# Preventing HIV in Developing Countries

Biomedical and Behavioral Approaches

### Edited by

Laura Gibney, Ph.D. Ralph J. DiClemente, Ph.D. and Sten H. Vermund, Ph.D., M.D.

### Preventing HIV in Developing Countries Biomedical and Behavioral Approaches

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### Foreword

Globally, action to prevent HIV spread is inadequate. Over 16,000 new infections occur every day. Yet we are not helpless in the face of disaster, as shown by the rich prevention experience analyzed in this valuable new compendium. "Best practice" exists—a set of tried and tested ways of slowing the spread of HIV, of persuading and enabling people to protect themselves and others from the virus.

Individually, features of best practice can be found almost everywhere. The tragedy, on a world scale, is that prevention is spotty, not comprehensive; the measures are not being applied on anywhere near the scale needed, or with the right focus or synergy. The national response may concentrate solely on sex workers, for example. Elsewhere, efforts may go into school education for the young, but ignore the risks and vulnerability of men who have sex with men. Action may be patchy geographically. AIDS prevention may not benefit from adequate commitment from all parts and sectors of society, compromising the sustainability of the response. In some countries matters are still worse—there is still hardly any action at all against AIDS and scarcely any effort to make HIV visible. It is no wonder that the epidemic is still emerging and in some places is altogether out of control.

Fortunately, many communities and some countries have managed to stabilize their HIV rates or achieve an actual downturn. It is by looking closely at their responses, and at the corresponding achievements, that we can pinpoint correlates of success.

Overall, UNAIDS analyses indicate that there are at least ten important features that are common to effective AIDS programs. To begin with, effective programs are those that receive political commitment stretching up from the community to the highest political level. This kind of commitment makes it possible to bring in all the sectors and players required, along with the necessary resources for interventions. It is also crucial for making the hard political choices often involved in AIDS prevention—applying best practices that may be considered controversial in some countries but that do work, from AIDS education and needle exchange for drug users to sexual health education in schools.

To be effective, programs need to make HIV visible and sex discussable. They have to make people aware that HIV exists and why it exists, and make them comfortable enough to talk about the epidemic and cope with it. This also involves dissipating fear and prejudice against people who are already living with HIV or AIDS.

Programs must be guided by a national strategy that is firmly grounded in national realities. It is essential to find out where people in the country are already infected, where they are exposed to HIV risk, and why. Epidemiological surveillance combined with a mapping of behavioral risk and socioeconomic vulnerability is the best basis for drawing up a national strategy.

Effective programs are characterized by focused but steadily expanding coverage. To begin with, action should be focused on locally important vulnerable populations and geographic areas where HIV is an emergency. Of course, planners must take into account the need to reach many different populations of this kind, including those who will become exposed tomorrow; after all, individual risk and vulnerability change over the life cycle as children mature into adolescence and adulthood. Action must be focused in the second sense—focused on achieving success through multiple, complementary interventions of known effectiveness. Gradually, without losing focus, the program must expand steadily until complete country coverage is achieved.

As a complement to focused action, programs must create general awareness and knowledge in the rest of the population, especially among young people, who represent more than half of all those infected after infancy. The idea is to impart knowledge, counter stigma, create social consensus on safer behavior, and boost AIDS prevention and care skills. This can be accomplished cost-effectively through mass-media campaigns and through peer/outreach education and lifeskills programs in schools and workplaces. Too much emphasis on vulnerable groups can inadvertently stigmatize them and generate an "I'm not at risk" attitude in the rest of the population.

Both prevention and care interventions are crucial for effectiveness. Health care services have benefits that extend even beyond the human rights and needs of people who are ill with HIV-related conditions. They can help convince others that the threat of HIV is real and make prevention messages more credible. Some interventions, such as voluntary counseling and testing, and programs to reduce the risk of mother-to-child transmission of HIV through zidovudine administration and the provision of safer infant-feeding options for HIV-positive women, straddle the conventional divide between prevention and care.

Because the epidemic is highly dynamic, programs have to be flexible enough to keep pace with the changes. This calls for careful monitoring of HIV and of the evolving risks and vulnerabilities of the population, as well as the evaluation of interventions.

For effective AIDS action, the challenges of the epidemic need to be routinely factored into the individual and joint agendas of government and civil society so that a true multisectoral and multilevel partnership results. Government sectors, community-based organizations (CBOs), businesses, and communities must

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understand that they each stand to suffer if HIV prevention is not effective. Not only do they have a stake in participating—they have valuable contributions to make. Ministries of labor can mandate workplace prevention programs in the private sector. The defense establishment can use its budget to implement programs for the military, and the education sector for schoolchildren. Private firms can contribute in cash and in kind. CBOs, who are trusted by and have access to vulnerable populations, are best positioned to mount prevention programs in collaboration with their communities.

A corollary of the preceding feature is mainstreaming and resource mobilization. It is a fallacy to assume that because designated AIDS funding is limited, so must AIDS action be. Instead of blindly accepting resource limitations, effective programs seek out opportunities to involve partners with similar goals. They capitalize on synergies between AIDS and other programs. If the action needed for risk-reduction and vulnerability-reduction becomes part of the mainstream of national life, direct costs will be lower, programs will become more sustainable, and there will be many spinoffs beyond AIDS prevention. For example, incorporating HIV/AIDS into a school curriculum involves only marginal costs but the resulting decision-making skills among the nation's youth will bring about extra benefits such as declines in sexually transmitted disease, unwanted pregnancy, and drug use. Similarly, boosting the educational and economic opportunities of young girls in rural areas, to discourage their entry into commercial sex, raises their status—a matter of social justice—and promotes rural development.

Lastly, effective programs are those that take a long-term approach and build up societal resistance to HIV. There will be no quick fix to this epidemic. Societies and especially the younger generation must be encouraged to adopt safer attitudes and behaviors that will gradually fortify them and ultimately offer serious resistance to the spread of HIV.

To sum up, just as we apply combination therapy for maximum effectiveness, so must we apply combination prevention. In AIDS, we face a disaster that is far larger than the wars or natural catastrophes that fill the headlines. Fortunately, it is a disaster that we know how to mitigate, as this welcome new volume on AIDS prevention shows. While we work on the longer-term goal of developing a vaccine, we can act to avert human suffering and societal devastation by applying existing best practices intelligently, durably, and above all in combination.

### PETER PIOT

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### Preface

The impetus for this volume was a seemingly simple query by an Asian Minister of Health, In 1995, two of the editors of this volume met with the minister who articulated his desire to take action to prevent an HIV epidemic in his country, but stated that he did not know what course of action to take. He asked for information on what had been tried and proven successful elsewhere.

This mirrored situations encountered in other contexts where academicians, governmental officials, and activists in nongovernmental organizations have been eager to learn more about prevention programs tried elsewhere, particularly those programs that have "worked." A common response to such requests for information has been to refer them to various academic articles reporting intervention results. This, however, has not always been the most helpful response. The people most engaged in HIV prevention often have limited time to read, and in some cases are without easy access to academic publications or have insufficient academic experience to enable them to easily read scholarly articles. Further, most journal articles focus on interventions that have been implemented in industrialized nations. And while much can be learned from those interventions, the relevance and applicability of their insights may be mitigated by the different economic and cultural contexts of developing nations.

We felt, therefore, that it would be helpful to have a single volume that reviewed notable interventions implemented to date in developing countries, with the aim of describing the strategies they have employed, implementation problems and opportunities encountered, and successes or failures in terms of results achieved. Such a volume would be particularly helpful if written in a style accessible to diverse audiences and if an effort were expended to make it available to those working on HIV prevention in developing countries.

The rationale for focusing specifically on interventions in developing countries is that program planners in the developing world, with fewer resources than those in more industrialized nations, might derive important insights from interventions tried in other countries with certain socioeconomic similarities. An additional reason for focusing on interventions in developing countries is that while there is an extensive body of published literature on interventions in North American and European nations, the literature is far more sparse for nations in Africa, Asia, and Latin America. The dearth of published literature is due in part to the fact that since the beginning of the global HIV/AIDS pandemic, it has been activists in nongovernmental and governmental organizations who have spearheaded HIV prevention efforts in developing nations, generally without the involvement of researchers. As a result, the motivation and skills to publish findings have not been strong, making it difficult for insights from these interventions to be shared with organizations and individuals engaged in HIV prevention in other developing countries.

Taking the view that much can be learned from these interventions, *Preventing HIV in Developing Countries* brings together researchers and activists in the field of HIV prevention to review the content and findings of behavioral and biomedical interventions implemented primarily in developing countries. The contributors have consulted both published and unpublished literature. While an emphasis has been placed on interventions that have been evaluated, the dearth of such interventions for certain target groups has led to the inclusion of nonevaluated interventions as well. The latter cannot provide evidence of results, but can offer important insights into approaches being utilized and into implementation issues in HIV prevention programs in developing countries.

It should be noted that we use the terms *developing countries* and *developing world* reluctantly. The terms are vague, lump highly divergent countries into one category, and imply that while certain countries are "developing," other countries have already reached the penultimate stage of being "developed." We reject the latter implication, recognizing that development is a continuous process and there exists a broad and multifaceted developmental continuum. Yet while we acknowledge the limitations of this terminology, we have retained the use of these terms for the simple reason that they have broad public recognition and can be used easily and effectively in literature searches.

Our hope is that this volume will provide a forum for insights from important and creative HIV prevention efforts undertaken in the developing world to be shared with others whose work is inspired by the common desire to prevent the transmission of a virus that is responsible for untold suffering and devastating losses to individuals, families, communities, and nations. To a greater or lesser degree, in a direct or indirect fashion, and with more or less acute awareness, we have all experienced loss as a result of this pandemic. Preventing its further spread remains a matter of urgency for us all; learning from each other's successes and failures may contribute to our achieving this end.

> LAURA GIBNEY RALPH J. DiCLEMENTE STEN H. VERMUND

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### HIV Prevention in Developing Countries

# Tenets of Behavioral and Biomedical Approaches

### LAURA GIBNEY

### INTRODUCTION

The reach of the HIV pandemic has been felt in all nations, whether they are presently experiencing a high prevalence or low prevalence of HIV. In lowprevalence nations, the priority has become the prevention of an epidemic, particularly in those nations considered to be at high risk because of sexual and injection drug use behaviors in the population and, in some cases, biomedical risks such as inadequate screening for HIV in the blood supply system. In high-prevalence nations, the priority is curtailing the spread of the disease and coping with the morbidity, mortality, and lost productivity it currently entails.

By the end of 1997, 30.6 million people were estimated to be living with HIV/AIDS, and the total number infected since the late 1970s was 42.3 million.<sup>1</sup> The developing world is bearing by far the greatest brunt of the pandemic, with Africa and Asia being the most afflicted. Of the 21.8 million cases in 1996, as reported by Tarantola, Lamptey, and Moodie (Chapter 2, this volume), 63% were located in sub-Saharan Africa and 23% in South and Southeast Asia. While many parallels exist between the HIV epidemics in different regions and countries, in their overview of the global pandemic of HIV/AIDS, Tarantola and co-workers describe the increasingly diverse and fragmented nature of the HIV/AIDS epidemics. The effect has been the development of a multifaceted pandemic that continues to have a devastating impact on the developing world, given the lack

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of effective, accessible treatment (see the preface for a comment on the term *developing world*).

Recently, important biomedical advances have been made in treating HIVinfected individuals with antiviral therapies, most notably highly active combinations including protease inhibitors. Regrettably, the expense of these medications renders them inaccessible to the vast majority of people infected with HIV in the developing world. The euphoria felt by many at the 1996 International AIDS Conference, where reports on these drugs took center stage, was therefore not shared by many of their colleagues from developing countries. These therapies were not going to reduce the suffering currently caused by HIV in their countries, at least in the foreseeable future. For the developing world, biomedical and behavioral interventions to prevent transmission of the virus remain the only hope for reducing the mortality, morbidity, and social trauma associated with HIV infection.

### **BIOMEDICAL APPROACHES**

Biomedical means of prevention currently being used include condoms, a barrier method that stops live virus from touching the genital mucosa, and the treatment of other sexually transmitted diseases (STDs) that are cofactors for HIV transmission.<sup>2,3</sup> While often logistically complex and expensive to provide (particularly STD treatment), they are in the reach of many developing countries. Other biomedical means of prevention among adults that are currently top research priorities include the development of microbicides, physical barriers, and vaccines to prevent acquisition of the virus, and testing the utilization of preemptive treatment therapies in preventing HIV infection following exposure to the virus. Lawson, Katzenstein, and Vermund (Chapter 3, this volume) examine these existing and emerging biomedical interventions, and discuss the technological challenges they pose, the methods used to evaluate their efficacy, and issues to be considered in their application in real-life scenarios.

Other interventions with a biomedical component include HIV testing interventions implemented to prevent infection of the blood supply or to influence risk behaviors. The great increase in the protection of the world's blood supply from HIV has been an important achievement in combating the spread of the disease, though much work remains to be done in this domain in parts of the developing world. Constantine, Abesamis, and Dayrit (Chapter 4, this volume) discuss the role of systematic HIV testing and other strategies to increase the safety of the blood supply. They discuss systems to overcome barriers to effective testing in developing countries and highlight measures that can be implemented in less than optimal testing situations.

#### **HIV Prevention in Developing Countries**

HIV testing is a biomedical technology that can be used as a tool of prevention not only by enhancing the safety of blood systems, but also by promoting behavioral change that will reduce transmission of the virus from infected to noninfected persons. Allen, Karita, N'Gandu, and Tichacek (Chapter 5, this volume) discuss the success of voluntary HIV testing and counseling interventions in preventing HIV transmission in couples where one partner is infected and the other is not (HIV-discordant). They explore the problems and opportunities encountered in implementing and evaluating such interventions. The two features that distinguish this type of prevention intervention from most others that promote behavioral change are (1) the central role of a biomedical technology, HIV-testing, and (2) use of the couple as the intervention target as opposed to individuals or communities. The mechanism for reducing transmission, through decreases in high-risk behaviors, remains nonetheless the same.

This combination of a biomedical and behavioral approach is also exemplified in many of the interventions that seek to reduce HIV transmission via improved control over other sexually transmitted diseases. These approaches often utilize a treatment approach to attain effective and timely treatment of STDs, as well as a behavioral change component to prevent future transmission of STD/ HIV. The importance of these STD control strategies with respect to HIV prevention lies in the role that other STDs play as cofactors for HIV transmission (i.e., other STDs enhancing transmission of the HIV virus). Dallabetta, Serwadda, and Mugrditchian (Chapter 6, this volume) review notable STD prevention and management programs implemented in developing countries, from large-scale, wellfunded, randomized clinical trials to small-scale, innovative interventions to control STD in highly resource-constrained settings.

#### **BEHAVIORAL APPROACHES**

Behavioral interventions seek to reduce high-risk practices such as sharing needles for injection drug use and having unprotected sexual relations in nonmonogamous relationships. This behavioral change, especially consistent behavioral change, is difficult both to achieve and to sustain, particularly after years of habit and the establishment of individuals' preferred sexual or drug use practices. Implementing HIV prevention interventions before adolescents become sexually active may have a greater long-term impact on sexual behavior and on HIV prevalence than interventions implemented after the onset of sexual activity.

Beyond individual reticence to change, inhibiting contextual factors can impede the adoption of lower-risk behaviors. These factors include limited power in the case of commercial sex workers serving clients who may be resistant to using condoms and the lack of easy and affordable access to sterilized/disposable needles for injection drug users who live in political contexts where the promotion of needle exchanges or distribution of bleach for sterilization is not permitted.

An additional important impediment to adopting safer behaviors is likely to be individuals' daily encounters with the more pressing problems and challenges that poverty brings; these diminish the attention they are willing or able to pay to something that is not an actual condition but represents a potential threat to their future health. At the national level, governments of poor countries with current low levels of HIV prevalence experience a similar situation, often necessarily electing to invest resources in coping with a myriad of other health and socioeconomic problems presently afflicting their populations, rather than investing substantially in preventing a potential future epidemic.

Despite these obstacles to the adoption of lower-risk behaviors, an array of HIV prevention approaches have been implemented in both developing and industrialized countries. O'Reilly, Msiska, Mouli, and Islam (Chapter 7, this volume) discuss individual, community, and structural–environmental level approaches to HIV prevention that have been utilized in developing countries. They argue that while previously the developing world benefitted from the guidance of industrialized nations in the design of individual interventions the latter are now learning from the creative societal and structural approaches being developed and implemented in developing countries.

Nevertheless, it remains true that more is known about approaches taken for HIV prevention and their results in industrialized nations than in developing countries (though for specific countries like Thailand much is known), perhaps because research has had a more prominent role in interventions in industrialized nations and more of an effort has been made to publish results. Believing that lessons derived from the successes and failures of approaches tried in industrialized nations may have implications for interventions in developing countries, Raj, Mukherjee, and Leviton (Chapter 8, this volume) review prevention approaches that are used with target groups in industrialized nations and discuss insights from those programs of potential relevance to nations in the developing world. They also point to differences in material resources and cultural contexts that may affect their applicability in developing country settings.

Most of the notable interventions reviewed by Raj and colleagues in industrialized countries have been based on a theory of behavior change. This may be because, as Wingood and DiClemente maintain (Chapter 9, this volume), theorybased interventions have proven to be particularly effective in preventing HIV infection, or it may be because the better-known studies that get published in reputable journals are those by academics who typically use explicit theoretical frameworks in their work. One impediment to practitioners using a theory-based approach can be their uncertainty over how to use theory to guide the formulation of an intervention. Another can be their lack of awareness that theories are flexible, and both can and should be tailored to specific contexts (indeed, constructs from

#### **HIV Prevention in Developing Countries**

several theories may be used in combination when developing an appropriate prevention approach for a specific target group). Using an actual case study, Wingood and DiClemente demonstrate how theory can be translated into practice in an HIV prevention intervention. They utilize components of social cognitive theory, one of the psychosocial theories most commonly used in HIV prevention, and the theory of gender and power, a recent social–structural theory that, while little used in developing countries, seems particularly appropriate to the needs of women in parts of the developing world.

### BEHAVIORAL INTERVENTIONS IN DEVELOPING COUNTRIES: TARGETED AND POPULATION-BASED STRATEGIES

Additionally, an important consideration in developing HIV prevention interventions is ascertaining who the intervention is striving to reach. Typically, HIV prevention interventions have either targeted specific groups or used a mass-based approach. Comprehensive national programs have sometimes incorporated both approaches. Targeted approaches have focused efforts on groups who engage in behaviors placing them at high risk for contracting and transmitting the disease and who often have a high incidence or prevalence of HIV. Population-based approaches target a broader range of individuals at varying levels of risk. There has been considerable debate on the appropriateness of targeted approaches versus population-based approaches.<sup>4</sup> The debate has centered on which approaches would be most successful in reducing the future prevalence of HIV, as well as on human rights considerations such as whether targeted approaches ignore the needs of individuals who are not in defined high-risk groups and stigmatize individuals in groups labeled as "high risk."

Most researchers would likely agree that both approaches are necessary and their appropriateness will vary in terms of the prevalence and pattern of diffusion of HIV in specific countries. Focusing on target groups perceived to be at highest risk for infection and to be core groups of transmitters to other segments of the population is the most cost-effective approach early in an epidemic in lowprevalence nations. However, as the epidemic spreads through the rest of the population, the salience of the concept of core transmitters is reduced and population-based strategies with a wider reach are also required.

Both targeted and population-based interventions implemented in developing countries are reviewed in this volume (Chapters 10–15). In reviewing targeted interventions, Ngugi, Branigan, and Jackson (Chapter 10) focus on commercial sex workers; Aggleton and Rivers (Chapter 11) on adolescents; Haour-Knipe, Leshabari, and Lwihula (Chapter 12) on workers away from their families; Abdul-Quader, Des Jarlais, Chatterjee, Hirky, and Friedman (Chapter 13) on injecting drug users; and Aggleton, Khan, and Parker (Chapter 14) on men who have sex

with men. Lamptey and Goodridge (Chapter 15) then examine population-based approaches operating at the community or national level.

The interventions covered are primarily behavioral, though some include a biomedical component, such as the treatment of other STDs as a means of reducing transmission of HIV, and almost all include the use of a simple technology that functions as a physical barrier to infection (i.e., condoms) or potentially inactivates the virus (e.g., bleach to disinfect needles). Given the dearth of published information on HIV available on interventions in developing countries, the contributors have explored studies in both the published and unpublished literature, believing that the latter, too, has much to contribute to our understanding of HIV prevention approaches.

### FUTURE DIRECTIONS

The tremendous resources, both material and human, being invested in HIV prevention efforts and the toll the pandemic is taking globally make it critical at this juncture to learn more about the content and outcomes of prevention strategies tried with or without success in the developing world. The experiences of those interventions may inform the development of future interventions, contributing to the implementation of more effective interventions and limiting the opportunity costs of investing resources in interventions with little or no impact on the spread of the disease (i.e., the cost of investing in ineffective interventions, and thereby missing out on the opportunity to use those funds in more effective prevention efforts).

Future interventions may also benefit from more collaborations in HIV intervention research between activists in nongovernmental or governmental organizations and researchers. These collaborations should be developed such that they meet the needs of all collaborating parties and, most importantly, of the populations being served. The challenges of such collaborations and of developing, implementing, and evaluating future intervention research projects that can play a more useful role in informing program planning and policymaking are highlighted by Gibney in the concluding chapter.

Current high rates of HIV infection and the spread of the pandemic into countries with previously low or nonexistent levels of the disease illustrate that despite the promise of biomedical advances in treating HIV-infected persons, and regardless of any naturally occurring "saturation effect" in countries that may be experiencing stable or decreasing rates of infection, HIV prevention remains an important target for public health promotion globally. The challenge is to do it most effectively, at the least cost, and with the greatest long-term viability in terms of the continuation and expansion of benefits realized.

### REFERENCES

- UNAIDS. Report on the global HIV/AIDS epidemic. December 1997; 1–25;http://www.unaids.org/ highband/document/epidemic/report97. html.
- Clottey C, Dallabetta G. Sexually transmitted diseases and human immunodeficiency virus, epidemiologic synergy? *Infect Dis Clin NA* 1993; 1:153–710.
- Grosskurth H, Mosha F, Todd J, et al. Impact of improved treatment of sexually transmitted disease on HIV infection in rural Tanzania: Randomized control trial. Lancet 1997; 349:1868–1873.
- Sumartojo D, Carey JW, Doll LS, Gayle, H. Targeted and general population interventions for HIV prevention: Towards a comprehensive approach. *AIDS* 1997; 11:1201–1209.

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### The Global HIV/AIDS Pandemic Trends and Patterns

## DANIEL TARANTOLA, PETER R. LAMPTEY, and ROB MOODIE

### GLOBAL OVERVIEW

In mid-July 1996, an estimated 21.8 million adults and children worldwide were living with HIV/AIDS, of whom 20.4 million (94%) were in the developing world (Fig. 1). Of the adults, 12.2 million (58%) were male and 8.8 million (42%) were female.<sup>1</sup> Close to 19 million adults and children (86% of the world total) were living with HIV/AIDS in sub-Saharan Africa and in South and Southeast Asia (Table 1).<sup>2</sup>

Worldwide during 1995, 2.7 million HIV infections occurred in adults (averaging more than 7000 new infections each day). Of these, about 1 million (an average of nearly 3000 new infections per day) occurred in Southeast Asia and 1.4 million infections (close to 4000 new infections per day) were in sub-Saharan Africa. The industrialized world accounted for about 55,000 new HIV infections in 1995 (nearly 150 new infections per day; about 2% of the global total).

In 1995, approximately 500,000 children were born with HIV infection (about 1400 per day); of these children, 67% were in sub-Saharan Africa, 30% in South and Southeast Asia, and over 2% in Latin America and the Caribbean.<sup>3</sup>

From the beginning of the pandemic until mid-1996, an estimated 27.9 million adults and children worldwide have been infected with HIV (Fig. 2). The largest numbers of individuals ever infected with HIV were in sub-Saharan Africa,

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Figure 1. Estimated mid-1996 distribution of adults and children living with HIV/AIDS. (Global total: 21.8 million.) Because of rounding, the figures may not tally. (Source: UNAIDS/WHO, 1996.)

	Epidemic started	Adults and children living with HIV/AIDS	Prevalence	Percent women	Main mode(s) of transmission for those living with HIV/AIDS
Sub-Saharan Africa	Late 1970s– early 1980s	14 million	5.6%	>50%	Heterosexual
South and Southeast Asia	Late 1980s	4.8 million	0.6%	>30%	Heterosexual
Latin America	Late 1970s– early 1980s	1.3 million	0.6%	20%	Male-male IDU, heteroa
N. America, W. Europe, Australia/New Zealand	Late 1970s– early 1980s	1.2 million	0.3%	20%	Male-male IDU, heteroa
Caribbean	Late 1970s– early 1980s	270,000	1.7%	>40%	Heterosexual
Central/E. Europe, Central Asia	Early 1990s	30,000	0.015%	20%	IDU <sup>a</sup> Male–Male
East Asia, Pacific	Late 1980s	35,000	0.001%	20%	IDU, hetero <sup>a</sup> Male-male
North Africa, Middle East	Late 1980s	200,000	0.1%	20%	IDU <sup>a</sup> Heterosexual

Table1. HIV/AIDS: Regional Statistics and Features, Mid-1996

<sup>a</sup>IDU: transmission through injecting drug use; hetero: heterosexual transmission. (Source: UNAIDS/WHO, 1996.)



**Figure 2.** Estimated distribution, as of mid-1996. of adults and children infected with HIV since the late 1970s. (Global total: 27.9 million.) Because of rounding, the figures may not tally. (Source: UNAIDS/WHO, 1996.)

totaling 19 million (68% of the global total), and in South and Southeast Asia, totaling 5 million (18% of the global total).

Since the beginning of the pandemic, the majority of HIV infections—26 million (93%)—have occurred in the developing world. The number of HIV-infected people in South and Southeast Asia is now more than twice the total number of infected people in the entire industrialized world.

The global cumulative number of HIV infections among adults has more than doubled since the beginning of the decade, from about 10 million in 1990, to almost 25.5 million by mid-1996. Of these, 14.9 million were men (58%) and 10.5 million were women (42%).

More than 6 million adults have developed AIDS from the beginning of the pandemic to July 1996; of these, 4.5 million (close to 75%) were in sub-Saharan Africa; 0.4 million were in Latin America and the Caribbean (7%); and 0.75 million were in North America, Europe, and North and South Pacific combined (12%). In South and Southeast Asia, where the pandemic gained intensity more recently, it is estimated that 330,000 adults have developed AIDS. Of the 1.6 million children with AIDS, the majority—1.4 million (85%)—were in sub-Saharan Africa.

By July 1996, 5.8 million people (4.5 million adults and 1.3 million children), or 75% of all people with AIDS, are estimated to have died from AIDS worldwide.

In summary, the HIV/AIDS pandemic is as powerful as ever. This chapter will demonstrate that the pandemic is now composed of distinct epidemics, each with their own features. As the HIV/AIDS epidemics within each region and
country have become increasingly diverse and fragmented, they have created a multifaceted and devastating pandemic that is disproportionately impacting the developing world.

# AFRICA AND THE MIDDLE EAST

#### Sub-Saharan Africa

By mid-1996, 13.3 million adults were living with HIV in sub-Saharan Africa, representing about 60% of the world's total. The highest national HIV prevalence rates in adults (over 10%) are found in sub-Saharan Africa (Fig. 3). Three broadly defined geographic areas, which include countries with severe epidemics and others with epidemics at their intermediate stages, account for almost 90% of all current HIV infections in adults and adolescents in Africa.<sup>4</sup> Within these three areas, 18 countries have at least 100,000 people living with HIV. In central/eastern Africa, Cameroon, Ethiopia, Kenya, Rwanda, Sudan, Uganda, and Zaire have 37% of all current HIV infections on the continent. A similar proportion is contributed by a second group of countries in southern Africa: Botswana, Malawi, Mozambique, South Africa, Tanzania, Zambia, and Zimbabwe. Finally, West African countries, including Burkina Faso, Côte d'Ivoire, Ghana, and Nigeria, contribute about 15% of the total number of adults and adolescents living with HIV in Africa.

In Kenya, Malawi, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe (countries where HIV began to spread widely in the early 1980s), more than 10% of women attending antenatal clinics surveyed in urban areas have been found to be HIV infected, with rates that may exceed 40% in some surveillance sites. In these populations, transmission of HIV occurs mainly through heterosexual contact,



Figure 3. Percentage of total number of adults and children living with HIV, by subcontinent, mid-1996. (Global total: 21.8 million.) (Source: UNAIDS/WHO, 1996.)

beginning in early teen years and peaking before age 25. Following similar patterns of spread and intensity, HIV epidemics have recently expanded in Botswana, Lesotho, Swaziland, and South Africa. The observed high rates of HIV in women of reproductive age have resulted in high numbers of HIV-infected newborns. Of the 3 million infants born in the world with HIV infection since the beginning of the pandemic, over 90% have been born in Africa. Many of these children typically develop AIDS and die within a few years.

In other sub-Saharan countries (mostly in West and central Africa), HIV epidemics are currently passing through their intermediate stage where between 1 and 10% of women attending urban antenatal clinics are HIV infected. A few of these countries still have relatively low levels of HIV prevalence, but these have begun to rise in several countries such as Nigeria and Cameroon, which earlier had been relatively spared.

HIV-2 is primarily found in West Africa, but HIV-2 infections also have been confirmed in African countries elsewhere, including Angola and Mozambique.5 The highest prevalence of HIV-2 infection is found in Guinea Bissau and in southern Senegal. In contrast to the increasing spread of HIV-1, the prevalence of HIV-2 has remained rather stable in West Africa. This is thought to be the result of the higher transmissibility of HIV-1 compared to HIV-2. The likelihood of transmission of HIV-1 through heterosexual intercourse is estimated to be about three times higher per exposure than for HIV-2. In addition, perinatal transmission rates of HIV-2 are reported to be significantly lower (less than 4% for HIV-2 compared with 25 to 35% for HIV-1).<sup>6</sup>

Under circumstances that are not yet fully understood, epidemics may suddenly explode, with rates of infection increasing several-fold within only a few years, as has been observed recently in Botswana and South Africa.<sup>7</sup> HIV prevalence in pregnant women in South Africa has grown dramatically. From 1993 to 1995, HIV prevalence increased from 4.3 to 11%, and from 9.6 to 18%, in the provinces of Free State and Kwazulu/Natal, respectively.<sup>8</sup> Population mobility, patterns of sexual behavior, societal factors, and prevalence of sexually transmitted diseases (STDs) are likely to influence the potential for such explosions.

The presence of STDs suggests a marked risk of concurrent HIV infection for at least two reasons: (1) the modes of transmission of HIV and other STDs are similar; and (2) the role of STDs in facilitating the transmission of HIV has been clearly established.<sup>9,10</sup> In addition, STDs are affecting young adults, especially women, with other direct serious consequences. For women, these consequences include pelvic inflammatory disease, cervical cancer, infertility, and postpartum endometritis. For infants, maternal STDs may lead to low birth weight, neonatal syphilis, and gonococcal ophthalmia. The lack of circumcision in males has been shown to add to the risk of acquiring STDs. The World Health Organization (WHO) estimates that in 1995, 65 million new cases of curable STDs occurred in Africa.

# **Populations Affected**

The transmission of HIV in adults and young people in sub-Saharan Africa occurs essentially through heterosexual contact. Rates of HIV infection among sex workers are now as high as 80% in Nairobi and 55% in Abidjan. HIV antibody testing of blood donations remains incomplete in most countries in sub-Saharan Africa. Transfusions continue to play a role in the spread of HIV to those most likely to receive them: women of reproductive age and children.<sup>11</sup> (G.M. Gershy-Damet, personal communication, 1997).

Within each country, HIV epidemics have progressed with different velocities in various population groups. Early in the evolution of the epidemics, urban populations and rural communities located along highways were more rapidly affected. Among them, young adults with multiple sexual partners acquired high rates of infection. Urban and trading centers generally continue to have substantially higher prevalence of HIV infection than rural areas.<sup>12-14</sup> But this pattern is by no means universal: Population displacement, armed conflicts, proximity to highways, or intense migration and population mobility for economic reasons strongly influences the spread of HIV.<sup>15–17</sup>

As a result of a combination of these factors, some rural communities of Kenya, Tanzania, and Uganda have higher infection rates than those observed in neighboring urban populations. In some countries where HIV epidemics were initially found in urban areas, rates of HIV infection in some rural populations have increased steadily over recent years. In other countries, perhaps with poorer transport networks, this has not been the case.

As epidemics mature, they tend to spread into younger populations, especially young women. The rates of newly acquired HIV infections are highest in the 15- to 24-year-old group among both females and males in most of sub-Saharan Africa. The peak of new infections occurs several years earlier in young women than in young men. In Masaka, Uganda, for example, HIV prevalence in 13- to 19year-old females is over 20 times higher than in males of the same age.<sup>13</sup> Most of the infections in 15- to 19-year-olds are in females, although as young men get older, their prevalence increases as well.

Apart from possible biological factors, there are at least two reasons for the disproportionate risk of young women acquiring HIV infection early, including: (1) an earlier age of sexual initiation of girls (in Masaka, the median age at first sexual intercourse is 15 for females and 17 for males); and (2) the patterns of sexual mixing, wherein young women tend to have sex with older men in the context of marriage or in exchange for money or advantages, whereas young men tend to have sex with young women. But for many women, the major risk factor for HIV is the behavior of their spouse or regular sexual partner. Monogamous women are at a disadvantage in protecting themselves against HIV when spouses are engaged in high-risk behavior.

# Populations on the Move

Major political, social, and demographic changes have occurred in sub-Saharan Africa over the last few decades and have resulted in important population displacement, migration, and rapid urbanization. The improvement of transportation and communication networks, the increased exchange of goods, and the creation of large-scale development programs have stimulated the movement of young men and women within and across national boundaries. Open conflicts, environmental degradation, natural disasters, and low-intensity wars have also led millions of Africans to leave their places of residence and, in some situations, to turn to survival strategies that have increased the practice of unsafe sex.<sup>18</sup> Consequences of political and civil unrest and subsequent population displacement have led to an increased spread in HIV transmission; populations displaced from Ethiopia, Mozambique, Rwanda, and Liberia are examples. In addition, the movement of troops from West Africa to Angola and Mozambique has been linked to the spread of HIV-2 to these countries.

Migration within countries and across borders and urbanization (e.g., from rural areas to urban centers or industrial sites) have led to high concentrations of predominantly male communities and increased participation in commercial sex. Professional groups characterized by mobility, for instance, truck drivers, traders, and military personnel, have also been associated with a higher risk of HIV infection.<sup>16,19</sup> Population mobility facilitates the spread of STDs, including HIV.

Economic development programs (the construction of highways, dams, and the creation of new industries or agriculture projects, for example) need to include an initial appraisal of the potential impact of these projects on the vulnerability of the labor force and the local population to HIV infection and other STDs. Measures to minimize this impact, such as reducing gender imbalance in the labor force, enabling workers to be joined by their families, allowing for regular contacts with distant spouses, and incorporating HIV/STD programs in development schemes, need to be built into the project design. But even with such initiatives, the sheer dynamic of transition toward increasingly urbanized society brings with it changing behavior mores that create new needs and present new opportunities for HIV transmission.

All these social and demographic changes need to be addressed by welldesigned national and intercountry HIV/STD prevention programs based on epidemiological, behavioral, and social determinants research.

# Burden of Disease

Although the constantly growing HIV/AIDS care needs have already overwhelmed the coping capacity of urban health systems in hard-hit countries, demands for care will increasingly fall on poorly equipped and underfunded rural

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services, households, and individuals. Already, 80% of hospital beds in an infectious disease hospital in Abidjan, Côte d'Ivoire, and 50% in a hospital in Kampala, Uganda, are occupied by people with HIV.<sup>20</sup>

Demographic surveys in several countries have already noted significant increases in infant and child mortality. Projections for Zambia and Zimbabwe indicate that AIDS may increase child mortality rates nearly threefold by the year 2010. Other estimates point to a more modest impact. In either case, because of high levels of fertility, populations will generally continue to grow, but critical deficits will affect the economically active ages.<sup>21,22</sup> Studies in areas where 8% of the adult population is HIV-infected have measured a doubling of mortality because of HIV and a decrease of 5 years in life expectancy. Some HIV epidemics will have severe effects on the population age structure, indenting the population pyramid in young adults, the main contributors to social and economic development, but this may not occur in all areas.

# Successes in Prevention

To date in sub-Saharan Africa, there has been a lack of rigorous evaluation of intervention strategies, especially for the behavioral interventions designed to reduce the sexual transmission of HIV. Without good behavioral, social, and contextual data, it is difficult to attribute observed changes in HIV prevalence rates to specific program efforts.

STD control programs, through early diagnosis, treatment, and the promotion of safer sexual behavior, have been shown to reduce significantly the rates of STD infections. Successful programs have been documented in Zambia and Zimbabwe.

Further, in a research study in Mwanza, Tanzania, early treatment of STDs in a rural population has been associated with a 42% decline in the rate of newly acquired HIV infections.<sup>23</sup> Emerging data also show substantial decline in some STDs. This important finding supports the revitalization of STD control programs benefiting from new approaches that have already been initiated in several sub-Saharan countries.

#### North Africa and the Middle East

This region represents 22 countries ranging from Morocco in the West to Pakistan in the East. Information on HIV infection in the region is sparse. Information available from mandatory screening of blood donors indicates low HIV prevalence in these populations, except for Djibouti.<sup>24,25</sup>

The highest levels of HIV infection have been documented in Djibouti (9.3% in pregnant women and from 2 to 20% in STD patients). HIV prevalence among STD patients rose from 1.3 to 5% in Sudan; this pattern has also been seen in Yemen, Pakistan, and the Syrian Arab Republic. Seventy-five percent of re-

ported AIDS cases are from five countries in the region: Morocco, Sudan, Saudi Arabia, Tunisia, and Djibouti.

The future size and trends of the epidemic in this region are difficult to predict. There is anecdotal evidence of high STD rates and risk behaviors. The region is characterized by late introduction of the virus, the status of women in society, the highly stigmatizing nature of STDs, and the difficulty of conducting effective sexual health programs.

# ASIA

This region includes Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, India, Indonesia, Hong Kong, Japan, DPR Korea, Republic of Korea, Laos, Malaysia, the Maldives, Mongolia, Myanmar, Nepal, the Philippines, Singapore, Sri Lanka, Thailand, and Vietnam. It is home to over 60% of the world's adult population; hence, what happens in the region will have a major impact on the global pandemic. The general epidemiology and estimated prevalence rates for these countries are extremely diverse, ranging from countries with low HIV prevalence rates (Mongolia, DPR Korea) to countries with high HIV prevalence (Cambodia, Myanmar, and Thailand).<sup>26</sup>

There has been substantial variation in the timing and rate of growth of the epidemic. In some countries, for example, Cambodia, India, Myanmar, and Thailand, HIV spread has been extensive, with extremely rapid growth in some geographic areas. In others, such as DPR Korea, the Republic of Korea, the Philippines, and Singapore, only limited spread has occurred to date and the rate of growth appears to be substantially lower.

The epidemic in Thailand is among the best documented in the world, with an estimated three quarters of a million people living with HIV. Nationally, HIV prevalence among injecting drug users (IDUs) rose quickly in 1988 to approximately 35%. HIV among brothel-based sex workers rose from 3.5% in 1989 to 33% by late 1994.<sup>27-29</sup> Infection levels in males at STD clinics grew from 0% to 8.6% over the same time period. HIV prevalence in women attending antenatal clinics has continued to rise steadily from 0% in 1989 to 2.3% in 1995. This trend is expected to continue for several years. However, there is evidence that prevention efforts are taking effect; HIV infection levels in military conscripts have dropped from 3.6% in 1993 to 2.5% in 1995.

In India, HIV seroprevalence is high in the South and West. For example, in Bombay, prevalence went from 2 to 3% in STD clinic attendees before 1990 to 36% in 1994. HIV prevalence in sex workers rose from 1% to 51% between 1987 and 1993, and antenatal clinic women tested positive at a 2.5% rate in 1994.<sup>30</sup> There is great geographic variation in India. HIV seroprevalence in the central, eastern, and northern parts of the country are generally lower than in the rest of

India. Studies among sex workers in Calcutta have shown a clear and consistently low prevalence of 1.2%. In Vellore, rates among women attending antenatal clinics have been steady at 0.1%, although STD clinic rates there grew from 4% to 15% between 1993 and 1995. Injecting drug use has been a problem in Manipur State, with prevalence reaching 60% by 1992.<sup>31</sup> This geographic variability and the size of the country have made estimation of the actual number of infections difficult. At the end of 1994, the WHO estimated 1.75 million HIV infections, while evidence suggested an estimate of between 2 to 5 million in mid-1996.

In Cambodia, the HIV/AIDS data indicate that the current extensive HIV epidemic started during the late 1980s or early 1990s, and is predominantly occurring among heterosexuals with multiple sex partners.<sup>32,33</sup> To date, there has been no evidence of a significant problem of injecting drugs in Cambodia. Levels among blood donors in Phnom Penh have risen from less than 0.1% in 1991 to about 10% in 1995. Dramatic rises have also been seen in sex workers, the police, the military, STD patients, and pregnant women.

The epidemic in Myanmar is one of the most serious in the region.<sup>34</sup> There were an estimated half a million people with HIV in this country in 1996. The epidemic began with the infection of large numbers of IDUs in the late 1980s, with a prevalence of 60 to 70% since 1992. HIV prevalence in sex workers has steadily risen from 4.3% in March 1992 to 18% in March 1995. There is substantial geographic variability, with infection rates in pregnant women varying according to region between 0 and 12% in 1993. High levels of other STDs, low levels of condom use, the clandestine nature of commercial sex, and limited blood screening because of cost constraints are contributing factors to HIV spread.

In Malaysia, HIV infection levels in IDUs have grown rapidly, from 0.1% in 1988 to 20% in 1994. In female sex workers, rates have gone from 0.3% in 1989 to 10% in 1994. A behavioral study conducted nationwide in 1992 found that almost one in three sexually active men and one in ten married men reported having had casual sexual contact in the previous month. Reported condom use in commercial sex is low. This implies a serious potential for heterosexual transmission. The rapid growth in prevalence in IDUs and sex workers in Malaysia in the last 3 years is similar to that seen in Thailand and Myanmar in the early stages of their epidemics.

In Vietnam, there is some evidence that the HIV epidemic is now growing rapidly.<sup>35</sup> High levels have been demonstrated in IDUs in treatment (32% in 1992–1995), and recent evidence suggests increasing levels among young men and women in the south of Vietnam. Rates in some sex worker populations rose from 9 to 38% between 1992 and 1994–1995.

In China, the majority (about 70%) of reported HIV infections and AIDS cases have been among IDUs in Yunnan Province.<sup>36,37</sup> HIV infections are believed to be increasing among heterosexual populations in southern China, especially in the areas surrounding Hong Kong. The Chinese Academy of Preventive Medicine

has estimated that there were 10,000 HIV-infected persons in China as of the end of 1993, which grew to 100,000 by the end of 1995.

Limited HIV/AIDS data for Laos suggest that HIV transmission may be starting in the heterosexual population. Additional data are needed to confirm the beginning of an HIV epidemic in Laos.

In Bangladesh, Indonesia, Nepal, and Sri Lanka, the situation must be assessed based on relatively limited testing, low rates of HIV detection in most populations, and low numbers of reported HIV and AIDS cases. These limits to our knowledge of the situation make any estimates of total prevalence or incidence quite speculative. However, most of these countries appear to have high levels of other STDs in their populations, implying a strong potential for extensive HIV spread.

In Hong Kong, Japan, Mongolia, and the Republic of Korea, extensive spread has not been documented. In DPR Korea and Bhutan, no AIDS cases or HIV infections have been reported, but only limited surveillance has been carried out.

In the Philippines, there appears to be slower growth of the epidemic, with much lower levels (less than 1%) of HIV among sex workers. Early AIDS cases indicated some spread of HIV among men having sex with men. The lower average number of sexual contacts per sex worker and the lower proportion of sexually active adults engaged in sex work compared with Thailand and Cambodia may help to explain the more gradual evolution of the situation.

In Singapore, infection levels in sex workers have been growing quite slowly. The rapid growth of HIV infection in sex workers seen elsewhere in the region has not been seen there, perhaps as a result of prevention efforts.

# **Populations Affected**

The epidemics in Asia are predominantly spreading through heterosexual contact. On a regional basis, infected men probably outnumber infected women by a factor of 3 to 1 or more, since commercial sex clients, IDUs, and men having sex with men have contributed most strongly to the rapid initial growth of the epidemic.<sup>38</sup> This male–femaleratio is expected to drop as the epidemic spreads into the general population through spread of HIV from clients of sex workers to their regular partners and spouses.

The HIV/AIDS epidemics in Asian countries have been strongly influenced by gender inequality and the frequent practice of men visiting sex workers. Since sexual expression for females is typically more limited than for males, the small population of sex workers has large numbers of clients, and consequently high rates of other STDs, which enhance HIV transmission.<sup>39</sup> As a result, most epidemics begin with rapid prevalence increases in sex workers and their clients (as seen through STD clinic data). This growth can be quite explosive. Annual incidences in sex workers as high as 25% and in clients of almost 10% have been seen in India. High growth rates have also been well documented in numerous studies in Thailand and Cambodia.

Sharing of needles among IDUs, given its high efficacy for HIV transmission, has also played a significant role early in the epidemics, particularly in the Golden Triangle region (from Thailand and Vietnam, across southern China, to Myanmar and to Manipur) and in northern Malaysia.<sup>40</sup> As the epidemics mature, transmission from sex worker clients and IDUs to their wives or girlfriends becomes the most important route of female infection, although this transmission occurs at slower rates than that between sex worker and client.

The ultimate size to which the epidemic might grow in most countries is difficult to assess, because few studies of risk behaviors in the general population are available. Only Hong Kong, Malaysia, the Philippines, Singapore, and Thailand have done national studies of risk behavior. These studies indicate that the total number of men engaging in sexual risk behavior is lower in Hong Kong, the Philippines, and Singapore than in Thailand and Malaysia, which may help to explain the slower growth of the epidemic in those countries.

Pediatric HIV infection is also difficult to assess in this region, given the wide geographic variability in antenatal clinic infection levels. In Thailand, it is now estimated that 6400 children are infected annually, which is approximately 10% of total new HIV infections.

# Impact of Prevention Programs

The extent of behavior change in the region has varied greatly from country to country. Thailand has best documented the most extensive behavioral change, the result of an active multisectoral national effort. In national surveys conducted in 1990 and 1993, the percentage of men visiting sex workers in the last year declined from 22% to 10%. Condom use in commercial sex transactions is now the norm. As a consequence of these behavioral changes, STD rates have fallen precipitously, with reported cases dropping to one fourth of their initial levels. Male HIV incidence is estimated to have fallen by an even greater factor. While there has been substantial success of HIV prevention in the commercial sex trade, the situation in noncommercial casual sex remains of concern. Current levels of condom use between boyfriend and girlfriend or with other longer-term partners remains low, on the order of 10%. Another area in which there has been only limited success has been slowing HIV transmission within HIV-discordant married couples in which the husband is HIV-infected and the wife is not. As these women become infected, rates found in antenatal clinics continue to climb.

The slow growth of the epidemic in Singapore may largely be attributable to general awareness and programs promoting condom use at STD clinics and in brothels. It is reported that condom use by sex workers has reached fairly high

levels, although commercial sex by Singapore residents traveling overseas remains an important avenue of HIV transmission.

Efforts to produce behavior change have been less effective in other countries of the region. In India, no formal studies have been done on the large-scale impact of prevention programs. From focus group discussions, however, it appears that fear of acquiring HIV has risen among the educated and the higher socioeconomic classes. This may lead to higher condom use in these populations, but is not yet documented. Unfortunately, in the lower socioeconomic classes and rural areas, there is still a gross lack of awareness and knowledge of HIV prevention methods, suggesting that behavioral change has probably been minimal. There still appears to be low use of condoms in many sex worker populations, especially among those who have many clients per day. Condoms continue to be the exception rather than the rule for most premarital and extramarital sex in India. STDs continue to be a major problem in this country, a fact not well recognized prior to the HIV epidemic.

In the Philippines, behavioral surveys in 1990 and 1994 in Metro Manila have shown fairly constant levels of casual and commercial sex, implying little behavioral change during that time. The levels of condom use, while rising somewhat in Metro Manila, remain quite low. STD rates are lower than in many other countries of the region, but as mentioned earlier, are high in certain populations, including sex workers.

Myanmar and Malaysia's effectiveness in inducing behavioral change is difficult to evaluate because no periodically collected data on risks are available there. However, extensive nongovernmental organization efforts in Malaysia and grassroots efforts in Myanmar may be reducing risk behaviors and increasing the use of condoms.

For those countries in the early stages of HIV epidemics (e.g., Bangladesh, Bhutan, Brunei Darussalam, Indonesia, Nepal, the Maldives, and Sri Lanka), national efforts at HIV control have been fairly limited and major nationwide behavioral change is unlikely to have yet occurred. Nongovernmental organization and governmental program efforts targeted at commercial sex may have raised condom use somewhat in more heavily populated urban settings, such as Jakarta, Kathmandu, and Columbo.

# Impact of Care Programs

Because the epidemics in the region are comparatively young, many doctors fail to properly diagnose AIDS; in addition, medical care is often difficult to access or limited in scope. As a result, what few data are available on issues of survival and the effect of care show somewhat shorter survival after diagnosis with AIDS than in the industrialized world. In one study in Thailand, median survival time after a diagnosis of AIDS was only 7 months, much shorter than in many industrialized countries, possibly because cases were only diagnosed when illness was quite advanced. In the Philippines, a small study following HIV-infected sex workers found survival times of 1½ years after the recognition that the immune system was seriously compromised. In Thailand, approximately one fifth of children infected at birth were found to have developed AIDS after 6 months. However, the findings of these small preliminary studies can hardly be generalized. Studies of accessibility to and use of care and their impacts on disease progression and survival are urgently needed throughout the region.

### AIDS: The Eruption in Asia

It is critical to recognize the sheer numbers of people living in South and Southeast Asia, a region that contains more than 60% of the world's adult population. In particular the evidence gathered in India suggests rapid, extensive, and uncontrolled spread in many parts of the country. There is an urgent need for a comprehensive synthesis of the state of the epidemic in India. It is clear that there is a critical need, in this country as elsewhere in the region, to gather more credible HIV/AIDS data on rural populations. China, too, because of its size and rapid changes in social and sexual behaviors, potentially represents a major focus of the epidemic in the region.

The different rates of spread within and between countries must be acknowledged and better understood. For example, why is the spread of HIV in the Philippines and Indonesia apparently slower than in Malaysia and Thailand? Is it related to later introduction of the virus, or to lack of reliable information or differences in behavior?

Some governments (Hong Kong, Malaysia, Singapore, Thailand) have committed extensive resources to responding to the epidemic. However, the majority of governments in the region are relying heavily on external financial support to prevent epidemics from occurring within their own borders. In addition, there continues to be a serious problem of denial and reticence about releasing surveillance and behavioral information by some governments in this region.

# LATIN AMERICA AND THE CARIBBEAN

Latin America and the Caribbean region are heterogeneous and diverse, with a total of 44 countries and territories, an estimated population of 470 million people with a variety of ethnic backgrounds, and four main languages (English, Spanish, French, and Portuguese). The rate of spread of HIV/AIDS has been slower than in other developing regions of the world, but the pandemic is well established and there is a wide variation in the level of HIV infection and the speed of the many epidemics among subregions and countries.

The dominant modes of transmission vary from one country to the next, ranging from some epidemics that are predominantly related to homo- and bisexual behaviors, to epidemics connected to injecting drug use, and to others that are primarily determined by heterosexual transmission. In spite of this epidemiological diversity, sexual transmission of HIV/AIDS accounts for 80% of overall transmission in the region, ranging from 64% in Brazil to as high as 93% in the Andean sub-region (Bolivia, Colombia, Ecuador, Peru, Venezuela).<sup>41</sup> Although data are limited and sometimes spotty, they reflect an increasing pandemic that is progressively affecting heterosexual populations and nonurban areas.

As of June 10, 1996, Latin America and the Caribbean accounted for 26% (176,930) of the cumulative total of cases reported in the Americas to the Pan American Health Organization (PAHO) and 13.4% of the cases reported world-wide to the WHO. It is estimated that 1.6 million people in the region have already been infected with HIV, and that some countries are at particular risk of rapid dissemination of HIV from traditional "at-risk" groups (sex workers, men who have sex with men, men with multiple partners) and to other vulnerable groups in the general population (women, youth, and children).

Sexual behaviors across the region reflect patterns that place the population at risk for HIV. These behaviors include early onset of sexual behavior, cultural acceptability of multiple partners, especially for males, and low levels of condom use. In this region, however, despite the relatively high proportion of men who have sex with men (MSM), patterns of homo- and bisexual behavior are still poorly understood. Bisexual behavior is more prevalent than exclusively homosexual behavior, while self-identification with a gay lifestyle or culture is not common. Consequently, targeting messages likely to reach MSM is difficult.

The current epidemiological profile of HIV/AIDS in Latin America and the Caribbean is driven by high-risk situations favorable to a rapid spread of the HIV infection. Slowly but steadily the pandemic is taking hold of communities rendered doubly vulnerable because of their socioeconomic disadvantage and lack of information. Migration, both between countries and from rural to urban areas, contributes to the continued spread of HIV/AIDS and creates additional challenges to HIV prevention. The epidemiological evidence signals a rapid shift of new infections to younger ages, particularly toward people between 15 and 24 years. In addition, there are marked tendencies for HIV infection to increase among the general population and among specific populations, in particular, women, children, the poor, rural communities, and generally those who have lower socioeconomic status and those who lack access to basic educational and health services.

# Mexico, the Isthmus of Central America, and the Latin Caribbean

The number of new HIV infections in Mexico, the Central American Isthmus (Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama),

and the Latin Caribbean (Cuba, Dominican Republic, Haiti, and Puerto Rico) continues to rise. As of June 10, 1996, 60,564 cases were reported to PAHO. This represents 8.7% of the total number of cases reported for the Americas and 4.6% of the cases reported worldwide to the WHO. However, the estimated "true" incidence of AIDS is substantially higher than the number of cases reported by 20 to 70%, with a 1- to 2-year lag in data collection.

There is evidence of continued increasing HIV incidence among MSM in Mexico, although the rise is not as rapid as it was in the 1980s.<sup>42</sup> Transfusion-associated HIV infection and AIDS cases have drastically declined in this country as in the rest of the region because of effective blood screening. In Mexico, this has resulted in an apparent slowing of AIDS cases among women; but there is in fact a much younger epidemic of heterosexually acquired HIV infection emerging among women. Consequently, in this country two epidemics are observed: an urban epidemic, more mature and affecting predominantly MSM, and an emerging rural epidemic, which is predominantly spreading through heterosexual transmission.

The Central American Isthmus and the Latin Caribbean reflect epidemics with increasing HIV/AIDS incidence and accelerated heterosexual transmission. Honduras accounts for 57% of AIDS cases diagnosed in Central America, whereas it has only 17% of its population.<sup>43</sup>

HIV seroprevalence levels among sex workers in Honduras have reached as high as nearly 40%. Sentinel surveillance of pregnant women in the city of San Pedro Sula has documented prevalence of up to 4%. Commerce, migration patterns, and communication within this subregion suggest that HIV is spreading within each country in well-established local epidemics and externally across international borders.

In the Latin Caribbean, Haiti is of particular importance, because perhaps alone in the region it represents a case of a relatively mature epidemic.<sup>44</sup> Due to social, economic, and political instability, among other factors, HIV prevalence rose from 2% in 1989 to an estimated 5% of the adult population in rural areas in 1994. In urban areas the prevalence was estimated at 10% in 1994. HIV prevalence is particularly high among sex workers, STD clinic attendees, and tuberculosis (TB) patients. High rates of HIV prevalence found by recent studies among pregnant women aged 14 to 24 years are of particular concern.

Within this subregion, there is diversity in the structure and organization of commercial sex, ranging from informal networks to thriving sex industries. The latter involve countries from which sex workers in other countries within and outside this region originate and others that have organized sex tourism. In the Dominican Republic, HIV seroprevalence among Dominican population subsets reached levels up to 11% among sex workers, 5 to 8% among STD patients, and by 1993, 1.2% among women attending antenatal clinics. International and intraregional travel, including tourism and employment seeking, also exert major

influences on the dynamics of the epidemics in the Caribbean, enhancing the potential for spread of HIV.

# The English-Speaking Caribbean

The predominant mode of transmission for HIV in the English-speaking Caribbean nations is heterosexual, but estimates of HIV transmitted through homo- and bisexual contacts account for 14% of all new infections. Intercountry variation exists in AIDS incidence rates and in the underlying HIV infection levels, but in general the number of cases is increasing in all countries. As of June 10, 1996, this region accounted for 4.6% (9399) of the cumulative total of cases reported in the Americas to PAHO and 0.7% of the cases reported worldwide to the WHO. The doubling time for the annual number of new AIDS cases in this subregion is 4 to 5 years. Some Caribbean countries report AIDS incidence rates that are among the highest in the world. Among the many small countries of the Caribbean, the presence of countries with very high and very low rates of HIV incidence indicates that there are many different epidemics and not one regional pattern.<sup>41</sup>

The male-to-female ratio of incident AIDS cases has fallen dramatically over the past 10 years, standing at just less than 2 men to 1 woman in 1994. Women aged 15 to 19 years now have higher annual incidence rates than men of the same age. Pediatric AIDS cases have been steadily rising and now account for 5% of all incident cases. AIDS has become the leading cause of death among young adult men in some Caribbean countries. There is an urgent need for increased surveillance of behavioral risk factors for AIDS and HIV infection, although the small size of most Caribbean countries makes the confidentiality issue an important obstacle to data collection and analysis.

Among the heterosexual population in the Caribbean, increasing numbers of persons from marginalized groups are becoming infected, including migrant workers, sex workers, and users of crack cocaine.<sup>45–47</sup> The extremely low incidence of HIV infection through contaminated blood represents a partial success story for the Caribbean region. Available data from sentinel surveillance indicate increasing HIV prevalence rates among pregnant women, sex workers, applicants for visas to the United States, and migrant farm workers in some Caribbean countries.

# South America

The number of HIV infections and AIDS cases in South America is rising steadily. As of June 10, 1996, South America accounted for 15.5% (106,841) of the cumulative total of cases reported in the Americas to the PAHO and 8.2% of the cases reported worldwide to the WHO. However, as in other subregions, the

true incidence of AIDS is believed to be substantially higher because of underreporting and difficulties in data collection. Within this specific region, Brazil accounts for 75% of all cases of AIDS reported to the PAHO/WHO, followed by the Andean region (15%) and the Southern Cone (10%). Sexual transmission of HIV accounts for 74% of all reported AIDS cases (51% homo- and bisexual and 23% heterosexual), injecting drug use for 19%, and blood and vertical transmission and undocumented cases, 7%.

The HIV/AIDS epidemics in the region are at differing levels of maturity, but are well established in most countries. There is considerable transmission of HIV/AIDS due to injecting drug use in Brazil (27%) and the Southern Cone countries of Chile, Argentina, Uruguay, and Paraguay (30%), although recent data in Brazil suggest that the HIV transmission through injecting drug use seems to be leveling off. The pandemic in this region has progressed since the early 1980s, from one predominated by homo- and bisexual transmission to one with accelerated heterosexual transmission.

In addition, there is an emerging transition from epidemics centered in major urban areas to increasing involvement of smaller urban centers and rural areas. Epidemics are increasingly taking hold in specific population subsets, including adolescents, marginalized communities, and others characterized by low socioeconomic status and lack of basic socioeconomic, educational, and health services.

High HIV seroprevalence levels have been reported among specific South American populations: 28% among sex workers in Santos City, Brazil<sup>48</sup>; 30 to 60% in several studies of urban IDUs in Brazil and Argentina,<sup>49</sup> 23% in MSM in Rio de Janeiro; and 1 to 3% among pregnant women in Santos City, Brazil. The impact of HIV/AIDS on morbidity and mortality is already seen in major urban centers in Latin America and the Caribbean. In the city of São Paulo, Brazil, for example, AIDS deaths are now the leading cause of mortality in women of reproductive age.

#### Challenges for Prevention

A significant increase in knowledge, attitudes, practices, and behaviors about HIV/AIDS has occurred in the region in the past 10 years. Behavior changes are most visible among sex workers, MSM, and health care providers involved in AIDS management. The behavior changes observed invariably coincide with prevention interventions. However, in spite of these trends, people's knowledge of the relationship between HIV and AIDS and of asymptomatic transmission is still very limited in the region as a whole. Knowledge of STDs and their relationship to HIV is limited, too. This is further compounded by the fact that although awareness of HIV/AIDS has substantially increased to levels over 80% in many countries, there are still many misconceptions regarding the transmission of HIV through casual contact. Surveys on knowledge, attitudes, practices, and behavior

have documented the coexistence of high levels of knowledge of HIV/AIDS in many populations with myths and misconceptions, unsafe practices, and low self-perception of risk.

Immediate and targeted attention to specific population subsets (women, adolescents, and children) is needed, as these populations are expected to become most vulnerable in the next phase of the epidemic. While attention has been given effectively to partner reduction, nonpenetrative sex, and the increase and correct use of condoms, programs have not fully capitalized on and need to be complemented with realistic prevention messages that address abstinence, delayed sexual initiation, and monogamy.

In brief, as the pandemic escalates in Latin America and the Caribbean, affecting larger segments of the population, the social, economic, and demographic impacts of HIV/AIDS are likely to exacerbate the burden on individuals, communities, and countries, threatening the development and stability of the region as a whole. Hence, the need for continued and increased support and an expansion of HIV/AIDS prevention and control programs is critical to effectively combat the pandemic in this region.

# NORTH AMERICA

The growth of the AIDS epidemic in North America has slowed in recent years and is approaching stable incidence, largely because of the decline in sexual transmission between men.<sup>50</sup> However, current AIDS incidence is at an unacceptably high level and it must be recognized that this leveling off should in no way be considered reason for complacency. AIDS data do not reflect current HIV infections, and HIV infection continues to occur at an alarming rate in a number of subpopulations and geographic areas. The characteristics of persons with HIV infection and AIDS continue to change, reflecting the evolving patterns of transmission.

# **Populations Affected**

Estimates from a statistical model show that in 1992, in the United States, about 750,000 persons were living with HIV, and that year about 60,000 persons became infected with HIV. In Canada, an estimated 34,000 adults were living with HIV in 1994, and 2500 to 3000 persons were newly infected with HIV each year in the period from 1990 to 1994. Recent estimates based on surveys of childbearing women indicate that approximately 3.2 per 10,000 children born in Canada and 15.1 per 10,000 children born in the United States carried HIV antibodies. In the United States, an estimated 12,000 children are currently living

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with HIV. Since the start of the epidemic, from 1 to 1.5 million cumulative HIV infections have occurred in North America.<sup>51</sup>

HIV infection has become one of the major causes of death for individuals between the ages of 25 and 44 years. Among men in this age group, it was the leading cause of death in the United States and the second leading cause of death in Canada in 1994. In that same year, HIV infection was the third leading cause of death among 25- to 44-year-old women in the United States.<sup>52</sup>

Through December 1995,513,486 persons had been reported with AIDS in the United States; 13,291 had been reported through March 31, 1996 in Canada. Overall AIDS incidence in North America has been slowing progressively. Although there were large increases in the number of persons annually diagnosed with AIDS-related opportunistic illnesses through the early 1990s, the annual increase since 1993 has been less than 5%. In 1995, after adjustment for delays in reporting, approximately 62,000 persons were diagnosed with AIDS-related opportunistic illnesses (29 per 100,000 population) in the United States and 2166 in Canada (9 per 100,000 population).

In North America, although there has been an overall slowing in the increase in AIDS incidence, there has been substantive variation in the populations affected. For example, in the United States, the increase in AIDS incidence in the 1990s has been greatest for women compared to men, blacks and Hispanics compared to whites, and persons infected through heterosexual contact compared to those infected through other modes of transmission.<sup>53</sup> As a result of these trends, AIDS incidence in 1995 was 6.5 times greater for blacks and 4 times greater for Hispanics than for whites, 20% of persons diagnosed with AIDS were women, and 15% were infected heterosexually.

The HIV infection rates are also high among certain groups, such as incarcerated persons. In 1994, 2.3% of nearly 1 million prisoners in the United States were known to be infected with HIV, the rate of AIDS among prisoners was seven times the rate of the nonincarcerated population, and AIDS was the second leading cause of death among prisoners. Among Canadian prisoners, HIV prevalence is higher in women, between 2 and 10% versus 1 to 4% for men; for both sexes, transmission is primarily related to injecting drug use.

In the United States, AIDS incidence among children younger than 13 years has declined annually. For example, while there were 938 cases in 1992, there were approximately 600 cases in 1995. Only 21 Canadian children were diagnosed with AIDS in 1995. This decline may well reflect such factors as lower conception rates in women diagnosed with HIV and the possible impact of maternal and neonatal zidovudine therapy on HIV transmission.

In North America, syphilis incidence has declined, yet 1994 rates in the United States were 60 times greater for blacks than for whites. The incidence of gonorrhea has also declined. In 1994, the US rate was 168 per 100,000 and the Canadian rate was 21 per 100,000.

Estimates from statistical models and data from several cohort studies demonstrate that HIV transmission among MSM has declined from the very high levels of the early 1980s. In Canada, HIV incidence among MSM has dropped from about 5 to 10% per year in the early 1980s to an estimated 1 to 2% per year in the early 1990s. The HIV seroprevalence rate among MSM attending STD clinics in the United States fell from over 30% in the late 1980s to 24% in 1995. However, the prevalence of HIV infection among MSM remains high in almost all areas of North America.

The declining trends in HIV infection and morbidity among MSM are consistent with trends in STD surveillance data, which show large decreases in the rates of syphilis and rectal gonorrhea. These declines are also consistent with behavioral survey results, which show decreases in the number of sexual partners and other indicators of sexual risk behaviors.<sup>54</sup> There does appear, however, to be some variation in the risk behaviors of younger MSM in that relatively high rates of unprotected receptive anal intercourse (30 to 47% over a 6- to 18-month period) continue to be reported by this age group.<sup>55,56</sup>

In the United States, HIV prevalence among IDUs has decreased in all areas. The largest decrease has been observed in the Northeast among IDUs in drug treatment programs. Anonymous testing in drug treatment centers in 29 US cities from 1988 to 1995 showed higher HIV infection rates in the Northeast (median HIV prevalence, 23%) and lower in the West (median, 1.5%). AIDS cases related to injecting drug use have increased less than 5% annually since 1993. In 1995, more than three quarters of the IDUs diagnosed with AIDS were black or Hispanic and one quarter were women. In Canada, HIV infection among IDUs is a major concern. For example, incidence in intravenous drug users in Montreal is currently estimated to be 5 per 100 person years; this rate is among the highest in North America.

Although some studies have shown a decrease in both unsafe injection practices and HIV incidence, new HIV infections continue to occur and the number of IDUs sharing injection equipment is high. Several studies have shown that 48 to 88% of IDUs continue to share injection equipment and that only 22 to 63% clean this equipment in any way. In Canada, sterile injection equipment for persons who continue to inject drugs is available in pharmacies and through numerous needle exchange programs. In contrast, 45 of the 50 states in the United States prohibit the sale or possession of sterile needles or syringes without a medical prescription, and only a small number of legal needle exchange programs exist.

AIDS cases related to heterosexual contact represent an increasing proportion of cases in North America. Heterosexual contact is the most common mode of transmission among women diagnosed with AIDS in the United States, and has doubled as a proportion of female AIDS cases in Canada since 1991. While a large proportion of these cases reported sexual contact with an IDU, a substantial proportion of women who acquired their infection heterosexually were unaware of their partner's risk status. In addition to injection drug use, the use of crack cocaine in the United States has been associated with an increased risk of HIV transmission through sexual contact in both urban areas and the rural South.

Between 1990 and 1995, the average HIV prevalence among heterosexual men and women attending STD clinics in North America changed little. However, the seroprevalence rates of heterosexual men and women in New York, Miami, and Washington, DC, grew by 5% or more.

#### Changes in Behavior

General population surveys have shown that the level of HIV/AIDS knowledge is high in North America and that changes in sexual behavior have occurred. Among adolescents in US schools, the use of condoms reported at last sexual intercourse increased from 46% in 1991 to 54% in 1995. In 1992, 50 to 65% of Canadian adolescents reported using a condom at last sexual intercourse. A study conducted in the United States from 1988 to 1991 showed that condom use by heterosexual adults with nonsteady partners increased from 14% to 22% among whites and from 5% to 27% among blacks. In a 1994 Canadian survey, 26% of men and 19% of women aged 20 to 45 reported using condoms with nonsteady partners.

# EUROPE

The European region counts some 850 million inhabitants living in 50 countries. For the purpose of this analysis, this region also includes countries of central Asia that have geopolitical affinities with countries in eastern Europe. The analysis of the European AIDS epidemic reveals complex patterns and dynamics that cannot be reduced to a simple division between eastern and western Europe. However, this report uses the old political division, because there are large differences in the timing and spread of the epidemic between eastern and western Europe, and the dramatic changes occurring in central and eastern Europe create specific situations of high vulnerability.

# Long-Term Trends from AIDS Surveillance

By the end of 1995, a cumulative total of 160,982 AIDS cases, including 154,866 adult/adolescent cases and 6,060 pediatric cases, had been reported in the region. A total of 26,139 new AIDS cases were reported in 1995, an increase of less than 1% over the 25,986 cases reported in 1994.<sup>57</sup>

Over the past 2 to 3 years, AIDS incidence appears to have stabilized in several countries in northwestern Europe. In contrast, there is no indication of the AIDS epidemic leveling off in countries in southwestern Europe. In central and

eastern Europe (with the exception of Romania) and central Asia, the HIV/AIDS epidemic is much more recent and AIDS incidence much lower than in western Europe. The highest rate per million (9.9) was found in the Federal Republic of Yugoslavia in 1995. However, in some countries, a rapid spread of HIV is indicated, which is mainly linked with injecting drug use. In Poland and the Federal Republic of Yugoslavia (Serbia and Montenegro), where IDUs account for the largest proportion of cases, the incidence of AIDS is rising rapidly.

Before 1990, most AIDS cases were diagnosed in MSM. Since 1990, however, IDUs account for the highest proportion of yearly diagnosed cases in the region (43% of adult and adolescent cases in 1995). Among the 22,494 cumulative heterosexual AIDS cases diagnosed up to December 1995, persons originating from other regions accounted for 30%. The shift in transmission patterns was accompanied by an increase in the proportion of female cases, which rose from 11% in 1986 to 20% in 1995. Most women diagnosed with AIDS in 1995 were IDUs (46%) or had been heterosexually infected (40%), often by an IDU sex partner (accounting for 33% of non-IDU heterosexually infected women).

The epidemic among children is closely related to that among women. In most countries, the vast majority of children have been infected through mother-to-child transmission. However, in the region as a whole, the epidemic among children is dominated by the epidemic in Romanian hospitals, which was detected in 1989 and accounts for over 50% of the 6060 pediatric cases reported in the European region.<sup>58</sup> Another, though much smaller, epidemic among children in hospitals occurred in the Russian Federation in the late 1980s.

# **HIV Incidence and Prevalence**

In western European countries, reconstruction of past trends of HIV incidence through back calculation models usually shows that the incidence of HIV infection peaked in the mid-1980s. The same method shows a low but steady increase of HIV prevalence among heterosexual populations. Trends for IDUs appear more variable and complex. Birth cohort analysis of AIDS cases suggest that HIV transmission through injecting drug use among young adults decreased in the early 1990s in France, Italy, and Switzerland, but increased over the same period in Spain and Portugal.

Among eastern European countries, large outbreaks of HIV infection in IDUs have been observed in the late 1980s in the former Republic of Yugoslavia and Poland.<sup>59</sup> Until recently, HIV reporting systems associated with systematic testing of large segments of the general population had not identified increasing trends of HIV incidence. However, the Ukraine recently reported a dramatic increase of newly infected IDUs in cities bordering the Black Sea. For example, the percentage of HIV-infected IDUs in Nikolayev rose from 1.7% in January 1995 to 56.5% in December, 11 months later.

Back calculations performed in western Europe in 1996 estimate that 450,000 adults were living with HIV in western Europe at the end of 1993, a figure similar to that obtained by adding national "best" estimates. There is no indication of a rapid upward or downward trend in these countries. An annual incidence of around 40,000 since the beginning of the 1990s seems a plausible estimate. In many countries of eastern Europe, which are at a very early stage of the AIDS epidemic, estimates of HIV prevalence are more uncertain. Best estimates, according to national surveillance systems, gave a total of around 18,000 cumulative infections by the end of 1993. The possibility of recent rapid increases in HIV incidence in some of these countries, as demonstrated by the 1995 Ukraine outbreak, makes any estimate of prevalence or incidence for 1995 extremely hazardous.

In countries where local data are available, the HIV prevalence in pregnant women has been much higher in urban than in rural areas (England, Scotland, Italy). The highest prevalence (between 1 and 4/1000) is observed in women who give birth or in newborns in the regions of Paris, Rome, Milan, London, Madrid, Barcelona, and Amsterdam. In northern and eastern Europe, where data are mostly limited to the national level, the prevalence among pregnant women appears much lower (between 0 and 0.1/1000).<sup>60</sup> In 1995, systematic screening for HIV did not detect any infection among women in Bulgaria, Lithuania, Moldova, Norway, or the Slovak Republic.

A European network of STD clinics from 17 countries (Czech Republic, Hungary, Norway, Switzerland, and countries of the European Union except Luxembourg and Ireland) has collected data on HIV prevalence among STD patients since 1990. Among the 87,640 patients tested, 2.8% were HIV infected. MSM had the highest HIV infection rate in most countries (between 30 and 50% in Denmark, France, Germany, Portugal, and Spain, and 10% or less in the Czech Republic, Finland, Greece, Hungary, Norway, Scotland, and Sweden). In Italy, Spain, and Switzerland, the highest rates of HIV infection were found in IDUs.

Among the heterosexual STD patients who were not IDUs, HIV rates were below 1% in 11 countries, 10 to 30 times lower than among MSM. Higher rates (between 1 and 3%) were found in France, Germany, Italy, Portugal, Spain, and Switzerland. No significant HIV prevalence trend has been observed in this population. Available results from systematic screening of STD patients in several countries in eastern Europe have shown very low rates of HIV infection. In Russia, HIV infections were identified in only 64 of nearly 6 million tests done between January 1987 and December 1993. In 1995, 2.3 per 100,000 STD patients tested in Russia were identified as infected with HIV. However, dramatic ongoing changes in STD incidence in these countries demonstrate a potential for a rapid change in HIV dynamics. Also, in some countries of eastern Europe, where STD incidence rates are relatively low (as, for example, in Slovenia, where 2/100,000 population early syphilis cases were reported in 1995), HIV infections are already beginning to be detected among STD patients. In one of the regions of Slovenia that year, 1.4% of 294 STD patients tested unlinked anonymously for surveillance purposes were found to be infected with HIV.

In some countries in southwestern Europe, the proportion of HIV-infected IDUs has been high for years. In Madrid, between 59 and 74% of IDUs entering drug treatment programs from 1986 to 1990 were found to be infected with HIV. In Italy, on a national level, HIV prevalence in IDUs was 31% and 39% in 1990 and 1991, respectively. In Poland, on a national level, the percentage of HIV-infected IDUs treated at health care settings ranged from 8.7% in 1988 to 2.9% in 1993. However, 46% of IDUs entering two drug treatment centers in Warsaw in 1993 were reported to be infected with HIV. In some eastern European countries, HIV infection seems not yet to have been introduced, although injecting drug use is on the rise and there is evidence of high-risk injecting behavior. In Slovenia, 80% of IDUs interviewed outside of IDU treatment centers in 1991 admitted sharing injecting equipment during the previous year, although none of 115 unlinked anonymously tested IDUs entering methadone maintenance programs in two IDU treatment centers in 1995 tested positive for HIV infection.

# **Changing Behavior**

In Europe, the lack of basic data on sexual behavior in most countries means that behavior change and condom availability and use are difficult to monitor. A review of behavioral surveys carried out in western European countries between 1987 to 1990 shows that the reported numbers of sexual partners remained quite stable irrespective of the country, while condom use increased markedly, particularly for the most sexually active populations. Among people with casual partners, the percentage of those reporting using condoms regularly rose from 8% in 1987 to 48% in 1989 in Switzerland, and from 9% to 40% in the Netherlands during the same period.<sup>61</sup> In the United Kingdom, the percentage of 18- to 24-year-olds who reported using a condom during their most recent sexual intercourse rose from 14% in 1986 to 31% in 1989. Such results, based on self-reported behaviors, are also partially supported by trends in condom sales. In Switzerland, wholesalers (representing 80% of the market) increased their sales from 7.6 million units in 1986 to 15 million in 1992. In France, the number of condoms sold in pharmacies and supermarkets rose from 38.6 million to 74.4 million between 1986 and 1993.

In contrast, very little is known about the condom market in central and eastern Europe. In Slovenia, condoms are available through pharmacies, petrol stations, and supermarkets. In some countries, condom availability and low income levels can heavily restrict condom use. In Kazakhstan in 1995, condoms were available only in some pharmacies of Almati, the capital city. In Moscow that year, although condoms were available at most pharmacies and also could be found in some commercial kiosks, supermarkets, and hotels, the price of a 12-unit pack represented nearly one third of the minimum monthly salary. The most worrisome information coming from STD surveillance arose recently from the independent republics of the former Soviet Union. Substantial increases in syphilis rates have been seen since 1990 in several of these states. In 1995 compared to 1994, syphilis incidence rates per 100,000 population rose from 81.7 to 172 in Russia (from 169.8 to 320.8 in St. Petersburg), from 72.1 to 147.1 in Belarus, from 116.6 to 173.6 in Moldova, and from 32.6 to 123 in Kazakhstan. These results indicate not only the likelihood of further spread of other STDs (including HIV infection), but also a potential for further spread to neighboring countries. This is already happening in Finland, where 118 new syphilis cases were diagnosed in 1995, as compared with 63 in 1994. Investigations have demonstrated close links between the Finnish and the Russian epidemics, through the increase of Finnish business/pleasure tourism in the St. Petersburg area and migration from Russia to Finland.

# Current and Future Trends

Transmission of HIV through injecting drug use has had and continues to play a major role in the dynamics of the epidemic in the region. Such transmission accounts for the majority of AIDS cases in some of the western countries with highest incidence (Spain and Italy), and is strongly associated with AIDS cases occurring among heterosexual adults and among children in the same countries. The sharp rise of AIDS incidence observed since 1992 in Portugal is due mainly to a rapid increase of cases among IDUs. In eastern European countries, the more serious HIV infection outbreaks reported until now (Poland and Ukraine) are also associated with injecting drug use.

The relative proportion of homo- and bisexual men among people with AIDS has steadily decreased in the past 10 years in the region. This is mainly due to a comparatively rapid progression of cases among drug users and to a low, but steady, increase in the proportion of heterosexual AIDS cases. AIDS incidence among gay men appears to be moderately declining or quite stable in most of western Europe, while still increasing in Greece, Portugal, and Norway. In the Baltic States, Slovenia, and Hungary, homosexual men account for the vast majority of HIV infections reported so far among males. Homosexual men represent 77% of the 171 HIV infections reported in Hungary in the past 5 years. In Russia, male-to-male sex was considered to be the mode of transmission in 53% of the 587 HIV/AIDS cases reported among adult males up to December 1994.<sup>62</sup> In Slovakia and Slovenia, 1996 data from unlinked anonymous HIV serosurveys using saliva tests performed in gay gathering places showed prevalence rates of around 3%, indicating a potential for further spread of the HIV epidemic in that population.

Moreover, information from the United Kingdom indicates that the declining

trend of male-to-male transmission noted in the late 1980s may have begun to reverse, starting in 1990. Although of great importance, the relative increase of AIDS cases and HIV infections among non-injecting-drug heterosexuals should not mask the fact that homosexual men and IDUs continue to experience the heaviest burden of the epidemic throughout the European region.

# NORTH AND SOUTH PACIFIC

For the purpose of this analysis, North and South Pacific is defined as Australia, New Zealand, Papua New Guinea, and the territories and independent island countries of the Pacific. Populations range from 18 million people in Australia to less than 10,000 in some of the island states. By the end of 1995, around 7400 cases of AIDS had been reported in North and South Pacific, of which over 7000 were in Australia and New Zealand.<sup>21</sup>

Australia and New Zealand's experience of the HIV epidemic has paralleled that of a number of industrialized countries, particularly those of Northern Europe. The major pathway of transmission has been through sexual contact between men, which occurred primarily in the early 1980s. This pattern also has been reflected in the French territories of New Caledonia and French Polynesia. The HIV epidemic in Papua New Guinea has developed more recently, mostly as a result of heterosexual transmission. In a number of the small island countries in the region, HIV and AIDS cases have been reported, but populations and case numbers are too small to define any clear patterns of transmission.

Overall, the per capita HIV prevalence and incidence of AIDS in Australia and New Zealand has been roughly in the middle of the range observed in industrialized countries in other regions of the world. Although AIDS incidence so far has been low in Papua New Guinea, it was estimated that by the end of 1994 there were 4000 adults living with HIV infection in Papua New Guinea, overtaking Australia on a per capita basis to give the highest prevalence in the North and South Pacific region. Some of the smaller countries of the region have relatively high rates, even though the number of reported cases is small.

# Populations Affected

Cumulatively, over 85% of HIV infections in Australia and New Zealand are reported to have been acquired through sexual contact between men.<sup>63</sup> In New Caledonia and French Polynesia, around two thirds of cases with a reported mode of transmission were in men with a history of homosexual contact. Back projection estimates from AIDS cases in Australia show that there was a peak in the homosexual transmission of HIV infection between men in the early to

mid-1980s and a substantial decline in transmission rates during the latter half of the 1980s.

The incidence of AIDS has reached a plateau in Australia and actually appears to be declining in New Zealand.<sup>64</sup> These patterns are essentially due to the drop in the rate of sexual transmission of HIV infection between men that occurred 10 years earlier. This decline began well before any organized prevention program was implemented, but is likely to have been supported through the strong partnerships developed between gay community-based organizations and governments. Current trends in sexual transmission between men are unclear. Cohort studies, behavioral surveys, and monitoring of rectal gonorrhea provide a basis for assessing changes in HIV risk.

In Australia and New Zealand, HIV has remained rare among people who inject drugs, apart from men who also have homosexual contact. In heterosexual IDUs, surveys have consistently found HIV prevalence below 2%. Both countries have adopted harm reduction policies, including extensive use of needle exchange. Although the low HIV rates indicate successful prevention efforts in this population, the transmission of hepatitis C continues to occur at epidemic levels among IDUs, with annual incidence rates of 15 to 20% being recorded in Australia. The ongoing hepatitis C epidemic indicates the continuing potential for a substantial outbreak of HIV through blood contact among IDUs.

On the basis of available evidence, heterosexual transmission of HIV has been infrequent in Australia and New Zealand. The pattern appears to be very different in Papua New Guinea, where heterosexual transmission accounts for the largest proportion of diagnosed infections.<sup>65</sup> By the end of 1995, nearly 90% of the diagnosed cases of HIV in Papua New Guinea for which modes of transmission had been reported were attributed to heterosexual contact, and an equal number of males and females had been diagnosed with HIV infection.

In Australia, and to a lesser extent New Zealand, high rates of STDs other than HIV in indigenous people have led to mounting concern about the potential for a major heterosexual epidemic of HIV infection in these populations. Surveillance data so far indicate that the rate of HIV diagnosis is no higher among indigenous than nonindigenous people, but in Australia the rate of HIV diagnosis has increased in the past 6 years among indigenous people. In contrast, the overall rate of HIV diagnosis in the Australian population has declined substantially. There also has been a shift toward more heterosexually transmitted infections among the diagnoses of HIV among indigenous people in Australia.

Surveys among MSM show a substantial decline in Australia and New Zealand over the past decade in the frequency of unprotected anal intercourse with casual male sexual partners. There also have been major declines in the sharing of equipment by IDUs. There has been little longitudinal information on heterosexual risk behavior at a national level, but increased condom use has been reported among heterosexual university students.

# **HIV Care**

Most of the needs for HIV care in the North and South Pacific so far has been in Australia and New Zealand. In these countries, there generally has been wide availability of good treatment services, access to appropriate therapy, and a steadily improving climate in regard to discrimination. As the burden of HIV illness increases in Papua New Guinea and possibly some of the other smaller countries of North and South Pacific, it is likely that strain will be placed on existing health infrastructures, as has been the case in other parts of the developing world.

# CONCLUSIONS

Remarkable progress has been achieved in reducing the spread of HIV in some developing countries and in certain populations in industrialized countries. Specifically, HIV incidence has declined in young men in Thailand. Impressive declines in HIV incidence and/or prevalence have been reported in gay men in the United States, Australia, Canada, and Western Europe. A decline in prevalence has also been observed in young women in Uganda, a country with one of the most mature HIV/AIDS epidemics. HIV prevalence has remained low in IDUs in a number of countries. In Australia, for example, major epidemics have been prevented in IDUs through timely prevention efforts. To a large extent, these successes in HIV reduction are likely attributable to education and prevention programs.

The HIV epidemic continues to expand in most developing countries, as well as in those European countries undergoing political stress and upheaval. Further, the social, economic, demographic, and health impacts of the HIV epidemics are increasing in most countries. Especially dramatic is the spread of HIV in young adults, adolescents, and children in developing countries. In a number of industrialized countries, the spread of HIV is increasing rapidly in minority populations. HIV is also continuing to spread to rural areas throughout the developing world. In many countries, the proportion of infected women is now roughly equal to that of men. Globally, heterosexual transmission continues to rise.

Extensive commercial sex industries and the high prevalence of STDs, and injecting drug use provide the potential for explosive epidemics in several countries, including Indonesia, China, and several countries in West Africa and Eastern Europe. In India, Cambodia, and Myanmar, the explosion has already occurred.

The global pandemic is now composed of multiple epidemics in different stages of development. The characteristics of these epidemics include different viruses (HIV-1 and HIV-2), different strains of the same virus, differences in transmission modes, and differences in incidence in population subsets, including young adults.

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# REFERENCES

- Anonymous. The HIV/AIDS situation in mid 1996: Global and regional highlights, Fact Sheet. Geneva, Switzerland: UNAIDS and WHO; July 1, 1996.
- Anonymous. World Health Organization's Weekly Epidemiological Record. Geneva, Switzerland: World Health Organization; 1995; 70:350–360, No 50.
- Tarantola D, Mann J. Global overview: A powerful HIV/AIDS pandemic. In: Mann J, Tarantola D, eds. AIDS in the World II. New York Oxford University Press; 1996; 1–18.
- 4. Anonymous. Final Report of the Workshop on the Status and Trends of the HIV/AIDS Epidemic in Africa, held in Kampala, Uganda, December 8–9, 1995. Boston, Mass: AIDS Control and Prevention Project of Family Health International and the François-Xavier Bagnoud Center for Health and Human Rights, Harvard School of Public Health; 1995.
- 5. De Cock KM. The emergence of HIV/AIDS in Africa. *Rev Epidémil Santé Publique* 1994; 44: 511–518.
- Kanki PJ, De Cock KM. Epidemiology and transmission of HIV2. AIDS 1994; 8 (suppl 1): S85–S93.
- 7. Anonymous. Southern Africa's unmentionable curse. Economist 1997; 343:47-49.
- Iralm J, Stuart J, Steinberg M, *et al.* Surveillance of HIV/AIDS in Kwanzulu-Natal, 1990–94. Paper presented at the 9th International Conference on AIDS and STD in Africa, Kampala, Uganda, 1995. Abstract MoC495.
- Wasserheit JN. Epidemiological synergy: Inter-relationship between HIV and other STDs. In: Chen L, Amar JS, Segal SJ, eds. *AIDS and Women's Reproductive Health*. New York: Plenum Press; 1992. Reprinted in Sex Transm Dis 1992; 19:61–77.
- Vuylsteke B, Sunkutu R, Laga M. Epidemiology of HIV and sexually transmitted infections in women. In: Mann J, Tarantola D, eds. *AIDS in the World II*. New York Oxford University Press; 1996; 97–109.
- 11. Gibbs WN, Corcoran P. Blood safety in developing countries. Vox Sanguinis 1994; 67:377-381.
- 12. Mnyika KS, Klepp KI, Old King'ori N, *et al.* Risk factors for HIV-1 infection among women in the Arusha region of Tanzania. J Acquir Immune Defic Syndr 1996; 11:484–491.
- 13. Wawer MJ, Serwadda D, Musgrave SD, et al. Dynamics of spread of HIV-1 infections in a rural district of Uganda. Br Med J 1991; 303:1303–1306.
- Barongo LR, Borgdorff MW, Mosha FF, et al. Epidemiology of HIV-1 infection in urban areas, roadside settlements and rural villages in Mwanza Region, Tanzania. AIDS 1992;6:1521–1528.
- Pison G, Le Guenno B, Lagarde E, et al. Seasonal migration: A risk factor for HIV infection in rural Senegal. J Acquire Immune Defic Syndr 1993; 6:196–200.
- Carswell JW, Namaara W, Lloyd G, *et al.* HIV infection among lorry drivers and their assistants in eastern Africa. Paper presented at the 6th International Conference on AIDS, Montreal, Canada, 1989. Abstract A.617.
- Jochelson K, Mothibeli M, Leger JP. Human immunodeficiency virus and immigrant labor in South Africa. Int J Health Serv 1997; 21:151–173.
- 18. Ananrfi JK. Female migration and prostitution in West Africa: The case of Ghanian women in

Côte d'Ivoire. Stud Sex Health No. 1; German Development Agency: Deutsche gesellschaft für Technische Zusammenarbiet (GTZ).

