faso Central African Rep. Chad Equatorial Guinea Gambia, The Ghana Guinea Guinea-Bissau Liberia Mali Mauritania Niger Nigeria São Tomé and Príncipe Sierra Leone Togo	Cambodia Indonesia Lao PDR Solomon Islands Viet Nam	Bangladesh Bhutan Maldives Myanmar Nepal Pakistan Sri Lanka			Afghanistan	Egypt, Arab Rep.	Guyana Haiti Honduras
Middle-income	Lower	Angola Botswana Djibouti Mauritius Namibia Swaziland Zimbabwe	Cameroon Cape Verde Congo, Rep. Côte d'Ivoire Senegal	Fiji Kiribati Korea, Dem. Rep. Malaysia Mongolia Papua New Guinea Philippines Thailand Tonga Vanuatu Western Samoa		Albania Bulgaria Poland Romania	Turkey	Iran, Islamic Rep. Jordan Lebanon Syrian Arab Rep. Yemen, Rep.	Algeria Morocco Tunisia	Argentina Belize Bolivia Chile Colombia Costa Rica Cuba Dominica Dominican Rep. Ecuador El Salvador Grenada Guatemala Jamaica Nicaragua Panama Paraguay Peru St. Lucia St. Vincent
	Upper	Reunion Seychelles South Africa	Gabon	American Samoa Guam Korea, Rep. Macao New Caledonia Pacific Is., Trust Terr.		Czechoslovakia Hungary Former USSR Yugoslavia	Gibraltar Greece Isle of Man Malta Portugal	Bahrain Iraq Oman Saudi Arabia	Libya	Antigua and Barbuda Barbados Brazil French Guiana Guadeloupe Martinique Mexico Netherlands Antilles Puerto Rico St. Kitts and Nevis Suriname Trinidad and Tobago Uruguay Venezuela
No. of low- & middle-income economies		25	23	23	8	8	6	10	5	37

Reference: The World Development Report 1992

Annex 2

Costing questionnaire for HIV/AIDS prevention strategies

Description

Location (city and country):

Implementation date:

Funding agency:

Executing agency:

Objective:

Target population (size and description):

Outline of activities:

Inputs (please describe and give cost if available)

Recurrent (costs per annum)

Staff

number, type and salary of project workers:

number, type and salary of central/HQ support staff:

Transportation

number, type and use profile of vehicles:

petrol costs:

maintenance costs:

Supplies (antibiotics, condoms, syringes, etc.):

Administrative

paper, postage, etc.:

rent of premises:

Media costs (print, radio, television, video, etc.):

Capital (inputs lasting more than one year)

Staff training:

Transportation

cost of vehicles and date of purchase:

Supplies

equipment:

other:

Administrative

cost of premises and date construction completed:

Outputs

Expected outputs

Measured outputs:

Process indicators (e.g., no. of condoms distributed):

Outcome indicators (no. of cases of HIV prevented):

Annex 3

Models of cost-effectiveness of blood screening

Modelling Ugandan blood transfusion costs

Figures for the cost per unit of blood of screening for HIV, assuming different prevalences, have been calculated by Watson-Williams *et al.* (1992), and are presented in Table 1 below. A cost per HIV case prevented has also been calculated and assumes 95% seroconversion of HIV-negative patients transfused with HIV-positive blood, and an average of 1.26 units of blood administered per transfusion recipient.

Table 1. The costs of screening blood for HIV in Uganda (1990 US\$)

HIV sero-prevalence	Cost of HIV testing per unit	Cost of replacement per unit	Total cost of HIV prevention per unit	Cost per HIV case prevented
5%	5.70	1.50	7.20	212
10%	5.70	3.40	9.10	172
20%	5.70	7.60	13.30	127
30%	5.70	12.70	18.40	110

At low levels of HIV seroprevalence in donors, the testing itself constitutes the main cost of HIV safety, whereas at higher levels the costs of replacing infected blood, which has to be destroyed, constitute the major component. Similarly, in high-prevalence situations, the eventual cost per HIV case prevented is more sensitive to the total cost per unit of blood than to the cost of testing itself.