- 19. Nunn AJ, Wagner HU, Okongo M, et al. HIV-1 Infection in a Uganda town along the Trans-African highway: prevalence and risk factors. Int J STD AIDS 1996; 7:123–130.
- Djomand G, Greenberg A, Sassan-Morokro M, et al. The epidemic of HIV/AIDS in Abidjan, Côte d'Ivoire: A review of data collected by project RETRO-CI from 1987–1993. J Acquir Immune Defic Syndr 1995; 10:358–365.
- 21. Quinn TC. Global Burden of the HIV Pandemic. Lancet 1996; 348:99-106.
- 22. Bongaarts J. Global trends in AIDS mortality. Popul Dev Rev March 1996; 22:21-25.
- Groskurth H, Mosha F, Todd J, et al. Impact of improved treatment of STD on HIV infection in a rural Tanzania: Randomized controlled trial. Lancet 1995; 346:530–536.
- Health Studies Branch, International Programs Center, Population Division. Recent HIV seroprevalence levels by country: January 1997. US Bureau of Census. Washington, DC: US Bureau of the Census; 1997. Research Note No. 23:36-44.
- Rodier GR, Couzineau B, Gray GC, et al. Trends of HIV-1 infection in female prostitutes and males diagnosed with a sexually transmitted disease in Djibouti, East Africa. Am J Trop Med Hyg 1993; 481682–686.
- Kaldor J, Effler P, Sarda R, et al. HIV and AIDS in Asia and the Pacific: An epidemiological overview. AIDS 1994; 8(suppl):S165–S172.
- Brown T, Sittitrai W. Estimates of recent HIV infection levels in Thailand, Research Report No 9. Bangkok, Thailand: Program on AIDS, Thai Red Cross Society; 1993.
- Brown T, Xenos P. AIDS in Asia: The gathering of storm. Asia Pacific issues series 16. Honolulu, HI: East-West Center; August 1994.
- Weniger BG, Limpakarnjanarat K, Ungchusak K, et al. Epidemiology of HIV infection and AIDS in Thailand. AIDS 1991; 5(suppl 2):S71–S85. [Errata corrected in 1993; 7:147]
- Jain M, Jacob JT, Keusch G. Epidemiology of HIV and AIDS in India. AIDS 1994; 8(suppl): S61-S75.
- Sarkar S, Das N, Panda S, et al. Rapid spread of HIV among injecting drug users in north-eastern states of India. Bull Narcotics 1993; 45:91–105.
- Agence France Presse, Phnom Penh, Cambodia. Health ministry estimates 1,000 AIDS virus carriers. Broadcast on Hong Kong AFP (in English), July 25, 1993. Printed in JPRS Report-Epidemiology, BK2507080493. Washington, DC: Foreign Broadcast Information Service; August 20, 1993.
- Agence France Presse, Phnom Penh, Cambodia. Government sets up anti-AIDS commission. Broadcast on Hong Kong AFP (in English), December 24, 1993. Printed in *JPRS Report-Epidemiology*, BK24D0504. Washington, DC: Foreign Broadcast Information Service; February 3, 1994.
- 34. Htoon MT, Lwin HT, San O, et al. HIV/AIDS in Myanmar. AIDS 1994; 8(suppl 2):S105-S109.
- 35. Nguyen TH, Wolffers I. HIV infection in Vietnam. Lancet 1994; 343:8894, 410.
- Zheng X, Tian C, Zhang J, *et al.* Rapid spread of HIV among drug users and their wives in southwest China. Paper presented at the 9th International Conference on AIDS, Berlin, Germany, 1993. Abstract PO-C08-2766.
- Zheng X. Cohort study of HIV infections among drug users in Ruili City and Longchuan County, Yunnan Province, China [in Chinese]. *Chung Hua Liu Hsing Ping Hsueh Tsa Chi (Chinese Journal* of Epidemiology) 1993; 14:3–5.
- Weniger BG, Thongcharoen P, John TJ. HIV epidemic in Thailand, India, and neighboring nations: A fourth epidemiologic pattern emerges in Asia. Paper presented at the 8th International Conference on AIDS, Amsterdam, The Netherlands, 1992. Abstract PoC 4087.
- 39. Sittitrai W. Thai sexual behavior and the risk of HIV infection: A report of the 1990 survey of partner relations and risk of HIV infection in Thailand. Bangkok, Thailand: Program on AIDS,

Thai Red Cross Society, and Institute of Population Studies, Chulalongkorn University; November 1992.

- 40. Weniger BG, Thongcharoen P, John TJ, et al. Emerging epidemiologic pattern of HIV/AIDS in South and East Asia. Paper presented at the 8th International Congress on Tropical Disease and Malaria, Pattaya, Thailand, 1992. Abstract TuP 4-21.
- Regional Program on AIDS/STD, Division of Disease Prevention and Control, Pan American Health Organization, AIDS Surveillance in the Americas. Geneva, Switzerland: World Health Organization, PAHO/HCA/Health Report; 1995; PAHO/HCA/95–015.
- 42. Valdespino-Gomes JL, Garcia-Garcia M de L, del Rio-Zolezzi A, *et al.* Epidemiologia del SIDA/ VIH en Mexico de 1983 a marzo de 1995. *Salud Publica de Mexico* 1995; 37:556–571.
- 43. Nunez C, Hsu L, Zelaya JE, et al. AIDS in Honduras. Modeling the epidemic. International Conference on AIDS, 1993, Berlin, Germany. Abstract No. WS-C19-2.
- 44. Pape F, Johnson WD Jr. AIDS in Haiti: 1982-1992. Clin Infect Dis 1993; 17(suppl2):S341-S345.
- 45. Caceres CF, Hearst N. HIV/AIDS in Latin America and the Caribbean: An update. *AIDS* 1996; 10(suppl A):S43–S49.
- McCoy CB, Metsch LR, Inciardi JA, et al. Sex, drugs, and the spread of HIV/AIDS in Belle Glade, Florida. Med Anthropol Q 1996; 10:83–93.
- Gomez MP, Bain RM, Major C, et al. Characteristics of HIV-infected pregnant women in the Bahamas. J Acquir Immune Defic Syndr Human Retrovirol 1996; 12:400–405.
- Gravato N, Tellini R, Lacerda R, et al. Census of commercial sex workers (CSWs) in Santos City, Brazil. International Conference on AIDS, 1994, Yokonama, Japan. Abstract No. PC0354.
- 49. Mesquita F, Moss AR, Reingold AL, *et al.* Pilot study of HIV antibody seroprevalence among IVDUs in the city of Santos, Brazil. *Int Conf AIDS* 1991; 7:1, 300. Abstract No. PC3008.
- Centers for Disease Control and Prevention. HIV/AIDS surveillance report. Atlanta, GA: Centers for Disease Control and Prevention 1995; 7:No. 1.
- 5 1. Neal J, Fleming P, Green T, et al. Trends in heterosexually acquired AIDS in the United States, 1988 through 1995. J Acquir Immune Defic Syndr Human Retrovirol 1997; 14:465–474.
- Anonymous. Update: Mortality attributable to HIV infection among persons aged 25-44 years, United States, 1994. MMWR 1996; 45:121–124.
- Denning P, Fleming P. Estimating recent patterns of HIV infection among adolescents and young adults. *4th Conference on Retrovorises and Opportunistic Infections* 1997; 22–26:133. Abstract No. 375.
- Silvestre A, Kingsley LH, Wehman P, et al. Changes in HIV rates and sexual behavior among homosexual men, 1984 to 1988/92. Am J Public Health 1993; 83:578–580.
- 55. Lemp GF, Hirozawa AM, Givertz D, et al. Seroprevalence of HIV and risk behaviors among young homosexual and bisexual men: The San Francisco/Berkeley young men's survey. JAMA 1994; 272:440–454.
- 56. Schatz B, Schechtel J. Novick A, *et al.* The silent crisis: Ongoing HIV infections among gay men, bisexuals and lesbians at risk. Report of the GLMA/AAPHR, Summit on HIV Prevention for Gay Men, Bisexuals and Lesbians at Risk. San Francisco, CA: Gil Gerald and Associates, Inc.; 1995; Gay and Lesbian Medical Association of San Francisco.
- Anonymous. HIV/AIDS Surveillance in Europe, Third Quarterly report. Saint Maurice, France: European Center for the Epidemiological Monitoring of AIDS; 1996; 51:1–25.
- Apetrei C, Mitrol I, Buzdugan I, et al. Epidemiological model of recent introduction of HIV in a virgin population: HIV infection of children in north-east Romania. International Conference on AIDS, 1994, Yokohama, Japan. Abstract No. PC0017.
- Stark K, Wirth D, Sieroslawski J, et al. High HIV seroprevalence in injecting drug users in Warsaw, Poland. J Acquir Immune Defic Syndr 1994; 7:877–878.
- 60. Lindgren S, Bohlin AB, Forsgren M, et al. Screening for HIV antibodies in pregnancy: Results from the Swedish national program. Br Med J 1993; 7:1447–1451.

- 61. Dubois-Arber F. Increased condom use without other major changes in sexual behavior among the general population in Switzerland. Am J Public Health 1997; 87558–567.
- Ladnaia NN, Savchenko I, Bobkov AF, et al. Risk factors for HIV-infection and HIV-subtypes isolated in different regions of Russia. International Conference on AIDS, 1996, Vancouver, B.C. Abstract No. MoC1463.
- Anonymous. Weekly Epidemiological Report. Geneva, Switzerland: World Health Organization; 1995.
- McDonald AM. A national surveillance system for newly acquired HIV infection in Australia. *Am J Public Health* 1994; 84:1923–1926.
- United Nations. *Time to Act: The Pacific Response to HIV and AIDS*. Suva, Fiji: United Nations, January 1996.

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# **Emerging Biomedical Interventions**

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# INTRODUCTION

Employment of existing methods and development of new tools to reduce transmission of HIV are crucial. Biomedical interventions range from those that can be currently implemented, such as promotion of condoms, sexually transmitted disease (STD) treatment, and therapy to reduce perinatal transmission, to those requiring discovery and/or development such as microbicidal barriers, vaccines, and affordable antiretroviral therapies. In this chapter, the data supporting current biomedical technologies for HIV prevention are reviewed and efforts to develop microbicides, vaccines, and therapies of relevance to HIV prevention are discussed. In addition, suggestions are made for decision-making strategies at both population and individual levels.

# SEXUAL TRANSMISSION OF HIV

In order to understand how biomedical interventions work to prevent HIV, it is necessary to have some understanding of the factors that affect HIV transmission. Figure 1 illustrates some of the known factors associated with heterosexual transmission of HIV, and Table 1 delineates factors that increase viral infectiousness. The risk of acquiring HIV sexually is a function of the number of sexual exposures to HIV and the probability of transmission at each exposure. The number of exposures and the probability of transmission are themselves affected by a number of factors, as illustrated. Behavioral risk reduction programs are often

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Figure 1. Factors important in the sexual transmission of HIV. \*, See Table 1.

targeted at reducing the number of exposures, as are barrier methods of contraception. Development of successful vaccines against HIV would work by reducing the probability of transmission per exposure. STD treatment programs also work by reducing transmission probability. A multifaceted approach combining, for example, condoms and STD treatment has a higher likelihood of success than a singlefaceted approach, because the combined approach has the advantage of reducing both the number of exposures and the transmission probability.

	Increased infectiousness	Increased susceptibility
Acquired factors of host or partner		
Immune activiation due to other infectious diseases	Yes	Yes
Stage of infection ("window" period, advanced	Yes	NA <sup>a</sup>
immunosuppression)		
Genital trauma or immaturity (menses, first coitus, cervical	Yes <sup>b</sup>	Yes
ectopy)		
Lack of circumcision in men	Yes	Yes
Mucosal sexually transmitted or reproductive tract infection	Yes	Yes
Behavioral and biological interactions		
Nature of sexual contact		
Insertive	Yes	No <sup>b</sup>
Receptive	$No^b$	Yes
Drug use (cocaine, alcohol, nitrites)	Yes <sup>b</sup>	Yes
Vaginal douches, astringents, or abrasives	$No^b$	Yes
Anal douches or trauma	Yes <sup>b</sup>	Yes

Table 1.
Factors that Increase Viral Infectiousness

of HIV+
Host or Susceptibility of HIV

<sup>a</sup>Not applicable.

<sup>b</sup>Data are inconclusive.

# ISSUES IN THE EVALUATION OF BIOMEDICAL INTERVENTIONS

In light of the global impact of the HIV epidemic, relatively little effort has been expended in developing and testing biomedical interventions for the prevention of HIV. Due to the limited amount of data available and the sometimes contradictory results of studies and interventions, public health practitioners are often confused about how to make decisions on the relative merits of the various interventions available to them. There is no one type of study that can provide all the answers that practitioners need to make informed decisions, and the wisest course must be to evaluate the best studies and make decisions based on the weight of the available evidence. Deciding which studies provide the best information for particular needs, however, requires some knowledge of the issues in evaluating biomedical interventions. Studies can be definitive controlled trials or suggestive observational studies, and can provide information on theoretical efficacy, actual use effectiveness, or population impact.

# Theoretical, Method, and Use Efficacy

*Efficacy* refers to the ability of a technique to produce the desired result (e.g., HIV prevention). A prevention technique is typically evaluated for its efficacy in the laboratory setting, under perfect conditions of use, and during typical use in a population. *Theoretical eficacy* refers to the effectiveness of a technique in the laboratory setting. For example, male latex condoms have been tested in the laboratory and have been found to be very effective barriers to HIV under controlled conditions.<sup>1</sup> Thus, the theoretical efficacy of condoms as an HIV prevention technique is good.

*Method efficacy* describes capabilities of a technique during perfect and consistent use by individuals. Method efficacy is commonly measured in studies of new contraceptives, and techniques for determining method efficacy are in themselves fraught with difficulties.<sup>2</sup> In spite of this, method efficacy is an important concept, as it provides pertinent information for individual decision making and potential public health benefits. Method efficacy can mimic theoretical efficacy. Studies of couples in whom one partner was HIV infected and one was not (discordant couples) suggest condom efficacy as high as 100% in preventing HIV when they are used 100% of the time.<sup>3</sup> Alternatively, method efficacy and theoretical efficacy can be very different for another product. For example, laboratory studies of the spermicide nonoxynol-9 indicate that it is effective in killing HIV,<sup>4,5</sup> but studies in humans have not shown nonoxynol-9 to be effective in preventing HIV infections in high-risk populations.<sup>5,6</sup> In this case, the high theoretical efficacy of nonoxynol-9 does not translate into good method efficacy.

Use efficacy is the term applied to the effectiveness of the technique as it is typically used in a population. A technique may have high method efficacy, but

inconsistent or incorrect use by a subset of the population will decrease the use efficacy. A large discrepancy between use efficacy and method efficacy usually indicates that the product is difficult or inconvenient to use correctly, or that it is not acceptable to some segment of the population. Low use efficacy due to incorrect or inconsistent use can potentially be improved by interventions to encourage correct and consistent use.<sup>7,8</sup> Use efficacy can vary between populations, so a planner or researcher should consider how a study population compares to the target population before attempting to generalize studies about use efficacy. The potential disparity in use efficacy between populations is illustrated in a study of the female condom that found pregnancy rates for Latin American women during typical use of the condom to be significantly higher than pregnancy rates for US women participating in the same study.<sup>9</sup>

# Study Designs

Two basic types of study designs are used to evaluate biomedical interventions: randomized clinical trials and observational studies. A randomized clinical trial is a structured evaluation of a prevention technique in which participants are randomized by the researchers to use either the innovative technique or the standard technique (or a placebo if no standard technique is available). The subjects are then followed through regular clinical examinations to assess the presence or absence of disease in the two groups. Observational studies compare rates of disease among those who used the technique and those who did not in a population whose use of the technique is not controlled by the researchers. In an observational study, the participants decide whether or not to use the technique and the researchers assess whether any difference in disease rates is present between the self-selecting groups.

For the most part, randomized clinical trials provide the strongest evidence for evaluation of a prevention technique and are accepted as the final word on use efficacy.<sup>10</sup> Clinical trials are similar to classic scientific experiments in that the participants in the study are randomly assigned to treatment groups. Except for the treatment, the groups are generally similar in all other ways. Thus, clinical trials provide an unbiased estimate of the use efficacy of an intervention.

Of course, clinical trials, unlike *in vitro* laboratory experiments, are conducted with human beings, and the researcher does not have complete control over whether or not the participants comply with the study protocol. There is sometimes controversy over whether clinical trials of HIV prevention techniques should be analyzed on an "intent-to-treat" basis, on an "as-treated" basis, or both. The intent-to-treat perspective means that the researcher determines whether there is a difference in disease rates between the two treatment groups, regardless of whether or not the participants adhered to the study protocol (i.e., used a condom every time they had sex). As-treated analysis takes into account variations in

#### **Biomedical Interventions**

compliance between and within the treatment groups. Traditionally, clinical trials are analyzed from the intent-to-treat perspective, which provides an extremely good estimate of the use efficacy. If compliance with the study protocol is high, then the intent-to-treat analysis will also provide a good estimate of the method efficacy. If compliance is not high, then the intent-to-treat analysis provides information on the use efficacy of an intervention and the as-treated analysis may provide better information on the method efficacy.

Although clinical trials represent the "gold standard" in study design for drugs, products, or behavioral interventions, they are often expensive and difficult to conduct. In addition, ethical issues arise when a new technique is to be evaluated in the presence of a technique known to be effective. An example of this is the difficulty in evaluating new microbicides for the prevention of HIV. As will be discussed later in this chapter, condoms have been shown to be effective in preventing HIV infection. Asking people in a clinical trial to use an untested microbicide for HIV prevention without also offering condoms would be unethical, so researchers cannot conduct a true clinical trial of a microbicide alone. Instead, researchers are left with the choice of conducting a clinical trial of the effectiveness of the microbicide in addition to condoms compared to condoms alone (as was done in a recently completed trial in Cameroon<sup>5</sup>) or conducting an observational study. Another example is testing of low-dosage antiretroviral therapies for prevention of mother-to-infant HIV transmission in countries where high-dose antiretroviral therapy is cost prohibitive. Some argue that use of a placebo group is unethical, since high-dose antiretroviral therapies are known to be effective,<sup>11,12</sup> while others have said that if standard therapy in a given setting is no intervention, then a placebo-controlled trial is ethical if there is community soupport.<sup>13,14</sup>

Observational studies are more commonly performed than clinical trials in HIV prevention research. The two major types are follow-up (also called cohort or longitudinal) and case–control studies. In follow-up studies, the participants (or cohort) are typically observed for some period of time for both use of the prevention technique and development of HIV. (This description of follow-up studies refers only to disease prevention studies. In classic follow-up studies of disease causality, exposure is determined at the beginning of the study, and cohorts of exposed and nonexposed subjects are followed over time.) At the end of the study, rates of HIV are compared among those who used the prevention technique and those who did not. The measure of effect that is calculated from a follow-up study is the rate ratio (RR) (Table 2). In case–control studies, the use history of a prevention technique by an HIV positive group (cases) and an HIV-negative group (controls) is utilized to estimate the odds of the diseased having used the technique when compared to the nondiseased (or vice versa). The measure of effect calculated is the odds ratio (OR) (Table 2).

Both types of observational study are considered weaker than randomized clinical trials because the study subjects self-select into use groups. The use groups
Study type	Effect measure	Formula for effect measure
Follow-up study (also known as cohort study)	Rate ratio (RR)	Number of cases in exposed/follow-up time in exposed Number of cases in unexposed/follow-up time in unexposed
Case-control study	Odds ratio (OR)	Number cases exposed/number cases unexposed Number controls exposed/number controls unexposed

Table 2. Types of Observational Study

may have different levels of risk, and so the estimate of the protective effect of a technique is biased. Investigators usually try to measure background risk and deal with the potential bias by restricting subjects (e.g., recruiting only prostitutes) or "adjusting" for the risk differences in the analysis of the study. Observational studies provide valuable information about the use efficacy of a prevention technique, however, because in the real world the choices individuals make about whether or not to use a technique will ultimately have a substantial effect on the overall impact of the intervention.

Follow-up studies usually provide stronger evidence for evaluation of a prevention technique than case–control studies, because in follow-up studies use of the prevention technique can be documented prior to the assessment of disease development. In addition, well-designed follow-up studies usually have some prospective measure of use compliance. In case–controlstudies, the history of use of the technique is measured at the time of entry into the study, as is the presence or absence of HIV. It is often difficult to be certain that the use history is accurate and more importantly to establish a temporal relationship between use of the technique and the presence or absence of disease. This is especially true when the cases used are prevalent (preexisting, i.e., not new) and the date of HIV infection cannot be determined. Case–control studies are much less expensive than followup studies, however, and can be conducted more quickly. In addition, a case– control study with incident (new) cases and a carefully constructed history can potentially be as informative as a follow-up study.

#### **Decision Making**

Deciding whether an HIV prevention technique is appropriate for a given purpose is dependent not only on the efficacy of the technique but also on the context in which the decision is to be made. For public health practitioners, who are called on to create strategies that will reduce the *rate* of HIV transmission in a population, method efficacy is not as important as use efficacy. For example, abstinence is

100% effective in preventing sexual transmission of HIV, so it has a method efficacy of 100%. The use efficacy, or the percentage of people actually willing and able to practice abstinence long-term, however, is significantly less than 100%. Hence, a program promoting abstinence alone as an HIV prevention technique might be successful with a small targeted group, but the overall impact on the population would be expected to be minuscule.

For individual decision making and recommendations to patients, the situation is reversed. In this case, method efficacy is more important than use efficacy. An individual is not interested in reducing rates of disease transmission, but rather in reducing personal risk. For an individual, knowledge about how well the technique will work in reducing risk if it is used correctly and consistently is crucial to the decision-making process. For the health practitioner, knowledge of the person is also important in determining whether the individual will be able to use the technique correctly, and the practitioner is also responsible for providing proper training on correct use.

# BARRIER METHODS OF HIV PREVENTION

The use of barrier methods to prevent the transmission of HIV is based on the idea of stopping live virus from ever touching the genital mucosa, thus interrupting the natural history of infection. Barriers can be *physical* (i.e., male and female condoms), which interrupt transmission by keeping the genital tract secretions of the infected individual from ever making contact with the uninfected individual, or they can be *chemical* (i.e., spermicides, microbicides), which usually work by inactivating the virus in the genital tract.<sup>15</sup> Some contraceptive devices (i.e., diaphragms, spermicidally lubricated condoms) are combinations of physical and chemical barriers.

All barrier methods of HIV prevention available at present are contraceptives. Thus, a woman who uses a barrier for protection against HIV is also simultaneously protected from pregnancy. Research and development of barriers that offer protection against disease while allowing conception are ongoing, but such products are not likely to be available in the near future. In addition, most barrier methods available require the knowledge and/or cooperation of the male partner in order to be used effectively. These male-controlled barriers, such as the male latex condom and to some extent the female condom, represent the best presently available technology for prevention of HIV. The female-controlled barrier methods, such as spermicides, diaphragms, and cervical caps, remain unproven as HIV prevention techniques. Unfortunately, many women are unable or unwilling to negotiate condom use with their male partner. As women are at higher risk of infection from heterosexual intercourse than their male partners, a top priority in basic research is to develop a female-controlled HIV barrier.

### Male Condoms

Male condoms have been used for pregnancy and disease prevention for hundreds of years.<sup>16</sup> At the advent of the HIV epidemic, condoms were advocated as potential prevention tools. The theoretical efficacy of male latex condoms in preventing HIV is exceptionally high. *In vitro* studies of male condoms indicate that latex condoms do not leak HIV in the laboratory setting,<sup>17,18</sup> while natural membrane condoms do.<sup>19</sup> Consequently, it is important to distinguish between male latex condoms and natural membrane condoms are not recommended for disease prevention, though their efficacy is comparable to latex condoms for pregnancy prevention.

The method efficacy of latex condoms in preventing HIV infection is also high. Repeated studies in discordant couples have shown that consistent use of condoms reduces the risk of infection for the seronegative partner by as much as 90%.<sup>20,21</sup> This means that a noninfected individual who regularly has sex with an infected individual is 90% less likely to become infected if condoms are used consistently. If condoms are used 100% of the time, the protective effect may be even higher. The European Study Group on Heterosexual Transmission of AIDS followed 124 discordant couples who used a male latex condom every time during a total of 15,000 acts of intercourse; none of the negative partners became infected with HIV.<sup>21</sup> Feldblum *et al.*<sup>3</sup> reviewed nine studies of discordant couples in 1995, and illustrated that all found a protected effect of condoms. Perhaps even more striking is the fact that in three of those studies (including the European study described above), no persons who were consistent condom users seroconverted.

While condom use does not reduce the risk of HIV transmission to zero, the substantial protection afforded by condoms is why they are the "gold standard" among the available prevention techniques. Male latex condoms have a better method efficacy than any other biomedical prevention available at the present time. For individuals who want to substantially reduce their personal risk of contracting HIV through heterosexual intercourse, use of male latex condoms is the most effective choice (after abstinence, of course).

The use efficacy of latex condoms, however, is lower than the method efficacy. In the discordant couple study mentioned above, only 48% achieved use of the condom at every act of intercourse. The remaining couples who used condoms inconsistently had a seroconversion incidence of 4.8 per 100 person years.<sup>21</sup> In a similar study of discordant couples in Haiti, only 42 of 177 sexually active discordant couples (24%) used a condom for every act of intercourse, in spite of receiving counseling and free condoms. In this study, the seroconversion incidence was 1.0/100 person years for the consistent condom users and 6.8/100 person years for the inconsistent and noncondom users.<sup>22</sup> In a follow-up study of 51 discordant couples in Rwanda, only nine couples (18%) used a condom for every act of inter-

course over a 2-year period. Again, none of the nine perfect users seroconverted, while the rate of seroconversion was highest in the individuals who never used a condom.<sup>23</sup>

The good news is that the demonstrated difference between the method efficacy and the use efficacy of condoms can be overcome in populations, because the lower use efficacy is related almost entirely to nonuse rather than incorrect use. The Thai government has had an amazing success with the "100% Condom Campaign," which has led to consistent use of condoms in over 90% of sexual acts in brothels, with one well-designed prospective follow-up study finding a rate of 99% protection in the 68 prostitutes followed.<sup>24</sup> Also, Roddy<sup>5</sup> and colleagues recently reported 90% of sexual acts protected by a condom in a population of prostitutes in Cameroon following an intensive government campaign and targeted intervention. Thus, it is clear that targeted interventions and government campaigns can have a substantial impact on the use efficacy of condoms in preventing HIV. Improving the consistency of use of condoms in targeted populations is a public health priority, and a focus of several chapters in this current volume.

# Female Condoms

The Reality brand female condom is an intravaginal barrier device marketed as an alternative to the male condom for the prevention of pregnancy and sexually transmitted infections. It consists of a soft, loose-fitting polyurethane sheath with two flexible rings. When the device is properly placed, the inner ring rests behind the pubic bone and over the cervix, while the external ring and about one inch of the sheath remain outside the vagina and partially cover the external genitals and the base of the penis during intercourse.

Due to the female condom being a device worn by the woman, it has been hailed by some as a female-controlled method of contraception and STD prevention that can be used without the consent of the male partner. This female condom however, is not a device that can be used surreptitiously by the majority of women, and proper use requires the male to guide his penis into the condom. A follow-up study conducted in Kenya found that the noncooperation of the man was a factor for women who, despite the opportunity, did not use the condom.<sup>25</sup> A similar study in Brazil stated that women recognized that their continued use of the condom was dictated by their male partner.<sup>25</sup> In both studies, however, women indicated that they felt empowered by the female condom and a large proportion of the women expressed the desire to continue using it. Thus, while the Reality condom gives more control to the woman than the male condom, it is not a completely female-controlled technique.

Regardless of the acceptability of the female condom in populations, the key factor for decision makers is whether or not the condom is an effective barrier to STD and HIV. The theoretical efficacy of the Reality condom in preventing HIV infection is high. An *in vitro* study with mechanical simulation of coitus showed no leakage of cytomegalovirus or of HIV through the polyurethane membrane of the female condom.<sup>26</sup> There is limited information available about the method efficacy of the female condom in preventing STD and no available information about its efficacy in preventing HIV infection. A 6-month follow-up study of 377 women attending family planning clinics in the United States, Mexico, and the Dominican Republic evaluated the contraceptive efficacy of the Reality condom. The gross 6-month pregnancy rate was 15%. Pregnancy rates were lower among US women (12%) and among women who reported perfect (i.e., correct and consistent) use of the device (4%). Use failure was frequent during follow-up. Although the study group consisted of women who were engaged in mutually monogamous relationships and who had agreed to use the female condom as their primary contraceptive device, only 36% reported perfect use.<sup>9</sup>

Comparison of the contraceptive efficacy of the male condom with that of the female condom is difficult. No large-scale vial data are available on the male condom,<sup>27</sup> and the only large-scale follow-up study of the male condom is based on a cohort of adult married women who were selected for having successfully used contraception.<sup>28</sup> Thus, it is possible that there are differences in fecundity and frequency of intercourse in the female condom use, accounting for the apparently higher failure rates observed for the female condom. The failure rates of US women who used the female condom perfectly are nearly the same as the lowest expected failure rates reported for the male condom.

Preliminary studies of the acceptability and reliability of the female condom suggested that fluid leakage after intercourse might be lower than for the male condom,<sup>29</sup> and breakage rates in a recently completed study of the Reality brand female condom were less than 1%. On the other hand, the same study found that slippage occurred in 13% of 2300 condom uses.<sup>30</sup> A prospective study of 126 women treated for trichomoniasis showed that among the 104 women who completed a 45-day follow-up period, no reinfection occurred among 20 women (0%) who used the female condom all the time, 7 reinfections occurred among 50 women (14%) who did not use the device, and 5 reinfections occurred among 34 women (15%) who used it inconsistently.<sup>31</sup> A UNAIDS report suggests that in a Thai study of female prostitutes, those given both the male and female condom subsequently developed one third fewer STDs than women given only the male condom.<sup>32</sup> Whether the increased protection was due to use of the female condom or increased use of the male condom was not clear. In an ongoing study of the female condom in STD clinic patients in Alabama, mixed use of the male and female condom is common.<sup>33</sup>

Given the paucity of information about whether the female condom reduces the risk of HIV transmission, it should not be advocated as a stand-alone prevention technique at the present time. As there is no evidence, however, that the female

condom increases the risk of acquiring HIV, it is reasonable to consider offering the female condom to couples who have not been able to use the male condom. Based on the present evidence, it is best to offer the female condom in conjunction with the male condom to women who have been unable or unwilling to negotiate male condom use.

#### Microbicides

Vaginal microbicides are chemical barriers that are inserted into the vagina prior to intercourse to allow a woman to protect herself from infection with an STD. In theory, microbicides will work to protect men as well by inactivating many viruses and bacteria in the female genital tract. At present, no microbicide is available that has been proven to be effective against HIV transmission *in vivo*. The development of new microbicides is a research topic of the highest priority because microbicides represent truly female-controlled methods to reduce risk of transmission of HIV. Use of a microbicide would not depend on male-initiated use of condoms and could be used without male decision making or negotiation. This is important for the many women worldwide who lack the power or willingness to negotiate condom use with their male partners.

#### Nonoxynol-9

At present, all commercially available spermicides that are being considered as potential microbicides act as contraceptives by inactivating sperm in the vagina. The spermicides currently in wide distribution include nonoxynol-9 (N-9), menfegol (Japan), and benzalkonium chloride (France), which are all detergents that destroy microbial cell membranes.<sup>15</sup> N-9 has been studied extensively for its microbicidal value in preventing STD infections. Although the majority of studies indicate some protective effect of N-9 against gonorrhea and chlamydia, the data are not conclusive.<sup>5,34</sup> In addition, generalizing from STD prevention to HIV prevention for N-9 is not a good idea. Studies of N-9 and other detergent-based microbicides have shown that genital irritation can occur with frequent use.<sup>35–37</sup> Caution should be used in recommending spermicides for STD prevention, given the concern that increased genital irritation might actually facilitate HIV infection.

There have been a few attempts to assess whether or not N-9 is effective in preventing HIV infection. The theoretical efficacy of N-9 is high, with several researchers showing that N-9 kills HIV in the laboratory setting.<sup>38,39</sup> Unfortunately, the data on the method efficacy of N-9 in preventing HIV are conflicting. Some researchers have suggested a protective effect of N-9, some have found that N-9 users have an increased risk of HIV,<sup>3</sup> while others have found no effect.<sup>5</sup> The differences in the findings may be due to multiple factors, including different study designs (women using spermicide in nonrandomized studies may

have a different HIV risk profile than nonusers), multiple delivery formulations of product or placebo (sponge, film, suppository, foam, jelly), varying spermicide doses, study sample sizes, and frequency of use in the populations studied.

The best quality study to date is a randomized controlled trial conducted in a population of prostitutes in Cameroon by investigators at Family Health International and the Cameroonian Ministry of Health. In this trial, the participants were randomized to receive either a 70-mg N-9 vaginal film or a vaginal film containing no N-9. The study was blinded such that none of the investigators, biostatisticians, or participants knew who was receiving the N-9 film. The rates of HIV transmission were the same between the 575 women who were given the placebo and the 595 women who were given the N-9 film (RR 1.01, 95% CI 0.68–1.52).<sup>5</sup> In addition, the rates of gonorrhea and chlamydia transmission were the same, and the women using the N-9 film were 26% more likely to develop genital lesions than those in the placebo group (although this finding did not quite reach statistical significance).

The results of this study must be interpreted with caution. The women were encouraged to use condoms, and 90% of the sexual acts were protected by both condoms and vaginal film.<sup>40</sup> Thus, the data from this trial can be interpreted as indicating that N-9 does not offer any *additional* protection over condoms. There is still no conclusive evidence about whether or not N-9 provides protection in the absence of condoms. Given this lack of evidence and the possibility that N-9 use may actually increase risk of infection in some women, the Centers for Disease Control and Prevention and the National Institutes of Health in the United States do not recommend that N-9 be suggested to women as a method of protection against HIV infection.<sup>41,42</sup>

#### Future Microbicides

Researchers worldwide are working to develop new products that can be used as microbicides. The ideal vaginal microbicide should be easy to use, safe and effective, stable even in hot climates, and affordable.<sup>43</sup> For microbicides to be useful as female-controlled barriers, they should be able to be used without the knowledge of the male partner, so they should also be tasteless, colorless, and odorless. Because in some cultures men prefer "dry" sex, some microbicides may be needed that do not add much moisture to the vagina in order for them to be acceptable to some users. In addition, microbicides that do not prevent pregnancy should be available for women who wish to protect themselves from HIV and other STDs while remaining fertile. Finally, the ideal vaginal microbicides should not disrupt the normal vaginal ecology by killing the naturally occurring organisms that help maintain healthy pH and mucous membranes, such as hydrogenperoxide-producing lactobacilli.<sup>44</sup>

Clearly, the development of microbicides that meet all of these criteria

presents a technological challenge. Promising new products are being developed that fall into three categories by the mode of action they take against HIV: killing or inactivating the virus, stopping the virus from entering mucosal cells, or inhibiting viral replication.<sup>37</sup> Several of these products are in safety, toxicity, and acceptability trials in humans, so there is hope of new products being on the market within the next decade.

# DIAGNOSIS AND TREATMENT OF STD FOR HIV PREVENTION

There is a strong biological rationale as to why STDs increase the probability of HIV transmission during a given infectious sexual encounter. Ulcerative STDs disrupt the integrity of the epithelial mucosa and facilitate HIV contact with the lymphatic and circulatory systems. Genital ulcers from syphilis, chancroid, or herpes simplex virus, among others, have been estimated to increase risk of HIV transmission five- to tenfold in high-risk settings. While inflammatory and exudative STDs (those without frank ulcers, such as chlamydia, gonorrhea, and trichomoniasis) are less disruptive of the epithelial tissues, the infection causes inflammation and associated recruitment of large volumes of cervical or urethral discharge filled with HIV-susceptible white blood cells (exudate). Inflammation results in microulcerations and the engorgement of capillaries, facilitating contact of HIV with easily infectable cells. These inflammatory, nonulcerogenic STDs are estimated to increase HIV infection risk two- to fivefold.<sup>45</sup>

This might suggest that ulcerogenic STDs should be the preferential targets of interventions; however, as inflammatory and exudative STDs are far more common than ulcerogenic STDs, the risk within a given population attributable to inflammatory STDs is greater than for ulcerogenic STDs. All STDs can recruit  $CD^{4+}$  lymphocytes and macrophages to the site of infection. It is therefore likely that all STDs should be targeted for control in order to effect a substantial impact on HIV transmission.

One of the most important findings in HIV prevention over the past decade is the discovery that successful reduction in STD can prevent HIV transmission in populations of high or medium risk.<sup>46</sup> A clinical trial design in Tanzania has demonstrated that even low-technology STD services such as syndromic management (treatment of STD for those who exhibit symptoms, with or without laboratory confirmation) have reduced HIV incidence substantially.<sup>47</sup> In the Tanzanian study in the Mwanza district (on the southeastern shore of Lake Victoria), investigators randomized 12 villages into 6 pairs that were balanced on similarity of characteristics. The matched-paired villages were also selected for not having much interaction, that is, persons were not expected to travel or move between the two villages. A sexual risk reduction program was instituted in all 12 villages. In addition, a basic community-health-worker-based syndromic management for STD was offered in one of each paired village, while referral to an STD clinic in Mwanza town was recommended to symptomatic persons in the other six villages. No changes in behavior were noted between the paired villages, but there was a 42% 2-year decline in HIV incidence in the villages receiving syndromic STD services compared to the villages where persons with STD symptoms were referred to Mwanza town. Reduced duration of infectiousness and active disease among persons with STD symptoms had resulted in the HIV transmission declines. This watershed study confirmed that even relatively low-cost STD control approaches can be vital tools in HIV prevention.<sup>47</sup>

In Zaire, STD and condom services for sex workers reduced HIV risk in proportion to the frequency with which the services were utilized.<sup>48</sup> The study design was to offer STD screening and treatment, HIV risk reduction education, and condoms to active sex workers. This enabled assessment of the relationship between level of exposure to an intervention (regularity of visits to a clinic) and HIV incidence. Two important issues were addressed: dose-response impact versus a saturation effect. Dose-response findings suggested that the protection afforded by the intervention was related to the level of exposure to it. The Zaire study suggested a dose-response association of lower HIV incidence in proportion to the increased frequency of STD clinic attendance, persisting after controlling for reported condom use and the number of sexual clients. STD detection and treatment was an important part of this successful risk reduction effort. Reduced HIV incidence was not simply due to a saturation effect, which can occur when the incidence of HIV infection declines owing to the fact that most susceptible persons have already been infected rather than owing to the impact of a preventive intervention. When susceptible highest-risk persons have been largely infected, those individuals in the population who are most at risk seroconvert first; the remaining lower-risk individuals in the cohort get infected at a lower rate simply because they are people who engage in less high-risk behavior. Since both regular and irregular condom users had a lower rate of HIV infection with increasing STD clinic attendance, the declining rate of HIV infection is very likely attributable, at least in part, to the STD intervention and not simply to a saturation effect. Moreover, the Zairian commercial sex workers who seroconverted did not report a significantly higher mean number of partners than those who did not seroconvert, suggesting that they were probably not a higher-risk group.<sup>48</sup>

The Zaire study is unusual in the HIV/AIDS literature because it examines the impact of a multiple-intervention program that includes both a behavioral intervention (condom promotion) and a medical intervention (the screening and treatment of STD). While the study cannot fully disentangle the effects of STD screening and treatment from condom use, it does suggest that increased condom use was not the only factor responsible for the reduced incidence of HIV infection. Regular clinic attendance clearly had an impact on incidence of HIV infection independent of condom use. The Zaire work is a model for epidemiological and

operations research within a control program, inferring enormously useful information from a "real-world" intervention. The Mwanzan study applied the most disciplined methodological approach—the controlled clinical trial—to fully confirm the impressions that STD control can reduce HIV incidence.

While a clinical trial remains the definitive field test of efficacy, it is not always feasible to do this within a given control program or ethical context. It is therefore all the more extraordinary that results of yet another approach, a community randomization of mass chemotherapy for STD to reduce HIV incidence, are forthcoming in 1998–1999 from the Rakai district of Uganda. Between Mwanza and Rakai, it should be even more apparent what the minimalist STD approach in the former and the aggressive mass chemotherapy approach of the latter can do to reduce HIV incidence. The costs of such programs are nontrivial. The need to monitor STD drug resistance is critical. Availability of at least syndromic diagnosis, training, and quality control and a steady supply of suitable drugs are extremely important. Hence, starting and sustaining STD programs to prevent HIV infection remains complex in resource-poor settings.

# ISSUES IN VACCINE DEVELOPMENT

The worldwide eradication of smallpox and the near eradication of polio through vaccines have fueled interest in the development of an effective vaccine for HIV infection. Development of a protective vaccine for HIV infection has been a goal since the recognition of the AIDS pandemic, though most investments in research and development have been through the public rather than the industrial sector. The development of successful veterinary vaccines for retrovirus infections of domestic cats and protection of chimpanzees from HIV-1 in idealized vaccine experiments illustrate the feasibility of an effective antiretroviral vaccine.<sup>49,50</sup>

However, fundamental barriers remain in understanding how to develop a vaccine for HIV infection in humans. The lack of a good animal model in which to test vaccines prior to use in humans is a major problem. Animal models for vaccines include mice that are genetically immunocompromised and have their immune systems reconstituted with human cells (SCIDhu-mice), chimpanzees infected with HIV or a recombinant of simian immunodeficiency virus (SIV) and HIV (termed SHIV), and macaques infected with SIV. None of these models is easily affordable, nor do any of them mimic human infection and disease in optimal ways.

In addition, it is not well understood whether infection is initiated by free virus particles, virus with or without antibodies, or HIV-infected cells. In other viral infections, it is possible to study the protective immune responses of exposed individuals who recover from disease and appear to be resistant to disease upon reinfection. In the case of HIV infection, there have been no demonstrated cases

of disease recovery, so we have no immune response to mimic. In addition, it has been difficult to characterize a protective immune response in exposed individuals who are not infected. A distinction must be made between protection from infection and disease. Prophylactic vaccines in wide use (measles, mumps, rubella, polio, hepatitis A, hepatitis B, and others) provide high levels of protection from disease. However, none of them absolutely restricts infection, that is, they permit but limit the infection. Thus, in considering the strategy for an HIV vaccine, the historical failure of other viral vaccines to completely prevent infection, so-called "sterilizing immunity," must be considered. Even transient replication of HIV allows the cell-to-cell spread of infection and development of latent infection. Finally, the antigenic and genetic diversity of HIV, including the recent demonstration of infection with viruses that appear to represent recombinants between more than one subtype, suggests that a universally effective HIV vaccine will need to be effective against a wide range of diverse viruses.<sup>51</sup>

Development and testing of candidate HIV vaccines has led to several studies in humans. Safety and immunogenicity studies of vaccines from genetically engineered proteins of HIV (subunits) demonstrated that these were safe and induced an antibody response. However, antibodies from vaccinated individuals failed to cross-neutralize wild virus.<sup>52,53</sup> This suggested that the immune responses elicited by subunit vaccines were unlikely to result in significant protection, which limited further government funded trials in the United States. Privately funded trials are expected to begin in the United States in the summer of 1998. In addition, the rapidly increasing rate of HIV infection in developing countries and the potential value of an HIV vaccine with any protective effect in the face of the global pandemic have led to studies of these vaccines in Thailand and Uganda.<sup>54</sup> While large-scale efficacy trials are still in the early phases, researchers hope to learn if subunit vaccines provide at least some protection against HIV infection.

The development of live, attenuated vaccines to prevent HIV infection and AIDS is more controversial. Live, attenuated vaccines are made from live virus that is genetically engineered not to cause disease. A genetically engineered SIV, in which important parts of the SIV genetic material were deleted, provided immunity to infection with normal SIV and prevented disease in adult rhesus macaques. However, inoculation of infant monkeys with the same live, attenuated virus resulted in infection and disease.<sup>55</sup> The complex safety issues arising in the use of live, attenuated retroviruses continues to raise concerns about (and prevent) studies in humans. However, a "natural" experiment occurred that may provide a rationale for the testing of a live HIV vaccine. Five transfusion recipients from a single infected donor in Australia, who had not developed disease, were found to be infected with a strain of HIV containing deletions similar to those in the live, attenuated SIV vaccine.<sup>56</sup> The fact that none of the individuals infected with this particular strain of HIV have developed disease argues for the potential safety of a live, attenuated HIV vaccine.

Live virus vector vaccines, in which one or more genes of HIV are inserted into non-HIV viral carriers (vectors), represent a live virus vaccine strategy without the risks of an attenuated HIV vaccine. The enthusiasm for a live vaccine approach is due to the fact that the viral carrier engenders an immune response from the same type of cells that are attacked by HIV. Strategies to insert HIV genes in viral vector vaccines are ongoing with the vaccinia and canarypox viruses.<sup>57</sup> Additional vaccine strategies that are under investigation include injection of "naked DNA" and insertion of HIV genes into bacterial vectors. Prior to human studies and development of an effective vaccine, research with animal models and an increasing understanding of the immune responses in HIV infection are crucial.

Because of the critical importance of a vaccine to prevent AIDS, determining the optimal design of HIV vaccine efficacy trials has been the focus of national and international investigators and organizations. The conduct of large efficacy trials studies of an HIV vaccine depends on the identification of populations at risk for HIV, the development of methods to solicit individual and national participation with appropriate informed consent, and provision of education and prevention to trial participants. Principles for the conduct of HIV vaccine trials span scientific, public health, economic, political, ethical, and social issues that must be considered as part of the global efforts to develop an effective vaccine.<sup>54</sup>

Scientific issues of greatest concern are the safety and immunogenicity of vaccines, their effectiveness against infection and disease resulting from different modes of transmission, and the durability of a protective response. For example, safety and immunogenicity testing in humans must take into account differences in immune responses in populations with a high burden of chronic parasitic infection or differences in the genetic makeup of the immune system. Differences in the genetic markers expressed by widely variable subtypes of HIV are also important considerations. Development of HIV vaccines in Europe and the United States has focused on subtype B HIV, while nonsubtype B viruses, with wide divergence in genetic markers, are common in developing countries. Heterosexual transmission of HIV, often associated with sexually transmitted diseases, is the dominant mechanism of transmission in much of the world. Yet risk groups identified in the United States and Europe as potential participants in trials acquire HIV infection through homosexual contact and parenteral drug use. It has not yet been determined whether the lessons learned from efficacy trials in one subtype of HIV or one transmission setting will apply to others.

The effect on HIV/AIDS prevention efforts of a vaccine without perfect use efficacy is a key public health issue in the conduct of large-scale efficacy trials. Blower and McClean<sup>58</sup> point out that barrier and behavioral prevention efforts may be compromised by even the perception that an effective vaccine is possible. The possibility that an HIV vaccine could actually increase the rates of transmission by encouraging greater risk behavior cannot be discounted in the development of clinical trials. Implementation and sustainability of prevention and education

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programs are first steps that must precede large-scale clinical trials or an immunization program. After the deployment of a vaccine strategy, surveillance for effective immunization in at risk populations and evaluation of the long-term effects on HIV transmission and disease are crucial.

Economic issues figure prominently in the development of clinical trials networks to test HIV vaccines. To provide meaningful protection, a vaccine must be readily available to large numbers of people, Generally it is assumed that this will be incorporated into government and supranational programs through the World Health Organization (WHO). However, it is not clear who will pay for vaccine production and delivery and the necessary surveillance systems. Pharmaceutical manufacturers are increasingly leery of investing in a vaccine without a clear market that affords a profit. National health organizations are unlikely to encourage large-scale vaccine studies that do not promise availability of a vaccine at an affordable price to the populations participating in the trials.

Political, practical, and ethical issues figure prominently in the planning of HIV vaccine trials. To assure populations and governments of the safety and plausibility of a vaccine strategy, safety and acceptability trials will need to be conducted both in the country of manufacture and the region in which a vaccine efficacy trial is considered *before* large efficacy studies are launched. Consensus among policymakers, the press, and the scientific community are also required prior to large-scale efficacy trials in countries most affected by the HIV pandemic.

# PREVENTING PERINATAL TRANSMISSION

Transmission of HIV infection from mother to child accounts for a growing proportion of infant mortality in many countries with a high prevalence of HIV infection in young adults. With improved blood screening and a decreased use of blood transfusion, the transmission of HIV to infants via blood transfusion has been reduced and mother-to-child transmission has become the leading cause of HIV infection and AIDS in infants and children throughout the world. Advances in evaluation and prevention of mother-to-child transmission of HIV have focused on identification of risk factors in the mother (see Table 3), improved diagnostic testing to identify infection in infants born to seropositive women, and most significantly the use of antiretroviral drugs in both mothers and infants to reduce transmission. Finally, the role of breast-feeding in the transmission of HIV infection from mother to infant presents a major public health and ethical challenge in developing countries. While there is clear evidence that HIV is transmitted to infants via breast-feeding, there are important limits on the capacity to provide safe and adequate formula feeding as an alternative to breast-feeding for the millions of HIV-infected women of childbearing age.

Studies conducted in Africa, Asia, North America, and Europe have demon-

Maternal	Obstetric	Postpartum
Advanced maternal disease Decreased CD4+ cell numbers Increased HIV plasma RNA Decreased vitamin A levels	Prolonged rupture of membranes Instrumentation Vaginal delivery Birth trauma	Breast-feeding Contaminated medical equipment (e.g., injections, cutting the cord) Contaminated blood or blood product

Table 3. Risk Factors for Mother-to-Child Transmission

strated a rate of mother-to-child transmission that varies from 14% to more than 40%, depending on maternal risk factors and the availability of alternatives to breast-feeding.<sup>59</sup> Most studies of HIV infection in infants born to seropositive women have depended on the long-term follow-up of infants, measuring the occurrence of AIDS and mortality. Infection was defined as the continued production of antibodies reactive with HIV after more than 12-15 months of life; only at that point were cases included in calculations of the frequency of vertical transmission.<sup>60</sup> Assessment of HIV infection in infants has been complicated by the passage of maternal HIV antibodies to the infant, causing any infant born to a seropositive woman to have the mother's HIV antibodies for up to 15 months after birth. Therefore, conventional tests for HIV antibodies often will be positive in the first year of life, regardless of the infant's actual infection status. New diagnostic tests offer more accurate early diagnosis of infection in infants born to seropositive women. These include the use of polymerase chain reaction (PCR) assays to identify HIV RNA and DNA in plasma and cells, immune complex, disassociated p24 antigen assays, and tests for the production of IgM and IgA antibodies.<sup>61–63</sup>

Despite the application of these technologies, the timing and mechanism(s) of transmission of HIV from mother to infant and the extent to which HIV infection is acquired by the infant during gestation (*in utero* infection), during labor and delivery (peripartum infection), during early infancy (late transmission), or from breast-feeding remain speculative. Precise definition of the frequency of each of these modes of transmission depends on sensitive and specific testing to identify infection in infants and may differ between countries and populations. Molecular methods (PCR and the Nucleic Acid Sequence Based Amplification [NASBA] assays) and virus culture that identify plasma viremia and cell-associated HIV DNA have proven to be the most sensitive and specific tests for the diagnosis of infection in infants. Sequencing of viruses from mothers and infants provides molecular "proof" that infection in the infant originated from virus strains present in the mother.<sup>64</sup> Nevertheless, even when infection is demonstrated by the identification of circulating virus in the infant, it is difficult to accurately assess when the infection was transmitted or acquired.

The timing and mechanism of transmission of HIV from mother to infant has important implications for prevention of vertical transmission. Several lines of evidence suggest that infection of infants occurs most commonly during labor and delivery. The majority of infants who are ultimately found to be infected only develop evidence of active virus replication (positive PCR tests and virus cultures) 2 to 4 weeks after birth, suggesting that the majority of infections occur during labor and delivery.<sup>65</sup> One study of twins born to HIV-seropositive women found that the firstborn twin was more likely to become infected, suggesting that birth trauma and exposure to maternal secretions and blood plays a role in transmission.<sup>66</sup> If HIV infection is acquired during labor and delivery, it has been postulated that operative delivery (cesarean section) with reduction in superficial trauma and exposure of the infant to maternal blood and secretions could reduce infection of the infant. Some observational studies have shown a decrease in mother-tochild transmission among children delivered by cesarean section, while others have not.67,68 While formal clinical trials comparing cesarean section with vaginal delivery have not been reported, analysis of existing observational data does suggest that infection in infants may be reduced by cesarean section. However, the cost and maternal morbidity associated with cesarean sections may not be justified in many settings.

A low-cost and practical treatment during labor and delivery to reduce infant exposure to maternal virus is the use of a virucide in the form of a vaginal and baby wash with an antiseptic. The first large-scale evaluation of this strategy was examined in a randomized controlled trial of chlorhexidine washing of the vagina prior to delivery in Malawi.<sup>69</sup> Use of a relatively dilute solution of chlorhexidine to cleanse the vagina failed to demonstrate an overall reduction in infant infection. However, there was a decrease in transmission in infants whose mother's received the wash and had prolonged rupture of membranes. Studies of the safety and activity of more potent virucides will be an important test of the hypothesis that infection can be prevented by reducing infants' exposure to maternal virus during birth.

Comparisons of the rate of infant infection in settings of universal breastfeeding suggest that 10–20% of infants born to seropositive women acquire infection through breast milk.<sup>70</sup> This poses difficult questions, since the maintenance of breast-feeding is recognized as crucial for adequate infant nutrition in settings where impure water and poverty are prevalent and breast-feeding is important in contraceptive, cultural, and emotional contexts. The increased morbidity, mortality, and expense associated with formula feeding are significant barriers to implementing recommendations to limit breast-feeding where there is limited access to safe drinking water and where resources do not permit the purchase or distribution of adequate infant formula. Practical and safe alternatives to maternal breast feeding for HIV-infected women are critically important but currently unavailable. Formal trials comparing breast- and formula feeding are in progress and will

provide important information on the frequency of transmission in the context of maternal-infant transmission.

There are strong associations between maternal HIV infection assessed by clinical, immunologic, or virologic measures and risk of infection in infants. Obstetrical risk factors associated with an increased frequency of infection in the infant include prolonged rupture of membranes before delivery, instrumentation (such as the use of scalp electrodes for fetal monitoring), and in some studies, vaginal delivery (as compared to cesarean delivery).<sup>71,72</sup> Throughout the world, lower CD<sup>4+</sup> cell numbers and higher HIV plasma RNA levels in mothers have each been associated with an increased risk of mother-to-infant transmission.<sup>73</sup> This leads to the general conclusion that efforts to decrease immunodeficiency and improve the health of mothers could result in a decrease in vertical transmission. An important study among HIV-infected pregnant women in Malawi showed that micronutrient status, specifically, low levels of vitamin A in maternal serum, were associated with vertical transmission of HIV.74 These findings, as well as the demonstration that vitamin A supplementation in Indonesia and Bangladesh<sup>75</sup> results in decreased infant mortality, have led to the initiation of further studies to examine the possibility that provision of vitamin A and other micronutrients could reduce HIV transmission and infant mortality.

The administration of zidovudine to seropositive women during pregnancy, labor, and delivery followed by 6 weeks of treatment of the newborn infant resulted in more than a 60% decrease in infection among infants enrolled in the AIDS Clinical Trial Group protocol 076 trial in the United States and France.76,77 While this has provided the first demonstration that mother-to-child transmission rates could be reduced dramatically, the large-scale practical application of antiretroviral therapy in pregnant women in developing countries has not been achieved. A series of international studies, using more affordable antiretroviral drugs or regimens administered for shorter lengths of time, are currently in progress. The aim of these studies is to determine whether affordable, short-course antiretroviral therapy can safely and effectively prevent maternal-infant transmission. As additional drugs are evaluated in this setting and the costs of antiretroviral therapies decrease, it should be possible to achieve significant reductions in perinatal transmission through programs to provide treatment to seropositive, pregnant women. Sustainability of affordable therapy for postpartum mothers is vet another daunting challenge for resource-poor settings.

Prevention of transmission through the use of antiretroviral therapy poses many ethical and practical problems. Implementation of antiretroviral treatment during pregnancy would require the identification of HIV infection in pregnant women. In many countries, this is associated with social stigmatization and loss of support from an extended family network and poses direct social and physical risks to women. Further, in order to sustain the benefits of antiretroviral therapy, it would be necessary to change traditional approaches to breast-feeding or to provide antiretroviral drugs to mothers or infants for a prolonged time period. Finally, the potency of antiretroviral drugs in the setting of pregnancy may be diminished if the same drugs are in widespread use for the treatment of HIV infection in adults owing to the development of resistant strains of virus. Thus, sustained activity of antiretroviral drugs in the prevention of perinatal transmission may require restrictions on the use of the same drugs for treatment of HIV infection and AIDS.

# PREEMPTIVE THERAPY

Antiretroviral drugs are significantly affecting the treatment of HIV infection and AIDS. Increasingly, combinations of potent reverse transcriptase and protease inhibitors are being used to inhibit the replication of HIV. This has translated into improved longevity and quality of life for thousands of individuals receiving new therapies for HIV.<sup>78</sup> Whether antiretroviral drug therapies can eradicate HIV from individuals with established infection is still being studied in HIV-infected individuals who are being maintained on intensive combination regimens over years. Treatment of HIV infection with antiretroviral drugs before the development of AIDS has been shown to prevent immune deterioration and disease progression. This is leading to the earlier application of drug therapy, extending to the treatment of acute and early virus infection. In a small number of subjects, antiretroviral therapy has been initiated in acute HIV infection, which is a syndrome associated with high-level viremia that occurs 1-2 weeks after exposure before an antibody response has developed. Here, it is posited that potent antiretroviral therapy will be more effective, since limited damage has been inflicted on the immune system, seeding of cells and organs with virus has occurred only in the brief time since infection, and the diversity of virus within in an individual is limited.

In the context of prevention, there is some evidence that potent inhibition of virus infection may be sufficient to abort or "cure" infection when antiretroviral drugs are administered during the days following exposure to the virus. Successful postexposure prophylaxis—the administration of potent drugs shortly after contact with infectious virus-has prevented transmission of HIV infection in tissue culture experiments and in animal models.<sup>79</sup> Administration of antiretrovirals to mice and rhesus macaques challenged with SIV results in decreased transmission when provided before and in some experiments within hours after virus challenge.<sup>80–82</sup> The potential benefit of postexposure prophylaxis in the reduction of HIV transmission has been reinforced by two observations. In hospital and clinical settings, a recent meta-analysis of the administration of zidovudine as postexposure prophylaxis in cases of parenteral exposures (needle stick accidents) provides evidence for a reduction as high as 80% in the transmission of HIV.<sup>82,83</sup> Further evidence that postexposure prophylaxis impacts transmission has been inferred from the success of antiretroviral therapy in pregnant women (see Preventing Perinatal Transmission). While the mechanism by which antiretroviral drugs de-

crease vertical transmission has not been defined, one explanation may be that the passage of drug across the placenta provides the infant with protective levels of intracellular drug before exposure to virus at the time of birth.

Can postexposure prophylaxis or "preemptive therapy" find an application in the prevention of HIV infection following sexual exposure to the virus? Several theoretical considerations about the early events in virus infection bear on this issue. There is evidence that HIV infection is usually the result of a single "one hit" event that initiates infection of a single cell. This is seen in the nature of early virus infection, in which all virus in an individual appears to be genetically identical. Also, the time between exposure and high-level virus replication is often as long as 3–4 weeks, probably because a single replication cycle takes as long as 16– 24 hr. This results in a bottleneck in the earliest replication events and subsequent infection of additional cells. In addition, the efficiency of production of infectious HIV, even under optimal conditions, is so low that only 1 in 100 to 1 in 1000 virus particles produced from an infected cell is competent to infect other cells. These observations may explain the relative inefficiency of sexual and parenteral transmission as well as the lengthy period beyond exposure and high-level viremia.

Can we use antiretroviral therapies to take advantage of the vulnerability of HIV during the earliest events following exposure? The results of the metaanalysis of postexposure prophylaxis among cases of needle stick exposures argue that this is possible. However, in the context of sexual exposure, there is a paucity of clinical data. In areas of the world with high rates of HIV infection and STD, the risk of subsequent seroconversion (HIV infection) is as high as 5-10%among individuals who report an STD (see Diagnosis and Treatment of STD for HIV Prevention). Since the incubation period of some of the STD associated with acquisition of HIV may be less than 7 days, treatment of those at greatest risk for HIV with an antiretroviral drug may be a testable strategy. As antiretroviral drugs become less expensive and drugs that have favorable pharmacokinetics are identified, postexposure prophylaxis following sexual exposure is a strategy that could be tested in STD patients, discordant couples, and in cases such as the breakage of condoms or involuntary sexual exposure (rape). While the postexposure prophylaxis strategy is important to test, there is a risk that deployment of this hypothetical prevention method could reduce the effectiveness of the more efficacious prevention measures such as the use of condoms and the promotion of risk reduction behaviors. In addition, the high cost of antiretroviral drugs limits its relevance for resource-poor settings.

# CONCLUSION

It is a difficult task to measure the effectiveness of HIV control programs. Risk reduction education, condom distribution, and STD control are still the best tools we have in controlling the HIV epidemic. It is of vital importance to know which programs work and in what social contexts; the remainder of this volume is devoted to describing how and why programs have been successful or unsuccessful. The impact of a multifaceted prevention program including condom promotion and social marketing, STD screening and treatment, reduction of perinatal transmission, use of novel barriers such as the female condom, and behavioral change interventions may well have a greater impact than the more limited interventions that are attempted in nearly all studies that have been discussed in this chapter.

#### REFERENCES

- Van de Perre P, Jacobs D, Sprecher-Goldberger S. The latex condom, an efficient barrier against sexual transmission of AIDS-related viruses. AIDS 1987; 1:49–52.
- 2. Trussel J. Methodological pitfalls in the analysis of contraceptive failure. Stat Med 1991; 10201-220.
- Feldblum P, Morrison C, Roddy R, et al. The effectiveness of barrier methods of contraception in preventing the spread of HIV. AIDS 1995; 9:S85–S93.
- 4. Malkovsky M, Newell A, Dalgleish A. Inactivation of HIV by nonoxynol-9. Lancet 1988; 1:645.
- 5. Roddy R. Presentation at the National Institutes of Health on April 9, 1997.
- Kreiss J, Ngugi E, Holmes K, et al. Efficacy of nonoxynol-9 contraceptive response use in preventing heterosexual acquisition of HIV in Nairobi prostitutes. JAMA 1992; 268:477–482.
- Allen S, Serufilira A, Bogaerts J, et al. Confidential HIV testing and condom promotion in Africa: Impact on HIV and gonorrhea rates. JAMA 1992; 268:3338–3343.
- Ngugi E, Simonsen J, Bosire M, et al. Prevention of transmission of human immunodeficiency virus in Africa: Effectiveness of condom promotion and health education among prostitutes. Lancet 1988; 1:877–890.
- Farr G, Gabelnick H, Sturgen K, et al. Contraceptive efficacy and acceptability of the female condom. Am J Public Health 1994; 84:960–1964.
- 10. Baigent C. The need for large-scale randomized evidence. Br J Clin Pharmacol 1997; 43:349-353.
- 11. Lurie P, Wolfe S. Unethical trials of interventions to reduce perinatal transmission of the human immunodeficiency virus in developing countries. N Engl J Med 1997; 337:853–856.
- 12. Angell M. The ethics of clinical research in the third world. N Engl J Med 1997; 337:847-849.
- 13. Phanuphak P, Vermund S. Ethical issues for perinatal HIV trials in developing countries. *Pediatr* AIDS HIV Infect 1996; 7:236-237.
- Varmus H, Satcher D. Ethical complexities of conducting research in developing countries. N Engl J Med 1997; 337:1003–1005.
- Stratton P, Alexander N. Prevention of sexually transmitted infections: Physical and chemical barrier methods. STD AIDS Era 1993; 7341–859.
- 16. Alexander N. Barriers to sexually transmitted diseases. Sci Am 1996; 3:32-41.
- 17. Judson F, Ehret J, Bodin G, et al. In vitro evaluations of condoms with and without nonoxynol-9 as physical and chemical barriers against Chlamydia trachomtis, herpes simplex virus type 2, and human immunodeficiency virus. Sex Transm Dis 1989; 16:51–56.
- Rietmeijer C, Krebs J, Feorino P, et al. Condoms as physical and chemical barriers against human immunodeficiency virus. JAMA 1988; 259:1851–1853.
- Lytle D, Carney P, Vohra S, et al. Virus leakage through natural membrane condoms. Sex Transm Dis 1990; 17:58–62.
- Cavalieri d'Oro L, Parazzini F, Naldi L, et al. Barrier methods of contraception, spermicides and sexually transmitted diseases: A review. Genitourin Med 1994; 70:410–417.

- De Vincenzi I. A longitudinal study of human immunodeficiency virus transmission by heterosexual partners. N Engl J Med 1994; 331:341–346.
- Deschamps M, Pape J, Hafner A, et al. Heterosexual transmission of HIV in Haiti. Ann Intern Med 1996; 125:324–330.
- Allen S, Tice J, VandePerr P, et al. Effect of serotesting with counseling on condom use and seroconversion among HIV discordant couples in Africa. Br Med J 1992; 304:1605–1609.
- Rugpao S, Beyrer C, Tovananbutra S, et al. Multiple condom use and decreased condom breakage and slippage in Thailand. J AIDS Human Retrovirol 1997; 14:169–173.
- 25. AIDSCAP Women's Initiative Summary Report. The female condom as a woman controlled protective method: Nairobi, Kenya (distributed by Family Health International).
- Drew W, Blair M, Minor R, et al. Evaluation of the virus permeability of a new condom for women. Sex Transm Dis 1990; 17:110–112.
- 27. Trussell J, Sturgen K, Strickler J, et al. Comparative contraceptive efficacy of the female condom and other barrier methods. Family Plan Perspect 1994; 26:66–72.
- Potts M, McDevitt J. A use effectiveness trial of spermicidally lubricated condoms. *Contraception* 1975; 11:701–710.
- Leeper MA, Conrardy M. Preliminary evaluation of Reality, a condom for women to wear. Adv Contracept 1989; 5:229–235.
- Lawson L. Acceptability and use of the female condom. Presentation at National Conference on Women and HIV, Los Angeles, Calif, May 6, 1997.
- 31. Soper D, Shope D, Shangold G, et al. Prevention of vaginal trichomoniasis by compliant use of the female condom. Sex Transm Dis 1993; 2:137–139.
- 32. UNAIDS, The female condom and AIDS. UNAIDS Best Practice Collection, April, 1997, Geneva: Author.
- Macaluso M. The female condom: Acceptability and use patterns among Alabama STD clinic patients (Abstract). 1996 National STD Prevention Conference, December 9–12,1996, Tampa, Fla.
- 34. Cavalieri d'Oro L, Parazzini F, Naldi L, et al. Barrier methods of contraception, spermicides and sexually transmitted diseases: A review. Genitourin Med 1994; 70:410-417.
- Roddy R, Cordero M, Cordero C, et al. A dosing study of nonoxynol-9 and genital irritation. Int J STD AIDS 1993; 4:165–170.
- Niruthisard S, Roddy R, Chutivongse S. Use of nonoxynol-9 and reduction in rate of gonococcal and chlamydial cervical infections. *Lancet* 1992; 339:1371–1375.
- Elias C, Coggins C. Female-controlled methods to prevent sexual transmission of HIV. AIDS 1996; 10(s3):s43-s51.
- 38. Malkovsky M, Newell A, Dalgleish A. Inactivation of HIV by nonoxynol-9. Lancet 1988; 1:645.
- Bird K. The use of spermicide containing nonoxynol-9 in the prevention of HIV infection. AIDS 1991; 51791–796.
- Roddy R, Leopold Z, Kelley R, *et al.* A randomized controlled trial of the effect of nonoxynol-9 film use on male to female transmission of HIV-1. National Conference on Women and HIV. Pasadena, Calif, May, 1997, p. 135.
- Randall P. NIAID evaluates N-9 film as microbicide. National Institute of Allergy and Infectious Diseases. Press release, April 3, 1997.
- Centers for Disease Control and Prevention. HIV/AIDS Prevention Newletter. May, 1997. Atlanta: US. Department of Health and Human Services.
- 43. The International Working Group on Vaginal Microbicides. Recommendations for the development of vaginal microbicides. *AIDS* 1996; 10:UNAIDS1–UNAIDS6.
- 4.4. Alexander N. Future contraceptives. Sci Am September, 1995:136-141.
- Wasserheit J. Epidemiologic synergy: Interrelationships between human immunodeficiency virus infection and other sexually transmitted diseases. Sex Transm Dis 1992; 19:61–77.
- 46. Laga M. STD control for HIV prevention-It works! Lancet 1995; 346518-519.

- Grosskurth H, Mosha F, Todd J, et al. Impact of improved treatment of sexually transmitted diseases on HIV infection in rural Tanzania: Randomized controlled trial. Lancet 1995; 346:530–536.
- Laga M, Alary M, Nzila N, et al. Condom promotion, sexually transmitted diseases treatment, and declining incidence of HIV-1 infection in female Zairian sex workers. *Lancet* 1994; 344:246–48.
- Jarret W. The development of vaccines against feline leukemia. In: H Hiatt, J Watson, & JH Winsten (Eds.) Origins of Human Cancer. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press, 1977; 1215–1222.
- Lubeck M, Natuk R, Myagkikh M, et al. Long-term protection against high-dose HIV-1 challenge induced by immunization. Nature Med 1997; 3:651–658.
- 51. Hu D, Dondero T, Ray field M, et al. The emerging genetic diversity of HIV: The importance of global surveillance for diagnostics, research and prevention. JAMA 1996; 275:210-216.
- Berman P, Gray A, Wrin T, et al. Genetic and immunologic characterization of viruses infecting MN-rgp1200-vaccinated volunteers. J Infect Dis 1997; 176:384–397.
- Schwartz D, Gorse G, Clements M, et al. Induction and HIV-1 neutralizing and syncytiuminhibiting antibodies in uninfected recipients of HIVIIIB gp120 subunit vaccine. *Lancet* 1993; 342:69–74.
- Vermund S, Fischer R, Hoff R, et al. Preparing for HIV vaccine trials: partnerships and challenges. AIDS Res Hum Retroviruses 1993; 9 (suppl 1):S127–S132.
- Daniel M, Kirchoff S, Czajak P, et al. Protective effects of a live attenuated SIV vaccine with a deletion in the nef gene. Science 1992; 258:1938–1941.
- Learmont J, Tindall B, Evans L, et al. Long-term symptomless HIV-1 infection in recipients of blood products from a single donor. Lancet 1992; 340:863–867.
- 57. Girard M, Barre-Sinoussi F, van der Ryst E, et al. An approach to vaccines against human immunodeficiency virus. AIDS Res Hum Retroviruses 1996; 12:461–463.
- Blower S, McClean A. Prophylactic vaccines, risk behavior change, and the probability of eradicating HIV in San Francisco. *Science* 1994; 256:1451–454.
- Vermund S, Galbraith M, Ebner S, et al. Human immunodeficiency virus/acquired immunodeficiency syndrome in pregnant women. Ann Epidemiol 1992; 2:773–803.
- Report of a consensus workshop, Sienna (Italy) January 17–18, 1992: Early diagnosis of HIV infection in infants. J Acquir Immune Defic Syndr 1992; 5:103–105.
- Bremer J, Lew J, Cooper E, *et al.* Diagnosis of infection with human immunodeficiency virus type 1 by a DNA polymerase chain reaction assay among infants enrolled in the Women and Infants Transmission Study. *J Pediatr* 1996; 129:198–207.
- 62. Borkowsky W, Krasinski K, Pollack H, et al. Early diagnosis of human immunodeficiency virus infection in children < 6 months of age: Comparison of polymerase chain reaction, culture and plasma antigen capture techniques. J Infect Dis 1992; 166:616–619.</p>
- 63. Kline M, Lewis D, Hiollinger F, et al. A comparative study of human immunodeficiency virus culture, polymerase chain reaction and antihuman immunodeficiency virus immunoglobulin A antibody detection in the diagnosis during infancy of vertically acquired human immunodeficiency virus infection. Pediatr Infect Dis J 1994; 13:90–94.
- 64. Ahmad N, Baroudy B, Baker R, *et al.* Genetic analysis of human immunodeficiency virus type 1 envelope V3 region isolates from mothers and infants after perinatal transmission. *J virol* 1995; 69:1001–1012.
- 65. Blanche S, Tardieu M, Duliege A, *et al.* Longitudinal study of 94 symptomatic infants with perinatally acquired human immunodeficiency virus infection. Evidence for a bimodal expression of clinical and biological symptoms. *Am J Dis Child* 1990; 144:1210–1215.
- Goedert J, Duliege A, Amos C, et al. High risk of HIV-1 infection for first-born twins. The international registry of first-born twins. *Lancet* 1991; 338:1471–1475.
- Mofenson L. A critical review of studies evaluating the relationship of mode of delivery to perinatal transmission of human immunodeficiency virus. *Pediatr Infect Dis J* 1995: 14:169–177.

- Kuhn L, Bobat R, Coutsoudis A, et al. Cesarean deliveries and maternal-infant HIV transmission: Results from a prospective study in South Africa. J Acquir Immune Defic Syndr Hum Retrovirol 1996; 11:478–483.
- Biggar R, Miotti P, Taha T, et al. Perinatal intervention trial in Africa: Effect of a birth canal cleansing intervention to prevent HIV transmission. Lancet 1996; 347:1647–1650.
- Dunn D, Newell M, Ades A, et al. Risk of human immunodeficiency virus type 1 transmission through breast-feeding. Lancet 1992; 340585–588.
- Landesman S, Kalish L, Bums D, et al. Obstetrical factors and vertical transmission of HIV-1: Role of duration of ruptured membranes. N Engl J Med 1996; 334:1617–1623.
- European Collaborative Study. Risk factors for mother-to-child transmission of HIV-1. Lancet 1992; 339:1007–1012.
- Pitt J, Brambilla D, Reicelderfer P, et al. Maternal and virologic risk factors for infant human immunodeficiency virus type 1 infection: findings from the women and infants transmission study. J Infect Dis 1997; 175567–575.
- Semba R, Miotti P, Chiphangwi J, et al. Maternal vitamin A deficiency and mother-to-child transmission of HIV-1. Lancet 1994; 343:1593–1597.
- Sommer A, Tarwotjo I, Djunaedi E, et al. Impact of vitamin A deficiency on childhood mortality: a randomized controlled community trial. *Lancet* 1986; 327:1169–1173, 1193.
- Sperling RS, Shapiro DE, Coombs RE, et al. Maternal virus load, zidovudine treatment and the risk of transmission of human immunodeficiency virus type 1 from mother to infant. N Engl J Med 1996; 335:1621–1629.
- Connor EM, Sperling RS, Gelber R, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. N Engl J Med 1994; 331:1173–1180.
- Altman L. Landmark studies change outlook of AIDS treatment: New combinations of drugs show promise. New York Times, 14 July 1996:14.
- St Clair M, Pennington K, Rooney J, et al. In vitro comparison of selected triple drug combinations for suppression of HIV replication: The inter-company collaboration protocol. J Acquir Immune Defic Syndr Hum Retrovirol 1995;10 (suppl 2):S83–S91.
- McCune J, Namikawa R, Shih C, et al. Suppression of HIV infection in AZT-treated SCID-hu mice. Science 1990; 247:564–566.
- Lori F, Gallo RC, Malykh A, et al. Didanosine but not high doses of hydroxyurea rescue pigtail macaque from a lethal dose of SIVsmmpbj14. AIDS Res Hum Retroviruses 1997; 13:1083–1088.
- Centers for Disease Control and Prevention. Case control study of HIV seroconversion in health care workers after percutaneous exposure to HIV infected blood—France, United Kingdom, and United States, January 1988–August 1994. MMWR 1995; 44:929–933.
- Centers for Disease Control and Prevention. Update: Provisional recommendations for chemoprophylaxis after occupational exposure to human immunodeficiency virus. *MMWR* 1996; 45: 468–472.

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# Intervening in Blood Supply and Use Systems HIV Testing

# NIEL T. CONSTANTINE, CRISELDA G. ABESAMIS, and MANUEL M. DAYRIT

# INTRODUCTION

One of the most important and successful interventions in addressing the emergence of HIV infection and AIDS has been protection of the blood supply through systematic testing. Unequivocally, a significant number of HIV infections were transmitted through contaminated blood prior to the availability and implementation of HIV antibody screening tests in 1985. Globally, it has been estimated that about 10% of people infected with HIV were infected through treatment with blood or blood products<sup>1</sup>; nearly all (3 million) could have been protected from infection by the screening of blood. Additionally, morbidity and mortality of the pandemic could have been decreased through the identification of these infected individuals with the resultant behavior change through counseling to protect the health of others.

Addressing issues indirectly related to testing, such as preventing HIVinfected individuals from donating blood by self-deferral and education, reducing the need for treatment with blood, and ensuring conformity with blood product production standards,<sup>1</sup> can further increase the potential for a safe blood supply. Appropriate interventions can be implemented following epidemiologic monitoring and identification of recent infection, since effective therapy can now be

*NIEL T: CONSTANTINE* • Institute of Human Virology, University of Maryland School of Medicine, Baltimore, Maryland 21201. *CRISELDA G. ABESAMIS* and *MANUEL M. DAYRIT* • Bureau of Research Laboratories, Department of Health, Republic of the Philippines. *Preventing HIV in Developing Countries: Biomedical and Behavioral Approaches, edited by Gibney et al. Plenum Press, New York, 1999.*  instituted in a clinically relevant time frame following exposure.<sup>2</sup> After a decade of testing, nearly 1 billion tests, and positive results on more than 30 million individuals, the use of an arsenal of tests to detect HIV infection and best medical practices by a global health care team continue to be major factors in saving lives through prevention. However, in developing countries the resources for effective HIV testing and implementation of safe blood practices are often less than adequate.

In our discussion, we will describe the barriers to effective testing in developing countries, emphasize the needs, and identify those measures that can be implemented in less than optimal testing situations. As an example of successful interventions in developing countries, we provide a case study describing recent changes that have been implemented in the Philippines. Comments on effective strategies in current use in other developing countries and recommendations for further enhancement of a safe blood supply are also presented.

# BARRIERS TO EFFECTIVE TESTING IN DEVELOPING COUNTRIES

Although HIV testing is widely used throughout the world, many laboratories in developing countries lack the capability for effective, consistent, and accurate testing. Capabilities vary, depending on resources provided by ministries of health, national programs, local governments, and nongovernment agencies. A spectrum of capabilities ranges from excellent facilities, as noted in large testing centers such as the Red Cross, to poorly funded local hospitals and clinics where infrastructure, reagents, equipment, and accurate testing are essentially nonexistent. In the majority of laboratories outside large facilities in major cities, improvement and assistance are badly needed.

Effective laboratory capabilities in most developing countries are hindered by a lack of formal programs to educate laboratory technical staff, less than optimal infrastructure, and poor quality control. It is apparent that individuals who have not received formal instruction or who are not working under optimal conditions could be reporting a significant number of inaccurate results. Inaccurate results, often due to technical or transcriptional errors, are common and preventable. Personal observations in many developing country laboratories have identified a need for reagents and equipment, better quality assurance, and improvement in basic laboratory techniques; this includes some national reference and ministry of health laboratories.

Industrialized countries have been fortunate in having the capacity and resources to screen all transfusion-targeted blood for HIV antibodies and antigen. Currently in the United States, the testing of blood for HIV antibody and antigen has substantially decreased the risk of transmission of HIV through transfusion.<sup>3</sup>

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However, the implementation of effective blood screening requires dedicated and well-trained personnel, sophisticated and well-maintained instrumentation, and availability of supplies, specific quality assurance and control measures, quality assessment, and enforcement of regulations through official organizations. In addition, there are a number of other issues that must be addressed related to protection of the blood supply from infectious diseases. These include selection of appropriate and cost-efficient tests, implementation of effective testing algorithms, provision of a suitable environment for testing and protection of laboratory workers, adherence to best medical practices (see below), and establishment of a national consciousness for blood safety. Such measures collectively can decrease the risk of transfusion-transmitted HIV infection by 30%.<sup>4</sup>

In summary, barriers to effective testing systems can generally be classified into four categories: (1) lack of sufficient reagents and equipment, (2) poor infrastructure to support systems, (3) insufficiently trained and educated personnel, and (4) lack of implementation of essential quality assurance/quality control measures. Central to these barriers is a lack of sufficient resources, primarily financial.

# CURRENT LABORATORY SYSTEMS AND NEEDS IN DEVELOPING COUNTRIES

# Facilities and Infrastructure

Components necessary to provide basic laboratory infrastructure such as stable electricity and a temperature-controlled environment are lacking in the majority of developing country laboratories outside of major cities (personal observation in over 25 countries). Also lacking are adequate space, proper refrigeration, and equipment, including enzyme-linked immunosorbent assay (ELISA) washers, readers, incubators, and water baths. Mechanical pipettes, if available, are outdated, many times inoperable, and in almost all cases have not been calibrated since purchase. Often, pipette tips and microtiter plates are washed and reused, contrary to recommendations. Reagents and kits for testing are often lacking or outdated.

#### Organizational Structure

Authorities in most developing countries have established organization strata for laboratories, but the presence of different national organizations makes systems inconsistent or ineffective. For example, the ministry of health in each country has its own laboratory system, as does the Red Cross, the military, and the national AIDS programs. In addition, other systems commonly exist, such as those in the universities, hospitals, private laboratories, physician offices, and clinics. Each system is under different administrative control and has different resources available; these systems may vary in their ability to provide quality testing. A major consequence of having such a diverse structural system is difficulty in maintaining communication for consistency and improvement. For example, an increase in the false-positive rate of a particular test kit may not be communicated to other laboratory systems. Similarly, changes in testing strategies or the use of improved technologies that could benefit other laboratories may not be communicated. It is clear that organizational and management problems can contribute to a less than adequate system for a safe blood supply.<sup>5</sup>

#### **Regulatory Agencies and Policies**

Regulatory agencies, as exist in industrialized countries, are less developed in many countries. Several developing countries, particularly in the Far East, India, and Latin America, are advancing in their efforts to assemble agencies that provide guidelines for laboratories. However, enforcement of regulations is difficult, due in part to poor communications, difficulty in obtaining resources for travel to inspect laboratories, and a lack of authority to intervene when compliance is not met. Legislation provides a mandate for moving toward a unified and improved system, but such mandates require long time intervals before compliance is realized.

#### Expert Laboratory Personnel

Individuals who work in laboratories in developing countries usually receive some degree of specific training. Those who work in major blood banks and reference centers are usually required to complete formal programs in laboratory medicine; those working in smaller laboratories are usually trained locally by other individuals. However, even formal training in these countries does not parallel the quality of programs offered in industrialized countries. In particular, there is a lack of instruction in fundamental laboratory techniques and in essential quality assurance measures. Finally, there are few, if any, structured programs that provide continuing education or periodic retraining of personnel.

# **Quality Testing**

Few developing countries have well-developed quality assurance programs, but recognition of this deficiency has resulted in recent efforts by a number of national and international agencies to address the issue. Although a number of external programs exist that include components for HIV laboratory quality assurance, each has been initiated or supported by different organizations as part of their goals, and little communication has existed between the organizations or between the investigators. This has resulted in duplication, inconsistency, a lack of stan-

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dardization, and an inefficient use of resources. Clearly, a coordinated effort is needed, both with international organizations and local programs.

# The Role of Reference Laboratories

Reference laboratories in developing countries may or may not be true reference centers. The authors have visited several reference centers only to find the most fundamental of testing capabilities. Reference laboratories should be centers of excellence, with near-perfect capabilities and expertise in quality assurance. In addition, they should be facilities that act as role models for other laboratories. They should provide education, training, and retraining; monitor other laboratories' performance; evaluate test kits, perform confirmatory testing; and act as a recommending body on technical issues. True reference centers are scarce in developing countries, and are greatly needed.

# SELECTION OF HIV TESTS

The selection of appropriate tests is dependent on cost limitations and the testing needs of the country. For example, the new third-generation ELISA screening assays possess the best analytical sensitivity for detecting low amounts of antibody, such that occur during seroconversion. These tests, which are among the most expensive, should be chosen when the incidence of HIV infection is high (high number of new infections). Populations with a high incidence of infection such as those in certain areas of Africa and Asia (and particularly countries where paid blood donors are used) may benefit from the use of these exquisitely sensitive tests or tests to detect p24 antigen. In populations where HIV-1 group  $O^6$  or HIV-2 infection' are suspected, the use of combination tests should be considered, even if their cost is higher. Conversely, in a low-incidence population of blood donors, the chances of having a seroconverting individual are extremely low, and the increase in cost required for purchasing more sensitive tests may not be justified.

Rapid and simple HIV tests are suitable in a variety of testing situations in developing countries, particularly where instrumentation and stable electricity are lacking.<sup>8</sup> In addition, rapid tests are useful when results are needed quickly (e.g., emergency transfusions), in small blood banks, and when alternative testing strategies are recommended.<sup>9</sup> These tests can offer a more simplified, foolproof, and cost-effective approach, and are therefore appropriately targeted to address some testing situations in developing countries.

Confirmatory tests, all of which are expensive, are needed to a certain degree in developing countries. Their use in reference laboratories can be of help in establishing which screening tests are most appropriate (can decrease costs later), to identify false-positive results, and to monitor the effectiveness of testing strategies. However, because of their high cost, alternative confirmatory strategies have been devised and should be considered for an accurate diagnosis. These can include the use of a second screening assay following repeatedly reactive results by the first. It has been shown that such a strategy can result in a significant cost savings (up to 48%) without jeopardizing predictive values.<sup>10</sup>

# SUCCESSFUL INTERVENTIONS TOWARD A SAFE BLOOD SUPPLY: THE PHILIPPINES—A CASE STUDY FOR DEVELOPING COUNTRIES

# Addressing Financial Constraints

Since most issues in developing countries center around a lack of sufficient financial resources, international assistance can be solicited to supplement country efforts. In the Philippines, organizations such as the World Bank, the World Health Organization (WHO), and the US Agency for International Development have contributed funds to support development and to enhance laboratory capabilities. These activities included assessment of current capabilities, recommendations for improvement, and the funding of internationally experienced consultants to assist in devising programs, establishing budgets, and listing appropriate time frames for completion of proposed activities. The latter is important as nonadherence to schedules for proposed improvements and monitoring of activities have been major obstacles to improvement in developing countries.

Not only has infrastructure (facilities and support systems) been strengthened through financial resources, but appropriate test kits have been purchased, laboratory workers have been trained, and information for effective testing has been provided. In addition, governmental and nongovernmental organizations have assisted in addressing issues through the establishment of informational networks, training programs, assessment strategies, and educational endeavors. The Philippines has been successful in obtaining funds from international agencies for improving testing capabilities, and this sets an example for other countries.

# Reorganization: Compartmentalization and Networking

In the Philippines, implementation of new standards is providing capability upgrading by requiring networking and centralized blood screening. These standards allow testing only in accredited facilities, including blood banks and clinical laboratories. Presently, some degree of networking is in place, but only when facilities are in close proximity. Establishment of new categories of blood service facilities and centralized testing units are allowing network linkages between

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blood centers for high-volume testing so that an efficient distribution of screened blood can be made available to hospitals for transfusion. This restructuring has the added advantage of allowing a more focused and easy to monitor laboratory system. In addition, there is better cost-effectiveness due to a more directed utilization of supplies between laboratories, better focusing of quality assurance efforts, more efficient collection and distribution of blood to hospitals in need, and better monitoring of effective donor recruitment and retention.

Concerning confirmatory testing for HIV, operational and administrative factors dictate that a specimen referral system to reference laboratories be compartmentalized. With the establishment of a blood services network, all blood banking facilities (governmental, Red Cross, private) will refer specimens to the Bureau of Research Laboratories, while difficult cases will be sent to the national reference laboratories Research Institute of Tropical Medicine (RITM). This coordinated referral system will contribute to efficiency and help to support an effective organizational structure.

Similarly, in other countries (e.g., Indonesia) a refinement of organizational structure is underway with the establishment of regional testing centers and centers of excellence, which will act as anchors for reference testing, education, and quality assurance.

#### **Regulatory Guidelines**

The Department of Health in the Philippines, which acts as the policy and regulatory agency, has issued policies for laboratories to follow when testing blood at the national level. These guidelines originate at the governmental level but are carried out by the major reference laboratories. Although enforcement of these policies is difficult, the development of published standards is a first step toward regulating testing. Policies include: (1) mandatory infectious disease testing of all blood units targeted for transfusion; (2) a requirement for pre- and postdonation counseling; (3) prohibition of a serum-pooling strategy for blood screening; and (4) elimination of rapid tests for the screening of blood (since they were found to be unsuitable for testing in the Philippines after evaluation). The use of certain tests that have not been "approved" by governmental authorities for use in the Philippines is being prohibited (this is also being done in Thailand, India, and China). The purpose is to limit the use of technologies that may not be accurate. Similarly, testing strategies, assessment, and employment of properly trained individuals are being mandated by the Department of Health in the Philippines.

#### Increasing Expertise in the Laboratories

As a requirement, laboratory personnel in the Philippines must possess an adequate level of expertise to help ensure proficiency in the testing process. Only

medical technologists or bacteriologists (a position title in government facilities) who have satisfactorily completed HIV testing proficiency workshops are allowed to perform HIV testing in blood banks and clinical laboratories. Satisfactory completion is indicated by the receipt of a numbered proficiency certificate, which corresponds with the Registry of Trained Medical Technologists. The training of personnel also includes modifying attitudes for better interactions with patients and blood donors, education as to the significance of counseling and the confidentiality of results, and for teaching personnel the necessity of prevention and control. In addition, such training emphasizes the concept that HIV infection is not only a medical issue, but is an issue that contains social, ethical, and legal aspects. Other instruction targets the rules and regulations governing the accreditation of HIV testing facilities and the standards for blood banks and licensing requirements.

Current efforts in the Philippines toward enhancing education of laboratory personnel have been supplemented by a World Bank funded project under the direction of the Education Development Center in the United States. Through this project, retraining of personnel is being accomplished via the use of a CD-ROM blood screening program. This frees the trainers from actual workshops, or at least lessens the time for actual instruction. In addition, it allows new personnel (prior to actually performing testing) to gain experience through simulation on a computer and to review background information.

# Monitoring of Laboratories

An important concept for strengthening blood systems is the monitoring of laboratory systems by visitation and by assessing proficiency through the use of serum panels. These means, recently implemented in the Philippines and other countries, help to ensure that test systems are adequate. Members of the Philippines' reference laboratories have pioneered supervisory and educational visits for HIV testing laboratories. At first, few individuals recognized the need for such monitoring and many were resistant to implementation. However, through feedback and education, the value was realized. These visits not only serve to review procedures, documentation, and the testing process, but also to ensure compliance with licensing, accreditation, and quality assurance minimum requirements. In addition, these visits allow for inspection of laboratory infrastructure, reagents, and equipment so that needs can be addressed. Most importantly, deficiencies can be identified and mechanisms for improvement can be suggested and implemented. Unfortunately, because of time and cost limitations, it is difficult to ensure that all laboratories are functioning optimally after the visitation. To supplement this strategy, assessment panels of sera are regularly sent to laboratories from national and international organizations to determine testing proficiency.

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# Other Interventions to Support a Safe Blood Supply

# Sequential Testing (Highest Prevalence First)

In the Philippines, testing is performed sequentially for hepatitis B virus (HBV), malaria, syphilis, HIV, and hepatitis C virus (HCV), based primarily on disease prevalence, respectively. This sequential testing is a cost-savings measure since the infections at highest prevalence will be the most likely to be detected, thereby excluding the unit and circumventing the need to test for the other infectious agents. Mandatory testing for infections such as HCV has not been as widely implemented globally, since it is a relatively newly identified agent, is of variable prevalence, and requires additional financial resources for implementation. However, elimination of units that are positive for HIV or HBV also eliminates many of the ones that are positive for HCV.

# Prevention of Conditions that Require Transfusions

A major cost- and time-saving measure to contribute to a safe blood supply is a dedicated program to educate physicians in the proper selection of donors and in the rational use of blood for transfusion. This not only saves money, but acts as a safety measure to prevent infection and transfusion reactions for patients who may unnecessarily be targeted for a transfusion. This policy has been exploited in the Philippines by the Department of Health where the micronutrient (iron, iodine, and vitamin A) deficiency prevention program and nutrition programs strive to provide individuals with the proper dietary intake to avoid the need for transfusion of blood (e.g., by preventing iron-deficiency anemia). Similarly, cases of postnatal hemorrhages due to birth complications can sometimes be prevented by educational efforts through regular and proper prenatal checkups. Again, such coordinated efforts and communication between different government organizations are helping to increase the safety of the blood supply.

# Institutionalization of Counseling for Self-Deferral

It is well known that a serological window period exists when HIV and other transfusion-transmitted infections cannot be detected by antibody tests. Providing information to donors about the effects of infections that cannot be detected by laboratory methods has been implemented in the Philippines and is aimed toward enhancing awareness for the donors to take responsibility of providing an accurate medical history, self-assessment, and if necessary, self-deferral. Although difficult to assess, the effect of such an intervention that seeks to make donors aware of health hazards for blood recipients has undoubtedly increased the potential for a safer blood supply.

# Use of a Medical Declaration Form

Part of the responsibility for providing an accurate medical history is that the donor becomes legally responsible for any information divulged (in confidence). The donor medical declaration form in the Philippine blood bank standards manual is focused on questions and information about the donors' risks for acquiring HIV infection. This information becomes a legal document and holds the donor responsible for its accuracy. Although similar documents are used in several developed countries, this has only recently been required in the Philippines. Although this is another means to intervene for a safer blood supply, a potential disadvantage of instituting such a policy is that individuals may become more reluctant to donate blood.

# SUCCESSFUL STRATEGIES IN OTHER DEVELOPING COUNTRIES

The elimination of infected blood through implementation of blood screening for HIV has saved countless lives throughout the world, particularly in Africa. In Zimbabwe, between 1986 and 1990, 3.4% of donations were found to be HIV positive; had these units been transfused, more than 10,000 persons could have become infected.<sup>11</sup> Similarly, in Rwanda between 1986 and 1990, 5.6% of donors were infected.<sup>12</sup> and over 15% of blood donors in Uganda were positive for HIV in the late 1980s.<sup>2</sup> These statistics exemplify the high prevalence of HIV in Africa and the gains in HIV prevention of implementing a low-cost mechanism such as HIV testing.

Since the application of more selective standards for recruitment of blood donors, infection rates among donors in Africa have decreased even as prevalence rates among the general population increases. This is exemplified in Rwanda, where HIV infection among blood donors decreased from over 13% in 1985 to about 2% in 1990, while infection rates rose in the general population.<sup>13</sup> In Uganda, better selection of donors has resulted in a reduction of HIV-positive blood donors by 50% within 3 years.<sup>14</sup> In Côte d'Ivoire, West Africa, excluding 31% of donors could have eliminated 73% of HIV-infected donations.<sup>15</sup>

A very effective mechanism for decreasing the risk of HIV-infected donors through better selection has been implemented in the country of Myanmar. Here, a system of recruiting repeat donors who have been previously tested and found to be HIV-negative has resulted in a decrease of HIV infection in blood donors from 13% in 1993 (50% repeat donors) to 1% in 1996 (90% repeat donors).<sup>16</sup> This excellent strategy for enhancing blood safety is essentially without cost.

Similarly, the use of voluntary blood donors has proven to decrease the risk of HIV positive blood. Rates of infection in voluntary donors were less than half of that from blood donors recruited amongst patients in hospitals in Kenya and

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Uganda.<sup>17,18</sup> In other parts of the world, a decrease in rates has been reported to be even greater, with five to six times less infection in volunteer donors than in paid donors in Mexico and New Delhi.<sup>19,20</sup>

Finally, as mentioned for the Philippines, a large number of transfusions have been found to be unnecessary in Africa; for example, 61% of blood transfusions in a rural district hospital in Kenya were considered to be clinically inappropriate,<sup>17</sup> and the need for transfusion could have been eliminated through proper education.

# RECOMMENDATIONS

#### Education and Technology Transfer

Given that many laboratories in developing countries are geographically isolated and communications are expensive, updated information and new regulations are difficult to distribute. In addition, inadequate resources may limit reproduction and distribution of informational materials. As described for the Philippines, periodic visitations by reference laboratory personnel can help to address this need. Materials, including books, newsletters, and checklists can help provide individuals with information that can improve their testing efforts. External means for education, including national and local teaching workshops, can provide teaching materials and instruction. The WHO, the World Bank, and the World AIDS Foundation have all participated and funded international professionals to provide information and technology transfer workshops in a number of countries. To augment these workshops, appropriate books and manuals that are available on HIV testing and quality control<sup>21</sup> have been provided. Assistance from such organizations must be aggressively pursued.

# Participation in Quality Assurance and Assessment Programs

There are a number of programs and international professionals worldwide that provide assistance for HIV laboratory quality assurance, and it is recommended that this assistance be sought where needed. An excellent program is offered through the National HIV Reference Laboratory (NRL) in Australia. The NRL, a WHO collaborating center, has acted as a regional reference laboratory for the Western Pacific and Southeast Asia regions since 1987. Similarly, the WHO collaborating centers in strategic regions can assist and coordinate such activities. The Centers for Disease Control and Prevention (CDC) in the United States has an established model proficiency evaluation program for blood banks, independent laboratories, hospitals, health departments, and research laboratories. This program assesses HIV testing and laboratory performance, identifies errors, collates data for interpretation, and provides feedback to participants. Results from these efforts are published and presented at national and international forums. This program targets laboratory assessment. The Association of State and Territorial Public Health Laboratory Directors is supported in part through a cooperative agreement with CDC, and provides training in the areas of quality control and quality assurance. Similarly, the PHLS Quality Assurance Laboratory at Colindale, England, has established an extensive quality assessment scheme for microbiology, including HIV.

#### **Cost-Saving Measures**

# Serum-Pooling Strategies

Serum pooling, where a number of different samples are "mixed" together prior to testing, is a strategy recommended as a cost-saving measure for certain testing situations; it is not recommended for use in the screening of blood for transfusion, but rather for epidemiological purposes. If a pool of five samples are mixed together and then tested as one, reagent cost is minimized. A positive result will necessitate retesting to identify the truly positive sample. This strategy will only be cost-effective if there are a limited number of positive individuals in the population being tested (low prevalence). Although this strategy can produce significant cost savings up to 69%<sup>22</sup> and is accurate, there have been reports of a less than 100% sensitivity, particularly if the procedure is not performed correctly. It is recommended for epidemiological testing that a pooling strategy be considered after it has been validated within the country.

#### Procurement of Test Kits

Certain manufacturers of HIV test kits offer kits through the WHO at reduced rates (up to a savings of 44%)<sup>10</sup> for developing countries (bulk purchase). All kits have performed well at the WHO collaborating center in Antwerp, and the results of their performance are available. Countries with limited resources should take advantage of this offering to reduce costs.

#### Sequential Testing

As described above, a testing strategy where donor samples are first tested for the infectious disease that occurs in highest prevalence is an excellent mechanism for cost and time savings, since it will result in the elimination of most infected units prior to the necessity to test the unit for all infectious agents. Although the savings can only be calculated based on the prevalence of each infectious agent, it is evident that this mechanism is effective and should be considered in many countries which have limited funds or test kits.

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#### Voluntary Blood Donation

The spectrum of blood safety starts with proper donor recruitment and appropriate selection of groups at low risk for infectious agents. Healthy, voluntary donors are the best selection to minimize the potential for transmission of infections. Donors who are paid for blood are usually attempting to acquire money to support high-risk behavior (such as buying drugs or visiting commercial sex workers). In addition, individuals at low economic status are more likely to use drugs and may resort to donating blood for money to support their habits. As these individuals realize that they may be denied the privilege of donating blood, they often do not tell the truth concerning their behavior. Interviews with HIV-positive donors have revealed that most recognize their risk but do not exclude themselves.<sup>23</sup> These individuals are not only at risk for HIV and hepatitis, but also for other infectious agents for which there may not be screening methods. Importantly, this unfortunate occurrence can be turned into an opportunity to highlight the hazard of using blood from paid donors and to recommend the use of blood only from volunteers through the issuing of guidelines for selection of donors.

In contrast, voluntary donors are more likely to provide an accurate medical history, self-assessment, and be self-deferred. The use of voluntary donors can provide a 75% safer supply of blood over that from paid donors, and the use of voluntary donations can reduce the HIV seropositivity rate by up to 9%.<sup>24</sup> As a result of educational efforts and support from international organizations, many developing countries are now recruiting blood only from volunteers; this is highly recommended.

# **Program Management**

Strong management for intervention programs is essential but is often lacking. In the testing system, this can be realized by good communication between testing centers, center managers, and those who are involved in making policies. Coordination of personnel involved in issues related to testing and the establishment of "officers" are the strongest recommendations. As examples, a quality control officer appointed by the government can be effective in communicating the most essential strategies to laboratories and can be effective in monitoring laboratories periodically. There can be interaction between different laboratory systems (e.g., Ministry of Health, military, Red Cross) to provide consistency in policies and to identify problems that could be having an impact in other laboratories (e.g., increases in the false-positive rate, poor lots of kits, identifying improved laboratory procedures, etc.). Similarly, educators can provide periodic newsletters for continuing education, changes in testing strategies, the availability of new testing technologies, calculations for cost efficiency, and they can design programs for the monitoring of laboratories for proficiency.
#### Strengthening Quality through the Use of Standards

A number of preparations that can be used to assist in the monitoring of HIV test performance on a routine basis are available commercially. Alternatively, preparations can be assembled in-house and tailored to the laboratory's needs (e.g., made to contain multiple analyses). These reagents offer a means to estimate precision, and can be used to monitor assay systems for random, systematic, and technical errors.<sup>21</sup> Their use as external controls or for periodic assessment allows for the monitoring of the test procedure to provide added confidence that the assay system is performing as expected and that the status assigned to unknowns is correct. These preparations are quality control reagents and offer a means for identifying inconsistencies and problems that may arise due to small changes (such as variations in temperature, pipetting techniques, and other procedural steps). They can be used to monitor assay performance by targeting intrarun, interrun, intertechnologist, lot-to-lot variations, trends, shifts, and other biases and can be used to compare a laboratory's performance to that of others. Commercial preparations to monitor quality assurance and quality control can be obtained from the following abbreviated list of sources: Boston Biomedical, Inc., West Bridgewater, MA: Blackhawk Biosystems, Inc., San Ramon, CA; Serologicals, Inc., Marietta, GA; and North Atlantic Biologicals, Inc., Boca Raton, FL.

## CLOSING COMMENT

Strategies to protect the blood supply are many and their implementation requires significant effort and resources. In developing countries, adequate resources are often lacking. However, best efforts are required and a number of interventions have been implemented and proven to be successful in helping to protect the blood supply.

We have described some of the existing situations in developing countries and identified a number of interventions that have been applied successfully to increase the safety of the blood supply. Although it is understood that the implementation of these strategies requires careful planning, significant time, and supplemented resources, enhancement of the safety of the blood supply is an important and effective means to save lives through prevention; hence, those measures must be pursued.

## REFERENCES

- Beal RW, Bontink M, Fransen L, eds. Safe Blood in Developing Countries: A Report of the EEC's Expert Meeting. Brussels, EEC AIDS Task Force; 1992: pp. 11, 28–29.
- 2. Anonymous. Recommendations for prophylaxis after occupational exposure to HIV. *MMWR* 1996; 45:468-480.

#### **Blood Supply**

- Selik RM, Ward JM, Buehler JW. Trends in transfusion associated acquired immune deficiency syndrome in the United States, 1982 through 1991. *Transfusion* 1993; 33:890–893.
- 4. Menitove JE. The decreasing risk of transfusion-associated AIDS. N Engl J Med 1989; 321: 966–968.
- N'tita I, Mulanga K, Dulat C, et al. Risk of transfusion-associated HIV transmission in Kinshasa, Zaire. AIDS 1991; 5:437–439.
- Constantine NT, Zekeng L, Sangare AK, et al. Diagnostic challenges for rapid human immunodeficiency virus assays: Performance using HIV-1 group O, HIV-1 group M, and HIV-2 samples. J Hum virol 1997; 1:46–52.
- 7. Hu DJ, Dondero TJ, Rayfield MA, et al. The emerging genetic diversity of HIV. JAMA 1996; 275:210–216.
- Constantine NT. Serologic tests for the retroviruses: approaching a decade of evolution. AIDS 1993; 7:1–13.
- 9. Anonymous. World Health Organization. Weekly Epidemiologic Report 1997; 72:81-88.
- Tamashiro H, Maskill W, Emmanuel J, et al. Reducing the cost of HIV antibody testing. Lancet 1993; 342:87–90.
- Anonymous. Mangwiro, Zimbabwe. In: Report of the Southern African Conference on AIDS. Harare, Zimbabwe: SANASO, 1990. Reprinted in ACT 1990:40–42.
- Mugabo P, Nkurunziza. Seroprevalence of HIV-1 in Rwanda blood banks from 1985–1990. Paper presented at the 9th International Conference on AIDS, Berlin, Germany, 1993. Abstract PO-C21-3113.
- Stanecki KA, Way PO. The dynamic HIV/AIDS pandemic. In: Mann JM, Tarantola DJ, eds. AIDS in the World II. New York Oxford University Press; 1996: 41–56.
- Kataaha P. Analysis of data for Nakasero blood bank, 1992. Commission of the European Communities AIDS Task Force Newsletter Report. From the AIDS Task Force Preconference held in Berlin, Germany, June 6, 1993. ATF News August 1993; 8–9.
- Schutz R, Savarit D, Kadio JC, et al. Excluding blood donors at high risk of HIV infection in a West African city. Br Med J 1993; 307:1517–1519.
- D. Goodwin, Abstract #A(O)004 presented at the 4th International Congress of AIDS in ASIA, Manila, Philippines, October 25–29, 1997.
- Lakritz EM, Ruebush TK, Zucker JR, et al. Blood transfusion practices and blood-banking services in a Kenyan hospital. AIDS 1993; 7:995–999.
- Anonymous. Briefing note on the Uganda AIDS Commission and the multisectoral HIV/AIDS control strategy in Uganda. Uganda AIDS Commission, May 1992:2–3.
- Avila C, Stetler HC, Sepulveda J, et al. The epidemiology of HIV transmission among paid plasma donors, Mexico City, Mexico. AIDS 1989; 3:631–633.
- Singh G, Sharma VK, Natarajan R. Prevalence of HIV-1 infection and its correlation with HBsAg carriage and VDRL reactivity among blood donors in Delhi. Paper presented at the World Congress on AIDS, Bombay, India, 1990. Abstract ESG.P16.
- 21. Constantine NT, Callahan JD, Watts DM. Retroviral Testing: Essentials for Quality Control and Laboratory Diagnosis. Boca Raton, Fla: CRC Press; 1992.
- 22. Liu P, Shi ZX, Zhang Y, et al. A prospective study of a serum-pooling strategy in screening blood donors for antibody to hepatitis C virus. Transfusion 1997; 37:732–736.
- Cleary PD, Singer E, Rogers TF, et al. Sociodemographic and behavioral characteristics of HIV antibody-positive blood donors. Am J Public Health 1988; 78:953–957.
- Gilmore N. Blood and blood product safety. In: Mann JM, Tarantola DM, eds. AIDS in the World II. New York: Oxford University Press; 1996:287–301.

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# The Evolution of Voluntary Testing and Counseling as an HIV Prevention Strategy

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#### INTRODUCTION

HIV testing is done in different circumstances for a variety of reasons. Blood transfusion centers perform HIV testing to ensure an uninfected blood supply, physicians use the test results to aid in patient management and to research the manifestations of HIV infection, surveillance programs test for HIV to determine the magnitude of the epidemic in a given risk group or geographic area, and voluntary testing centers provide HIV antibody test results to people who want to know their serostatus. Depending on the reasons for testing, the priorities established by the given programs, and the available resources, HIV test results may or may not be linked to patient identifiers, and if linked, may or may not be communicated to the individual concerned. Several years of experience with giving HIV antibody test results has led to the recommendation that, if and when an HIV test result is given, it should be voluntary, accompanied by a thorough explanation, emotional support, and practical recommendations.<sup>1</sup> This process is referred to here as "voluntary HIV testing and counseling" (VTC).

When the HIV antibody test first became available in 1985, many blood transfusion centers noted that some blood donors were motivated by the desire to

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know their HIV antibody test status, and that these donors were often at high risk of being infected, and thus represented a threat to the blood supply. To resolve this problem, the demand for testing was met through the establishment of centers that provided VTC free of charge. Debate ensued about whether all programs that did HIV testing should give the results to the individual. In 1987, the National Institutes of Health (NIH) instituted a requirement that all participants in NIHfunded studies had to be given their HIV test results with appropriate counseling.

These regulations are based on an underlying assumption that giving HIV test results will provoke changes in behavior that will reduce the spread of HIV. This assumption has been supported by some researchers,<sup>2–6</sup> and challenged by others,<sup>7–9</sup> though there is general agreement that VTC is effective in certain groups suchascouples.<sup>2,10,11</sup>

Although VTC may prove to be an effective prevention strategy, it is important to consider the possible negative consequences: If the counseling is inadequate, it could conceivably result in depression or suicide, or even in "revenge" behaviors that increase rather than decrease spread of HIV, if there is a breach of confidentiality or if the patients disclose their result to others, there might be discrimination from family, friends, insurance providers, and employers; in some circumstances, the availability of testing technology might result in mandatory or coerced testing. The definition of "confidential" also varies, depending on which care providers and health authorities have access to linked names and test results. For example, in the United States, some states require reporting of HIV-positive persons to public health authorities to permit "contact tracing," a traditional public health strategy for other sexually transmitted diseases. Individuals may be reluctant to seek testing if their name is recorded, preferring anonymous services where names are not recorded.<sup>12</sup>

The example of Thailand is illustrative. Until 1991, HIV testing was generally available only in government health clinics (which offered the test for free and kept a central registry of HIV-positive persons) and in private clinics (which rarely reported HIV-positive cases to the government but charged \$15–\$20 for the service and provided little counseling). In 1991, the government "legalized" VTC and allowed the private sector and nongovernmental organizations (NGOs) to provide the service. Subsequently, there was a proliferation of centers, with the Thai Red Cross providing an excellent model for other organizations. The Red Cross can now offer anonymous VTC for an affordable price, and the service has become completely self-financed. Results are not reported to authorities (J. Kraus, verbal communication).

#### Overview of VTC

The goals of VTC are to stop the spread of HIV and limit the pain it causes. These goals—preventive and supportive—overlap in many situations. The em-

phasis on one or the other depends on the target population, the program providing the service, and the population served.

#### Preventive HIV Testing and Counseling

The goals of primary preventive VTC are to prevent spread of HIV through heterosexual contact and maternal-child transmission. Secondary prevention attempts to reduce the morbidity of HIV infection through early or prophylactic treatment of HIV-infected persons; examples include antiretroviral triple drug therapy and, of greater relevance in developing countries, tuberculosis chemoprophylaxis and possible future therapeutic AIDS/HIV vaccines. Although secondary prevention may become increasingly important in developing countries, should affordable treatments become available, this discussion is limited to the role of VTC in primary prevention.

Most primary preventive VTC involves HIV-negative or asymptomatic HIV-positive persons identified through HIV testing centers or through linked testing of blood donors, hospital inpatients, and outpatient clinic visitors. VTC may be provided confidentially (identifiers are recorded but steps are taken to ensure that knowledge of the test result is limited) or anonymously (where the test results are number coded and the client's identifiers are not recorded). The advantage to anonymous testing is that the client is protected from any harm that might come from their test results being disclosed to others, and many people are more likely to seek testing using anonymous rather than confidential services.<sup>12,13</sup>

Persons who are tested for reasons other than their own request may or may not be offered the opportunity to know their test results, depending on the circumstances. Blood transfusion centers may not see prevention of heterosexual and maternal transmission as their mandate and may not want to offer VTC if it encourages high-risk groups to donate blood. Similarly, health care staff often test patients as part of a clinical evaluation or for research purposes. Ideally, for the process to be truly voluntary, informed consent should be obtained and systematic preand posttest counseling provided, but-ethical mandates notwithstanding<sup>14,15</sup>circumstances may not allow it. This is easy to imagine in a hospital public ward with two patients per bed; there is little opportunity for a confidential discussion and health care staff are already overwhelmed. A similar situation exists in many outpatient settings, where the large number of patients may reduce the average consultation time to 5 minutes or less. If VTC were shown to be effective as a preventive measure in these settings, it might prove to be cost-effective, since the cost of the HIV test itself is already paid (either subsidized or paid for by the patient) and only counseling staff would need to be added to existing services. This would have the added advantage of allowing HIV testing to proceed in a manner more compatible with ethical guidelines. A suggested model for the evaluation and addition of VTC in these settings is presented later in this chapter.

## Supportive Services

Supportive counseling for AIDS/HIV patients and their families attempts to reduce the psychological and social morbidity associated with HIV disease. Emotional support to reduce stress and promote acceptance of the situation may be given by health care staff or by social service providers, and may be offered to individuals, couples, families, or in support groups.<sup>16,17</sup> Practical assistance includes the provision of social services such as food, clothing, and medicine; home health care; housing, child care, and school fees; employment assistance; and legal advice regarding discrimination, wills, and insurance.<sup>18</sup> Integrating supportive services with testing services may reduce the dramatization of HIV/AIDS in society and improve the quality of life of participants.<sup>19</sup> Training programs sponsored by the World Health Organization (WHO) and other organizations have added supportive counseling to the skills of social workers and nurses involved in health care.<sup>20</sup> In many countries, supportive counseling for emotional well-being is not a traditional intervention, however, and given time constraints, a greater emphasis is often placed on practical assistance. The role of health care personnel in these circumstances is often to liaise with agencies outside the health sector and provide appropriate referrals.

Religious organizations have traditionally provided material assistance for the indigent and were quick to respond to the needs of AIDS patients. As an example, in Rwanda, Caritas (a Catholic NGO) was the implementing agency for a WFP/UNDP/WHO psychosocial support project, including a food distribution program targeting families stressed by HIV disease. One study in the capital of Rwanda found that HIV-positive women who had been counseled by a clinicbased social worker initially considered the social worker to be their primary source of emotional support. Two years later, these same women viewed the church as far more important in that role.<sup>18</sup> Where health care staff are overwhelmed with other responsibilities, referral to church-based or other NGOs may be a practical way to provide material and emotional support following initial preand posttest HIV counseling.

While it is important to integrate preventive and supportive services, it is essential to distinguish between the needs of asymptomatic HIV-positive clients and those of chronically ill patients. In the recent enthusiasm for provision of "care and support" for HIV, the negative consequences of some practical assistance programs have, at times, been overlooked. Creating service delivery systems that specifically target HIV-positive persons can create a black market for HIV-positive test certificates, motivate the very poor and desperate to become HIV positive in order to qualify, and breach patient confidentiality because the assistance is usually very visible. Furthermore, most HIV-positive persons who attend VTC centers are asymptomatic and do not require additional services beyond the expected routine of pre- and posttest counseling. Therefore, it is more helpful—and less harmful—to prioritize very ill patients and their families when developing supportive services, and it is most efficient to have those services emanate from hospitals and clinics rather than VTC centers.

### Indicators of Impact for VTC

In order to convince donor agencies that a particular intervention deserves funding, a case must be made that it has a clear impact on reducing the spread of the epidemic and that it is cost-effective. Ideally, impact is measured with randomized control prospective studies comparing the intervention — in this case VTC—with another intervention or with the current standard of practice. A prerequisite for this type of study design is the belief that the impact of VTC on the outcome of interest is unknown.<sup>21</sup> As is often the case with new interventions, this is a controversial point. Opinions range from believing that data already exist to show the beneficial impact in some groups<sup>22–28</sup> (see following section) to believing that VTC may actually do more harm than good because the available technology (for example, rapid HIV tests, which are less expensive and require less skill to perform) might facilitate mandatory testing, which would clearly be an undesirable outcome.<sup>29</sup>

Outcomes of VTC as a preventive intervention include objective measures such as a decrease in HIV seroconversion rates or a decrease in rates of other sexually transmitted diseases (STDs). Self-reported measures of behavior change such as condom use, monogamy, sexual abstinence, and a decrease in number of sex partners or in sex with persons of known HIV serostatus are the next outcome measures. Self-reported behavior changes are difficult to validate, however, and real behavior change (while it might be exactly what was advised and might represent considerable sacrifice for the individual) may not always reduce risk. Examples of this include someone who decreases the number of his or her partners from 12 per year to 6, while the prevalence of HIV in the pool of partners doubles, or someone who becomes monogamous without realizing that the partner they have selected is HIV positive. Intent to change behavior is an easy and inexpensive measure and is usually predictive of subsequent behavior change, but results must be interpreted with caution because many people who intend to change do not actually do so (S. Allen, unpublished data from Rwanda). These difficulties argue for measurement of the true target indicator, HIV incidence, or the objective proxy indicator of STD incidence whenever possible. An initial investment of time and money to prove efficacy is a worthwhile expenditure, particularly as donor agencies will increasingly require evidence of impact as a condition for new or continued funding for any preventive program.

## HIV TESTING AND COUNSELING IN DEVELOPING COUNTRIES: A REVIEW OF EXPERIENCE

Although VTC has become increasingly common in developing countries, there are few published objective data regarding its impact on HIV or STD incidence or reported behavior change. The few existing articles are focused on couples (Zaire, Rwanda, Zambia) who were identified in the course of research projects. Anecdotal evidence confirms, however, that VTC is ongoing in several developing countries and that the idea is being discussed and developed in many others. In order to expand the available information about the impact of VTC in the developing world, in addition to searches of published journals, we have reviewed relevant abstracts presented at international AIDS conferences.

#### Conference Reports of VTC

Abstract books from five conferences (international conferences on AIDS in San Francisco, 1990, and Florence, 1991; international conferences on AIDS in Africa in Kinshasa, 1990, and Dakar, 1991; international conference on AIDS information and education in Cameroon, 1989) were reviewed manually and frequencies tabulated to describe results. Any abstract stating that individuals in a developing country were given their HIV test results was included. A total of 64 abstracts from 18 countries were included. The conclusions of this are expanded with abstracts from the 1992, 1993, 1994, and 1996 conferences obtained by scanning computer databases using keywords "HIV testing and counseling."

The countries with the most presentations in 1989–1991were Zaire (8), Zambia (8), Brazil (7), Kenya (7), Mexico (6), Rwanda (6), and Uganda (6). The settings and populations in which HIV testing and counseling (VTC) was done varied: 11 of the 64 abstracts reported data from voluntary testing centers (Brazil, Morocco, Mexico, Peru, Rwanda, and Uganda), 27 were from hospitals or health centers, and 14 were community/outreach or home-based. The populations studied were diverse, but the most commonly mentioned groups were AIDS patients and their families (18) and discordant couples (9). The number of clients counseled was not mentioned in 14 abstracts; the range of number of clients served in the remaining 50 was 15 to 6349. Not surprisingly, given the venue, 39% (N =25) of presentations were made by universities (as determined by the affiliation of the first author), with ministries of health/national AIDS control programs (MOH) presenting 25% (N= 16), NGO, 17% (N= 11), and bilateral donor agencies, 14% (N = 9).

Evaluation of behavior change following HIV testing and counseling included measures of condom use, monogamy, reduction in the number of partners, contraceptive use, and knowing the serostatus of the sexual partner. One third (22) of the abstracts mentioned at least one of these outcomes, 15 of which reported some type of positive behavior change (increased condom use in 15, reduction of partners in 3), and three of which reported a positive change in knowledge (knowing partner's serostatus). Seroconversion rates were reported in six abstracts, only one of which could cite a decrease (the others had no control group or preintervention rates for comparison). Other rarely reported changes included reduced alcohol intake, reduced anal intercourse, and avoidance of intercourse. One study reported that only 30% of HIV-positive STD clinic visitors felt that they could tell their partner about their HIV test result.<sup>30</sup> The most commonly reported

"failure" overall concerned contraceptive use in HIV-positive clients; of seven abstracts that measured it, six said that it had not increased. With regard to the possible negative effects of VTC, one Tanzanian hospital-based university group reported frequent depression and rejection from the family following receipt of HIV test results,<sup>31</sup> and one Mexican study found frequent depression in HIV-positive clients.<sup>32</sup>

Particularly noteworthy have been results obtained in a multisite randomized trial of VTC, which were recently presented in Abidjan at the Tenth International Conference on AIDS, STD, and tuberculosis. The trial, which includes sites in Kenya, Tanzania, Jamaica, and Indonesia, recruited cohorts of couples, single men, and single women to receive either health education or testing and counseling.<sup>33</sup> A clear treatment effect was evident at the end of the 6-month follow-up period, with a 50% reduction in the percentage of single individuals in the VTC group reporting unprotected intercourse with nonprimary partners. Overall, HIV-seropositive individuals changed behavior more often than HIV-seronegative individuals. The incidence of negative psychological outcomes did not differ between VTC and controls. The incidence of abuse and breakups was slightly more common among HIV-positive women in discordant relationships, but still low overall in that group (T. Coates, personal communication, December 24, 1997).

In conclusion, HIV test results are being provided to a variety of groups in several countries in Africa, Central and South America, and Asia. It is clear, however, that only a small minority of organizations that provide VTC have presented their work at conferences or in peer-reviewed journals and that relatively few are measuring indicators of behavior change. Of importance is the finding that 75% (15/20) of university groups who measured objective outcomes reported improvement in at least one.

## HIV TESTING AND COUNSELING AS A PREVENTION INTERVENTION

The transmission of the test result is the pivotal element in VTC and is what differentiates this prevention intervention from mass media campaigns and targeted educational programs. The circumstances in which HIV testing and counseling can be expected to be useful are:

- 1. When the behavior change desired depends on the HIV test result (i.e., steady couples that may have discordant results).
- 2. When the desired behavior change is the same regardless of the test result, but behavior change is promoted by giving HIV testing with counseling (i.e., sex workers and sexually active single adults).

#### Existing Evidence of Efficacy and Comparison to Other Interventions

HIV testing and counseling has been shown to promote risk reduction in certain groups, but the data are not consistent. Most studies involving discordant couples in Africa show that knowledge of HIV test results promotes behavior change and reduces transmission,<sup>2,10</sup> while studies of other high-risk groups such as western homosexual men and intravenous drug users (IVDU) have conflicting results,<sup>3,7,8,34,35</sup> as do studies of US heterosexuals.<sup>4</sup> The high demand for voluntary VTC in existing testing centers in the developing world suggests that it is an intervention worth investigating.<sup>36</sup> In view of the cost and the possible negative consequences, however, there are several steps that should be taken before VTC is promoted on a large scale as a prevention strategy: Its efficacy in comparison to other interventions should be determined in different geographic areas and risk groups; cost-recovery mechanisms should be explored to ensure sustainability of the service and encourage funding agencies to provide initial monies; and a survey of existing VTC should be undertaken to document the negative consequences, if any, and to develop strategies to avoid them.

#### When to Consider Evaluating and Promoting VTC

When developing an integrated AIDS prevention program, it is helpful to think about which of a variety of possible interventions works best with particular target groups in a given area.<sup>37–39</sup> Data comparing the impact of different strategies in pattern II countries\* are needed for this prioritization of target groups and the development of appropriate interventions. The advantage of VTC over a targeted intervention that does not include the HIV test result is that it allows risk reduction strategies to be tailored to the HIV status of the person.<sup>40</sup> For an HIV-negative individual, the goal is to prevent them from becoming infected. For an HIV-positive person, the goals are to keep them as healthy as possible and to prevent them from transmitting the infection to others. Desired behavior outcomes and the content of intervention messages thus depend very much on the test results. An example of cohabiting couples, given in Fig. 1, is illustrative.

While all individuals should be advised to use condoms with other partners, the counsel one would give to the couple as a unit is clearly dependent on HIV status. As long as both partners are HIV negative and stay monogamous (or consistently use condoms with outside partners), there is no real need for them to use condoms with each other. In the case of discordant results, however, monogamy will not protect the HIV-negative partner and condom use is the goal. In couples with two HIV-positive partners, condom use may be advised (although the effect of additional virus exposure on the course of HIV disease is unclear), but more effective long-term contraceptives are required for prevention of unplanned pregnancies.

\*WHO terminology for countries whose main route of HIV transmission is through heterosexual contact.



Figure 1. When to consider evaluating and promoting VTC.

A different situation exists if the desired behavior is the same regardless of the test result. For example, the advice one would give to a single person—condom use, monogamy, abstinence, or reduction in number of partners—would be the same whether they were HIV positive or HIV negative. For such a target group, if HIV status does not affect the content of the prevention strategy, and unless VTC promotes the desired behavior, one could argue that it might not be helpful. An evaluation of the impact of VTC on risk reduction in a target group therefore is indicated prior to its promotion as a prevention strategy.

Certain guidelines may be helpful in identifying which groups in a given area might benefit from VTC. In an area of high prevalence in the general population, the target audience for VTC is all sexually active adults. An example of this situation would be the urban centers in East Central Africa, where the prevalence of infection in prenatal care clinic visitors is 20–30% and seroincidence is 3–5% per year,<sup>41</sup> and the prevalence of HIV in sex workers surpasses 80%.<sup>41</sup> In capital cities in these areas, most women aged 20–24 are married and the proportion rises

to >88% in women aged 25–40.<sup>42</sup> Between 1986 and 1991, in Kigali, the capital city of Rwanda, an estimated three-quarters of seroconversions in childbearing women occurred in married women, and most single women reported only one to two partners a year and were not sex workers in the classic sense.43 Of HIV-positive women, less than one third reported a venereal disease in the last five years.<sup>43</sup> Clearly, an intervention targeting only sex workers or STD patients in a high-prevalence area is unlikely to have much impact on the epidemic. In these cities, VTC for couples should be promoted (since the evidence is clear that it is effective in reducing transmission of the virus in discordant couples) and the impact of VTC on risk reduction in single people should be evaluated.<sup>46</sup>

Bangkok, the capital of Thailand, is an example of a situation in which the epidemic is still largely confined to certain high-risk groups, with a relatively low prevalence in married couples. Here, the majority of incident infections are still likely to be occurring in IVDUs and in sex workers and their clients, and an evaluation of the efficacy of VTC in these groups would be the highest priority. The transition from this type of epidemiology to one of high prevalence in the general population can occur extremely quickly, however, and it is essential to have current information on the demographics of an area and of the prevalence and incidence by subgroup when prioritizing the target audience for VTC evaluation. One circumstance in which VTC would probably not be helpful would be that of low prevalence in all groups, but examples of this type of epidemiology are becoming rare.

## Evaluation of VTC in Reducing Risk of HIV

VTC has been shown to increase condom use and decrease HIV and gonorrhea incidence in married women from Kigali, Rwanda; 15% of married couples had discordant HIV test results and risk reduction was the most dramatic in this group.<sup>45</sup> A significant point is that in Rwanda, as in many other places, men are the main decision makers about sexual matters. The importance of this was highlighted by the finding that the incidence of HIV in married women who were tested alone (without their husbands) did not decrease significantly. Similarly, although condom use increased in single women and gonorrhea incidence decreased in those who were HIV positive, HIV incidence in seronegative single women did not appreciably decrease. These findings indicate that VTC may be highly effective in certain groups and less so in others.

#### **Pilot Testing Operational Aspects**

Once the evaluation of VTC has identified the groups in which it is effective in reducing risk of HIV transmission (see later discussion on methods of evaluation), the operational aspects should be explored. These include demand for the

service, client satisfaction, cost-recovery mechanisms, potential referral networks, targeted promotional strategies, and possible negative outcomes. The experience of existing VTCs in areas with similar risk groups should be used to guide the process of evaluation. Detailed instruments for process evaluation developed for the VTC in Kampala, Uganda, can be used as a model.<sup>46-48</sup> If VTC is shown to be effective but VTC is not yet established in the area, a pilot center should be opened. NGOs with experience in health are a good mechanism for this because they can mobilize more quickly than government institutions or bilateral agencies to implement small projects. The Joint United Nations Program on HIV/AIDS (UNAIDS) can provide training for counseling staff and technical assistance to ensure that mechanisms for evaluation are incorporated from the beginning. For the pilot phase, a linkage should be established with an existing HIV-testing laboratory such as the Red Cross or a National AIDS Control Program (NACP) facility in order to avoid the cost and complications of setting up an independent laboratory. The pilot center should be anonymous and testing should be offered at a price that is generally affordable but allows cost-recovery. Reporting of negative as well as positive outcomes and dissemination of findings to relevant audiences is essential.

## Expand to Fill the Identified Need for VTC

If the pilot phase shows that VTC is a feasible intervention, a needs assessment should be undertaken and, if necessary, plans for expansion should be made. NGOs may be capable of meeting existing needs (as in Uganda and Thailand), or the larger resources of a bilateral agency, with contracts between pairs of developed and lesser developed countries, may be required (as in Rwanda, Uganda, or Zambia). Social marketing techniques may be helpful in targeting promotion of VTC to the groups that benefit most from the service.<sup>44,49</sup> Experience in Uganda, where seropositivity rates declined across 100% (24) of VTC sites, suggests that VTC can be implemented on a national scale in developing countries as a method of decreasing the incidence of HIV infection.<sup>50</sup>

### Outreach to Services that Do HIV Testing but Do Not Provide VTC

Inpatient hospital wards and outpatient clinics in health care facilities, transfusion centers, and surveillance programs are examples of settings where an HIV test may be performed but the patient is not provided access to the result. In health care facilities and in some blood banks, the testing is often linked—that is, the test result is connected to patient identifiers and health care personnel can know which patient has which result—but existing staff is inadequate to provide VTC. Under these circumstances, counselors from the VTC service can come to the health facility and provide pre- and posttest counseling. In collaboration with health care staff, patients for whom the HIV test is indicated can be approached and informed consent to be tested can be obtained. Patients can be given the option to know their result, or they may allow the test but request not to be given the result. In either case, they should receive the appropriate pretest counseling.

Once the usefulness of VTC is demonstrated (evaluation of efficacy) and the practical aspects of providing the service in these settings are addressed by VTC staff (operational aspects), alternatives that ensure sustainability can be explored. For example, the facility may elect to supplement their staff in order to provide VTC themselves, or VTC staff may continue to provide the service but may charge the facility for the counselors' time. Experience in Congo shows that integrating counseling services into an existing blood transfusion center is justified, but personnel must be recruited and properly trained, site capabilities must be assessed, and responsible managerial persons must be identified.<sup>53</sup> Additional multicountry studies support the feasibility of blood donor counseling.<sup>52</sup>

A slightly different situation exists for unlinked testing, where the blood is tested but patient identifiers are removed so that staff do not know to whom the test results belong. Examples of this are surveillance programs and some blood banks. The WHO recommendations are that people tested under these circumstances should be given access to a parallel service that can provide them with VTC if they want to know their test results.<sup>1</sup> Often, unfortunately, no such voluntary testing service exists. VTC staff can establish procedures whereby patients in these settings are given the necessary referral information.

# METHODS OF EVALUATING THE EFFICACY OF VTC AS A PREVENTION INTERVENTION

Although voluntary HIV testing and counseling effectively reduces risk of transmission in couples, it is not clear that it promotes more risk reduction than alternative interventions in other groups. Two study designs are proposed here to evaluate the efficacy of HIV testing and counseling. Both are randomized control studies, the gold standard for clinical trials. Randomized control studies are essential in circumstances such as this, where opinions vary considerably, and any other type of study (historical control\* or concurrent but unrandomized control†) will be open to criticism and will only delay resolution of the issue.

In the first three-armed study, VTC (intervention 1) is compared to an alternative strategy, such as peer education (intervention 2), and to "usual care" (the control group that receives the current standard of practice). In the second, a

<sup>\*</sup>Study in which a new intervention is initiated in a group of subjects and compared to results obtained previously in a similar group of subjects.

<sup>†</sup>Subjects and controls are enrolled simultaneously, but participants are not randomly assigned to receive either treatment or placebo.

factorial design is used to compare VTC to education (1 vs. 2), then each intervention is compared to a combination of the two (1 vs. 1 + 2 and 2 vs. 1 + 2), and each intervention and the combination are compared to "usual care" (neither 1 nor 2). In both studies, demographic variables and risk behaviors are measured at entry, the intervention is administered, and risk behaviors are measured again 3 and 6 months later. Several issues are important to consider in undertaking these studies, including definition of the target population, definition of the desired outcome variables, sample size calculations, subject recruitment and informed consent, follow-up and data collection, data analysis, and dissemination of results. A clinical trials textbook is recommended for more detailed explanations of methodological issues.

A three-armed randomized control trial allows comparison of two interventions to each other and to the control group and requires less than 150% of the sample size needed for a two-armed study. For ethical reasons, at the end of the 6-month follow-up period, the VTC and peer education groups would be offered the opportunity to participate in the complementary arm and the control group would be offered either or both interventions. Those who chose a second intervention could be followed with risk behaviors measured again 3 and 6 months after the second intervention. Although this is a type of crossover study in that it would allow comparison of behaviors in the same subjects before and after two interventions, crossover studies require that there be no residual effect from the first intervention when the effect of the second is being measured and that there be no interaction between interventions. This is not the case here, where the HIV test result and elements taken from peer education may influence the impact of subsequent interventions. There also might be a volunteer bias in subjects who requested a particular second intervention (as opposed to being randomly assigned). This could be turned to advantage, however, in that it could give an idea of which intervention is most popular or appealing, an operational question that is not answered with a randomized control design. Another advantage to this type of design is that it allows qualitative data to be gathered from subjects who had received both interventions, rather than only one intervention, as occurs in twoarmed studies.

Another possibility is to use a factorial study design in which subjects are randomized in equal numbers to one of four groups: intervention 1, intervention 2, interventions 1 + 2, and neither intervention. This design offers an advantage over a three-armed trial because it allows a more reliable assessment of possible interactions between the two interventions. For instance, VTC and peer education might each double the level of condom use, and the combination of the two should then result in a fourfold increase in condom use. If there was an interaction, which is likely, the combined interventions might result in more or less than a fourfold increase and a larger sample size would be needed to characterize the interaction. It should be kept in mind that VTC is popular and can be used to attract clients who

can be offered additional interventions. However, before doing so, gaining an understanding of the interaction between VTC and other programs in effecting desired outcomes would be important.

## **Definition of Target Populations**

The study population in each case should be homogeneous. Examples include sex workers, clients of sex workers, STD clinic visitors, sexually active single adults, sexually active adolescents, and married couples. Each study should include only one group at a time and the subjects should be representative of the larger target population that might request the intervention if it were offered on a volunteer basis.

### Definition of Outcome Variables and an Example of Data Analysis

A primary outcome variable should be defined and used for sample size calculations, though several secondary outcome variables can also be used. The definition of outcome variables, even in this relatively simple situation, can be quite difficult. Ideally, HIV and/or STD incidence is measured. If this is not possible, then reported sexual exposures can be used. If the goal is to prevent heterosexual transmission to or from the study subject, then the desired outcome is to bring to zero the number of episodes of unprotected sex with a partner whose serostatus is not known to be the same as that of the subject. If the index case and partner are both known to be HIV positive, or they are both known to be HIV negative and mutually monogamous, then there is no risk of heterosexual transmission even if a condom is not used. A suggested outcome variable could be defined as the number of exposures (i.e., sex with risk of heterosexual transmission). If the subject and partner are known to have the same test results, then even if they have sex without a condom it does not count as an exposure. This outcome variable would allow comparison of those who do and do not know their HIV test results or those of their partners. The number of exposures is a final common pathway for several types of risk reduction including abstinence, reduction in number of partners, and increase in condom use. Secondary outcomes of number of sexual encounters with a condom and number and type of sexual partners can also be measured.

## COST AND COST-EFFECTIVENESS OF HIV TESTING AND COUNSELING AS AN INTERVENTION TO PREVENT HIV TRANSMISSION

The simplistic assumption of the study designs proposed in the previous section is that, if the two interventions—VTC and peer education for example—

were implemented, they would be equal from the operational standpoint. They would be equally popular and the costs would be comparable. A number of models could be suggested to compare the costs of VTC to other interventions. For example, in an area of high prevalence in the general population, most incident infections are now in steady couples; this is the case for urban areas in Uganda, Tanzania, Rwanda, Burundi, and Zambia, and it is rapidly becoming the case in many other sub-Saharan African countries. A cost comparison of blanket condom promotion versus VTC plus targeted condom promotion would be reasonable here.

## ETHICAL ISSUES

There are many ethical issues involved in HIV testing and counseling. Mandatory testing is clearly undesirable, all the more so if confidentiality is not maintained. On the other hand, individuals should ideally be given the opportunity to know their HIV serostatus and receive appropriate counseling if resources permit it. Likewise, it is argued that individuals possess the right not to know their HIV test results.<sup>53,54</sup> The decision to provide supportive counseling for ill patients and their families is largely a question of priorities and resource allocation, while the decision to provide and promote voluntary testing and counseling as a preventive tool may be based more on the perceived efficacy of the intervention in preventing further spread of the disease. An intermediate situation is found when patients are tested by health care staff to aid in clinical management or because they are in a research study. In these circumstances, obtaining informed consent might be viewed as an empty gesture if patients defer to the doctor's decision without having a clear understanding of the implications of testing. Yet another problem may arise if religious, cultural, or family pressure is placed on individuals to be tested. Examples include churches that insist on premarital testing before they agree to perform the marriage, or parents that will not allow their children to wed until the fiancée is tested.

In all circumstances, emphasis should be placed on providing individuals with enough information to allow them to make a free and informed choice about being tested and about being told their result.<sup>56</sup> The advantage of centralizing voluntary testing services, at least initially, is that the staff can be trained to deal supportively and ethically with these difficult issues. They can emphasize to families and church staff that the decision to be tested and knowledge of the test results must rest with the individual or the couple in question. A particularly difficult situation is that of a married person who decides to be tested alone in an area where discordant couples are common; the counselor can discuss the possible outcomes, and the client can then choose to return for testing with their spouse, to be tested alone and discuss the result with their spouse, or to give consent to the counselor to discuss their result with their spouse. Opinions are divided about

partner notification in situations where the counselor knows the identity of both parties and knows that the positive partner is not disclosing their test result. This situation is best avoided by obtaining permission for the counselor to discuss the result with the spouse *before* the test is performed.

In circumstances where linked testing is currently not voluntary in the strictest sense, as in health facilities or blood banks, consent should be obtained in two stages: consent for the test to be performed, and consent to receive the test result. The goal is to provide pretest counseling so that an STD patient, prenatal care clinic visitor, blood donor, or hospital inpatient can make informed decisions on both counts. Omitting to inform the patient that they are being tested in order to avoid the problem is not justifiable.

# EVOLUTION OF HIV TESTING AND COUNSELING IN RWANDA AND ZAMBIA, 1986–1996

This section describes the 10-year evolution of testing and counseling in a research project that originated in Rwanda in 1986 and expanded to Zambia in 1994. The intent of this chronology is to provide a realistic framework for the information presented in the previous sections.

#### Project San Francisco in Rwanda, 1986-1994

In 1986, a collaborative study between the Ministry of Health and the University of California at San Francisco was established in the capital of Rwanda to study the epidemiology, natural history, and manifestations of HIV infection in urban adults. The first step involved HIV serological screening of a consecutive sample of 3800 women attending prenatal and pediatric clinics at the main hospital.<sup>43</sup> At the time, the only HIV testing in Rwanda was being performed for surveillance purposes and in the blood bank. Results were either not linked to patient names or not shared with tested individuals, and the Ministry of Health was reluctant to allow HIV results to be offered to a large group of healthy childbearing women. The general feeling was that there was some risk and no benefit involved in giving HIV test results.

In 1987, NIH funding was obtained to recruit a subset of the 3800 Rwandan women into prospective studies. NIH regulations mandated that participants must agree to accept their HIV test results with appropriate health education. Prior to 1987, participants in NIH-funded AIDS studies could consent to HIV testing but could decline to receive their test result. While this new regulation caused controversy in the United States, it was welcomed by the research team in Rwanda who had witnessed firsthand the demand for HIV test results among prenatal care clinic attendees. As no formal counseling protocols were yet available for developing

countries, pre- and posttest procedures developed by the California anonymous testing centers were adapted and an educational video was produced in the local language to facilitate and standardize health education.

When recruitment for the prospective studies began in 1988, all but a handful of women wanted to know their HIV test results and many requested that HIV testing and counseling be provided to their spouses as well.<sup>56</sup> Additional funding was obtained and one third of the eligible spouses requested the test. Unexpectedly, a substantial number of couples, 15%, had discordant HIV test results despite having lived together for an average of 7 years. Twenty percent of couples were concordant positive and the remaining 65% were concordant negative.<sup>2</sup> The results of this couple testing were enlightening in many ways: It was immediately evident that condom use was reported more frequently by women whose husbands had been tested, and that this was not due to volunteer bias or secular trend.<sup>45</sup> Providing VTC to married women without participation of their husbands did not result in a significant decrease in HIV incidence rates, despite HIV counseling and education and knowledge of the woman's test result. As a result, it became very clear that providing VTC to the couple together was the only strategy to effectively reduce HIV incidence rates in cohabiting steady couples. However, it was also clear that dealing with couples required some forethought to avoid difficult situations, in particular those in which partners were tested separately and proved to have discordant results.

By 1990, it was apparent that Rwandan men dominated sexual decision making<sup>57</sup> and that sexual and physical violence against women was common.<sup>58</sup> Also clear was that the involvement of men in HIV testing and counseling contributed to significantly reduced rates of HIV and gonorrhea among the women enrolled in the studies.<sup>45</sup> Funding was obtained for a parallel study of male spouses in 1991.<sup>59</sup> A second video targeting married men was developed for the study using the results of formative research,<sup>60</sup> as well as social marketing techniques. The number of spouses who were tested and counseled rose to over 850 and the low seroconversion rate among men previously tested whose wives were HIV positive (who had not been seen since the one-time testing and counseling session in 1988) confirmed the sustained impact of a simple and popular VTC intervention.

The results of the first several years of work indicated that heterosexual transmission of HIV was highly variable and not as efficient as originally thought, and that characteristics of both HIV-infected persons and their partners influenced the likelihood of transmission. An NIH grant was submitted and accepted to continue the study of discordant couples. A testing service for couples was established as a recruitment center, and outreach and active promotion strategies were used to publicize the service. Attendance reached 10 couples/day; the proportion of couples with discordant results was again 15%.

Although condom use had increased and STD rates had declined following testing and counseling, the prevalence of long-acting contraceptive use did not change among HIV-positive women and the incidence of pregnancy remained high.<sup>61</sup> In order to evaluate family planning promotion as a potentially costeffective strategy to prevent unplanned pregnancy and pediatric HIV infection, a family planning service offering long-acting contraceptives was added at the research clinic. Although a placebo-controlled clinical trial would not have been considered ethical, before–after analyses confirmed that providing easy access to contraceptives did result in a 50% increase in their use by the HIV-positive women and a corresponding decrease in pregnancy incidence.<sup>62</sup>

In summary, approximately two thirds of incident HIV infections each day in Kigali occurred in married couples. The HIV prevention programs existing in Kigali prior to 1988 did not adequately target this group, but the introduction of voluntary testing and counseling in 1988 had a significant impact on HIV prevention practices. The following results were achieved after implementation of VTC:

- Condom use in discordant couples increased from 4% to 57% after only 1 year of follow up.
- The rate of HIV transmission among discordant couples declined 65%, from 23% per year to 8% per year.
- The rate of gonorrhea among HIV-positive women declined more than 50%.

Other findings included:

- Providing HIV VTC to married women without the participation of their husbands did not result in a significant decrease in HIV incidence rates.
- Conception rates in the 2 years following VTC were lower among HIVpositive women than among HIV-negative women (43% vs. 57% had a new pregnancy), and many HIV-positive women expressed a desire to limit their fertility.
- With the introduction of contraceptive services to Project San Francisco, the use of oral and injectable contraception increased by 50%, resulting in a corresponding decrease in new pregnancies.

## Project San Francisco in Zambia, 1994-Present

In the wake of the 1994 genocide in Rwanda, the main research site was relocated to Lusaka, Zambia. A voluntary HIV testing center for couples was established and outreach and publicity efforts were adapted and refined for the local context. When rapid HIV tests achieved acceptable technical standards and became inexpensive and locally available, a same-day system was established in 1995 to allow patients to be tested, informed of the results, and receive pre- and posttest counseling in one visit.<sup>44</sup> With the combined influence of community outreach, provision of transportation, and same-day testing, the service has now hosted 4000 cohabiting couples from Lusaka. Over 250 counselors from Zambia

and surrounding countries have attended workshops at the project's clinical site to observe the community outreach, couple counseling, and same-day testing procedures. Although the goals of the project are primarily oriented to biological research, the recruitment, testing, and counseling methods are in and of themselves a popular and cost-effective prevention strategy that has been transferable in several settings.

## CONCLUSIONS AND RECOMMENDATIONS

- 1. VTC has been shown to be effective in reducing HIV and gonorrhea incidence in couples from high-prevalence African cities. Consistent data from several countries indicate that VTC reduces heterosexual transmission in discordant couples.
- 2. VTC is most likely to be cost-effective in high-prevalence areas, where the majority of new infections occur in steady couples and concurrent STD contributes little to the spread of the epidemic.
- 3. Evaluation of HIV testing and counseling (VTC) as a preventive strategy is warranted when:
  - The desired behavior change depends on the HIV test result.
  - The desired behavior change is the same regardless of the test result, but behavior change is promoted by giving HIV testing with counseling.
- 4. The efficacy of VTC in promoting risk reduction needs to be evaluated in other target groups, and compared to other types of ongoing or potential interventions.
- 5. Where pilot VTCs are successful, services should be expanded and promoted in the groups that benefit most from the impact on risk reduction.
- 6. Where VTC is shown to be effective, management and financial issues, including cost-recovery, should be explored with a pilot voluntary counseling and testing center.
- 7. Counseling staff from the VTCs should offer outreach services to other organizations that do HIV testing but cannot provide counseling.
- 8. VTC is already available in many developing countries in Africa, Central and South America, and Asia. The staff from these centers should be used as a resource by groups establishing community VTC services.

## REFERENCES

1. World Health Organization. Proposed International Guidelines for Unlinked Anonymous Screening for the Public Health Surveillance of HIV Infections. Geneva: World Health Organization; 1990.

- Allen S, Tice J, Van de Perre P, et al. Effect of serotesting with counseling on condom use and seroconversion among HIV discordant couples in Africa. Br Med J 1992; 304:1605–1609.
- Coates TJ, Stall RD, Catania JA, Kegeles SM. Behavioral factors in the spread of HIV infection. AIDS 1988; 2 (suppl 1):S239–S246.
- Wenger NS, Linn LS, Epstein M, Shapiro MF. Reduction of high-risk sexual behavior among heterosexuals undergoing HIV antibody testing: A randomized clinical trial. Am J Public Health 1991; 81:1580–1585.
- Choi K, Coates T. HIV prevention does not work to reduce new infections. International Conference on AIDS, 1994, Yokohama, Japan. Abstract No. PP00220 p. 354.
- Muziginva W, Higgins D, Rwabuhemba T, et al. "It works": Uganda's HIV counseling protocol. International Conference on AIDS, 1993, Berlin, Germany. Abstract No. PO-C35-3386.
- Dawson J, Fitzpatrick R, McLean J, et al. The HIV test and sexual behaviour in a sample of homosexually active men. Soc Sci Med 1991;32:683–688.
- Higgins DL, Galavotti C, O'Reilly K, et al. Evidence for the effects of HIV antibody counseling and testing on risk behaviors. JAMA 1991; 266:2419–2429.
- Landis SE, Earp JL, Koch GG. Impact of HIV testing and counseling on subsequent sexual behavior. AIDS Educ Prev 1992; 4:61–70.
- Kamenga M, Ryder RW, Jingu M, *et al.* Evidence of marked sexual behavior change associated with low HIV-1 seroconversion in 149 married couples with discordant HIV-1 serostatus: experience at an HIV counselling center in Zaire. *AIDS* 1991; 5:61–67.
- Padian NS, O'Brien T, Chang Y, et al. Prevention of heterosexual transmission of human immunodeficiency virus through couple counseling. J Acquir Immune Defic Syndr 1993; 6:1043–1048.
- Kegeles SM, Catania JA, Coates TJ, et al. Many people who seek anonymous HIV-antibody testing would avoid it under other circumstances. AIDS 1990; 4:585–588.
- Fehrs LJ, Fleming D, Foster LR, et al. Trial of anonymous versus confidential human immunodeficiency virus testing. Lancet 1988; 2:379–382.
- Benn C. Ethical considerations on the application of informed consent in HIV testing and counselling. *International Conference on AIDS*, 1990, Kinshasa, Zaire. Abstract No. TPA13.
- Sovinks F. Ethical concepts of "informed consent" in epidemiological research on HIV infection. International Conference on AIDS, 1991, Dakar, Senegal. Abstract No. WA274.
- Marum E, Gumisiriza E, Moore M, Onen J. Impact of a social support club following HIV counseling and testing (CT), Uganda, 1993-1994. *International Conference on AIDS*, 1994, Yokohama, Japan, Abstract No. 240C.
- Perkins H, Laski M, Hofman S. HIV/AIDS psychological consulting: Prevention and care. International Conference on AIDS, 1994, Yokohama, Japan. Abstract No. PD0242.
- Keogh P, Allen S, Almedal C, Temahagili B. The social impact of HIV infection on women in Kigali, Rwanda: A prospective study. Soc Sci Med 1994; 38:1047–1053.
- Chieze F, Bonnaud C, Van Den Noort P, et al. Action for care, quality of life, research and ethics in Africa: the example of the CTA in Brazzaville, Congo. International Conference on AIDS, 1996, Vancouver, B.C. Abstract No. Tu.B.2142.
- 20. Global Programme on AIDS. Annual report. Geneva: World Health Organization; 1991.
- Friedman LM, Furberg CD, DeMets DL. Fundamentals of Clinical Trials, 3rd ed. St. Louis: Mosby; 1996.
- Benetucci J, da Bouza J. Multare S, et al. Risk of HIV heterosexual transmission in women from Buenos Aires City. International Conference on AIDS, 1990, San Francisco, USA. Abstract No. THC566.
- Sepulveda J, Hernandez M, Herrera E, Avila C. Heterosexual HIV transmission: a multicenter partner study in Mexico City. *International Conference on AIDS*, 1990, San Francisco, USA. Abstract No. THC568.
- 24. Ramirez G, Avila C, Herrera E, et al. The impact of partner notification on sexual behavior among

a heterosexual population. *International Conference on AIDS*, 1990, San Francisco, USA. Abstract No. SC104.

- Garcia P, Uribe Z, Hernandez A, et al. Factors that determinate an individual's repeatedly asking to be HIV tested. International Conference on AIDS, 1990, San Francisco, USA. Abstract No. SC648.
- 26. Lindan C, Allen S, Nsengumuremyi F, et al. HIV testing and education promote safer sex among urban women in Rwanda. International Conference on AIDS, 1990, San Francisco, USA. Abstract No. SC669.
- Omari MA, Bwayo J, Muterc A, *et al.* Changes in behavior and the incidence of HIV and other sexually transmitted diseases in truck drivers from East Africa. *International Conference on AIDS*, 1991, Florence, Italy. Abstract No. WC3118.
- Ndawa G, Mumba G, Hira S, et al. Effectiveness of psychosocial counselling of HIV infected clients in a referral clinic in Lusaka, Zambia. *International Conference on AIDS*, 1990, Kinshasa, Zaire. Abstract No. TPA14, p. 154.
- Shandera WX. Discrimination and AIDS among African AIDS policies. *International Conference* on AIDS, 1991, Dakar, Senegal. Abstract No. WA275, p. 309.
- Mukisa E, Rubagiza J. Partner notification about HIV serostatus in National STD Clinic Mulago. International Conference on AIDS in Africa, 1991, Dakar, Senegal. Abstract No. MA193.
- 3 1. Msengi S. Initial reactions of patients and their friends and relatives towards a diagnosis of HIV infection, Muhimbili Medical Center, Tanzania. *Fifth International Conference on AIDS in Africa*, 1990, Kinshasa, Zaire. Abstract No. TPA11.
- Mendez G, Avila C, Lopez A, et al. Psychosocial profile in a population attending an HIV testing and counseling center in Mexico City. *International Conference on AIDS*, 1990, San Francisco, USA. Abstract No. SB375.
- De Zoysa I, Phillips KA, Kamenga MC, et al. Role of HIV counseling and testing in changing risk behavior in developing countries. AIDS 1995; 9:S95–S101.
- Perry SW, Card CA, Moffatt M Jr, et al. Self-disclosure of HIV infection to sexual partners after repeated counseling. AIDS Educ Prev 1994; 6:403–411.
- 35. Sarkar S, Panda S, Sarkar K, et al. Widespread availability of free HIV testing and awareness about individual HIV test result does not influence safer sex behavior of the injecting drug users in Manipur, India. International Conference on AIDS, 1996, Vancouver, B.C. Abstract No. Pub. C. 1243.
- 36. World Health Organization. Draft: *Reported Desire to Have an HIV Test*. Geneva: World Health Organization.
- Beardsell S, Coyle A. A review of research on the nature and quality of HIV testing services: A proposal for process-based studies. Soc Sci Med 1996; 42:733–743.
- Hinman AR. Strategies to prevent HIV infection in the United States [editorial]. Am J Public Health 1991; 81:1557–1559.
- Mhalu F. Options for AIDS control in sub-Saharan Africa. International Conference on AIDS, 1991, Dakar, Senegal. Abstract No. T0119.
- 40. Moore M, Tukwasiibwe E, Mamm E, et al. Impact of HIV counseling and testing (CT) in Uganda. International Conference on AIDS, 1993, Berlin, Germany. p. 97.
- Rwandan HIV Seroprevalence Study Group. Nationwide community-based serological survey of HIV-1 and other human retrovirus infections in a central African country. *Lancet* 1989; 1:941–943.
- 42. Bureau National de Recensement. Kigali, Rwanda; 1978.
- 43. Allen S, Van de perre P, Serufilira A, et al. Human immunodeficiency virus and malaria in a representative sample of childbearing women in Kigali, Rwanda. J Infect Dis 1991; 164:67–71.
- 43a.Allen S, Lindan C, Serufilira A, *et al.* Human immunodeficiency virus infection in urban Rwanda. Demographic and behavioral correlates in a representative sample of childbearing women. *JAMA* 1991, 226:1657–1663.

- 44. McKenna SL, Muyinda GK, Roth D, et al. Rapid HIV testing and counseling for voluntary HIV testing centers in Africa. AIDS 1997; 11:S103–S110.
- 45. Allen S, Serufilira A, Bogaerts J, et al. Confidential HIV testing and condom promotion in Africa. Impact on HIV and gonorrhea rates. JAMA 1992; 268:3338–3343.
- Baryarama F, Kalule J, Gumisiriza E, et al. Couple counseling and HIV testing in Uganda: Four years experience at the AIDS information centre. *International Conference on AIDS*, 1996, Vancouver, B.C. p. 250.
- Muller O, Bamgahare L, Schwartlander B. HIV prevalence, attitudes, and behavior in clients of a confidential HIV testing center in Uganda. *AIDS* 1992; 6:869–874.
- Moore M, Tukwasiibwe E, Rwekikomo F, *et al.* Monitoring HIV counseling and testing in Kampala, Uganda: A new management tool. *International Conference on AIDS*, 1992, Amsterdam, The Netherlands. p. 177.
- Boulos R, Johnson MP, Coberly JS, *et al.* Tuberculosis (TB) screening as a means to promote HIV counseling and testing in a high risk developing country population. *International Conference on AIDS*, 1993, Berlin, Germany. p. 389.
- Moore M, Nabwiso F, Tukwasiibwe E, et al. Nationwide counseling and testing (CT) in Uganda: Comparisons across sites and over time. *International Conference on AIDS*, 1994, Yokohama, Japan. p. 392.
- Peko J, Mukaka J, M'Pele P. The integration of a counselling service with the blood transfusion service in Brazzaville, Congo. *International Conference on AIDS*, 1994, Yokohama, Japan. p. 233.
- Miller D, Kalibala S, Anderson S, et al. Blood donor counselling for HIV Results of a multicountry feasibility study. *Public Health* 1994; 108:219–226.
- Temmerman M, Ndinya-Achola J, Ambani J, Piot P. The right not to know HIV-test results [see comments]. *Lancet* 1995; 969–970.
- 54. Nabais I, Goncalves G, Ouakinin S, Figueira ML. Disclosure of HIV infection to sexual partners: Implications in relationship. *International Conference on AIDS*, 1996, Vancouver, B.C. p. 351.
- Ekdawi I, Wanigaratne S. Outcomes of pre-HIV antibody test counselling. International Conference on AIDS, 1993, Berlin, Germany. p. 755.
- Allen S, Lindan C, Serufilira A, *et al.* Human immunodeficiency virus infection in urban Rwanda. Demographic and behavioral correlates in a representative sample of childbearing women. *JAMA* 1991; 266:1657–1663.
- VanderStraten A, King R, Grinstead O, et al. Couple communication, sexual coercion and HIV risk reduction in Kigali, Rwanda. AIDS 1995; 9:935-944.
- VanderStraten A, King R, Grinstead O, et al., Sexual coercion, physical violence, and HIV infection among women in steady relationships in Kigali, Rwanda. AIDS and Behavior 1998; 2(1): 61–73.
- Seed J, Allen S, Mertens T, et al. Male circumcision, sexually transmitted disease, and risk of HIV. J Acquir Immune Defic Syndr Human Retrovirol 1995; 8:83–90.
- 60. Lindan C, Allen S, Carael M, *et al.* Knowledge, attitudes, and perceived risk of AIDS among urban Rwandan women: Relationship to HIV infection and behavior change [published erratum appears in *AIDS* 1992 Jan;6(1):128]. *AIDS* 1991; 5:993–1002.
- 61. Allen S, Serufilira A, Gruber V, et al. Pregnancy and contraception use among urban Rwandan women after HIV testing and counseling. Am J Public Health 1993; 83:705–710.
- King R, Estey J, Allen S, et al. A family planning intervention to reduce vertical transmission of HIV in Rwanda. AIDS 1995; 9:S45–S51.

## Controlling Other Sexually Transmitted Diseases

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#### INTRODUCTION

Sexually transmitted disease (STD) prevention and management are now recognized as essential components of HIV prevention programs. Mounting evidence that STDs enhance HIV transmission has added urgency to efforts to improve STD services.

But STDs are a serious public health problem in their own right, with grave economic, social, and health consequences. Globally, an estimated 333 million new cases of curable STDs (i.e., gonorrhea, trichomoniasis, syphilis, chancroid, chlamydial infection) occur each year.<sup>1</sup> Although there are few data on the chronic viral STDs (i.e., genital herpes, hepatitis B virus, genital human papilloma virus, and HIV), these infections are estimated to be in the billions.<sup>2</sup> For several decades, STDs have ranked among the top five diseases for which adults in developing countries seek health care services.<sup>3</sup> In these countries, STDs are the second cause of healthy life lost, measured in disability-adjusted life years (DALYs\*), in women of 15 to 45 years of age, after maternal morbidity and mortality.<sup>4</sup> In men, HIV and other STDs combined account for nearly 15% of all healthy life lost in this age group?

\*Disability-adjusted life years (DALYs) represent the reporting units of a measure of global burden of disease. The global burden of disease is arrived at by combining (1) losses from premature death, which is the difference between actual age of death and age of death in a low-mortality populations and (2) healthy life lost as a result of a disability.<sup>4</sup>

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STDs' role in enhancing the sexual transmission of HIV was initially suspected on the basis of several observational epidemiological studies.<sup>5</sup> These studies were subsequently corroborated by biological studies demonstrating increased amount of HIV detected in genital secretions in the presence of urethral or cervical inflammation and, more compellingly, the reduction in the amount of virus detected in genital secretions after appropriate treatment.<sup>6-10</sup> The role of STD control in preventing HIV transmission was confirmed in Mwanza, Tanzania, where a community randomized trial of strengthened syndrome management of symptomatic STDs was associated with a 42% reduction in new HIV infections over a 2-year period.<sup>11</sup> The Mwanza study is discussed in more detail below.

Treating STDs constitutes both primary and secondary prevention. For bacterial and protozoal STDs, early detection and curative treatment of recently infected individuals provide secondary prevention at the individual level by preventing potential complications of STDs in the individual and primary prevention at the population level by preventing further transmission of STDs and reducing the effectiveness of HIV transmission. Effective primary prevention needs to address individuals who are not infected with STDs or HIV as well as those who are.<sup>2</sup>

STD epidemiology defines the basic strategies for prevention and management interventions.<sup>12</sup> Thus, interventions can prevent the spread of STDs within a population by (1) reducing the rate of exposure to STD, (2) reducing the efficiency of transmission, or (3) shortening the duration of infectiousness for the specific STD(s). An approach to STD prevention at both the individual and population level using these three intervention strategies is presented in Table 1.<sup>2,13</sup> As Table 1 indicates, STD clinical management should be viewed as a component of a comprehensive strategy that also emphasizes the primary prevention strategy of reducing risk of sexual exposure to STDs, including HIV. Beyond interventions aimed at individuals or communities, enabling interventions that address structural barriers should also be implemented.<sup>14</sup> Examples of enabling approaches include:

- Designing services that are more acceptable and accessible to target populations (such as youth or sex workers) by, for example, changing clinic hours, changing clinic location, or sensitizing service providers to the special needs of the community.
- The 100% condom brothel policy of Thailand (discussed in detail below), whereby condom use was a policy enforced by management rather than the responsibility of the individual sex worker.
- Ensuring that industrial or agriculture projects with large in-migrating populations of workers provide STD/HIV prevention and care services.

Patterns of sexual partner mixing and the characteristics of sexual networks are important in the rate of spread of STDs.<sup>15</sup> Interventions will have the greatest impact on the spread of STDs in a population if they are effectively focused and delivered among individuals who have many partners and in dense sexual net-

	Population level	Individual level
Reduce rate of exposure to STD (all STDs)	<ul> <li>Reduce population prevalence of STDs</li> <li>Promote social nom change to reduce number of sexual partners,</li> </ul>	<ul><li>Have fewer sexual partners</li><li>Delay sexual debut</li><li>Avoid risky partners</li></ul>
	delay sexual debut, avoid high- risk partners	
Reduce efficiency of transmission (all	<ul><li> Promote use of barrier methods</li><li> Promote safer sexual practices</li></ul>	• Use barrier methods (male and female condoms, microbicides)
STDs)	<ul> <li>Make barrier methods available</li> </ul>	<ul> <li>Adopt safer sexual practices</li> </ul>
Shorten duration of	<ul> <li>Provide accessible, acceptable,</li> </ul>	<ul> <li>Seek appropriate STD care</li> </ul>
infectiousness (curable STDs)	effective services for management	promptly upon recognition of
	• Make SID drugs available	symptoms (avoid self-treatment)
	• Promote the use of STD services	• Complete full course of
	<ul> <li>Ensure linkages between male</li> </ul>	medication
	and female services for partner	<ul> <li>Avoid sex until cured</li> </ul>
	management	· Assist with partner treatment

Table 1. Individual- and Population-Level Approaches to STD Prevention<sup>a</sup>

<sup>a</sup>Adopted from Holmes.<sup>2</sup>

works.<sup>16</sup> A recent analysis of the cost-effectiveness of HIV prevention programs using estimates of HIV infections averted found that targeting high-risk populations provided substantial benefits and should be considered in decisions regarding allocation of resources.<sup>17</sup>

The data are now clear that in communities with substantial STD prevalence, STD treatment and prevention are key strategies for HIV prevention. The main question that remains is which approaches to delivering STD services work in light of the many infrastructure, personnel, supply, and population treatment-seeking behavior constraints found in most countries.<sup>18</sup> Implementation strategies involve two main areas: (1) technologies for actual clinical management (i.e., syndromic management, diagnostics for case finding/creening, presumptive/periodic treatment, and partner treatment), and (2) service delivery strategies for the general population and specific groups. Strategic approaches for clinical management of STDs in the general population and within groups with frequent casual or commercial sex are outlined in Table 2.

The use of World Health Organization (WHO) recommended standardized STD flowcharts based on the syndromic management approach will enable the majority of providers, who generally lack access to adequate examination or laboratory facilities, to manage symptomatic patients effectively.<sup>19</sup> The syndromic management approach to STD care is patient-centered, rapid, and effective, in marked contrast to the classic dermatovenereology approach. Treatment can be

	Table 2         Approaches to the Clinical Management o           for General Population and Settings of Frequent Casual Sex/C	STDs ommercial Sex
	Strategic approaches	
Categories of clients	General population	Frequent casual/commercial sex
Symptomatic and seek care in appropriate health services	<ul> <li>Promote syndromic management (needs refining for vaginal discharge in women)</li> <li>Upgrade acceptable, accessible services [primary health care, STD, matemal-child health/family planning (MCWFP), private</li> </ul>	<ul> <li>Determine clinical management strategies (group-specific risk assessment, diagnostics, presumptive treatment)</li> <li>Determine accessible and acceptable service</li> </ul>
	<ul> <li>sector]</li> <li>Ensure availability of effective drug/diagnostics</li> <li>Provide preventive education at time of clinical management (e.g., condom use, compliance with prescription, partner treatment, risk reduction)</li> </ul>	delivery strategies (adolescent clinics, sexual health, brothel-based, MCWFP)
Symptomatic but does not seek appropriate care or does not recognize symptoms	<ul> <li>Implement communication strategies to improve symptom recognition and change social norms to improve treatment-seeking behavior</li> <li>Improve care, both curative and preventive, at nonclinic-based health services (e.g., pharmacies, STD drug social marketing, community-based distribution, traditional healers)</li> </ul>	<ul> <li>Formative research to identify groups and to address group-specific issues (adolescents, migrant population, sex workers)</li> </ul>
Asymptomatic (subclinical infection)	<ul> <li>Screening and case finding (syphilis screening available but underutilized, other rapid tests under development, risk assessment for case finding performs poorly)</li> <li>Implement partner treatment strategies</li> </ul>	<ul> <li>Case-finding strategies untested</li> <li>Presumptive treatment</li> <li>Partner treatment strategies and using index</li> <li>patient to locate high-risk groups for targeting</li> </ul>

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provided during the initial visit, which reduces the risk of further spreading the infection and the risk of sequelae developing from untreated infections. In addition, the need to return for laboratory results is eliminated. As there are no laboratory expenses, there are cost savings. And since treatment covers all major pathogens, there are fewer treatment failures.

Women represent a major challenge in STD control primarily because of the low specificity or absence of clinical manifestations when they are infected. The validity of syndrome-based flowcharts for lower genital tract infections in women is not optimal, and laboratory tests remain essential for detecting STDs in asymptomatic and high-risk women.

Screening and case finding are limited by the availability of validated tools and diagnostics. The use of diagnostic tests for screening purposes is limited by cost, the need for quality laboratory capabilities, and logistics. Antenatal syphilis screening is an example of a screening program that identifies syphilis in pregnant women to prevent an adverse pregnancy outcome and disease in the woman. Despite the fact that the diagnostic test is widely available, rapid, inexpensive, and simple and that the treatment of syphilis is relatively inexpensive, it is underutilized, often because of logistic and managerial obstacles. By instituting clinicbased screening, antenatal clinics in Kenya were able to dramatically increase the number of women who were screened for syphilis with a rapid plasma reagin (RPR) and treated.<sup>20</sup> Clinic-based screening allowed them to bypass many of the logistical problems of sending specimens to the laboratory, waiting for results, and asking the women to return. Outside of antenatal clinics, syphilis screening should also be implemented in the management of urethritis and vaginal discharge.

The main obstacle in the management of STDs other than syphilis in asymptomatic individuals, especially women, is defining valid, feasible, and affordable case finding or screening strategies, especially for gonococcal and chlamydial infection. The studies done to date that have attempted to define a risk profile to identify infected, asymptomatic women have been disappointing. Flowcharts, including risk assessment scores derived from these studies, lack a high enough sensitivity and specificity to be acceptable for widespread use. The disappointing results of the studies to date and the absence of a simple, rapid, affordable, and valid screening tool limits case-finding and screening strategies for asymptomatic women. However, these imperfect approaches, which include risk profiles, may be a better option than doing nothing at all, especially in areas where STD prevalence is high.

The development of an inexpensive, simple bedside diagnostic test for gonorrhea and chlamydial infection in women is now a research priority for several international health organizations.<sup>21</sup> Risk assessment and diagnostic tests are not mutually exclusive approaches to asymptomatic infections. A region in the United States successfully used risk assessment of asymptomatic women to identify those who would undergo a diagnostic test for chlamydial infection.<sup>22</sup> The use of the risk assessment prior to testing made the screening more cost-effective.

Partner treatment is an underutilized and understudied approach to STD control. In settings that lack the capacity to perform screening tests, partner referral/ notification of symptomatic men offers an opportunity to identify and treat women who are asymptomatic or otherwise unaware of their infections. In the United States, a pilot project is underway to determine the effectiveness of sending the index patient home with therapy for the partner(s).<sup>23</sup>

## OVERVIEW OF NOTABLE INTERVENTIONS

There are very few reports, either published or unpublished, on STD intervention programs. This is due in part to the low priority of STDs prior to the HIV epidemic, the difficulty and expense of accurately measuring STD incidence or prevalence in a community, and the costs of establishing or improving existing STD services. In this chapter, we will describe a spectrum of pilot STD control interventions to cover a range of service delivery issues and strategies and utilize a variety of research designs. These represent studies published in the English language literature, abstracts from scientific meetings, and unpublished reports of interventions that the authors were able to identify. All available studies are not discussed in this chapter, since several reported on similar interventions (e.g., partner referral, services for sex workers, syphilis decentralization). Studies and interventions were chosen to represent the variety of strategies employed in Africa, Asia, and Latin American and the Caribbean.

## Africa

According to WHO estimates, in sub-Saharan Africa the annual incidence of curable STDs in 15- to 49-year-olds is 11 to 35%.<sup>1</sup> HIV prevalence in patients attending STD clinics in Africa varies widely from less than 1% in Madagascar (1995) and Morocco (1995), to less than 5% in Senegal (1994), to over 50% in Malawi (1993) and Zimbabwe (1995).<sup>24</sup> Numerous interventions are being implemented to address the epidemics of STDs and HIV on the continent, and some of the strongest and most innovative global data come from these interventions including the only community-based randomized control trials of STD control for HIV prevention, marketing STD treatment and prevention kits, and clinic-based syphilis screening and treatment programs.

### Improved STD Treatment to Prevent HIV in Mwanza Region, Tanzania

The Mwanza district trial represents the second published randomized controlled trial of an intervention designed to reduce HIV transmission, the first being a study reporting a reduction in perinatal HIV transmission with the use of zidovudine.<sup>11,25</sup> The objectives of the Mwanza study, which began in 1991, were to (1) establish a program for improved STD management, (2) evaluate the impact of the program on HIV incidence, (3) evaluate the impact on STD prevalence and incidence, and (4) evaluate the feasibility and cost-effectiveness of the intervention.

In this randomized, community-based trial, 12 communities in rural Tanzania were matched based on location (roadside, lakeshore, or rural), geographical area, and levels of STD attendance in the health centers as measured from clinic records.<sup>26</sup> One community of each of the six pairs was randomly assigned to receive the intervention and the other acted as the control site. The 2-year intervention had five main components: (1) training in STD syndrome management for health center and dispensary medical staff; (2) ensuring a regular and adequate supply of drugs at the clinics to manage these STD syndromes; (3) establishing a system of regular supervisory visits to each health facility; (4) conducting periodic health education in the villages; and (5) establishing an STD referral center with supporting diagnostic laboratory services.

The intervention was evaluated in a randomly chosen cohort of 1000 adults from each community using baseline and 2-year follow-up questionnaires, HIV testing, syphilis testing (RPR and TPHA), and, among men, a screening leukocyte esterase dipstick of urine followed by a urethral swab tested for gonorrhea (Gram's stain) and chlamydial (antigen capture enzyme immunoassay) infections. In addition, cross-sectional STD surveys were done in antenatal clinic attendees including structured interviews and testing for *Trichomonas vaginalis* and *Candida albicans* (vaginal fluid wet mount), *Neisseria gonorrhoeae* (cervical culture), *Chlamydia trachomatis* (antigen capture enzyme immunoassay), and syphilis (RPR and TPHA).

Of the individuals who were initially HIV negative, 1.2% seroconverted in the intervention communities and 1.9% in the control communities—a 42% reduction in HIV incidence. For the other STDs measured, prevalence was consistently lower in the intervention communities. After adjusting for baseline prevalence, there was a significant reduction in the prevalence of serological syphilis in the intervention communities, and the prevalence of symptomatic urethritis in men decreased about 50%.<sup>27</sup> There was no difference, however, in the incidence of self-reported symptoms or in the STD prevalence among antenatal clinic attendees. There was also no difference between the control and intervention communities in reported condom use or sexual behavior.

The estimated cost of each HIV case averted from this intervention was US\$250, which translates for this setting into about US\$11/DALY saved.<sup>28</sup> By comparison, tuberculosis chemotherapy is estimated to cost US\$7/DALY, tetanus vaccination US\$2–10/DALY, measles vaccination US\$2–15/DALY, and neonatal ophthalmia prophylaxis US\$5–125/DALY. Based on the Mwanza district data, STD treatment to prevent sexually transmitted HIV infection is among the public health interventions with the highest estimated benefit-to-cost ratio.<sup>29</sup>

Periodic, Presumptive STD Therapy in the General Population in Rakai District, Uganda

The Rakai Project, working in Rakai district of Uganda since 1994, has been involved in several HIV intervention studies.<sup>30,31</sup> In 1996, a study was initiated to evaluate whether mass treatment for STDs can effectively reduce STDs in a community.<sup>32</sup> In addition, the study sought to demonstrate whether a reduction in STD prevalence and incidence will result in a decrease in HIV transmission.

Mass treatment was chosen as a viable option in Rakai district for several reasons. First, the prevalence of STDs in the district is high. Before the study started, the STD prevalence was estimated at over 10% in persons 13 to 49 years of age. Second, because the district has only two functional health centers, clinic-based STD services would only reach a small number of people. And finally, the large number of asymptomatic infections that occur in the district would not be treated in clinic-based facilities.

The study is a community-based, randomized trial with a treatment and a control arm.<sup>33</sup> The treatment and control arms both consist of five clusters of communities. Each cluster is made up of communities that interact with each other in trade and social activities. The clusters were defined with the intention of encompassing sexual networks. The aim of this cluster design of interacting communities was to avoid contamination between control and intervention clusters. Each treatment community was matched to a similar control cluster, for a total of ten clusters, five in each arm.

Every 9 to 10 months, all consenting adults aged 15 to 59 years enrolled in the study are visited in their homes where a questionnaire is administered. Participants provide a blood sample for syphilis, HIV, chancroid, and herpes simplex virus type 2 (HSV-2) serology and a urine sample for DNA amplification testing for chlamydial and gonococcal infections. Women use a self-administered swab to obtain vaginal fluid specimens for *T. vaginalis* culture and for a Gram's stain that is evaluated for bacterial vaginosis and candidiasis. For those participants with genital ulcers, swabs of ulcers are taken for DNA amplification testing for HSV-2, syphilis, and *Haemophilus ducreyi*.

In the treatment arm, all consenting adults, regardless of STD symptoms, receive a directly observed single oral dose of azithromycin 2 g, ciprofloxacin 500 mg, and metronidazole 2 g. If the participants are found to have a reactive syphilis serology (a syphilis screening test is performed within 24 hr after the blood specimen is taken), an injection of benzathine penicillin is given the following day. Cefixime is substituted for ciprofloxacin in pregnant women. Candidiasis is treated only in those individuals who have a documented infection. All individuals in the control arm are given mebendazole and an iron-folate tablet and, if found to have a reactive syphilis serology, an injection of benzathine penicillin is given the following day.

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A total of 13,628 individuals were enrolled and biological samples were successfully obtained from 89% of them.<sup>33</sup> The prevalence of STDs at enrollment was found to be high. Among the 5436 enrolled males, 11.1% had syphilis and 14.3% had HIV. On a smaller sample (testing was not complete at the time of the report), gonococcal and chlamydial infections were detected in 0.9% and 2.1%, respectively. Of the 6757 enrolled females, 19.1% had reactive syphilis serology and 11.9% were infected with HIV. Gonococcal infection was found in 1.5% of the women and chlamydial infection in 2.3%. In addition, 47.5% of the women had bacterial vaginosis and 28.3% had trichomoniasis.<sup>34</sup>

This study offered a unique opportunity to evaluate asymptomatic STD infection, since all members of an enrolled household were evaluated for STD infection irrespective of symptoms. Among males with documented gonococcal infection, 53% were asymptomatic, while 92% of men with documented chlamydial infections reported no symptoms. Among females with documented gonococcal or chlamydial infection, 66% and 76%, respectively, were asymptomatic. Preliminary analysis at 30 months of follow-up indicates that mass treatment of STDs resulted in substantial reductions in key STDs, including significant reductions in syphilis and trichomoniasis. The rates of chlamydia and gonorrhea were reduced by 50%. There was, however, no observed impact on HIV incidence, in the cohort as a whole or in any subgroups (pregnant women, HIV discordant couples, HIVnegative concordant couples). There was no difference in HIV incidence between the treatment and control arm. The lack of STD effect on HIV incidence could be explained by the fact that the STD population attributable risk for HIV was rather low, estimated at about 20%.<sup>35</sup>

## Prepackaging Urethritis Treatment and Prevention Materials in Cameroon: The MSTop Project

The first demonstration project of the provision of prepackaged antibiotics for urethritis along with prevention materials (condoms, partner referral cards, instructions, and educational material) was field-tested in Cameroon.<sup>36</sup> The project was designed to raise the level of effective treatment by addressing the high incidence of urethritis in young men, the high levels of self-treatment, the wide-spread use of inappropriate and ineffective drugs by physicians and pharmacies, and the widespread undermedication due to partial prescription filling documented in Cameroon.<sup>37</sup> A kit for urethritis was developed under the brand name MSTop, the French abbreviation for STD (MST) and the word *stop*. The kit contained two 500-mg tablets of cefuroxime axetil as a single-dose therapy for gonorrhea; 20 100-mg tablets of doxycycline as a 10-day course for chlamydial infection; an STD educational leaflet; eight condoms; and two partner referral cards encouraging partners to seek medical care. The kit was priced at US\$17, with the brand name antibiotics accounting for most of the cost, since generic, untaxed drugs could

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not be sold in Cameroon at the time of the project. This price, although high by low-income country standards, was competitive when compared to the mean cost per STD episode estimated from pharmacy exit interview.<sup>36</sup> Although the kit was originally designed to be sold over the counter in pharmacies, health authorities ultimately allowed MSTop to be sold only in a limited number of government clinics and private pharmacies by prescription.