Modelling cost-effectiveness of HIV screening under different scenarios in Zambia

Using the costs from the Monze Hospital study (given in section 3.6 of this report), it is possible to build a simple model to estimate the cost-effectiveness of HIV screening of blood at different HIV seroprevalence rates and using different screening strategies. Figure A illustrates the relationship between cost per HIV case prevented and HIV seroprevalence under the following scenarios:

1. Confirmation of positive results using two repeat antibody tests and Western blot if repeat antibody tests are positive. In addition, post-test counselling of all donors found to be HIV-positive and follow-up, counselling and testing of, on average, three sexual contacts per positive donor.
2. As in 1, but without follow-up of sexual contacts.
3. Anonymous blood collection, i.e., donors are not informed of their HIV antibody status, so there is no post-test counselling or confirmatory testing.
4. As in 3, but without the US\$ 5 added for overheads.

Scenarios 1 and 2 follow the model of Eisenstaedt and Getzen (1988), but follow-up costs have been set considerably lower than those estimated for the USA. A cost of US\$ 3 per counselling episode has been used, and it is assumed that each HIV-positive donor will have three sexual contacts to trace. The HIV prevalence in contacts is assumed to be the same as in the general population.

For all scenarios, replacement costs have been calculated using the formula:

$$\text{replacement cost} = \text{HIV prevalence} \times (1 + \text{HIV prevalence}) \times \text{pre-transfusion cost}$$

Rates of seropositivity of hospital patients are derived from Monze Hospital data and extrapolated in a linear fashion across the range of community prevalence rates up to 30%. It is assumed that 95% of HIV-negative patients transfused with HIV-positive blood will seroconvert. It is also assumed that HIV-positive patients are as likely to need and receive a transfusion as HIV-negative patients.

Cost per HIV case prevented decreases steeply as donor seroprevalence increases to approximately 20%. At this point costs begin increasing again because fewer recipients of HIV-positive blood are likely to be HIV-negative themselves, and thus do not count as cases prevented. These findings are in keeping with the results of the models of Bertozzi and Harris (1991), which revealed that cost per HIV case prevented is highly sensitive to HIV prevalence.

Annex 4

Detailed results of global extrapolations

The results of the projections for mass media programmes and school educator training programmes are shown in Tables 1 and 2 respectively. The estimates for male prostitute peer education programmes are given in Tables 3 (low estimates) and 4 (high estimates). The fact that total costs more than double at the high level of assumed need is explained by the inclusion, in the high estimate calculations, of one programme for every four small cities in each country, whereas small cities are assumed not to require a programme in the low estimate.

The estimates for female prostitute peer education programmes are given in Table 5.

The estimates for total costs of condom social marketing programmes range from US\$ 640 million to US\$ 1160 million, and are shown in Tables 6 (low) and 7 (high). The doubling of costs is attributable to the doubling of coverage of the male population.

The estimates for sexually transmitted disease (STD) control programmes (Tables 8 and 9) show an almost tenfold variation between low and high estimates, which is attributable to the similar range of difference between the low and high estimates of conventional STD incidence derived from the published literature.

The total costs for needle exchange and bleach provision programmes are shown in Table 10, those for blood safety programmes in Table 11.

Table 12 shows the global totals using the high estimates of cost, while Table 13 shows the same totals after Europe and the former socialist economies have been excluded. Tables 14 and 15 show the same information as 12 and 13 but for the low estimates of cost. Tables 16 and 17 show the relative contributions of each of the strategies to total costs under high and low cost assumptions respectively.

Table 1. Projected annual resource requirements for mass media programmes (US\$ 1990)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	39 919 607	21 056 496	5 264 124	66 240 227
Americas	5 264 124	26 320 620	14 037 664	45 622 408
Asia	35 971 514	15 792 372	7 896 186	59 660 072
Europe^b	0	8 334 863	7 896 186	16 231 049
Total	81 155 245	71 504 351	35 094 160	187 753 756
^a Programme costs:				
	Low income	438 677		
	Low-middle income	438 677		
	Upper-middle income	438 677		
	<u>Urban population</u>	<u>No. of programmes</u>		
	50 000-10 million	1		
	10-50 million	2		
	For each additional 10 million	1		
^b Including the former socialist economies.				

Table 2. Projected annual resource requirements for school educators training projects (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	16 323 130	27 445 752	3 428 314	27 197 196
Americas	465 008	13 212 273	17 842 788	31 520 069
Asia	136 018 621	22 353 975	8 353 424	166 726 020
Europe^b	0	18 570 497	5 451 683	24 022 180
Total	152 806 759	61 582 497	35 076 209	249 465 465
^a Cost per student per year: 1.33				
^b Including the former socialist economies.				