Sales targets were never achieved. This was due in part to poor physician acceptance of syndromic management, since a consensus on the syndromic approach to STD management had not been reached in Cameroon when the project was implemented. It was also due to the limited distribution of the product. However, follow up with patients who received the kit showed a high level of satisfaction: 98% reported taking the two tablets of cefuroxime axetil and 83% reported completing the 10-day course of doxycycline; 84% reported using condoms while on treatment; and 44% used their partner referral cards. The number of partners who actually sought treatment could not be monitored.

## Intensive Condom Promotion and Regular STD Screening and Treatment in Female Sex Workers

The incidence of HIV and other STDs was monitored in a cohort of 531 HIV-negative female sex workers in Kinshasa, Zaire, followed for a mean of 23 months between 1988 and 1991.<sup>38</sup> The women were tested and treated for STDs every 3 months and received individual health education and condom promotion counseling on a monthly basis. In addition, group condom promotion sessions were held and the women were tested for HIV-1 antibodies every 3 months. The study was conducted through a Woman's Health Center clinic established for the study in a location that was convenient for the sex workers and provided quality, nonjudgmental services.

Of the 531 initially HIV-seronegative sex workers, 70 became infected over the course of the study, with a calculated HIV incidence of 8.0 per 100 women years (wy). The incidence of HIV-1 infection declined over time from 11.7 per 100 wy during the first 6 months to 4.4/100 during the last 6 months of the 3-year intervention. The incidence of the other STDs (gonococcal infection, trichomoniasis, and genital ulcer disease) also declined significantly over the 3 years. The incidence of chlamydial infection did not decline, but the interpretation of these data is confounded by the introduction of a more sensitive diagnostic test during the course of the study. In multivariate modeling, gonorrhea, trichomoniasis, genital ulcer disease, and irregular condom use were all associated with HIV seroconversion. Regular clinic attendance for screening, treatment, and counseling was associated with fewer HIV seroconversions. Women who kept over 90% of their clinic appointments and therefore had regular STD diagnosis and

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treatment had an HIV incidence rate of 2.7 per 100 wy compared to an HIV incidence rate of 44.2 per 100 wy among women who kept fewer than half of their appointments. Condom use was also associated with regular clinic visits. However, it appears that clinic visits had an independent effect on both the level of reported condom use and the incidence of HIV-1 infection. The conclusion of the study was that condom promotion and regular STD treatment can have a considerable impact on new HIV infections in sex workers. The authors also noted a "care-prevention" synergy, whereby patients who perceive that they receive good care are more likely to heed prevention messages.

## Improving Syphilis Screening and Treatment in Antenatal Clinics in Nairobi, Kenya

A decentralized syphilis screening and treatment program was piloted in Nairobi, Kenya, in 1992, to address the inefficacy of the centralized syphilis screening system then in place.<sup>20</sup> Under the centralized system, blood samples were taken from women at the first antenatal visit and transported to a central laboratory for testing with a turnaround time for results of 2 to 4 weeks. An evaluation of the system showed that no more than 60% of pregnant women had had blood taken at the first antenatal visit. Of these, 87% had had their results registered on their antenatal clinic card, but only 9.1% of the women with reactive syphilis serology had received adequate treatment.

The decentralized system was a clinic-based model of on-site diagnosis and treatment of maternal syphilis and partner treatment and was piloted in 9 of the 30 antenatal clinics run by the city of Nairobi. Only clinics with an existing syphilis screening program were eligible for the study.

Clinics were selected based on geographic distribution and preference was given to clinics that served lower income urban and periurban populations. Components of the pilot strategy included (1) upgrading antenatal clinics with equipment and supplies for the rapid diagnosis and treatment of syphilis, (2) training clinic nurses to perform rapid syphilis serological testing and to manage patients based on treatment protocols that included patient education and partner referral, and (3) ensuring supervision, monitoring, and laboratory quality assurance.

After the program was established, virtually 100% of 13,131 antenatal clinic patients were screened for syphilis. Syphilis seroprevalence was 6.5%. Overall, 87.3% of the women with reactive serologies were treated on their first visit and 86% of the seroreactive women were advised about the importance of having their partners treated and were given referral forms. While a total of 49.8% of the male partners were treated in the same clinic as the index case, the number of male partners actually treated could not be determined, since they might have sought treatment at another clinic site. Quality control testing indicated that the overall
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sensitivity of the testing at the peripheral laboratories compared to the University of Nairobi laboratory was 82.7%, with a range from 92.9 to 38.9%. The reason for the low sensitivity was not determined. The cost per case of congenital syphilis averted was estimated to be US\$50.

This study demonstrates that syphilis screening and control by antenatal clinic nurses is feasible and can result in high patient coverage when implemented optimally. The authors noted that good initial training and continuous supervision were necessary to maintain staff motivation and morale. The authors also report that although contact time between project and clinic staff was high at the beginning of the project, service quality could be maintained after start-up with monthly supervisory visits.

### Asia

The WHO estimates the annual incidence of curable STDs in 15- to 49-yearolds in Asia to be 10 to 19%.<sup>1</sup> Like Africa, HIV prevalence in patients attending STD clinics in Asia varies widely.

Available data on HIV prevalence in STD clinic attendees in Asia are limited, however, and range from less than 1% in islands of the South Pacific to less than 10% in parts of India (Tamil Nadu, 1993) and Cambodia (1994), to over 30% in parts of India (Pune, 1993).<sup>24</sup> Based on the epidemiology of the exploding HIV epidemic in this region, the majority of reported interventions address commercial sex workers and STD patients.

### 100% Condom Brothels in Bangkok, Thailand

The "100% Condom Program" launched by the Thai Ministry of Health in 1989 distributed government-procured condoms to commercial sex establishments in sufficient quantities to protect the majority of commercial sex in the country.<sup>39</sup> In addition, the Ministry of Health established sanctions against commercial sex establishments where condoms were not used consistently and launched a mass media campaign to advise the use of condoms in commercial sex.

Prior to the 100% condom policy, sex workers were expected to have weekly checkups where they received free examinations and treatment through the already established national STD clinic infrastructure. This effort was intensified when the 100% condom policy was implemented in part as a method to verify consistent condom use. Condoms were promoted and distributed to sex workers during these periodic STD checkups. It is unclear, however, whether new diagnostic equipment or supplies were procured or whether STD diagnostic protocols were changed (most clinics use Gram's stain to diagnose gonorrhea) as a result of this intensified effort. Also, as a response to the HIV epidemic, clinic staff were

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increased and trained in HIV outreach education and HIV counseling (T. Bennett, personal communication).

Data from several sources were used to evaluate this intervention. Between 1989 and 1993, reported condom use by sex workers increased from 14% to 94% of commercial sex acts. It was estimated that enough condoms were supplied by the government and through sales in the private sector to cover 126% of commercial sex acts in 1992 and 95% in 1993.

Public sector STD data showed a 79% decline in five reported STDs (syphilis, gonorrhea, nongonococcal urethritis, lymphogranuloma venereum, and chancroid) between 1989 and 1993. Prior to this very steep decline in reported STDs, there was a modest decline between 1986 and 1989, which could be attributed to the introduction of quinolone antibiotics into Thailand in 1986, which were widely available without prescription.

These public sector STD data are supported by other studies. For example, HIV prevalence studies in five cohorts of Thai military recruits showed that HIV prevalence was 10.4% in 1991 and 12.5% in 1993, but fell to 6.7% in 1995—a statistically significant decline.<sup>40</sup> The recruits' reported use of condoms during their most recent sexual contacts with sex workers increased from 61% in 1991 to 92.5% in 1995. In 1991, 42.2% of recruits reported a history of STDs, compared with 15.2% of men in 1995.

STD Services and HIV/STD Prevention Services in a Red-Light District in Sonagachi, India

In 1992, an HIV/STD prevention project was initiated in the Sonagachi redlight district of Calcutta, India.<sup>41</sup> Based on an assessment of the community's needs and preferences, a free health service center for sex workers and their families was opened at the local youth club in the heart of the red-light district. The clinic focused on sexual health and provided STD treatment; however, people also utilized it for general health purposes, such as immunization of the sex workers' children. Clinic services were designed to be nonjudgmental, and operating hours were chosen to be convenient to the sex workers' schedules. The HIV prevention efforts were broad and included peer educators to educate sex workers, clients, pimps, and brothel owners about HIV infection, promote condoms, and encourage sex workers to attend the clinic on a regular basis.

As a result of this effort, attendance at the clinic increased from 168 patients during the first month of operation to around 900 per month in the second and third years. Data obtained at baseline and 14 months later showed that knowledge and awareness about STDs increased from 69% to 90.5%, and knowledge and awareness of HIV/AIDS increased from 31% to 85.8%. Reported regular use of condoms rose from 1.1% to 47.2%. In 612 sex workers, cervical gonococcal infection decreased from 13.2% at baseline to 3.9% at follow-up, trichomoniasis decreased

from 11.1% to 9.8%, and syphilis (reactive serology) decreased from 58.8% to 49.6%. HIV prevalence in this group of sex workers was reported as 1.1%. The success of this pilot project was attributed to the involvement of sex workers in the design of the services, provision of nonjudgmental services, and modification of services as needs evolved.

### Training Pharmacy Workers in STD Treatment and Prevention in Nepal

Male STD patients in Nepal, as in the majority of developing countries, seek treatment outside the formal, clinic-based system. In addition, existing health structures in Nepal are limited, and drugstore personnel are often the first recourse for medical advice and treatment for a wide variety of complaints, including STDs.<sup>42</sup> The Nepal Chemists and Druggists Association (NCDA) conducted a series of formal training workshops for the chemists in the central regions of Nepal in 1996.<sup>43</sup> The intervention was developed and implemented by NCDA in close collaboration with the Nepal Medical Association, the Department of Drug Administration, and other relevant government agencies and university experts. The purpose of these training workshops was to train chemists to recognize and manage STDs according to the national syndromic guidelines and to improve the chemists' communication with clients regarding condom use and partner referral. The intervention also included establishing appropriate referral networks between drugstores and clinics.

The intervention was evaluated before and after the training using the simulated patient approach (mystery shopper), whereby interviewers were trained to go to drugstores and pose as persons with symptoms of urethritis.<sup>44</sup> Following each interchange with drugstore personnel, the interviewer recorded the pharmacist's or clerks actions on a structured questionnaire. Prior to training, 81% of the 160 drugstore personnel surveyed recommended medications, including antibiotics, aphrodisiacs, antihistamines, vitamins, and alkalizing agents. Polypharmacy prescribing multiple drugs with no proven efficacy or with overlapping coverage was common. Only 1 of 130 (0.8%) drugstore personnel suggested an appropriate treatment for urethritis (correct cotherapy for gonococcal and chlamydial infection). In treating gonococcal infection, 25% gave an effective drug for a 5- to 10day course, when a single dose would have been adequate. Seventy-four percent gave an ineffective antibiotic. Only 13.7% of the chemists advised the clients to use condoms, and only 5% suggested that the recent sexual partners should receive treatment.

After the pharmacy training, a repeat "mystery shopper" survey was done of 160 of the drugstore personnel who had undergone the training. The percentage suggesting correct treatment for urethritis increased to 44.6% from 0.8%. A total of 23% of drugstore personnel advised the clients to use condoms, and 21.2% suggested that recent sexual partners should receive treatment.

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### Latin America/Caribbean

The WHO estimates the annual incidence of curable STDs in 15- to 49-yearolds in Latin America/Caribbean to be 7 to 14%.<sup>1</sup> Like Africa, HIV prevalence in patients attending STD clinics in Latin America/Caribbean varies widely, and like Asia, HIV prevalence data in STD clinic attendees are scant. Available data indicate that HIV prevalence in STD clinics in the Dominican Republic was 8.1% in 1994, and in Jamaica (Saint James parish) it was 9.3% in 1993. Reports in the English literature of STD studies and interventions in this region are extremely limited.

### Introduction of Partner Referral and Treatment for STDs in a Community in Haiti

As part of an effort to upgrade STD services in a community in Haiti and as part of an STD prevalence assessment, a pilot project was conducted in 1993 to determine whether male partner referral and presumptive treatment of antenatal clinic women with identified STDs were feasible and acceptable.<sup>45</sup> Prior to instituting partner referral, focus group discussions were held with pregnant women and husbands of pregnant women in order to understand their perceptions of STDs and to determine whether a partner referral strategy was acceptable, and if so, how it should be designed. Of note is the fact that both men and women understood the need to treat both sex partners and the possibility of vertical STD transmission.

The policy at the site where the demonstration project was conducted calls for free preventive services (e.g., prenatal care including syphilis screening and treatment), whereas curative services (e.g., the outpatient department) and drugs required payment. Treatment of the partners of women identified with an STD was considered a curative service and was handled in the outpatient department. In order to evaluate the effect of sending partners to the curative center for management, men who presented to the antenatal clinic were randomized to either immediate, free treatment at the antenatal clinic or to an internal referral to the curative center.

During the baseline study of 851 consecutive pregnant women, 418 (47%) had at least one STD.<sup>46</sup> Ninety-three percent of the women with identified STDs reported that they wanted to inform their partners. A total of 73% agreed to referral by a community volunteer if a partner had not presented to the clinic within 1 week. The 384 women who were treated for an STD named 331 reachable partners. Of those, 101 (30%) came to the clinic after referral by the partner. An additional 38 partners (11%) presented to the clinic after referral by community health volunteers.

Fifty-nine men who presented to the clinic were referred to the curative center. Of these, 26 (44%) were treated. Of the 33 men who did not present to the curative center for treatment, 24 (73%) were traced and interviewed. The main

reasons cited by these men for not presenting to the curative center included lack of money, loss of time, not feeling ill, the operating hours of the clinic, a preference for buying drugs elsewhere, and not wanting to make the extra effort.

This study demonstrated that there were no major obstacles to partner referral for STD treatment in this community. This voluntary, passive partner referral system was able to find and treat 30% of the partners. In addition, these results show that partners need to be treated promptly upon presentation; therefore, coordination for referrals between clinical settings providing STD services for men and those women is essential.

### Sexually Transmitted Diseases in Female Sex Workers in Peru: An Evaluation of Current Services

In many countries, registered sex workers are screened regularly for STDs, often as a legal requirement. Many of these programs receive inadequate financial or administrative support and are technically inadequate for diagnosis and treatment of STDs. They also do not provide STD/HIV prevention services, such as counseling on risk reduction, promoting or providing condoms, or teaching skills in condom use and condom negotiation.

A cross-sectional survey was performed in Lima, Peru, in 1991 and 1992, to evaluate the STD prevalence and condom use of registered and unregistered female sex workers (FSWS).<sup>47</sup> At the time of the evaluation, services provided by the Centro Antivenereo de Lima included a vaginal speculum exam with a methylene blue stain of a cervical swab smear every 2 weeks and a serological test for syphilis (VDRL) every 3 months. Women identified with gonorrhea were given prescriptions.

Registered FSWs were seen every 2 weeks and unregistered FSWs were seen intermittently, either because they sought care in the clinic or because they were brought in by the police. Three years before this study started, the practice of twice monthly intramuscular injections of 2.4 million units of benzathine penicillin G had been discontinued. However, many of the FSWs reported that they continued to receive penicillin injections from pharmacies or private practice physicians.

Over a 7-month period, a total of 400 FSWs agreed to participate in the study: 284 were registered FSWs and 116 were unregistered. The prevalence of gonorrhea, chlamydial infections, or syphilis [reactive VDRL titers 1:4 or greater with a reactive confirmatory test (FTA-ABS)] was not significantly lower in registered FSWs despite the more regular STD services they received.

However, there was a lower prevalence of gonorrhea [odds ratio (OR) 0.4, 95% confidence interval (CI) 0.2–1.0] and syphilis (VDRL titers 1:4 or greater with reactive FTA-ABS) (OR 0.3, 95% CI 0.1–1.2) in FSWs reporting consistent condom use during all sexual encounters in the past year compared to FSWs who did not report consistent use. Furthermore, FSWs who reported consistent condom use in the previous year and for more than 3 years (or the full duration of sex work

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if fewer than 3 years) had a reduced prevalence of serological evidence for syphilis (FTA-ABS) (OR 0.4,95% CI 0.2–0.8), *C. trachomatis* (OR 0.6,95% CI 0.4–0.9), hepatitis B [anti-hepatitis B core (anti-HBc)] (OR 0.6, 95% CI 0.3–0.9), and human T-lymphotropic virus type I (OR 0.3, 95% CI 0.1–0.8). The presence of anti-HBc antibodies was associated with the number of years a woman had received prophylactic penicillin injections for syphilis as well as inconsistent condom use and place of birth. The authors conclude that public health STD programs for FSWs warrant scrutiny in terms of coverage, quality, effectiveness, and safety.

This study identified several areas for improving STD services to FSWs in Lima. As a result of these findings, the authors have begun a demonstration project that provides counseling on risk reduction and condoms to FSWs during every visit to the clinic. The management protocols were changed so that the FSWs have a vaginal speculum examination each month for *Neisseria gonorrhoeae* culture, C. *trachomatis* antigen test every 3 months, and monthly vaginal fluid examination for *T. vaginalis* and bacterial vaginosis. All STD treatment is provided free.

### Evaluation of STD Case Management after STD Training in São Paulo and Rio de Janeiro, Brazil

As part of a larger HIV prevention program, improved STD case management was implemented at primary health care centers in the Santos section of São Paulo and in Rio de Janeiro since 1993. A major component of improved STD management—in-servicetraining of health care providers—was evaluated through a posttraining assessment based on the WHO's prevention indicators (PIs) 6 and 7.<sup>48</sup> PI6 is defined as the proportion of STD patients treated in an appropriate way (according to national standards). PI7 is defined as the proportion of STD patients receiving basic advice on condoms and partner notification. The WHO provides a protocol for interviewing and observing health care providers.<sup>48</sup> A rapid baseline assessment of STD case management in the intervention cities showed that a syndromic approach to STD case management was almost never employed by the health care providers. Providers relied on clinical judgment or used laboratory services that provided diagnostic services for only a handful of STDs.

The posttraining assessment was performed in 1996 to evaluate the training program and to detect any problems in the case management of STD patients.<sup>49</sup> Exit interviews with patients were used instead of provider interviews and direct observation, because interviews were considered more acceptable to both patient and provider and less time consuming. Health care providers who agreed to participate in the evaluation selected and referred patients for an interview with a trained interviewer. All were outpatients who had either presented with symptoms suggestive of an STD or been diagnosed with an STD during the clinical examination. The interviews were conducted in a private room with a structured questionnaire, and all prescriptions and medication were reviewed by the interviewer.

A total of 162 patients were interviewed, 20 (12.3%) men and 142 (87.7%) women from 12 health care facilities in Santos and 13 in Rio de Janeiro. The majority of patients presenting to the clinics were self-referred (85%) and attended because of genitourinary symptoms (76% in Santos and 62% in Rio). Among the men, 45% complained of urethral discharge. In women, 56.1% complained of vaginal discharge and 24.8% complained of abdominal pain.

Almost half the drugs prescribed were not recommended for STD treatment by either Brazilian national or by international standards. In male patients, 80.6% of all prescribed drugs were recommended, compared with 45.7% in female patients. Not one prescription for a women included treatment for cervical gonococcal and chlamydial infection.

Several striking observations have programmatic implications for this project. First, the majority of patients attending primary health care settings were women, even though every health center had participating physicians who referred both women (gynecologist) and men (general medicine). Second, not one symptomatic woman was treated syndromically for gonococcal and chlamydial cervical infection. Unpublished data from a multicenter study in Brazil show that the prevalence of gonococcal and chlamydial infection in women with a vaginal discharge was 7.4% and 8.9%, respectively (F. Moherdaui, personal communication). Consequently, it is unlikely that there were no cervical infections in the 142 mainly symptomatic women interviewed. This failure to treat women for cervical infection may reflect physicians' lack of awareness of the prevalence of gonorrhea and chlamydial infection in general population women. Other possible explanations are that the clinical sign of endocervical mucopus is not recognized by physicians, has a low sensitivity and specificity in this population, or is not present because of self-treatment.

Important differences were also noted in men and women's recall of prevention messages. Men reported messages regarding the importance of partner management (90%) and condom use (80%) more frequently than women (50% and 20%, respectively). Of the 81 patients who indicated that they did not know how to use a condom, only four (4.9%) reported that condom use had been explained or demonstrated. More men (55%) than women (9%) were given condoms during the clinic visit. Based on these results, the authors recommended that a reevaluation be done of which health care providers should be trained to reach symptomatic men and what improvements can be made in training on STD management in women and to improve the marked gender difference in the provision of prevention education.

### STUDY DESIGN

A total of 11 studies addressing various aspects of STD control and prevention have been described in this chapter. Although each study provides useful data and insights into STD control, all of them have some limitations intrinsic to the study design.

Randomized, controlled trials are considered the most rigorous study design for obtaining data that represent the effects of the intervention and not other, unmeasured, cofactors.<sup>50</sup> However, in the real world of program design and implementation for STD management and STD/HIV prevention, randomized, controlled trials are rare. Although the randomized, controlled trial is the most scientifically rigorous, it is not necessarily the most appropriate design. This type of study is appropriate at the individual and community level only under limited conditions. For community-based studies, for example, such conditions include adequate numbers of communities for statistical power and a simple measurable intervention and outcome.<sup>50,51</sup> The final decision on a study design requires a balance between what is useful and relevant and what is feasible and essential.

The Mwanza district<sup>11</sup> and the Rakai district study<sup>32</sup> described in this chapter are two community-based, randomized, controlled trials that evaluate the effect of STD treatment on STD and HIV infection (see Table 3). In the Mwanza trial, the diagnostic tests used to identify the infections were limited by laboratory capability in rural Tanzania and by the state of technological developments in STD diagnostics at the time of the study.

While the investigators were able to document a reduction in serological syphilis and the prevalence of symptomatic urethritis in men, there was no effect on the STD prevalence in the antenatal clinical attendees in the intervention sites. Syndromic management (the clinical management approach used in the Mwanza study), by definition, treats patients who present to health centers with symptoms, and as such is unlikely to have a significant effect on asymptomatic STDs. The STD testing in the antenatal women was done regardless of symptoms as two

Study: Author and location	Study design/analysis
Grosskurth, <sup>11</sup> Mwanza region, Tanzania	Community-based, randomized controlled trial
Wawer, <sup>32</sup> Rakai district, Uganda	Community-based, randomized controlled trial
Crabbé, <sup>37</sup> Cameroon	Observational, pre- and postdesign
Laga, <sup>38</sup> Kinshasa, Zaire	Prospective cohort design
Jenniskens, <sup>20</sup> Nairobi, Kenya	Observational, pre- and postdesign
Hanenberg. <sup>39</sup> Bangkok, Thailand	Analysis of existing surveillance data
Jana, <sup>41</sup> Sonagachi, India	Observational, pre- and postdesign
Anon, <sup>43,44</sup> Naubise, Janakpur and Birgunj,	Observational, pre- and postdesign
Nepal	
Désormeaux, <sup>45</sup> Port-au-Prince, Haiti	Observational, pre- and postdesign
Sanchez, <sup>47</sup> Lima, Peru	Cross-sectional design
Vuylsteke,49 São Paulo and Rio de Janeiro,	Observational design
Brazil	-

 Table 3.
 Summary of Study Designs Described in Chapter 6

cross-sectional studies; it is not surprising, therefore, that the prevalence of asymptomatic infections was not affected. The Rakai district study in Uganda overcame of these limitations in STD detection, since all participating individuals were tested using state-of-the-art diagnostics not available during the Mwanza trial.

Longitudinal cohort studies that follow individuals prospectively to determine whether the incidence of new HIV infection is related to the acquisition of an STD have the advantage of documenting whether or not an STD preceded HIV infection. These studies, however, cannot always accurately measure the sexual behavior of the study participants and have almost no valid information on the sexual partners of study participants.<sup>52</sup> The prospective cohort study in Kinshasa<sup>38</sup> was limited by the fact that there was no control group followed prospectively and by the fact that it was a closed cohort. The observed decline in HIV incidence could have occurred regardless of the intervention if all the women susceptible to HIV infection became infected early in the follow-up or if new HIV infections were declining for other reasons.

There were several limitations to cross-sectional study designs like the one reported on the FSWs in Lima, Peru.<sup>47</sup> In this study, the sample of FSWs studied may not represent the entire registered FSW population, but only those who attend the clinic regularly. The study design also could not exclude cohort effects on the relationship between antibody to STDs and age and duration of prostitution. Moreover, the cross-sectional design could not assess the time sequence of condom use or registration status and acquisition of STDs.

The analysis of the declining STD rates in Thailand<sup>39</sup> represents a retrospective analysis of nonexperimental data. There are several limitations to this analysis. It relied on public sector STD statistics, which are of unknown quality and may vary between health centers or over time due to clinic staffing, drug supplies, and clinic practices. Further, because the STD statistics represent only the public sector, a shift of males seeking STD treatment in the private sector (physicians and pharmacies) could account for the dramatic decline of STDs reported in the public sector. Finally, sex workers may have overreported condom use to please the interviewers (social desirability bias), and although the researchers document the number of condoms that were shipped to brothels, they cannot document that they were actually used. The conclusion of this analysis is strengthened, however, by the decrease in HIV prevalence reported in the Thai military recruits.<sup>40</sup>

The other interventions described in this chapter focus on STD service delivery, providing information on the feasibility of new STD intervention strategies and possible new or improved modes of service delivery. The effectiveness of STD control in preventing HIV and other morbidities was acknowledged from the outset. As such, the more rigorous study designs necessary to measure impact of the intervention on STD prevalence or incidence let alone HIV transmission were not employed. These types of studies with a program orientation fall into the

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category of operations research. Broadly defined, operations research encompasses studies that attempt to (1) diagnose and correct an operational problem, (2) test new approaches in pilot or demonstration projects, (3) evaluate programs, or (4) test different activities to compare impact and cost effectiveness.<sup>53</sup> For example, the evaluation of STD training in Brazil<sup>49</sup> represents a program evaluation type of operations research. The prepackaged STD therapy project in Cameroon,<sup>37</sup> the syphilis decentralization project in Kenya,<sup>20</sup> the red-light district STD intervention for sex workers in India,<sup>41</sup> the STD pharmacy project in Nepal,<sup>44</sup> and the partner referral project in Haiti<sup>45</sup> all represent pilot or demonstration projects. None of these projects were designed to measure the impact of STD treatment on HIV prevention. Only one, the India project,<sup>41</sup> has information on the impact of STD treatment on STD prevalence in the intervention population but it lacks a control group.

The results of the Brazil evaluation<sup>49</sup> should be interpreted with some caution, because there was no comparable baseline study and the numbers are relatively small. The inability to verify diagnoses and the reliance on patient's memories of the messages that they heard are other limitations of the patient exit interview methodology.

### SUMMARY

The Mwanza district study was the first to corroborate in a controlled clinical trial the evidence from numerous cross-sectional and prospective epidemiological studies suggesting that STDs enhance HIV transmission. In this trial, improved STD care was integrated into primary health care centers and symptomatic STDs were managed using syndromic management. The authors point out that the STD services introduced were designed to be feasible rather than optimal.<sup>11</sup> STD services were directed at community members and not at specific high-risk groups because these groups were not easily identifiable in the rural villages where most of the study population lived.<sup>26</sup> Although this trial offers the clearest evidence that STDs contribute to HIV infection, it does not demonstrate how to provide services to community members or to high-risk groups in all settings. In addition, the syndromic management approach, by definition, does not address individuals with asymptomatic infections or unrecognized infections or those who seek care outside the clinic setting.

The Rakai district study, just completed, also addressed the effect of STD treatment on HIV transmission. However, it was also able to identify which STDs are most strongly associated with HIV transmission. Presumptive, periodic treatment of STDs is a strategy to rapidly reduce a community's pool of STDs and may be desirable because (1) community and individual behavior change takes time; (2) there is a high prevalence of asymptomatic infection and a lack of simple,

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inexpensive, and widely available diagnostic tests; and (3) recognition of symptoms does not necessarily lead to appropriate treatment-seeking behavior.<sup>54</sup> However, several potential individual- and community-level risks associated with presumptive treatment and with the widespread use of antibiotics should be weighed. These include disruption of normal flora (a mucosal barrier against infection), increasing drug resistance of STD pathogens or other major pathogens in the community, adverse drug reactions, and an increase in high-risk sexual behavior. The Rakai district study will address some of these concerns. The Rakai study could be viewed as an efficacy trial (a trial to determine what effects a certain intervention *could have* if it were implemented optimally), the results of which could be used to devise more targeted strategies.<sup>55</sup>

Two demonstration projects have addressed the issue of treatment-seeking behavior outside clinic settings (see Table 2). The pharmacy approach demonstrated in Nepal<sup>44</sup> is particularly relevant in settings where the health infrastructure is weak and where drugstore personnel are often the main or only recourse for medical advice and treatment. Enlisting pharmacy workers in STD management acknowledges the significant though informal role this sector plays in providing STD treatment. It also recognizes the sector's potential role in patient education (prevention education, compliance with treatment, and partner referral) and condom promotion and distribution. However, it does not overcome the problem of patients purchasing partial prescriptions because of lack of funds. Moreover, it is often difficult in a public business setting to guarantee confidentiality and the privacy necessary for gaining customer trust.

Public health authorities and members of the medical profession usually have no objection to enlisting drugstore personnel in patient education. There is much less acceptance for explicitly training them in STD syndrome management, which some authorities perceive as condoning sales of antibiotics without prescription and many in the medical community view as a threat to their profession. For this approach to succeed, these groups must be engaged as partners in the intervention from the outset.

The final word on the prepackaged STD therapy and prevention project in Cameroon<sup>37</sup> should be delayed until there are results of other field studies. The extension of social marketing to antibiotic treatment for STDs is a relatively new and untested concept that raises several complex issues. Full-scale social marketing of STD treatment and prevention can potentially offer significant advantages in terms of improving the accessibility, effectiveness, and affordability of STD treatment to many individuals, but these advantages have to be weighed against a number of potential drawbacks that include increasing antimicrobial resistance of STD pathogens and other important pathogens in the community, drawing individuals away from the formal health care sector, and the possibility that people will break up subsidized kits and sell component parts for profit, to name a few.

Socially marketed STD treatment is not readily accepted by the medical

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community. There are reasons, both practical and moral, for recommending that it be introduced only in a way that provides sound, objective evidence of efficacy and that will enable decision makers to make informed judgments.

The concept of packaging effective drugs (ideally, single-dose drugs) and prevention material for managing STD syndromes could be modified for different country situations. Options include:

- A syndromic package of generic drugs and prevention materials could be sold in public sector clinics as part of a cost-recovery scheme. Limiting sales to the public sector clinics where drugs are often supplied free of charge or for a nominal cost might reduce resistance from the pharmaceutical industry.
- A syndromic management kit of effective drugs and prevention materials could be marketed to health care providers through the usual routes of pharmaceutical marketing. This would ensure consistently effective treatment for STD syndromes and reinforce the syndromic management approach.
- A syndromic management kit could be marketed to pharmacists to be made available by prescription. Drugs that are single dose and orally administered are preferable, because injections would require a return trip to a health care facility. This approach would also reinforce syndromic management.
- A syndromic management kit could be marketed to the public as an overthe-counter product available without prescription. This avenue deserves careful study before it can be promoted.

Although the 100% Condom Brothel policy was instituted in response to the HIV epidemic in Thailand,<sup>39</sup> this governmental policy initiative has also had an impact on the prevalence of classic STDs as well. The analysis of the Thai experience illustrates three important issues in STD control. First, the importance of policy-level activities in creating a favorable environment for STD prevention is documented. In Thailand, condoms were made widely available in commercial sex establishments, behavior change messages were broadcast, and brothel policies were changed to encourage condom use. Second, the impact of primary prevention (in this case, barrier method use) in decreasing STD prevalence was dramatic. STD control managers often overlook this aspect of STD control. And finally, the analysis shows that targeting core groups (in this case sex workers and their clients) can have a large impact on community STD prevalence.<sup>16</sup>

The authors of the Lima cross-sectional study<sup>47</sup> make recommendations regarding characteristics of a more effective and friendly health delivery system for FSWs. These recommendations included (1) modification of the configuration of services to meet the perceived needs of FSWs, (2) preventive counseling services, (3) access to social services, (4) reduction in barriers to access to ensure

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regular visits as well as prompt health-care-seeking behavior for symptoms, and (5) introduction of effective treatment and testing algorithms for examination and laboratory testing. The two intervention studies in sex worker populations in Zaire and India reported here<sup>38,41</sup> implemented many of these recommendations to develop client-centered services that were not stigmatizing and provided preventive services as well as effective clinical services. By involving the population in the design of their services, they were able to target without stigmatizing.

Quality training and ongoing supportive supervision of health care providers is essential to ensure adequate services as demonstrated by the Brazil evaluation<sup>49</sup> and the Kenya syphilis decentralization project.<sup>20</sup>

### FUTURE DIRECTIONS

One of the most important challenges facing reproductive health programs of all kinds is improving services for adolescents. It is critical that programs respond to the fact that adolescents are behaviorally and physiologically more vulnerable to STDs. In general, they have limited information and skills for making responsible sexual decisions. And in addition to the general constraints faced by all STD patients (i.e., inadequate infrastructure, limited diagnostics, laboratories, and drugs; poorly trained health care providers; and poor STD service management, poor symptom recognition, and a high prevalence of asymptomatic infection, especially in women), adolescents face additional obstacles. They usually lack an independent income to cover service fees, and health care providers are often judgmental toward adolescents and fail to provide privacy in a situation that is embarrassing to the adolescent. Adolescents traditionally have been underserved by most existing health care systems, and the current efforts to integrate STD/HIV services into broader reproductive health services are unlikely to have a large impact on the adolescent population who rarely attend family planning clinics.

Some groups have started pilot projects to address the unique reproductive health needs of adolescents.<sup>54,56</sup> Most of these pilot projects attempt to establish user-friendly services or alternative approaches to reach youth with education and services outside the traditional health care system:

- UNICEF is developing youth centers, or special care units, in Colombia and Swaziland within existing care facilities with specific days for youth. These units will provide comprehensive health care, including STD and family planning services.<sup>54</sup>
- A Population Services International condom social marketing project in Botswana targets 13- to 18-year-olds in medium-sized towns to increase their awareness and use of reproductive health services and products. Peer

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educators, who conduct the campaigns and assist in the materials development, promote reproductive health protection through abstinence, contraceptive use including condoms, and use of clinic services. A youth drama group travels to promote condoms and a weekly radio show provides information on reproductive health issues.<sup>56</sup>

 In Rio de Janeiro, an NGO working with street youth, SOS Crianca, provided health services in an informal drop-in center from 1987 to 1994. The youth received health care and education on how to prevent STDs, HIV, and pregnancies. Certain days were reserved for street youth with additional special needs such a young girls or young sex workers.<sup>56</sup>

These projects represent a few of the innovative approaches being utilized to address the needs of youth. Much work remains to define and optimize service delivery for adolescents and other high-risk groups. In addition to the technical constraint of the lack of a simple, inexpensive, accurate diagnostics to detect asymptomatic gonococcal and chlamydial infection mentioned above, STD service delivery strategies must address other realities that may exist in many countries. These include (1) inadequate infrastructure and personnel; (2) limited diagnostics, laboratories, and drugs; (3) health care providers inadequately trained in STD management and in the interpersonal skills necessary for sexual history taking and prevention education; (4) weak STD service management, including supervision and quality assurance; (5) lack of awareness about signs and symptoms of STDs, especially among women; (6) high prevalence of asymptomatic infection, especially in women; (7) significant STD treatment-seeking behavior outside the formal sector, especially by men; and (8) difficulty in identifying higher-risk groups for targeted services.<sup>18</sup> The specific approaches will ultimately depend on the epidemiology and the social, cultural, economic, and political realities of each location. The goal, however, is to provide acceptable, accessible, and effective STD services.

These goals are important anywhere but are particularly critical where there is a high prevalence of STDs or HIV/AIDS. In countries with a low HIV prevalence but high STD prevalence, the implementation of effective STD treatment and prevention services may play an important role in delaying or minimizing HIV spread.

### REFERENCES

- World Health Organization. Sexually transmitted diseases: three hundred and thirty three million new, curable cases in 1995. Press Release, 25 August 1995. Geneva: World Health Organization; 1995.
- Holmes KK, DeLay PR, Cohen, MS. STD control: A public health priority. In Dallabetta GA, Laga M, Lamptey PL, eds. Control of Sexually Transmitted Diseases: A Handbook for the Design and Management of Programs. Arlington, VA: AIDSCAP/Family Health International; 1996; p v-xii.

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- World Health Organization. Management of Patients with Sexually Transmitted Diseases. WHO Technical Report Series 810. Geneva: World Health Organization; 1991.
- The World Bank. World Development Report 1993: Investing in Health. New York: Oxford University Press; 1993.
- Clottey C, Dallabetta G. Sexually transmitted diseases and human immunodeficiency virus, epidemiologic synergy? *Infect Dis Clin NA* 1993; 7:753–770.
- Plummer FA, Wainberg MA, Plourde P, *et al.* Detection of human immunodeficiency virus type 1 (HIV-1) in genital ulcer exudate of HIV-1 infected man by culture and gene amplification. *J Infect Dis* 1990; 161:810–811.
- Kreiss J, Willerford DM, Hensel M, et al. Association between cervical inflammation and cervical shedding of human immunodeficiency virus DNA. J Infect Dis 1994; 170:1597–1601.
- Moss GB, Overbaugh J, Welch M, et al. Human immunodeficiency virus DNA in urethral secretions in men: Association with gonococcal urethritis and CD4 cell depletion. J Infect Dis 1995; 172: 1469–1474.
- 9. Levine WC, Pope V, Bhoomkar A, et al. Increase in endocervical CD4 lymphocytes among women with nonulcerative sexually transmitted disease. J Infect Dis 1998; 177:167–174.
- Cohen M, Hoffman I, Royce R, *et al.* Reduction of concentration of HIV-1 in semen after treatment of urethritis: Implications for prevention of sexual transmission of HIV-1. *Lancet* 1997; 349:1868– 1873.
- Grosskurth H, Mosha F, Todd J, et al. Impact of improved treatment of sexually transmitted disease on HIV infection in rural Tanzania: Randomized control trial. Lancet 1995; 346530–536.
- 12. Anderson RM, May RM. Epidemiologic parameters of HIV transmission. *Nature* 1988; 333: 514–519.
- Aral SO, Holmes KK, Padian NS, et al. Overview: Individual and population approaches to the epidemiology and prevention of sexually transmitted diseases and human immunodeficiency virus infection. J Infect Dis 1996; 174(suppl 2):S127–S133.
- O'Reilly KR, Piot P. International perspectives on individual and community approaches to the prevention of sexually transmitted disease and human immunodeficiency virus infection. J Infect Dis 1996; 174(suppl 2):S214–S222.
- Anderson RM, Ng TW, Boily MC, *et al.* The influence of different sexual contact patterns between age classes on the predicted demographic impact of AIDS in the developing world. *Ann NY Acad Sci* 1989; 569:140–274.
- Over M, Piot P. HIV infection and sexually transmitted diseases. In Jamison DT, Mosley WH, Measham AR, et al., eds. Disease Control Priorities in Developing Countries. New York: Oxford University Press; 1993; 455–527.
- Kahn JG. The cost-effectiveness of HIV prevention targeting: How much more bang for the buck? *Am J Public Health* 1996; 86:1709–1712.
- Dallabetta G, Laga M, Islam M, et al. STDs: Global burden and challenges for control. In Dallabetta GA, Laga M, Lamptey PL, eds. Control of Sexually Transmitted Diseases: A Handbook for the Design and Management of Programs. AIDSCAP/Family Health International; 1996; 1–22.
- 19. World Health Organization. *Management of Patients with Sexually Transmitted Diseases*. WHO Technical Report Series 810, Geneva: World Health Organization; 1991.
- Jenniskens F, Obwaka E, Kirisuah S, *et al.* Syphilis control in pregnancy: Decentralization of screening facilities to primary care level, a demonstration project in Nairobi, Kenya. *Int J Gynecol Obstet* 1995; 48(suppl):S121–S128.
- 21. Berkley S. Diagnostic tests for sexually transmitted diseases: A challenge. *Lancet* 1994; 343: 685-686.
- 22. Britten TF, DeLisle S, Fine D. STDs and family planning clinics: A regional program for chlamydia that works. *Am J Gynecol Health* 1992; 6:24–31.
- 23. Handsfield HH. Design and implementation of a successful chlamydial control program. 35th

Interscience Conference on Antimicrobial Agents and Chemotherapy, September, 1995. Abstract S65.

- 24. US Bureau of the Census. HIV/AIDS Surveillance Database. Washington, DC: International Programs Center, Population Division, US Bureau of the Census; May 1996.
- Conner EM, Sperline RS, Gelber R, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. N Engl J Med 1994; 331:1173–1180.
- Hayes R, Mosha F, Nicoll A, et al. A community trial of the impact of improved sexually transmitted disease treatment on the HIV epidemic in rural Tanzania: 1. Design. AIDS 1995; 9:919–926.
- Mwijarubi E, Grosskurth H, Mosha F, *et al.* Improved treatment services significantly reduce the prevalence of sexually transmitted diseases in rural Tanzania: Results of a randomised controlled trial. AIDS 1997; 11:1873–1880.
- Gilson L, Mkanje R, Grosskurth H, et al. Cost-effectiveness of improved treatment services for sexually transmitted diseases in preventing HIV in Mwanza region, Tanzania. Lancet 1997; 350: 1805 - 1809.
- Jamison DT. Disease control priorities in developing countries: an overview. In: Jamison DT, Mosley WH, Measham AR, et al., eds. Disease Control Priorities in Developing Countries. New York: Oxford University Press; 1993:3–34.
- Wawer MJ, Sewankambo NK, Berkley S, et al. Incidence of HIV-1 infection in a rural region of Uganda. Br Med J 1994; 308:173–176.
- Wawer MJ, Serwadda D, Musgrave SD, et al. Dynamics of spread of HIV-1 infections in a rural district of Uganda. Br Med J 1991; 303:1303–1306.
- 32. Wawer MJ, Gray RH, Quinn TC, et al. Design and feasibility of population-based mass treatment, rural Rakai District, Uganda. Paper presented at the 11th Meeting of the International Society for STD Research, New Orleans, Louisiana, 1995. Abstract 079.
- 33. Gray RH, Wawer MJ, Sewankambo NK, *et al.* Methodological issues in sampling and study design for a community-based intervention trial of STD control for AIDS prevention, Rakai District, Uganda. Paper presented at the 11th Meeting of the International Society for STD Research, New Orleans, Louisiana, 1995. Abstract 078.
- Paxton LA, Sewankambo N, Wawer MJ, et al. Asymptomatic genital tract infections in a rural district of Uganda. Paper presented at the 11th International Conference on AIDS, Vancouver, Canada, 1996. Abstract Mo.C. 340.
- Wawer MJ, Sewankambo NK, Sewadda, D, et al. Population attributable risk of HIV incidence associated with STD symptoms, Rakai community based study, Uganda. International Conference on AIDS, Geneva, Switzerland, July 1998. Abstract No. 23372.
- 36. Trebucq A, Louis JP, Tchupo JP, *et al.* Treatment regimens of STD patients in Cameroon: A need for intervention. Sex Transm Dis 1994; 21:124–126.
- Crabbé F, Tchupo JP, Manchester, T, et al. Pre-packaged therapy for urethritis: The "MSTOP" experience in Cameroon. Sex Transm Int 1998; 74:249–252.
- Laga M, Alary M, Nzila N, et al. Condom promotion, sexually transmitted disease treatment, and declining incidence of HIV-1 infection in female Zairian sex workers. Lancet 1994; 344:246–248.
- 39. Hanenberg RS, Rojanapithayakorn W, Kunasol P, et al. Impact of Thailand's HIV-control program as indicated by the decline of sexually transmitted diseases. Lancet 1994; 344:243–245.
- Nelson KE, Celentano DD, Eiumtrakol S, et al. Changes in sexual behavior and a decline in HIV infection among young men in Thailand. N Engl J Med 1996; 335:297–303.
- 41. Jana S. Three-year stint at Sonagachi: An exposition. Internal report. Calcutta, India: Department of Epidemiology, All India Institute of Hygiene and Public Health; 1995.
- 42. Regmi SC, Moktan PL, Mugrditchian DS, *et al.* STDs and STD health seeking behavior among CSW and their clients, and the role of chemist shops as sources of STD treatment in central Nepal. Paper presented at the 3rd International Conference on AIDS in Asia and the Pacific, Chiang Mai, Thailand, 1995. Abstract PD 210.

- 43. A baseline study of sexually-transmitted disease (STD) services provided by chemists in the land transportation routes from Naubise to Janakpur and Birgunj. Internal report. Nepal: AIDSCAP/ Family Health International; 1996.
- 44. Thladhar SM, Mills S, Acharya S, et al. The role of pharmacists in HIV LSTD prevention: Evaluation of an STD syndromic management intervention in Nepal. AIDS 1998; in press.
- Désormeaux J, Behets FMT, Adrien M, *et al.* Introduction of partner referral and treatment for control of sexually transmitted disease in a poor Haitian community. Int *J STD AIDS* 1996; 7: 502–506.
- Behets FMT, Désormeaux J, Joseph D, et al. Control of sexually transmitted diseases in Haiti: Results and implications of a baseline study among women living in Cité Soleil shantytowns. J Infect Dis 1995; 172:764–771.
- Sánchez J, Gotuzzo E, Escamilla J, et al. Sexually transmitted infections in female sex workers: Reduced by condom use, not by a periodic examination program. Sex Transm Dis 1998; 25:82–89.
- World Health Organization Global Program on AIDS. Evaluation of a national AIDS program: A methods package. 1. Prevention of HIV infection. Geneva, Switzerland: WHO/GPA/CO/ SEF/94.1; 1994.
- 49. Vuylsteke B, Ramos M. Evaluation of STD case management using exit interviews: A pilot study in AIDSCAP projects in Brazil. Internal report. Arlington, VA: AIDSCAP/FHI; 1997.
- Susser M. Some principles in study design for prevention HIV transmission: Rigor or reality. Am J Public Health 1996; 86:1713–1716.
- Fishbein M. Great expectations, or do we ask too much from community-level interventions (Editorial). Am J Public Health 1996; 86:1075–1076.
- 52. Mertens TE, Hayes RJ, Smith PG. Epidemiological methods to study the interaction between HIV infection and other sexually transmitted diseases. AIDS 1990; 4:57-65.
- 53. Wawer JH, Mcnamara R, McGinn T, *et al.* Family planning operations research in Africa: Reviewing a decade of experience. *Stud Fam Plan* 1991; 22:279–293.
- Mugrditchian DS, Dallabetta GA, Lamptey PR, et al. Innovative approaches to STD control. In Dallabetta GA, Laga M, Lamptey PL, eds. Control of Sexually Transmitted Diseases: A Handbook for the Design and Management of Programs. AIDSCAP/Family Health International; 1996; 253–274.
- 55. Wawer MJ, Gray RH, Quinn T. AIDS intervention in Uganda [letter]. Science 1995; 270:564-565.
- Anonymous. Reaching adolescents: Innovative approaches worldwide to preventing HIV/AIDS. In *Passages*. Washington DC: Advocates for Youth; 1995; 4.

# Behavioral Interventions in Developing Nations

### KEVIN R. O'REILLY ROLAND MSISKA, V. CHANDRA MOULI, and MONIR ISLAM

### INTRODUCTION

Though it has been a devastating event in most ways, the AIDS epidemic has had the positive effect of forcing public health to broaden its horizons and consider new approaches to prevention. A rich epidemiological and behavioral literature now exists where previously only outdated and incomplete information was available. An acceptance and growing understanding of the need and the approaches required for meaningful behavioral change also now exist. Within the area of behavioral interventions, new directions are developing, including prevention efforts that take into account the broader societal context of risk and risk behaviors. These are increasingly being used in conjunction with the more individual approaches that were borrowed from cardiovascular disease or smoking prevention and characterized the earliest prevention efforts. Most importantly, perhaps, is the increasing exchange of information and ideas between industrialized and developing nations in the area of HIV prevention. Whereas previously the developing world benefitted from the guidance of industrialized countries especially in the design of individual interventions, the industrialized world can now benefit from the creative societal and structural approaches being developed and implemented in the developing world as well.

In this chapter, we review the evidence from the developing world, focusing our attention first on the more traditional individual approaches and then on community approaches, including those that address structural factors that relate to HIV risk behavior. We restrict our attention to those interventions for which good

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evaluation data, focusing at least on behavior change, can be found in the published literature. By doing so, we overrepresent intervention studies and unfortunately underrepresent much of the behavior change efforts that take place in national HIV prevention programs. In the process, we briefly review as well the evolving understanding of determinants of HIV risk behaviors, in an attempt to help the reader understand the rationale and justification for the creative approaches being tried in the developing world.

## SEXUAL BEHAVIOR AND ITS DETERMINANTS IN THE DEVELOPING WORLD

Mathematical models to describe the spread of sexually transmitted infections have focused on three key variables: the efficiency of transmission, the rate of new partner acquisition, and the duration of infectiousness.' Each component can be addressed by interventions. The efficiency of transmission can be reduced by condoms<sup>2</sup> or by sexual practices that do not include penetration. Reduction in the number of sex partners through the promotion of monogamy or the delay of the onset of sexual activity for young people can also alter the basic reproductive rate of sexually transmitted disease (STD). Finally, prompt treatment seeking for infections and effective treatment of infections can affect the duration of infectiousness, particularly in the case of bacterial STDs.

Risk of sexually transmitted infections, including HIV, is usually considered to be largely determined by individual behavior.<sup>3</sup> Other factors outside the control of the individual may also be important, but factors such as economic and other social characteristics like poverty and the role and status of women are usually seen as immune to intervention. If we restrict our thinking to interventions that can be administered effectively in clinical settings, then this view is accurate. Since the advent of the AIDS epidemic, however, thinking about interventions has changed. Where formerly they were conceived as actions taken on the behalf of those in need or administered to clients or patients, interventions today may be increasingly participatory in their design and less focused on the behavior of an individual. For example, community-level interventions to increase the prevalence of condom use in the general population or to enhance the economic status of women are now being explored as potential ways to address the risk behaviors that facilitate STD/HIV transmission. In our review of interventions, we review the evidence for these approaches that can be found in the literature.

Around the world, norms and standards for acceptable behavior vary. This is true for sexual behavior as well and the greater acceptance of multiple sex partners in some social contexts is well known. Studies from the developing world have shown clearly that multiple sexual partner behaviors are widespread and frequent in countries of Africa,<sup>4–6</sup> Asia,<sup>7</sup> and Latin America.<sup>8</sup> In some places, this

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behavior is culturally acceptable for both sexes, but usually this type of latitude is afforded more to men. For them, it may be seen as a proof of manhood and virility. as has been reported in Thailand.<sup>7,9</sup> for example, or in South Africa, where men employed in extremely dangerous mining characterize sexual risk taking as another expression of their masculine identity. <sup>10</sup> The discrepancy between cultural expectations for men's and women's roles in sexual behavior in developing countries often demand sexual acquiescence from women while allowing or even expecting sexual experimentation from men. In some areas of Asia, for example, going to a brothel has been identified as a social activity for groups of men, not just a sexual activity for an individual man.<sup>11,12</sup> Even with this greater acceptance, though, going to a brothel is often associated with alcohol consumption for Thai military conscripts.<sup>13</sup> For these young men, the disinhibiting effect of the alcohol eases entry to the brothels, facilitates interactions with the women, and provides a socially acceptable excuse for not using condoms. This complex matrix of social norms and gender-based power discrepancies may limit women's ability to refuse sex even to partners suspected of HIV, while encouraging men to take the risk of acquiring the infection,<sup>5,7</sup> resulting in a serious cultural constraint on prevention efforts. These culturally determined roles make it difficult if not impossible for women to implement many of the prevention suggestions they receive.<sup>14</sup>

Even in countries where multipartner sexual behaviors are acceptable and are common, the practice is not uniform across populations. The concept of core groups of transmitters, long a feature in epidemiological and modeling studies of STD and HIV in industrialized countries, appears to be important in developing countries as well.<sup>15–17</sup> Though consideration of this concept has been seen as stigmatizing and has been criticized for facilitating blaming of the victims, core groups are useful in explaining the epidemiological patterns of STD and HIV in many countries. The effect on the HIV epidemic that could be derived from curing or preventing STD cases in core and noncore groups has been estimated<sup>18</sup> and clearly shows the benefit of targeting prevention efforts (Fig. 1). Behavioral interventions that are tailored to core groups merit consideration for inclusion in prevention efforts.

Mere numbers of partners alone may not be the only important factor in epidemic spread of HIV and STD. The concurrence of sexual relationships has also received attention.<sup>19</sup> Concurrence, or the simultaneous existence of more than one sexual partnership, appears to facilitate transmission of sexually transmitted agents,<sup>20</sup> and may be particularly important in enhancing the transmissibility of HIV by increasing the probability of transmission during the elevated state of viremia following infection.<sup>21</sup> In some studies, the existence of simultaneous sexual relationships has been shown to facilitate the passage of infection across the partnerships and explain more variance in HIV prevalence than numbers of partners alone.<sup>22</sup> Even relatively low numbers of sexual partners in a lifetime could still pose significant risk of STD, particularly HIV, in areas of high prevalence.



Figure 1. Effect on STD/HIV epidemic of curing/preventing 100 STD cases in core and noncore groups.

Among those commonly thought of as core transmitters, sex workers and the men who use their services are the most studied. While interventions have largely focused on sex workers themselves, it is in fact the men who use their services who transmit STD/HIV to other sex workers and to wives and partners who may have no other risks or any knowledge of their partners' sexual behaviors. As mentioned above, the frequency of this behavior is supported by the social and cultural acceptance of this behavior for men.<sup>23</sup> Clients of sex workers have also been studied, though the greater difficulty in identifying them outside of sex work areas makes this research more difficult to conduct.

Most of the studies on sexual behavior have focused on the need to describe and quantify the key behaviors that may increase the risk of HIV acquisition. While understanding the frequency with which particular sexual behaviors take place may help to assess the potential for the epidemic spread of STD/HIV, it is generally not sufficient information on which to base the design of interventions. Interventions must be based on an understanding of the determinants and motivations for sexual behavior, apart from just the physical drive or details of the sexual

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act.<sup>24</sup> While this understanding has generally lagged behind descriptions of the quantitative aspects of sexual behavior, studies of the meaning and motivations for various sorts of sexual behaviors have been conducted.

Studies in recent years have focused attention on the economic aspects of sexual exchange, particularly for women who may derive financial as much as emotional support from relationships. Development strategies in low resource countries may create surplus cash but also tend to exaggerate inequalities between more highly paid men and more lowly paid women.<sup>25</sup> Studies in Asia identify the economic component of sexual exchange,<sup>8</sup> as do to a lesser extent studies in Africa.<sup>26</sup> In some cases, as in Zimbabwe, the economic principle involved is straightforward: Women often expect to receive rewards for sex outside marriage.<sup>27</sup> In other cases, such as Thailand, the principle is compounded by additional considerations: Women involved in sex work are often expected to comply with traditional family support roles by sending money home to their families.<sup>28</sup> In many cases, the choice women face is between a long-term threat of disease, a threat with unknown probabilities, and a short-term threat of poverty, with which they are too familiar.<sup>29</sup> Interventions that ignore this complex reality face little chance of success.

The economic aspects of sexual behavior are intimately wrapped up in issues of migration in much of the developing world.<sup>30</sup> Some studies have even been able to quantify the effect of mobility and migration on HIV acquisition. In Tanzania, for example, men who are farmers and who do not travel often or migrate for labor were half as likely to be infected with HIV as were those who were employed in towns or who traveled frequently.<sup>31</sup> In Lesotho, women's need to engage in extramarital sexual relations for financial considerations is compounded by migration: Men in Lesotho commonly migrate to South Africa for work and leave women in need of money and basic necessities.<sup>32</sup> Such absences for labor additionally put men at risk for commercial or other casual sexual encounters. In Senegal, local HIV epidemics are thought to be fueled by the migration of men for seasonal labor.<sup>33,34</sup> Labor camps for migrant males in Asia have also been seen as likely to increase chances of commercial sex encounter.<sup>35</sup> As our understanding of power relationships, economic exchange, and other determinants of risky sexual behavior increases, so too does our understanding of how to develop interventions to help those who most need to avoid risky sexual behavior.

### BEHAVIORAL INTERVENTIONS FOR INDIVIDUALS, COUPLES, AND GROUPS

As mentioned earlier, the field of behavioral intervention has generated a smaller literature than has the field of behavioral studies, which is itself dwarfed by the descriptive epidemiological literature. Much of the behavioral intervention literature that has been produced has been criticized for failing to use experimental methods for evaluation.<sup>36</sup> Indeed, the evaluation of behavioral interventions is complicated, focusing as it does on demonstrating that transmission that did not occur would have happened had the intervention not taken place. Experimental designs would be better suited to this task than observational studies, but their use is often restricted by ethical considerations. Furthermore, the use of experimental designs in behavioral interventions research is most appropriate for studies of individual behavior change; they are less suitable for examining changes at the community level or for exploring the potential benefits of structural interventions.<sup>37,38</sup> It is these latter two categories of interventions that merit particular attention in the future.

In the section that follows, we focus our attention on intervention trials and evaluation of their impact, particularly measured by behavior change or by changes in disease transmission. While the quantity of reports from developing countries may be somewhat limited and experimental trials virtually nonexistent, the creativity of what is attempted there can be encouraging. We focus our attention on interventions for individuals, couples, and groups and for communities, including structural interventions.

Behavioral interventions for individuals, couples, and groups have largely been based on social psychological theories of behavior. These theories, including principally the theory of reasoned action,<sup>39</sup> the health belief model,<sup>40</sup> and social cognitive theory,<sup>41</sup> are sometimes called *rational actor models* in that they posit the key determinants of decisions and intentions about behaviors. A summary theory that includes the key components of these may be useful for guiding the development of interventions for HIV prevention on the individual level (Fig. 2). In this summary theory, an individual's intentions to perform a behavior are influenced by attitudes about the behavior and its consequences (for example, will good things happen if he or she performs the behavior or will the costs of doing so be unacceptably high), the normative beliefs an individual has about the behavior (do people important to the individual endorse the behavior), and the individual's



Figure 2. Model of determinants of individual behavior.

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self-efficacy, or the feeling that he or she is capable of performing the behavior. The actual performance of the behavior in turn is influenced by the intention to do so, the skills necessary to perform the behavior, and the lack of environmental constraints such as unavailability of condoms or drunkenness. Good interventions for HIV prevention explicitly or implicitly use a theoretical premise such as this for their design.<sup>42</sup>

### Individual Counseling

The first serious attempts to help individuals change risky sexual behaviors centered on counseling. Counseling has been defined for HIV prevention purposes as an interactive process in which a trained counselor assists a client in developing and rehearsing a personal risk reduction strategy, including, if necessary, role playing of important steps that might be required. Topics typically addressed in counseling for HIV prevention include informing partners of HIV serostatus and introducing condom use into new and existing relationships. Counseling is one of the most common interventions used for individuals in clinical settings in the developed world and is becoming increasingly common in the developing world.

Volunteer HIV antibody testing and counseling (VCT) has been the cornerstone of the HIV prevention effort in the United States since the mid-1980s. Extensive reviews of the literature on VCT have revealed variable effectiveness for the different risk groups and the different risk behaviors for which it could be evaluated.43,44 Clinical trials of the effectiveness of VCT in assisting individuals in developing countries to change behavior are underway in both the developed<sup>45</sup> and the developing world.<sup>46</sup> In a number of earlier studies in Africa, counseling and knowledge of HIV antibody status did not seem to have a significant effect on condom use.<sup>47,48</sup> However, in Uganda, an evaluation of VCT revealed that the majority of clients seeking VCT were sexually abstinent and not in need of condoms.<sup>49</sup> Those who tested seronegative were likely to return to sexual activity but with very high levels of condom use. The majority of those seropositive remained abstinent, with the minority resuming sexual activity monogamously and with condoms. Less striking results were reported previously from a study in the same setting.<sup>50</sup> Elsewhere, in Puerto Rico, injection drug users who received VCT and returned for their results were followed for 6 months. They showed no marked change in their injection practices regardless of their serostatus. Injectors who tested seropositive, however, were less likely to be sexually active and more likely to use condoms than were those who tested seronegative.<sup>51</sup> In one prevention study in Kenya, VCT was used in conjunction with STD management and condom promotion for 556 seronegative truck drivers.<sup>52</sup> In follow-up, the researchers found that reported extramarital sex decreased 49% over the first year of the study, but consistent use of condoms did not change significantly. Nonetheless, the

incidence of STDs declined from 34 per 100 person years to 10. However, in an observational study that did not include any intervention in a Tanzanian factory, similar decreases in numbers of casual sex partners and smaller decreases in extramarital sex were also reported, without significant increases in condom use.<sup>53</sup> The effect of VCT on subsequent behavior is still an unresolved issue, in part because what actually is provided in a counseling intervention is largely unspecified. By its nature, counseling must respond to the needs of a client, making standardization of the intervention difficult if not impossible. Nevertheless, the positive experiences with counseling, especially VCT, in the developing world would indicate that this intervention deserves consideration for inclusion in prevention efforts.

VCT may have its greatest impact when it is used with couples, as studies in the United States<sup>54</sup> and Europe<sup>55</sup> have shown. Counseling couples makes it easier to discuss the issue of condom use in an established relationship and to negotiate that use with the help of a professional counselor. This effect seems to work in the developing world as well. In both Rwanda and Zaire, VCT for discordant couples resulted in an increase in condom use from 3% to 57% in one year in the first case<sup>56</sup> and from 5% to more than 70% very quickly in the second.<sup>57</sup> The potential benefit of VCT or counseling in general in this particular aspect is another area that deserves particular consideration.

### Group Counseling

Group counseling, long popular in the United States and Western Europe, also has been tried in the developing world. Even in the provision of VCT discussed above, some of the counseling may be provided in groups, as was the case with the serodiscordant couples in Zaire referenced above.<sup>57</sup> Group counseling in the workplace, without testing, has been used as well, especially with military personnel. In one trial of a group counseling and educational intervention for Thai military personnel,<sup>58</sup> the intervention was shown to be effective in increasing condom use, decreasing visits to sex workers, and stopping HIV transmission: No participants seroconverted during the intervention period or the follow-up. Group counseling, again without testing, has also been used for those at highest risk. In an intervention for sex workers in Kenya, the percentage of women reporting at least occasional condom use increased from 7% before to 58% 12 months after one intervention.<sup>59</sup>

### Behavioral Interventions at the Community Level

Effective prevention anywhere, but particularly in developing countries, requires a mix of interventions that address all the key determinants that influence sexual behavior and the probability of STD or HIV infection. These include, as

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referenced earlier, factors that are outside the scope of individual decision making or over which individuals may have difficulty exercising control. Attempts to intervene through the communities in which people live or even to change the structures in those communities are becoming more common in HIV prevention. In this section, we review what is known about these approaches to date.

The term *community* is often used but little defined. The term can be used to connote a physical area or a geographic place with a specific political structure. For epidemiology, this meaning can be useful when location is important. Community can also be used to describe groups of people who interact in a substantive way with each other. This interaction can imply shared behaviors or norms, beliefs, and values that influence behaviors. It can also imply an increased likelihood of performing key social behaviors with some people but not others. Sexual behavior is one of the most discerning of these defining behaviors, with usually sharp lines drawn around those for whom sharing sex is possible or acceptable and those for whom it is strictly out of bounds.

In epidemiology, this definition of community can be useful when discussing STD and AIDS. The weakness of this definition, however, is the inability to locate exactly where a community is or to enumerate exactly who belongs to a community, as community identity is a product of ideology, not geography. Modem community-level interventions focus not just on the behaviors that place people at risk, but on the social, cultural, psychological, and environmental factors that characterize communities. These intervention approaches target members of communities to a lesser degree and instead may use elements of the organizational structure of a community to facilitate behavior change. The range of potential intervention points extends beyond the individual but affects the individual by facilitating decisions about behaviors, by increasing access to risk-reduction supplies such as condoms and disposable syringes, by increasing social acceptance of risk reduction, or by changing legal constraints or economic needs that may constrain risk reduction (see Fig. 3).

As a result of its reach and its power to influence knowledge and attitudes, mass media has been used for STD/HIV prevention efforts. Mass media interventions that take the form of long-running soap operas or serials seem to be particularly effective. In these approaches, the goal is to educate and influence social norms for large segments of the population while providing entertainment.<sup>60</sup> In some developing countries, these soap operas have been able to attract enormous audiences, making them commercially viable. Evidence of social norm change has been documented in some of these cases—but after long exposure to the interventions (more than 200 installments).<sup>61</sup>

Documented behavior change is much more difficult to measure or to attribute to mass media interventions. In a well-monitored mass media intervention in Zambia, knowledge of AIDS increased and sexual risk behaviors decreased among frequent listeners to a radio drama.<sup>62</sup> However, knowledge in the general public



Figure 3. Model of community-level determinants of individual behavior.

increased as well and it was not possible to attribute changes to listening to the radio program.

Social marketing has also been extensively used for HIV prevention. This approach has contributed to enormous increases in condom sales and distribution in Africa, with Zaire perhaps being the best example.<sup>63</sup> In this case, sales of condoms through social marketing increased from fewer than 500,000 to more than 18 million in 4 years (Fig. 4).

Social marketing has also been used for other commodities, such as STD drugs in Cameroon,<sup>64</sup> where the availability of drugs and the stigma associated with STDs were identified as barriers to seeking treatment in clinics. Other attempts to involve more peripheral health workers in the promotion and distribution of condoms have also been tried, although an attempt to dispense information and condoms through pharmacists in Mexico was found to be only partially successful.<sup>65</sup>

Interventions for sex workers that operate through other sex workers and attempt to mobilize women for their own protection are perhaps the most effective. In Nigeria, sex workers were trained to be peer educators to work with clients and sex workers.66 Reported consistent condom use doubled in one year. Increases in condom use were reported from similar interventions in Zimbabwe<sup>67</sup> and Ghana,<sup>68</sup> both using trained peer educators. An intervention in Abidjan, Côte d'Ivoire, in an attempt to work at a large-scale, focused attention on all sex workers in the city, using frequent large community meetings in all areas of sex work as an intervention.<sup>69</sup> Condom use increased significantly in those areas first exposed to the intervention. In Kinshasa, Zaire, an intervention for sex workers included regular



Figure 4. Increase in condom sales through social marketing in Zaire.

STD examination and treatment, promotion of condom use by sex workers, and the support and collaboration of bar owners where sex work was practiced.<sup>70</sup> Regular use of condoms increased fivefold over 3 years, to nearly 70%. HIV incidence among women reporting regular condom use was one third that of irregular users or nonusers.

Social mobilization and addressing the broadly defined needs and concerns of sex workers have been the themes of the Sonagachi project in Calcutta.<sup>71</sup> The intervention in a large red-light area uses community outreach workers to bring risk reduction education and condoms to all brothels each week and a community clinic to provide STD treatment and primary care to sex workers and their children. It also provides emergency loans and literacy classes, organizes sex workers to provide flood relief to affected squatter settlements, and it has been assisting the organization of a political organization for sex workers' rights.<sup>72</sup> Evaluation has

shown significant increases in condom use, significant reductions in syphilis, and only a minor increase in HIV prevalence from less than 1% to 4% over 3 years, a rate of increase much slower than that of sex workers in other Indian cities.<sup>73,74</sup>

As our review of the determinants of risks for HIV has shown, the exclusive focus on individual risk neglects the powerful social and cultural forces at large in a community that may greatly limit individuals' ability to control their immediate circumstances and control their risks. The evolution of thinking in HIV prevention from an individual focus to a focus on community mobilization<sup>75</sup> is perhaps no place better exemplified than in the Sonagachi project from Calcutta.

# STRUCTURAL AND ENVIRONMENTAL APPROACHES FOR STD/HIV PREVENTION

The major emphasis in HIV prevention has been on influencing and persuading choices individuals make about their sexual behavior. In the West, where the focus on individual's rights, health, and the ability to control their future course are important features, this approach was appropriate and probably the best point of departure for prevention efforts. However, in much of the developing world, the emphasis on individual choice is less useful, as the individual's limited ability to choose and act on those choices may stand in sharp contrast to the community's rights and powers. Public health approaches to HIV prevention that ignore this central fact may be limiting their potential impact or worse, may even be ineffective.

Even in the industrialized world, however, public health interventions outside of HIV prevention are not restricted only to those approaches that rely on influencing individual behavior and choice. Fluoridation of water or salt, vitamin supplementation of foods, taxes on harmful products, and laws requiring protective measures like immunizations and seat belt use are standard features of public health in the developed world. These interventions rely more on policies and economic incentives that may facilitate risk reduction or inhibit risk exposure. The potential benefit of such approaches for STD/HIV prevention has been described previously.<sup>37,38,76</sup>

Focusing on structural and environmental changes, two principal areas present themselves for consideration: policy and economic approaches. In the first case, policy approaches can include both removing restrictive policies to enable risk reduction behaviors to be practiced (as in legalizing the sale and possession of sterile injection equipment) and erecting barriers to continued risk taking. In the second case, economic approaches can include taxation or pricing mechanisms that make risky behavior economically less attractive than risk reduction behavior, which make means of risk reduction truly affordable or which offer economic empowerment to women. Approaches like these offer the possibility of shaping and influencing behavior even in areas where it is difficult to influence and

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persuade people at risk to change their behavior. For women in the developing world, these types of approaches may be an important adjunct to the approaches outlined previously.

Some examples of the application of policy approaches to STD/HIV prevention do exist. One such example pertains to the use of short-term stay hotels, where risky sexual behavior is likely to take place, and the mandatory placement of condoms in them. An evaluation of such an approach was conducted in the Dominican Republic.<sup>77</sup> Hotels complying with the rule were compared to noncompliant hotels by observing used condoms and wrappers in the randomly selected rooms after checkout. The mere placement of condoms mandated by the policy doubled the rate of usage, from 12 to 24%. Clearly, a simple policy of environmental facilitation for risk reduction efforts can have a substantial effect, even in the absence of other interventions.

A more sweeping policy approach to HIV prevention has been used in Thailand.<sup>78</sup> In this now well-known effort, the government instituted a policy of mandatory condom use in brothels. The policy made condom use the responsibility of the customer and the brothel owner, not of the women, as they were often not in a position to demand. A link was made between STD clinics, which report occurrences of STDs among sex workers, and the police who investigate laxness in implementing the policy in brothels in which the infected sex workers work. Evaluation of this policy has revealed a strong effect.

Surveys of sex workers show high rates of condom use (exceeding 90% using on the last commercial sex encounter in most provinces) and greatly decreased rates of STDs. Incidence of STDs among men has also dropped sharply and the prevalence of HIV infection among Thai military recruits, in a random sample of young men in Thailand, has been decreasing steadily.<sup>79</sup> While the policy allows the high-risk behavior (i.e., multipartner sex) to continue, it mandates sufficient changes (i.e., condom use) to apparently reduce much of the risk.

Economic approaches may also be helpful in STD/HIV prevention. To date, these approaches have usually focused on income-generating alternatives to sex work, a difficult challenge given the potential wages of sex work compared to other wage labor available to women.<sup>80</sup> However, the example of the sex worker intervention in Calcutta described above includes emergency low-interest loans for women with difficulties paying their rent or fees to a brothel. This is designed to prevent them from becoming amenable to persuasion from clients to forgo condom use in the interest of raising the necessary money quickly. On a larger scale, an example from family planning is also illustrative of an economic approach. In Bangladesh, the Grameen Bank has been operating a cooperative that offers a revolving loan scheme for rural women. The purpose is to finance the development of self-employment activities. The loan schemes have been successful in their stated purpose of creating economic opportunity for women, as well as increased use of contraception.<sup>81</sup> This effect was seen even for nonparticipating women who lived in villages where the Grameen Bank program operated, compared to women

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in villages without the program. Economic empowerment would appear to facilitate women's ability to control their personal decisions in the sorts of ways that we would hope for in HIV prevention as well. This evidence also suggests a diffusion of new norms from the successful participating women to other women in their villages who did not participate. The empowerment and economic participation of women may enable them to exert the necessary control of their sexual behavior that reduces the likelihood of STD/HIV infection.

These examples suggest ways to address HIV prevention in the broader social context of the community and its structures that may facilitate or impede HIV risk reduction. The efforts cited above are hopeful in that they try, in their modest way, to address the real problems of inequalities in health that are at the root of many health problems in the developing world, not only HIV/AIDS.<sup>82</sup> They demonstrate as well that interventions that address the structure or the environment can be effective. These approaches thus represent an additional STD/HIV prevention strategy that can be used with the more standard individual-level behavior change interventions.

### CONCLUSION

HIV prevention is at a crossroads. The approaches that have characterized the mainstream of HIV prevention during the last 15 years do not reflect our growing understanding of the broad social and cultural determinants of sexual behavior. Our understanding of how to address these broader social and cultural determinants is only now developing and is certain to carry us beyond the traditional models that have been used in public health. At the same time, increasing pressure is felt for more evidence of effectiveness of the behavioral intervention approaches that have been used, with the relative lack of experimental designs in evaluation of behavioral trials being particularly criticized.<sup>36</sup> Unfortunately, these two themes clash in that the type of innovative approaches needed at the community level to tackle structural problems will not lend themselves to evaluation through experimental designs for quite some time to come, if at all. The resolution of these two competing forces will take time but will not, we hope, preclude the development of community and structural approaches so badly needed.

While the picture is brightening in industrialized nations, where increasingly high-quality interventions are being conducted, evaluated, and published, the case of the developing world is less bright. Indeed, some of the most innovative work in HIV prevention is being carried out in the developing world, work that forces those in industrialized countries to question the very premises on which they try to intervene. However, much of this work is not evaluated and little is published. Nonetheless, our understanding of sexual behavior, the varieties of forms it takes, what determines or drives those behaviors, and how to change these sexual behav-

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iors, directly or indirectly, have all improved. Much of this improvement is the result of creative efforts in the developing world and the interchange of ideas and approaches between those in industrialized and developing nations. While the pattern until now has been one in which the developing world benefits from the experience and expertise of the industrialized world, the opposite may be true in the future, especially in the exciting area of community and structural interventions.

### REFERENCES

- 1. Anderson RM, May RM. Epidemiologic parameters of HIV transmission. *Nature* 1988; 333: 514–519.
- Cates W. How much do condoms protect against sexually transmitted diseases? *IPPF Med Bull* 1997; (February) 31:2–3.
- Holmes KK. Human ecology and behavior and sexually transmitted bacterial infections. Proc Natl Acad Sci 1994; 91:2448–2455.
- 4. Cleland J, Ferry B. Sexual Behavior and AIDS in the Developing World. London: Taylor and Francis, 1995.
- Orubuloye IO, Caldwell JC, Caldwell P, et al. Sexual networking and the risk of AIDS in southwest Nigeria. In: Dyson T, ed. Sexual Behavior and Networking: Anthropological and Socio-cultural Studies on the Transmission of HIV. Liege, Belgium: Editions Derovaux-Ordina; 1992; 283–301.
- Anarfi JK, Awusabo-Asare K. Experimental research on sexual networking in some selected areas of Ghana. *Health Transition Rev* 1993; 3(suppl):29–43.
- Asavaroegchai S. Double standard, double threat: HIV and reproductive health in Thailand. In: Mirsky J, Radlett M, Davies W, eds. *Private Decisions, Public Debate: Women, Reproduction and Population.* London: Panos Publications; 1994; 107–120.
- Carael M, Cleland J, Roger I, et al. Extramarital sex: Implications of survey results for STD/HIV transmission. Health Transition Rev 1995; 4(suppl):153–172.
- Kane TT, De Buysscher R, Taylor-Thomas T, et al. Grossesse de l'adolescente et contraception dans l'agglomeration de Banjul: Les jeunes ont besoin d'une information precise. Pop Sahel 1990; 13:28–34.
- Campbell C. Migrancy, masculine identities and AIDS: The psychosocial context of HIV transmission on the South African gold mines. Soc Sci Med 1997; 45:273–281.
- 11. Havanon N, Bennett A, Knodel J, et al. Sexual networking in a provincial Thai setting. Stud Fam Plan 1993; 24:1-17.
- Maticka-Tyndale E, Elkins D, Haswell-Elkins M, *et al.* Contexts and patterns of men's commercial sexual partnerships in northeastern Thailand: Implications for AIDS prevention. *Soc Sci Med* 1997; 44:199–213.
- MacQueen KM, Nopkesorn T, Sweat MD, *et al.* Alcohol consumption, brothel attendance and condom use: Normative expectations among Thai military conscripts. *Med Anthropol Q* 1996; 10:402–423.
- Gupta, GR, Weiss, E. Women's lives and sex: implications for AIDS prevention. Cult Med Psychiatry 1993; 17:399–412.
- Lamptey P. An overview of AIDS interventions in high-risk groups: Commercial sex workers and their clients. In: Chen L, Sepulveda J, Amor S, et al., eds. AIDS and Women's Reproductive Health. New York: Plenum Press; 1991; 151–163.
- 16. Plummer FA, Nagelkerke NJ, Moses S, et al. The importance of core groups in the epidemiology and control of HIV-1 infection. AIDS 1991; 5 (suppl 1):S169–S176.

- Ronald A, Ndinya-Achola JD, Ngugi EN, et al. Social epidemiology in Africa: Slowing the heterosexual transmission of AIDS. AIDS Soc 1991; 2:7–8.
- Over M, Piot P. Infection and STD: Disease Control Priorities. Washington, DC: World Bank; 1991.
- 19. Hudson, CP. Concurrent partnerships could cause AIDS epidemics. Int J STD AIDS 1993; 4: 349–353.
- Morris M, Kretzschmar M. Concurrent partnerships and the spread of HIV. AIDS 1997; 11: 641–648.
- Phanuphak P. Concurrent relationships could cause AIDS epidemics: Thailand's point of view (letter). Int J STD AIDS 1994; 5:155–156.
- Watts CH, May RM. The influence of concurrent partnerships on the dynamics of HIV/AIDS. Math Biosci 1992; 108:89–104.
- 23. Brown T, Sittitrai W. Heterosexual risk behavior in Asia: the implication for HIV/AIDS. Curr Sci (Indian Acad Sci) 1995; 69:840–848.
- Aggleton P, O'Reilly K, Slutkin G, et al. Risking everything? Risk behavior, behavior change and AIDS. Science 1994; 265:341–345.
- Jones GW. Prostitution in Indonesia. Working Papers in Demography #52, Research School of Social Sciences, Australian National University, Canberra, 1995.
- Nkya WM, Gillespie SH, Howlett W, et al. Sexually transmitted diseases in prostitutes in Moshi and Arusha, Northern Tanzania. Int J STD AIDS 1991; 2:432–435.
- Vos T. Attitudes to sex and sexual behavior in rural Matabeleland, Zimbabwe. AIDS Care 1994; 6:193–203.
- Wawer MJ, Podhistia C, Kanungsukkasem U, et al. Origins and working conditions of female sex workers in urban Thailand: Consequences of social context for HIV transmission. Soc Sci Med 1996; 42:453–462.
- Schoepf B. Women at risk Case studies from Zaire. In: Herdt G, Lindenbaum S, eds. *The Time of AIDS*. London: Sage Publications; 1992; 259–286.
- Quinn TC. Population migration and the spread of types 1 and 2 human immunodeficiency viruses. Proc Natl Acad Sci 1994; 91:2407–2414.
- Quigley M, Munguti K, Grosskurth H, et al. Sexual behavior patterns and other risk factors for HIV infection in rural Tanzania: A case-control study. AIDS 1997; 11:237–248.
- 32. Romero-Daza N. Multiple sexual partners, migrant labor and the makings for an epidemic: Knowledge and beliefs about AIDS among women in Lesotho. *Hum Org* 1994; 53:192–205.
- Pison G, Lebuenno B, Lagarde E, et al. Seasonal migration: A risk factor for HIV infection in rural Senegal. J Acquir Immune Defic Syndr 1993; 6196–200.
- Kane F, Alary M, Ndoye I, *et al.* Temporary expatriation is related to HIV-1 infection in rural Senegal. *AIDS* 1993; 7:1261–1265.
- Moodie R, Aboagye-Kwarteng T. Confronting the HIV epidemic in Asia and the Pacific: Developing successful strategies to minimize the spread of HIV infection. AIDS 1993; 7:1543–1551.
- Oakley A, Fullerton D, Holland J, et al. Behavioral interventions for HIV/AIDS prevention. AIDS 1995; 9:479–486.
- O'Reilly KR, Piot P. International perspectives on individual and community approaches to the prevention of sexually transmitted diseases and human immunodeficiency virus infection. J Infect Dis 1996; 174(suppl 2):S214–S222.
- Tawil O, Verster A, O'Reilly KR. Enabling approaches in HIV/AIDS prevention: can we modify the environment and minimize the risk? AIDS 1995; 9:1299–1306.
- Fishbein M. Belief; Attitude, Intention and Behavior: An Introduction to Theory and Research. Boston: Addison-Wesley; 1975.
- 40. Becker MH. The health belief model and personal behavior. Health Educ Monogr 1974; 2324-508.
- 41. Bandura A. Social cognitive theory and exercise of control over HIV infection. In: DiClemente RJ,

Peterson JL, eds. Preventing AIDS: Theories and Methods of Behavioral Interventions. New York: Plenum Press; 1994; 84–117.

- 42. Leviton LC, O'Reilly K. Adaptation of behavioral theory to CDC's HIV prevention research: Experience at the Centers for Disease Control and Prevention. Public Health Rep 1996; 111(suppl 1):11-17.
- Higgins DL, Galarotti C, O'Reilly K, etal. Evidence for the effects of HIV-antibody and testing on risk behaviors. JAMA 1991; 266:2419–2429.
- 44. Choi K-H, Coates TJ. Prevention of HIV infection. AIDS 1994; 8:1371-1389.
- 45. Kamb ML, Dillon VA, Fishbein M, et al. Quality assurance of HIV prevention counseling in a multi-center randomized controlled trial. Public Health Rep 1996; 111(suppl 1):99–107.
- de Zoysa I, Phillips KA, Kamenga, MC, et al. Role of HIV counseling and testing in changing risk behavior in developing countries. AIDS 1995; 9(suppl A):S95–S101.
- Pickering H, Quigley M, Pepin J, et al. Effects of post-test counselling on condom use among prostitutes in the Gambia. AIDS 1993; 7:271–273.
- Heyward WL, Batter VL, Malulu M, et al. Impact of HIV counseling and testing among childbearing women in Kinshasa, Zaire. AIDS 1993; 7:1633–1637.
- Moore M, Tukwasiibwe E, Marum E, et al. Impact of HIV counseling and testing (CT) in Uganda. Paper presented at the 4th International Conference on AIDS/IV STD World Congress. Berlin; 1993.
- 50. Muller 0, Barugahare L, Schwartlander B, et al. HIV prevalence, attitudes and behavior in clients of a confidential HIV testing and counselling centre in Uganda. AIDS 1992; 62369–874.
- Colon HM, Robles RR, Marrero CA, et al. Behavioral effects of receiving HIV test results among injecting drug users in Puerto Rico. AIDS 1996; 10:1163–1168.
- Jackson DJ, Rakwar JP, Richardson BA, et al. Decreased incidence of sexually transmitted diseases among trucking company workers in Kenya: Results of a behavioral risk-reduction programme. AIDS 1997; 11:903–909.
- Ng'weshemi JZL, Boerma JT, Pool R, et al. Changes in male sexual behavior in response to the AIDS epidemic: Evidence from a cohort study in urban Tanzania. AIDS 1996; 10:1415–1420.
- Padian NS, O'Brien TR, Chang Y, et al. Prevention of heterosexual transmission of human immunodeficiency virus through couple counseling. J Acquir Immune Defic Syndr 1993; 6:1043– 1048.
- de Vincenzi I. A longitudinal study of human immunodeficiency virus transmission by heterosexual partners. N Engl J Med 1994; 331:341–346.
- Allen S, Tice J, Van de Perre D, et al. Effect of serotesting with counselling on condom use and seroconversion among HIV-discordant couples in Africa. Br Med J 1992; 304:1605–1609.
- 57. Kamenga M, Ryder RW, Jingu M, et al. Evidence of marked sexual behavior change associated with low HIV-1 seroconversion in 149 married couples with discordant HIV-1 serostatus: experience at an HIV counselling center in Zaire. AIDS 1991; 5:61–67.
- 58. Celentano DD, Bond K, Beyrer C, et al. HIV prevention in the Royal Thai Army reduces HIV risks among conscripts. Paper presented at the 3rd International Conference on AIDS in Asia and the Pacific. Chiang Mai, Thailand; 1995.
- 59. Ngugi EN, Plummer FA, Simonsen JN, et al. Prevention of HIV transmission in Africa—effectiveness of condom promotion and health education among prostitutes. Lancet 1988; 2:887–890.
- 60. Brown WJ, Singhal A, Rogers EM, et al. Pro-development soap operas: a novel approach to development communication. Media Dev 1989; 4:43-47.
- Chandran AS, Hirata TM, Rogers EM, et al. Using entertainment for development: Viewer identification with a pro-social Indian soap opera. Paper presented at the Intercultural and Development Communication Division, Communication Association. Washington, DC; 1993.
- 62. Yoder PS, Hornik R, Chinwa BC, etal. Evaluating the program effects of a radio drama about AIDS in Zambia. Stud Fam Plan 1996; 27:188–203.

- Global Programme on AIDS. Effective approaches to AIDS prevention: Report of a meeting. Geneva, Switzerland: World Health Organization; 1992.
- Dadian MJ. Public health approaches to STD control: New challenges in the era of AIDS. AIDS Captions 1996; 3:24–28.
- Pick S, Reyes J, Alvarez M, et al. AIDS prevention training for pharmacy workers in Mexico City. AIDS Care 1996; 8:55–69.
- Williams E, Lamson N, Efem S, et al. Implementation of an AIDS prevention program among prostitutes in the Cross River State of Nigeria (Letter). AIDS 1992; 6:229–230.
- Wilson D, Nyathi B, Nhariwa M, et al. A Community-level AIDS Prevention Programme among Sexually Vulnerable Groups and the General Population in Bulawayo, Zimbabwe. Harare, Zimbabwe: University of Zimbabwe; 1993.
- Asamoah-Adu A, Weir S, Pappoe M, et al. Evaluation of a targeted AIDS prevention intervention to increase condom use among prostitutes in Ghana. AIDS 1994; 8:239–246.
- 69. Kale K, Gnaoré E, Mah-bi G, et al. Evaluating a behavioral intervention in high risk settings in Abidjan, Cote d'Ivoire. Paper presented at the loth International Conference on AIDS/International Conference on STD. Yokohama, Japan; 1994.
- Laga M, Alary M, Nzila N, et al. Condom promotion, sexually transmitted diseases treatment and declining incidence of HIV-1 infection in female Zairian sex workers. Lancet 1994; 344:246–248.
- Jana S, Singh S. Beyond medical model of STD intervention—Lessonfrom Sonagachi. Indian J Public Health 1995; 39:125–131.
- Mahila Samanwaya Committee. The "Fallen" Learn to Rise: The Social Impact of STD-HIV Intervention Program. Calcutta, India: Mahila Samanwaya Committee; 1997.
- Jana S, Khodakevich L, Larivee C, et al. Changes in sexual behavior of prostitutes in Calcutta. Paper presented at the 10th International Conference on AIDS/International Conference on STD. Yokohama, Japan; 1994.
- O'Reilly KR, Mertens T, Sethi G, et al. Evaluation of the Sonagachi Project, Calcutta. Report to ODA, New Delhi, India; 1996.
- Parker RG. Empowerment, community mobilization and social change in the face of HIV/AIDS. AIDS 1996; 10(Suppl 3):S27–S31.
- Sweat MD, Dennison JA. Reducing HIV incidence in developing countries with structural and environmental interventions. AIDS 1995; 9(suppl A):S251–S257.
- Guerrero E. UDOCETS: Disponibilidad y uso de condones en hoteles/moteles de paso. Final report to GPA. Santo Domingo; 1994.
- Rojanapithayakom W. The one hundred percent condom programme in Thailand: An update. Paper presented at the loth International Conference on AIDS/International Conference on STD. Yokohama, Japan; 1994.
- Nelson KE, Celentano DD, Elumtrakol S, et al. Changes in sexual behavior and a decline in HIV infection among young men in Thailand. N Engl J Med 1996; 335(5):343–345.
- Ford N, Koetsawang S. The socio-cultural context of transmission of HIV in Thailand. Soc Sci Med 1991; 33:405–414.
- Schuler SR, Hashemi SM. Credit programs, women's empowerment and contraceptive use in rural Bangladesh. Stud Fam Plan 1994; 25:65–76.
- Klouda T. Responding to AIDS: are there any appropriate development and health policies? J Int Dev 1995; 7:467–487.

### Insights for HIV Prevention from Industrialized Countries' Experiences

### ANITA RAJ, SNIGDHA MUKHERJEE, and LAURA LEVITON

### INTRODUCTION

If numbers count, then among developing nations the need for effective interventions to prevent the spread of HIV is more dramatic than in the industrialized world. Statistics presented earlier in this volume testify to the urgency of disseminating and adapting effective strategies for HIV prevention. Unfortunately, few of the HIV intervention studies from developing nations have been formally evaluated and published.<sup>1</sup> In large part due to greater access to material resources, the industrialized world has served as a setting for over 1200 published behavioral intervention studies in the past 15 years.<sup>2</sup> Much of the HIV intervention research that has been evaluated and found effective has come from industrialized rather than developing countries.<sup>3</sup>

This wealth of information concerning intervention research from industrialized nations may be useful to HIV behavioral intervention researchers in the developing world. This is not to claim that interventions that work in the United States would be effective in Kampala, Uganda. HIV prevention must take into account social and cultural context.<sup>4</sup> However, some universals are likely to exist in HIV prevention, and certain similarities exist between industrialized and developing nations in epidemiological trends and routes of transmission.<sup>5</sup>

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With a view to adapting what industrialized nations have learned, the purpose of this chapter is threefold:

- 1. To review the literature on "what works" in industrialized countries, using only published studies that have been evaluated by scientific standards. This contrasts with other chapters in this book that also review published and unpublished studies, due to a dearth of published evaluated interventions in developing countries.
- 2. Using the existing literature on each population at risk, to speculate on some likely "universals" concerning factors affecting HIV acquisition, whether these are biological or cultural.
- 3. From the literature on each population at risk, to identify important variations in culture, settings, and resources available that appear to modify the outcomes of HIV interventions or to force adaptations of intervention strategies.

On this basis, it may be feasible to adapt interventions for application in developing countries that have been tested in the industrialized nations.

# INSIGHTS FROM INTERVENTIONS IN THE INDUSTRIALIZED WORLD

The goals of behavioral HIV interventions are to prevent acquisition of the virus at the individual level and transmission of the virus at the population level.<sup>6</sup> Industrialized countries can offer some insights about "what works," because a body of research exists on this subject. Although the information is often flawed and there are many gaps in knowledge, evaluations of cognitive–behavioral interventions have been conducted in industrialized countries in many locations and situations and with diverse populations. Often, a sufficient number of evaluations to new groups. To the extent that the studies do not all share the same flaws but share a similar design, confidence in their overall conclusions about the effectiveness of cognitive–behavioral interventions is strengthened.<sup>7</sup>

The interventions that have been studied are generally individual-level, community-level, and/or structural-level programs promoting HIV risk reduction knowledge, attitudes, and behavior. Individual-level interventions are the most common, targeting high-risk individuals [those affiliated with groups with high sexually transmitted disease (STD) and HIV prevalence], often in clinical settings.<sup>8</sup> These interventions have the greatest potential to affect the individual, but they are time consuming, expensive, and unlikely to reach a large sector of the population.<sup>9</sup> Community-level interventions address high-risk communities (those

with high STD and HIV prevalence).<sup>8</sup> These interventions are more likely to reach larger numbers of people, but they have less of an impact on the individual than individual-level interventions.<sup>9</sup> Structural-level interventions, or "enabling approaches," intervene with the social or physical environment where HIV risk behaviors occur, often through policy change.<sup>8</sup> Examples of using this approach include government-sanctioned needle-exchange programs<sup>10</sup> and legally required condom use among commercial sex workers in Thailand.<sup>11,12</sup> Although few studies use this approach in the industrialized world, findings indicate a strong impact on HIV risk practices on larger segments of a population.<sup>10–12</sup> Unfortunately, these are the most difficult interventions to implement, and few researchers are able to stimulate government policy change.

Effective HIV interventions in Europe and North America have generally applied cognitive-behavioral theories to risk reduction, using individual counseling, small-group work, or social marketing techniques. These cognitive-behavioral theories include social cognitive theory,1<sup>3</sup> theory of reasoned action,<sup>14</sup> the health belief model,<sup>15</sup> and the transtheoretical model.<sup>16</sup> The cognitive-behavioral approach states that to alter an individual's behavior and have it be maintained, the individual must have behavioral intention, a conducive environment, and behavioral skills. The extent to which the individual engages in the behavior is further dependent on the individual's outcome expectancies, perceptions of social norms, self-monitoring ability, actual and perceived self-efficacy, and emotional coping responses.<sup>17</sup> All these factors can be altered through interventions to influence and reinforce each other, thereby promoting the desired behavior through a process termed *reciprocal determinism*.<sup>18</sup>

Evaluations demonstrate improved outcomes from a cognitive-behavioral approach across many settings, ethnicities, and types of people at risk (see Table 1). This increases confidence that the approach has potential for developing countries as well, although it is always possible that one of the concepts may simply be outside the cultural reality of certain groups. More often, it is likely that concepts such as "emotional coping responses" are universal, although the type of response will vary across groups. Thus, it is necessary to adapt the particular aspect of the intervention to the cultural and physical setting of a group; this adaptation of intervention is termed *tailoring*.

# UNIVERSALS AND IMPORTANT VARIATIONS

There are several reasons for the existence of universal features of effective HIV interventions: (1) Worldwide, routes of HIV transmission (e.g., anal or vaginal sex, drug use) are not region specific, though the primary means of transmission may differ from country to country. Thus, goals of interventions

ï	able 1. Constructs of Cognitive-Beha	vioral Theories and Populations with which Th	ey Have Been Used
Theory constructs	Definition of construct in HIV prevention	Examples of approaches in HIV prevention	Populations using these constructs~
Behavioral intention	Deciding to engage in the desired behavior	• All	All
Conducive environment	The environment is conducive to the behavior and the individual	<ul> <li>Available and accessible condoms and syringes</li> <li>Partner(s) does not oppose condom use</li> </ul>	All
Abilities	percerves it as conductive Has skills to engage in the behavior	<ul> <li>Condom demonstration</li> <li>Safer sex negotiation demonstration</li> <li>HIV prevention and transmission lecture</li> </ul>	All
Outcome expectancies	Belief that the advantages of engaging in the behavior outweigh the disadvantages	<ul> <li>Increase positive attitudes toward condoms through condom eroticization</li> </ul>	All
Social norms	Perceptions that similar others engage in the behavior	<ul> <li>Peer facilitators</li> <li>Role model stories<sup>b</sup></li> <li>Group discussion</li> </ul>	Adolescents, men who have sex with men, women, commercial sex workers, injecting drug users
Self-monitoring	Self-regulation of the behavior	• Trigger identification <sup>c</sup>	Adolescents, men who have sex with men, women
Self-efficacy	Perceptions of capability to engage in the behavior	<ul> <li>Putting condoms on penile model</li> <li>Role play for safer sex negotiation</li> <li>Cognitive rehearsal<sup>d</sup> used to practice resistance to unwanted or unsafer sex</li> </ul>	All
Emotional coping responses	Individual's emotional response to the behavior	• Handle condoms to alleviate embarrassment or revulsion	Adolescents, men who have sex with men, women, commercial sex workers, injecting drug users
Reciprocal determinism	The above constructs overlap and reinforce each other to promote behavioral change	<ul> <li>Above approaches overlap</li> </ul>	All
"See population secti *Role model stories ( Trigger identification include alcohol or dr Cognitive rehearsal ii	In for specific articles addressing construct. lepict peers or community members engaging in H involves the identification, understanding, and mana ug use, mood states (e.g., depression), settings (e. nvolves the mental rehearsal of response to a situ	IIV risk reduction behavior. gement of one's personal, environmental, and cognitive-affect g., bars), and sex partner or relationship characteristics (e.g., ation (e.g., partner refuses to wear a condom).	ve triggers to high-risk behavior. Triggers can power-imbal anced relationships).

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combating the spread of HIV (e.g., condom use and needle exchange) are similar worldwide. (2) Theory-driven interventions are designed to be generalizable, provided that necessary and sufficient conditions are present for the constructs of the theory to operate. Theory-driven interventions, therefore, should be applicable to similar target populations in other nations (e.g., men who have sex with men, sex workers, adolescents, etc.), as long as the constructs are applicable. (3) Marginalized groups in both industrialized and developing nations are at greatest risk for HIV,1<sup>9</sup> and they often suffer from similar types of oppression, if of varying intensity. Interventions are likely to help reduce HIV transmission in any region when they are part of broader social efforts to reduce, cope with, or eliminate oppression based on class, race, ethnicity, or gender. In such contexts marginalized groups will have greater access to and control of means of preventing HIV.

Overlap also exists in concerns of HIV prevention for certain industrialized and developing nations: (1) Like the United States and Western Europe, certain areas and groups within the developing world remain untouched by the HIV epidemic, while others have exceedingly high rates of infection.5 Developing nations may be able to benefit from the experiences of interventions in the industrialized world that target specific populations or "segment the market." (2) Some countries are ethnically diverse while others are more homogeneous. South Africa and certain other sub-Saharan African nations have ethnically diverse societies and, like the United States, need to develop intervention strategies that cope with heterogeneity. (3) Some countries, such as India and China, hold more restrictive sexual norms than do others. As in the United States, restrictive norms require special strategies to implement interventions addressing sexuality, particularly among men who have sex with men, females, and adolescents.

# ARE LESSONS FROM INTERVENTIONS IN THE INDUSTRIALIZED WORLD APPLICABLE IN DEVELOPING COUNTRIES?

The answer is a tentative "yes," in those circumstances where (1) sufficient evaluation work has been done and (2) where knowledge about the populations at risk in industrialized and developing countries indicates the extent of similarity and dissimilarity. Only when such information is available can lessons from interventions in an industrialized country be assumed to have any generalizability in the context of a developing nation. It is important to define what generalization means in this context, because many professional assumptions about generalization are mistaken. Cronbach20 made an important distinction between two types of generalization: generalization about classes of interventions, and generalization to specific new projects. The first type is more familiar: generalization about classes of interventions. In actuality, evaluators generalize from specific studies to four classes of variables: interventions, populations, settings, and evaluation methods. For example, one may be able to generalize that small-group discussions using cognitive-behavioral techniques (the class of interventions) are relatively effective among gay and bisexual men of Western countries (class of populations), in clinics and community-based organizations (class of settings), and using selfreport measurement in randomized experiments (class of methods).

The second type of generalization defined by Cronbach is perhaps more relevant for developing nations. This type of generalization involves determining if an intervention effective with a population in the industrialized world could be tailored to effectively produce behavioral change in a similar population with whom you are working in the developing world. For example, a project for gay and bisexual men located in Quito, Ecuador, may wish to adopt and adapt interventions that have been shown to be effective with gay and bisexual men in the United States and Europe. Generalization to new projects is always an art, according to Cronbach.<sup>20</sup> However, usually some data from previous studies with certain similar features are available to reduce uncertainty about whether an intervention will be effective in the new situation.

One source of information is the theory underlying an intervention. If application of the theory can be tailored to the new setting, the cultural and life situation of the target population, and the organizational resources of the new project, then uncertainty is reduced. A second source of information to assist with prospective generalization involves looking within and across the available studies for evidence that interventions apply to several ethnicities. For example, peer-led interventions with adolescents in industrialized countries are effective with many ethnicities and in varied situations. The robust effects of these interventions in diverse contexts in the industrialized world increase confidence that peer-led interventions would also be effective with adolescents in the developing world.

A third source of information is that some ethnic groups migrated to Western countries from the developing world; some interventions have been targeted to their specific needs. For example, Loue and co-workers<sup>21–23</sup> have developed interventions for immigrant groups including Asian and Pacific Islanders and Hispanics. Though culture and life situation may be quite different from those of the home country, this information nevertheless assists in reducing uncertainty. It is an empirical question whether an intervention that is effective with Hmong refugees in the United States would be as effective in Laos. A final source of information involves the patterns of transmission and other "universals" that might be applied in the new project. For example, as marginalized ethnic groups in the United States may be tailored to be effective with marginalized groups in the United States may be tailored to be effective with marginalized groups in Africa.

To summarize, we recognize that interventions must be culturally tailored and adapted to the situation of developing countries. However, specific HIV intervention strategies proven effective in industrialized nations may be useful for develop-

ing HIV prevention programs within developing nations. Effective interventions are those that demonstrate significant HIV risk reduction, for example, increased condom use, decrease in numbers of sexual partners, or decrease in use of unsterile needles. Thus, this chapter will describe and critique HIV intervention studies in the industrialized world, and will provide recommendations based on these findings for HIV intervention research. Developing country researchers can decide whether these recommendations have applicability in their own context. Included in this critique will be published HIV evaluation studies targeting the following populations: adolescents, men who have sex with men, heterosexual women, female commercial sex workers, injecting drug users, and STD clinic clients. In reviewing these studies, only effects in behavioral change that have proven to be statistically significant are reported.

## HIV INTERVENTIONS FOR ADOLESCENTS

Currently, there is increasing incidence of HIV among adolescents in the industrialized world.<sup>24</sup> The prevalence of high-risk sexual behavior among teenagers<sup>25,26</sup> contributes to the epidemic among this group. The need for HIV interventions targeting adolescents is substantial, but some citizen groups remain concerned that sex education might promote sexual activity. Also, some feel that such issues are best discussed within the family. These forces have hindered the development of effective interventions. Of note is the fact that evaluated abstinencebased programs for adolescents, or for any other population, were not found in the published literature. Evaluated studies of condom-based sex education programs do not support the belief that they result in an increase in teens' sex activity. Condom-based sex education appears to either have no impact on sexual activity<sup>27</sup> or to actually postpone first coitus among nonsexually active adolescents.<sup>28–30</sup> Further, adolescence may provide an opportunity to encourage development of safer sex practices, prior to establishment of risky sexual patterns.

Most of the HIV education with teenagers in the industrialized world is education-only in design, does not account for potentially important sociocultural and developmental issues, lacks a strong research base, and is not formally evaluated.<sup>31,32</sup> Further, few of the HIV risk reduction interventions that have been evaluated are methodologically sound, although recent studies tend to be more rigorous than earlier studies.<sup>32</sup> In this section we will highlight those HIV interventions for adolescents that have been evaluated and have resulted in HIV-related behavioral change.

Most HIV interventions for adolescents are conducted in schools.<sup>33,34</sup> Since most adolescents are in school systems, it is argued that schools offer an efficient location to train adolescents in HIV education and risk reduction skills. Unfortunately, few of these interventions have evaluated their impact on risk reduction

practices, though some studies demonstrated increases in HIV-related knowledge, attitudes, and intention to engage in safer sex.<sup>35–40</sup> Nonetheless, a few schoolbased interventions have been evaluated and proven effective. Interventions with ethnically diverse samples evaluated by Eisen *et al.*<sup>28</sup> and Walter and Vaughan<sup>41</sup> resulted in delayed first coitus and increased use of sexual protection. Of note is that Eisen and co-workers'<sup>28</sup> school-based study resulted in delayed first coitus among males but not females and increased use of contraception including condoms among females but not males. Delayed first coitus was also an outcome of school-based interventions with an ethnically and socioeconomically diverse sample,<sup>29</sup> as well as with an African-American sample.<sup>42</sup> Main and co-workers'<sup>43</sup> intervention with high school students had the greatest impact on sexually active students' HIV risk behaviors, resulting in increased condom use and reduced multiple partnering (defined as having more than one sex partner within a given time period).

School-based interventions have also been conducted with college students. For many, going away to college offers first-time freedom to engage in sexual activity; for most, it will mean increased opportunities for sex. HIV interventions can take place in college students' living environment as well as the classroom, enabling individual, community, and structural interventions. Abramson et al.<sup>44</sup> and Turner et al.<sup>45</sup> evaluated the effectiveness of comprehensive sexual health education courses in reducing students' sexual risk behaviors. Abramson et al.44 reported that participants were more likely to carry and use condoms. Turner et al.<sup>45</sup> found male students reported increased abstinence, where female students reported increased condom use. Theory-driven, multisession, cognitive-behavioral group interventions with college students also resulted in behavioral change.<sup>46,47</sup> Sikkema and colleague'<sup>46</sup> study with college women resulted in a decrease in high-risk behavior and increased condom use among program participants. Fisher and co-workers'47 study with male and female dormitory residents resulted in increases in participants buying and keeping condoms, condom use, and HIV testing.

Another highly targeted group of adolescents are hard-to-reach delinquent, substance-using, and/or runaway teens. A multisession intervention with incarcerated adolescent male drug users utilized an HIV education program based on problem-solving therapy; education and skills training were offered via the use of scenarios addressing problems that could impede adopting lower-risk behaviors. This intervention resulted in increased condom use and decreased involvement with high-risk partners.<sup>48</sup> A multisession, small-group, behavioral skills-training intervention for substance-dependent adolescents in a residential treatment facility resulted in increased refusal of unsafe sex, increased proposal of safer sex strategies with partner, and increased statement of desire for safer sex with partner.<sup>49</sup> Rotheram-Borus *et al.*<sup>50</sup> evaluated a multisession education and skills-training intervention for predominantly minority adolescent runaways residing in an urban runaway shelter. This cognitive-behavioral, small-group intervention resulted in reduced multiple partnering and increased condom use.

Culturally sensitive programs tailored to ethnic minority adolescents have also proven effective in HIV prevention. The majority of these in the United States have targeted African-American adolescents because African Americans, proportionately, have significantly higher rates of HIV/AIDS than white Americans.<sup>51</sup> In one such study, African-American adolescent males attended a one session education and skills training intervention. At follow-up, participants reported reduced multiple partnering and increased condom use.<sup>52</sup> St. Lawrence and co-workers'30 multisession behavioral skills intervention with African-American adolescents resulted in a reduction of unprotected sex, an increase in condom use, and maintained abstinence for nonsexually active adolescents. Of note is that this intervention had a significantly greater impact on male risk reduction behavior compared with female participants.

Despite the fact that sexual transmission among gay males is the primary means of HIV infection among males in much of the industrialized world.<sup>53</sup> little intervention work has been done with gay male adolescents. This is probably attributable to the dual stigma attached to sexuality of adolescents in general and of being gay or bisexual in particular. However, two recent studies have evaluated HIV interventions targeting gay and bisexual adolescent males. Rotheram-Borus et al.<sup>53</sup> evaluated a small-group, multisession intervention recruiting participants from a recreation and service agency for gay and bisexual teens in Los Angeles. Components of the intervention included education, access to health care, trigger identification (see examples in Table 1), coping skills, use of gay male facilitators, and discussion of perceived barriers to safer sex. Reduction in unprotected anal sex and oral sex resulted from program participation; greater impact was seen among those at lower risk at baseline and those attending more sessions. Effects also varied by ethnicity and participants' engagement in commercial sex; the greatest impact was seen among African-American males and those not involved in commercial sex. Remafedi<sup>54</sup> also evaluated a small-group, peer-led intervention program for gay and bisexual adolescent males. Components of this intervention included HIV education, skills, and discussion, as well as optional gay male social support groups. At follow-up, participants reported reduced substance use, reduced number of insertive and receptive anal sex encounters, and increased condom use with anal sex.

Effective interventions for adolescents, as judged by self-reports of behavior, have many program components in common, including use of a cognitive– behavioral theoretical framework to guide the intervention, a narrow focus on HIV prevention, skills building, cultural and developmental tailoring, personalization of risk, and enhancement of self-efficacy.<sup>43,55,56</sup> The majority of these interventions also involved small groups, multiple sessions with adequate time per session, and trained professional or peer educators facilitating programs. Further, these interventions used combined educational strategies, such as lecture, discussion, role play, videos, modeling, and practicing skills such as decision making, resistance to unhealthy sexual practices, coping with triggers of high-risk sexual behavior, values clarification, safer sex communication/negotiation, and condom use.

These cognitive-behavioral interventions appear to be effective in producing behavioral change among socially, sexually, and ethnically diverse adolescents whether the intervention is implemented in schools, in detention or drug treatment centers, or through community-based organizations for teenagers. However, many adolescents at risk have not been addressed by these interventions; these include homeless children, street children, and adolescent female commercial sex workers. Nonetheless, the consistency of effective cognitive-behavioral strategies across diverse groups of adolescents in diverse settings suggests that these strategies may be useful for those adolescent groups that have yet to be reached in the industrialized world, as well as adolescents in the developing world.

# HIV INTERVENTIONS FOR MEN WHO HAVE SEX WITH MEN

For many industrialized nations, the majority of AIDS cases are still among men who have sex with men,<sup>19,51,57,58</sup> and HIV risk behaviors and AIDS incidence in young gay men and gay men of color continue to rise.<sup>59</sup> Nonetheless, HIV transmission through same-sex encounters has been considerably reduced, largely because of gay community organizations' efforts and, in some nations, government commitment to HIV prevention.<sup>19</sup> The results of such work have been reduction of risk behaviors and seroconversion among gay men across the industrialized world.<sup>19</sup> Through the foundations established by gay male communities' mobilizing, AIDS risk reduction research among gay men has been described as the best-developed efforts in the field of HIV prevention.<sup>31</sup>

In this section we will discuss strategies used in effective interventions with gay and bisexual men. Of note is the fact that the interventions reviewed utilized samples of self-identifying gay and bisexual men, many of whom affiliated themselves with the gay male community. This group is a subset of men who have sex with men. This is an important distinction to make because in many countries, because of high stigmatization and low acceptance of homosexuality, men who have sex with men may not self-identify as gay or bisexual or they may not affiliate with the gay male community, if one is even present. Thus, certain aspects of the reviewed interventions may not apply to certain groups of men who have sex with men (e.g., intervening in gay bars if there are no gay bars in a community). Nonetheless, given the effectiveness of these interventions in increasing risk reduction in male–male sexual encounters, certain aspects of these interventions may be useful and generalizable for HIV interventions with men who have sex with men in developing countries. Due to the difficulties involved in recruiting this

possibly underground population, particular emphasis will be placed on recruitment strategies.

As with adolescents and injecting drug users, cognitive-behavioral group interventions providing HIV education and skills training have resulted in behavioral change among gay and bisexual men.<sup>60-63</sup> Valdisem *et al.*<sup>63</sup> evaluated a one-session education and skills-training session that utilized both the format of a small-group lecture as well as support group discussion and focused on the promotion of the acceptability of safer sex and safer sex strategies (skills building in condom negotiation and use) and discussions on being gay or bisexual. Participants were recruited from a separate AIDS research study, mass media campaigns, gay male community-based organizations, and outreach with male prostitutes. Behavioral skills training involved the use of role play and psychodramas with a gay male health educator and a group process facilitated by a psychotherapist. At follow-up, an increase in condom use for insertive anal sex was reported among participants.

Kelly *et al.*<sup>60</sup> evaluated a 12-session, small-group HIV intervention for gay men in the southern United States, a region with deep prohibitions against homosexuality. Participants were recruited through HIV testing sites and gay male organizations and bars. Clinical psychologists and research assistants facilitated groups. Cognitive–behavioral intervention strategies included assertiveness training to reduce high-risk sex; trigger identification and coping skills training; increasing self-efficacy to engage in risk reduction; group problem solving; condom skills training; group support; cognitive self-management; and pride building in self, relationships, and health. Results included reduced unprotected anal sex and increased condom use. Kelly *et al.*<sup>61</sup> later replicated their study using the same recruitment strategy, facilitators, and intervention strategies, but they consolidated the 12-sessions into 7 sessions. Results included reduced unprotected anal sex, reduced oral–analcontact, increased condom use, and reduced multiple partnering.

Peterson *et al.* <sup>62</sup> evaluated a culturally tailored intervention to promote HIV risk reduction among African-American gay and bisexual males. Participants were recruited into this study through media campaigns, referrals, and gay bathhouses, bars, bookstores, and organizations. Facilitated by gay African-American men, a three-session education and skills-training intervention, as compared with a one-session intervention using the same content, resulted in reduced unprotected anal sex among participants.

Interventions based on diffusion of innovation theory were also conducted in the southern United States. These used trained popular opinion leaders, wellknown and liked individuals, in gay bars to communicate HIV risk reduction messages and personally endorse safer sex behaviors.<sup>64–66</sup> Gay bars are a good place for HIV intervention with gay males, as previous study has shown that men in gay bars report higher levels of risky sexual activity than men who do not visit gay bars.<sup>67</sup> Further, gay bars are generally frequented by much of the gay male community. The initial intervention, involving one southern city,<sup>65</sup> was replicated in three additional southern cities<sup>64</sup> and more recently in 16 additional cities across the United States.<sup>66</sup> The popular opinion leaders, who were chosen by bartenders, were trained in HIV knowledge and risk reduction strategies, including keeping condoms available, avoiding sex when drinking or using drugs, discussing safer sex at the beginning of any casual or potentially long-term sexual relationship, and assertively refusing unsafe sex. Results of all three studies included decreased unprotected anal sex, increased condom use, and decreased multiple partnering among attendees of gay bars.<sup>64–66</sup>

Another community-based intervention for gay and bisexual men targeted hard-to-reach young gay men.<sup>68</sup> This intervention strove to mobilize and empower the young gay men's community, involving them with design and implementation. Strategies involved included peer outreach (similar to that used by opinion leaders in Kelly *et al.*<sup>64–66</sup>) and participation in a small-group education and skills training session. Strategies for the peer-led small-group component of the intervention included eroticizing safer sex, promoting condom use, condom skills building, and safer sex negotiation and communication skills training. Participants were recruited through gay organizations and bars, media campaigns, and referrals. Decreased unprotected anal sex was reported by young gay men in the community.

Use of peer facilitators and trained opinion leaders, through small groups or in community settings, provides effective means for diffusion of safer sex knowledge and skills to gay and bisexual men. Community-based approaches appear to offer the most in advocacy of HIV risk reduction practices, possibly because for gay men community messages are the primary messages of what gay life and gay sexual encounters are.<sup>68</sup> Further, because of the stigmatization of homosexuality, it may be only through community involvement that interventions will be accepted by gay men. Unfortunately, such approaches will only reach men who affiliate with the gay male community; outreach strategies may be necessary to reach men who do not affiliate with the gay community or who do not self-identify as gay or bisexual.

Of note is the fact that the interventions discussed focus on behavioral change within same-gender sex encounters, yet many men who have sex with men also have sex with women. Bisexual behavior continues to be ignored in risk reduction interventions, even when self-labeled bisexuals are included in the study. Doll and Beeker<sup>69</sup> state that bisexual behavior may be more common among communities of color where gay male behavior is less accepted, or where sex with a man does not necessarily define one as gay. These forces may encourage individuals to maintain a "heterosexual front life" and closeted homosexual relationships, potentially increasing the likelihood of casual sex encounters with men. This results in risk not only for the gay or bisexual male but also for his heterosexual partner(s). This is particularly alarming, as studies show that these men are actually more likely to engage in risky sexual activity with their female partners rather than with their male partners.<sup>70-71</sup> Hence, while cognitive–behavioral interventions at the

individual and community levels have resulted in risk reduction among men who have sex with men, heterosexual safer sex education and skills training and outreach may effectively supplement these interventions to better meet the needs of the men who have sex with men as well as women.

## HIV INTERVENTIONS FOR HETEROSEXUAL WOMEN

According to the World Health Organization (WHO), women are being infected with HIV as often as men, and infection rates among women are expected to surpass those of men by the year 2000.<sup>72</sup> However, in comparison to other groups recognized as being at high risk, few interventions have been designed for women<sup>73</sup> The interventions discussed in this section are those designed for women whose primary risk factor is risky sexual activity with casual or long-term male partners. Only sexual risk reduction interventions are included, since the primary route of HIV transmission among women in both the developing and industrialized worlds is sexual activity with an infected male partner.<sup>51,74</sup>

The majority of interventions for women have been designed for and implemented with African-American women, as African-American women in the United States are almost 18 times more likely than white women in the United States to become infected with HIV.<sup>51</sup> Theory-driven cognitive-behavioral group interventions with low-income, urban African-American women have been effective in producing behavior change among this population.<sup>75–77</sup> These small, closed group, multisession interventions used many of the same strategies used with gay men and adolescents, including videos, group discussions, group support, role play, cognitive rehearsals, peer cofacilitators, and behavioral skills training. Constructs addressed by interventions include gender and ethnic pride; assertiveness, communication, and negotiation skills building; condom eroticization; condom use demonstrations; demonstrations of cleaning drug injection equipment; sexual decision making; sexual autonomy and resistance to sexual pressure; trigger identification; increasing risk perceptions; increasing self-efficacy; and promoting peer norms of sexual risk reduction.

Kelly and colleague'<sup>77</sup> primary care clinic-based intervention resulted in reduced unprotected sex and increased condom use. Two community-based interventions, recruiting participants through outreach and fliers and from housing projects, health clinics, community-based businesses, and social service organizations, resulted in increased consistent condom use among group participants.<sup>75,76</sup> Kalichman and co-workers'<sup>76</sup> test of intervention components (education, behavioral self-management, and sexual communication) further indicates that communication and behavioral self-management combined are necessary to promote condom use among African-American women. A cognitive–behavioral group intervention for low-income, ethnically diverse, pregnant (1st or 2nd trimester)

women used similar strategies to those used with African-American women, but also provided information about healthy sexual positions comfortable in later stages of pregnancy. The evaluation by Hobfoll *et al.*<sup>78</sup> of these multisession, open groups (groups that anyone could join at any time) demonstrated increased condom use among participants.

Community-level interventions have also had some success in promoting risk reduction among women. A recent community-based intervention with homeless or drug-addicted Latinos recruited from homeless shelters and drug recovery programs demonstrated some impact on behavior change.<sup>79</sup> This one-session intervention facilitated by a Latina nurse counselor involved HIV information (video format); HIV testing and counseling; distribution of bleach and brochures; condom use demonstrations; demonstrations of cleaning drug injection equipment; skills building on problem solving, decision making, and health information seeking; and increasing self-esteem and perceptions of control. While this intervention did not yield significant differences as compared with a less comprehensive intervention providing only HIV information (video format), HIV testing and counseling, and distribution of bleach and brochures, both interventions resulted in a reduction in multiple partnering, injecting drug use, and noninjecting drug use.

Santelli et al.<sup>80</sup> evaluated a community-based program designed to prevent perinatal transmission by preventing infection among women. While the program reached both men and women, only the outcome evaluation of women's behavior was presented. This intervention involved distribution of role model stories illustrating HIV risk reduction messages in a high-risk African-American community. These stories were developed from stones told by community members in focus groups and were put into graphic art and print form for distribution. The written stories were then given to community members by outreach workers or taken by community members from passive distribution sites (i.e., sites where the literature can be picked up at any time by community members, but is not actively distributed by outreach workers). Outreach workers also communicated and reinforced sexual risk reduction and distributed condoms. A cross-section of female community members pre- and posttested, but not necessarily reached by the intervention, reported an increase in condom use at last sexual intercourse with a dose-response, that is, greater exposure to outreach and media was associated with increased use of condoms at last intercourse.

Both cognitive-behavioral groups that focus on the individual- and communitylevel approaches appear to influence behavior change among ethnic minority women. A primary strategy of all the interventions discussed was the use of cultural and gender sensitivity. In terms of ethnicity, this was done using facilitators of the same ethnic background, sessions on ethnic pride, and use of language and stories of the targeted ethnic group. In terms of gender, this was done through the use of female facilitators, sessions on gender pride, focus on self-esteem and self-efficacy, discussion of relationship power imbalance and sexual autonomy,

and skills training in assertiveness and resistance to unsafe or unwanted sex. While both ethnicity and gender are important in targeting ethnic women, gender is of particular relevance because of the gender-based social context of sexual decision making and condom use. Women often have less control over sexual decisionmaking,<sup>81</sup> and condoms are a male-controlled barrier method. Thus, it may not be enough to motivate and train women to use condoms because they are not the ones who wear them. For a woman to engage in safer sex with a partner who has not initiated risk reduction, she must be able to effectively negotiate condom use. Societal prohibitions against female sexual decision making, negotiation, and autonomy make this is a particularly difficult issue to address. Strategies used in the cognitive–behavioral interventions appear effective in addressing these issues through their incorporation of gender pride with ethnic pride and self-esteem.

# HIV INTERVENTIONS FOR FEMALE COMMERCIAL SEX WORKERS

Although commercial sex workers (CSWs) are at high risk for HIV because of the nature of their work, little evaluation of interventions tailored to CSWs in the industrialized world has been seen in the published literature. Nonetheless, there have been a few interventions targeting commercial sex workers in the industrialized world that appear to have had some success in promoting risk reduction behaviors.<sup>82–84</sup> These include interventions run through the government, health clinics, and the community in Europe and North America.

Because of legalized prostitution in Greece, a government-run campaign was able to be implemented and evaluated, with substantial results.<sup>84</sup> Following an intensive educational campaign and regular HIV testing and counseling sessions every 3 months, condom use with clients rose to 98%, and incidence of HIV. gonorrhea, and syphilis remained low among commercial sex workers. Evaluation of a clinic-based program in the United Kingdom did not assess sexual risk behaviors but did increase drug risk reduction.82 The clinic drop-in center, designed to prevent HIV transmission among street prostitutes, provided a variety of medical and health services, including HIV testing and counseling, STD treatment, a needle and syringe exchange program, and condoms for women.<sup>82</sup> The center also provided a sitting room with free, nutritious food and drink for the prostitutes, who often do not meet their daily dietary requirements. Results of the program evaluation revealed an increase in visits to the needle exchange program and an increase in the number of needles and syringes issued. A community-based study in the United States, with assistance from a local organization for prostitutes, used former prostitutes to provide street outreach and HIV educational workshops to prostitutes at work on the street.<sup>83</sup> Outreach workers provided explicitly sexual HIV information, condom demonstrations and skills training (e.g., eroticizing condoms), free condoms and bleach, and social support to women on the street.

Sex workers were also invited to attend educational sessions away from the work environment; these sessions were composed of interviews, physical examinations, educational videos, and free food and drink. Results indicate increased condom use with clients but no impact on condom use with main partners.

Interventions with female sex workers appear to be effective in addressing injecting drug use behavior and sexual behavior with clients but have no impact on sexual behavior with main partners. Cognitive-behavioral group interventions with women who are not commercial sex workers have resulted in risk reduction practices with main partners,<sup>73</sup> and therefore may be useful to supplement programs for commercial sex workers that have proven to be effective in reducing drug risk and sexual health risk with clients. The effectiveness of these interventions with male prostitutes is not addressed, but cognitive-behavioral programs that are effective with adolescent male prostitute<sup>53</sup> suggest that these programs may be useful with adult male prostitutes as well.

# HIV INTERVENTIONS FOR INJECTING DRUG USERS

The HIV epidemic among injecting drug users (IDUs) has been of notable concern in industrialized nations because of the rapid spread of the virus among this population.<sup>85</sup> Rapidity of transmission among IDUs can be attributed to the fact that, unlike other groups at risk for HIV, IDUs can become infected and transmit the virus through their drug use as well as their sexual activity. HIV risk among this group is becoming an increasing concern for developing nations as the epidemic of injecting drug use hits Southeast Asia and Latin America and as the virus spreads quickly among IDUs in countries such as India.<sup>86</sup>

Evaluated HIV interventions for IDUs in the industrialized world are the most numerous in the published literasture,<sup>19,34,87</sup> as well as the most diverse in design. Interventions at all three levels (environmental, community, and individual) have been evaluated and found to be effective in promoting HIV risk reduction. The primary environmental intervention used with IDUs is syringe exchange. For IDUs, particularly active IDUs not in treatment, increasing the availability of sterile needles and syringes appears to offer the best means of controlling HIV transmission through needle sharing, especially in areas with low seroprevalence.88 Increasing the availability of sterile injection equipment requires changes at both the policy and the program levels in the industrialized world. Some countries long ago instituted laws prohibiting the sale and distribution of drug paraphernalia, including injection equipment, believing this would discourage drug use. As a result, programs to exchange used needles and syringes for clean ones have been controversial in countries such as the United States and Sweden. Yet these programs have demonstrated reduced needle sharing among participants, stabilized seroprevalence rates among participants, and no increase in injecting drug

use among drug-using populations in the United Kingdom and North America.<sup>88–91</sup> Further, the lower rates of HIV infection in the United Kingdom have been attributed to prevention efforts early in the epidemic, including needle exchange programs.<sup>19,86</sup> Clearly, syringe exchange programs offer much in the way of HIV prevention among IDUs in terms of injecting drug use. Unfortunately, they have no impact on sexual behavior.

Community-level approaches promote drug-use risk reduction for active IDUs not in treatment, and in some cases promote sexual risk reduction. These approaches attempt to change social norms concerning both risk behaviors. Three avenues have been employed to change these norms: national information campaigns, attempts to self-organize IDU social networks, and outreach by organized programs into IDU networks. National media campaigns in conjunction with government-supported intervention efforts through physicians and other service providers have been evaluated across Europe.<sup>92-94</sup> Postcampaign evaluation of IDUs in and out of treatment facilities revealed fewer HIV-positive IDUs, a reduction in injecting drug use, a reduction in needle sharing, a reduction in the number of individuals with whom needles were shared, and an increase in condom use. Self-organizing of drug users around AIDS issues resulted in increased condom use, reduced injecting drug use, reduced attendance of shooting galleries, increased use of new needles, and increased use of bleach for needle cleaning.<sup>95</sup>

Community street outreach within the context of a structured program offers a more consistently effective way to contact and educate IDUs. Outreach has been found to be the best means of prevention for active drug users not in treatment, because of the social nature of drug injection and needle sharing in many networks.<sup>96,97</sup> Outreach workers are often former and even current drug users, who are in a good position to recognize and relate to IDUs at risk. Outreach intervention strategies include sharing information about HIV prevention, suggesting options for reducing risk for HIV, teaching needle cleaning with bleach, and teaching condom use. Outreach workers also provide or offer referrals for HIV testing and counseling, offer referrals for drug treatment, distribute bleach and condoms, and reinforce risk reduction. Street outreach programs have resulted in reductions in general drug use, injecting drug use, sharing of cookers, sharing of needles, renting of needles, use of unclean needles, as well as increases in cleaning of needles, street demand and price of new needles, and condom use in some but not all studies. A few have also shown a reduction in seroconversion rates,<sup>91,96</sup> Risk reduction occurred in individuals directly contacted by outreach workers, as well as in the surrounding community at large.<sup>98-102</sup>

For drug users in treatment, interventions based in treatment facilities can often be implemented and evaluated in a more cost-effective manner than the community-based interventions appropriate for active IDUs. Further, IDUs in treatment are more accessible for intervention than those not in treatment. The most common clinic-based interventions address drug treatment, risky injection behavior, and HIV counseling and testing programs. Involvement in a methadone treatment clinic alone results in a reduction in needle sharing and injection drug use<sup>103,104</sup> and fewer sex partners without condoms.<sup>103</sup> Methadone maintenance with AIDS education and condoms also resulted in a reduction in injection drug use and sustained involvement in a drug treatment program.<sup>105</sup> Counseling and testing of patients in drug treatment facilities have resulted in reduced multiple partnering, increased condom use, as well as reduced injecting drug use, needle sharing, and use of shooting galleries.<sup>106–109</sup> MacGowan *et al.*<sup>103</sup> found that the impact of counseling and testing in methadone clinics was contingent on sero-status. At posttest, a reduction in number of sex partners without condoms and an increase in injecting drug use was seen among HIV-positive clients.

Most, though not all, of the cognitive-behavioral group interventions for IDUs have also been conducted through drug treatment facilities. These studies, similar in design to cognitive-behavioral studies with other populations, involve theory-based HIV education and skills training through the use of lecture, group discussion, videos, and role play, often in multiple sessions. Intervention strategies include condom use demonstrations, needle-cleaning demonstrations, discussion of drug addiction, condoms and bleach distribution, and HIV testing and counseling. These interventions have resulted in decreased sharing of needles, increased use of bleach, reduced injecting drug use, reduced multiple partnering, and increased condom use among both male and female IDUS.<sup>110–116</sup>

Environmental, community, and individual interventions have all been effective in promoting HIV risk reduction practices in IDUs, although less emphasis was placed on and less impact was seen with sexual risk reduction in many of these interventions. Many of the more effective interventions were multilevel in design; for example, cognitive-behavioral interventions included counseling and testing, while HIV education was provided in some of the syringe exchange programs, and media campaigns and methadone maintenance supplemented the counseling and testing programs. Combining attributes of environmental, community, and individual interventions appears most effective in producing behavior change among IDUs, and is consistent with cognitive-behavioral theories and their application. This is particularly important among the IDU population, as environmental interventions (syringe exchange) do not address sexual behavior but have the broadest impact on drug risk behavior among IDUs; and cognitive-behavioral interventions have the greatest impact on sexual behavior but need community-level strategies (outreach, changing social norms in IDU networks) to increase IDUs' involvement with and acceptance of individual risk reduction strategies.

A major flaw of intervention studies with IDUs is that interventions target only injection drugs, disregarding noninjecting drugs that are common among IDUs and are associated with increased sexual risk taking. Further, no intervention work has been evaluated with non-IDUs, such as crack/cocaine users, despite numerous studies that have found such non–injecting drug use to be a risk factor

for HIV acquisition.<sup>117–121</sup> Given the effectiveness of multilevel strategies in reducing drug and sexual risk behavior among IDUs, cognitive–behavioral interventions combined with community interventions with drug users' social networks may offer an effective means of working with non-IDUs.

# STD CLINIC-BASED HIV INTERVENTIONS

STD clinics provide an important opportunity to intervene with individuals at high risk for HIV, since clinic patients, by virtue of their patient status, are highly likely to have engaged in HIV risk practices and perceive themselves at risk for STDs and potentially HIV. Clinic patients are also a sample at increased risk for HIV because of a likely synergistic relationship between HIV and other STDs; studies have shown that individuals with ulcerated or nonulcerated STDs are at higher risk for acquisition of HIV.<sup>122-124</sup> Despite the obvious risk factors among clients of STD clinics, few studies outside of HIV counseling and testing have been conducted with this population in the industrialized world, and few HIV counseling and testing programs have been evaluated to assess impact on behavior change. There are a few effective evaluated programs, however, that have been implemented with this population; these have included counseling and testing programs and cognitive-behavioral interventions. All these programs were implemented with predominantly young adult, heterosexual African-American males, as this is the dominant group attending STD clinics in the United States, but this is not the only population at high risk for STDs. The Centers for Disease Control.<sup>125</sup> reports certain STDs, such as chlamydia and gonorrhea, as most common among African-American women and adolescents, and it is likely that whites are undercounted in these surveillance reports. Ethnic minorities are more likely than white Americans to use public rather than private clinics and public clinics offer more complete STD surveillance reporting than private sources. Thus, the population included in the STD clinic studies is not most representative of STD patients, but may be most representative of clients of STD clinics.

Evaluated counseling and testing programs for specific populations have been described in the previous sections; the following are STD clinic-based HIV counseling and testing programs. Wenger and co-workers'<sup>126</sup> evaluation of an HIV counseling and testing program that included HIV education demonstrated an increase in condom use among participants at 8 weeks follow-up. Otten and co-workers'<sup>127</sup> evaluation of a counseling and testing program targeting patients with STDs demonstrated a decrease in STDs among HIV-positive individuals but an increase in STDs among HIV-negative patients. These findings illustrate the importance of counseling and testing, yet indicate the inadequacies of such programs in producing sustained behavior change among participants who have not sero-converted.

Two cognitive-behavioral interventions implemented with STD patients demonstrate more success with this population. Cohen et al.<sup>128</sup> evaluated a group counseling HIV intervention, facilitated by a trained health educator. The onesession intervention involved a short group discussion of condom use, a culturally sensitive video on HIV prevention and transmission information that also demonstrated the social acceptability and eroticization of condom use, and a condom negotiation role-play exercise. Results revealed an intervention impact only on male participants; they were less likely to be reinfected with an STD at follow-up. Boyer et al. 129 also evaluated a cognitive-behavioral HIV intervention facilitated by a trained counselor in an STD clinic. The multisession, one-on-one intervention was facilitated by a trained counselor and involved increasing participants' HIV knowledge, personal risk perceptions, perceptions of HIV as avoidable, perceptions of self-efficacy to avoid HIV, and perceptions that the cost of engaging in risk behaviors is greater than the benefits. Strategies included group discussion, practicing condom use on a penile model, trigger identification, decision making and communication skills building through the use of vignettes, providing social support and identifying sources of social support, and condom distribution. Results revealed a significant impact on men but not women. Among males, condom use increased and mean number of partners without condoms decreased; this increase in condom use was not maintained over time.

Few interventions with STD patients have been evaluated and found effective, and those that are available are less than promising. One reason may be the absence of multilevel, theory-driven interventions. The effectiveness of HIV counseling and testing programs appears contingent on gender<sup>128,129</sup> and whether or not the individual tests positive for HIV.<sup>130</sup> Cognitive–behavioral interventions with this population, while more effective in producing behavior change than counseling and testing programs, appear to have little impact on female participants. Nonetheless, STD clinic patients are an important population with which to intervene, and the above interventions demonstrate some effect. Counseling and testing in conjunction with a cognitive–behavioral intervention may offer a more effective means of intervening with STD patients; however, interventions for female STD patients may increase their effectiveness by being developed specifically for females and excluding males, as has been done in cognitive–behavioral interventions that have proven effective with African-American women.<sup>74–76</sup>

# CASE STUDY: THE AIDS COMMUNITY DEMONSTRATION PROJECT

A recent study from the Centers for Disease Control and Prevention illustrates how an effective intervention can be tailored to diverse populations at the community level.<sup>131</sup> The AIDS Community Demonstration Project was a communitylevel HIV intervention program targeting hard-to-reach, high-risk groups in five US cities. These groups were street-recruited IDUs, female sex partners of male IDUs, female commercial sex workers, non-gay-identifying men who have sex with men, and youth in high risk situations (street youth). The theory-driven intervention involved distribution of condoms and bleach kits through community networks and development and distribution of printed materials containing stories of individual risk reduction among community members. These role model stories were obtained through the use of community focus groups. Implementation of the project was slightly varied across groups, according to the needs of the addressed population (based on group targeting and formative research) and availability of local resources. Results indicate that the volunteer peer networks were able to effectively reach their target populations, particularly commercial sex workers and IDUs.<sup>132</sup> Evaluation of the intervention revealed increases in consistent condom use with vaginal sex with nonmain partners and consistent use of bleach to clean injecting equipment among project participants engaging in these behaviors. No change was observed in condom use during vaginal sex with a main partner or condom use during anal intercourse.131-134

The Community Demonstration Project demonstrates an effective, lowercost HIV intervention for hard-to-reach populations. Use of volunteer community networks for information and condom and bleach distribution not only helped maintain low costs for the intervention, it also allowed for more widespread community contact as well as enabling intervention resources (i.e., trained community networks) to remain in the community after the grant was completed. However, the program had little impact on sexual behavior with main partners or anal sex behavior. This type of community-level approach may be combined best with cognitive-behavioral group interventions, which are more expensive and reach far fewer high risk individuals but show a greater impact on individual behavior. The combination of such community-level approaches with individually based approaches may offer the most effective and cost-effective means of reaching HIV risk groups and promoting HIV risk reduction behavior change across diverse risk populations.

## CONCLUSION

Developing countries have minimal resources for HIV prevention. Therefore, it is imperative that research hones in on the processes that have effected behavior change. As mentioned previously, most of the evaluated HIV intervention research that has been found effective has come from the industrialized world.<sup>3</sup> The purpose of this chapter was to review HIV intervention programs in the industrialized world that have targeted specific at-risk populations and resulted in behavior change. This review described models that may, at least in part, be usefully applied and integrated into the experience of developing countries.

In our review of literature, some universals appear that suggest we focus on three emerging themes:

1. Effective interventions are grounded in behavioral theory. The studies presented have many similarities in design and strategy, indicating their potential usefulness for ethnically, socioeconomically, and culturally diverse groups. Specifically, the cognitive-behavioral design, based on social cognitive theory or related models, appears to be effective in producing behavior change across groups. The reviewed studies indicate that HIV intervention programs, embedded in the context of personal, situational, and environmental factors, are successful in producing behavior changes in a multiplicity of settings and with a variety of populations, including but not limited to adolescents, men who have sex with men, women, female commercial sex workers, injecting drug users, and STD patients.

2. Effective interventions are often multimethod and multilevel. One implication of the findings is the necessity of designing a multimethod, multilevel intervention design that integrates different aspects of intervention. Across populations, most of the effective interventions used varied strategies and addressed behavior at the individual, community, and structure/environmental levels. Taken singly, each of these levels offers both advantages and disadvantages for intervention implementation and evaluation; hence, intervening at all levels may offer the best means of reaching the larger population while still allowing for effective evaluation of behavior change. Further, the reciprocal determinism of cognitive– behavioral theory supports the use of multimethod, multilevel techniques for interventions.

3. Methodological rigor is necessary. While the reviewed studies offer effective strategies for health promotion, there are certain methodological flaws. Interpretation of the studies presented here must account for these methodological flaws. Further, developing countries, using research paradigms based on the experience of industrialized countries, can perhaps strengthen their studies by avoiding the methodological flaws that limit some of the present studies. The need for carefully designed experiments to examine the effects of intervention cannot be overemphasized. The following are key features of evaluation design that improve inferences about effectiveness; while they cut across intervention programs for all target groups, they are not necessarily present for specific studies:

- Presence of a control group to insure behavior change was due to intervention.
- · Pretest or baseline measurement to assess change over time.
- Intervention varying the duration or intensity of treatment to assess dose– response—how much or how little is needed for behavior change to occur.
- Component analysis to assess if certain components are more or less important or even unnecessary.

- Follow-up data collection over a reasonable period to determine if changes are maintained over time.
- Multiple outcome measures, independent of self-report, which is subject to response biases.
- Sample of sufficient size to assure statistical power and diversity of the target group, which assists generalizing from the data to other populations, settings, and interventions.
- Use of biological markers, such as HIV/STD prevalence rates, to assess risk. Most studies rely on self-reported behavior, which is a less accurate measure of HIV risk. Unfortunately, it is more difficult and expensive to rely on biological markers.

# Basic Requirements to Establish Effective HIV Interventions in Developing Countries

The experience of the industrialized countries implies the need for the designers of prevention programs to know the target population (their needs, their knowledge level regarding HIV/AIDS and other STDs) and the limits of the prevention infrastructure. For this to occur, basic requirements are necessary. These include:

1. National surveillance systems. Both to develop appropriate interventions and to evaluate these interventions adequately, a minimum surveillance system for HIV/AIDS is required. This should be part of the initial response for any country. This system provides invaluable and ongoing information to understand a country's profile in the epidemic and to refine interventions. The surveillance system can maintain a database on a national level on incidence of HIV/AIDS and other STDs. In some cases, sexual and contraceptive behavior on an individual and community level are measured, often for other purposes such as family planning. For evaluation, this can provide a baseline concerning HIV risk. Developing countries have to factor in the costs, the necessary infrastructure, and adherence to protocols as they create a surveillance system. However, it can be done effectively. Thailand has established an extensive surveillance system for seroprevalence that has proved most effective in tracking the epidemic.

2. Tailored prevention programs based on formative research. Prevention programs should be tailored to the heterogeneous needs and concerns of diverse groups within a target population.31,54 Formative research is useful to identify the personal, situational, and environmental factors important to these diverse groups and to the development of meaningful interventions. Focus groups and other qualitative research techniques can elicit information about individual, community, and structural forces. The findings from these sources can verify and comple-

ment information obtained from quantitative approaches such as surveys and pilot projects, for sounder conclusions about intervention.<sup>31</sup>

3. Given the resource limitations of many developing nations, it may not always be possible to design an ideal research study. In such cases, the overall generalizability of study results may be limited; yet, research findings might still be generalized to populations with similarities such as education level, risk profile, behavior patterns that may be new or deeply entrenched, community values and norms, or levels of information regarding HIV and other diseases. Of particular relevance to developing countries with culturally diverse populations is the finding that culturally sensitive programs had a positive effect on risk behavior of adolescents, heterosexual women at risk, and men who have sex with men. This conclusion highlights the general principle of cultural tailoring, one that developing countries can also apply. In addition, where industrialized nations tailor intervention to ethnic diversity, developing countries with similar ethnic groups may benefit from the insights of those interventions.

4. Recognition of logistical limitations in program implementation. In addition to methodological concerns, certain facets of interventions effective in industrialized nations may be difficult to implement in developing nations. For instance, incentives were provided in some of the cognitive-behavioral group interventions; it is believed that incentives attract more participants and reduce attrition. Financial constraints may make incentive provision difficult for other researchers wishing to replicate the study; on the other hand, incentives such as food can be very modest in cost.

Further, certain populations of concern in developing nations have not have been addressed directly in studies reviewed in this chapter (e.g., street children or adolescent female sex workers, migrant workers, and commercial blood donors). Nonetheless, the principles of effective intervention that we suggest may have universal applicability, providing effective groundwork for the development of interventions tailored to specific populations.

#### Challenges and Opportunities in Developing Countries

Table 2 summarizes some of the challenges and opportunities confronting researchers in developing countries. This table represents a "first draft," which should be revised and expanded as more information about intervention barriers and facilitators is obtained from the developing world. Although overgeneralization is a real danger, it is possible to identify some general tendencies that make HIV prevention either more difficult or in some cases easier than it is in the industrialized countries.

The problem of denial and reticence must be overcome and intervention programs providing general education about HIV/AIDS need to be initiated, par-

Target group	Challenges in some countries	Opportunities in some countries	Some relevant studies
Adolescents	<ul> <li>School-based interventions available only to middle class</li> <li>Street children and child prostitutes must be reached</li> </ul>	<ul> <li>Intervention can occur prior to first coitus</li> <li>Adolescents involved with community networks</li> </ul>	Rotheram-Bows <i>et al.</i> <sup>50</sup> St. Lawrence <i>et al.</i> <sup>49</sup> Rotheram-Borus <i>et al.</i> <sup>53</sup>
Men who have sex with men	<ul> <li>Stigmatization and "closeting" of men having sex with men</li> <li>Culturally, may not define self as "gay" on how of human of human with men</li> </ul>	Self-identifying gay men involved with gay male community groups	Guenther-Grey <i>et al.</i> <sup>131</sup> Kelly <i>et al.</i> <sup>64</sup> Kegeles <i>et al.</i> <sup>68</sup>
Heterosexual women	oasis of liaving sex with men • Gender-based power favors the man	• Women's organizations are common	DiClemente and Wingood <sup>75</sup> Santelli <i>et al</i> <sup>80</sup>
Female commercial sex workers	<ul> <li>Brothel operators control access to safer sex information and practice</li> <li>Free-floating sex workers are hard to access</li> </ul>	<ul> <li>Prostitutes are registered which allows follow-up on them</li> <li>Brothels provide locale for intervention</li> </ul>	Papaevangelou et al. <sup>84</sup>
Injecting drug users STD clinic clients	<ul> <li>Fewer drug treatment programs to access population</li> <li>Few go to STD clinics</li> </ul>	<ul> <li>Legally permitted syringe exchange programs</li> <li>Highly at-risk populations can be accessed through clinics</li> </ul>	Des Jarlais <i>et al</i> . <sup>88,110</sup> Keene <i>et al.</i> <sup>90</sup> Boyer <i>et al.</i> <sup>129</sup>
Overall	<ul> <li>Resource constraints</li> <li>Diverse target groups</li> </ul>	<ul> <li>Community resources</li> <li>Activist nongovermental organizations</li> </ul>	Guenther-Grey et al. <sup>131</sup>

 Table 2.
 Challenges and Opportunities for Target Groups in Developing Nations

# Industrialized Countries

ticularly in countries that currently have a low prevalence of HIV but are considered to be at high risk. Illiteracy, malnutrition, political and economic instability, and poverty may be other determinants of vulnerability to HIV/AIDS in developing countries. Resource and infrastructure limitations make it more difficult to link educational interventions with accessible health care (e.g., for STD care) and available self-protection measures (distribution of condoms and syringes). Mobilization of finances to support programs is especially crucial for developing countries. In many countries, nongovernmental agencies (NGOs) have been at the forefront in responding to the AIDS crisis, and compared with government organizations are often more cost-effective and responsive through direct access to the people at risk.<sup>3</sup> NGOs often provide education and information, offer AIDS testing and counseling, promote community development, provide primary health care, conduct counselor training, and offer family planning services. Unfortunately, NGOs rarely evaluate their programs, and when they do, they often use poor study designs and problematic research instruments. Thus, NGOs offer both challenges and opportunities for developing nations. A partnership between NGOs and trained researchers may offer the most effective means of combating the HIV epidemic in the developing world.

Sexual behavior is greatly influenced by structural and cultural factors and also offers both challenges and opportunities. In contrast to industrialized nations, developing countries have relatively young populations. As youth are a more sexually active group, the high percentage of youth in these countries implies that they may see a continued rise in the incidence of HIV/AIDS. Intervention programs for this age group are urgently needed, and must be compatible with a variety of settings. School-based programs may be an effective locale for middleclass adolescents. Unfortunately, however, in many countries the lower class do not go to school.

In industrialized and developing countries alike, the power disparity between men and women has been a barrier to prevention. Many developing nations will need to grapple with the issues that make women more vulnerable to infection. In general, the medical care and knowledge of medical issues for women have lagged behind that of men, increasing women's risk for HIV acquisition.<sup>3</sup> Further, females often hold less control of HIV prevention in their relationships.<sup>81</sup> Perhaps this is an area where developing countries can lead the vanguard of research, developing structural as well as individual-level HIV prevention programs that can empower women and increase their sexual autonomy.

Finally, it is important to remind readers that developing countries have contributed important research directed to populations that have been little studied or not studied at all in the industrialized world, such as migrant workers, truck drivers, and STD clinic attendees. The range of prevention strategies available to public health workers in developing countries may be limited because of economic or political constraints, but within those constraints well-designed theory driven

intervention programs that are methodologically sound will make a critical contribution to the global war against AIDS/HIV.

## REFERENCES

- Schopper D. Research on AIDS interventions in developing countries: State of the art. Soc Sci Med 1990; 30(12):1265–1272.
- Oakley A, Fullerton D, Holland J. Behavioral interventions for HIV/AIDS prevention. AIDS 1995; 9:419–486.
- Mann J, Tarantola DJM, Netter T. A Global Report: AIDS in the World. Cambridge, MA: Harvard University Press; 1992.
- Krause RM. Reflections on the first decade of the HIV/AIDS pandemic: Opportunities and priorities for international behavioral research and interventions. *Int J STD AIDS* 1996; 7(suppl 2): 47–51.
- Piot P, Islam MQ. Sexually transmitted diseases in the 1990s: Global epidemiology and challenges for control. Sex Transm Dis 1994; 21(2):S7–S13.
- Aral SO, Holmes KK, Padian NS, et al. Overview: Individual and population approaches to the epidemiology and prevention of sexually transmitted diseases and human immunodeficiency virus infection. J Infect Dis 1996; 174(suppl 2): S127–S133.
- Cook TD, Leviton LC, Shadish WR. Evaluation research. In: Lindzey G, Aronson E, eds. *The Handbook of Social Psychology*. New York Random House; 1995: 699–726.
- O'Reilly KR, Piot P. International perspectives on individual and community approaches to the prevention of sexually transmitted disease and human immunodeficiency virus infection. J Infect Dis 1996; 174(suppl 2):214–222.
- Kelly J. Sexually transmitted disease prevention approaches that work: Interventions to reduce risk behavior among individuals, groups, and communities. Sex Transm Dis 1994; 21(2):S73–S75.
- O'Hare P, Newcombe R, Mathews A, et al. The Reduction of Drug Related Harm. London: Routledge; 1992.
- 11. Hanenberg RS, Rojanapithayakorn W, Kunasol P, et al. Impact of Thailand's HIV-control program as indicated by the decline of sexually transmitted diseases. Lancet 1994; 344:234-235.
- 12. Rojanapithayakorn W, Hanenberg R. The 100% condom program in Thailand. AIDS 1996; 10:1-7.
- Bandura A. Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, NJ: Prentice-Hall; 1986.
- Ajzen I, Fishbein M. Understanding Attitudes and Predicting Social Behavior. Englewood Cliffs, NJ: Prentice-Hall; 1980.
- 15. Becker MH. The health belief model and personal health behavior. *Health Educ Monogr* 1974; 2:324–508.
- Prochaska JO, DiClemente CC. Toward a comprehensive model of change. In: Miller W, Heather N, eds. *Treating Addictive Behavior*. New York: Plenum Press; 1986; 3–27.
- 17. Fishbein M, Bandura A, Triandis HC, et al. Factors Influencing Behavior and Behavior Change: Final Report. Rockville, MD: National Institute of Mental Health; 1991.
- Perry CL, Baranowski T, Parcel GS. How individuals, environments, and health behavior interact: Social learning theory. In: Glanz K, Lewis FM, Rimer B, eds. *Health Behavior and Health Education Theory, Research, and Practice.* San Francisco: Jossey-Bass; 1991; 161–186.
- Coates TJ, Aggleton P, Gutzwiller R, et al. HIV prevention in developed countries. Lancet 1996; 348:1143–1148.
- Cronbach LJ. Designing Evaluations of Educational and Social Programs. San Francisco: Jossey-Bass; 1982.

- Loue S, Oppenheim S. Immigration and HIV infection: A pilot study. AIDS Educ Prevent 1994; 6(1):74–80.
- Loue S, Lloyd LS, Loh L. HIV prevention in US Asian Pacific Islander communities: An innovative approach. J Health Care Poor Underserved 1996; 7(4):364–376.
- Loue S, Lloyd LS, Phoombour E. Organizing Asian Pacific Islanders in an urban community to reduce HIV risk: A case study. *AIDS Educ Prevent* 1996; 8(5):381–393.
- Rosenberg PS, Biggar RJ, Goedert JJ. Declining age at HIV infection in the United States. N Engl J Med 1994; 330:798–790.
- Centers for Disease Control and Prevention. Selected behaviors that increase risk for HIV infection, other sexually transmitted diseases, and unintended pregnancy among high school students—United States, 1991. MMWR 1992; 41:945–950.
- Johnson AM, Wadsworth J, Wellings K, et al. Sexual Attitudes and Lifestyle. Oxford, England: Blackwell Scientific Publications; 1994.
- Sellers DE, McGraw, McKinlay JB. Does the promotion and distribution of condoms increase teen sexual activity? Evidence from an HIV prevention program for Latino youth. *Am J Public Health* 1984;1952–1959.
- Eisen M, Zellman GL, McAlister AL. Evaluating the impact of a theory-based sexuality and contraceptive education program. *Fam Plann Perspect* 1990; 22:261–271.
- Kirby D, Barth RP, Leland N, etal. Reducing the risk: Impact of a new curriculum on sexual risktaking. Fam Plann Perspect 1991; 23:253–261.
- St. Lawrence JS, Brasfield TL, Jefferson KW, et al. Cognitive-behavioral intervention to reduce African American adolescents' risk for HIV infection. J Commun Clin Psychol 1995; 63(2): 221–237.
- 31. Fisher JD, Fisher WA. Changing AIDS-risk behavior. Psychol Bull 1992; 11(3):455-474.
- Stanton B, Kim N, Galbraith J, et al. Design issues addressed in published evaluations of adolescent HIV-risk reduction interventions: A review. J Adolesc Health 1996; 18:387–396.
- Centers for Disease Control and Prevention. School-based HIV prevention education—United States, 1994. MMWR 1994; 45(35):760–765.
- 34. Choi K-H, Coates TJ. Prevention of HIV infection. AIDS 1994; 8:1371-1389.
- Ashworth CS, DuRant RH, Newman C, et al. An evaluation of a school-based AIDS/HIV program for high school students. J Adolesc Health 1992; 13(7):582–588.
- Brown LK, DiClemente RJ, Beausoleil, NI. Comparison of HIV-related knowledge, attitudes, intentions and behaviors among sexually active and non-active young adolescents. J Adolesc Health 1992; 13:140–145.
- DiClemente RJ, Pies CA, Stoller EJ, et al. Evaluation of a school-based AIDS curricula in San Francisco. J Sex Res 1989; 26:188–198.
- Miller L, Downer A. AIDS: What do you and your friends need to know—A lesson plan for adolescents. J School Health 1988; 58:137–141.
- Newman C, DuRant RH, Ashworth CS, et al. An evaluation of a school-based AIDS/HIV education program for young adolescents. AIDS Educ Prevent 1993; 5(4):327–339.
- Seigal HA, Falck RS, Carlson RG, et al. Reducing HIV needle risk behaviors among injectiondrug users in the midwest: An evaluation of the efficacy of standard and enhanced interventions. AIDS Educ Prevent 1995; 7(4):308–319.
- Walter HJ, Vaughn RD. AIDS risk reduction among a multi-ethnic sample of urban high school students. JAMA 1993; 270:725–730.
- Howard M, McCabe J. Helping teenagers postpone sexual involvement. Fam Plann Perspect 1990; 2291–26.
- Main DS, Iverson DC, McGloin J, et al. Preventing HIV infection among adolescents: Evaluation of a school-based education program. Am J Prevent Med 1994; 23:409–417.
- Abramson PR, Sekler JC, Berk R, et al. An evaluation of an undergraduate course on AIDS. Eval Rev 1989; 13516–532.

- Turner JC, Korpita E, Mohn LA, et al. Reduction in sexual risk behaviors among college students following a comprehensive health education intervention. J Am Coll Health 1993; 41:187–193.
- Sikkema KJ, Winett RA, Lombard DN. Development and evaluation of an HIV-risk reduction program for female college students. *AIDS Educ Prevent* 1995; 7(2):145–159.
- Fisher JD, Fisher WA, Misovich SJ, et al. Changing AIDS risk behavior: Effects of an intervention emphasizing information, motivation, and behavioral skills in a college student population. *Health Psychol* 1996; 15(2):114–123.
- Magura S, Kang S-Y, Shapiro JL. Outcomes of intensive AIDS education for male adolescent drug users in jail. J Adolesc Health 1994; 15:457–463.
- St. Lawrence JS, Jefferson KW, Alleyne E, *et al.* Comparison of education versus behavioral skills training interventions in lowering sexual HIV-risk behavior of substance dependent adolescents. *J Consult Clin Psychol* 1995; 63(1):154–157.
- Rotheram-Borus MJ, Koopman C, Haignere C, et al. Reducing HIV sexual risk behaviors among runaway adolescents. JAMA 1991; 266(9):1237–1241.
- Centers for Disease Control and Prevention. *HIV/AIDS Surveillance Report* (1996 Year-End Edition), 8(2). Atlanta: Department of Health and Human Services (CDC: Division of HIV); 1997.
- Jemmott JB, Jemmott LS, Fong JT. Reduction in HIV risk-associated sexual behaviors among black male adolescents: Effects of an AIDS prevention intervention. *Am J Public Health* 1992; 82:372–377.
- Rotheram-Borus MJ, Reid H, Rosario M. Factors mediating changes in sexual HIV risk behaviors among gay and bisexual male adolescents. Am J Public Health 1994; 84:1938–1946.
- 54. Remafedi G. Cognitive and behavioral adaptations to HIV/AIDS among gay and bisexual adolescents. J Adolesc Health 1994; 15:142–148.
- Kim N, Stanton B, Li X, et al. Effectiveness of the 40 adolescent AIDS-risk reduction interventions: A quantitative review. J Adolesc Health 1997; 20:204–215.
- Kirby D, Short L, Collins J, et al. School-based programs to reduce sexual risk behaviors: A review of effectiveness. Public Health Rep 1994; 109(3):341–360.
- 57. Hart GJ. The evaluation of behavioral interventions for gay men: Obstacles to evidence-based prevention. *Int J STD AIDS* 1996; 7(suppl 2):25–29.
- 58. DuBois-Arber F, Masur J-B, Hausser D, et al. Evaluation of AIDS prevention among homosexual and bisexual men in Switzerland. Soc Sci Med 1993; 37(12):1539–1544.
- Lemp GF, Hirozawa AM, Givertz, D, et al. Seroprevalence of HIV and risk behaviors among young homosexual and bisexual men: The San Francisco/Berkley Young Men's Health Study. Am J Public Health 1994; 84:1933–1937.
- Kelly JA, St. Lawrence JS, Hood HV, et al. Behavioral intervention to reduce AIDS risk activities. J Consult Clin Psychol 1989; 57(1):60–67.
- Kelly JA, St. Lawrence JS, Betts R, et al. A skills-training group intervention model to assist persons is reducing risk behaviors for HIV infection. AIDS Educ Prevent 1990; 2(1):24–35.
- 62. Peterson JL, Coates TJ, Catania JA, *et al.* Evaluation of an HIV risk reduction intervention among African American homosexual and bisexual men. *AIDS* 1996; 10:319–325.
- Valdiserri RO, Lyter DW. Leviton LC, et al. AIDS prevention in homosexual and bisexual men: Results of a randomized trial evaluating two risk reduction interventions. AIDS 1989; 3:21–26.
- Kelly JA, St. Lawrence JS, Stevenson Y, et al. Community AIDS/HIV risk reduction: The effects of endorsement by popular people in three cities. Am J Public Health 1992; 82(11):1483–1489.
- Kelly JA, St. Lawrence JS, Diaz YE, et al. HIV risk reduction following intervention with key opinion leaders of a population: An experimental community-level analysis. Am J Public Health 1991; 81:168–171.
- 66. Kelly JA, Murphy DA, Sikkema KJ, *et al.* Outcomes of a randomized controlled community-level HIV prevention intervention: Effects on behavior among at-risk gay men in 16 small US cities. Paper presented at the 11th International Conference on AIDS, Vancouver; 1996.

- Ekstrand M, Staff R, McKusick L, *et al.* Two worlds of risk: Gay male bar patrons need special AIDS prevention interventions. Paper presented at the 8th International AIDS Conference, Berlin; 1993.
- Kegeles SM, Hays REi, Coates TJ. The Mpowerment Project: A community-level HIV prevention intervention for young gay men. Am J Public Health 1996; 86(8):1129–1136.
- Doll LS, Beeker C. Male bisexual behavior and HIV risk in the United States: Synthesis of research with implications for behavioral interventions. AIDS Educ Prevent 1996; 8(3):205–225.
- Padian N, Marquis L, Francis D, et al. Male to female transmission of human immunodeficiency virus. JAMA 1987; 258:788–790.
- Stokes J, McKirnan D, Burzette B. Sexual behavior, condom use, disclosure of sexuality, and stability of sexual orientation in bisexual men. J Sex Res 1993; 30:1–10.
- Altman LK. Women worldwide nearing higher rate for AIDS than men. *The New York Times* 1992, July 21; C1, C3.
- Wingood GM, DiClemente RJ. HIV sexual risk reduction interventions for women: A review. Am J Prevent Med 1996; 12(3):209–217.
- World Health Organization/Joint United Nations Program on AIDS. HIV/AIDS Statistics and Information. 1996, December; Internet.
- DiClemente RJ, Wingood GM. A randomized controlled trial of an HIV sexual risk reduction intervention for young African American women. JAMA 1995; 274:1271–1276.
- Kalichman SC, Rompa D, Coley B. Experimental component analysis of a behavioral HIV–AIDS prevention intervention for inner-city women. J Consult Clin Psychol 1996; 64(4):687–693.
- Kelly JA, Murphy DA, Washington CD, et al. The effects of HIV intervention groups for highrisk women in urban clinics. Am J Public Health 1984; 84:1918–1922.
- Hobfoll SE, Jackson AP, Lavin J, et al. Reducing inner-city women's AIDS risk activities: A study of single, pregnant women. *Health* Psychol 1994; 13:3979–4003.
- Nyamathi AM, Flaskerud J, Bennet C, et al. Evaluation of two AIDS education programs for impoverished Latina women. AIDS Educ Prevent 1994; 6(4):296–309.
- Santelli JS, Celentano DD, Rozsenich C, et al. Interim outcomes for a community-based program to prevent perinatal HIV transmission. AIDS Educ Prevent 1995; 7(3):210–220.
- DuGuerny J, Sjoberg E. Inter-relationship between gender relations and the HIV/AIDS epidemic: some possible considerations for policies and programs. *AIDS* 1993; 7:1027–1034.
- Can S, Goldberg DJ, Elliot L, *et al.* A primary health care service for Glasgow street sex workers— 6 years experience of the "Drop-in Center" 1989–1994. *AIDS Care* 1996; 8(4):489–497.
- Dorfman LE, Derish PA, Cohen JB. Hey girlfriend: An evaluation of AIDS prevention among women in the sex industry. *Health Educ Q* 1992; 19(1):25–40.
- Papaevanelou G, Roumeliotou A, Kallinikos G, et al. Education in preventing HIV infection in Greek registered prostitutes. J AIDS 1988; 1:386–389.
- Friedman SR, Des Jarlais DC. HIV among drug injectors: The epidemic and the response. AIDS Care 1991; 3:239, 250.
- Paone D, Des Jarlais DC, Gangloff R, et al. Syringe exchange: HIV prevention, key findings, and future directions. Int J Addict 1995; 30(12):1647–1683.
- 87. Ostrow DG. AIDS prevention through effective education. Daedalus 1989; 118:209-254.
- Des Jarlais DC, Casriel C, Friedman SR, et al. AIDS and the transition to illicit drug injection— Results of a randomized trial prevention program. Br J Addict 1992; 87:493–498.
- Donoghue MC, Stimson GV, Dolan K, et al. Changes in HIV risk behavior in clients of syringeexchange schemes in England and Scotland. AIDS 1989; 3(5):267–272.
- Keene J, Stimson GV, Jones S, et al. Evaluation of syringe-exchange for HIV prevention among injecting drug users in rural and urban areas in Wales. Addiction 1993; 88:1063–1070.
- Stimson GV, Alldrit L, Dolan K, et al. Syringe exchange schemes for drug users in England and Scotland. Br Med J 1988; 296:1717–1719.

- Bortolotti F, Stivanello A, Noventa F, et al. Sustained AIDS education campaigns and behavioral changes in Italian drug users. Eur J Epidemiol 1992; 8:264–267.
- Power R, Hartnoll R, Daviaud E. Drug injecting, AIDS, and risk behavior: Potential for change and intervention strategies. Br J Addict 1988; 83549–654.
- Robertson JR, Skidmore CA, Roberts JJK. HIV infections in intravenous drug users: A follow-up study indicating changes in risk-taking behavior. Br J Addict 1988; 83:387–391.
- Sufian M, Friedman SR, Curtis R, et al. Organizing as a new approach to AIDS risk reduction for intravenous drug users. J Addic Dis 1991; 10(4):89–98.
- Des Jarlais DC, Friedman SR, Friedmann P, et al. HIV/AIDS-related behavior change among injecting drug users in different national settings. AIDS 1995; 9:611–617.
- Des Jarlais DC, Friedman SR. HIV epidemiology and interventions among injecting drug users. Int J STDs AIDS 1996; 7(suppl 2):57–61.
- Booth RE, Weibel WW. The effectiveness of reducing needle-related risks for HIV through indigenous outreach to injection drug users. Am J Addict 1992; 1:277–288.
- 99. Chaisson RE, Demond D, Moss AR, et al. HIV, bleach, and needle sharing. Lancet 1987; 1430.
- 100. Ginzburg HM, French J, Jackson J, et al. Health education and knowledge assessment of HTLV-III diseases among intravenous drug users. *Health Educ Q* 1986; 13:373–382.
- Neagius A, Sufian M, Friedman SR, et al. Effects of outreach intervention on risk reduction among intravenous drug users. AIDS Educ Prevent 1990; 2:253–271.
- Watters JK, Downing M, Case P, et al. AIDS prevention for intravenous drug users in the community: Street-based education and risk behavior. Community Psychol 1990; 18:587–596.
- 103. MacGowan RJ, Brackbill RM, Rugg DL, et al. Sex, drugs and HIV counseling and testing: A prospective study of behavioral-change among methadone-maintenance clients in New England. AIDS 1997; 11:229–235.
- Robert C-F, Deglon J-J, Wintsch J, et al. Behavioral changes in intravenous drug users in Geneva: Rise and fall of HIV infection, 1980–1989. AIDS 1990; 4:657–660.
- Yancovitz SR, Des JD, Peyser NP, et al. A randomized trial of an interim methadone maintenance clinic. Am J Public Health 1991; 81:1185–1191.
- 106. Calsyn DA, Meineche C, Saxon AJ, et al. Risk reduction in sexual behavior: A condom giveaway program in a drug-abuse treatment clinic. Am J Public Health 1992; 82:1536–1538.
- 107. Martin GS, Serpelloni G, Galvan U, et al. Behavioral change in injecting drug users: Evaluation of an HIV/AIDS education program. AIDS Care 1990; 2:275-269.
- McCusker J, Willis G, McDonald M, *et al.* Community-side HIV counseling and testing in Central Massachusetts: Who is retested and does their behavior change? *J Community Health* 1996; 21(1):11–22.
- Nicolosi A, Molinari S, Musicco M, et al. Positive modification of injecting behavior among intravenous heroin users from Milan and northern Italy, 1987–1989. Br JAddict 1991; 86:91–102.
- Des Jarlais DC, Casriel C, Friedman SR, *et al.* AIDS and the transition to illicit drug injection: Results of a randomized trial prevention program. *Br J Addict* 1992; 87:493–498.
- El-Bassel N, Schilling RF. 15-month follow-up of women methadone patients taught skills to reduce heterosexual HIV transmission. *Public Health Rep* 1992; 107(5):500–504.
- 1 12. Gibson D, Wermuth L, Lovelle-Drache J, et al. Brief counseling to reduce AIDS risk in intravenous drug users and their sexual partners: Preliminary results. Counsel Psychol Q 1989; 215–19.
- 113. McCusker J, Stoddard AM, Zapka JG, et al. AIDS education for drug abusers: Evaluation of short-term effectiveness. Am J Public Health 1992; 82533–540.
- 114. Schilling RF, El-Basse BN, Schinke SP, et al. Building skills of recovering women drug users to reduce heterosexual AIDS transmission. *Public Health Rep* 1991; 106:297–304.
- 115. Seigel D, DiClemente R, Durbin M, et al. Change in junior high school students' AIDS-related knowledge, misconceptions, attitudes, and HIV-preventive behaviors: Effects of a school-based intervention. AIDS Educ Prevent 1995; 7(6):534–543.

- 116. Stephens RC, Feucht TE, Roman SW. Effects of an intervention program on AIDS-related drug and needle behavior among intravenous drug users. Am J Public Health 1991; 81568–571.
- 117. Edlin BR, Irwin KL, Farque S, et al. Interesting epidemics: crack-cocaine use and HIV infection among inner city adults. N Engl J Med 1995; 331:1422-1427.
- 118. Fullilove RE, Fullilove MT, Bowser BP, et al. Risk of sexually transmitted diseases among black adolescent crack users in Oakland and San Francisco, CA. JAMA 1990; 263:851-855.
- Inciardi JA. Trading sex for crack among juvenile drug users: A research note. Contemp Drug Probl 1989; 689–700.
- 120. Marx R, Aral SO, Rolfs RT, et al. Crack, sex, and STD. Sex Transm Dis 1991; 18:92-101.
- Weatherby NL, Schultz JM, Chitwood DD, et al. Crack-cocaine use and sexual activity in Miami, Florida. J Psychoactive Drugs 1992; 24:373–380.
- 122. Aral SO, Wasserheit JN. Interactions among HIV, other sexually transmitted diseases, socioeconomic status, and poverty in women. In: O'Leary A, Jemmott LS, eds. Women at Risk: Issues in the Primary Prevention of AIDS. New York: Plenum Press; 1995: 13–41.
- Clottey C, Dallabetta G. Sexually transmitted diseases and human immunodeficiency virus, epidemiology synergy? *Infect Dis Clin NA* 1993; 7:753–770.
- Grosskurth H, Mosha F, Todd J, *et al.* Impact of improved treatment of sexually transmitted disease on HIV infection in rural Tanzania: Randomized control trial. *Lancet* 1995; 1005(346): 530–536.
- 125. Centers for Disease Control and Revention. *Sexually Transmitted Disease Surveillance, 1995.* Atlanta, GA: Department of Health and Human Services (CDC: Division of STD); 1996.
- 126. Wenger NS, Linn LS, Epstein M, *et al.* Reduction of high-risk sexual behavior among heterosexuals undergoing HIV-antibody testing: A randomized clinical trial. *Am J Public Health* 1991; 81:1580–1585.
- 127. Otten MW, Zaidi AA, Wroten JE, et al. Changes in sexually transmitted disease rates after HIV-testing and posttest counseling, Miami, 1988 to 1989. Am J Public Health 1993; 83529–533.
- Cohen DA, MacKinnon DP, Dent C, et al. Group counseling at STD clinics to promote use of condoms. Public Health Rep 1992; 107:727–731.
- 129. Boyer CB, Barrett DC, Peterman TA, *et al.* Sexually transmitted disease (STD) and HIV risk in heterosexual adults attending a public STD clinic: Evaluation of a randomized controlled behavioral risk-reduction intervention trial. *AIDS* 1997; 11:359–367.
- 130. Higgins DL, Galavotti C, O'Reilly KR, et al. Evidence for the effects of HIV antibody counseling and testing on risk behaviors. JAMA 1991; 266(17):2419–2429.
- Guenther-Grey C, Johnson WD, Higgins DL, *et al.* Community-level prevention of human immunodeficiency virus infection among high-risk populations: The AIDS Community Demonstration Project. *MMWR* 1996; 45:1–24.
- 132. Jamner MS, Wolitski RJ. Findings of the Long Beach AIDS Community Demonstration Project. In: Corby NH, Wolitski RJ, eds. Community HIV Prevention: The Long Beach AIDS Community Demonstration Project. Long Beach, CA: University Press: 1997; 107.
- Corby NH, Wolitski RJ. Condom use with main and other sex partners among high risk women: Intervention outcomes and correlates of risk. *Drug Socie* 1996; 19(1–2):75–96.
- Reitmeijer CA, Kane MS, Simons PZ, *et al.* Increasing the use of bleach and condoms among injecting drug users in Denver: Outcomes of a targeted community-level HIV prevention program. *AIDS* 1996; 10:291–298.

# The Use of Psychosocial Models for Guiding the Design and Implementation of HIV Prevention Interventions Translating Theory into Practice

# GINA M. WINGOOD and RALPH J. DICLEMENTE

# INTRODUCTION

Despite advances in biomedical research (e.g., the emergence of protease inhibitors as an effective therapy), there is still no preventive vaccine or medical cure for HIV/AIDS. Further, biomedical advances, such as new antiretroviral drugs, are not likely to have a marked impact in many developing countries given their lack of availability and their prohibitive costs. Consequently, prevention programs designed to decrease or eliminate HIV risk behaviors remain the only available means to prevent HIV infection and reduce the burden of human suffering and medical care expenditures.

In this chapter we discuss the applicability of psychosocial and social structural theory for guiding the design and implementation of HIV prevention interventions aimed at motivating individuals to adopt and/or maintain HIV preventive practices. Initially, we will describe the rationale for using theory to guide HIV prevention programs. We will then familiarize the reader with two theories, the social cognitive theory and the theory of gender and power. The social cognitive theory is perhaps the most influential psychosocial theory guiding intervention design in many parts of the world, while the theory of gender and power is a relatively new social structural theory that holds considerable promise for inter-

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ventions targeting women. To illustrate how theory can be used in designing a prevention program, we present a case study, based on our own research, demonstrating how these theories were used in developing an HIV prevention program for African-American women.

# THE ROLE OF THEORY IN GUIDING THE DESIGN AND IMPLEMENTATION OF BEHAVIORAL INTERVENTIONS

Theories of behavior change have been used effectively to guide the development and implementation of HIV risk reduction interventions.<sup>1</sup> Basically, a theory is a set of interrelated propositions containing constructs that describe, explain, predict, or control behavior. Theories vary in the extent to which they have been conceptually developed and empirically tested. Most theories are multifactorial; that is, they are based on a number of constructs. Constructs [for example, selfefficacy, perceived peer norms, power imbalances in relationships, and perceived risk of HIV/sexually transmitted disease (STD) infection] are the building blocks of theory and usually can only be understood within the context of a specified theory. When the relationships between constructs are defined, the theory provides a "road map" for understanding behavior and how social and behavioral interventions may be used to modify HIV risk behaviors.

Having this road map of relationships between constructs that influence behaviors can result in more effective programs being designed, as it leads planners to focus on those influential factors that need to be addressed to achieve behavioral change. Without a theoretical foundation, programs sometimes focus on factors that are not the most important or the sole determinants of behavior (e.g., concentrating only on increasing knowledge rather than also addressing social constraints to adopting the desired behavior). Alternatively, they may correctly identify factors promoting high-risk behaviors but may adopt strategies to influence them that are not particularly effective (e.g., simply didactically teaching women about how to negotiate condom use without giving them the opportunity to practice those skills in skills-based learning sessions). Those responsible for the formulation of a theory, as well as other adherents of the theory, typically provide guidance on strategies to effectively address those factors the theory identifies as being important influences on behavior. Those strategies, however, do need to be tailored to specific contexts. Further, in adopting a theoretical framework in a given context, program planners may find that no one theory is appropriate in its entirety and that constructs from more than one theory must be combined.

While no single psychosocial theory dominates the field of HIV prevention, we will describe perhaps the most widely used theory in the field: the social cognitive theory. In addition, we will present a relatively new theoretical model that may be particularly relevant for designing interventions that target heterosex-

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ual couples. These theories are presented to offer a framework for interventionists who wish to design prevention interventions. A host of other theories such as the health belief model, the theory of reasoned action, the AIDS risk reduction model, and diffusion theory have been applied to designing HIV prevention programs and are described in detail in DiClemente and Peterson<sup>1</sup> and DiClemente.<sup>2</sup> For a greater understanding of the applicability of these theories to a broader range of health behaviors, see Kohler *et al.*<sup>3</sup> and Glanz *et al.*<sup>4</sup> It is important to note that while the theories presented have all been developed in an industrialized country, they also have been judiciously used in the developing world.

Before theories can be used successfully, it is important to understand the different constructs that comprise the theory. We will describe the social cognitive theory and discuss its applicability for designing HIV prevention programs.

# SOCIAL COGNITIVE THEORY AND HEALTH BEHAVIOR CHANGE

An underlying assumption of the social cognitive theory is that behavior is dynamic and depends on environmental and personal constructs that influence each other simultaneously.5,6 The continuous interaction among a person, the behavior of that person, and the environment in which the behavior is performed is called *triadic reciprocal determinism*. This concept is schematically presented in Fig. 1.

The *environment* refers to factors that can affect a person's behavior but that are physically external to that person; it encompasses both social and physical environments. Examples of social environments include family, friendship networks, peers at work or in the classroom, and so on. Physical environments may include the availability, accessibility, and affordability of facilities and services such as transportation, child care, condoms, neighborhood STD clinics, and HIV testing facilities.

While social cognitive theory is a broad and complex theory with many constructs, it is often articulated with a focus on four cornerstones of the theory, namely, (1) enhancing knowledge of risk and prevention, (2) promoting acquisition and proficiency in HIV preventive skills, (3) enhancing self-efficacy, and (4) fostering protective peer norms. We will describe each of these four critical constructs in greater detail.

#### Enhancing Risk and Prevention Knowledge

If a person is to perform a particular type of behavior, he or she must be knowledgeable about how to perform that behavior and he or she must be knowledgeable about the consequences of engaging or not engaging in that behavior. For example, individuals should be knowledgeable about how to use condoms during



**Figure 1.** Social cognitive theory schematization of triadic reciprocal determinism. B signifies behavior; P, the cognitive, biological, and other internal events that affect perceptions and action; and E, the external environment.

sexual intercourse and they must be knowledgeable about the consequences of using or not using condoms. Specifically, individuals have to be made aware of the risk of STDMIV transmission through non-condom-protected sexual intercourse, and that when properly used, condoms are an effective means of markedly reducing the risk of STD/HIV infection. While knowledge is necessary, it often is not sufficient, in and of itself, to encourage the adoption or maintenance of HIV preventive behaviors.

### Promoting Acquisition and Proficiency in HIV Preventive Skills

One of the goals of health promotion interventions is to bring the performance of health behaviors under the control of the individual. This requires focusing on a specific type of behavior and developing proficiency in a narrow range of preventive skills. Many HIV prevention programs, for example, target social competency skills, including sexual negotiation, sexual refusal, and proper condom use skills. There are several techniques that often are used to enhance skills acquisition and proficiency. These include observational and participatory learning.

Observational learning is when an observer watches the actions of another person and observes the reinforcements that the other person receives. The effects of observational learning are enhanced when the observer and the person being observed are similar with respect to their age, gender, and ethnicity. Examples of observational learning include use of videotapes illustrating women using condoms properly or negotiating condom use. Another observational learning technique is social modeling in which observers actually watch a person perform skills. Again, social models are most effective when the observer and the person being observed are similar with respect to their age, gender, and ethnicity. For example, in an HIV prevention program for women an appropriate social model would be a

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woman of similar age or ethnicity performing proper condom use or sexual negotiation skills.

Participatory learning is when an individual actually performs the behavior him- or herself in a graded hierarchy of increasingly difficult situations. Participatory learning often occurs by role-playing the skills. For example, in an HIV prevention program for women, participatory learning may begin with women becoming familiar with condoms by unrolling them and stretching them. Subsequently, women may role-play placing condoms on dildos properly. Additionally, women may learn to distinguish the difference between passive, assertive, and aggressive communication styles. Subsequently, women may practice sexual negotiation skills.