Table 3. Projected annual resource requirements for male prostitute peer education programmes: zero weightings for small cities (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	670 000	435 500	234 500	1 340 000
Americas	33 500	737 000	1 038 500	1 809 000
Asia	4 690 000	871 000	368 500	5 929 500
Europe^b	0	1 105 500	234 500	1 340 000
Total	5 393 500	3 149 000	1 876 000	10 418 500

^a Programme costs: 33 500

City size	No. of programmes
Small	0
Medium	1
Large	2
Very large	3

^b Including the former socialist economies.

Table 4. Projected annual resource requirements for male prostitute peer education programmes: positive weightings for small cities (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	1 541 000	762 125	435 500	2 738 625
Americas	75 375	1 716 875	2 948 000	4 740 250
Asia	8 726 750	2 043 500	795 625	11 565 875
Europe^b	0	4 011 625	552 750	4 564 375
Total	10 343 125	8 534 125	4 731 875	23 609 125

^a Programme costs: 33 500

City size	No. of programmes
Small	0.25
Medium	1
Large	2
Very large	3

^b Including the former socialist economies.

Table 5. Projected annual resource requirements for female prostitute peer education programmes (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	9 365 000	4 631 900	2 646 800	16 644 300
Americas	458 100	10 434 500	17 916 800	28 809 400
Asia	53 037 800	12 419 600	4 835 500	70 292 900
Europe^b	0	24 381 100	3 359 400	27 740 500
Total	62 861 500	51 867 100	28 758 500	143 487 100
^a Programme costs: 203 600 <u>City size</u> <u>No. of programmes</u> Small 0.25 Medium 1 Large 2 Very large 3 ^b Including the former socialist economies.				

Table 6. Projected annual resource requirements for condom social marketing: low coverage assumptions (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	45 125 964	29 237 130	11 056 500	85 419 594
Americas	1 270 386	44 914 545	73 573 695	119 758 626
Asia	235 361 100	61 593 909	26 728 845	323 683 854
Europe^b	0	94 695 705	16 597 620	111 293 325
Total	281 757 450	230 441 289	127 956 660	640 155 399
^a Coverage:				
	Low incidence	10.0%		
	Other	15.0%		
	Condoms per person per year	52		
Cost per condom sold:				
	Low income	0.06		
	Low-middle income	0.15		
	Upper middle income	0.15		
^b Including the former socialist economies.				

Table 7. Projected annual resource requirements for condom social marketing: high coverage assumptions (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	90 251 928	58 474 260	22 113 000	170 839 188
Americas	2 540 772	89 829 090	147 147 390	239 517 252
Asia	364 379 808	110 635 629	51 790 830	526 806 267
Europe^b	0	189 391 410	33 195 240	222 586 650
Total	457 172 508	448 330 389	254 246 460	1 159 749 357
^a Coverage:				
	Low incidence	10.0%		
	Other	30.0%		
	Condoms per person per year	52		
Cost per condom sold:				
	Low income	0.06		
	Low-middle income	0.15		
	Upper middle income	0.15		
^b Including the former socialist economies.				

Table 8. Projected annual resource requirements for STD control programmes: high incidence assumptions (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	70 337 306	33 107 184	13 801 693	117 246 183
Americas	2 232 251	51 618 939	89 160 769	143 011 959
Asia	528 784 182	85 584 243	30 993 742	645 362 167
Europe^b	0	88 807 426	21 454 551	110 261 977
Total	601 353 739	259 117 792	155 410 755	1 015 882 286
^a Costs per episode treated:				
	Low income	9.46	Assumed coverage:	
	Low-middle income	9.46	Low income	50%
	High income	10.20	Low-middle income	80%
			High income	80%
STD incidence:				
		<u>High</u>	<u>Low</u>	
	Low income	0.08134	0.01002	
	Low-middle income	0.08134	0.01002	
	High income	0.08134	0.01002	
^b Including the former socialist economies.				

Table 9. Projected annual resource requirements for STD control programmes: low incidence assumptions (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	8 664 615	2 548 976	985 523	12 199 114
Americas	274 983	3 974 227	6 366 611	10 615 821
Asia	65 139 138	6 589 271	2 213 138	73 941 547
Europe^b	0	6 837 429	1 531 983	8 369 412
Total	74 078 736	19 949 903	11 097 255	105 125 894
^a Costs per episode treated:				
	Low income	9.46	Assumed coverage:	
	Low-middle income	9.46	Low income	50%
	High income	10.20	Low-middle income	80%
			High income	80%
STD incidence:				
		<u>High</u>	<u>Low</u>	
	Low income	0.08134	0.01002	
	Low-middle income	0.08134	0.01002	
	High income	0.08134	0.01002	
^b Including the former socialist economies.				