To encourage the adoption of prevention skills, it is necessary to reinforce an individual's performance and to provide corrective feedback to enhance proficiency. The concept of *positive reinforcement* or reward is a response to a person's behavior that increases the likelihood that behavior will be repeated. Positive reinforcement can be of two types: either external or internal. External reinforcement, for example, can be the receipt of positive feedback from health educators for correctly performing a behavior or incentives for appropriate performance such as T-shirts, graduation certificates, and monetary incentives. Internal reinforcement is more personal in that it provides fulfillment of personal desire and is considered intrinsically rewarding. For example, using condoms during sexual intercourse fulfills an individual's desire to stay healthy or avoid HIV which can be, in and of itself, intrinsically rewarding.

### Enhancing Self-Efficacy

Bandura has proposed that self-efficacy is the most important prerequisite for successful behavior change. Self-efficacy is the confidence an individual feels about performing a particular behavior or activity, that is, confidence in their ability to perform the behavior efficaciously. Repetition of the specific skill builds an individual's self-efficacy, which in turn effects task persistence, initiation, and endurance, all of which promote behavior change. Both observational and participatory learning techniques are useful in enhancing the adoption of an individual's self-efficacy to perform specific behaviors. Simplifying each step and allowing patients to practice each in isolation with many repetitions enables them to build their self-efficacy in performing each step. For example, in an HIV prevention program for women, participants often engage in activities aimed at teaching them the specific steps to properly use a condom with lubrication.

#### Fostering Peer Norms Supportive of Preventive Behaviors

Behavior change occurs within a network of normative influences as social norms (i.e., common and socially accepted beliefs and behaviors) convey stan-
dards of conduct. Standards of conduct are often influential determinants of risky and preventive behavior. Within the social cognitive theory framework, peer educators are often used to amplify positive health-promoting norms and displace unhealthy norms to reinforce health preventive skills. For example, in an HIV prevention program for women, female peer educators endorse health-promoting behaviors such as practicing safer sex and negotiating condom use via testimonials and they enhance the perception that these practices are normative by illustrating how prevalent these practices are becoming among women.

## Strengths and Limitations of Social Cognitive Theory

While the social cognitive theory has been valuable in explaining HIV risk and preventive behavior and for serving as an underlying model for designing and implementing HIV prevention interventions, there has been renewed interest in the development of additional theoretical models.<sup>7</sup> A major perceived limitation of the social cognitive theory and of psychosocial theories, in general, is their overemphasis on intrapsychic (intrapersonal) influences and their lack of recognition of relational and cultural influences. And, while the core constructs of the psychosocial theories do in fact include environmental constraints, they are often rarely assessed and poorly measured. A new model that addresses cultural and genderspecific influences on behavior is the theory of gender and power.

## THE THEORY OF GENDER AND POWER

In 1987, R.W. Connell, an Australian sociologist, developed a collection of writings on the theories of gender and power.<sup>8</sup> Connell identified the critical components of existing theories on gender and developed an integrative social structural theory of gender. According to Connell, there are three major components that characterize the relationships between men and women. They are the sexual division of labor, the sexual division of power, and the division of affective attachments and social norms. Both the sexual division of labor and the sexual division of power had been identified from previous research as two fundamental structures that explain gender relations. Connell devised the third component: the division of affective attachments and social norms to address the affective (emotional) component of relationships. These three overlapping but distinct components serve to explain the culturally bound gender roles assumed by men and women. Connell emphasized that none of the three components is or can be independent of the others.

He also indicated that these three components or structures exist at two different levels: the societal and the institutional. The highest level in which the three components are embedded is the societal level. The three components are

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rooted in society through numerous historical influences, cultural beliefs, and sociopolitical forces. The society changes very slowly; hence, these structures remain largely intact over a long period of time.

At a lower level—the institutional level—the three social structures or components are also evident. Social institutions include but are not limited to schools, workplaces, families, marriages and other relationships, churches, legal systems, medical systems, the media, and our communities. The three social structures are maintained in social institutions through mechanisms that constrain women's daily practices by producing gender-based inequities and disparities. These institutions can change, though gradually.

From a public health and psychological perspective, it is these inequities and disparities that serve as the exposures and risk factors that adversely influence women's health. Hence, Connell's work on gender and power has direct relevance for understanding issues regarding gender and health. While Connell's original writings form the underpinning of the theory of gender and power, we have subsequently extended, modified, and applied this theory to health (see Fig. 2) in a public health model. This model examines factors that are environmental, economic (i.e., health insurance), psychological, and social in nature and that influence the risk of disease patterns that affect populations and groups. The biological level variables refer to the gender disparity in health as manifested in the biological properties of diseases, disabilities and health-related quality of life resulting from these exposures, and risk factors.

The first of the constructs in the model—the *sexual division of labor*—refers to the allocation of women and men to certain occupations. Women are frequently assigned different and unequal positions relative to men. This assignment constrains women because the nature of "women's work" limits their economic potential and confines women's career paths. The sexual division of labor is manifested in the segregation of "unpaid work" for women, namely, child care, caring for the sick and elderly, and housework. Because this work is uncompensated, an economic imbalance occurs in which women often rely on men financially. The sexual division of labor is also manifested in practices that favor male educational attainment and the segregation of "income-generating work" for men, allowing men control of the family income. Additionally, while "men's work" is often valued either directly through paid remuneration or indirectly through its high status, "women's work" often fails to be recognized as work and is valued as lower status.

Interventions targeting the division of labor may involve removing barriers to women's access to jobs, increasing women's access to health care, providing women job training, offering alternative employment opportunities, and compensating women for their unpaid work. HIV prevention interventions for women focusing on the division of labor may wish to provide child care, condoms, and transportation to attend HIV educational programs. Further, HIV prevention



interventions for women should employ women from the communities in which they are intervening as peer educators as a means of offering alternative and meaningful employment opportunities for women.

Tightly intertwined with the division of labor is the division of power. Inequalities in power between the sexes form the basis for the *sexual division of power*. This component is characterized by imbalances in control, patriarchy, authority, and coercion within heterosexual relationships. Power is a fundamental element of all human relationships, particularly intimate heterosexual relationships.<sup>9</sup> Within heterosexual relationships, power is often observed as the abuse of physical force directed toward another person and the inequality of resources. Numerous studies indicate that women are psychologically, economically, and socially the more dependent partner in heterosexual dyads.<sup>10</sup> Often the male partner brings more assets (i.e., money, status, security) to the relationship and the female partner becomes dependent on these resources. The dynamics in these relationships evolve into an imbalance of power whereby the male wields power and the female lacks power. Women in these power-imbalanced relationships are more vulnerable to males' use and abuse of physical and economic power.

HIV intervention efforts for women targeting the division of power may want to define abuses of power within heterosexual relationships including emotional, physical, and sexual abuse. Additionally, intervention efforts may wish to discuss characteristics of healthy and unhealthy relationships. Subsequently, intervention efforts should discuss how these abuses of power make it difficult to practice HIV prevention skills such as negotiating condom use and using condoms. Finally, resources available within the community to assist women in coping with abusive relationships should be discussed.

The *sexual division of affective attachments and social norms* dictates appropriate sexual behavior for women. This structure is characterized by the emotional and sexual attachments that individuals have with one another. This sexual division of affective attachments and social norms illustrates how sexuality is associated with a range of human activities and values such as the procreation of children and the attainment of physical pleasure, emotional intimacy, and spirituality. This structure also produces the stereotypical images of female sexuality, as well as laws, taboos, and prohibitions that define normalcy and restrain sexuality, such as taboos against incest and rape.

HIV prevention efforts for women that target the sexual division of affective attachments and social norms will need to consider "triggers" or social influences that make it difficult to adopt and maintain HIV preventive practices. These triggers may include the interest in bearing a child, the belief that only "bad girls" use condoms, the media's image of attractive women as women who are sexually available, and the perception that negotiating safer sex implies infidelity in the relationship. Subsequent to discussing these triggers with women, the health educator should employ inoculation or countering techniques. These techniques teach women how to counter social influences that are associated with higher-risk behaviors and prevent the adoption and maintenance of lower-risk behaviors. These countering techniques may include exposing women to images in music, movies, or television that portray attractive women engaging in healthy sexual practices. Other HIV intervention activities may involve engaging women in normative exercises that teach women that "safe" girls use condoms and that discuss the importance and responsibilities of both bearing and rearing children (in order to counter popular images in peer groups of the attractiveness of becoming a young, unwed mother). All these techniques aim to increase gender pride and counter gender-based stereotypes that increase women's risk of HIV.

# THE USE OF THEORY REQUIRES ATTENTION TO CULTURAL RELEVANCE

Theories are complex representations of how the world operates, in this case, how various constructs interact and affect risk and preventive behaviors. Theories can be difficult to operationalize, as many of the constructs may not be reliably or validly measured, the language in theories can be obscure, and the meaning of various constructs difficult to interpret. Additionally, taking a theory that has been developed in one context and trying to apply it in another context can be challenging, given differences in social and individual environments and nonnative behaviors.

Certainly, theories should not be utilized without first determining their relevance to a particular population or cultural context.<sup>11,12</sup> Theories can and should be modified to be suitable for a particular cultural context. For instance, some constructs may differ in their meaning across cultures and some cultures may not possess a particular theoretical construct. It is therefore important to determine the cultural equivalence and relevance of constructs across groups.<sup>13</sup> Thus, theories should not constrain interventions through standardized application, but rather provide a foundation on which particular cultural elements and environmental constructs can be examined in a specific sociocultural context and appropriately integrated into the theoretical framework. It is this broader definition of theory, that is, one that is not rigid but is capable of being tailored for different contexts (though without losing the basic essence of the theory), that is most appropriate for designing HIV prevention interventions.

## APPLYING THEORY TO AN ILLUSTRATIVE CASE STUDY

We have identified and described the constructs within each of the theories. To offer insights into how these theoretical constructs can provide the basis for an HIV prevention program, we present an actual case study of an intervention

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research project. In it we apply both the theory of gender and power and the social cognitive theory to guide the design of an HIV prevention program, the implementation of the program, and the selection of measures that will help to evaluate the program's effectiveness.

## Collaborating with the Target Community: Enlisting Environmental Support for HIV Prevention Interventions

The most effective interventions build on the strengths and resources found within a community. This process fosters positive collaborations between researchers and the community, roots an intervention within the community, and allows researchers the opportunity to identify motivated individuals within the neighborhood to assist in developing and implementing the intervention.<sup>14</sup> Adopting these guiding principles, we established a partnership with a local African-American community-based organization, the Bayview-Hunter's Point Foundation. The Bayview-Hunter's Point Foundation, herein referred to as the Foundation, is the second largest African-American community-based organization in San Francisco. The Foundation provides legal, mental health, medical, and social services to the residents of the Bayview-Hunter's Point neighborhood. The Bayview-Hunter's Point neighborhood is 84% African American. Twenty-four percent of the total households are below the poverty line and the median family income is 34% lower than the median family income for the rest of San Francisco.<sup>15</sup> The long-standing relationship between the Foundation and the community lent credibility to our program as being sensitive to the needs of the residents.

The tripartite partnership between ourselves, the Foundation, and the community residents undoubtedly influenced the adoption of our HIV prevention program by African-American women in the community. This partnership facilitated our ability to conduct qualitative research, which led to our gaining a better understanding of the social context of sexual decision making among young adult African-American women in the community. This partnership also allowed us to work with women from the community to design the HIV sexual risk reduction intervention manual. Having young adult African-American women from the community assist in developing the manual made the vignettes more realistic, tailored the manual to the linguistic and cultural influences pervasive in the community, created a more developmentally appropriate intervention, and captured the essence of being a sexually active young adult African-American woman in the community. Finally, the partnership allowed us to identify motivated African-American female peers to implement the intervention.

## Objectives of the HIV Prevention Intervention

The project had three main objectives<sup>16</sup>: (1) To design a gender-sensitive, community-based HIV sexual risk reduction intervention for African-American

young adult women; (2) to use indigenous peers to implement the HIV sexual riskreduction program for young adult women; and (3) to evaluate the efficacy of this community-based HIV sexual risk reduction intervention to enhance the adoption and maintenance of consistent condom use among young adult African-American women.

## Methods and Procedures for Conducting the Project

Women were recruited from the Bayview-Hunter's Point community of San Francisco, California. Women were recruited over an 11-month period from February 1993 through December 1993, using street outreach and media advertisements placed throughout the community. Indigenous African-American women field recruiters familiar with the Bayview-Hunter's Point neighborhood approached and screened women for eligibility at the local unemployment office, the Social Security office, public laundry facilities, beauty salons, grocery stores, health clinics, and the local Aid to Families with Dependent Children office. Inclusion criteria consisted of being a sexually active, heterosexual African-American woman, 18 to 29 years of age, and residing in the Bayview-Hunter's Point neighborhood. Exclusion criteria included use of crack cocaine in the previous 3 months or a history of injection drug use. Interviews were conducted at the Bayview-Hunter's Point Foundation, an African-American community-based organization with a long history of providing social and medical services in this community. Prior to the interview, all participants completed a tracking form that included their name, address, and telephone number, as well as the address and phone number of a close confidant. After being informed of the purpose of the investigation and procedures to protect confidentiality and providing written informed consent, a trained African-American woman interviewer administered a face-to-face, 45-min private interview. Upon completing the baseline interview, women were compensated \$10 for their time.

The project director, using a random numbers table, generated a listing that identified the treatment assignment for each participant who completed a baseline assessment and entered their treatment allocation into the log book. One week prior to implementation of the treatment conditions, the project director telephoned each participant to inform her of the start date for her treatment condition. Upon completing baseline interviews, women were randomly assigned to one of three study conditions: a five-session social skills intervention condition (n = 53), a one-session HIV education condition (n = 35), or a delayed HIV education control condition (n = 40). The study design was a randomized, single-blind controlled trial. To encourage compliance, the project director telephoned participants the day prior to implementation of their treatment condition.

Three months postintervention, the project director contacted and scheduled all participants to return for a follow-up interview using a modified version of the

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baseline interview to assess changes in consistent condom use and theoretically important constructs thought to mediate condom use. Each participant completed a follow-up interview administered by an interviewer who was blinded to the participant's treatment assignment. A reimbursement of \$20 was provided to all participants upon completion of the 3-month follow-up interview.

## Implementation Issues and Scheme

As this intervention was designed for African-American women, the topic of HIV prevention was contextualized within a framework that addressed African-American cultural pride, gender awareness, and values prioritized by African-American women. Women in the HIV social skills intervention received five, 2-hr weekly group sessions implemented by two African-American women peer health educators. The five session HIV sexual risk reduction program was known as SISTA (sisters informing sisters about topics on AIDS). The acronym SISTA was chosen, as this name represents the sisterhood that African-American women share with one another. Throughout the intervention, reinforcements were of several types. First, peer educators provided positive feedback when women performed skills correctly and provided corrective feedback when women failed to perform skills correctly. Additionally, all women in the SISTA program received program incentives for performing skills correctly and a graduation certificate for completing the SISTA program. To address inequities characteristic of the division of labor, all women in the SISTA program were offered child care and transportation to and from the SISTA program.

The project motto was also designed to be culturally appropriate for young African-American women. The project motto read, "SISTA love is strong. SISTA love is safe. SISTA love is surviving." The statement "SISTA love is strong" was reflective of the strong pride and dignity that African-American women possess. The statement "SISTA love is safe" refers to the desire to create a norm of safer sex and the establishment of safer relationships. The statement "SISTA love is surviving" refers to the legacy of African-American women surviving through hardship. Woven throughout the intervention were issues that personally addressed young African-American women as they attempted to protect themselves from HIV infection. Additionally, before each session, participants read and discussed a poem by an African-American female artist that related to the particular session. Further, each session was tailored to be culturally relevant for young African-American women.

The first session emphasized gender and ethnic pride. A component of the theory of gender and power is reducing gender-based and cultural stereotypes and increasing gender and ethnic pride. Prior to imparting risk reduction knowledge, skills, and norms to women, we wanted to listen to the women talk about their lives, goals, and dreams and to have them assert their self-worth. We felt that it was

essential for the participants to build their self-esteem and personal self-confidence before discussing issues related to sexuality and HIV. This process allowed us to embed the values of young African-American women with the HIV prevention messages and vignettes. During this session the women discussed the positive attributes of being an African-American woman, identified personal African-American women role models, and engaged in values clarification exercises. At the end of this session, the participants framed postcards designed by African-American female artists, and the peer and health educators discussed how these artists served as positive role models for African-American women.

The second session emphasized HIV risk reduction information by increasing participants' knowledge about HIV-associated risk behaviors and preventive strategies. A key component of the social cognitive theory is enhancing risk and prevention knowledge. The intention of this session was to enhance women's perceived risk of HIV and discuss how the HIV epidemic disproportionately affects African-American women compared with white women. Participants viewed and discussed an HIV educational video, "AIDS: Me and My Baby," which encouraged women to take responsibility for sexual decision making. This session focused on staying safe not only for oneself but also for one's children and family, as unity and the family are values that are highly prioritized by many African Americans. This session also discussed the social relations that place African-American women at greater risk for acquiring HIV. During this activity, the women discussed the consequences of having a sexual partner who injected drugs or who had been in jail and may have had sex with another man.

Another cornerstone of social cognitive theory promotes the acquisition and proficiency of preventive skills and enhancing one's self-efficacy by performing these skills. Thus, the third session emphasized enhancing women's sexual assertiveness and communication and developing their self-efficacy with regard to performing these skills. Participants were first taught the difference between and the consequences of being assertive, passive, and aggressive in a relationship. The women were taught to distinguish between these communication styles in nonsexual vignettes using scenarios common to African-American women. For example, in a nonsexual scenario, a peer educator modeled how a young African-American women assertively communicated to her beautician the need to restyle her hair braids prior to leaving the salon so that they appeared more attractive. Women were then taught an assertiveness model to assist them in managing risky sexual situations. The assertiveness model, known as the SISTAS assertiveness model, had six steps, including, (1) thinking of oneselffirst, (2) using the *information* they gained to practice safer sex, (3) assessing the situation, (4) stating the trouble or concern to their partner, (5) informing the partner of their concern in an assertive manner, and (6) suggesting alternatives that both partners could be comfortable with if safer sex was not an option (i.e., massaging or cuddling). Subsequent to learning the SISTAS assertiveness model, the women applied the model to assist

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them in negotiating the safer sex vignettes. All exercises by the peer health educators were role-played by participants in several practice situations with the peer health educators providing corrective feedback.

The intention of the fourth session was to enhance proficiency in using condoms properly, to increase feelings of self-efficacy in using condoms, and to foster positive norms about consistent condom use. The health educator first sought to dispel many of the myths and misconceptions that many African-American women have regarding condoms and their use. Then, the peer educators conducted condom use demonstrations with African-American phallic replicas. Subsequently, the participants engaged in role playing in which they practiced condom application on the phallic replicas. Norm-setting exercises focused on establishing the perception of consistent condom use as becoming more normative with young adult African-American males and females.

The fifth session emphasized coping skills. A key component of the theory of gender and power is the division of labor. During this session, the health educator defined coping and discussed adaptive and maladaptive coping styles. The vignettes focused on refining women's assertiveness skills to avoid sex when they or their partner are under the influence of alcohol, if a condom is not accessible, or if one's sexual partner is abusive. This sessions also discussed characteristics of healthy and unhealthy relationships and provided the participants with information about resources for women in abusive relationships. At the end of this session, the participants read a poem or story that illustrated how they had grown as African-American women as a result of the SISTA project. At the end of the fifth session, women received a certificate of empowerment signed by the project director that congratulated the women on their achievements.

## Results of the Evaluation

A total of 128 African-American women 18 to 29 years of age (mean, 23.2 years; SD, 3.8 years) completed baseline interviews prior to the intervention. Of the 128 participants completing baseline interviews, 100 (78.1%) completed 3-month follow-up interviews. Follow-up rates differed by treatment condition, with 48 (90.6%) participants in the social skills intervention, 29 (82.9%) participants in the HIV education condition, and 23 (57.5%) participants in the delayed HIV education control condition completing the 3-month follow-up interview.

Women in the social skills intervention, compared to the delayed HIV education control condition, were twice as likely to practice consistent condom use, nearly twice as likely to have greater sexual self-control, four times as likely to engage in sexual communication, nearly twice as likely to be sexually assertive, and twice as likely to have a sex partner whose norms were supportive of consistent condom use.

No statistically significant differences in outcome variables were observed

between women in the HIV education condition relative to those in the delayed HIV education control condition.

## Discussion of the Program

This study is the first randomized controlled trial of a community-based sexual risk reduction intervention for economically disenfranchised young adult African-American women. Women's self-reports indicate that significant changes were made in theoretically important areas of HIV prevention: the development of interpersonal skills (e.g., in negotiating safer sex practices with partners), coping skills such as exercising sexual self-control, communicating with partners to modify their norms, and, most importantly, consistent condom use. The inference that the increase in consistent condom use is attributable to the social skills intervention is strengthened by the fact that favorable changes occurred in the development of theoretically important HIV preventive skills and norms by women in the social skills intervention group but not by those in the education or control groups.

One methodological characteristic of the present study that differentiates it from other randomized controlled behavior change interventions designed to enhance condom use is the classification of the outcome variable. Consistent condom use was selected as the primary outcome measure based on findings from prospective studies indicating that condoms, when used consistently, can provide a 70 to 100% reduction in the risk of HIV transmission.<sup>17</sup> In particular, the most recent findings from the European Study Group on Heterosexual Transmission of HIV<sup>18</sup> observed no seroconversions among couples who used condoms consistently, while among inconsistent condom users the seroconversion rate was significantly higher-4.8 per 100 person years. Moreover, predictions based on mathematical modeling suggest that, irrespective of the number of sexual partners and the prevalence of HIV among potential sex partners, consistent condom use can substantially reduce the risk of sexually transmitted HIV infection relative to never or half-time condom use.<sup>19</sup> Thus, as empirical evidence supports the clinical and public health significance of consistent condom use for preventing HIV infection, future behavior change interventions should assess consistent condom use as a primary outcome measure for evaluating program efficacy.

## Analysis of the Case Study

The effectiveness of this intervention may be attributed in large part to the focus on gender relations in which HIV sexual risk behaviors occur. In managing safer sex, women have to exercise influence over themselves as well as their sexual partners.<sup>6</sup> However, few HIV prevention interventions have been based on theoretical models that address gender relations.<sup>20,21</sup> The theory of gender and power,<sup>8</sup>

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a gender-appropriate model useful for understanding relationship dynamics, provided a framework for developing and implementing the social skills intervention. In particular, the social skills intervention addressed how to successfully negotiate safer sex and foster favorable partner norms supportive of consistent condom use within the context of a heterosexual relationship where women are often in unequal positions of power relative to men.

## CONCLUSION

Changing individuals' HIV risk behaviors is a formidable challenge. Behavior change represents the endpoint of conscious and unconscious decision-making processes that weigh relevant internal and external influences: interpersonal, social, economic, and psychological influences that are superimposed over traditions, values, and patterns of social organization within a cultural context. Such a complex decision-making process is not likely to be understood in unidimensional or simplistic terms. Hence, as the HIV epidemic continues to evolve, with new groups engaged in different patterns of relationships being affected, ever more sophisticated theories and intervention strategies will be needed. Theories that address multiple rather than single levels of causation and that go beyond a narrow focus on the intrapersonal level to also consider interpersonal and environmental influences will be needed to guide the development and implementation of HIV prevention interventions. By judiciously utilizing psychosocial and structural theories, by closely linking theory directly to programmatic content and mode of implementation, and by carefully evaluating program efficacy, we can better assess our prevention interventions and the relevance and utility of their underlying theoretical models.

## REFERENCES

- 1. DiClemente RJ, Peterson J. Preventing AIDS: Theories and Methods of Behavioral Interventions. New York Plenum Press; 1994.
- 2. DiClemente RJ. Adolescents and AIDS: A Generation in Jeopardy. Newbury Park, CA: Sage Publications; 1992.
- 3. Kohler CL, Grimley D, Reynolds K. Theoretical approaches guiding the development and implementation of health promotion programs. In: DiClemente RJ, Raczynski J, eds. *Handbook of Health Promotion and Disease Prevention*. New York: Plenum Press; in press.
- Glanz K, Lewis FM, Rimer BK. Health Behavior and Health Education. San Francisco: Jossey-Bass; 1997.
- Bandura A. A social cognitive approach to the exercise of control over AIDS infection. In: DiClemente RJ, ed. Adolescents and AIDS: A Generation in Jeopardy. Newbury Park, CA: Sage Publications: 1992; 89–116.
- 6. Bandura A. Social Cognitive Theory and exercise of control over HIV infection. In: DiClemente

RJ, Peterson J, eds. Preventing AIDS: Theories and Methods of Behavioral Interventions. New York Plenum Press; 1994: 25–59.

- McLeroy K, Steckler A, Simons-Morton R, et al. Social science theories in health education: Time for a new model. *Health Educ Res Theory Prac* 1993; 8(3):305–312.
- 8. Connell RW. Gender and Power. Stanford, CA: Stanford University Press; 1987.
- 9. Gillespie D. Who has the power? The marital struggle. J Marriage Family 1971; 33:445-458.
- Kelley HH, Thibaut JW. Interpersonal Relations: A Theory of Interdependence. New York John Wiley & Sons; 1978.
- 11. Airhihenbuwa C, DiClemente RJ, Wongood GM, Lowe A. HIV/AIDS education and prevention among African-Americans: A focus on culture. *AIDS Educ Prevent* 1992; 4:251–260.
- Burdine JN, McLeroy K. Practitioners' use of theory: Examples from a workgroup. *Health Educ* Q 1992; 19:331–340.
- 13. Berry J. On cross-cultural comparability. Int J Psychol 1996; 4:207-229.
- Freudenberg N, Eng E, Flay B, *et al.* Strengthening individual and community capacity to prevent disease and promote health: In search of relevant theories and principles. *Health Educ Q* 1995; 22:290–306.
- Bowser BP. Bayview-Hunter's Point: San Francisco's Black ghetto revisited. Urban Anthropol 1988; 17:383–400.
- DiClemente RJ, Wingood GM. A randomized controlled trial of an HIV sexual risk-reduction intervention for young African-American women. JAMA 1995; 274:1271–1276.
- 17. Fineberg HV. Education to prevent AIDS: Prospects and obstacles. Science 1988; 239:592-596.
- 18. DeVincenzi I. A longitudinal study of human immunodeficiency virus transmitted by heterosexual partners. *N Engl J Med* 1994; 331:341–346.
- Roper WL, Peterson HB, Curran JW. Commentary: Condoms and HIV/STD prevention— Clarifying the message. Am J Public Health 1993; 83:501–503.
- Wingood GM, DiClemente RJ. HIV sexual risk reduction interventions for women: A review. Am J Prevent Med 1996; 12(3):209–217.
- Wingood GM, DiClemente RJ. Understanding the role of gender relations in HIV prevention research. Am J Public Health 1995; 85(4):592.

## Interventions for Commercial Sex Workers and Their Clients

## ELIZABETH N. NGUGI, ERIN BRANIGAN, and DENIS J. JACKSON

## INTRODUCTION

Seroprevalences of HIV-1 in female commercial sex workers (CSWs) of over 80% in sub-Saharan Africa,<sup>1</sup> 40% in Asia,<sup>2</sup> and up to 20% in South America<sup>3</sup> are now common. In the Pumwani district of Nairobi, CSWs who are initially seronegative have a 42% risk of becoming infected with HIV-1 by the end of 1 year of sex work, despite prevention intervention programs.<sup>4</sup> CSWs are at the core of numerous sexual networks, because of their high number of sexual partners, and have a much higher risk of sexually transmitted disease (STD) and HIV infection (and subsequent transmission) than the general population.<sup>5</sup> Studies in northern Tanzania revealed an HIV-1 seroprevalence of 73% among CSWs, compared with up to 3% among blood donors in the same district.<sup>6</sup> Given the well-documented synergy between STD and HIV infection, HIV transmission models have projected that treatment of STDs in a core group of female CSWs would lead to the prevention of approximately 10 times more cases of HIV than treatment of the same number of STDs in women in the general population.<sup>7</sup>

This daily danger of HIV infection has become a fact of life for almost all CSWs in developing countries. It is within this context that health and social welfare workers attempt to decrease the risk of HIV infection for these women and to measure that decrease in order to direct further intervention efforts. This chapter describes the environment, strategies, and effects outlined in reports of evaluated HIV prevention interventions aimed at CSWs in developing countries and offers

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perspectives on future directions. It is not intended that the list of interventions examined be exhaustive, but rather that features of notable interventions be highlighted.

## LIFESTYLES OF COMMERCIAL SEX WORKERS

Female CSWs in developing countries are characteristically poor, have little formal education, and live in a setting where gender inequality dictates that women have little power within their sexual relationships.<sup>2</sup> Their goal is almost always survival. A typical example from Africa is that of Nairobi CSWs, whose earnings of approximately US\$3 a day are comparable to the earnings of a manual laborer. Young women entering sex work in their teenage years fall into two broad categories: the rural girl who migrates to the city to find work and make money for herself and her family, and the urban girl from the slums who has no other prospect of employment and who may be the daughter of a sex worker herself. These young women often have had a child outside marriage or are estranged from their families for other reasons. Some girls are sold into indentured service by their families.8 Older women, in their 20s or over, are commonly divorced or widowed and have several children whom they must feed and try to educate. The death of husbands from AIDS has already forced many widows into sex work, creating another dangerous synergy between HIV and sex work.

The clients of female CSWs in developing countries are often men who live away from home. Many live in a culture where sex before marriage is not socially acceptable, with the result that single men visit CSWs.<sup>9</sup> Because of the economic circumstances of the women, their low social standing, and the large number of women selling sex, the client of the sex worker retains the power in the sexual relationship.<sup>3</sup> Combining risk reduction with economic survival can thus be difficult or impossible for CSWs without the consent of clients. If a client visits the same sex worker on several occasions, the nature of the relationship often changes: the client may come to view the sex worker as a girlfriend and may help with her subsistence costs rather than paying a fee per sex act.<sup>10</sup> This financial and emotional shift in the relationship is disadvantageous to both partners, as the man feels more secure not to use a condom and the woman is more dependent and less able to insist on condom use.

One aspect of the client-sex worker relationship, which is not often discussed, is the emotional needs of the client. It is not safe to assume that men only visit CSWs for sexual gratification. Many of the young men who visit CSWs have moved away from home to find work. They are often socially dislocated, suffer from a sense of isolation, and live in bachelor groups under brutal conditions. Sexual contact may be the only form of human tenderness to which they have access. This emotional need for intimacy, which they cannot admit to themselves

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or their peers, may contribute to unsafe practices, such as offering to pay more for sex without a condom.

It is important to remember that sex work followed the same pattern during the period of industrialization of North America and Western Europe, when there was widespread poverty, large-scale movements of men to work on building national infrastructures, and many thousands of CSWs in Victorian London. While the current studies relate to the countries and cultures of the South, it needs to be recognized that sex work has no ethnic basis, and its magnitude at any given time, in any given place, is usually a function of socioeconomic circumstances.

Sex work, or prostitution, is known as the oldest profession. It is also the profession that is subject to the most draconian legislation and pejorative namecalling. In most countries, sex work is illegal. Yet laws banning sex work usually do not eliminate it; they typically serve only to increase the corruption of public officials and police, the oppression and degradation of CSWs, and the creation of additional barriers to STD and HIV control. Nonetheless, it is also true that in some countries official prohibition coexists with a spirit of tolerance and regulation for the public good.

There are several ways in which sex workers can meet their clients: independently or through broker-mediated ("protected") encounters. Broker mediation and protection can range from relatively benign to violent and abusive. This range is best illustrated in brothels ("direct" sex work), where CSWs may have an arrangement akin to a hotel, where they rent rooms and enjoy collective protection for a percentage of their earnings,<sup>11</sup> or it may be a situation where the women are prisoners and the brokers are the guards.<sup>2</sup> The brokers may be male (pimps) or female (madams). The pimp usually has more of a controlling influence over the sex worker and often exercises and cements his domination by also being a regular nonpaying sex partner. Other women may work in establishments such as bars. discos, or massage parlors ("indirect" sex work), where they supplement their income by selling sex and are subject to varying degrees of regulation. In some countries in sub-Saharan Africa, home-based CSWs are common; they work independently by sitting outside the door of their houses in the slums and waiting for clients, mostly during the day. Sometimes girls who still live at home also engage in sex work without the knowledge of their family, usually with the help of a broker who arranges meetings with clients.9 Of all the categories of sex workers, it is the street workers, who usually have no premises to work from and are very visible, who tend to be subjected to the most harassment and abuse.

Male CSWs, who are typically engaging in commercial sex with other men, often are even more stigmatized than female CSWs,<sup>12</sup> but they are far less common, and the power relationship between CSW and client may be less clear-cut. Male CSWs who service men, such as young boys forced into sex work due to poverty or homelessness, may not consider themselves homosexual.<sup>13</sup> Their clients may seek out CSWs because of strong cultural taboos, which prevent men from

openly admitting sexual interest in other men.<sup>14</sup> Male CSWs are more common in South America and parts of Asia than in Africa; sometimes they form culturally distinct subgroups, such as the transvestite *waria* of Indonesia and *ali* of south India, who often initiate young men who do not consider themselves homosex-ual.<sup>9,14,15</sup> While male CSWs contribute relatively little to the huge burden of HIV infections in developing countries, they may have served as entry points for HIV into communities, through bisexual bridges into heterosexual networks.<sup>16</sup> An analysis of HIV/AIDS surveillance data and 60 HIV-1 surveys conducted in Latin America from 1987 to 1990, found significant male-to-female transmission from core groups of male CSWs, via their bisexual clients who were married or had stable female partners.<sup>17</sup>

It is also possible that sex tourists from industrialized nations introduced HIV into previously uninfected areas through relations with local sex workers, female or male. Once local transmission is established, however, their continued presence is not necessary to maintain the epidemic, and now that prevention methods are well known, tourists are often more likely to use condoms with sex workers than are local residents.<sup>18</sup>

## INTERVENTIONS FOR COMMERCIAL SEX WORKERS

The dearth of studies on interventions for male sex workers in developing countries makes it impossible to examine the types of interventions that have been implemented for this population. Pilot HIV prevention programs clearly have been initiated for male sex workers, particularly in Latin America, and it is hoped that studies assessing their effectiveness will be published in the future. Because of their present unavailability, however, this chapter's discussion of interventions will necessarily focus on those that have been implemented for female CSWs.

CSW interventions have employed several strategies with varying degrees of measured impact. There have been four broad approaches, involving different strategies, though often multiple strategies are employed in the same program (Table 1).

Evaluated interventions, incorporating components of these strategies, are reviewed. Interventions in the three geographic regions (Africa, Asia, Latin America) are discussed separately for the sake of convenience and because the cultural contexts, and the stages of the epidemic differ. The reader is offered brief accounts of the salient features and results of each of the selected interventions.

## Asia

Although the first case of HIV was not documented in Asia until 1985, it is projected that this continent will have the highest number of new infections and

Purpose	Method
Sex worker training (HIV prevention methods, as well as literacy,	<ul><li>Training of peer educators</li><li>Small group education and counseling</li></ul>
income generation, etc.)	<ul> <li>Larger group activities and education</li> </ul>
Promotion of barrier methods	<ul> <li>Condom-only brothels</li> </ul>
	<ul> <li>Condom distribution (free and social marketing)</li> </ul>
	• Female-controlled biological barriers (nonoxynol-9)
	Female condom
STD care	<ul> <li>Contact tracing and partner treatment</li> </ul>
	• STD screening and treatment (for CSW and clients)
	<ul> <li>HIV screening and counseling</li> </ul>
Education	<ul> <li>Mass media campaigns for clients</li> </ul>
	Targeted education for CSWs

Table 1. Interventions Used with Commercial Sex Workers

the most people infected with HIV by the year 2000.<sup>19</sup> There has been an explosion in HIV-1 seroprevalence rates in CSWs in South and Southeast Asia, particularly in the early 1990s (see Chapter 2, this volume).

### Thailand

Thailand has been one of the countries most afflicted with HIV and has gone the farthest in striving to reduce rates of infection. Indeed, the mixed intervention strategy for HIV prevention is best illustrated by the example of Thailand, where sex work is technically illegal but where the government has adopted a pragmatic, multifaceted approach to the epidemic. The elements of the national program are mass media campaigns encouraging condom use during commercial sex, distribution of sufficient quantities of condoms to cover most commercial sex activity, and the introduction of a condom-only brothel policy, enforced by tracing the CSW partners of male STD clinic attendees and penalizing brothels for noncompliance with the condom use policy.<sup>20</sup> A large-scale expansion of the existing network of STD clinics also took place between 1991 and 1994.<sup>21</sup> On a smaller scale, other projects have been implemented.<sup>22</sup>

The multifaceted national program appears to have been very successful, based on multiple measures: HIV rates in army conscripts, STD incidence rates in men, and surveys of condom use. Sexual histories and HIV prevalence figures were obtained from a sample of 21-year-old men from northern Thailand who were conscripted into the army by a lottery in 1991, 1993, and 1995. Between 1991 and 1995, reported visits to CSWs during the previous year decreased from 57% of conscripts to 24%, condom use during the most recent commercial sex act increased from 61 to 93%, and the percentage of men who reported a lifetime

history of an STD dropped from 42 to 16%. HIV prevalence in this cohort of 21-year-old males decreased from a high of 12.5% in 1991 to 6.7% in 1995.<sup>23</sup>

Between 1989 and 1994, the number of male cases of five standard STDs seen at government clinics in Thailand declined by 85%, from 199,000 to 28,000 cases.<sup>21</sup> This decline is particularly impressive given the steady rise in the reported incidence of these infections in Thailand since the mid-1960s. This decline also has to be seen in the context of the increase in the number of government STD clinics from 85 in 1990 to 474 in 1994. This expansion and improvement of public STD treatment facilities increased accessibility of care, enabling CSWs and clients to obtain regular and efficient screening and management of sexually transmitted diseases. Finding the source of infection has also been important. Since almost all men (96%) who present at government STD clinics with an infection in Thailand give a history of commercial sex contact, STD patient reports can be used to identify unregistered or noncompliant commercial sex establishments, that is, those not complying with the 100% condom use policy.

Surveys of CSWs indicated that the percentage of commercial sex acts protected by condom use increased from 14% in 1989 to 96% in December 1993.<sup>21</sup> While condom use may be exaggerated in self-reports by CSWs who tell interviewers what they think they want to hear, the low level of freelance sex work (i.e., outside brothels) in Thailand ensures that at least a representative sample can be achieved in surveys of CSWs in brothels. Further, the fact that almost all CSWs work in brothels has meant that almost all CSWs can be reached by public health education staff and official condom distribution efforts. One additional feature of the Thai 100% condom policy has been the logistic support for condom distribution, which, combined with all private condom sales, ensures that there are enough condoms available to cover all commercial sex acts.<sup>20</sup> This is clearly important, in that attempts to enforce a policy of consistent condom use would be fatally weakened by lack of condom availability.

The registration of all commercial sex establishments is very helpful in countries like Thailand where the brothel system is common and corruption of police and government officials has not become institutionalized. It has enabled the 100% condom policies in Thailand to be enforced. The political situation in Thailand also has contributed positively to this process, in that decision makers did not make sex work and HIV prevention a moral issue, and health and social welfare professionals were able to structure coherent HIV control programs around a perceived and acknowledged public health problem.

A number of smaller-scale interventions also have been undertaken and likely have contributed to the apparent reduction in high-risk behavior and in HIV transmission. One notable yearlong intervention targeted CSWs in brothels, brothel owners, and clients in urban Chiang Mai, in Northern Thailand in 1992.<sup>22</sup> Almost 500 women and over 40 brothel owners took part in the program, which included the following components:

- 1. Small-group training sessions for CSWs. These sessions, held for 2 hr every 3 months, were conducted at each brothel by government health workers. The cumculum included sessions on HIV transmission and AIDS, the concept of personal risk, condom demonstration, and condom negotiation skills. An approach based on hope of a better future, rather than the fear of AIDS, was used to motivate the women.
- 2. Peer educators. The project staff selected experienced CSWs in each brothel, who could serve as role models and peer educators ("super-stars") for the other CSWs.
- 3. A "model brothel" policy. Influential brothel owners were enlisted to encourage the owners of surrounding brothels to institute the condomonly policy, which was being implemented nationally at that time. A cost-benefit approach was used as motivation: the condom-only policy could help brothel owners save money on the cost of STD treatment (US\$200–240 per month for 30 women). The CSWs' ability to work longer and more consistently if free of disease was emphasized.
- 4. Free condom supply. Government public health agencies supplied condoms twice a week to all sex establishments, free of charge.

To assess compliance with condom use, volunteers posing as clients visited the CSWs before and after the intervention. Before the intervention, 42% of women surveyed by the volunteer "clients" refused to have sex without a condom, even when the client insisted and offered to pay three times the usual fee. Immediately following the program, 92% refused; 1 year later, 78% refused in the same scenario. Once the program was well established, neither the owners nor the CSWs reported a decline in the number of clients or in net income. It would be interesting to repeat this evaluation now, given the decrease in brothel visits by young men in recent years.

The investigators of this program recognized several possible impediments to its sustainability and replicability, the twin yardsticks of success of any research intervention. This staff-intensive program relied on ongoing outreach activities, yet full and active government support for the program declined once the initial funding was expended. They also questioned whether compliance might decline if condoms were no longer distributed free.

This intervention, like the national program, focuses on brothel-based sex workers ("direct" CSWs). Women who work out of non–sex-related establishments such as bars or massage parlors ("indirect" CSWs) also need to be targeted by AIDS prevention campaigns. The Bangkok Behavioral Surveillance Survey carried out biannually in eight different population groups,<sup>24</sup> revealed in 1993 that 89% of direct CSWs reported consistent condom use, compared with only 56% of indirect CSWs. By 1997, consistent use by both types of sex workers had increased significantly (P < 0.05) and the gap between the two groups became slim: 97%

consistent use for direct workers and 89% for indirect workers. These figures, however, are for condom use with a paying partner. Consistent condom use with nonpaying partners remained low in 1997 (18% for direct, 17% for indirect sex workers). Indirect sex workers were much more likely to have nonpaying sex partners (55%) than direct workers (38%).

## India

Perhaps the most worrying of the insights into the nature of sex work come from the Indian subcontinent. An evaluation of the impact of an intervention to prevent HIV and STD infection and promote condom use among CSWs in Bombay was carried out in 1992 and 1993.<sup>2</sup> According to the authors,

[t]he sex industry in India, along with other Asian countries, displays often appalling conditions of forced prostitution and sexual exploitation. Prostitution is illegal in India, but young girls are frequently kidnapped and sold to brothel-owners through a network of agents for money to families or villages. These women are often difficult to approach because they fear loss of business or arrest by police. Access to medical care is minimal and women rarely if ever go to public hospitals. (p. S22)

These scenarios pose ethical dilemmas for investigators and public health workers. Are they being complicit with an inhumane situation when they work on prevention interventions in that context?

The investigators in the Bombay study estimated that there were as many as 100,000 CSWs in Bombay, 5,000 of whom were informed of the study. A total of 334 CSWs and 20 madams were recruited from the intervention area, and 207 CSWs and 17 madams from a similar control site, both in red-light areas of Bombay. This self-referred sample was 0.5% of the total population under study.

CSWs in the study, mostly uneducated women who came from the adjacent country of Nepal, lived under prisonlike conditions: their activities were strictly controlled by their madams or brothel-owners and they were rarely allowed out alone. Access to this population was gained through the help of a local physician who treated STDs and who was known to the members of the Nepal CSW Association, CSWs and madams interested in the study came to a project clinic to obtain more information. Verbal informed consent was obtained after the reading aloud of a consent document, because most of the women were illiterate. The study did not indicate what language the consent document was read in, but no women declined enrollment. Knowing more about the motives of the madams in bringing the women to the study site would have been of interest for structuring future interventions that target CSWs through their madams. The extent to which the CSWs were able to exercise free will in deciding whether to join the study is open to question, as the women were brought to the site by the madams. All CSWs were tested for antibodies to HIV and syphilis and for hepatitis B surface antigen. Women complaining of symptoms underwent STD evaluation. Posttest counsel-

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ing, including information on HIV transmission and prevention, was given to all women, including the control group, along with the test results. A questionnaire was administered that included questions on HIV/AIDS knowledge, sexual behavior, drug use, and client behavior.

Groups of 25–30 women in the intervention group viewed educational videos on HIV/AIDS and attended large- and small-group discussions on three or four occasions. Pictorial flyers on condom use and safer sex were given to the CSWs and similar posters were placed in brothels. Fifty good-quality condoms were provided to each CSW per week. No condoms were supplied to the control group.

A separate intervention was developed for madams; they came in two smallgroup sessions for education and motivation regarding the importance and economic benefit of helping to maintain the health of CSWs. As an additional incentive to attend the group sessions, videos of popular Hindi songs from films were shown and social functions were organized for both the madams and CSWs.

The baseline level of knowledge about HIV and experience with condoms was extremely low among both CSWs and madams. The prevalence of HIV antibodies was 47% in the intervention group and 41% in the control group. The incidence of HIV and STDs during follow-up was significantly different in the two groups (all P < 0.005): 0.05 and 0.16 per person year (PY) of follow-up for HIV, and 0.08 and 0.22 per PY for syphilis in the intervention and control women, respectively. These significant differences in incidence of sexually transmitted infections were achieved in a very short period. This scenario mirrors the Nairobi experience outlined below,<sup>25</sup> and illustrates the potential impact of CSW interventions.

At follow-up, some 42% of CSWs in the intervention group said they were willing to refuse clients who would not use condoms (vs. 0% at baseline; P < 0.001), but the study does not report whether any CSWs had actually refused clients on this basis. Both the CSWs and the madams were concerned about losing business if condom use was insisted upon, yet CSWs who reported using condoms "always" increased from 3% to 28% (P < 0.001); "sometime" use went from 31% to 70% (P < 0.001); and 100% of madams in the intervention group claimed they now kept a stock of condoms available in the brothel. Reported condom use in the control group showed little change and remained at a very low level. Madams of CSWs in the control areas did not keep a stock of condoms, clients rarely brought them (there was no intervention targeted at males), and the women were rarely allowed to leave their brothel-prisons, and thus could not go to purchase them. Even if they could, the cost of condoms would be a significant proportion of their income.

Knowledge of HIV transmission and prevention also increased among the intervention CSWs; while at baseline only 60% responded that HIV is transmitted through sex, this increased to 99% after the intervention. In the control group, women giving correct responses dropped from 56% to 26%, largely due to women

answering "don't know." Possible reasons offered by the investigators to explain this decline in knowledge in the control group were:

- 1. Without intensive education, the illiterate women may not grasp even the basic concepts of HIV transmission.
- 2. The self-report data were unreliable, and the CSWs were reluctant to admit greater knowledge in the absence of power to use that knowledge, so as not to lose face with the interviewer.

It is also possible that practicing this kind of denial may enable women in the control group to cope with a situation that they believe they have little power to change.

Another notable and multifaceted STD/HIV intervention for CSWs and their community was initiated in Calcutta in 1992 by a consortium composed of United Nations and government agencies, a school of public health, local nongovernmental organizations, and, subsequently, a sex worker organization.<sup>26</sup> The Sonagachi red-light district of Calcutta is estimated to house 4000 CSWs in 370 brothels. The CSWs live in crumbling tenements and may operate independently or under the control of madams or pimps.

The main program components were:

- 1. Provision of health services. A clinic was opened at a youth club in the heart of the red-light district in 1992. Though the emphasis is on sexual health, the clinic provides general health services. Clinic hours are from 11 AM to 2 PM (during a lull in the sex business), 6 days a week.
- Information, education, and communication. Peer educators receive 6 weeks of training and work a few hours each day under field supervisors. They contact 40–50 CSWs and 10–15 madams per day, providing them with education, motivating them, and distributing condoms.
- 3. Condom distribution. The peer educators distribute condoms to CSWs but also collect information on condom use and client refusal. The program has not always been able to meet the demand for high-quality imported condoms.
- 4. Other activities. To reduce the isolation of CSWs, the program arranged social visits to different parts of the city, as well as opportunities to meet with other segments of society to learn as well as educate others about their lives. The project helped to organize the first CSW-run cooperative in Asia, which featured social marketing of condoms, sold essential commodities, and provided loans to CSWs. And when peer educators expressed a need to read and write, they received literacy and numeracy training from their supervisors or literate peers. An evening clinic targeting clients was also opened, and an educational campaign targeting them initiated.

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To evaluate the program, a survey was conducted of a random sample of 612 CSWs, along with physical examinations using laboratory testing, 14 months after the initiation of the intervention. Over this study period the prevalence of gonorrhea in the CSWs decreased by 70% from the baseline and syphilis by 16%; HIV prevalence remained at 1%. "Regular" use (undefined) of condoms was reported to have increased to 47% of CSWs, compared to 1% at baseline. Client surveys reported that 71% of sex acts performed on the previous day were protected with condoms, indicating that at least that percentage knew they should have used a condom. Awareness of AIDS increased from 31% to 86%.

The investigators attributed the project's success to a number of factors including the trust and rapport between the community and the project personnel, the use of CSWs as peer educators, the project helping the CSWs to band together as a community, the effort to incorporate the perceived needs of the CSW community into the program, and program personnel serving as advocates for CSWs. They noted the following serious problems, however, which the project has been unable to resolve:

- 1. The madam- and pimp-regulated sex trade, as well as cramped conditions (four CSWs to one room), which prevents CSWs from asserting themselves, especially in negotiation with clients for condom use.
- 2. "Babus" (husbands or lovers of CSWs) who have very low rates of condom use.

A more limited intervention in Delhi was initiated in 1988 with an "intense" awareness campaign for female CSWs.<sup>27</sup> This intervention is worth discussing as it illustrates the effects of an intervention that is far more modest and single-faceted than those discussed above. A film, made in Hindi with the participation of CSWs, was shown in Delhi brothels; each screening was followed by a short discussion. At baseline, 1/701 CSWs was found to be HIV seropositive. A repeat study in 1990 found 1/600 to be seropositive. "Regular" condom use increased from 20% to 50%, with 40% of the women stating that they used condoms "most of the time." Interpretation is difficult, as many of the interventions were not characterized in the publication, though the use of peer educators in a video for CSW education appeared to be one clearly positive feature.

The above interventions in Bombay, Calcutta, and Delhi all focused on CSWs working in brothels. A pilot project for HIV prevention targeting CSWs and sex brokers in Madras, India, on the other hand, also targeted CSWs outside brothels.<sup>9</sup> The project worked outside any formal or informal organization of CSWs, to reach "occasional" sex workers. The research team gained access to the underground sex circuit and designed and tested community-based strategies in a limited geographic area. An estimated 500 CSWs worked in the area: approximately 300 "family girls" who lived at home and worked without the knowledge of their families, using trusted brokers (male or female) or friends to procure clients; 100

brothel-based workers; and another 100 street workers. There were approximately 800 client visits each day, mediated by around 40 female and 35 male brokers.

Peer educators were recruited mainly among the brokers and information, education, and communication materials were designed in consultation with the brokers and CSWs. Leaflets, posters, comic books, and audio cassettes were adapted to the literacy level of the CSWs. The materials were designed to promote the idea that "safe sex is fun." Educational messages and an introduction to the project were presented as well as a popular Tamil film and folk dances. Peer educators were provided condoms to sell for a small profit. They performed information, education, and communication outreach work and also manned the project's office, which became a drop-in center. After a few months of the project, condom sales by peer educators were meeting 21% of the estimated monthly requirements for CSWs. Older clients were more receptive to condom education, especially messages that appealed to their responsibility to safeguard the health of their families. Younger men proved difficult to motivate and "berated brokers for spoiling their pleasure."

Unfortunately, the peer educator system did not proliferate in the way it was initially hoped; efforts continued to rely on the peers recruited during the pilot phase, and their initial enthusiasm for the project declined. The latter was reported by outreach workers to be because of their difficulties in sustaining both their own interest and that of the target audience in a symptomless disease that might manifest itself at some time in the future. Moreover, given the limitations on what the peers could do, they ended up concentrating on providing information and selling condoms; outreach became just another way of making money rather than an instrument for community empowerment. The program was irreparably damaged in October 1993 by a police crackdown that forced most of the brothels in the area to close or relocate. The program subsequently abandoned its targeted interventions for CSWs and clients and began to serve the general public. Researchers concluded that the organization of the commercial sex trade in Madras that drives prostitution underground is not conducive to the kind of collective action required in community-based HIV interventions.

## Indonesia

A behavioral intervention implemented in Indonesia (a country that currently has a low level of HIV/AIDS) took a different approach in emphasizing the economic incentives of STD/HIV prevention, not using peer educators, and explicitly basing the intervention on theories of behavior change. This intervention targeted low-priced female CSWs in large brothel complexes, their pimps, and their male clients and was carried out near Denpasar, the capital of Bali, in 1994.<sup>28</sup> Approximately 1000 CSWs live in these brothels and each services an average of 16 clients per week. (Despite being illegal, prostitution is reportedly present throughout

Indonesia, and in Bali is concentrated near the capital city of Denpasar.) The project had two intervention areas, with different condom interventions, and one control area.

Theoretical perspectives guiding the intervention were the health belief model and social cognitive theory. Trained outreach workers were used instead of CSW peer educators because of high levels of mobility by CSWs. These outreach workers provided a three-session series of interactive lectures to CSWs in the intervention areas and visited the complexes to provide informal advice and condom supplies. The program for the CSWs was designed to: (1) increase AIDS/ STD knowledge; (2) increase perceived susceptibility to these diseases; and (3) improve skills related to condom use and partner negotiation. Two sessions were also held with the pimps in the intervention areas, focusing on increasing their knowledge of STD/HIV transmission and prevention, and promoting condom use. The economic incentives of STD/HIV prevention were emphasized; condoms were provided to pimps in one intervention area at subsidized prices, and the pimps in turn sold them to clients at a profit. CSWs in the other intervention area were provided with free condoms throughout the intervention. The aspect of the program focusing on client education involved the use of posters and pamphlets, specifically targeting clients of low-priced CSWs in the brothels. These materials aimed at increasing clients' knowledge of and perceived susceptibility to AIDS/ STD, as well as promoting the use of condoms to prevent these diseases. In the control area, brochures and condoms were given to CSWs after the baseline questionnaire and project staff answered their questions about STDs and AIDS; following the final evaluation of the intervention, the outreach workers conducted educational sessions there.

Evaluation data were collected through surveys of 300 CSWs and 300 domestic clients at baseline and after 6 months of program activities. Pimp involvement in the intervention was assessed in interviews completed with them before and after the formal training sessions and by asking the CSWs questions in the evaluation survey about their pimps' actions toward condom promotion in the complex. The evaluation results showed that for CSWs, clients, and pimps, HIV and STD transmission knowledge increased significantly in the two intervention areas from baseline to the evaluation at 6 months (and a "dosage" response was seen, with CSWs' knowledge being significantly related to the number of educational sessions attended). Knowledge of AIDS also increased significantly in the control area for CSWs, though not for clients (pimps in the control area were not included in the study); the increase in CSWs knowledge in the control area was possibly due to the HIV/AIDS media campaign in Indonesia. Despite significant increases in knowledge, certain misconceptions remained such as the view by pimps that antibiotics should be taken regularly to prevent STDs, and by CSWs that traditional medicines could prevent STDs.

According to both the CSW and the client survey, condom use increased

significantly and substantially in the intervention areas. As an example, condom use for vaginal sex with paid partners the day before the interview increased in the intervention areas from 18 to 75% and 29 to 62% of the CSWs (the higher figure was reported in the area with free condom distribution, though free distribution was not necessarily responsible for the greater magnitude of change, given the other differences between the two intervention areas such as police raids and client mix). The percentage of women whose pimps encouraged them to use a condom also increased considerably in the two intervention areas from 10% to 83% and 16% to 86%. Several of the condom use indicators increased significantly in the control area as well. The increases were not as substantial, however, as in the intervention areas, though this may have been due, at least in part, to the fact that at baseline there were higher levels of condom use in the control group. The baseline condom use indicators were almost uniformly higher in the control group; these indicators included "used a condom with an unpaid partner in the previous week" (control area 20% vs. free condom area 1% at baseline), and "always had condoms available in rooms" (control area 27% vs. free condom area 0%). Clearly there are limits to how far investigators can go to ensure reasonable homogeneity between intervention and control areas, but it does raise questions about differences in the CSWs' condom negotiation skills and experience in the intervention and control areas of this study, the reasons for those differences, and how they affected the comparability of the two groups.

## Africa

By 1996, it was estimated that over 13 million people had been infected in sub-Saharan Africa, a pandemic partially fuelled by concurrent epidemics of other STDs.<sup>16</sup> Commercial sex workers have been one of the most afflicted groups in the African pandemic. In Rwanda, one of the countries with a high prevalence of HIV, an HIV seroprevalence of over 80% was documented among CSWs as early as 1985.<sup>1</sup> Commercial sex work exists in various forms throughout Africa (direct and indirect, full time and occasional, for money and for barter), though not typically in the context of the large-scale brothels common in Asia.

Promising interventions with CSWs in Africa have illustrated that achieving risk-reducing behavioral change is possible, though more research is needed on whether this behavioral change is sustained, particularly when interventions have been discontinued or reduced in their intensity. Further, a considerable problem with CSW interventions in Africa has been that their coverage, in terms of numbers of CSWs reached, has been very limited. In Kenya, for example, only a fraction of the CSWs are being reached. One reason for this has been that most programs have been undertaken as small demonstration projects by dedicated nongovernmental organizations (often supported by external donors) without the capacity to expand the projects to a larger scale. Consequently, in relation to need, the number of sex

workers incorporated into prevention programs remains small. The primary limitation in improving coverage for CSWs appears to be insufficient funding, though inadequate political commitment (which is related to funding) is undoubtedly also a factor.

## Republic of Congo (Former Zaire)

One of the most well-known interventions for CSWs in Africa was conducted by Maria Laga *et al.*<sup>29</sup> in Kinshasa, Democratic Republic of Congo. It combined a behavioral component (largely condom promotion) with monthly STD screening and free treatment, and followed a cohort of 531 initially HIV-1-negative females from 1988 to 1991. Study participants were seen every month for STD evaluation and individual health education with the provision of free condoms and every 3 months for group sessions aimed at condom promotion and for HIV-1 screening. HIV-1 incidence declined steadily from 11.7 per 100 PY during the first 6 months of follow-up to 4.4 per 100 PY during the last 6 months of follow-up (P < 0.003). The HIV-1 incidence rate ranged from 44.2 per 100 PY among irregular visitors to 2.7 per 100 PY among the most frequent clinic visitors, suggesting a dosage effect (greater effects with higher levels of exposure). While condom use was associated with regularity of clinic visits, the decline in HIV-1 incidence associated with increasing regularity of clinic visits remained significant for both regular and irregular condom users. This indicated that STD treatment had an impact on the incidence of HIV-1, independent of the impact of increased condom use. Consistent with other studies was the complaint by CSWs that the main obstacle to achieving 100% condom use was clients' refusal to use condoms.

The study results suggest that the decline in HIV incidence was not due to a saturation effect. Such an effect can occur when the highest-risk individuals seroconvert first, whether or not there is any intervention. The lower-risk individuals become infected at a lower rate because they engage in lower risk behavior or because of other constitutional factors that remain to be fully elucidated. In this intervention, the Zairian CSWs who seroconverted did not report a significantly higher mean number of partners than those who did not seroconvert, suggesting that they were probably not a higher-risk group, though it is possible that their client mix might have been different in the sense of having more higher-risk partners.

## Kenya and Zimbabwe

Two of the first peer-mediated CSW interventions in Africa, undertaken in Kenya and Zimbabwe, were examined in a study published in 1996.<sup>30</sup> The Zimbabwe study for CSWs was initiated in 1989 by the Bulawayo City Council. Program components included:

- 1. Rapid assessment. This included surveys of CSWs and clients, ethnographic assessment and mapping, and the identification of key informants.
- Female peer educators. About 80 informal leaders among the CSWs were recruited and trained as peer educators. They distributed condoms as well as free STD treatment cards for use at public sector health facilities.
- 3. Male peer educators. These educators were recruited and trained to work with vulnerable groups of men (CSW clients, military, truck drivers, migrant workers).

An evaluation, conducted in 1992, reported an increase in condom use from 18% of all reported sexual encounters at baseline to 66% at evaluation. A strong linear relationship between condom use and frequency of exposure to the educational program was determined, indicating again the dosage response reported in other studies for CSWs. The study also reported a significant decline in the general community in attendance at governmental health facilities for STD treatment (mostly men) in the period after the intervention focusing on female sex workers. While this decline cannot be attributed to the intervention, the reduction in STD attendance after the onset of the intervention was paralleled in the Kenyan study.

The intervention in Kenya targeted female CSWs in the Pumwani area of Nairobi. It began to show promising results in 1986, leading to four new sites subsequently being established in Nairobi and other parts of Kenya. The following strategies were used in Pumwani:

- 1. Entry into the community through the use of key informants. A health committee of researchers and CSWs representatives was formed.
- 2. The organization of a *baraza*, or public meeting, for all CSWs; at the *baraza*, the issue of sexual health was discussed, communication links were established, smaller groups of women were formed, and group leaders were elected. After the *baraza*, groups met weekly.
- 3. Leaders were trained as peer educators and counselors; each peer educator was responsible for a group of about 20 CSWs, and in addition to serving as resource persons, they distributed condoms. Traditional media, drama, songs, posters, pamphlets, and video were used to communicate health messages.
- 4. Individual and group STD and AIDS counseling sessions were held that allowed for discussions of difficult issues, including condom negotiation.

The 229 women in the intervention group were asked to attend the project's clinic every 2 weeks for a physical examination and STD treatment, and an opendoor policy was initiated for the 266 women in the control group to attend the clinic if they so desired. Every 6 months all those still residing in Nairobi were seen

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for a physical examination and assessment of infection with STDs, including HIV infection. For the purposes of evaluation, women were divided retrospectively into three groups: group 1 (N = 91) was part of the initial cohort and received all four elements; group 2 (N = 67) did not receive counseling but was part of the initial cohort; and group 3 (N = 205) did not receive anything and functioned as the control group.

At baseline, condom use was low among the three groups (10%, 7%, and 7%). At evaluation 1 year after the baseline survey, at least occasional condom use was reported by 81%, 70%, and 58% of women in the respective groups. There was a dose-related increase in condom use with increased exposure to education and counseling. The increased use of condoms by group 3 (the control group) may have been due to contamination or spillover from informal contacts with groups 1 and 2; further, client-demanded condom use was high in this group, perhaps due to government and Red Cross media campaigns urging condom use.<sup>31</sup> Encouraging with respect to condom use was the finding that the high level of condom use attained by 1989 (approximately 80% of all reported sexual contacts among the CSWs in Pumwani) was still at that level when reported on two years later.

According to the investigators of the study, "any condom use" was associated with a threefold decrease in risk of seroconversion to HIV-1 and there was a decrease in seroconversion associated with "increasing condom use." The investigators suggested that this decreased risk of seroconversion was due to a multiplier effect of (1) decreased number of potentially infective (unprotected) exposures, and (2) decreased risk of HIV acquisition during these exposures due to a decline in prevalence of other STDs known to increase susceptibility to infection, such as genital ulcers (the mean annual gonorrhea incidence rate, for example, fell from 2.85 cases per woman in 1986 to 0.66 cases per woman in 1989). As in the Zimbabwean study, in Pumwani there was a decrease in attendance by men from the Pumwani area at Nairobi's main STD treatment and referral center after the onset of the intervention for CSWs. Although other factors might explain this decline, it occurred in the absence of any observed declines in STD attendance by men from other areas of the city of similar socioeconomic circumstances and has been sustained over time. This provides supporting evidence for the effectiveness of the Pumwani intervention in preventing STDs.

An additional heartening aspect of this study was that HIV status did not influence subsequent reported condom use. This indicates that CSWs will react in a responsible way to HIV screening and counseling, so as to avoid the transmission of the virus to clients.

Recognizing that economic imperatives not only lead women into sex work but also leave them vulnerable to the demands of clients who favor high-risk sexual practices, another small study was carried out in Kenya to measure the effects of an intervention that included an alternative income-generation program on safer sex practices such as condom use and on self-reported STDs.<sup>31</sup> Thirty women received STD/HIV prevention education and counseling and were provided with condoms. They were also individually supported and trained to start an alternative income-generating activity of their choice. Financing to support their small businesses was provided, ranging from US\$76 to US\$228, to be paid back in 12 months. The CSWs' income, through alternative income-generating activities, improved: those earning US\$18 a month increased from 27% to 33%, and those earning US\$8 a month increased from 33% to 43%. New sexual partners decreased from a mean of 3.5 per day to 0.5 per day, and 2 of the 30 women reported having suspended sexual activity at the time of evaluation. Self-reported negotiation for safer sex, even with steady lovers and husbands, increased from 4% to 93% within about 1 year.

It is noteworthy that 80% of the women had suffered a symptomatic STD a year before the study compared to none during the study period. An improvement in the women's self-esteem was noticeable. The consumption of alcohol decreased from 73% to 44% and smoking from 17% to 0. It is likely, however, that over time there will be a decrease in the degree of success of any alternative economic opportunities program, with some of the women returning to sex work. In a program managed by the principal author of this chapter in 1992, 8 out of 60 women who had started businesses recommenced sex work. The reason they gave for this was that they were able to make more money in sex work. The women reported that they used the extra income to buy clothes and other items to make their lives more enjoyable and did not save. While this situation is clearly not ideal, the women were acting of their own free will.

An intervention targeting mine workers in Zimbabwe used a somewhat more coercive approach with CSWs as a means of lowering STD infections in mine workers, one of their client groups. In Africa, employers, particularly large mining companies, have frequently offered HIV education programs. This Zimbabwean mining company went a step further in initiating an STD treatment and prevention intervention among CSWs as ameans of reducing STDs in its employees.<sup>32</sup> CSWs were given a lecture about STD transmission from the company's community health specialist and were asked to form their own committee, which would work with the local STD committee formed by the company. At the first meeting, a health card system for CSWs was decided on. To qualify for a card, each CSW had to undergo a physical examination by the committee's medical officers. No CSWs could enter a beer garden, where most of the clients socialized, without the health card (checked by a security guard). CSWs found to have an STD had their cards withdrawn until they recovered. The researcher gave lectures on STDs in several community and work sites. After the implementation of the intervention, the number of men presenting with an STD at the mine's clinics dropped from 452 cases in March 1988, to 117 in December 1988. This may be due to a decrease in STDs; however, it is also possible that because of the active campaign to reduce

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STDs, workers may have been increasingly reluctant to seek treatment at the company clinic.

A potential problem with this approach may be that the card system for CSWs indicating monthly STD screening was probably interpreted as a "clean bill of health" from the authorities, and could have led to a false sense of security for CSWs and clients alike. Even though the card states that an HIV test is not part of the screening, men might use the card to reassure themselves that their behavior is not high risk. In addition, the date stamps used on such cards are easily copied. Cards can also give police and public health officials cause to harass the women and may encourage corrupt practices. And, finally, there are obvious issues of justice involved in a system where regulation and sanctions are restricted to only one side of a consensual transaction.

## Nigeria

Several of the difficulties in implementing HIV-prevention interventions for CSWs and the importance of understanding a particular context when developing an intervention plan were underscored in a program in Cross River state, Nigeria. This initiative targeted communities of full-time CSWs in 19 sites in the seaport of Calabar and four sites in the border town of Ikom; both clients and CSWs were reached in the program.<sup>11</sup> The CSWs lived and worked in highly structured hotel and housing settings where the owners and hotel managers had significant influence. The program initially encountered substantial obstacles in reaching the high-risk population because of a general apathy to HIV/AIDS (perhaps because of the low prevalence of HIV in the area; in 1989 only 1% of the female CSWs and 1.5% of male clients tested HIV positive), a lack of confidence or trust in the program and its staff by the target population, and the indifference of hotel proprietor/owners and managers.

The proactive role the program played in serving as an advocate of the CSWs in situations of harassment was reportedly helpful in building trust with the target population. Obtaining official support for program activities from the Cross River State Ministry of Health and the Cross River State AIDS Committee was also important. The investigators noted that in addition to the implied message of concern that this relayed to the target community, such official approval can stifle harassment by the police and others.

The indifference of owners and managers was alleviated via their incorporation into the implementation plan; owners and female managers ("chairladies") were used as peer educators and condom distributors. Paid program staff also provided on-site educational sessions, and the program operated an STD treatment clinic. Due to supply difficulties, free condom distribution gave way to condom sales later in the program.

During the 1-year period between September 1989 and September 1990, more than 2500 clients and 1150 CSWs were reached by the program. Comparing the results of a baseline and a 1-year follow-up questionnaire survey administered to CSWs (139 pre- and 102 postintervention), the number of CSWs reporting that they "always" used condoms increased from 12% at baseline to 24% at follow-up, and those never using dropping from 25.2% to 3.0%. With respect to knowledge, belief in the effectiveness of condoms as a method of preventing HIV increased from 17.4% to 82.9%, and the belief that taking a mixture of oral antibiotics daily would prevent sexually transmitted diseases including AIDS decreased from 54.8% to 1.0%. Additional information collected only in the 1-year follow-up survey indicated that at that point 67% of the CSWs had used a condom during their most recent sex act and almost all women using condoms had initiated their use. While the investigators reported measures of success with their target population of "fulltime" CSWs, they expressed concern about the need to address the needs of "parttime" CSWs, who were outside the hotel-brothels and had little discernible organization or leadership.

## Latin America

Of the three developing continents, Latin America has a pattern of HIV transmission that is closest to that in the West, with more male-to-male transmission and intravenous drug use.<sup>33</sup> Male sex workers are also thought to play more of a role in the propagation of the epidemic there, becoming infected by their male clients and sometimes transmitting the virus to their female lovers.<sup>3</sup> In the published literature, however, no studies evaluating interventions for male CSWs in Latin America were located, and only one published study with an evaluation of an intervention was found for female CSWs.

The study of female CSWs was conducted in Honduras. In September 1988, an educational program was implemented for female CSWs attending an STD control clinic in the capital city of Tegucigalpa.<sup>34</sup> Despite the fact that sex work is illegal in Honduras, CSWs are expected to register with the Ministry of Health and visit a government STD clinic weekly. After each medical evaluation, the CSW's health card is stamped.

In the intervention, presentations on STDs and AIDS as well as free condoms were offered to all CSWs who attended the clinic during a 10-week period. A physician–health educator team conducted lectures and slide presentations on various STDs and HIV transmission and prevention. CSWs submitted condom use and coital log diaries (recording each sex act and whether a condom was used) weekly and received regular supplies of condoms.

Upon evaluation, the women understood the importance of condom use, but they did not report recognition that having fewer sex partners held less risk. This could have been due to economic considerations. The proportion of women who

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reported that they "always" used a condom increased from 19% to 31%. Client refusal was the most common reason given for inconsistent use. The educational component of the program was run by a physician and was overtly clinical, with minimal time devoted to practical and behavioral issues. Data from the condom diaries revealed markedly greater condom use and number of clients than did the interviews (condom resupplies were based on verbal reports rather than on the coital logs). This is interesting, as this chapter's authors' experience with coital logs in African CSW populations has been that they are incompletely filled in and likely to be an underestimate of sexual contacts. This suggests that the population under study in Honduras was well-educated and motivated. It must also be noted that this was a self-referred group who voluntarily and regularly attended the STD clinic, and that there was a high loss to follow-up (55%). Those who remained for evaluation were therefore a highly selected group. The mobility of CSWs is a common problem in evaluations of CSW interventions.

## SUMMARY AND FUTURE DIRECTIONS

Most HIV prevention studies involve multiple intervention strategies, making it difficult to evaluate the effectiveness of individual program components. The studies reviewed here illustrate that interventions such as STD testing and treatment, education programs, and condom distribution can reduce HIV rates in the CSW population. However, it is difficult to determine exactly what the most effective mix of strategies is, given our current level of knowledge and the differences between the cultures and circumstances of various CSW populations. It is clear, nonetheless, that while certain interventions (such as STD testing and treatment for CSW) can be costly (and politically unpopular) for developing nations, the benefits derived from such targeted programs for CSW's may be far greater than less expensive programs aimed at the general population, particularly in countries with low HIV prevalence.

The message that comes through consistently from interventions in different settings is that CSWs can be reached by sensitive programming, and CSWs can become willing partners with health and social welfare staff in HIV control if efficient, nonstigmatizing services are available. Further, evidence from Nairobi informs us that many will comply with safer sex interventions regardless of their own HIV status.<sup>25</sup>

Programs that include elements of individual and community capacity building and efforts to build CSWs' self-esteem, through cultural activities, skills building, and alternative economic opportunities, are likely to contribute to the success of an intervention. Such activities may bring CSWs more into the mainstream of society and give them a greater sense of control and social responsibility. CSWs often suffer from low self-esteem and a feeling of hopelessness, which can contribute to their failure to assume responsibility for safer sex practices. It also leads to problems with alcohol and drug abuse, which are conducive to higherrisk sexual practices, particularly since the clients are often also intoxicated.

It also needs to be recognized that the clients may themselves suffer from psychosocial problems, such as a feeling of alienation from the mainstream, particularly in the case of itinerant workers who visit CSWs. The lack of social responsibility among some clients of CSWs, as manifested in their refusal to use condoms, is a recurrent theme in CSW interventions, leading to difficulties in condom use negotiations. Therefore, the importance of improving CSWs' condom negotiation skills in prevention interventions cannot be overemphasized.

Also of paramount importance is the efficiency of condom distribution, social marketing, and logistics management. This requires the active support of governments who must recognize that while sustainability, through condom sales, is a laudable long-term goal, in the short term it may not be feasible and the government may need to be actively engaged in subsidizing an effective condom distribution system. A comment is warranted on the Bombay study,<sup>2</sup> where the women in the control group were not given access to condoms and appeared to suffer a loss of knowledge on HIV prevention. Our experience leads us to believe that CSWs understand that unprotected sex leads to HIV infection and AIDS, and that knowledge stays with them. In the absence of any power to prevent infection, however, they may employ denial in order to be able to cope with the reality of their situation. It is the belief of these authors that research interventions that do not include the provision of reasonable access to condoms should not be replicated. The threefold reduction in HIV infection in Kenyan CSWs associated with any condom use illustrates that the importance of promoting condom use cannot be underestimated in HIV prevention efforts.30

Peer educator systems have been shown to be successful in many settings, helping to engender a feeling of solidarity and group strength and to effectively convey HIV prevention messages. Trained health and social welfare staff, however, are typically also needed to mobilize and educate groups of CSWs. The training of this staff should occur before such interventions make the transition from demonstration projects to integration within national programs.

The introduction of alternative economic opportunities for CSWs is another laudable strategy in HIV prevention. A possibility to consider, however, is that if the strong and resourceful CSWs leave the industry to take advantage of alternative income-earning opportunities and are replaced by young and desperate girls without condom negotiation skills, an increase in STD and HIV transmission rates may result.

Further evaluations of CSW interventions are clearly needed, particularly in contexts where few have been conducted to date. While the most powerful outcome measure in intervention studies is pre- and postintervention HIV testing, it is expensive and not always logistically feasible. Therefore, most studies continue

## **CSWs and Their Clients**

to rely on self-reported behavior by subjects to measure program effectiveness, though the accuracy of self-reports is questionable and the issue of their validity is controversial. In this chapter we have cited several other methods of measuring program impact, such as using STD rates as a proxy measure for condom use and sending volunteer clients to visit CSWs to test their likelihood to refuse a client who does not want to use condoms. While these proxy measures may be flawed, they provide useful examples of alternative or supplemental methods of program evaluation.

There is an obvious need for rigorously evaluated interventions of femalecontrolled methods to decrease heterosexual transmission of HIV. This is especially true for CSWs, given the frequent lack of compliance of clients with requests for condom use. At the time of writing, the authors could locate no published studies that had evaluated the female condom for effectiveness in preventing HIV infection in high-risk groups, such as CSWs, in developing countries. Another potential female-controlled method is appropriately formulated nonoxynol-9 (N-9), the most used spermicide worldwide. Several evaluated interventions with N-9 have now been published; however, the usefulness of N-9 in preventing transmission of HIV remains in question.

There is a particularly strong need for rigorously evaluated interventions for male CSWs. It is not yet clear how well models developed for female CSWs can be adapted to the needs of men who have commercial sex with men. As previously stated, research on this population is difficult due to its frequently extreme stigmatization; nonetheless, anthropological and pilot projects have already been conducted, particularly in Latin America, suggesting that prevention intervention programs can be implemented.

Oppressive legislation does nothing to eliminate sex work, serves to further disempower the sex worker, and obstructs positive change. Health and social welfare workers therefore need to use every opportunity to lobby governments to soften their approach. At the very least, destructive "police crackdowns," which usually do not put sex workers out of work but make them more difficult for health workers to reach, should be stopped. Thailand is an excellent example of how the State can work with brothel owners and CSWs to bring about behavior change in clients. Other countries should examine this model and others discussed above to discern elements appropriate to their culture, infrastructure, and the characteristics of their CSW and client population. The long-term economic and developmental benefits of effective HIV prevention programs targeting CSWs are potentially enormous for countries afflicted by the HIV pandemic, whether they currently have a low or high prevalence of the disease.

The formation of a multidisciplinary team of clinicians, social workers, behaviorists, and anthropologists in the planning, as well as implementation, of an intervention is desirable to prevent policy or program errors that would be more difficult to rectify retrospectively. Full participation of the target population is
also vital at all levels of planning and implementation. In addition, disclosure of problems encountered and decisions made that in retrospect turned out to be mistakes should be encouraged. We all make mistakes, but there is no need for us to allow other people to repeat them by not informing them about our experience.

In an ideal world, all sexual relationships would be loving and free from stigma, manipulation, oppression, and disease. In an imperfect but pragmatic world, there would be a realization that sex workers can and have been valuable allies in the fight against the HIV epidemic.

## REFERENCES

- Van de Perre P, Clumeck N, Carael M, et al. Female prostitutes: A risk group for infection with human T-cell lymphotropic virus type III. Lancet 1985; 2(8454):524–527.
- Bhave G, Lindan C, Hudes ES, et al. Impact of an intervention on HIV, sexually transmitted diseases, and condom use among sex workers in Bombay, India. AIDS 1995; 9 (suppl 1):S21–S30.
- 3. Estebanez P, Fitch K, Najera R. HIV and female sex workers. Bull World Health Organ 1993; 71:397-412.
- Fowke KR, Nagelkerke NJD, Kimani J, et al. Resistance to HIV-1 infection among persistently seronegative prostitutes in Nairobi, Kenya. Lancet 1996; 348:1347–1351.
- Plummer FA, Nagelkerke NJD, Moses S, et al. The importance of core groups in the epidemiology and control of HIV-1 infection. AIDS 1991; 5(suppl 1):S169–S176.
- Nkya WM, Gillespie SH, Howlett W, et al. Sexually transmitted diseases in prostitutes in Moshi and Arusha, Northern Tanzania. Int J STD AIDS 1991; 2:432–435.
- Over M, Piot P. Human immunodeficiency virus infection and other sexually transmitted diseases in developing countries: Public health importance and priorities for resource allocation. J Infect Dis 1996; 174(suppl 2):S162–S175.
- 8. Sharma J. Nepal: Fighting against fate. WorldAIDS 1994; 32:11.
- Asthma S, Oostvogels R. Community participation in HIV prevention: Problems and prospects for community-based strategies among female sex workers in Madras. Soc Sci Med 1996; 43:133–148.
- 10. Mgalla Z, Pool R. Sexual relationships, condom use and risk perception among female bar workers in north-west Tanzania. *AIDS Care* 1997; 9:407–416.
- Williams E, Lamson N, Efem S, et al. Implementation of an AIDS prevention program among prostitutes in the Cross River State of Nigeria [letter]. AIDS 1992; 6(2):229–230.
- Longo P, Oliveira S. Street boys from Copacobana. Why are we hard to reach? Paper presented at the 11th International Conference on AIDS. Vancouver; 1996. Abstract Th.D.5032.
- 13. Kunawararak P, Beyrer C, Natpratan C, et al. The epidemiology of HIV and syphilis among male commercial sex workers in Northern Thailand. AIDS 1995; 9517–521.
- Marin G. AIDS prevention among Hispanics: Needs, risk behaviors and cultural values. *Public Health Rep* 1989; 104(5):411–415.
- Lubis I, Master J, Bambang M, et al. AIDS related attitudes and sexual practices of the Jakarta Waria (male transvestites). Southeast Asian J Trop Med Public Health 1994; 25:102–106.
- AIDSCAP/Family Health International, Harvard School of Public Health, UNAIDS. The status and trends of the global HIV/AIDS pandemic. Official Satellite Symposium, Final Report. 11th International Conference on AIDS. Vancouver; 1996.
- Cespedes J, Easterbrook P, Quinn TC. Male prostitutes and heterosexual HIV-1 spread in Latin America. Paper presented at International Conference on AIDS 1992. Abstract No. PoC 4039.

#### **CSWs and Their Clients**

- Ford N, Koetsawang S. The sociocultural context of the transmission of HIV in Thailand. Soc Sci Med 1991; 33:405–414.
- Quinn TC. The epidemiology of the acquired immunodeficiency syndrome in the 1990s. Emerg Med Clin NA 1995; 13:1–25.
- 20. Hanenberg RS, Rojanapithayakorn W, Kunasol P, et al. Impact of Thailand's HIV control program as indicated by the decline of sexually transmitted diseases. Lancet 1994; 344:243–245.
- 21. Rojanapithayakorn W, Hanenberg R. The 100% condom program in Thailand. AIDS 1996; 10:1-7.
- Visrutaratna S, Lindan CP, Sirhorachai A, *et al.* "Superstar" and "model brothel": Developing and evaluating a condom promotion program for sex establishments in Chiang Mai, Thailand. *AIDS* 1995; 9(suppl 1):S69–S75.
- Nelson KE, Celentano DD, Eiumtrakol S, et al. Changes in sexual behavior and a decline in HIV infection among young men in Thailand. N Engl J Med 1996; 335:297-303.
- Mills S, Benjarattanaporn P, Bennett A, et al. HIV risk behavioral surveillance in Bangkok, Thailand: Sexual behavior trends among eight population groups. AIDS 1997; 11(suppl 1):S43–S51.
- Ngugi EN, Plummer FA, Simonsen JN, et al. Prevention of transmission of human immunodeficiency virus in Africa: Effectiveness of condom promotion and health education among prostitutes. Lancet 1988; 2:887–890.
- Jana, S. Three Year Stint at Sonagachi: An exposition. Calcutta: Department of Epidemiology, All-India Institute of Hygiene and Public Health. Unpublished report.
- Singh YN, Malaviya AN. Experience of HIV prevention interventions among female sex workers in Delhi, India. Int J STD AIDS 1994; 5:56–57.
- Ford K, Wirawan DN, Fajans P, *et al.* Behavioral interventions for reduction of sexually transmitted disease/HIV transmission among female CSW and clients in Bali, Indonesia. *AIDS* 1996; 10:213–222.
- Laga M, Alary M, Nzila N, et al. Condom promotion, sexually transmitted diseases treatment, and declining incidence of HIV-1 infection in female Zairian sex workers. Lancet 1994; 344:246–248.
- Ngugi EN, Wilson D, Sebstad J, et al. Focused peer-mediated educational programs among female sex workers to reduce sexually transmitted disease and human immunodeficiency virus transmission in Kenya and Zimbabwe. J Infect Dis 1996; 174(suppl 2):S240–S247.
- 3 1. Ngugi EN, Staugard F, Gallachi A, et al. Social economic empowers commercial sex workers to reduce reported attack rate of STDs. Paper presented at the 10th International Conference on STD/ AIDS in Africa. Abidjan; 1997. Abstract C.290.
- 32. Chipfakacha V. Prevention of sexually-transmitted diseases: The Shurugwi sex-workers project. S Afr Med J 1993; 83:40-41.
- Berkley S. AIDS in the developing world: An epidemiologic overview. Clin Infect Dis 1993; 17(suppl 2):S329–S336.
- Fox LJ, Bailey PE, Clarke-Martinez KL, et al. Condom use among high-risk women in Honduras: Evaluation of an AIDS prevention program. AIDS Educ Prevent 1993; 5(1):1–10.

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## Interventions for Adolescents

## PETER AGGLETON and KIM RIVERS

## INTRODUCTION

The World Health Organization (WHO) and numerous other international organizations have identified young people as being at special risk of HIV infection. Estimates from the Joint United Nations Program on AIDS suggest that up to 60% of new HIV infections are among those aged between 15 and 24 years,<sup>1</sup> and UNICEF has estimated that two thirds of those who become infected with HIV will do so before they reach 25 years of age.<sup>2</sup> There is also evidence that the average age at which young people become sexually active has fallen worldwide.<sup>3</sup> With 800 million people under the age of 25 living in developing countries, the implications of HIV infection for young people are of great concern.<sup>3</sup>

Developing countries, where resources are extremely limited, are most severely impacted by the AIDS epidemic,<sup>4</sup> and adolescents in those countries are likely to suffer most.<sup>5</sup> The percentage of the population who are young is much higher than in industrialized countries, as is the annual growth rate of the youth population and the proportion of young rural to urban migrants.<sup>6</sup> The level of risk for youth in developing countries may be greater due to what Sweat and Denison,<sup>7</sup> among others, have described as the ways in which social, cultural, economic, and political forces, such as poverty, migration, urbanization, war, and civil disturbance, facilitate HIV transmission. It is not surprising therefore that those countries with the lowest standards of living are also among those with the most serious AIDS epidemics.

With an increasing incidence of AIDS among young people in developing countries, it is crucial to ensure that effective HIV prevention programs are developed and disseminated. Young people also present an opportunity for halting the epidemic. Since their sexual habits may not yet be firmly established, behavior modification strategies may be more effective, relative to older people, in motivat-

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ing the adoption and maintenance of HIV preventive behaviors.<sup>8</sup> Yet, there is much uncertainty about how best to approach HIV and AIDS prevention when working with young people. This is due in large part to the ambivalent way in which young people are viewed by adults. Hoffman and Futterman<sup>9</sup> have noted that young people are often perceived both as "small adults and as immature, inexperienced and untrustworthy children." Such attitudes have informed the theory, research, and practice of many involved in developing and implementing health promotion programs with young people. It is important therefore to examine underlying assumptions about young people in relation to the design and implementation of HIV prevention programs.

Aggleton and Warwick<sup>10</sup> discuss in detail the ways in which young people and their behavior have been characterized by those researchers and health practitioners who are concerned with adolescent health. They point out that usually, and often in the absence of evidence, adolescence has been conceived as a period of "storm and stress." Young people have been almost uniformly viewed as irresponsible and hedonistic risk takers who regard themselves as impervious to danger. In reality though, youth and adolescence are highly variable periods of life. Before the mid-19th century, young people living in Europe made the transition from childhood to adulthood at a much earlier age and more quickly than in modern industrialized countries. Indeed, in many parts of the developing world today, the onset of puberty often signals greater economic and social responsibilities rather than increased opportunities for pleasure seeking.

Not only do young people's experiences depend on historical, social, and cultural background, but within a particular context their experiences are mediated by gender, sexuality, socioeconomic status, state of physical and mental wellbeing, and so on. Since the turn of the century, psychologists and other researchers interested in adolescence have tended to characterize young people in a largely uniform manner. Stereotypical ideas about youth became so powerful that some researchers began to talk about universal adolescent characteristics, ignoring such influential characteristics as diversity of social background, ethnicity, gender, sexuality, and other variables such as different age groups within the overall category of "youth." Studies of adolescence, then, have been dominated by biased assumptions. This has serious consequences not only for young people and the way they are viewed and feel about themselves, but also for work focusing on young people and AIDS.

Among the central images to be found in the burgeoning global literature on young people and AIDS are the "unknowledgeable adolescent," the "high-risk adolescent," the "overdetermined adolescent," and the "tragic adolescent."<sup>11</sup> Respectively, these categories describe young people who are ill-informed, inclined toward unnecessary and excessive risk-taking, unduly conforming to peer pressures, and those who have HIV infection or are living with AIDS. Such images have dominated the work on young people and AIDS throughout the epidemic.

Most importantly, these accounts are unlikely to speak to young people themselves, since the predominant theme in them suggests that adolescent sexuality needs to be controlled, restrained, and often sanctioned by others, namely adults. Only rarely are youth afforded a version of their sexuality that provides a sense of pleasure and the potential for human fulfillment. Future HIV-related work with and for young people needs to start from a set of more realistic and less stereotypical premises, acknowledging the diversity of young people's experience, and adapting prevention programs to ensure that different needs are met.

Stereotypical accounts of young people often have stimulated the development of sex education programs with a narrow focus. Adults are inclined to have some difficulty acknowledging adolescents as sexual and potentially sexual beings.<sup>9</sup> Concerns have been expressed and reflected in government policies that providing too much or certain kinds of sex education may propel young people into premature sexual relationships. As a consequence, many programs of sex education in both industrialized and developing countries have tended to concentrate on abstinence and helping young people to say "no" to sex. Yet, several important studies now suggest that well-designed programs of sex education, which combine messages about safer sex as well as abstinence, may delay sexual debut, decrease sexual activity among those young people who are sexually active, and increase contraceptive use.<sup>12</sup> In spite of such findings, work with young people historically tends to have emphasized the prevention of pregnancy and, more recently, sexually transmitted diseases (STDs) and HIV infection, rather than the promotion of sexual health. Only now and only in some parts of the world are we seeing a more helpful shift from pregnancy and disease prevention toward broader, more multidimensional and rights-orientated conceptions of sexual health.<sup>13</sup>

Ultimately, this move toward the promotion of sexual health will draw young men into the forum, since a great deal of HIV-related intervention activities have thus far focused on young women. Certainly young women in developing countries are at increased risk of HIV infection when compared with young men. Estimates suggest that in Uganda, for example, HIV infection among women aged 13 to 19 years is 20 times higher than for young men of the same age group.<sup>1</sup> However, if prevention programs are to make a significant impact on the HIV epidemic, it is important that more programs be targeted toward young men. The stereotypical gender roles and unequal status of women in sexual relationships mean that it is often difficult for young women to negotiate safer sex. That most young girls have sex with older males further increases the power imbalance in these relationships. Interventions that focus solely on girls and young women not only deny the important power relations that exist between males and females and the very real threat of sexual exploitation and abuse that many young females face, but they also deny young men the opportunity to maximize their sexual health. Similarly, many programs assume heterosexuality in young people, thereby denying young people who have same-sex relationships the opportunity to acknowledge their own sexuality and to work toward protecting themselves from HIV infection.

## STYLES OF INTERVENTION

Interventions designed to prevent HIV infection in young people have differed in style, theoretical framework, and level at which the intervention is pitched. Many interventions, designed early in the HIV epidemic, were based on individualistic approaches using theoretical frameworks such as the health belief model, the theory of reasoned action, protection motivation theory, and social learning theory. Each of these models places emphasis on changing individual behavior through information giving, rational discussion, and skill development. Such individualistic approaches tend to marginalize the social and cultural context that informs individual experience. They tend to assume, for example, that people, having acquired certain knowledge, insights, and skills, will be free to make certain choices. Yet in both industrialized and developing countries people do not behave in isolation of their particular social contexts. Young people may be victims of poverty, abuse, and exploitation, in which case negotiating skills may be difficult to exercise.

In developing countries people often express needs that are perceived to be more pressing than the risk of HIV infection, such as educational and employment opportunities. Rotheram-Boms *et al.* <sup>14</sup> have pointed out that young people who live with stressful situations, such as homelessness, may engage in "survival sex," which makes consistent use of condoms difficult. Baldo<sup>5</sup> sums up these concerns when she states that the burden of prevention of HIV infection cannot be borne solely by the individual through attempts to regulate his or her behavior; this burden is especially heavy for adolescents who face barriers denying them access to education, health, and social services.

The middle years of the epidemic have been characterized by a move away from the individualistic models of intervention described toward models which work at the level of community.<sup>15</sup> Although definitions of community may vary, these interventions have had a common concern with changing and reinforcing norms by addressing groups of people assumed to share social experiences.<sup>15</sup> The increasing number of peer education programs that fall within the category of community-based interventions have been perhaps the most important for young people. Peer education utilizes members of an existing social group or network who undertake communication and training with other members of the group to which they themselves belong.<sup>3</sup> Clearly, peers can be important sources of information and support for behavior change,<sup>16</sup> but it should be noted that several studies have found that young people need and desire communication and support form trusted adults as well.<sup>17</sup>

Most recently, and in response to some of the limitations of both individuallevel and community-level interventions, researchers and practitioners have become interested in what Sweat and Denison<sup>7</sup> refer to as "structural and environmental interventions." These recognize that factors such as urbanization, civil disruption, and poverty in developing countries have facilitated the growth of the epidemic. For example, migration from rural to urban areas means that large numbers of men leave their families in order to seek work in cities. While there, they may have unprotected sex with new partners, and on periodic visits home introduce HIV infection into rural areas.

In relation to young people particularly, learning how to manage relationships in ways that bring personal fulfillment without risk of HIV infection, social policies that inhibit the growth of the epidemic need to be emphasized and disseminated.<sup>5</sup> For example, in many circumstances women lack the resources and power to negotiate effectively with men over safer sex.<sup>15</sup> Hence, social policies that foster greater equality between men and women and greater access to education for girls are crucial in halting the epidemic. Similarly, legal and policy barriers to condom promotion and other relevant social and health services have to be eliminated.<sup>5</sup>

While each of these levels of intervention may appear quite distinct and while each is underpinned by quite different theoretical standpoints, future HIV and AIDS-related interventions are likely to attempt to work simultaneously at one or more levels. Young people need to be persuaded that HIV infection is relevant to them, and certain enabling interventions at the level of public policy need to take place to ensure that young people are able to behave in ways which will protect their health.<sup>18</sup>

At all levels of intervention, questions about the most appropriate ways in which to evaluate impact are important. Clearly, we need to ensure that the interventions are effective and efficient. In the early days of the epidemic, people used and adapted the skills and techniques that they already had, often without engaging in any systematic evaluation of their interventions. Now, practitioners and researchers must increasingly support their intervention program, curriculum, or strategy by producing concrete evidence of its effectiveness.<sup>19</sup> The move toward evidence-based HIV and AIDS-related programs means that intervention planners must now think carefully how they can demonstrate program effectiveness. There are a variety of ways in which to evaluate interventions, producing a range of different types of evidence about what works and what does not, including observation, objectives-based evaluation, theory-driven evaluation, randomized controlled trials, and quasi-experimental methods.

In discussing the various interventions for young people in developing countries, this chapter will take an inclusive stance: that is, a wide range of evaluation methods will be considered, in spite of the current privilege given to randomized controlled trials and quasi-experimental methods.<sup>20</sup> In addition, we will consider some innovative programs that have not yet been systematically evaluated. Furthermore, because the effects of health promotion programs may not be immediately evident and it may take a lengthy follow-up period to observe decreases in prevalence of HIV, a range of prevention strategies will be discussed including those still in development or ongoing and for which conclusive outcome evaluation is unavailable.

# INTERVENTIONS FOR YOUNG PEOPLE IN DEVELOPING COUNTRIES

Parts of the world have high prevalence of HIV infection but constant or diminishing rates of infection; numerous countries in developing parts of the world such as Africa, Southern and Central America, and Asia have been identified as having high and increasing rates of infection. It is important to note that within regions rates of HIV prevalence may not be uniform and may vary considerably between countries. It is also important to note that the countries that constitute a geographic region are not homogeneous; rather, they are diverse in culture, religion, socioeconomics, tradition, and practices. Understandably, this is not helped by the mass media that often presents developing regions, most notably Africa, as an undifferentiated whole rather than continents made up of different countries.<sup>21</sup> In spite of this, there are commonalities in the needs of young people in developing countries: access to education is often limited and attendance at school may not be mandatory, common, or consistent; levels of literacy are lower than in industrialized countries; young people may have increased economic and familial responsibilities from a younger age; and most importantly, young people are more likely to be living in or vulnerable to poverty. Young people in poverty and most especially those living on the street are more likely to experience sexual coercion or rape and to engage in sex for their economic survival.<sup>4</sup> For the purposes of this chapter, then, bearing in mind the aforementioned caveats, we will divide our discussion of interventions for young people in developing countries into three geographic sections: (1) Africa, (2) South and South East Asia, and (3) Central, South America, and the Caribbean.

## Africa

Young people in sub-Saharan Africa have been most severely impacted by the AIDS epidemic. In some cities, HIV prevalence among young pregnant women, for example, is as high as 30%.<sup>22</sup> Although sexual behavior varies between and within countries on the African continent, there is clear evidence that young people in Africa, like young people all over the world, engage in sexual activity earlier than many adults acknowledge.<sup>1</sup> In Guinea Bissau, for example,

50% of males aged between 15 and 19 years reported having sex in the previous year. In Malawi, 56% of 300 young girls surveyed reported being sexually active, and of these 56% reported having had sex prior to the onset of the menarche.<sup>17</sup> Economic necessity also means that young people are more likely to engage in sex work. In Malawi, two thirds of 168 female adolescents recently surveyed reported having sexual intercourse in exchange for gifts or money, while at the University of Calabar in Nigeria, nearly 15% of women studying said they engaged in commercial sex to pay for their education.<sup>17</sup>

As in all of the developing world, young women in Africa are at particular risk of HIV infection. While up to 60% of all new HIV infections are among 15- to 24-year-olds, females outnumber males by a ratio of two to one.<sup>17</sup> There is considerable evidence to suggest that women have increased physiological risk of HIV infection.<sup>17</sup> In addition, gender relations that are characterized by an unequal balance of power mean that women are less likely to control sexual decision making.<sup>17</sup> The partners and husbands of adolescent girls are often men considerably older than themselves, more sexually experienced, and hence more likely to be infected with HIV.<sup>1</sup>

Although many young people in Africa have accurate information about HIV and AIDS, economic disadvantage can obscure concerns about the epidemic. In 1993, focus group discussions held throughout Zimbabwe with out-of-school youth aged between 12 and 20 were conducted by the Ministry of Education and Culture. Young people expressed frustration with the lack of opportunities to earn money and acquire the respect from parents and others that is afforded through having employment and a salary. In fact, these issues overshadowed any concern about HIV infection.<sup>23</sup>

Large numbers of young people in Africa do not have access to education. For example, 45% of youth aged between 11 and 19 years in Zimbabwe are out of school.<sup>23</sup> This means that programs designed to prevent HIV infection need to also target out-of-school youth and to take into account the low levels of literacy that are common among some people in parts of Africa.

Responses to HIV infection in Africa have varied enormously. Some of these responses have consisted of attempts to encourage young people to remain sexually abstinent, others to provide young people with access to information and condoms as well as an opportunity to participate in a program.<sup>1</sup> In some countries, sex education is controversial and adults have attempted to restrict information about sex available to young people for fear of a deterioration in moral values.<sup>24</sup> In spite of local taboos that surround talking openly to young people about sex, a variety of prevention programs have taken place, with varying degrees of success. These might be characterized as follows: peer education programs; school-based programs; programs for out-of school youth; programs for youth at particular risk, such as those living in the streets and with refugee status; and programs using the mass media and other media such as comic strips.

Combining peer education with increased access to condoms has had some success in Cameroon. Initiated in 1993, 60 peer health educators were trained to work with university students. In addition, outlets for condoms on campus were increased by 50%. Peer educators reached a total of 1600 students, and 6 months after the program began condom sales on campus had increased by 30%. The program coordinators noted that increasing numbers of students both requested information through the peer education program and applied to become peer educators themselves.<sup>25</sup>

However, while the intervention led to increased sales and possibly use of condoms, variable access to and acceptability of condoms within Cameroon remain barriers to increased condom use. In Zimbabwe, young people participating in focus group interviews observed that condom use is an effective strategy for preventing HIV infection, but it is not realistic because of both poor availability and negative associations with sex work, promiscuity, and mistrust.<sup>23</sup> This suggests that distribution and increased accessibility are not enough to promote consistent condom use.

Peer education involving university students has also taken place in Nigeria.<sup>26</sup> After a preintervention phase involving the collection of qualitative and quantitative data, a Campus Women's Alliance against AIDS (CWA) was formed at the University of Ibadan with the aim of increasing knowledge and modifying risky behavior. A 2-day training course was held for 30 self-selected peer educators. A variety of CWA activities, including distribution of information and materials, sponsorship of talks, and video and film screenings, were planned for a 12-week period. Of those attending the CWA events, 73% of females and 60% of males reported that the activities were either very or quite effective at raising awareness and the importance of abstinence or monogamy. As in many peer education programs, the most important impact was on the peer educators themselves, who were observed to be very enthusiastic; perhaps the greatest measure of success is that the CWA is now an ongoing program run voluntarily by those initially trained.

Although the peer programs in Cameroon and Nigeria have enjoyed some success, it must be noted that university students are one of the easier populations of young people to access. First, high levels of education and literacy mean that it is possible to use a wide range of materials and methods in order to communicate messages about HIV infection. Second, university attendance is often accompanied by an affluent background, thus decreasing, although not eliminating entirely, the numbers of young people having to engage in risky practice for economic gain. Third, university students represent an older adolescent population with whom it is possible to talk more frankly about HIV-related issues.

More challenging peer work has been conducted in Uganda with youth who attend school and those who do not in 30 villages in the Rakai District. Four hundred and seventy original respondents were interviewed in June 1994. Highly significant increases in correct knowledge about transmission of HIV and use of

condoms was found. Peer educators and peer education contacts were reported to be six and five times more likely, respectively, to use a condom than those who had no exposure.<sup>27</sup>

A randomized controlled trial was used to evaluate the impact of a schoolbased AIDS education program with high school students in a socially disadvantaged African township of Cape Town, South Africa. The program was the culmination of a process of consultation with teachers and students. Teachers were trained in HIV-prevention information and the use of participatory methods. Over a 2-week period, an intense, high-profile course was delivered throughout the school. Various educational methods and channels, including structured information dissemination, group discussions, integration of AIDS content in the language curriculum, and role playing, were used to promote AIDS-related messages. To assess the impact of the program, students completed self-report questionnaires before and after the intervention. Students were compared with those in a school with similar demographic characteristics but in which no specific AIDS education was provided. At baseline, students at both schools had similar levels of HIV knowledge, but following the program students in the intervention school had significantly higher scores on most knowledge items. The program also sought to promote more positive attitudes toward people living with AIDS; at baseline acceptance of people with AIDS was very low in both schools. Small increases in acceptance were reported in the intervention school. In the intervention school, an increase in the number of students who felt personally vulnerable to HIV infection also was noted.

Although the intervention had a favorable impact on knowledge and some attitudes, the impact on behavioral intentions was disappointing. There was a small but statistically insignificant change in students' intentions to use condoms following the program and negative attitudes toward condoms were still common. One unintentional and undesirable impact of the intervention was that a rumor began in the community that the reason for the intervention in one school and not others was because teachers and pupils at the intervention school were infected with HIV. This caused teachers and pupils a great deal of distress. This raises important questions about the care that must be taken when planning interventions and using randomized controlled trials. The researchers who evaluated the project felt that the rumor most likely affected the overall impact of the program and resulted in high levels of denial of vulnerability to HIV infection.<sup>28</sup>

In Tanzania, an innovative school-based program called *Ngao* (shield) was designed to reduce risks of infection and improve attitudes toward people living with AIDS. A randomized controlled trial was employed to evaluate program effectiveness. Implemented for about 20 hr over a period of 2 to 3 months, the program consisted of factual information disseminated by teachers, posters, songs, poetry, and performances for younger pupils generated by the students. In addition to working with students, panel discussions were held with elders and parents.

However, national guidelines from the Ministry of Education prevented teachers from explicitly addressing condom use with this age group.

After implementation of the *Ngao* program, pupils from intervention schools reported significant increases in exposure to AIDS information and discussion of HIV/AIDS, in AIDS-related knowledge, and more positive attitudes to people living with AIDS, relative to comparison schools. Six months after the intervention, pupils from the intervention schools reported being exposed to and discussing AIDS-related information far more frequently than did pupils from comparison schools, a significant increase in knowledge, and significantly more positive attitudes to people with AIDS.<sup>29</sup> The program designers conclude that work with this age group, although still unusual in Tanzania, is both possible and fruitful.

An interesting school-based intervention that raises pertinent issues for intervention development has taken place in South Africa. In Africa, as in other regions, values and cultural context are crucial considerations in designing programs. What is more, traditional values about how, where, and between whom sexual activity is acceptable may be in conflict with the real practices of both young and older people. These factors are of particular importance when working with school-based populations, since parents, teachers, community, and government may be particularly sensitive about the type of work that takes place with young people in school. In Cape Town, a team of social scientists, health educators, and educationalists developed a program for high school students drawn from a largely Islamic community.<sup>30</sup> Before the intervention, research revealed that although sex outside of marriage is heavily sanctioned by the community, young people were having sexual relationships. For teachers, however, it was important to heed religion and respect and uphold values. Although teachers showed enthusiasm for development of a program, they faced conflict in their role as Muslims - a role that encompasses both the need to give religious guidance and counseling and the desire to protect students. The teachers clearly felt conflicted over the different needs and requirements of all various stakeholders in AIDS education: parents, students, and religious and other community leaders. Through careful negotiation, the researchers were able to agree with teachers that value clarification should not be prescriptive for young people. Charts illustrating condom use were withdrawn and the amount of information on condoms reduced. This project demonstrates the need to work with the community and to help those who are delivering programs to young people clarify first their own values about HIV-related issues.

Interventions targeting school-based populations are clearly popular in Africa, although large numbers of young people and some of the most vulnerable young people do not attend school. Some researchers and health promoters have suggested that through working with schools, it may be possible to reach the wider community and out-of-school youth, who may be impacted by the messages about safer sex disseminated to their school-attending peers.<sup>31</sup>

Reaching young people living in refugee camps or even more precarious situations also will be challenging in some parts of Africa. War and civil unrest

clearly have an important impact on the AIDS epidemic. Particularly innovative work, which has attempted to operate simultaneously on individualistic, community, and structural levels, has taken place with Rwandans, including adolescents, living in refugee camps in Tanzania.<sup>32</sup> The project recognized that the conditions of refugee life greatly increase the risk of HIV infection: the destruction of families, deterioration of former social structures and mores, loss of homes and income, overburdened health services, overcrowding, and an increase in the commercial sex trade. Most at risk are women and adolescent refugees who are vulnerable to coercive sex and rape. With particular reference to young people, cultural baniers posed a special challenge. In Rwanda, sex is rarely discussed with young people. Meetings with religious and other community leaders in the camps allowed project staff to develop culturally acceptable and appropriate messages about HIV infection. These include strategies that focus on protecting future fertility in a context where the ability to bear children has great social significance.

Reaching young people in this refugee environment where there were no schools presented another hurdle, but through sporting events, which draw thousands of refugees, the young, most particularly young men, could be targeted. In intermissions, traditional dancers were recruited to incorporate messages about HIV into their performances. At the same time, condoms were distributed and megaphones used to broadcast messages and songs. In refugee situations, young women are at specially heightened risk, since they do not even have the limited means to earn money that are available to boys. Consequently, they may be coerced into exchanging sex for money, gifts, or protection. This project is developing income-generating activities to enable them to earn some money without endangering themselves. In addition, a series of "adolescent health days" have been organized to demystify health services and encourage young people to come forward for STD treatment. The first such event drew 700 people to one clinic alone.

Finally, a number of innovative and attractive comic books have been developed for young people in Africa. Although pre- and posttesting to determine acceptability among young people has taken place, the impact of such resources has rarely been formally evaluated. One study has revealed that even a single reading of a comic book, which has been piloted to determine a high level of acceptability among young people, can be associated with improved knowledge of HIV infection and correct condom use.<sup>33</sup>

## Central and South America and the Caribbean

In Latin America, the average age for first intercourse has been estimated at 15 years of age for boys and 17 years for girls.<sup>34</sup> In particular contexts and areas, the age of sexual debut may be earlier. In Mexico, for example, it is estimated that almost half of all teenagers are sexually active, while one in six of all live births is to a mother aged 15 to 19 years.<sup>35</sup> In a Brazilian school-based study, 36% of

females reported having had intercourse by the time they reached 13 years.<sup>17</sup> Not surprisingly, the incidence of STDs and prevalence of HIV infection among young people in this region is high: the Caribbean Epidemiology Center reports that young people aged 15 to 29 years now account for 50% of all cases of AIDS.<sup>14</sup>

Social attitudes toward sexual activity for boys and girls vary radically in many parts of the region: While sexual activity is often considered acceptable for young men, it is sanctioned in young women. In Guatemala, for example, it is commonly believed young men must have sex to enjoy good mental and physical health.<sup>36</sup> Here, the high social value afforded to virginity for girls, in conjunction with a very different set of values for boys, may in itself lead to higher risks of HIV infection. In Brazil and Guatemala, cultures where virginity in unmarried women is highly valued, young people interviewed in a number of studies reported that anal sex is often used as a means to protect a girl's virginity.<sup>7</sup>

As in most parts of the world, young women in Central and South America and the Caribbean have less power and control in sexual relationships. Gender stereotypes too have an important impact on the epidemic. Research in Mexico has suggested that traditional stereotypes about maleness affect the level of responsibility that young men take for using condoms, as well as promote the idea that one partner may be appropriate for young women, but that in order to be manly a young man must have several partners at one time.<sup>37</sup> Young women also often find it more difficult to suggest the use of condoms since they fear that they may be considered too sexually experienced, or that the man with whom they are having a relationship may reject them.

Economic need in this region means that young people are at increased risk of HIV infection. In some areas, very large numbers of young people live on the streets. In Brazil, for example, estimates suggest that 7 million young people are living on the streets, with HIV seroprevalence rates ranging from 1.5 to 7.5%.<sup>38</sup> Such young people are highly vulnerable to rape, coercive sex, and the economic need to exchange sex for money or goods. The high prevalence of injecting drug use on the streets also presents another risk of HIV infection for these young people.<sup>38</sup> Clearly, young people who are concentrating on meeting their immediate economic needs, and facing daily threats to their health and well-being, such as those living on the streets, are difficult to reach with messages about a disease that may or may not affect them some time in the future.

Responses to HIV infection in the region have varied, but some extremely innovative work with young people has been conducted in Central and South America and in the Caribbean. Perhaps more than in other regions, interventions have focused on the development of sexual health, rather than on narrow conceptions of disease prevention. Much of the work with young people here has been characterized by an openness that is rarely found in other contexts; indeed, this region has led the way for work with young people who are marginalized by society, such as young people who live in the streets and gay, bisexual, and other young people who have same-gender sexual relations.

In Belo Horizonte, Brazil, an outreach intervention has been ongoing since 1992.<sup>39</sup> Youths living on the streets have been exposed to a series of communication materials including videos and comic books. A preintervention survey of 329 youths was conducted as well as two phases of follow-up. Postintervention, the perceived risk of HIV infection rose from 33 to 95% in those surveyed. Overall drug use decreased in the 90 days prior to the follow-up survey, and 70% of drug users reported needle cleaning in follow-up surveys compared to none in the preintervention survey. Although condom use increased by 32% among those having sex with adult males, no change was reported in condom use with peers.

The Pegação Program, initiated in 1989, set out to reach young male sex workers aged 11 to 23 in Rio de Janeiro.<sup>40</sup> Outreach work, often conducted in cafes and bars, concentrated its efforts on listening to all the concerns expressed by young men, not only those that related to their sexual health. This was important in developing a relationship with the young men, since they did not feel AIDS was more likely to kill them than hunger or violence from the police and clients. Conversations also revealed important information, such as the fact that many of the young men did not have contact with a gay community and so were unlikely to be reached through that channel of information. Few of the young men contacted were able to read, and they rarely accessed health services, thereby closing more channels through which they might see or hear HIV-related prevention messages. Evaluations demonstrated that whereas at baseline only 15% of the young men reported that they always used a condom, 6 months into the project the figure had increased to 65% and 1 year later to 80%. The associated decrease in STD levels from 75 to 32% in the first 6 months suggests that the young men were engaging in safer sex.40

In Recife, one of Brazil's poorest cities, the Brazilian Center for Children and Adolescents is involved in work to defend the rights of girls, especially those living in the streets, brothels, and slums. Two projects have been developed for HIV-related work: the Casa de Passagem (Passage House), which provides schooling, support, food, and access to health care for girls aged 7 to 17. Here, the girls are given space to talk about their lives and problems and are supported in a nonjudg-mental way, which has given rise to some criticism from those in Brazilian society who feel threatened by the lifestyle of street girls. As with the Pegação Program, asserting self-worth and valuing the self-perceived needs of the street girls were given precedence over work on sexual health, since this provides a foundation for helping young people to protect themselves from risks of HIV infection. Additionally a follow-up program has been developed that trains graduates of the Casa de Passagem to work with peers. UNICEF is now documenting the progress of the program. Both these related programs are characterized by the promotion of self-esteem and empowerment.<sup>41</sup>

As a way of incorporating potentially the most marginalized of street youth in Rio De Janeiro, a drop-in center for street youth included a special day each week for young transvestites.<sup>38</sup> Posters of young transvestites were displayed, which

attracted young people who realized that they could come to the center without fear of approbation.

Globally, few programs focus on the positive aspects of sexual relationships, yet clearly it is not realistic to discuss the consequences and implications of sexual activity without discussing the pleasurable and meaningful nature of sexuality. In São Paulo State in Brazil, a group of young people aged 15 to 20 were trained to work in their communities for AIDS prevention. The training program included discussion of beliefs, values, prejudices, behaviors, knowledge, prevention, sexuality, eroticism, safer sex, and HIV and testing. As a result, young people together with program organizers have developed a program that actively discusses pleasure and responsibility.<sup>42</sup>

In the Caribbean, young people aged 8 to 19 have developed a musical review about HIV infection and sexually transmitted diseases called "Vibes in a World of Sexuality." Originally developed in Jamaica, the review has now reached 50,000 people in five different Caribbean countries. Performances have taken place in 60 Jamaican schools, youth clubs, communities, and churches. Pre- and postperformance evaluation has shown a 20% increase in correct knowledge about STDs and HIV infection. Young people have shown their interest by staying behind to ask questions, and the performers have received letters from parents thanking them for helping them to begin talking with their children about sex.<sup>38</sup>

## South and Southeast Asia

The WHO predicts that if effective HIV prevention programs are not rapidly developed and disseminated in Asia, it will overtake Africa by the end of the decade in terms of numbers of newly infected people each year.<sup>43</sup> To date, most of the reported incidence of HIV infection has occurred in India and Thailand, but numbers of infections are rising in other countries.<sup>44</sup> Although less is known about the sexual experience of young people living in Asia than in other regions, estimates suggest that in some countries 70% of young people have had sex by the age of 17.<sup>45</sup> This clearly places young people in Asia at risk of HIV infection.

In many countries in South and Southeast Asia, it is usual for young people, most particularly young women, to marry at an early age. In the case of young women, marriage to an older and more sexually experienced man is usual. Rather than protecting young women from the risk of HIV infection, this kind of early marriage may increase their risk. It is important to recognize that many young women who have HIV infection have had only one sexual partner: their husband.<sup>46</sup>

As in many parts of the world, women in South and Southeast Asia often have limited power to negotiate about sex with their partners. Women participating in focus group discussions in Bombay have commented that because of economic dependence on their husbands and fear of physical violence, they must quietly submit to their husband's sexual demands whatever they may be.<sup>47</sup>

Stereotypical gender roles also place women at risk in cultures where having "too much" knowledge about sex can stigmatize young women, making it very difficult to ask that condoms be used. Studies in Thailand have revealed that young women must pretend not to know anything about sex for fear that people will think badly of them.<sup>48</sup>

In many Asian countries, much of the sex outside of marriage involves payment or the exchange of goods. Young men may have their first sexual encounter with a sex worker. One study in Thailand, for example, found that 44% of Thai men had their first sexual experience with a sex worker when they were around 18 years old.<sup>43</sup> Similarly, some young women may find themselves drawn into sex work, usually as a result of poverty and sometimes to pay off family debts. The Chiang Mai Hill Tribes Welfare and Development Center in Thailand has estimated that one in five girls from that area works as a sex worker, some of whom have been sold or given into prostitution by family members.<sup>43</sup>

Use of drugs may also place young people in this region at risk of HIV infection. Patterns of drug use in Asia have changed in recent years: while older drug users have tended to smoke opium, younger people are more likely to inject.<sup>43</sup> If needles are shared, this can present another risk of HIV infection that needs to be addressed.

As in many other parts of the world, young people in South and Southeast Asia have the increased risks of HIV infection commonly associated with poverty, unequal life chances, urbanization and migration, rigid gender roles, and poor access to education and health services. Many young people in South and Southeast Asia, especially girls, do not attend school. In addition, girls often have increased familial responsibilities and are based primarily at home, making them a difficult group to reach.<sup>7</sup>

One intervention in India has attempted to reach such young women in lowincome communities in Bombay.<sup>49</sup> In the preintervention period, information about daily life, friendships, level of knowledge about sex, sexual activity, and health problems was collected. A baseline survey was conducted on a sample of 85 adolescent girls to determine their knowledge, attitudes, beliefs, and practices with regard to puberty, reproduction, marriage, sex, STDs, and AIDS. In developing the intervention, it was clear from the outset that community and parental support would be crucial, since sexual matters are not ordinarily discussed with adolescent girls in this community. In addition, the girls were found to have heavy workloads, necessitating support services, such as child care for the younger siblings for whom the girls have responsibility. In addition, it was clear that for the intervention to be effective, it had to look at issues related to women's status and rights as well as STD/HIV infection.

The intervention developed looked at issues around puberty, human sexuality, sexual exploitation and harassment, the human immune system and health problems (with specific reference to HIV and STDs), women and AIDS, and the development of a plan of action to protect oneself from HIV infection. Methods included lectures, storytelling, role playing, group discussion, puppet shows, and games. In each session, emphasis was placed on building the girls' self-confidence by encouraging them to participate and express themselves. Small incentives such as door prizes and refreshments were offered to attract attendance. The average age of the girls attending the program was 14 years. Simultaneously, an AIDS awareness program was implemented in the community. This included meetings with different groups such as community leaders, parents, young men, and adolescent boys.

Observations of the sessions suggested that the girls became more vocal and self-confident as the sessions progressed. The level of participation, in fact, made it impossible to cover the content of the course in six sessions, so a seventh had to be added. There was a great demand for the intervention to continue beyond the seventh session, and suggestions were made by the girls on how to cut costs (such as eliminating door prizes and refreshments). A follow-up survey of the participants indicated that a higher proportion of the girls demonstrated correct knowledge than in the baseline survey. Eighty-three percent reported that they had talked to others about a range of topics covered in the intervention, with HIV/AIDS being discussed by the highest number (62%).

In the Philippines, researchers have observed that most of the information that young people receive about AIDS comes from the mass media and health care providers. In many parts of the world this has resulted in high levels of knowledge but continued risk behaviors. A model for a school-based intervention for high schoolers has been developed and tested in Manila.50 Four demographically similar high schools in a semiurban district were selected for a randomized controlled trial. An AIDS prevention program was implemented by high school teachers, local AIDS experts, social scientists, and health educators to dispel misconceptions, provide accurate information, foster positive attitudes toward people living with AIDS, and develop skills aimed at clarifying values. After the implementation, statistically significant effects favoring the intervention group were observed in knowledge and attitudes toward people with AIDS, but no statistically significant differences were observed in intended HIV preventive behavior, although some delay to intended onset of sexual activity was recorded. Efforts are continuing to develop a program that will effect change in behaviors.

Increasing numbers of young people in South and Southeast Asia are moving to cities to seek employment. Such young people find themselves removed from the protection and traditional expectations and values of the family and are exposed to urban culture as well as often insecure conditions of work: This places young migratory workers at high risk of HIV infection. One intervention aimed at young female factory workers in Thailand has revealed that prior to their exposure to AIDS education, the young workers did not perceive themselves at risk because they identified HIV infection with sex workers and their clients and drug users.<sup>43</sup>

The young women also reported that condom use is inappropriate in a love relationship. In face-to-face interviews a number of the young women reported being sexually active, sometimes with more than one partner. The program designers prepared educational materials based on their preintervention research with the young women. Noting that the women enjoyed romantic dramas on television and in magazines, a romantic novel was written about a factory worker called Lamyai. Lamyai finds out she is HIV positive and tells her sister that she will work in the factory to support her family until she becomes sick. The young women responded positively to the story and reported that they cried when they read it and felt as if they knew Lamyai personally.

In addition to the production of educational materials, peer leaders were trained to use educational materials with others. Peer facilitators gave young women the chance to practice different kinds of negotiation with hypothetical partners as well as undertaking sex and HIV-related education. All participants were awarded certificates to say they had completed an AIDS education program; these were highly valued and the young women reported that having the certificates enabled them to discuss issues with others. Another indication of the success and acceptance of the program is that they used their own money to photocopy materials to take back to their villages.

Findings from the collection of qualitative and quantitative data suggest that this project improved young women's communication skills and self-confidence, increased their perception of risk, and strengthened their intention to prevent AIDS and help others. Peer education proved the most effective means by which to influence beliefs and intentions to change behavior. The young women enrolled in the peer leader group demonstrated the most significant improvements in knowledge and enabling skills and the largest increase in perceived vulnerability to HIV infection. As a result of the program, the young women expressed more acceptance and higher regard for women who prevented AIDS by negotiating condom use: "it is not shameful now; it is up-to-date."<sup>51</sup>

## CRITICAL REVIEW OF METHODS USED

In this chapter we have discussed a wide variety of interventions, some of which have been systematically evaluated and others that have not. The interventions reviewed can be divided into two types: those which have a strong research orientation, for example, the school-based randomized controlled trial carried out in Cape Town,<sup>28</sup> and those in which research is not a priority, such as the work carried out with girls in Recife, Brazil.<sup>41</sup> Some of the interventions described were motivated by the need to systematically evaluate program impact through randomized controlled trials and quasi-experimental methods. Other projects arose from the need to take action immediately with young people who were facing

particular risk of HIV infection. Although the latter types of projects are often subjected to some kind of evaluation, the process of health promotion is more frequently given precedence over research issues.

All interventions with young people need to evaluate the impact that they are having, especially when increasingly health promoters are asked not only to demonstrate that their interventions are effective, but that they offer good value for money.<sup>15</sup> However, work in HIV/AIDS prevention presents those embarking on evaluation with a difficult set of research issues. First, whereas in other fields of health promotion most interventions use biological indicators to evaluate progress, accurate baseline data for HIV/AIDS in the developing world are often unavailable or difficult to obtain.52 Where accurate data about the prevalence of AIDS do exist, they reflect infections that may have occurred 10 or more years ago, and thus are unable to tell us much about recent changes in behavior. Incidence data, which would be useful for evaluating the impact of interventions to prevent HIV infection, are rarely available and expensive to collect.<sup>52</sup> In the absence of such data, most researchers have attempted to gather information about changes in people's sexual behavior. Because sexual behavior among young people may be prescribed or taboo, it is hard to ensure the validity of data. Even if we can assume that reliable and valid information about behavior change has been collected, the process of behavior change itself generates another concern. While interventions may be of short duration, behavior change can and does take many years to occur, as evidenced in earlier work on family planning.<sup>52</sup>

Notwithstanding the difficulties in evaluating HIV/AIDS prevention, a number of projects presented here have built-in methods of evaluation. There are a variety of ways in which evaluation can take place, and it would be unfortunate if one or two methods were to be given precedence over all others. Recently, in HIV/ AIDS prevention work an increasing number of practitioners have employed randomized controlled trials to test whether or not the intervention is successful and have on occasion advocated this method as superior to all others.<sup>19</sup> However, this method has a number of difficulties associated with it, not the least of which are cost and the ethical problems that it can pose. The study in South Africa discussed in this chapter highlights some of the problems that can occur when one population is singled out from others around it for intervention. Research effects of this kind may in fact influence program outcomes as much as the prevention program itself.

Qualitative methods, such as observation, focus group interviews, and faceto-face interviews, can provide rich sources of data. The evaluation of young women in Bombay presented here reveals very clearly that the intervention has a high level of acceptance among the participants; similarly, the information that young female workers in Thailand reproduced educational materials using their own money tells us a lot about the success of that particular project. Observation, when carried out rigorously and systematically, can provide useful clues as to what is taking place in health promotion. Like many programs worldwide, the US

Government's AIDS Control and Prevention projects (AIDSCAP) recommends the use of multiple methods of evaluation for projects in developing (and industrialized) countries: "information from these sources can then be triangulated to gain as complete a picture as possible of what is happening in the field."<sup>52</sup>

It is important to bear in mind the strengths and limitations of different kinds of data when making decisions selecting or implementing different types of HIV and AIDS-related health promotion programs. By itself, no approach can answer all the questions about the appropriateness and effectiveness of different interventions. However, by bringing together data collected in different ways, it may be possible to distinguish some of the more promising approaches to HIV and AIDSrelated health promotion from those that may be less promising.<sup>15</sup> It is also important to remember that the purpose of HIV prevention activities with young people is to help reduce the risk of HIV infection. This goal must take priority over other research concerns: for example, while it may be relatively easy to measure changes in HIV knowledge, it is now clear that projects that focus solely on imparting information about AIDS do not help young people reduce their risk of infection.<sup>53</sup> We must continue, then, to focus on what will assist young people most, rather than develop evaluation programs that focus on what is most measurable.

## SUMMARY

A range of different interventions among young people has been described in this chapter. Some of the most interesting and possibly most effective ways of working, however, are those programs that are ongoing and not yet fully evaluated. Clearly there are some commonalities in the programs that are best received by young people and might be most effective. Further, adults working with young people in HIV prevention now have access to an increasing body of knowledge about what does and does not work, particularly with respect to changing knowledge and attitudes. Still, what is effective in terms of promoting behavioral change is not as apparent, because of a dearth of evaluations of interventions' effects on actual behavior, to the methods of measuring behavioral change with a reliance on self-reports of behavior rather than incidence of disease, and to the fact that lasting behavior change is difficult to achieve and to monitor.

Despite considerable evidence from both industrialized and developing countries that increasing levels of knowledge about HIV and its transmission does not necessarily produce changes in behavior, many programs still place undue weight on that approach. This is evident in several of the programs reviewed here. Young people in the studies conducted by Kuhn *et al.*<sup>28</sup> and Aplasca *et al.*<sup>50</sup> demonstrated statistically significant improvements in levels of knowledge, but no corresponding changes in behavior or intended behavior. Asha Mohamud, Director of the International Center on Adolescent Fertility at the Center for Population, has pointed out that although HIV/AIDS prevention programs are engaging adolescents in many countries, too often they are just "throwing information at the young people."<sup>52</sup> While information about HIV and how it is and is not transmitted is clearly important, simply providing the basic facts about AIDS does not suffice to help young people protect themselves from infection.

Study findings from around the world show that there is a gap between young people's knowledge and behavior. Romer and Hornik<sup>54</sup> have shown that although 70-90% of the young respondents in 23 surveys conducted in North and Central America, Europe, African, and Asia knew how HIV is spread and how it is preventable, large proportions of young people who were sexually active were not using condoms and less than half those reporting condom use said that they did so consistently. Programs promoting the acquisition of specific skills and the development of social norms for healthy behavior have proven the most effective in reducing risk. In addition, education programs implemented to promote abstinence only have proven less effective than those offering a range of options in delaying the initiation of sexual risk behaviors. However, it should be noted that, like knowledge, skills alone may not be sufficient to help young people protect themselves against HIV infection. In many parts of the developing world, the social, economic, and political context within which young people live impact their ability to engage in HIV-protective behaviors. In several of the interventions described here, young people talked about the barriers generated by cultural factors and societal pressures that make it difficult for them to think about or act upon a health issue that may affect them in some years' time.

While peer education programs are currently very popular, the programs reviewed here appear to be most effective with those who are trained to be peer educators rather than those who participate as recipients of peer education. This may be because of the control that those trained as educators have over program design and content, delivery, and empowerment. In addition, peer educators are often self-selecting, which may indicate a preexisting degree of concern with HIV-related issues.

Perhaps most interesting of all is the success of programs that take an interest in all the very real concerns of young people living in precarious situations. A number of the programs enjoying success in Central and South America have a commitment to listening to the problems that young people themselves identify, whether or not these are perceived to be directly related to HIV infection. It is clear that young people in developing countries have a variety of very real difficulties to face in their daily lives, and that the threat of HIV infection is only one of these. Programs that afford young people an opportunity to think about and talk through the issues that impact their lives may enjoy the greatest level of success, given that HIV infection occurs within contexts that are broader than the spheres of sexuality and sexual behavior. Indeed, helping young people deal with

pressing immediate concerns, such as the need to generate income, may play an important role in helping them to protect themselves from HIV infection.

A number of programs still face restrictions and taboos around talking with young people about certain issues to do with the prevention of HIV infection. In Tanzania and South Africa, for example, it was not possible to talk about condom use with young people in some schools. This occurs despite evidence that young people in Africa, like young people in many other parts of the world, engage in sex from a young age without using condoms, which are acknowledged to help prevent HIV infection. Such restrictions reflect the concerns of adults rather than the reality that young people experience. Sex education, and more recently HIV-related education, for young people has had to face a series of such hurdles. Yet evidence collected by the WHO, which summarizes 19 research studies, found that in no study was there evidence that sex education leads to earlier or increased sexual activity. Indeed, six of the studies found that sex education led to either a delay in the onset of sexual activity or to a decrease in overall sexual activity.12 Programs that focus on the reality of young people's experience and use the needs of young people themselves as their starting point are more likely to bring about behaviors that help prevent HIV infection. As Hoffman and Futterman<sup>9</sup> have pointed out, to effect change in risk-related behavior, young people must be treated as genuine partners in dialogue and decision making.

# FUTURE DIRECTIONS AND RECOMMENDATIONS FOR WORK WITH YOUNG PEOPLE IN DEVELOPING COUNTRIES

As the HIV epidemic unfolds and as new areas of the world are touched by the tragedy of AIDS, prevention efforts involving young people must continue to be given the priority they deserve. This is not because young people are more needing of support than others; all groups have equal claim to the information and resources important to protecting themselves and their sexual partners from HIV-related risks. They deserve it since by working with those who are young, we may be able to significantly alter the future course of the epidemic.

As the evidence reviewed in this chapter shows, we already have strong indications of what styles of HIV-related health promotion work best with young people and what do not. We know, for example, that programs that offer young people a range of choices about sexual health are more effective than those which focus solely on abstinence.<sup>12</sup> We know too that program effectiveness requires an acceptance of young people's perspectives and needs, as well as their equal participation in learning.<sup>9</sup> And we know that programs must do more than attempt to persuade young people to adopt safer sex and safer drug use; structural and environmental circumstances must be enabling and supportive of such behavior change, including condom use.<sup>5</sup>

Past successes and failures in HIV-related health promotion enable us to identify a series of principles that underpin successful work. These include:

- Recognizing the diversity of young people and their needs rather than beginning from stereotypes and possible inaccurate presuppositions.
- Beginning work with the expressed needs of young people themselves, and encouraging youth participation in project design and implementation.
- Working in a climate of openness that acknowledges the realities that young people face, rather than the preferences and prejudices of adults.
- Providing opportunities to address issues relating to gender, social status, and sexuality in work to promote young people's sexual and reproductive health.
- Undertaking more work with young men to enable them to think about their role in relation to both their own sexual health and that of their partners, as well as improving programs targeting young women.
- Examining the positive aspects of sexual health including eroticism and pleasure as well as the more negative aspects such as unwanted pregnancy and sexually transmitted disease.
- Promoting greater awareness of structural issues affecting sexual and reproductive decision making, including rights and protection for young people, as well as improved access to education and health services.

With greater attention to these key principles in program design and implementation, and with continuing research to identify other key components of success, the new millennium may yet see the kinds of progress in HIV prevention that generations, both past and present, have hoped for and deserve. But such goals cannot be accomplished without the will of politicians and policymakers, many of whom need to be more realistic in their appreciation of young people and their needs. We need swiftly to jettison our desire to proscribe and prescribe, and to substitute a respect for young people and their multifaceted needs. We need too the courage to set in place a broad agenda for sexual risk reduction, that is, an agenda that recognizes that there is no one style of risk reduction appropriate for all, but a range of options from which young people, like adults, could one day be free to choose.

## REFERENCES

- 1. Panos. AIDS and young people. AIDS Briefing 1996; (4):1-24.
- 2. Anonymous. The Second Decade: A Focus on Youth and Women. New York: UNICEF; 1993.
- Fee N, Yousef M. Young people, AIDS and STD prevention: Peer approaches in developing countries. Unpublished paper prepared for the World Health Organization Global Program on AIDS. Geneva, Switzerland; 1993.

- 4. Anonymous. The HIV/AIDS Pandemic Overview. Geneva: World Health Organization; 1994.
- Baldo M. Youth and AIDS: Adapting to an evolving epidemic. Paper presented at the 6th Congress in Adolescent Health/Youth Health. Vancouver; 1995.
- 6. Anonymous. Statistical Charts and Indicators on the Situation of Youth 1970–1990. New York United Nations; 1992.
- Sweat MD, Denison J. Reducing HIV incidence in developing countries with structural and environmental interventions. AIDS 1995; 9(suppl. A):S251–S257.
- Mann JM, Tarantola DJM, Netter TW, Cohen ME. Prevention. In: Mann JM, Tarantola DJM, Netter TW, eds. AIDS in the World. Cambridge, MA: Harvard University Press; 1992; 325–448.
- Hoffman ND, Futterman MD. Youth and HIV/AIDS. In: Mann J, Tarantola D, eds. AIDS in the World II: Global Dimensions, Social Roots and Responses. New York: Oxford University Press; 1996; 237–238.
- Aggleton P, Warwick, I. Young people, sexuality and AIDS education. In: Sherr L, ed. Adolescents and AIDS. Amsterdam: Harwood 1997; 79–90.
- Warwick I, Aggleton P. Adolescents, young people and AIDS research. In: Aggleton P, Davies P, Hart G, eds. *AIDS: Individual, Cultural and Policy Dimensions*. Basingstoke, England: Falmer Press; 1990; 89–102.
- Baldo M, Aggleton P, Slutkin G. Does sex education lead to earlier or increased sexual activity in youth? Poster presented at the 9th International Conference on AIDS, Berlin; 1993.
- 13. Dixon-Mueller R. The sexuality connection in reproductive health. *Stud Fam Plan* 1993; 24(5): 269–282.
- Rotheram-Boms M.J, Mahler KA, Rosario M. 1995. AIDS prevention with adolescents. AIDS Educ Prevent 1995; 7(3):320–336.
- Aggleton P. Global priorities for HIV/AIDS intervention research. Int J STD AIDS 1996; 7(suppl. 2):13–16.
- Rickert V, Jay MS, Gottlieb A. Effects of a peer-counseled AIDS education program on knowledge, attitudes and satisfaction of adolescents. J Adolesc Health 1991; 12:38–43.
- Anonymous. Vulnerability and Opportunity: Adolescents and HIV/AIDS in the Developing World. Washington, DC: International Center for Research on Women; 1996.
- Tawil 0, Vester A, O'Reilly KR. Enabling approaches for HIV/AIDS prevention: Can we modify the environment and minimize the risk? AIDS 1995; 9:1299–1306.
- 19. Aggleton P. Success in HIV Prevention. Horsham, England: AVERT; 1997.
- Oakley A, Fullerton D, Holland J, et al. Sexual health interventions for young people: a methodological overview. Br Med J 1995; 310:158–162.
- Kitzinger J, Miller D. African AIDS and audience beliefs. In: Aggleton, P, Davies P, Hart G, eds. AIDS: Rights, Risk and Reason. London: Falmer Press; 1995:28–52.
- Anonymous. Youth, HIV Infection and development in Africa. Technical paper prepared for the Pan African Conference on Youth and Development in Tunis. Geneva: World Health Organization; 1995.
- Ministry of Education and Culture Zimbabwe. A report on focus group discussion with out of school youth on perceptions and strategies for communicating about AIDS. Ministry of Education and Culture, Zimbabwe: UNICEF; 1993.
- Baldo M. Sex education: adolescents' future versus adults' fears. In: Mann JM, Tarantola D, eds. AIDS in the World II. New York Oxford University Press; 1996; 238–240.
- Ella M, Boupda A, Fouda A, et al. Mobilization of students for STDs/AIDS prevention in universities in Cameroon. Paper presented at the 10th International Conference on AIDS. Yokohama, Japan; 1994.
- Uwakwe CBU, Mansaray AA, Onwa GOM. A Psycho-educational Program to Motivate and Foster AIDS Preventive Behaviors among Female Nigerian University Students. Women and AIDS Research Program Reports-in-Brief. Washington, DC: International Center for Research on Women; 1994.

- Kelly R, Coghlan A, Dombo E, Ssembatya J. Youth peer education: An HIV intervention strategy in Rakai district. Paper presented at the Third USAID HIV/AIDS Prevention Conference, Washington, DC; 1995.
- Kuhn L, Steinberg M, Mathews C. Participation of the school community in AIDS education: An evaluation of a high school program in South Africa. AIDS Care 1994; 6(2):161–171.
- Klepp KI, Ndeki SN, Seha AM, et al. AIDS education among primary school children in Tanzania: An evaluation study. AIDS 1994; 8:1157–1162.
- 30. Matthews C, Everett K, Binedell J, et al. Learning to listen: Formative research in the development of AIDS education for secondary school students. *Soc Sci Med* 1995; 41(12):1715–1724.
- Blake SM, Middlestadt S, Lohrmann D, *et al.* School-based programs to prevent HIV/AIDS: An overview of strategies used and lessons learned. Paper presented at the 11th International Conference on AIDS. Vancouver; 1995.
- Benjamin JA. AIDS Prevention for refugees: The case of Rwandans in Tanzania. AIDScaptions 1996; 3(2):4–9.
- Reddy P, Everett K, Matthews C, *et al.* An evaluation of an AIDS education photo-comic for the youth of South Africa. Paper presented at the Third USAID HIV/AIDS Prevention Conference, Washington, DC; 1995.
- Henry K. Positive vibes in Jamaica: Drama helps teens, parents and teachers discuss sexuality and AIDS. AIDScaptions 1993; 1(1):17–19.
- 35. Pan American Health Organization. *Health Conditions in the Americas*. Albany, NY: Pan American Health Organization; 1990.
- Bezmalinovic B, Skidmore DuFlon W, Hirschmann A. Guatemala City Women: Empowering a Vulnerable Group to Prevent HIV Transmission. Women and AIDS Research Program Report-in-Brief. Washington, DC: International Center for Research on Women; 1997.
- 37. Lemus B. Mexican agencies reach teenagers. Network 1992; 13(1):14-15.
- Filgueiras A. Defending children's rights: An AIDS prevention strategy. AIDScaptions 1993; 1(1): 10-13.
- Pinto J, Rafaelli, M, Andrade J, *et al.* Impact of AIDS education on knowledge, attitudes and behavior of street youth in Brazil. Paper presented at the 10th International Conference on AIDS. Yokohama, Japan; 1994.
- World Health Organization. Effective Approaches to HIV Prevention: Report of a Meeting, Geneva, 26-29 May. Geneva: World Health Organization, Global Programme on AIDS; 1992.
- Vasconcelos A, Neto A, Valença A, et al. Sexuality and AIDS Prevention among Adolescents from Low-Income Communities in Recife, Brazil. Women and AIDS Research Program Reports-in-Brief. Washington, DC: International Center for Research on Women; 1993.
- 42. Munhoz R, Peres C, Antunes M, *et al.* Adolescents' training as health agents, sexual orientation and STD/AIDS Prevention. Paper presented at the 11th International Conference on AIDS. Vancouver; 1996.
- 43. Anonymous. AIDS: Images of the Epidemic. Geneva: World Health Organization; 1994.
- 44. Elford J, Dwyer J. HIV and AIDS in Asia and the Pacific. AIDS Care 1993; 5(3):259-260.
- 45. Henry K. AIDS and adolescents: Protecting the next generation. AIDScaptions 1993; 1(1):2-4.
- United Nations Development Programme. Silence, Susceptibility and the HIV Epidemic. New York UNDP HIV and AIDS Development Program; 1993.
- George A, Jaswal S. Understanding Sexuality: Ethnographic Study of Poor Women in Bombay. Women and AIDS Program Research Report-in-Brief. Washington, DC: International Center for Research on Women; 1994.
- Cash K, Anasuchtkal B. Experimental Educational Interventions for AIDS Prevention among Northern Thai Single Migratory Female Factory Workers. Women and AIDS Research Program Report-in-Brief. Washington, DC: International Center for Research on Women; 1993.
- 49. Bhende A. Evolving a Model for AIDS Prevention Education among Low-Income Adolescent Girls

in Urban India. Women and AIDS Research Program Report-in-Brief. Washington, DC: International Center for Research on Women; 1993.

- Aplasca M, Seigal D, Mandel JS, et al. Results of a model AIDS education program for high school students in the Philippines. AIDS 1995; 9(1):7–13.
- 51. Cash K. Peer education reaches young women factory workers in Thailand. *AIDScaptions* 1993; 1(1):14–16.
- 52. Henry K. Evaluating HIV/AIDS prevention programs. AIDScaptions 1996; 3(2):29-32.
- Brown LK, DiClemente RJ, Beausoliel NI. Comparison of human immunodeficiency virus-related knowledge, attitudes, intentions and behaviors among sexually active and abstinent young adolescents. J Adolesc Health 1992; 13:140–145.
- 54. Romer, D, Hornik R. HIV education for youth: the importance of social consensus in behavior change. *AIDS Care* 1992; 4(3):285–301.

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## Interventions for Workers Away from Their Families

MARY HAOUR-KNIPE, MELKIZEDEC LESHABARI, and GEORGE LWIHULA

## INTRODUCTION

The link between the movement of people and the spread of HIV is one that has been treated with a great deal of ambivalence. On the one hand, and especially at the beginning of the epidemic, people in one country after another tried to show that HIV came from somewhere else, from any country but their own. Stories about an "AIDS-bringing foreigner" circulated in the press in many countries, the common theme being that someone from elsewhere, and who was usually of another race, was accused of having infected members of the local population. On the other hand, and on the other side of the ambivalence about migration and HIV, it is principally in the bodies of people who move that the virus has been transported from one place to another.' Several studies, to be reviewed in this chapter, have traced the development of the epidemic along the routes followed by people on the move for professional reasons, or have traced the first AIDS cases in particular regions to the return of people infected as they worked abroad.

It is such workers who reside temporarily apart from their families that are the subject of this chapter. Some are migrants, people who live as foreigners in countries; others are ethnic minorities; and still others are nationals of the country in which they are living but mobile for professional reasons. The chapter discusses HIV prevention among populations of such mobile workers as truck and bus drivers, military personnel, seafarers, miners, migrant labors, and mobile traders.

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The chapter will not discuss HIV prevention efforts among refugees in developing countries, a subject that would merit a chapter of its own.

HIV prevention and care among migrant populations have been the object of publications in Europe<sup>2</sup> and in the United states,<sup>3</sup> but published literature concerning mobile populations in developing countries is scarce. A Medline literature search performed to prepare this chapter led to a very small number of published articles, and most of what exists has been epidemiological, focusing mainly on HIV status. For example, surveys of a population cohort of approximately 10,000 individuals in a rural subcounty of southwest Uganda<sup>4</sup> and along major truck routes in Tanzania<sup>5</sup> have shown that change of residence is strongly associated with an increased risk of HIV-1 infection. There is, however, no coherent framework in the published literature for understanding either the migration or the risk behaviors that may be associated with it: Published studies rarely address the why that might be behind the differences, why people might move, or the circumstances surrounding risk behaviors.

Much of the chapter is based on "gray literature," unpublished project and conference reports the authors were able to gather through requests to colleagues and some of which they have produced themselves. Saturation was reached in the search for information (the point when the same names and references kept appearing from different sources); nonetheless, the review is necessarily patchy. Most of the literature concerns baseline evaluations (although some research teams indicate they performed action research, providing HIV prevention while gathering data). Actual program descriptions are rare and program evaluations even more so.

We review what literature does exist, discussing research concerning migrant labor and truck and trading routes in Africa, in Asia and in Latin America. Such initiatives in the military are then discussed in a separate section, since by their very nature questions concerning HIV and the military are international in scope, transcending the boundaries of the continent in which they occur. The chapter focuses heavily on Africa since the issues have been more thoroughly explored there and for a longer time. For Asia, the chapter covers some of the major projects concerning mobile populations that have begun within the past 2 or 3 years. We were able to find very little about such populations in Latin America.

## AFRICA

It was with truckers and their sex partners in African countries that early international attention came to be focused on a possible link between mobile populations and the spread of HIV. This section covers some of this early research, but first discusses a perhaps more fundamental link, that between migrant labor and HIV risk.

### Workers Away from Their Families

## Migrant Labor in Africa

A medical geographer postulated several years ago that a key to understanding differences in patterns of the AIDS epidemic in eastern, central, and southern Africa lay in a labor migration system that concentrated male workers at the site of industry, of agriculture, or of extraction such as at mines. Depletion of males from rural villages and farms would cause a deterioration in women's ability to carry on alone to provide for their families. Young rural women, seeing no means of adequate support for a family and emigrating to the city, would find no jobs available and would enter marginal or secondary labor markets, from which prostitution might be one of the few viable sources of income available. Long separations would cause a breakdown in family and sexual patterns, and increased numbers of sexual partners result in an explosion of STDs, facilitating transmission of HIV.<sup>6</sup> Empirical support for this scenario has come from a number of authors.

At the 1996 international AIDS conference, for example, a report from a rural South African community found that 33% of the adults under the care of a randomly selected health community health worker were migrants, temporarily or permanently away from home. HIV prevalence among the 239 people tested was 11%, all of which was among people who spent 10 or less nights per month with their regular partners.<sup>7</sup>

The unintended consequences of major construction projects such as the Akosombo dam in Ghana have been given some attention. When the dam was built between 1961 and 1965, the flooding and creation of the Volta lake displaced about 10,000 inhabitants. Men became fishermen and some migrated to work on dam construction. Many women who lost their land, however, started to work as service personnel in the only profitable and growing businesses, the hotels and drinking spots that sprang up in the small towns of the area. From there it was only a small step into the business of prostitution. When dam construction was finished after 5 years, the women took their business to larger cities, and then abroad throughout West Africa. The money they sent home was an important source of development funds in some towns in the region. There were great difficulties for the children of these women, who were without recognized fathers in a patrilineal society and some of whom in turn entered the circle of prostitution. The long-term economic consequences of the events beginning in the 1960s are becoming apparent only now, as women with AIDS return home for medical care and to die.<sup>8</sup> The unintended consequences of another major construction project have been described in Lesotho. Reported AIDS diagnoses have risen precipitously in this small, mountainous country in South Africa since the first case was identified in 1986. One of the reasons can be traced to the initiation of the Lesotho Highlands Water Project, which gave rise to an influx of a migrant work force of predominantly single males. Unlinked, anonymous HIV testing of 486 persons revealed a seroprevalence seven times higher among workers than among nearby villagers of the same sex and age. In a concomitant survey, STD clinic patients knew about HIV/AIDS and condoms, but only 2.4% (including those who were HIV positive) used them regularly.<sup>9</sup>

Similar scenarios are described for other industries that recruit and house large numbers of male workers, for example, in mines, railroads, and cantonments of South Africa and of Botswana.<sup>10</sup> A study using in-depth interviews among mine workers in South Africa describes the ways in which frequent and lengthy absences from homes disrupt familial and stable sexual relationships. Workers live in single-sex hostels, sleeping in rooms with 12 to 16 other men, queuing for showers, meals, and to wash. They return home for visits when possible, on weekends if home is close enough. The dominant theme when workers describe their leisure time is the need to escape the mine environment - to bury anxieties about work and separation from home. Although many workers undoubtedly remain faithful to their wives, those who seek sexual relationships may do so in several ways: in cash transactions with the commercial sex workers to be found at the hostel gates and other nearby pickup points, in casual short-term relationships, or in longer-term quasi-domestic relationships. As for the commercial sex workers interviewed, the decision to provide sexual services was usually described as having been an economic one. Eight out of ten had children and described entering prostitution after having being abandoned by their husbands or partners when they became pregnant. Others had left rural areas to seek higher wages in towns, and still others were wives of migrant mine workers who had arrived illegally to be with their husbands. As for HIV prevention messages contained in mine pamphlets, many miners dismissed them. As one worker commented: "If these pamphlets were true [the mine owners] would give us at least 4 days every month to be with our wives." Interviewees perceived multiple relationships and prostitution as social consequences of the migrant labor on which the mines depend, and were highly skeptical about the sincerity of management's concern about HIV.11

A number of baseline studies, designed to precede the establishment of HIV prevention programs, have examined factors leading to HIV risk among populations for whom temporary migration is common. In Senegal, for example, sexual multipartnership was found to be associated with such migration in an area in which most of the adult population spends half of the year away. Women work as maids in major cities in Senegal and Gambia and men go to other regions of Senegal to harvest palm wine.<sup>12</sup> In West Africa particularly, seasonal, cyclical migrations occur annually as men, especially, leave home annually in search of incomeearning opportunities during the dry season. Most employment opportunities — petty trade and unskilled labor—occur along the broad coastal zones. Action research has been underway since 1991: Men were interviewed in bus depots in

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Mali and Niger before they migrated, then migrant men were interviewed where they lived and worked in Abidjan. The ideas developed in the study are being applied in a number of HIV prevention projects with migrants throughout several West African countries.<sup>13</sup>

In East Africa, male sugar cane cutters have been the focus of an HIV prevention intervention in Tanzania. These are usually young or middle-aged men who leave their families behind for the 6 months they go to work in the sugar factory. Some set up household during the season with women from a village near the sugar estate, an arrangement that appears to have contributed to high STD and HIV rates observed on the estate.<sup>14</sup>

Another study, also from Tanzania, reports significant changes in roles between husbands and wives within the last generation. Economic changes make it impossible for men alone to provide for basic household needs. Income-earning activities for women include petty trading, some of which involves spending several days away from home, during which child care is delegated to the eldest child in the family. The subsequent lack of good parental models could be one explanation for an increase in the problem behaviors that were rare in the villages only a generation ago.<sup>15</sup> Other studies have examined the impact of such changes on commercial sex. At one extreme, although prostitution is illegal, commercial sex is known to be readily available at well-defined urban "scenes,"<sup>16</sup> and attempts at repressive measures have mainly resulted in moving activities elsewhere. On the other hand, in a society where exchanges of gifts and money are common, it may be difficult to distinguish commercial relationships from other relationships between men and women. The quasi-domestic arrangements discussed elsewhere in this chapter are an example. In addition, a decline in social and economic conditions has created HIV risk conditions for women, especially, for whom commercial sex is among the coping strategies available. Bar and restaurant workers, for example, may find their wages inadequate for meeting their own basic needs, as well as those of their children and other dependents. Even government and other official employees may find their income unrelated to costs for basic survival needs in urban settings: rent for a single room in a major city such as Dar es Salaam, for example, amounted in the mid-1990s to a third of the official minimum salary.

## Trading, Trucking, and Fishing Routes in Africa

Truck drivers, their assistants, and their sex partners were early subjects of research concerning mobile populations and HIV. As early as 1986, a classic study of 68 drivers or assistant truck drivers who passed through a transport depot in Kampala, Uganda, on the major truck route between the port of Mombassa in Kenya and Zaire, Burundi, and Rwanda, noted a high prevalence of HIV (35%) already present.<sup>17</sup> Attention at this stage was also focused on the local populations

in areas reached by trading routes. In the Rakai district of Uganda, for example, risk was found to be greater in trading centers than in agricultural areas (a higher proportion of respondents reported multiple sex partners and histories suggestive of STDs), and HIV seroprevalence was also higher. This was in spite of the fact that residents of such centers had greater AIDS knowledge and more access to health care. Main road trading centers seemed to act as focal points of infection, which seemed at least partly associated with domestic and international trucking and commercial sex in bars and hotels. Rural trading centers on secondary roads not directly accessible to international traffic were not noted as centers of commercial sex, but were thought to provide a conduit or secondary locus for the spread of HIV to the remote rural villages, which had the lowest seroprevalence.<sup>18</sup>

Less obvious was the possible contribution of trading routes. In the late 1970s, political changes in East Africa and the border closures resulting from them had given rise to the illegal transport of essential goods across the Kenya, Uganda, and Tanzania borders, through both official and unofficial routes. Mode of transport involved trekking on foot during the night, as well as cycling, overnight boat trips across the lake, and in rare instances motor vehicles. Those involved in this trade were mainly young men and women, moving from villages to towns, then across borders to neighboring countries. Many became wealthy, and part of the patterns of conspicuous consumption that resulted involved anonymous casual sex in the bars, hotels, and guest houses available in towns and trading centers. The migration of such young traders preceded and transcended the era of the first official reports of HIV/AIDS in 1983 from the Kagera region in Tanzania, but appears to have contributed to the rapid spread of HIV in the region. Between 1987 and 1990, prevalence rates varied from nearly 25% in the headquarters of the region, the town of Bukoba, to between 10 and 12% in rural areas.<sup>19</sup>

A rapid ethnographic assessment from Tanzania helps reveal the possible dynamics of risk in a trading and truck stop environment, starting with how a truck stop and commercial area develops.<sup>20</sup> When the first trucks began to pass through 30 years ago, local farmers from surrounding rural areas brought surplus agricultural production to the roadside, staying with it for a day or two until they secured transportation. Over the next few years, the area became a local center for selling small surpluses, bringing more farmers with their goods and more drivers who stopped. This led to the construction of the first small guest house, then of a gas station, then more guest houses, restaurants, and bars. There was also a steady stream of migrants, many of whom found jobs in the service sector and also in the informal sector. At the time the ethnographic assessment was carried out in 1991, the truck stop had bars, restaurants, guest houses, clubs for music and dancing, and also a number of locations where local brew was sold. There was a large informal sector, providing such services as truck washing, collection and sale of semirefined cooking oil, packing and loading of produce, sale of prepared food, and messenger,

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communications, and taxi services. An additional important segment of the informal economy involved partnerships between truck drivers and local residents for the sale of illegally imported goods such as soap, cooking oil, and cloth: goods that were often, although not always, sold by female sexual partners of the drivers.

Research in this truck stop, as in others, for example in Zimbabwe,<sup>21</sup> illustrates several factors that could potentially render the situation of truck drivers, especially long-haul truck drivers, one of high risk. Such factors include long stretches of time away from spouses or regular sexual partners, a milieu of sexual bravado and truckers' reputation for sexual infidelity, and obvious, anonymous places along truck routes at which to gather. In addition, drivers may have considerable disposable funds and goods: The money provided for incidental expenses and for fuel and minor maintenance of the trucks, coupled with that acquired from unauthorized business along the truck routes, may provide them with financial resources superior to those of even senior government executives in several countries. In addition, their jobs are both monotonous and potentially dangerous: HIV may be simply one of a number of perils, perhaps of secondary importance in relation to other, more immediate needs.

This combination of factors means that the trucking environment may become interwoven with commercial sex, both professional and informal. For instance, truckers may provide transportation for people traveling along the route, since taking along a rider relieves the monotony of long trips and provides company, and such rides may be paid for by sex. On some segments of the road, such as that of the truck route from the port of Dar es Salaam to Zaire, Rwanda, Burundi, and several parts of Western and lakes areas of Tanzania, boarding and lodging facilities are scarce, and a night with a commercial sex worker may be less expensive than a hotel room. Having become known, certain truck stops attract mobile commercial sex workers from neighboring regions. Commercial sex and economic activities become intricately interwoven, and barmaids, petty traders, and lodging or restaurant attendants working in truck stops may also on occasion sell sex.<sup>5,20</sup> Such anonymous areas may also be used by locals for commercial or transitory relationships. A baseline study recently performed along the trans-Africa highway in Kenya, for example, reported alarmingly high levels of risk behavior among 200 adolescents frequenting truck stops, among whom 50% of the girls and 30% of the boys reported at least one STD.<sup>22</sup>

## **HIV Prevention Programs in Africa**

Several HIV/AIDS prevention interventions have taken place among such transient populations in Africa. This section describes a project underway since 1989, carried out under the umbrella of the HIV High Transmission Areas Inter-
ventions project,\* which incorporates a series of projects covering highway transportation routes as well as mining and fishing centers in Tanzania and Zimbabwe.<sup>21.23,24</sup>

The main goal of the intervention was to control the spread of HIV infection along transport routes and other high transmission areas through the adoption of safer sex by transport workers, travelers, miners, and fishers and their sexual partners. Specifically, the interventions were to educate about the risk of HIV infection and other STDs, promote a reduction in the number of sexual partners among men and women, promote the use of condoms by men and women, develop and implement an appropriate distribution system for making condoms readily available, and assist in the strengthening of accessible STD services in order to facilitate the provision of STD counseling, education diagnosis, and treatment.

The major components of the interventions were:

- 1. Obtaining active support of communities and leaders.
- 2. Providing AIDS education through peer health educators. In some of the projects health educators were elected by their peers. Face-to-face communication was preceded by other materials and approaches, including drama, videos, and films.
- Promoting condoms. Peer health educators demonstrated proper use and storage of condoms among target groups and held group discussions. Condoms were distributed in guest rooms and in dispensaries, as well as through street vendors, pharmacies, and residences of commercial sex workers.
- 4. Offering STD treatment.

Evaluations took place before, during, and after several of the interventions, combining, in the project's various studies, baseline and follow-up knowledge, attitudes, practices, and behaviors (KAPB) studies; key informant and focus group discussions; participant observation; in-depth interviews; educators' monthly reports; and regular meetings between project staff, peer educators, local leaders, and project participants. After the intervention with truck drivers, their assistants, and the sex partners in Tanzania,<sup>23</sup> AIDS knowledge had increased (from 94 to 100% correct responses concerning transmission by sexual intercourse, and from 31 to 71% by sharing needles, for example, with a decrease to less than 10% of respondents who incorrectly cited casual/social transmission routes such as kissing, hugging, sharing toilet facilities, and assuming one cannot become infected from people who appear to be healthy). Attitudes toward people with HIV/AIDS

<sup>\*</sup>Partners in this project are AMREF (American Medical Research Foundation), GDS (German Development Services), MUTAN (Tanzania/Norway AIDS Control Project), GTZ (German Agency for International Cooperation), the Red Cross, and World Vision.

had also changed: There was an increase in the proportion of people willing to live in the same house as someone infected with HIV, for example. Indicators concerning condoms were also positive. Condom distribution increased from 20,000 to 120,000 units between July and December 1990. Guest house owners and attendants reported an increase in demand for condoms from customers, and some drivers were reported to ask if condoms were available before they booked rooms. Reported condom use increased, although use of condoms was less consistent among regular sexual partners.

Qualitative data emerging from these evaluations helped define some points at which HIV/AIDS education efforts had been misunderstood or where further efforts were necessary. For example, after the intervention there were reports of increased anal and oral sex: Some who had participated in project activities had understood that these were safer than vaginal sex. Anal sex, although rarely talked about, was in fact found to be fairly common. It was used, for example, by some women when a known and well-paying partner came when she was menstruating, and informants also reported that some men were willing to pay considerably more for anal sex. As for condoms, some drivers reported using them only for the first few days of a new relationship. In a relationship established while a driver waited several days for repair of a mechanical breakdown, for example, condoms would be abandoned after a number of days on the grounds that the relationship was no longer casual. The concept of "knowing your partner well" was construed to mean something quite different from the message advocated by the HIV prevention campaigns that had taken place.

Another HIV prevention program in the same series took place with fishermen in Zimbabwe,<sup>24</sup> whose conditions are in many ways similar to those of truckers. These conditions include relatively high salaries and gatherings of young people away from the social controls prevailing in the rural communities from which they came. In this program, 1034 community meetings were held over a 6-month period in fishing camps, fish-processing plants, harbors, bars, and residences, and especially with commercial sex workers. The authors note that participants were glad for a change in their routine: The boredom that is part of fishermen's lives helped when it came to recruiting participants for AIDS prevention meetings. An outcome evaluation in this case showed that the vast majority of those contacted from a random sample of camp residents had been exposed to one or to several community HIV prevention meetings and/or face-to-face peer education sessions. In addition, more than 600,000 condoms had been distributed in a remote, inaccessible area with historically low condom usage, and self-reported condom use with the last casual partner had risen from 46% before the intervention to 72% after one year.

The recommendations emerging from this and other prevention programs are covered in the last section of this chapter.

# ASIA

It is only more recently that HIV has been examined from the point of view of mobile populations in other regions of the world, including Asia.<sup>25–27</sup> This section first examines work concerning migrant labor, then concerning truck, trading, and fishing routes in Asia. Most of the work that has been done so far has concerned Thailand and India as well as their neighbors.

# Migrant Labor in Asia

Singhanetra-Renard<sup>28</sup> provides an excellent discussion of why migration occurs in Thailand, of the complex factors of change that have led to increased mobility, and the decreased social control that may accompany such mobility. Socioeconomic development and the creation of new industries have led to an increased need for labor. At the same time there has been a decline in the need for agricultural labor, and modern transportation and communication routes have developed. The development of Chiang Mai City, for example, has brought a flourishing construction industry and a demand for inexpensive labor, including female and clandestine foreign workers. It has also brought employment in commercial, manufacturing, and service sectors, more than half of which is also female.

Several other complex factors have contributed to increased labor migration to cities. The economic boom, for instance, has given urban elites disproportionately high buying power, and rapid growth in rural land purchases has meant that agricultural laborers have become wage workers, making it necessary to send a family member to a city to work. Strife along Thailand's borders has created both combatants and refugees. The replacement of opium as a crop is changing the economy and ecology of hill regions, forcing upland ethnic minorities to migrate to lowlands for employment. The creation of newly perceived needs and rapid growth of addiction to heroin, which is not produced locally and is more expensive, have created debts that must be met by selling resources. In some cases the only resources available to be sold are daughters-sold into commercial sex work. For rural women, routes to social mobility include urban employment, marriage, and education, but a "shortcut" can be found through commercial sex work. Finally, there has been a lessening of traditional constraints: migration of young people to work in cities is one factor that has undermined parental control and also lessened constraints on pre- and extramarital sex as well as on injecting drug use.<sup>28</sup>

The (work of Archavanitkul and Guest,<sup>29</sup> discussing migration and the commercial sex sector in Thailand, provides a very similar analysis. These authors point out that many employers prefer females as laborers, because they are more likely to accept lower wages, and migrants, because they are more easily controlled. Rural families are increasingly dependent on female earnings. There are

limited employment opportunities for women in rural areas, but one well-paid employment opportunity that does exist is commercial sex work: The mean income for commercial sex workers in this survey was ten times higher than for women working in other industries, or for female accountants, for example. Women working in the commercial sex industry may provide a major source of income for their families of origin, and although such work is not socially approved, women engaged in it say their families need the money they earn. Their earnings may in fact enable their families to live in better houses and to buy consumer goods.<sup>29</sup>

# Trading, Trucking, and Fishing Routes in Asia

As they had in the 1980s, in Uganda and Tanzania, truck drivers in Thailand have recently become a focus of attention for their possible role in carrying HIV to new areas, serving as a link between commercial sex workers and the general female population.<sup>30</sup> Several projects are now getting under way for AIDS prevention along Thailand's borders, among traders, small-time smugglers, loggers, fishermen, commercial sex workers, and tourists. A baseline survey assessing risk among cross-border populations along the Thai–Cambodian border, for instance, combines both top down and grass roots approaches, obtaining assistance from government authorities and working with local informants in close contact with people on both sides of border check points.

Data collection methods are similar to those used in the African studies previously discussed, mainly involving in-depth and group interviews, and results are also remarkably similar. Fishermen, for example, have relatively high incomes and few expenses at sea, and commercial sex is considered to be part of the lifestyle, especially for young boat crews. As in the African studies, the distinction between various sorts of commercial and noncommercial sex partners was found to be tenuous, as was that between minor wives\* and noncommercial sex partners. In particular, many fishing boat captains along the Thai-Cambodian border had established long-term relationships with Cambodian or Vietnamese war widows. Such partners may receive money, but are not considered prostitutes. Wives of fishermen were also interviewed: They were aware of fishermen's general reputations for infidelity, but all informants said they were confident their own husbands were faithful. A number of other populations who could be targeted by HIV prevention activities were defined, such as the unemployed men who congregate around border areas ready to provide services such as that of porter, push cart operator, or guides to commercial sex establishments.<sup>31</sup>

<sup>\*</sup>*Minor wives* is a term that refers to female partners who are not casual and may be marital partners, though not the first wife, who is the most important and the eldest wife. Polygamy may be involved with minor wives, and marriage ceremonies may or may not be performed.

In India, truck drivers have been the object of particular attention. One study found that in 1990,3 out of 302 long-distance truck drivers tested were infected<sup>32</sup>; and a more recent article<sup>33</sup> attributes long-distance truck drivers with being significant vehicles of the spread of HIV. Unpublished reports on action research along trucking routes between Nepal, India, and Bangladesh<sup>34,35</sup> find, once again, that the culture of long-haul truck drivers is one that expects casual sex, reporting a local saying: "A driver is a driver," a statement that is not intended as a compliment.\* They also point out that drivers have ways of earning extra cash and are known to have plenty of money available, As in the African studies, the anonymous climate of border town or truck stop environments is noted, in which a wide range of people gather away from traditional cultural restrictions and social pressures.

#### HIV Prevention Programs in Asia

Most of the studies described above combine baseline research and initial HIV prevention interventions. A series of such efforts among truck drivers in India was presented at the 1996 international AIDS conference.<sup>36–40</sup> One such project takes place 55 km from Calcutta, on the national highway from southwest India. Some 1200 trucks pass through every day and must stop for tax clearance, a process that may take up to 8 hr. Baseline evaluation had revealed extremely low AIDS knowledge and high levels of risk behaviors among truck drivers and their assistants. Project staff provides treatment of minor ailments, referrals, HIV counseling, condom distribution, health education, and blood screening. They also offer drivers a space for rest and relaxation, and accident insurance. The authors report that over the period of a year the project has become known as a place where one can come for treatment of "secret diseases."

A similar model project,<sup>41</sup> which is meant to be replicated, takes place at the border area between India and Nepal where services had been lacking. This project also involves outreach in parking zones, as truckers wait for customs clearance. Discussions start with the health hazards involved in trucking. A clinic has been established for general medical treatment as well as for treatment and counseling concerning STDs, for truckers as well as for community people. Efforts have been made to create community support for the project, and those responsible note that AIDS prevention may also include providing accident insurance and offering medical treatment to local children. Evaluation measures include the number of condoms distributed, monitoring of AIDS-related knowledge, attitudes, and behaviors (the survey shows that over the year from August 1995 to August 1996, a maximum of 20% of the respondents possessed full AIDS knowledge, whereas 20

<sup>\*</sup>This is less so for short-haul drivers. In fact, some truckers will have chosen short hauls specifically in order to be able to spend time with their families.

to 72% had none, and that 46 to 80% had never used condoms), as well as observation of such qualitative indicators as increase in trust (noting, for example, that truckers who come for repeat visits to the center often bring several others with them).

A final project in Asia should be mentioned: a baseline survey carried out among truckers and maritime workers in Papua New Guinea.<sup>42</sup> The rapid ethnographic assessment included observations that can permit validation (or lack thereof) of interview data, for example, about the ways in which potential riders wave a truck down or are smuggled into sailors' rooms. The authors note, in common with other authors, that in spite of strict company rules forbidding passengers, it is common for women to hitch rides with truck drivers and to pay for the ride with sex. This includes teenagers on school vacations. The project involves peer education for HIV prevention, and is being evaluated, although results are not yet available. Outcome evaluations are not available for any of the projects described. Co-ordination Action Research on AIDS and Mobility has recently started an eight country participatory action research program in Southeast Asia.

# LATIN AMERICA

If research and programs of HIV prevention for mobile populations have been underway for some time in Africa and are now being undertaken in Asia, this review was able to discover very little such information concerning such populations in Latin America or the Caribbean. This is in spite of social and economic transformations in many ways comparable to those taking place in the developing regions discussed above, and in spite of the strong links between travel or labor migration and the beginnings of the epidemic in Haiti,<sup>43</sup> in Mexico,<sup>44</sup> and in Jamaica. Tracking of the epidemic in Jamaica has shown that HIV was introduced from abroad, including by seasonal migrant farmworkers who had gone to Florida to work in sugar plantations and to Canada to pick apples. In what could reflect a much-needed success story in the field, HIV infection is now found to be decreasing among migrant farm workers in Jamaica. The authors of the study mention that intensive education efforts have been occurring, but unfortunately do not describe these prevention efforts.<sup>45</sup>

A series of studies and projects from Mexico touch on many of the factors that contribute to migrant vulnerability: floating populations of people unsuccess-ful in attempts to cross borders; injected drugs easily available; inadequate conditions and wages in local jobs; alienation and release of social controls in host countries; and precarious economic circumstances that drive some to exchange sexual services for food, lodging, or money.<sup>46–49</sup> One of the studies in this series reports from the border between Mexico and Guatemala, along the Pan American

highway.<sup>47</sup> This is a stopping point for undocumented male and female migrants from Colombia, Panama, and Central America, who stay an average of 3 to 6 months working to earn additional money for the trip to the United States. In a scenario that has by now become familiar, the study reports that among them are many women who sell sex to truckers to finance their journey.

Another study in this series,<sup>49</sup> also taking place on the border between Mexico and Guatemala, notes that border regions allow both commercial sex workers and their clients to remain anonymous. For the sex workers, this anonymity coupled with their illegal status as foreigners renders them vulnerable to violence and other crimes. In this study the sex workers had poor AIDS knowledge. The prevention strategy being developed involves local authorities and health officials from the region; since the high mobility of the target population makes it hard to reach, interventions are being directed not at the population of migrants specifically but at specific points such as the brothels, customs offices, bars, and other places where truck drivers and the military tend to congregate. The authors of this series of studies note that the results of the research and intervention studies are being made available to decision makers, in order to inform policy.

Another prevention strategy was developed as the result of a further Mexican study.<sup>50</sup> This study used ethnographic research among migrant workers in both the country of origin and in the destination country to explore the ways in which such migration may increase risk factors, including by permitting migrants to learn about and adopt higher-risk practices. One of the applications of the study was to produce a television soap opera, a format that allowed HIV/AIDS information to be presented in a colloquial and socially accepted way. The program reached an estimated audience of over 6 million television viewers in 90 cities in Mexico with a high number of migrants. Evaluation showed that the number of calls to Spanish-language AIDS hotlines increased and Mexican consulates reported interest in the program and suggestions that it should be replicated and more widely disseminated.

A final study from Mexico is rare in examining risk from the other side, from the point of view of the women who are left behind when men migrate to work abroad. Interviews with 100 rural Mexican women married to temporary migratory workers to the United States revealed that, although the women may have the necessary knowledge, it may be extremely difficult for wives of migrant men to protect themselves against the risk of HIV infection. A third of the women said they felt themselves to be at risk for HIV, yet most did not use condoms and would be embarrassed to buy them. Furthermore, a wife is hesitant to ask her husband to use one. Women felt incapable of refusing or negotiating sexual matters with their husbands, regardless of how much they feared such possible consequences as unwanted pregnancies, STDs, or HIV. They felt they owed it to their husbands to

have the sex the husbands requested since they had been away for so long, working hard, in order to send money home. $^{51}$ 

Little has been done in Latin America in terms of research or prevention efforts among another type of mobile worker, truck drivers. In Brazil, a cross-sectional study of 300 male truck drivers in the port of Santos was the first study to examine HIV and risk-related behaviors among truck drivers in South America.<sup>52</sup> It found that 1.3% were positive for HIV and 8.3–13% for syphilis. While 72% of the participants were married, 40% currently had more than one sex partner, 21% reported sex with commercial sex workers, 14% sex with girls they met on the road, and 16% with other men's wives; 24% reported having sex with men (3.3% had sex with men in the past year). Almost half (47%) had had an STD. The study's results indicate that while levels of HIV in this population are still low, given the drivers' degree of sexual activity, there is a substantial risk of their acquiring and disseminating HIV infection along Brazil's truck routes.

A prevention effort for truck drivers in the port of Santos is reportedly underway now, though the author did not discuss the content of that intervention. In addition, prevention efforts are being directed toward port workers and commercial sex workers in Santos, populations likely to be in the sexual networks of the truck drivers and at least in the case of CSWs to have a higher prevalence of HIV (an estimated 8% of the CSWs in Santos are HIV positive). For the truck drivers, being HIV positive was associated with having sex with friends, partners truck drivers usually considered "safe." This suggests that prevention efforts directed at this population must emphasize the need to use condoms with all sexual partners outside mutually monogamous relationships between HIV-negative persons.<sup>52</sup>

#### MILITARY

A somewhat separate area that concerns workers who live apart from their families for periods of time is the military. This area is particularly sensitive: If construction companies or mayors have been reluctant to admit that risk behaviors may occur in their zones of influence, military officials throughout the world have been even more so. Defense ministries have been extremely reluctant to reveal HIV and AIDS data, fearing that high prevalence will undermine confidence in the military and possibly reduce national security. An excellent overview of the field<sup>53</sup> describes it as one fraught with ironies and contradictions: High levels of militarization exacerbate the spread of HIV and AIDS, and civil unrest and wars disrupt a nation's health and welfare services and its capacity to deal with infection. Yet, while HIV and AIDS are best tackled through openness and nondiscrimination to reduce stigma and promote active individual prevention and coping, militaries are often closed and secretive organizations, and also among the most likely to

introduce compulsory control measures, including screening. In addition, if military organizations have the advantage of having a scope for frequent medical checks, for providing health services, and of having a strong organizational capacity to mount intensive educational and prevention programs, at the same time troops have the potentially risk-increasing disadvantages of relative isolation from girlfriends, wives, and families, and of the stressful nature of the work. There may be peer pressure that encourages rather than discourages casual sex. The young age and occupation of soldiers may give them a sense of personal invulnerability and power that requires that they control, dominate, and even kill others. Such a prevailing attitude of invulnerability may encourage risky sexual behavior and reduce condom use, and STDs may be viewed as the honorable battle scars of an active sex life, rather than as something to be avoided.

The link between the military and other STDs is one that is well known.54 A UNAIDS document on the subject recalls that STD rates are generally two to five times higher in military than in comparable civilian populations in peacetimes, that the risks go even higher in times of foreign deployment and in conflict situations, and that the presence STDs not only indicates high-risk behavior, but greatly increases the risk of HIV transmission by sexual contact.<sup>55</sup> Furthermore, a number of studies have documented higher prevalence of HIV in the military than among civilian populations, citing, for example, rates of 50% among government and rebel troops in Angola (compared with 10% among civilians), of 21% among soldiers in one province in Cambodia in 1995, or of 50% among soldiers in Zimbabwe between 1989 and 1993, compared with 10–20% among civilians.<sup>56</sup> A large study carried out among a representative sample of American army personnel shows higher levels of all HIV exposure risk behaviors than among general populations of the same age.<sup>57</sup>

The possible role of military forces in spreading HIV has been explored to some extent: In Uganda, the 1990 clinical pattern of AIDS was shown to partially reflect the diffusion of HIV associated with civil war during the first 6 years of the post-Amin period. Soldiers recruited in the North and deployed in the South, where HIV was spreading unnoticed in the late 1970s and early 1980s, were most likely to have carried it back to the North with them.<sup>58</sup> Spread to civilian populations may also occur through rape: There have been accusations that this has occurred deliberately in Rwanda.<sup>59</sup>

Numerous countries have established HIV prevention initiatives for their own military personnel, and an international and interagency effort has been formed to address issues of HIV and AIDS and the military. The Civil–Military Alliance to Combat HIV and AIDS\* has held a number of international regional training and

<sup>\*</sup>The alliance involves, among others, the World Bank Economic Development Institute, UNAIDS, and the United Nations Department of Peace Keeping Operations, as well as nongovernment organizations and the governments of a number of countries.

policy seminars (for example in Africa, Asia, and Latin America), has produced occasional papers, carried out a global policy survey, and publishes a regular newsletter.<sup>60</sup> Several HIV prevention programs are described in the newsletters, although there is little mention of evaluation. One national program for HIV prevention among military that is systematically evaluated is that of Thailand, where interviews and HIV testing of cohorts of conscripts have shown that public health programs put in place in that country have led to substantial changes in sexual behavior among young men and that the rate of new HIV infections has declined. In one study of 21-year-old conscripts in northern Thailand, for example, prevalence decreased from 12.5%, in November 1991, to 6.8%, in November 1995.<sup>61</sup>

# DISCUSSION

Some comments are in order before concluding this chapter with recommendations concerning HIV prevention and care programs for mobile populations. The remarks concern two of the principal target groups that thus far have been defined for such programs: truck drivers and prostitutes. A third set of comments concerns research about such groups.

# Truck Drivers

Truck drivers have become a significant, if not a main, target group for STD and HIV prevention in East and West Africa, Asia, and Latin America. Their movement across different local populations makes truck drivers important, but the question also has been posed as to whether the attention paid to truck drivers may simply be due to the visibility of "men who move with 20 tons of steel around them."<sup>62</sup> One of the things that ethnographic analyses have shown is the importance of specific environments for HIV risk behaviors, and these environments are frequented by a wide range of people. The truck stops described in Tanzania, for example, are obvious gathering places for truck drivers, but they also bring together traders, cattle sellers, people providing a large number of services, and local residents. HIV prevention activities focused only on the drivers would miss a large number of others potentially at risk. Furthermore, there is a need to avoid generalizations about population groups. For example, oral diaries collected from another sort of transporter, 51 small-time male traders in Uganda (half of whom lived in a trading town where HIV prevalence is about 40%, and half in rural areas where it is about 8%), revealed that a high rate of sexual partner change did indeed occur, but for some men only. Little mixing was in fact found to occur between urban and rural populations: Rural men did not feel comfortable in town, and urban

men reported that rural women were reluctant to have sex with them for fear of contracting HIV.  $^{63}$ 

# **Commercial Sex Workers**

The second principal target group that has been defined for such programs is that of commercial sex workers. Prostitution has been a recurring theme in this chapter, as numerous programs and research projects focus on commercial sex workers in relation to migrant workers and truck drivers, noting that their clients are often men away from home. There is effectively much cause for concern in some situations, such as those described in camps of migrant workers in several countries, when, on payday or weekends, many men share a single commercial sex worker for unprotected sex. Simply promoting condom use in such situations could go a considerable way toward prevention, but just as with "truck drivers" there is need for more subtlety in definitions when referring to global categories of "prostitute."