Table 10. Projected annual resource requirements for needle exchange and bleach programmes (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	0	0	0	0
Americas	146 526	2 197 890	3 077 046	5 421 462
Asia	11 722 080	2 344 416	879 156	14 945 652
Europe^b	0	3 956 202	879 156	4 835 358
Total	11 868 606	8 498 508	4 835 358	25 202 472

^a Assuming one programme per city of 1 million plus.
Programme costs: 146 526.

^b Including the former socialist economies.

Table 11. Projected resource requirements for blood safety programmes (1990 US\$)^a

	Low income	Low-middle income	Upper-middle income	Total
Africa	23 334 808	3 111 188	983 232	27 429 228
Americas	593 420	3 707 628	6 358 236	10 659 284
Asia	52 074 852	5 781 000	1 603 098	59 458 950
Europe^b	0	6 507 000	1 277 100	7 784 100
Total	76 003 080	19 106 816	10 221 666	105 331 562

^a Prevalence level Per capita cost
 Low 0.018
 Medium 0.024
 High 0.070

^b Including the former socialist economies.

Table 12. Projected resource requirements - global totals: high cost assumptions (1990 US\$)

	Low income	Low middle income	Upper middle income	Total
Africa	251 073 379	128 588 905	48 672 663	428 334 947
Americas	11 775 576	199 037 815	298 488 693	509 302 084
Asia	1 190 715 607	256 954 735	107 147 561	1 554 817 903
Europe ^a	0	343 960 123	74 066 066	418 026 189
Total	1 453 564 562	928 541 578	528 374 983	2 910 481 123
^a Including the former socialist economies.				

Table 13. Projected resource requirements - global totals excluding Europe and the former socialist economies: high cost assumptions (1990 US\$)^a

	Low income	Low middle income	Upper middle income	Total
Africa	251 073 379	128 588 905	48 672 663	428 334 947
Americas	11 775 576	199 037 815	298 488 693	509 302 084
Asia	1 190 715 607	256 954 735	107 147 561	1 554 817 903
Total	1 453 564 562	584 581 455	454 308 917	2 492 454 934
Percentage reduction^a	0.00%	37.04%	14.02%	14.36%
^a Compared with totals including Europe and the former socialist economies (see Table 12).				

Table 14. Projected resource requirements - global totals: low cost assumptions (1990 US\$)

	Low income	Low middle income	Upper middle income	Total
Africa	143 403 724	68 466 942	24 598 993	236 469 659
Americas	8 506 047	105 498 683	140 211 340	254 216 070
Asia	594 015 105	127 745 543	52 877 847	774 638 495
Europe ^a	0	164 388 296	37 227 628	201 615 924
Total	745 924 876	466 099 464	254 915 808	1 466 940 148
^a Including the former socialist economies.				

Table 15. Projected resource requirements - global totals excluding Europe and the former socialist economies: low cost assumptions (1990 US\$)

	Low income	Low middle income	Upper middle income	Total
Africa	143 403 724	68 466 942	24 598 993	236 469 659
Americas	8 506 047	105 498 683	140 211 340	254 216 070
Asia	594 015 105	127 745 543	52 877 847	774 638 495
Total	745 924 876	301 711 168	217 688 180	1 265 324 224
Percentage reduction^a	0.00%	35.27%	14.60%	13.74%
^a Compared with totals including Europe and the former socialist economies (see Table 14).				

**Table 16. Relative contributions (%) of different strategies to global costs:
high cost assumptions**

Income	Mass media	Prostitute peer education	School education	Blood safety	STD control	Condom social marketing	Needle exchange/ bleach programmes
Low	5.6	5.0	10.5	5.2	41.1	31.5	0.8
Low-middle	7.7	6.5	6.6	2.1	27.9	48.3	0.9
Upper-middle	6.6	6.3	6.6	1.9	29.4	48.1	0.9
Total	6.5	5.7	8.6	3.6	34.9	39.8	0.9

**Table 17. Relative contributions (%) of different strategies to global costs:
low cost assumptions**

Income	Mass media	Prostitute peer education	School education	Blood safety	STD control	Condom social marketing	Needle exchange/ bleach programmes
Low	10.9	9.2	20.5	10.2	9.9	37.8	1.6
Low-middle	15.3	11.8	13.2	4.1	4.3	49.4	1.8
Upper-middle	13.8	12.0	13.8	4.0	4.4	50.2	1.9
Total	12.8	10.5	17.0	7.2	7.2	43.6	1.7

* * *