In the settings described in this chapter at least four types of commercial sex relationships are discernible. The first is mobile. These include people who hitch rides with trucks, for example, moving from one place to another. Some may be professional commercial sex workers, others traders, and still others simply young people on school holidays. The second type of relationship concerns a wide range of men and women in employment, for example, in bars, restaurants, and hotels, and who may sell sex to supplement inadequate incomes. Elsewhere, a study among the approximately 30,000 Philippine housemaids in Malaysia found that if a certain proportion avoid sexual relationships, a small group of "happy-goluckies" may double as informal sex workers during weekends.<sup>64</sup>

The third type of relationship resembles the more usual definition of commercial sex worker: These are stationary workers visited by customers who pay money in exchange for sexual relations. Here, too, however, there is need for more subtlety in definitions and classifications, as demonstrated by an ethnographic study that took place in 1990 in Belize. The study took place near a British military base, where it was found that there were two quite different scenes where sex is exchanged for money or for gifts, with different probabilities of risk. *Recognized prostitution* involves a gender-specific form of migrant labor. Young girls from other countries, hired specifically for the purpose, enter the country illegally and have little contact other than professional with the native population. They see the job as a parenthesis for a year or so, during which they can save money, then return home and resume their lives without the stigma of having been known to work as prostitutes. They are monitored for STDs, and condom use is obligatory.

*Quasi-prostitution* is a much more risky business. This fourth type of commercial sex work is not regulated, and the relationship is not regarded as prostitution. Relations established between military personnel and local women may last

the 6 months a soldier is posted in the country. Such relations involve the exchange of gifts or of money, which may be an extremely important element from the woman's point of view, but feelings of friendship and romance are also important.<sup>65</sup> Similar situations are described near military bases in Thailand and in the Philippines, as well as between migrant workers at sites such as mines, major construction sites, and food-processing factories. It is far more difficult to negotiate condom use in these romantic or quasi-domestic relations than when the relationship is seen as purely professional. Although it is with such relationships that risk reduction interventions should be made, trying to do so runs straight into cultural stereotypes and denial; this fourth type of commercial relationship has not yet been the subject of attention from either researchers or for HIV prevention.<sup>9</sup>

# CONCLUSIONS

Early discussions of mobile populations and HIV simply tried to understand the spread of the epidemic, along truck routes, through migrant labor, and through the military. Since then, research has enormously improved our understanding of the epidemic and of the conditions under which HIV is transmitted. We know that there is a link between mobility and HIV, but that the reasons vary widely. We know that it is important, even critical, to focus HIV prevention and care efforts on mobile populations, both in order to protect local populations at the very beginning of an epidemic, and then later to protect potentially vulnerable mobile workers and their partners. A number of HIV prevention programs have been put into place, and some have been evaluated. We are beginning to see that some prevention strategies work and to have ideas about why. The chapter has concentrated heavily on research for the simple reason that far more information is available about research than about programs. This final section, however, returns to programs. Conclusions from programs are summarized and some outstanding needs are discussed.

The basic ground rules for HIV programs for mobile populations are similar to those for other populations: These start with providing the knowledge necessary for protection, such as that concerning the proper use of condoms and of clean needles. In prevention specifically for migrants or mobile populations, messages will need to be clear and simple, relayed in many languages, and appropriate to the specific culture or subculture of the group to which they are addressed. Written materials have been used on occasion, although it is noted that brochures used with mobile populations will be ineffective if they are not simple, attractive, and aggressively distributed and not just left sitting around. Oral means of communication are more often used. Several programs have made use of radio, for example, or of street plays, as well as interactive approaches such as demonstrations, questionand-answer sessions, and testimonials. The first step in defining an overall HIV prevention strategy among workers away from their families is mapping geographic and social networks, then choosing sites for interventions according to their current and potential risk profiles. Most programs start with sites where levels of risk behaviors are thought to be high, although some first test methods and approaches with sites that are nearby or seem easier to approach before they attempt to move into more difficult situations. The process of setting up a new program involves establishing collaborative relations with the agencies already working in priority sites: At least one of the programs described in this chapter, for example, mentions working with local associations of migrant workers in organizing HIV-related activities. Others work from a different direction, sensitizing owners and managers to HIV issues at work sites where employees live away from their families in single-sex dormitories.

Almost all recommend working from within the target groups the program is trying to reach, facilitating efforts developed from the ground up and avoiding the externally imposed interventions that may alienate the very people a program is trying to reach. They note that even the very best of AIDS prevention messages will not get through if the people for whom they are intended perceive them as coming from meddling outsiders.

It is for this reason that a great many of the projects rely on peer educators. As one project notes, truck drivers, sailors, fishermen, or commercial sex workers have lifestyles that middle-class educators and other health professionals cannot share. For empathy and credibility, interventions are better led by peer educators, people chosen from within the group for whom the intervention is intended. In some programs peer educators are chosen by program staff; in others, they are elected or nominated from within the target group.

Even if most of the HIV prevention activities are carried out by peer educators, several programs note that it is necessary at the same time to have someone to coordinate and to be accountable. This becomes especially necessary as the project unfolds and as demands and responsibilities increase. They also note that as interest is raised and projects develop, burdens increase on project staff. Peer educators, for example, may become informal experts within their communities in the field of HIV and AIDS, and may be approached with requests for counseling, advice, and support far beyond what they had thought would be requested of them when they started their prevention activities.

Another factor that makes stable central coordination necessary is that a consistent presence is necessary to allow trust to develop. Working with the people who are the subject of this chapter means working with marginal populations whose legal status in the country may be precarious and who may have a great deal to lose if trust is betrayed. A large part of the success of the program will depend on its demonstrating over the long term that those who work with it can be trusted.

A program working with mobile populations will need to be flexible in approach and to be ready to adapt procedures to conditions encountered in the

field. The target group is one that shifts constantly. By definition, migrant workers, truckers, traders, fishermen, and military personnel move from place to place, and in any one particular place those who are present from one year—or even one week—to the next may be quite different. If the program is to reach such populations, creative use must be made of local resources and possibilities. Such possibilities are impossible to define in advance. They are developed as the program moves along and are the elements that give it vitality. (The AIDS workers who developed an extensive network of free transportation and lodging to reach fishermen in rural Zimbabwe are an example. They arranged to ride on the boats of fish buyers and to sleep in the cabins of government fisheries personnel while the government employees were working.<sup>24</sup>)

The most interesting programs focus on situations, not on groups, or on sites rather than on individuals. Several programs focus on strategic sites through which people pass, for example, truck stops, autogares in West Africa, or customs clearing points in India. These are places through which pass large numbers of trucks, buses, and taxis. They are surrounded by traders, eating houses, and various kinds of temporary accommodation. They also are places where people have free time: As they wait or rest, they are more available than they might otherwise be to health education messages. Similarly, several programs note that they aim broadly, intervening with several groups, not just one. For example, most programs intervene not only with truck drivers but also with the commercial sex workers frequented by them. Less common but perhaps even more important is to include the wide range of other people who are around the intervention site. To mention just the truck stop environment most often discussed in this chapter, HIV interventions would also include the traders, workers, and local villagers (including the young people) who also are to be found there.

# WHAT ARE THE NEEDS IN THIS FIELD?

This final section discusses some of the needs that have emerged from the present review in the field of HIV prevention and care for workers who live apart from their families. Important facets of approaches to meet these needs are also discussed.

There is a clear need for evaluation, including rapid ethnography baseline evaluation, to help understand the conditions that prevail in each situation. Such baseline evaluations should be integrated into the first interventions so that a program does not have to wait the long time it usually takes for research results to be fully written up. There is need for monitoring of programs as they get underway. There is also a need to examine the problems of recruiting, training, supervising, and following up of some of the key personnel used by many of the programs described, such as peer educators. Finally, good outcome evaluation is needed to

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help understand the reasons behind the problems and successes encountered, as well as to increase credibility with funders.

There is need to be able to share knowledge about programs that already exist. Very little program description has been published so far. There is also great need for a central place to store gray literature, with competent documentalists who can make the information easily accessible to those who need it.

A number of projects have been set up, and in some areas there is need for coordination and collaboration between those who work in the same region or with the same target groups. This is particularly the case in an era of inadequate and diminishing resources, when competition between projects could be wasteful at best, destructive at worst.

As for the various groups of workers who live away from their families or of people around them, two have emerged from this review as being in need of HIV prevention efforts. The first is the military, among whom HIV prevention raises enormously important issues that urgently need to be addressed. The second are noncommercial sex partners of workers away from their families. If the needs of commercial sex workers have been addressed in many programs, those of their noncommercial partners have not. These may include partners of the same gender at work or living sites. They also include romantic and domestic relationships established with partners of the opposite sex where the workers are living and the wives left at home.

Approaches that simply promote individual behavior change are highly unlikely to be entirely effective in situations such as that of many migrant workers, however. There is need to focus on situations in order to reduce vulnerability. A number of relatively simple policy changes could considerably help reduce risk situations. Such changes include modifying work site policies to permit families to migrate with workers, for example, permitting families to live near major construction sites. For truckers, they include such measures as arranging salaries and schedules to allow them to spend more time with families, encouraging drivers to take wives or regular partners with them on long journeys, and improving the accommodations available on routes.

Finally, there is need for the political will to invest in such populations. Migrant workers, especially, have all too often been treated as disposable, as though, when they become ill, they could simply be replaced by someone else eager to find a job. Ultimately, there is need to address the "why" behind the movement of people in search of employment. This review has found that risk factors for workers away from their families are strikingly similar worldwide. Economic decline in developing country after developing country has pushed large numbers of people to migrate from rural villages to urban centers and to other countries, in search of employment, employment that may be difficult or impossible to find. Such movement often means leaving families for weeks, months, or years. For some, coping may involve taking risks that dramatically increase

vulnerability to HIV, entailing infection not only of themselves but also of their partners where they are working and when they return home.

As the epidemic matures and as our understanding of it matures, it is increasingly obvious that social issues must be addressed if we are to control it.<sup>66</sup> One urgent social issue is the movement of people from place to place, for reasons of or in search of employment.

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## REFERENCES

- 1. Decosas J, Adrien A. Migration and HIV. AIDS 1997; 11(suppl. A):577-584.
- 2. Haour-Knipe M, Rector R. Crossing Borders: Migration, Ethnicity and AIDS. London: Taylor and Francis; 1996.
- Mishra S, Conner R, Magaña JR, eds. AIDS Crossing Borders: The Spread of HIV among Migrant Latinos. Boulder, CO: Westview Press; 1996.
- Nunn AJ, Wagner HU, Kamali A, et al. Migration and HIV-1 seroprevalence in a rural Ugandan population. AIDS 1995; 9503–506.
- 5. African Medical and Research Foundation. HIV High Transmission Areas on the Principal Transport Routes of Tanzania: Field Survey Report. October–December, 1991.
- Hunt C. Migrant labor and sexually transmitted disease: AIDS in Africa. J Health Soc Behav 1989; 30:3.53–373.
- 7. Colvin M, Abdool Karim SS, Connolly C, *et al.* The prevalence of HIV and other selected STDs in a rural South African community. Paper presented at the 11th International Conference on AIDS, Abstract MoC1484. Vancouver; 1996.
- 8. Decosas J. HIV and development. AIDS 1996; 10(suppl 3):S69-S74.
- 9. Kravitz JD, Mandel R, Petersen EA, et al. Human immunodeficiency virus seroprevalence in an occupational cohort in a South African community. Arch Intern Med 1995; 155:1601–1604.
- Macdonald DS. Notes on the socio-economic and cultural factors influencing the transmission of HIV in Botswana. Soc Sci Med 1996; 42:1325–1333.
- 11. Jochelson K, Mothibeli M, Leger J-P. Human immunodeficiency virus and migrant labor in South Africa. Int J Health Serv, 1991; 21:157–173.
- Lagarde E, Pison G, Enel C. A study of sexual behavior change in rural Senegal. JAcquir Immune Defic Syndr Human Retrovirol 1996; 1:282–287.
- Painter T. Migrations and AIDS in West Africa: A study of migrants from Niger and Mali to Cote d'Ivoire. Report to CARE, New York, 1992.

- Lwihula GK. Ethnographic study on STDs in Mwanza region: A report on people's perception on STD and seeking behavior. AMREF Report, Mwanza; 1994.
- African Medical and Research Foundation. HIV/AIDS and STDs Interventions at the workplace. AMREF Report, Dar es Salaam; May 1996.
- Leshabari MT, Kaaya SF, Nguma JK, et al. Household and Community Responses to HIV/AIDS in Tanzania. Institute of Public Health, University of Dar-es-Salaam; Dar-es-Salaam, Tanzania; 1996.
- Carswell JW, Lloyd G, Howells J. Prevalence of HIV-1 in east African lorry drivers. AIDS 1989; 3: 759–761.
- Wawer M, Serwadda D, Musgrave S, et al. Dynamics of spread of HIV-1 infection in a rural district of Uganda. Br Med J 1991; 303:1303–1306.
- Lwihula G. Socio-cultural factors associated with the transmission and control of HIV/AIDS with a focus on the Kagera region. In: Killewo JZT, Lwihula G, Sandström A, eds. Behavioral and Epidemiological Aspects of AIDS Research in Tanzania: Proceedings from a Workshop Held in Dares Salaam, Tanzania, 6–8 December 1989. Dar-es-Salaam: Sarec Documentation; 1990; 53–61.
- O'Connor P, Leshabari MT, Lwihula G. Ethnographic Study of the Truck Stop Environment in Tanzania. Dar-es-Salaam: Department of Behavioral Sciences Muhimbili University College; 1992.
- 21. Wilson D, Sibanda A, Nyathi B, et al. Ethnographic and quantitative research to design a community intervention among long-distance truck drivers in Zimbabwe. In: Focusing Interventions among Vulnerable Groups for HIV Infection: Experiences from Eastern and Southern Africa. Nairobi: Network of AIDS Researchers of Eastern and Southern Africa Monograph 2 1994:99–108.
- Nzyuko S. Adolescent high risk sexual behavior along the trans-Africa highway. Paper presented at the 11th International Conference on AIDS. Abstract MoC1487. Vancouver: 1996.
- 23. Mwizarubi BK, Mwaijonga CL, Laukamm-Josten U, et al. HIV/AIDS education and condom promotion for truck drivers, their assistants and sex partners in Tanzania. In: Focusing Interventions among Vulnerable Groups for HIV Infection: Experiences from Eastern and Southern Africa. Nairobi: Network of AIDS Researchers of Eastern and Southern Africa Monograph 2,1994; 109–118.
- 24. Wilson D, Winkelmann R, Mavesere D, et al. Using public and private infrastructure for costeffective intervention among fishermen in rural Zimbabwe. In: Focusing Interventions among Vulnerable Groups for HIV Infection: Experiences from Eastern and Southern Africa. Nairobi: Network of AIDS Researchers of Eastern and Southern Africa Monograph 2, 1994; 119–124.
- Asian Research Center for Migration. Report of the technical consultation on information regarding population movements and HIV/AIDS, 24–26 May, 1995. Bangkok Chulalongkom University.
- Asian Regional Office/Family Health International. On the need for a regional strategy for crossborder interventions to reduce the transmission of HIV in Asia, unpublished position paper, July 1996.
- Tenaganita and Free University, Amsterdam. Regional workshop on migration and HIV/AIDS in Malaysia, 24–27 November, 1994, Melaka, Malaysia.
- Singhanetra-Renard A. Population movement and the AIDS epidemic in Thailand. Paper presented at the IUSSP seminar on sexual subcultures and migration in the era of AIDS/STDs. Chulalongkorn University, Bangkok, 27 Feb–3 March, 1994.
- Archavanitkul K, Guest P. Migration and the commercial sex sector in Thailand. *Health Transition Rev* 1994; 4(suppl):273–295.
- Moms M, Podhisita C, Wawer MJ, et al. Bridge populations in the spread of HIV/AIDS in Thailand. AIDS 1996; 10:1265–1271.
- Pramualratana A, Somrongthong R, Jindasak K, et al. Assessment of the Potential for Spread and Control of HIV among Cross-Border Populations along the Thai–Cambodian Border. Bangkok: Institute for Population and Social Research, Mahidol University, 1995.
- Singh YN, Malaviya AN. Long distance truck drivers in India: HIV infection and their possible role in disseminating HIV into rural areas. Int J STD AIDS 1994; 5:137–138.

- 33. Pais P. HIV and India: Looking into the abyss. Trop Med Int Health 1996; 1:295-304.
- 34. Rao A, Sundararaman R, Shrestha B. Report of the study team for the assessment of the situation of HIV/AIDS on the trucking routes between Nepal, India and Bangladesh. Unpublished report to AIDSCAP, Family Health International, July 1995.
- Seminar report. Sharing tripartite experiences. Seminar organized by the Bhoruka public welfare trust. Calcutta. April 22–24, 1996.
- 36. Shanmuganandan S, Uma A, Maniyosai R, *et al.* HIV infection and HIV risk behavior among truck drivers in Tamilnadu, India: An attempt on modeling the risk factors. Paper presented at the 11th International conference on AIDS. Vancouver; 1996. Abstract MoD1914.
- Islam A, Misra K, Verma K, et al. Socioeconomic status of truckers in West Bengal India. Paper presented at the 11th International conference on AIDS. Vancouver; 1996. Abstract TuC2636.
- Verma K, Misra K, Dey A, *et al.* Knowledge, attitudes, beliefs, and practices of truck drivers and helpers at Haldia, a port in West Bengal. Paper presented at the 11th International conference on AIDS. Vancouver; 1996. Abstract MoD1696.
- 39. Dev A, Misra K, Verma K, *et al.* A unique approach to intervention. Paper presented at the 11th International conference on AIDS. Vancouver 1996. Abstract ThC4829.
- Agarwal A, Rao A, Misra K, *et al.* "Halting AIDS on highways"—A unique initiative of transport corporation of India—A transport business group in India. Paper presented at the 11th International conference on AIDS. Vancouver; 1996. Abstract ThC4830.
- 41. Bhoruka AIDS Program. A clinic based outreach HIV/AIDS prevention project among truck drivers and helpers at Raxaul. Bhoruka Public Welfare Trust annual report, October 1996.
- 42. Jenkins C. Preliminary report: Behavioral risk assessment for HIV/AIDS among workers in the transport industry, Papua New Guinea. Unpublished report submitted to AIDSCAP/FHI, August 1994.
- 43. Farmer P, Connors M, Simmons J, eds. Women, Poverty and AIDS: Sex, Drugs and Structural Violence. Monroe, MA: Common Courage Press; 1996.
- 44. Santarriaga M, Magis C, Loo C, et al. HIV/AIDS in a migrant exporter Mexican state. Paper presented at the 11th International Conference on AIDS. Vancouver; 1996. Abstract TuD2906.
- 45. Figueroa JP, Brathwaite A, Ward E, et al. The HIV/AIDS epidemic in Jamaica. AIDS 1995; 9: 761–768.
- Muñiz-Martelón M, Baez-Villaseñor J, del Rio C, *et al.* Mexican migrant HIV issues: Problems and strategies. Paper presented at the 11th International Conference on AIDS. Vancouver; 1996. Abstract TuD246.
- 47. Bronfman PM, Rubin-Kurtzman J, et al. Two borders, one country: Sexual behavior of migrants and HIV infection risk practices at Mexico's southern and northern borders. Paper presented at the 11th International Conference on AIDS. Vancouver; 1996. Abstract TuD2904.
- Montiel-Hernhdez AM, Muñiz M, Baez-Villaseñor J, et al. HIV/AIDS in the Mexico–US border: Specific risk factors. Paper presented at the 11th International Conference on AIDS. Vancouver; 1996. Abstract PuD1293.
- Uribe-Zúniga P, Bronfman M, Sejenovich G, *et al.* Migration, commercial sex and HIV infection: Problems and possible interventions. Paper presented at the 11th International Conference on AIDS. Vancouver; 1996. Abstract TuD2905.
- Bronfman M, López Moreno S. Perspectives on HIV/AIDS Prevention among immigrants on the US-Mexico Border. In: Mishra S, Conner R, Magaña JR, eds. AIDS Crossing Borders: The Spread of HIV among Migrant Latinos. Boulder, CO: Westview Press; 1996; 49–76.
- 51. Salgado de Snyder VNS, Perez MDJD, Maldonado M. AIDS-fisk behaviors among rural Mexican women married to migrant workers in the United States. *AIDS Educ Prevent* 1996; 8:134-142.
- Lacerda R, Gravato N, McFarland W, *et al.* Truck drivers in Brazil: Prevalence of HIV and other sexually transmitted diseases, risk behavior and potential for spread of infection. AIDS 1997; 11(suppl):S15–S19.

- Jackson J. Southern Africa AIDS Information Dissemination Service Bulletin, vol 4, No 2, adapted as: "The Quintessential AIDS in the Workplace Issue." In: *Civil–Military Alliance to Combat HIV* and AIDS Newsletter, October, 1996;4–7.
- Hopperus Buma APCC, Veltink RL, van Ameijden EJC, et al. Sexual behavior and sexually transmitted diseases in Dutch marines and naval personnel on a United Nations Mission in Cambodia. Genitourin Med 1995; 71:172–175.
- Kingma S. AIDS Prevention in Military Populations-Learning the Lessons of History. Geneva: UNAIDS; 1996.
- Kingma S. AIDS prevention, testing and care in current military practice. Paper presented at the 11th International Conference on AIDS. Vancouver; 1996. Abstract MoD350.
- Temoshok LR. HIV exposure and transmission risk in military populations: Uncharted prevention frontiers. Paper presented at the 11th International Conference on AIDS. Vancouver; 1996. Abstract MoD354.
- Smallman-Raynor MR, Cliff AD. Civil war and the spread of AIDS in Central Africa. *Epidemiol Infect* 1991; 107:69–80.
- 59. Dodd R. HIV-Rwanda's new weapon of war. Panos WorldAIDS, March 1995; 3.
- 60. Civil-Military Alliance to Combat HIV and AIDS Newsletter. Contact: Prof. Norman Miller, Director, Hanover, NH.
- Nelson K, Celentano D, Eiumtrakol S, et al. Changes in sexual behavior and a decline in HIV infection among young men in Thailand. N Engl J Med 1996; 335/5:297–303.
- 62. Decosas J. Migration et sida en Afrique de 1'Quest. J Sida 1996; 86/87:97-100.
- Pickering H, Okongo M, Bwanika K, et al. Sexual mixing patterns in Uganda: Small-time urban/ rural traders. AIDS 1996; 10533–536.
- Remmelts A. What do Philippine house maids know about HIV/AIDS? Tenaganita and Free University, Amsterdam. Regional workshop on migration and HIV/AIDS in Malaysia. Melaka, Malaysia; 1994.
- Kane S. Prostitution and the military: Planning AIDS intervention in Belize. Soc Sci Med 1993; 36:965–979.
- 66. Quinn T. Global burden of the HIV pandemic. Lancet 1996; 348:99-106.

# Interventions for Injecting Drug Users

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# INTRODUCTION

During the first half of the 20th century, the use of illicit drugs by injection was so sufficiently concentrated in one country that it was known as "the American disease."<sup>1</sup> (Noninjected use of psychoactive drugs, however, occurred throughout the world.) Over the last three decades, the practice of injecting illicit psychoactive drugs has spread rapidly. There are now an estimated 5 million persons throughout the world who inject illicit drugs and this number is probably growing rapidly.<sup>2</sup> By 1996, drug injection had been reported in 120 different countries and HIV infection in drug injectors in 80 of these countries.<sup>3</sup> The latter is a substantial increase over the 59 countries with HIV infection among injecting drug users (IDUs) in 1989,<sup>4</sup> illustrating the extent to which HIV infection among IDUs has become a worldwide public health problem.

In Spain and Italy, injecting drug use has long been the most common risk factor for HIV infection and AIDS.<sup>5</sup> In the United States, it has been the second-most common risk behavior among cases of AIDS, with approximately 30% of cases reporting injection drug use as a risk behavior. Over half of the heterosexual transmission cases have involved transmission from an IDU, and over half of the

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perinatal transmission cases have occurred in women who injected drugs themselves or were the sexual partners of IDUs. In the most recent estimate of new HIV infections in the United States, approximately half of all new infections in the country are occurring among IDUs.<sup>6</sup> High rates of HIV infection among IDUs have already been observed in many countries outside of the United States and Western Europe such as Argentina, Brazil, Thailand, India, Vietnam, Malaysia, and Myanmar. In many countries in the developing world, injection drug use has become the most common risk behavior associated with HIV infection.

HIV may be introduced into a local population of IDUs through a "bridge population," such as men who have sex with men and who also inject drugs. This appears to be the way in which HIV was introduced into the IDU population in New York City.<sup>7</sup> Travel by IDUs may serve to introduce HIV into local populations, and incarceration of IDUs from different geographic areas may also contribute to spread of blood-borne viruses among IDUs.<sup>8</sup>

Although HIV is probably the best-known blood-borne infectious agent spread through multiperson use of drug injection equipment, many other pathogens can be transmitted by this route. Hepatitis B and hepatitis C are two viruses that are relatively easily transmitted in this manner, and infection with these viruses is very common among IDUs throughout the world. IDUs may constitute a special ecological niche for "emerging" pathogens that are relatively slow acting and spread through blood-to-blood contact.

# RAPID TRANSMISSION OF HIV AMONG IDUs

Once HIV enters the IDU population, it spreads very quickly, both among IDUs and from IDUs to other populations. Further, a substantial HIV epidemic among an IDU population has an impact on children, either directly through vertical transmission or indirectly through the death of one or both parents.

In many areas, HIV has spread extremely rapidly among IDUs, with the HIV seroprevalence rate (the percentage of IDUs infected with HIV) increasing from less than 10% to 40% or more within a period of 1 to 2 years.<sup>9</sup> In many cities around the world the prevalence of HIV infection among drug injectors has grown very rapidly, with 50% or more infected within a few years of the appearance of the virus in these populations. For example, in Bangkok, HIV prevalence among IDUs was 0–1% between 1985 and 1987, but had increased to approximately 40% by late 1988.<sup>10</sup> In Ruili, in Yunnan Province in China, 13% of IDUs tested at the end of 1989 were HIV positive, increasing to 58% in 1990.<sup>11</sup> In Manipur, northeast India, the first seropositive drug injector was documented in October 1989. Within 6 months the prevalence rate in Manipur had increased to 56%.<sup>12</sup> In Myanmar, no HIV-positive IDUs were documented until 1989, when rates of 73% or more were

found in different parts of the country. A similar rapid spread of HIV was found among IDUs in Malaysia and Vietnam.

Several factors have been associated with extremely rapid transmission of HIV among IDUs: (1) lack of awareness of HIV/AIDS as a local threat; (2) restrictions on the availability and use of new injection equipment; and (3) mechanisms for rapid, efficient mixing within the local IDU population. Without an awareness of AIDS as a local threat, IDUs are likely to use each other's equipment very frequently.

Legal restrictions can reduce the availability of sterile injection equipment, and thus lead to increased multiperson use ("sharing") of drug injection equipment. In some jurisdictions, medical prescriptions are required for the purchase of needles and syringes. Possession of needles and syringes can also be criminalized as "drug paraphernalia," putting users at risk of arrest if needles and syringes are found in their possession. In some jurisdictions, drug users have also been prosecuted for possession of drugs based on the minute quantities of drugs that remain in a needle and syringe after it has been used to inject drugs. In addition to the possible legal restrictions on the availability of sterile injection equipment, the actual practices of pharmacists and police can create important limits. Even if laws permit the sale of needles and syringes without prescriptions, pharmacists may choose not to sell without prescriptions, or not to sell to anyone who "looks like a drug user." Similarly, police may harass drug users found carrying injection equipment even if there are no laws criminalizing the possession of narcotics paraphernalia.

Simple "sharing" of needles and syringes among sexual partners or small groups of friends is not sufficient to cause an "epidemic" of rapid HIV transmission among IDUs. For rapid transmission to occur, there needs to be some mechanism by which large numbers of IDUs can share equipment with each other within relatively short time periods. Shooting galleries (places where IDUs can rent injection equipment, which is then returned to gallery owners for rental to other IDUs) and dealers' works (injection equipment kept by a drug seller, which can be lent for successive drug purchases) are examples of situations that provide rapid transmission of HIV among IDUs. In many cities, IDUs will gather at specific locations, form loose groups to purchase drugs (better prices usually can be obtained if users purchase in large volumes), and then inject together, sharing the injection equipment. Membership in these drug purchasing groups will then change very rapidly. Several studies have indicated that the infectiousness of HIV is many times greater in the 2- to 3-month period after initial infection compared to the long "latency" period between initial infection and the development of severe immunosuppression.<sup>13</sup> Thus, the concentration of new infections in these settings may synergistically interact with continued mixing and lead to highly infectious IDUs transmitting HIV to large numbers of other drug injectors.

Several other factors may also facilitate the sharing of injection equipment. For example, in some countries, for many people injecting is the only way to begin using drugs and sometimes drugs are only available in injectable forms. Further, high rates of polysubstance use may lead to intoxication with alcohol or other drugs prior to injecting, which increases the likelihood of sharing "dirty works."

Besides sharing of injecting equipment, HIV is also transmitted and acquired through unprotected sexual intercourse. Among many people who use recreational drugs, periods of drug use are likely to be interspersed with phases comprising conventional behavior, including sexual activity. The risk of sexual transmission of HIV through sex with an IDU is closely related to the frequency of equipment sharing among drug injectors, to the frequency of risk-associated sexual activity, and also to the extent of the epidemic in a given area.

# HIV PREVENTION INTERVENTIONS THAT ARE CURRENTLY AVAILABLE

In response to the problem of transmission of HIV among IDUs, a variety of prevention interventions have been implemented in different parts of the world. Some of these interventions have been found to be effective in reducing as well as preventing transmission of HIV. A substantial body of empirical and theoretical evidence demonstrates that a reduction in the sharing of injection drug use equipment significantly reduces HIV transmission rates among IDUs. The following discussion presents brief summaries of some of these interventions that have been used with IDUs. Subsequently, some specific interventions implemented in a selected number of developing countries are reviewed.

# Education of IDUs

One of the interventions that can facilitate risk reduction is education of IDUs to raise their awareness about the risk of contracting HIV through injection drug use. Studies conducted in the United States have shown the positive impact of educational programs targeting IDUs.<sup>14</sup> In contrast, the impact of a lack of basic factual information about HIV/AIDS can be seen in the very rapid spread of HIV in many areas of Southeast Asia where little AIDS education occurred prior to the initial, rapid spread of HIV among IDUs.

# Increasing Availability of Clean Injection Equipment

Making available clean needles and syringes has been very controversial in some countries as a way to prevent HIV among IDUs. Clean needles and syringes

can be made available to IDUs through needle and syringe exchange programs, pharmacy-based programs, or pharmacy sale of needles and syringes. Secondary outlets, such as health centers, drug dealers, vending machines, and outreach distribution, could be used as well. Because of legal restrictions in many countries, it has been very difficult to implement needle exchange programs.

Evaluation of needle exchange programs around the world shows that they have played a significant role in lowering rates of needle-sharing among IDUs,<sup>15–18</sup> and have served as referral sources for other health-related services.<sup>19</sup> Needle exchange programs have also been found not to lead to an increase in drug use nor an increase in HIV drug risk behaviors. Furthermore, HIV infection rates in many cities have remained at a stable rate after implementation of needle exchange programs.

# Decontamination of Used Needles and Syringes

There are two effective approaches to inactivate HIV in injection equipment: heat and chemicals. Continuous boiling in water for 20 minutes is sufficient to inactivate HIV. However, this may not be a practical option for many IDUs. A second alternative is decontamination using a bleach solution. Bleach is strong and available, and it does not harm the injection equipment or the injector. Bleach distribution programs were first initiated in San Francisco and later on in other cities in the United States. The use of bleach was generally accepted by IDUs and, in the absence of syringe exchange programs, bleach was used by a large proportion of IDUs where bleach was distributed.

Although bleach is easily available and accepted by the IDUs, studies in the United States have failed to show any relationship between self-reported use of bleach to disinfect injection equipment and protection from infection with HIV.<sup>20,21</sup> Several other factors may also determine efficacy of bleach in protecting IDUs from HIV infection. First, the drug users may not know how to "properly" use bleach to disinfect injection equipment. Second, even if the drug users know how to properly use bleach, they may not be using it properly under "field conditions."<sup>22</sup> The chemical strength of bleach varies from country to country, and it is the free-chlorine concentration in such solutions that governs effectiveness against HIV.

# Pharmacological Treatment of Drug Addiction

There are now numerous studies that have demonstrated that participation in pharmacological maintenance treatment, such as methadone maintenance, reduces HIV transmission and acquisition. It has been shown, for example, that riskassociated behavior, incidence of new HIV infection, and overall HIV seroprevalence are significantly lower in IDUs undergoing methadone maintenance treatment than among those not being treated.<sup>23</sup>

# Outreach as a Method of Intervention

Since the beginning of the AIDS epidemic, outreach has been initiated in the United States and later on in other countries to educate IDUs about HIV infection and to encourage them to engage in HIV risk reduction behaviors. The outreach programs have provided HIV/AIDS prevention information–education materials to IDUs, established links with available services such as drug treatment, HIV counseling and testing, medical care, and social services. The programs often provide some means for engaging in risk reduction behaviors, such as clean syringes, bleach for decontaminating used syringes, and condoms for safer sexual behavior. Most of these programs have hired ex-drug users as peer outreach workers. These outreach interventions have been found to be effective in both reaching IDUs who had never been in any drug treatment program and in reducing HIV risk behaviors.<sup>24-47</sup>

# **HIV Testing**

The role of HIV testing in prevention is not conclusive. Studies conducted in the United States and other countries have shown that while testing for HIV may have contributed to the prevention of HIV/AIDS among the general population, the effect among IDUs was not conclusive. In order to use testing for prevention purposes, appropriate counseling must accompany testing. In addition, issues such as anonymity and confidentiality are also important.<sup>28,29</sup>

# Organization of IDUs

Establishing organizations of IDUs can have a considerable positive impact in communities where individual IDUs are reluctant to identify themselves because of the legal or stigmatizing environment. In some countries, drug users' organizations have been found to be very helpful in the fight against HIV/AIDS. Such an organization can have many benefits.

The drug users' organization can organize provision of services, such as needle and syringe exchange, have a significant community advocacy role, provide advice to health departments, and be a good source of information for IDUs. It involves users and ex-users, and therefore has close relations with the entire IDU community. This is also a good way to mobilize support and enthusiasm. They also act as entry points to other active users. While the relationship between drug users' organizations and HIV/AIDS risk reduction among IDUs was not clear, studies conducted in New York indicated that group efforts to shape the norms of IDUs can

lead to increased consistent condom use and bleach use and to decreased syringe sharing, injecting at shooting galleries, and other risk behaviors.<sup>30</sup>

#### Social Network Intervention

During the last few years, network intervention techniques have been used to promote risk reduction among IDUs. A drug injector is asked to bring in members of his or her network for a series of group sessions. In the sessions they discuss HIV and how they can work together to protect themselves from infection. Underlying this is the theory that the group has norms and bonds within itself. Thus, they will mutually reinforce each other in their efforts to avoid risk behaviors. The expectation is that the participants in the networks are more likely to change their risk behaviors than those who receive only individually focused intervention. Studies conducted in the United States have shown that participants in the network intervention changed a variety of risk behaviors more than did drug injectors who received an individually focused intervention.<sup>31</sup>

# EXPERIENCES FROM DEVELOPING COUNTRIES

Most of these interventions have been implemented in developed countries such as the United States, the countries in Western Europe, and Australia. Since the early 1990s, HIV prevention interventions have also been implemented in a number of countries in the developing world. In the following pages we discuss a number of interventions implemented in Asia and Latin America.

# Asia

The spread of HIV infection in Asia is of particular significance and concern. Across Asia the prevalence of AIDS in general and among IDUs in particular varies greatly. The transmission pattern in Asia has been particularly identifiable, as infection patterns are closely linked to drug-producing areas (i.e., the Golden Triangle). HIV infection rates have been further heightened by a change from noninjection to injection drug use and economic factors driving the common practice of sharing needles. Responses to the epidemic of HIV among IDUs in Asia have included drug treatment programs, information–education campaigns, and material outreach programs. Additionally, efforts have been made to gamer increased political and economic support among government and community organizations for prevention interventions such as bleach distribution and needle exchange that explicitly acknowledge (and some argue sanction) the use of illicit drugs. The following discussion summarizes the state of the epidemic among IDUs as well as prevention intervention responses made by select countries in Asia.

# Thailand

Part of Thailand is in the Golden Triangle of Southeast Asia, which has long been a major center for growing opium. Smoking opium had been the traditional method for using narcotics. This was replaced by heroin injection following law enforcement suppression of opium smoking in the 1960s.

The HIV epidemic among IDUs in Thailand in general and Bangkok in particular is notable for both the rapidity with which the virus spread within the local IDU population and for demonstrating that the problems of HIV infection among IDUs occur in developing as well as industrialized countries. HIV seroprevalence among IDUs in Bangkok increased from approximately 2% in the spring of 1988 to over 40% in the autumn of 1988, with an estimated rate of four new HIV infections per 100 person-months at risk.<sup>32</sup> The spread of the virus was not limited to Bangkok only. High rates of infections were also noted among IDUs in other parts of the country, especially in Northern Thailand. In Bangkok, rapid transmission of HIV was associated with needle sharing among large numbers of IDUs, use of needles and syringes kept by drug dealers (who would lend the needles and syringes to different customers), and incarceration.<sup>33</sup> Whether incarceration as a risk factor was a result of actually "sharing" equipment while injecting in prison or whether incarceration led IDUs to form new social networks with other IDUs (with whom they shared injection equipment after being released from prison) has not yet been determined. However, there may be differences in risk behaviors in other parts of the country.

Bangkok does not have prescription requirements or narcotics paraphernalia laws. Sterile injection equipment can be purchased at a reasonably low cost in pharmacies. There are a large number of methadone maintenance treatment facilities in Bangkok. In response to the epidemic, the IDUs in these programs are provided with HIV risk reduction information and education as well as HIV risk reduction counseling. In addition, HIV prevention information and education campaigns also have been initiated by the authorities. Pharmacy availability of sterile injection equipment combined with these efforts have resulted in decreased sharing of injection equipment and subsequent stabilization of HIV seroprevalence at 40% among the IDUs in Bangkok.<sup>34</sup>

In addition to Bangkok, HIV prevention activities also have been implemented in other parts of the country. These have included drug treatment facilities such as methadone maintenance, syringe-needle distribution, and HIV/AIDS risk reduction information and education. A syringe-needle exchange program was initiated in 1992 in Mae Chan District, Chiang Mai Province in Northern Thailand. Initially the program was implemented in three villages serving approximately 45 IDUs. In 1995, in addition to syringe-needle exchange, primary health care centers were set up and the program was extended to a total of nine villages. In 1998, the

program was extended to a total of 12 villages. In 1996, the program began disbursing methadone and tincture of opium to heroin users. HIV seroprevalence among IDUs is lower (17%) than the national rate (40%). Incidence rate among the IDUs in program villages is 2.2%, which is lower than the rate in the north (22%) (J. Gray, personal communication, 1998).

# Vietnam

There are an estimated 185,000 drug users in Vietnam, of which roughly 50,000 are injectors and the remaining 135,000 use noninjectable drugs.<sup>35</sup> The majority of the injectors are concentrated in urban areas. Traditionally, opium has been smoked in the country. Although a recent decline in the availability of heroin has led to a decrease in heroin use, it also has led to an increase in the use of opium, as well as a change from smoking to injecting opium. Drug users inject a solution, called sai, made from opium and other sedatives. As the price of opium for smoking is high, IDUs mix the residues left after smoking with water and then boil this solution for injecting. Sometimes other sedatives that are available in the market are also added.

Risks of HIV transmission among the IDUs are very high because of the high frequency of sharing of injection equipment, shooting gallery use, and the absence of risk reduction measures such as cleaning of injection equipment. In most places, the injections are usually administered by the person from whom the IDU is buying the drug. For example, drug dealers and shooting gallery owners usually sell the drugs in a ready-to-use form, that is, ready to be injected from their syringe. Thus, the drug seller usually administers the injection.

HIV was first reported in Vietnam in December 1990, and as of December 1996, there were 4891 reported HIV cases in the country.<sup>36</sup> Most (69.3%) of these HIV infections were among IDUs. Initially, the infections were concentrated mostly in the south, especially Ho Chi Minh City; however, within 6 years, the virus has spread to 43 of the 53 provinces in the country, including those in the far north. Injecting drug use is thought to have played a significant role in the spread of the virus.

Given the prevalence and extent of HIV infections among IDUs, a number of HIV/AIDS intervention programs have been initiated targeting IDUs. About 4 years ago, Save the Children Fund (SCF-UK) initiated a peer education program at the Binh Trieu rehabilitation center in Ho Chi Minh City (M. Beukema, personal communication, 1997). Later, the program was extended to IDUs in the community as well as commercial sex workers, street children, and men who have sex with men. The program was implemented in cooperation with local authorities and mass organizations such as the Women's Union and the Youth Union. Since 1993, these outreach programs have contacted more than 4500 IDUs in Ho Chi Minh

City, providing information-education for risk reduction in different locations throughout the city including shooting galleries and community locations where IDUs congregate.

In 1995 and later in 1996, SCF-UK implemented experimental syringe exchange programs in Ho Chi Minh City that provided sterile syringes and needles to 175 IDUs. Although the programs were discontinued after only a few months of operation, a survey conducted a year later indicated that 70% of the participants continued to practice safer injection behavior. In addition, many of the users also began to inject at home rather than at shooting galleries (M. Beukema, personal communication, 1997).

In addition, the National AIDS Committee, in collaboration with local AIDS committees, has initiated peer outreach activities targeting high-risk behaviors including injection drug use in 14 provinces in the country and has provided HIV risk reduction information and education. Although these outreach activities in Ho Chi Minh City and in Hanoi have been in operation for some time, their efficacy in changing behaviors, and thus reducing the risk of HIV transmission, has not yet been assessed.

Nonprescription sterile syringes and needles are available in the pharmacies. Additionally, the costs of purchasing syringes and needles are very low. However, because of the illegal nature of drug use and marginalization of drug users, pharmacy purchase of sterile syringes and needles by the drug users has been difficult. A number of attempts have been made so far to provide sterile syringes and needles to IDUs in Hanoi and Ho Chi Minh City as well as other provinces. These attempts to provide syringes and needles to IDUs have not been very successful and in most cases have been discontinued.

As no evaluation was done, the reasons for discontinuation of syringe and needle distribution could not be ascertained. Although syringes and needles have been distributed to IDUs through outreach in 14 provinces in the country, no data are available to examine the effectiveness of the outreach as well as the impact of the program. In addition, the limited information that is available indicates that the return rate of used injection equipment was very low (less than 20%). That means that only 20% of the syringes and needles distributed to IDUs were returned by them to exchange for new ones.

In September 1995, the WHO Global Program on AIDS (GPA), in collaboration with the National AIDS Bureau in Vietnam, funded and initiated an intervention project for prevention of HIV/AIDS among IDUs that was initiated in Hanoi and Ho Chi Minh City. This is an intervention research study with a pre and postintervention cross-sectional design.<sup>37</sup> It involves the implementation of intervention activities and an evaluation of their feasibility, efficacy, and impact. The activities include information dissemination, provision of educational materials, and distribution of sterile syringes and needles on a limited scale, as well as monitoring and evaluation of the intervention.

The project recruited and trained ex-users as outreach workers to provide HIV/AIDS risk reduction information, condoms, and sterile syringes to IDUs in the community. Distribution of syringes, however, was initiated only after gaining support from community leaders, local law enforcement officials, and health care providers. One of the most important aspects of this program was gaining support from the community and establishing HIV/AIDS as an important public health problem. The community support was obtained through a series of workshops and seminars attended by community leaders. With respect to the IDUs, outreach workers initially provided risk reduction information and developed rapport with them before providing syringes.

Preliminary data indicate that the IDUs and the community, including law enforcement authorities, have all been supportive of the syringe–needleexchange program. Data also indicate that the program has been successful in reaching and distributing clean syringes and needles to a large number of IDUs. In Hanoi and Ho Chi Minh City, the number of IDUs reached by outreach workers doubled within 3 months.<sup>38</sup> Preliminary analyses of follow-up data show initiation of risk reduction by the drug users.

# India

Since the late 1980s, the northeastern states of India (Manipur, Nagaland, and Mizoram) have witnessed a tremendous increase in injecting drug use and a subsequent increase in HIV infection among IDUs. Injecting drug use has also been reported in other large cities in the country such as Madras, Calcutta, and Delhi, where the drug users have switched from smoking or chasing heroin (heating it in aluminum foil and inhaling it) to injecting synthetic analgesics such asbuprenorphine.<sup>39–41</sup>

There is a wide difference in HIV seroprevalence rates among IDUs in India. In Manipur, HIV among IDUs is the highest at about 70%.<sup>42</sup> Nagaland has a rate of 50% seroprevalence. A 10% prevalence rate has been reported among IDUs in Mizoram.<sup>42</sup> According to a number of studies, HIV prevalence rates among IDUs in Madras vary between 15 and 20%.<sup>43</sup> In Calcutta, about 1% of IDUs has been found to be infected with HIV.<sup>44</sup>

Responses to the epidemic have varied, depending on the extent of the problem as well as the availability of resources and support from the authorities and the larger community. Since the late 1980s and early 1990s, a variety of intervention programs targeting IDUs have been initiated in different parts of India. In some locations a combination of intervention approaches has been used, while in others only one approach has been advocated.

HIV prevention interventions targeting IDUs have been implemented in Calcutta, Delhi, Madras, Bombay, and a number of towns in the states of Manipur, Nagaland, and Mizoram. Most of these interventions include a combination of street-based outreach by ex-users, distribution of HIV/AIDS information, and distribution of risk reduction materials such as bleach for cleaning of injection equipment and condoms for safer sex. In Manipur, the intervention approach has also included outreach to family members and friends of IDUs as well as to community members in an attempt to create a supportive environment for the interventions. Advocacy among law enforcement authorities has also been endeavored. In addition, the outreach workers helped the IDUs in forming a drug users' organization. The organization has been found to be very helpful in reaching those IDUs who have not been contacted by the outreach workers.<sup>45</sup>

In Churachandpur, Manipur, the outreach intervention project has reached 700 IDUs and has provided them with HIV/AIDS prevention information–education. Distribution of educational materials has been associated with increased knowledge among IDUs about the risk of sharing of injection equipment. Further, the use of bleach increased from 31 to 72% within 6 months.<sup>46</sup>

Delhi has a relatively large drug-using population. The majority of the users either smoke heroin or inject buprenorphine. Very few interventions have been initiated targeting IDUs in the city. SHARAN, a Delhi-based nongovernment organization (NGO) working for the urban poor, has initiated a substitution program where buprenorphine tablets are being provided to buprenorphine injectors and those "chasing" and/or smoking heroin.<sup>39</sup>

Interventions in Madras include outreach in the community, provision of risk reduction information and education, distribution of syringes on a limited scale, and drug treatment services. Preliminary data collected in Madras indicate a decrease in sharing of injection equipment as well as a decline in injection of buprenorphine. There also has been a decrease in indirect sharing (e.g., sharing of cookers, cotton, water). However, condom use still remains low.<sup>43</sup> In Madras, in addition to outreach intervention, personal network-oriented intervention also has been implemented and has been found to be effective in reducing HIV risk behaviors.

In addition, on a limited basis, syringe-needleexchange programs have been implemented in Manipur, Calcutta, and Madras. Most of these programs have been implemented by local NGOs with limited resources and without much political support. The programs' effectiveness have not yet been appropriately assessed or evaluated.

# Nepal

It is estimated that there are about 40,000 drug users in Nepal of which heroin is the predominant drug of choice. About 10% of these drug users are injectors. Other drugs that are being used include benzodiazepine, buprenorphine, and barbiturates. Injecting drug use is a recent phenomenon in Nepal. About half of the injectors of the country are in Kathmandu, the main urban center. Syringes are

available from pharmacies, but are expensive relative to income. There are six drug treatment centers in Kathmandu and most of them emphasize detoxification.

HIV was first detected in Nepal in 1988. Initially, HIV prevention efforts in the country focused on providing information and education to different population groups. In 1991, the Lifesaving and Lifegiving Society (LALS) of Kathmandu began distributing sterile injecting equipment to IDUs in exchange for contaminated equipment. In addition to syringe exchange, LALS also distributes other risk reduction materials, such as sterile water, bleach, and condoms, and provides education, counseling, and primary health care to drug users. The outreach workers of LALS have been in regular contact with about 750 of the 2000 IDUs in Kathmandu. By the end of 1994, there had been <sup>57,734</sup> exchanges.<sup>47</sup> A multiple cross-sectional design has been used to evaluate the program; randomly selected IDUs were interviewed on a yearly basis. This evaluation indicates that there have been significant changes in self-reported injecting behavior and knowledge of HIV among IDUs in Kathmandu from 1991 to 1994. In 1991, 58% of those interviewed knew about HIV/AIDS. By 1994, all the IDUs interviewed knew about HIV/AIDS. HIV risk perception also increased from 25% in 1991 to 47% in 1994. Average number of injections per month decreased from 24 injections in 1991 to 17 injections in 1994. Average number of times of needle sharing per month decreased from 13 in 1991 to 6 in 1994. The overall HIV seroprevalance did not change significantly (1.6% in 1991 and 0% in 1994) and no new HIV-infected individuals were identified in 1993 or 1994. Although there have been significant changes in HIV drug risk behaviors, changes in sexual behavior have not been apparent.<sup>47</sup> Even though the program has shown relative success in reaching IDUs and initiating risk reduction among them, continuous evaluation is needed to examine the program's efficacy in maintaining risk reduction initiated by the IDUs as well as reducing future infections among IDUs.

A few years ago a methadone maintenance treatment program (MMTP) was started in Kathmandu. Baseline assessment data indicate that the majority of IDUs enrolled in this MMTP had knowledge of HIV/AIDS. However, half of them reported engaging in needle sharing.<sup>48</sup> While the outcome of the program in terms of reducing drug use and HIV risk is yet to be evaluated, the program in Nepal supports the feasibility of initiating methadone maintenance treatment in a developing country.

#### Malaysia

It is estimated that there are about 170,000 drug users in Malaysia. Fifty percent of the users use heroin and about 20% are injecting users. HIV infection among IDUs in Malaysia increased from 0.1% in 1988 to 20% in 1994.<sup>49</sup> There are 21 government-operated drug rehabilitation centers in the country at which drug users usually spend about 16 months for first-time treatment. The relapse rate is

quite high at 70%, and people who relapse after initial drug treatment usually enter treatment again for approximately another 24 months. Additionally, there are 16 half-way houses run by the government. There are no syringe–needle exchange programs, as the present policies do not allow distribution of sterile injection equipment to IDUs, and anyone known to use drugs or aid others in using drugs can be prosecuted.

Although a national AIDS program does exist as part of the Ministry of Health's Division of Disease Control, most of the HIV/AIDS prevention activities to date have been initiated by NGOs. The government allocates funds through its NGO AIDS council to implement these HIV/AIDS activities.

Among different NGOs involved in HIV/AIDS prevention activities, the IKHLAS project of Pink Triangle has implemented HIV/AIDS risk reduction activities targeting IDUs in Kualalampur. The project operates a drop-in center for drug users and conducts outreach in the community. The drop-in center is open 5 days a week and is where drug users can get medical attention, food, and a place to take a shower and rest. As part of its outreach activities, IDUs in the streets are provided with HIV/AIDS risk reduction information and education and bleach for decontamination of injection equipment.

Evaluation of the program has identified difficulties encountered by IDUs when using bleach under field conditions. However, patterns of consumption among many of the users have been stabilized and many have switched to non-injecting drug use.<sup>50</sup> The relative success of the IKHLAS project has been attributed to the non-judgmental nature of the program and for creating a "homelike" safe space for drug users where their voices are heard and where they are treated with respect and importance.<sup>50</sup> In addition to providing HIV/AIDS risk reduction information and education, IKHLAS project also makes referrals to social and health service providers.

Pengasih, an NGO run by former drug users and people with HIV, conducts outreach to drug users on the streets of Kualalampur. While they focus mainly on getting people off drugs, they also provide HIV/AIDS risk reduction information and education and provide social support to other former users and people with HIV. The program has yet to be formally evaluated to assess its efficacy and impact.

# Myanmar

Myanmar is one of the countries in Asia that has experienced very rapid spread of HIV among drug injectors. The HIV epidemic in Myanmar began in 1988 with the infection of a large number IDUs; in 1993, the seroprevalence rates among IDUs varied from about 27% in Taunggyi to 95% in Myitkyeena.<sup>51</sup>

It is estimated that there are about 20,000 IDUs in Myanmar. There are six

major drug treatment centers with a combined daily bed capacity of about 220 to 245 and a yearly capacity of about 2000 to 2200. There are six smaller-scale treatment centers with a combined bed capacity of 125. There are also eight drug rehabilitation centers.<sup>52</sup>

Although the National AIDS Committee, established in 1989, coordinates AIDS prevention and control activities in the country, very few specific interventions have been implemented targeting IDUs. The drug treatment centers and the rehabilitation centers provide information, education, and counseling about HIV and AIDS. Interventions targeting IDUs, however, are limited to the provision of HIV risk reduction information and education. There are no syringe–needle exchange programs.

# China

In mainland China, HIV was first detected in 1985. In October 1989, about 100 HIV infections were reported among drug users in treatment in a drug detoxification center in Ruili County, Yunnan Province, southwest China. A study conducted in 1990 in one of the villages in the Yunnan Province found 43% (N = 182) of the drug users (both IDU and non-IDU) to be HIV positive. Among the IDUs (N = 64), 80% were HIV positive.<sup>53</sup> Another study conducted in the Yunnan Province showed that HIV seroprevalence among the spouses of drug users increased from 3% in 1992 to 10% in 1995.<sup>54</sup>

While the national government has initiated an educational campaign for prevention and control of HIV/AIDS, so far no syringe-needleexchange program has been implemented. A community-based drug abuse prevention program initiated in the southwest focuses more on detoxification and abstinence from drug abuse than on HIV prevention. However, HIV/AIDS risk reduction information and education are also provided. The efficacy of the program in terms of HIV prevention has yet to be evaluated.

# Latin America

HIV infection in Latin America initially has been attributed primarily to sexual transmission. However, in a number of countries in this region, injecting drug use played and continues to play a significant role in the spread of the virus. Drug injectors have become the second largest HIV transmission category in Argentina and Brazil. A comparison of the intervention efforts among IDUs in Argentina and Brazil highlights the contrast in magnitude and, to some extent, in the quality and appropriateness of intervention efforts among IDU populations. Intervention efforts in Argentina have been limited both in quantity and quality, while efforts in Brazil have been more extensive and somewhat more comprehensive. The following discussion summarizes the response made by each of these countries to the HIV epidemic among IDUs.

# Argentina

It is estimated that there are about 30 to 50 thousand IDUs in Argentina, with the majority residing in Buenos Aires. Injection drug use now accounts for about 40% of all AIDS cases in Argentina. One study conducted in Buenos Aires at two drug rehabilitation centers showed that HIV infection increased from 29% in 1987 to 47% in 1990 for one center and from 38% in 1987 to 46% in 1990 for the other.<sup>55</sup> A similar study conducted in the city of Rosario found an increase in HIV prevalence from 28% in 1988 to 40% in 1990.<sup>56</sup> The rapid spread of HIV among IDUs has been facilitated by a lack of appropriate interventions targeting the IDUs. Injection of cocaine has also contributed to the rapid spread of the virus, primarily due to higher injection frequency resulting from the shorter length of cocaine's effects compared to opiates.

Efforts have been made by local NGOs to try to change public opinion to favor increasing the availability of sterile injection equipment as well as developing and implementing needle and syringe exchange programs. However, these efforts have not passed the discussion stage (G. Touzi, personal communication, 1995). Thus, therapeutic programs for IDUs continue to stress drug use abstinence.

#### Brazil

After the United States, Brazil has the largest number of HIV/AIDS cases in the Americas. As of December 1995, Brazil reported 76,396 AIDS cases. Bisexual/ homosexual AIDS cases accounted for 80% of all AIDS cases in 1985. This percentage declined to 41% in 1990 and to 26% in 1995. The proportion of AIDS cases reported due to injecting drug use increased from 1% during 1982–1985 to 22% in 1995. Similarly, AIDS cases due to heterosexual transmission also increased from 5% in 1990 to 28% in 1995.<sup>57</sup>

The increase in HIV/AIDS among IDUs in Brazil from the mid-1980s to 1995 indicates both an increase in high-risk behaviors among IDUs as well as a lack of effective prevention interventions. A study conducted in Rio de Janeiro with IDUs recruited both from the street and from drug treatment centers found 29% of the participants (n = 72) to be HIV positive.<sup>58</sup> Forty-six percent of the subjects reported injecting more than once a week and 58% reported sharing injection equipment. Fifty-one percent reported engaging in unprotected sex with a casual partner. A similar study conducted with IDUs in the city of Santos found 62% of the study participants (N = 220) to be HIV positive.<sup>59</sup> Those who were HIV positive reported significantly greater frequency of daily drug injections than those who were HIV

negative and less drug-related behavior change (i.e., in cleaning and sharing needles), despite HIV/AIDS awareness.

In 1996, a comprehensive HIV prevention program was initiated nationally targeting IDUs. The program includes syringe exchange, drug treatment, outreach intervention, and condom distribution for safer sex. Even though prescriptions are not required to purchase syringes, the program has generated much controversy, as many local law enforcement officials do not support providing sterile injection equipment to people to use for drug injection. However, syringe exchange programs have been initiated in seven locations in five states.<sup>60</sup> The program has yet to be evaluated to measure effectiveness.

The government also has funded a number of local NGOs to implement interventions targeting IDUs. These interventions have focused mainly on outreach activities through which drug users are provided with risk reduction information and education as well as bleach for syringe decontamination.

In 1989, the city government of Santos declared its intention to start a needle exchange program, but it generated a heated public debate and the program could not get off the ground. In 1991, the city government agreed to an educational campaign designed to educate IDUs on decontamination of syringes and needles. An outreach intervention with bleach distribution was initiated in 1993. The program also focused on building trust among drug users and providing risk reduction information and education. Data collected in 1991–1992 indicate that while 52% (N = 220) of the IDUs shared syringes, only 9% of those who shared used bleach. To assess the effectiveness of the program, a selected number (n = 104) of IDUs were interviewed to measure changes in behavior. The results show an increase in the use of bleach. However, no significant changes in needle sharing were reported.<sup>61</sup> Efforts were made to start a users' group to facilitate risk reduction among IDUs in Santos. However, no formal evaluation was conducted to measure its impact on risk behavior.

Prevention programs targeting drug users also have been initiated in other parts of the country as well. Most of these programs have focused on providing risk reduction information and health education without any specific intervention such as syringe exchange or bleach distribution. In the city of Porto Alegre, IDUs were asked to join the prevention intervention team to help develop appropriate outreach messages. In addition to the IDUs, relatives of IDUs and professionals in the health and communication fields were part of the team developing and testing the prevention campaign. Using members from the IDU community helped in the development of appropriate messages as well as in reaching the IDUs. The campaign also helped to generate interest in HIV prevention issues in the local community including local government officials, academia, and the local press.<sup>62</sup>

In 1995, a syringe-needle exchange program was initiated in the city of Salvador in the state of Bahia. The program so far has reached about 600 cocaine injectors, and at present 500 to 700 syringes are exchanged per month. In addition
to syringes, risk reduction information, condoms, and social and health care support and referrals are also provided to IDUs. Although the program is yet to be formally evaluated, preliminary data collected from IDUs indicate a decrease in needle sharing (T. Andrade, personal communication, 1997).

# DISCUSSION

There is now substantial evidence that participation by IDUs in several types of prevention programs will lead to a reduction in HIV risk behavior and lower rates of new HIV infection. Protecting individuals at risk from HIV infection and protecting populations at risk, however, are two different questions. Protecting a population requires delivery of prevention services to a relatively large proportion of the population at risk, and thus involves issues of access and availability of services.

Research conducted in the United States, Europe, and Australia shows that there are a number of cities around the world where HIV was introduced into the local IDU population but seroprevalence remained low (under 5%) and stable for at least 5 consecutive years. The important characteristics of the cities that avoided epidemics of rapid HIV transmission include:

- 1. Prevention programs were implemented early, when HIV seroprevalence was quite low.
- 2. Street outreach programs were utilized to establish trusting communication between IDUs and health workers.
- 3. IDUs were provided with very good access to sterile injection equipment.
- 4. Large majorities, i.e., 70% or more, of IDUs reported knowing about HIV and AIDS and changing their behavior in response to this knowledge.
- 5. There was a substantial amount of residual risk behavior. From 30% to almost 60% of the IDUs in these cities reported at least occasionally engaging in the sharing of injection equipment. This sharing appeared to be limited to small groups and only rarely involved the "rapid partner change" type of sharing associated with epidemics of HIV transmission. As the vast majority of IDUs in these cities were HIV seronegative, the majority of risk behavior occasions involved two seronegative partners, and thus did not lead to HIV transmission.

The stable low seroprevalence in these cities does not involve risk elimination or the absence of all new HIV infections (the HIV incidence rate in these cities appears to be less than 1 per 100 person-years at risk, but is not zero). Given the diversity within IDU populations and the problems in implementing programs to reach all of the population at risk, it may not be realistic to eliminate all risk

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behavior and to prevent all new HIV infections once the virus has become established in a local population. It is critical, however, to prevent epidemics of rapid HIV transmission. This does appear to be a feasible public health goal. In many developing countries HIV among IDUs is still at a low level, and if appropriate measures are taken now, without any delay, it is not only possible to keep seroprevalence low but also to stop the rapid spread among IDUs and from IDUs to other population groups.

#### Issues in HIV Prevention in Developing Countries

To prevent HIV infection among IDUs in developing countries a number of issues must be taken into account. First, as discussed earlier, injecting drug use is diffusing to an increasing number of developing countries. The public health consequences of increased injection behavior include the spread of HIV both among IDUs as well as from IDUs to other populations.

Second, the illegal status of drugs such as heroin and cocaine increases the likelihood that, if used, these drugs will be used through intravenous injection. The illegal status of these drugs increases the "cost of doing business" for the producers and distributors of the drugs. These increased costs are then passed on to the customers/consumers. The higher prices then create pressure for the user to consume the drugs in a manner that is cost-efficient. Intravenous injection both produces a relatively strong drug effect (because of the rapidity of the increase of drug in the brain) and permits a very high percentage of the drug to be consumed. (In contrast, when heroin or cocaine are "smoked," only about one third of the drug is actually consumed.) Thus, all other things being equal, people who are using these drugs are more likely to inject them. The actual prices of the drugs and local customs regarding preferred routes of administration vary across different locations but can change rapidly over time. It is also worth noting that the actual costs of production and distribution of drugs such as heroin and cocaine are usually sufficiently low that large amounts of money can be made selling these drugs.

The illegal nature of drugs such as heroin and cocaine often makes them relatively difficult to purchase, at least compared with licit drugs such as nicotine. Persons who inject illicit drugs will then often "cooperate" in obtaining the drugs. This cooperation can take many forms, from sharing information about how to obtain drugs, to working together to obtain money to purchase drugs, to pooling money to purchase the drugs (sellers usually give discounts for higher volume purchases), to sharing drugs and injection equipment if one person is temporarily without. These different forms of cooperation in obtaining drugs and supplies can then lead to people injecting together, which increases the likelihood that they will share drug mixtures and injection equipment—and transmit blood–borne viruses.

Syringe-needle exchange has been found to be effective in reducing HIV risk among IDUs in many industrialized countries and recently has been implemented in some developing countries. Furthermore, in countries where there are not sufficient resources to use a new sterile needle and syringe for each injection (even in health care settings), it is possible that this procedure may not be advocated for IDUs in some countries.

The economics of reusing injection equipment can also be quite compelling. A standard diabetic needle and syringe often can be reused 40 or more times before the tip becomes too dull for further use. The cost of manufacturing a needle–syringe unit is modest (several US cents), but packaging and distribution costs may be considerable.

In the absence of a syringe-needle exchange/distribution program, disinfecting injection equipment between users is a possible solution. Full-strength household bleach is a relatively strong inexpensive disinfectant. Household bleach has been distributed to drug injectors as an anti-HIV disinfectant in many cities in the United States and also in developing countries such as Brazil, India, and Malaysia. As mentioned earlier, however, there are important limitations to the use of bleach for disinfecting drug injection equipment. Bleach is not currently available in all areas where drugs are currently injected. Bleach is chemically unstable in heat and sunlight. Perhaps most importantly, while bleach is a powerful disinfectant, it may be difficult for IDUs to disinfect needles and syringes successfully under field conditions, that is, in the regular contexts in which IDUs would need to do the disinfecting.

Given that in some countries the drug users themselves will not be able to afford new needles and syringes and that in some contexts needle exchange will not be permitted, some form of disinfection procedure is needed as a method of reducing HIV transmission. Additional research is needed to develop disinfection procedures that: (1) utilize readily available materials; (2) do not damage the needle and syringe; and (3) lead to high rates of compliance among drug injectors. While there are formidable problems in developing highly effective disinfection procedures, it is still probable that any disinfection provides some protection over no disinfection.

Drug abuse treatment also can be an effective method for reducing HIV transmission among drug injectors. As noted above, there are several convincing studies showing that participation in methadone maintenance treatment in particular can reduce the risk of becoming infected with HIV. While methadone maintenance is a relatively inexpensive form of drug abuse treatment, large-scale methadone maintenance programs may still be beyond the resources available in many developing countries. Currently, the World Health Organization is in the process of developing and implementing a project to examine the feasibility of substitution therapies for drug abuse treatment. The buprenorphine distribution project in Delhi, discussed earlier, is an example where buprenorphine, a legal drug that is not usually injected, is being used as a substitution treatment both to reduce drug abuse as well as for HIV prevention.

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Outreach programs to drug users have been found to be effective in reducing HIV risks not only in industrialized countries but also in a number of developing countries such as Brazil, India, Malaysia, and Vietnam. While resources for conducting outreach programs will undoubtedly be very limited in many developing countries, it is possible to conduct outreach with relatively modest resources. Outreach programs in Manipur and Madras in India and in Vietnam, described above, used members of the at-risk community as change agents. Active drug users are provided training as community health workers who then act to change the risk behaviors of their peers and the social norms in the group regarding risk behaviors. Given that these types of "social change" outreach programs utilize the at-risk population as the primary change agents, it is possible to implement them with very modest resources.

Similarly, drug users' organizations and network intervention have been found to be effective in promoting risk reduction and creating risk reduction norms among injectors. Studies conducted in the United States and in Madras, India, showed efficacy of network intervention in reducing risk behaviors. Network intervention is needed to be promoted and implemented in developing countries.

#### Structural Issues: Societal Attitudes toward Illicit Drug Use

Lack of resources of health authorities and those involved in disease prevention is clearly a major problem in implementing programs to reduce HIV transmission among IDUs in many developing countries; however, support at the community level and by the political leaders will also play a large role in HIV prevention programs for IDUs. Because of the illicit status of many psychoactive drugs, it is not possible to implement effective programs to reduce HIV transmission among IDUs without a political philosophy that legitimizes this type of prevention work. Here we want to discuss briefly three different perspectives on illicit psychoactive drug use and their implications for HIV prevention among drug users. These perspectives are discussed as "ideal types" and do not necessarily reflect the complexity of any specific country's policies toward psychoactive drug use. Nevertheless, we believe that these types provide an analytic framework for considering the possibilities of implementing effective HIV prevention for drug users.

#### Traditional Values as Assurance of Immunity to Drug Use

Many religious and cultural traditions ban the use of almost all psychoactive drugs. Followers of these traditions then tend to believe that their society will be immune to the "modern decadence" of illicit drug use. There is little doubt that strong religious beliefs can have a protective effect against illicit drug use both at the individual and at the community level. At a policy level, there is a tendency for community leaders to assume that strong religious beliefs will be sufficient protection against illicit drug use. The belief among the politicians and community leaders that traditional and religious values will provide societal immunity against illicit drug use appears to be particularly common in developing nations.63 The increase in the number of countries with illicit drug injection (from 80 countries in 1989 to 120 countries in 1996) indicates that traditional/religious values will rarely be sufficient to fully protect a society against illicit drug use.

The traditional values perspective provides little guidance for addressing problems such as HIV infection among IDUs. There are religious-based forms of drug treatment that are consonant with traditional values perspectives, for example, the 12-step Alcoholics Anonymous program, and the Buddhism-based programs in Thailand. Although there is some evidence that these religious-based treatment programs can reduce drug use, they are far from comprehensive in their approach to either addressing illicit drug use or to preventing HIV transmission among IDUs. Once injecting drug use has become established in such a society, the important question becomes at what point will the societal leaders recognize that traditional/religious beliefs are not sufficient by themselves to address illicit drug use. Subsequent to this recognition, leaders then must decide what additional interventions will need to be implemented in order to address the multiple problems associated with illicit drug use.

# The "War on Drugs" Response to Drug Use

The "war on drugs" perspective is probably the most common policy perspective among both industrialized and developing nations. There are both important similarities and differences between the traditional values immunity perspective and the war on drugs perspective. Both share a moral condemnation of illicit drug use as "wrong." In addition, according to the war on drugs perspective, drugs are seen as addicting, thus destroying the capacity for responsible behavior of the individual. The social effects of drug use often are held to include increased crime, corruption, and the destruction of communities.

While many community leaders who believe in the traditional values immunity perspective believe that their societies will not develop illicit drug use problems, community leaders who subscribe to the war on drugs perspective tend to see their societies as quite vulnerable to illicit drug use. Drug-free societies are seen as achievable goals within the war on drugs perspective, but only with intense efforts. Law enforcement at the international, national, and local levels is the primary method for ridding society of the drug menace. Belief systems, such as religions, are not believed to be sufficiently powerful for eliminating illicit drug use. Criminal sanctions are needed to punish the individual users (criminalizing possession of the drugs even for personal use) and severe criminal sanctions are

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needed to punish distributors and sellers, including capital punishment in some countries.

Drug abuse treatment is also a potentially important method for reducing drug use within the war on drugs perspective. A variety of treatment programs may be utilized, but there usually is an emphasis on abstinence-oriented forms of treatment. Abstinence from illegal drug use is the primary outcome for assessing treatment. Drug abuse treatment is often operated separately from "regular" medical care. In some countries with a war on drugs perspective, the drug abuse treatment programs are operated by the law enforcement authorities.

While drug abuse treatment leading to abstinence from illicit drug use is the preferred method for preventing HIV infection within the war on drugs perspective, other prevention activities are also used. Outreach programs, to provide information/education about HIV and AIDS, and HIV counseling and testing have been utilized in many countries with war on drugs perspectives. Bleach distribution to disinfect used syringes has also been used, though syringe exchange and decriminalizing the possession of syringes as narcotics paraphernalia are usually seen as antithetical to a war on drugs. The need for consistent symbolism of government actions as "tough on drugs" may thus substantially limit implementation of HIV prevention activities.

#### Harm Reduction Response

HIV and AIDS have dramatically increased the adverse health consequences of injecting drug use, and thus have led to an increased realization that psychoactive drug use is a health problem rather than simply a criminal justice problem. At the same time, HIV infection can be prevented without the cessation of injecting drug use. This potential separation of a severe adverse consequence of drug use from the drug use itself has formed much of the basis for what has been termed the harm reduction perspective on psychoactive drug use.<sup>64–66</sup>

The harm reduction perspective often emphasizes the pragmatic need to reduce the harmful consequences of psychoactive drug use while acknowledging that eliminating drug use is not likely to be feasible in the foreseeable future. Thus, the harm reduction approach does not offer a solution to all psychoactive drug problems. Indeed, the harm reduction perspective presumes that psychoactive drug use will continue and that problems associated with its use will also continue. Harm reduction programs are therefore designed to reduce one or more specific harms associated with psychoactive drug use. These programs are implemented based on the assumptions that psychoactive drug use will continue and that it is possible, concurrent with the drug use, to reduce some of the harmful consequences of drug use.

Harm reduction should not be confused with legalization of currently illicit drugs. Rather than legalization, a harm reduction approach usually suggests a

balance of criminal law, civil law, education, prevention, treatment, syringe exchange, and other health programs to address the many problems associated with psychoactive drug use. It is essentially a pragmatic response by which programs that seek to reduce drug-related harms are preferred over programs whose value is symbolic (i.e., send a message that society is against drugs) without necessarily having any demonstrable positive effect on drug use or drug-related harm.

The transmission of HIV among IDUs is an excellent example of a specific drug-related harm that has the potential to be reduced dramatically through programs such as needle-syringe exchanges. Although there may be political problems with harm reduction, as it does recognize the continuation of drug use, there do not appear to be any inherent reasons why harm reduction concepts cannot be used to reduce HIV transmission among drug injectors on a global basis. Despite the fact that the harm reduction perspective was initially developed and implemented primarily in industrialized countries, these concepts can be transferred to developing countries and are not necessarily antithetical to the socio-cultural beliefs and practices of developing countries. As discussed earlier, harm reduction programs such as needle-syringe exchanges have been implemented in some developing countries such as Brazil, India, Nepal, Thailand, and Vietnam.

## Standards for Assessing HIV Prevention Programs for IDUs

The evaluation of HIV prevention programs is critical to reducing HIV transmission. The resources available for HIV prevention are limited; in many developing countries, these resources are severely limited. Thus, expending resources on ineffective programs will involve serious opportunity costs. The lost opportunities include the possibilities of spending resources on more effective prevention programs. Randomized clinical trials are the current gold standard for evaluating public health and medical interventions. There are, however, many good reasons not to use randomized clinical trials for HIV prevention efforts. First, effective HIV prevention often occurs at a community level rather than at an individual level. This means that the community (or local population of IDUs) is the appropriate unit of analysis for evaluating prevention programs. While community-level randomized clinic trials are possible, they are usually very difficult and very expensive to conduct. A large sample of communities may be needed to assess a particular type of HIV prevention program because HIV prevention may be highly dependent on the local context. For example, communities' transportation systems may be a relevant contextual factor as these affect mixing patterns among drug injectors, and thus the potential for rapid partner change.

Given the multiple difficulties in conducting randomized clinical trials, researchers should use them on programs that have a sound biological, psychological, or sociological theory underlying the intervention. For example, at the biolog-

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ical level, a theoretical basis for an intervention may be that syringes obtained from pharmacies or exchanges will not contain HIV, or that HIV does not penetrate latex condoms, so use of latex condoms will diminish risk of exposure to HIV. At a psychological level, the theory may articulate that persons with accurate information about how HIV is and is not transmitted, who have options in selecting methods for reducing risk, will be more likely to reduce their risk behavior and to actually do so. At a social level, a theory may be based on the assumption that drug injectors influence each others' behavior, and thus can act as influence agents to reduce the risk behavior of their peers. The underlying theory in the prevention program should be sufficiently well established that it would be unethical to conduct a randomized trial. (Although specific methods of operationalizing the theory may need to be tested empirically.)

Effectiveness in such trials must be defined as participants achieving a low HIV transmission rate. A low incidence rate will be determined with respect to HIV seroprevalence in the local population of IDUs. We would suggest that in areas where the seroprevalence is under 10%, a low incidence rate would be 1% per year or less. In areas with higher HIV seroprevalence rates, we would suggest that a low incidence rate would be 2% per year or less. Another, more operational criteria of effectiveness is that the prevention program is popular with the target audience, that is, it is able to attract and retain a large number of persons at risks for HIV transmission.

# SUMMARY, CONCLUSIONS, AND FUTURE DIRECTIONS

As outlined initially in this chapter, a number of HIV prevention interventions for IDUs have been successfully implemented and evaluated throughout the developed world. These available and effective prevention intervention methods include access to sterile injection equipment, needle–syringe exchange, needle decontamination, pharmacological drug use treatment for heroin addiction, and network intervention, as well as prevention education outreach programs.

Some prevention intervention programs using these methods have been initiated in developing countries. More often than not, these programs have been initiated but not formally evaluated for their efficacy. More startling, however, is the fact that according to currently available data, many developing countries have not initiated HIV prevention intervention programs targeting IDUs. In many countries, prevention programs only include provision of HIV/AIDS information and promotion of abstinence from drug use.

Clearly, more prevention intervention programs need to be initiated in developing countries, even in countries where HIV has not entered the IDU population. Program planners and researchers implementing those programs should strive for complementarity of prevention efforts. Given the diversity within populations of IDUs, it is extremely unlikely that there is a single "best" HIV prevention program for all drug injectors at risk for HIV infection. Research studies that pit different prevention programs against each other are not likely to produce knowledge that will be of great use in reducing HIV transmission among IDUs. Research resources would be better spent in investigating how different programs can complement each other to reduce transmission within diverse populations of IDUs.

Intervention programs need to be systematically and formally evaluated. Evaluation data not only provide useful feedback concerning program efficacy to the program initiators, they provide a means by which the experiences of individual programs can be shared with others. Much has been learned in the last decade of research on prevention of HIV infection among IDUs. Nonetheless, despite the progress in terms of lessons derived from research findings, increasing sophistication of prevention programs, and actual reduction in HIV transmission, there still are a number of problem areas with respect to prevention of new HIV infections among IDUs in many developing countries and some industrialized countries.

While we now have relatively good observational data on many epidemics of HIV among IDUs, there are a few critical questions for which answers are needed. First, we need a better understanding of the "takeoff" process in rapid transmission epidemics. Rapid transmission clearly involves situations that facilitate rapid partner change, that is, mixing patterns in which people change at fast pace the partners with whom they inject drugs. However, we do not yet have any precise understanding of the relationship between the extent of rapid partner change risk behavior and rapid transmission of HIV. It is very likely that newly infected persons are much more infectious than persons who have been infected for several months or longer,<sup>67</sup> so that the higher infectiousness would be an additional amplifying factor in rapid partner change epidemics.

A better understanding of how to prevent epidemics of rapid HIV transmission is particularly important for developing countries. As illicit drug injection continues to spread to new countries, the opportunities for rapid transmission epidemics will also increase. As noted above, political resistance to HIV prevention can be very important in many developing countries. If research was able to provide a more detailed explanation of how epidemic takeoff occurs, it might be possible to persuade political leaders in developing countries to begin HIV prevention efforts before rather than after rapid transmission occurs.

We also need to understand under what conditions is it possible to reverse a large, high-seroprevalence HIV epidemic. Where such reversals have occurred, the general chronological pattern in high seroprevalence has been: (1) a level of high seroprevalance leading to the implementation of interventions; (2) behavioral change following interventions; followed by (3) stable seroprevalance with moderate to high rates of new HIV infections. Theoretically, after a relatively long period of time (perhaps a decade or longer), most persons in the initial group of rapid transmission HIV infections would have died from AIDS (likely the highest-

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risk group), and seroprevalence could start to decline. This would presumably require at least stable risk reduction in the population over the long time period. Recent data from New York City indicate that long-term risk reduction has been sustained and that HIV seroprevalence has declined among IDUs. Whether this decline in seroprevalence will continue, versus stabilization at a new, lower level, and whether the declining seroprevalence will occur in other high seroprevalence epidemics, however, remain to be determined. How declines in seroprevalence might be accelerated is also an important question to be addressed.

# Sexual Transmission of HIV among Drug Users

While there is highly consistent evidence that IDUs will make large changes in their injection risk behavior in response to concerns about AIDS, changes in sexual behavior appear to be much more modest. Most studies that have compared changes in injection risk behavior with changes in sexual risk behavior found greater changes in injection risk behavior.<sup>68</sup> In general, IDUs appear more likely to make risk reduction efforts (reduced numbers of partners, increased use of condoms) for casual sexual relationships rather than in primary sexual relationships.

The reasons for the difficulties in changing the sexual behavior of IDUs have not been fully clarified, but the problem appears in many different cultural settings, including IDUs in Asia, Europe, and Latin America, as well as in the United States.<sup>69</sup> To place the problem in perspective, however, IDUs have undoubtedly changed their sexual risk behavior more than noninjecting heterosexuals in the United States as a whole.<sup>70</sup>

One factor that appears to be important in increasing condom use among IDUs is an altruistic desire to avoid transmitting HIV to a noninjecting sexual partner. In Bangkok and New York City,<sup>71</sup> and in multiple European cities,<sup>72</sup> IDUs who know (or have reason to suspect) that they are HIV positive are particularly likely to use condoms in relationships with sexual partners who do not inject illicit drugs. Most programs that have urged IDUs to use condoms thus far have focused on the self-protective effects of condom usage (protecting oneself from infected partners). Appealing to altruistic feelings of protecting others from HIV infection may be an untapped source of motivation for increasing condom use.

# REFERENCES

- 1. Musto D. The American Disease: Origins of Narrotic Control. New Haven, CT Yale University Press; 1973.
- 2. Mann JM, Tarantola DJM, eds. AIDS in the World II. New York and Oxford: Oxford University Press; 1996.
- Des Jarlais DC, Stimson GV, Hagan H, et al. Emerging infectious diseases and the injection of illicit psychoactive drugs. Curr Issues Public Health 1996; 2:102–137.

- 4. Des Jarlais DC, Friedman SR. AIDS and IV drug use. Science 1989; 245578-579.
- Third Quarterly Report, No 49. World Health Organization—European Commission. Collaborating Centre on AIDS; 1996.
- Homberg S. The estimated prevalence and incidence of HIV in 96 large US metropolitan areas. Am J Public Health 1996; 86(5):642–654.
- Des Jarlais DC, Friedman SR, Novick D, et al. HIV-I infection among intravenous drug users in Manhattan, New York City, from 1977 through 1987. JAMA 1989; 261:1008–1012.
- Wright N, Vanichseni S, Akarasewi P, et al. Was the 1988 HIV epidemic among Bangkok's injecting drug users a common source outbreak? AIDS 1994; 8529–532.
- Des Jarlais DC, Friedman SR, Choopanya K, et al. International epidemiology of HIV and AIDS among injecting drug users. AIDS 1992; 6:1053–1068.
- Stimson GV. Recontruction of subregional diffusion of HIV infection among injecting drug users in southeast Asia: Implications for early intervention. *AIDS* 1994; 8(11):1630–1632.
- 11. Zheng X, Tian C, Zhang J, et al. Rapid spread of HIV among drug users and their wives in southwest China. 9th International Conference on AIDS, Berlin, 1993. Abstract No. 2766.
- Sarkar S, Das N, Panda S, et al. Rapid spread of HIV among injecting drug user in north-eastern states of India. Bull Narcotics 1994; XLV91–105.
- Jacquez J, Koopman J, Simon C, Longini I. Role of the primary infection in epidemic HIV infection of gay cohorts. J Acquir Immunodefic Syndr 1994; 7:1169–1184.
- 14. Ostrow DG. AIDS prevention through effective education. Daedalus 1989; 118:229-254.
- Institute for Health Policy Studies. The public health impact of needle exchange programs in the United States and abroad: summary, conclusions and recommendations. School of Public Health, University of California, San Francisco, 1993.
- Hartgers C, Buning EC, van Santen GW, et al. The impact of the needle and syringe-exchange programme in Amsterdam on injecting risk behavior. AIDS 1989; 3:571–576.
- Stimson GV. Syringe-exchange programmes for injecting drug users—Editorialreview. AIDS 1989; 3:253–260.
- Des Jarlais DC, Maynard H. Evaluation of needle exchange program on HIV risk behaviors: Supplemental final report. American Foundation for AIDS Research, New York, 1992.
- 19. Dolan KA, Stimson GV, Donoghoe M. Reductions in HIV risk behavior and stable HIV prevalence in syringe-exchange clients and other injectors in England. *Drug Alcohol Rev* 1993; 12:133–142.
- Vlahov D, Astemborski J, Solomon L, Nelson KE. Field effectiveness of needle disinfection among injecting drug users. J Acquir Immunodefic Syndrs 1994; 7:760–766.
- 21. Titus S, Marmor M, Des Jarlais DC, et al. Bleach use and HIV seroconversion among New York City injection drug users. J Acquir Immunodefic Syndr 1994; 7:700–704.
- 22. Gleghorn AA, Doherty MC, Vlahov D, et al. Inadequate bleach contact times during syringe cleaning by injection drug users. J Acquir Immunodefic Syndr 1994; 7:762–772.
- Caplehorn JR, Ross MW. Methadone maintenance and the likelihood of risky needle sharing. Int J Addict 1995; 30:685–698.
- Neaigus A, Sufian M, Friedman SR, et al. Effects of outreach intervention on risk reduction among intravenous drug users. AIDS Educ Prevent 1990; 2:253–271.
- Centers for Disease Control. Assessment of street outreach for HIV prevention-selected sites, 1991–1993. MMWR 42(45):873, 879–880.
- Abdul-Quader AS, Des Jarlais DC, Tross S, *et al.* Outreach to injecting drug users and female sexual partners of drug users on the Lower East Side of New York City. *Br J Addict* 1992; 87: 519–526.
- Weibel W, Jimenez A, Johnson W, *et al.* Positive effect on HIV seroconversion of street outreach intervention with IDU in Chicago: 1988–1992. 9th International Conference on AIDS, Berlin, 1993. Abstract No. WS-C15-2.
- Canter ML, Petersen LR, Savage RB, Donagher J. Providing HIV counseling and testing services in methadone maintenance programs. *AIDS* 1990; 4(5):463–465.

#### **Injecting Drug Users**

- Higgins DL, Galavotti C, O'Reilly KR, et al. Evidence for the effects of HIV antibody counseling and testing on risk behaviors. JAMA 1991; 266:2419–2429.
- 30. Friedman SR, Des Jarlais DC, Neaigus A, *et al.* Organizing drug injectors against AIDS: Preliminary data on behavioral outcomes. *Psychol Addict Behav* 1992; 6:100–106.
- Latkin CA, Mandell W, Vlahov D, et al. The long-term outcome of a personal network-oriented HIV prevention intervention for injection drug users: The SAFE study. Am J Commun Psychol 1996; 24:341–364.
- Vanichseni S, Sakuntanaga P. Results of three seroprevalence surveys for HIV and IVDU in Bangkok. Sixth International Conference on AIDS, San Francisco, CA, 1990.
- Choopanya K, Vanichseni S, Des Jarlais DC, et al. Risk factors and HIV seropositivity among injecting drug users in Bangkok. AIDS 1991; 5:1509–1513.
- 34. Des Jarlais DC, Choopanya K, Wenston, et al. Risk reduction and stabilization of HIV seroprevalence among drug injectors in New York City and Bangkok, Thailand. In: Rossi GB, Beth-Giraldo E, Chieco-Bianchi L, et al., (Eds.) Science Challenging AIDS. Basel: Karger, 1992; 207–213.
- Government of the Socialist Republic of Vietnam. Vietnam National Drug Abuse Control Plan. Hanoi; 1995.
- 36. Vietnam National AIDS Committee. Annual Report. Hanoi; 1996.
- 37. Vietnam National AIDS Committee. Harm Reduction for Injecting Drug Users. Hanoi; 1995.
- Quan VM, Chung A, Abdul-Quader AS. Feasibility of a syringe-needle exchange program in Vietnam. Substance Use Misuse 1998; 33 (5):1–14.
- 39. SHARAN-Annual Report. New Delhi, 1995.
- Kumar S, Daniels D. HIV risk reduction strategies among IDUs in Madras: Assessment research report. Madras, India; 1994.
- Stimson GV. The global diffusion of injecting drug use: implications for human immunodeficiency virus infection. *Bull Narcotics* 1993; 45(1):3–17.
- 42. Indian Council of Medical Research. Annual Report. Calcutta, 1995.
- Kumar S, Daniels D. Empirical evidence of behavior change. Paper presented at the Indo-US Workshop on Behavioral and Social Research on HIV Prevention. Bombay, 1996.
- Panda S, Chattejee A, Sarkar S, et al. Injection drug use in Calcutta: A potential focus for an explosive HIV epidemic. Drug Alcohol Rev 1997; 16:17–23.
- Hangzo C, Chatterjee A, Sarkar S, et al. Reaching out beyond the hills: HIV prevention among injecting drug users in Manipur, India. Addiction 1997; 92 (7):813–820.
- 46. Chatterjee A, Hangzo CZ, Abdul-Quader AS, et al. Evidence of effectiveness of street-based peer outreach intervention to change behavior among injecting drug users in Manipur, India. XI International Conference on AIDS, Vancouver, 1996. Abstract No. 4975.
- Peak A, Rana S, Mahajan SH, et al. Declining risk for HIV among injecting drug users in Kathmandu, Nepal: The impact of a harm reduction programme. AIDS 1995; 9:1067–1070.
- Shreshtha DM, Shreshtha NM, Gautama K. Methadone treatment programme in Nepal: A one-year experience. J Nepal Med Assoc 1995; 33:33–46.
- AIDSCAP/Family Health International. Harvard School of Public Health, and UNAIDS. The Status and Trends of the Global HIV/AIDS Pandemic Symposium Final Report. Vancouver, 1996.
- Palaniappan N. Intervention among multiracial injecting drug users from different cultural and economical backgrounds. XI International Conference on AIDS, Vancouver, 1996. Abstract No. Mo.D. 1949.
- 51. Htoon MT, Lwin HH, San KO, et al. HIV/AIDS in Myanmar. AIDS 1994; 8(suppl 2):S105-S109.
- Stimson GV. HIV infection and injecting drug use in the Union of Myanmar: Final report to the United Nations Drug Control Programme, Vienna, Austria, 1994.
- Xia M, Kreiss JK, Holmes KK. Risk factors for HIV infection among drug users in Yunnan Province, China: Association with intravenous drug use and protective effect of boiling reusable needles and syringes. *AIDS* 1994; 8:1701–1706.

- 54. Zheng X, Zhang J, Qu X, et al. The sero-prevalence and incidence rates of HIV infection among IDUs by cohort study from 1992 to 1995 in Ruili and other counties of China. XI International Conference on AIDS, Vancouver; 1996. Abstract No. Tu.C. 2515.
- Libonatti O, Lima E, Peruga A, et al. Role of drug injection in the spread of HIV in Argentina and Brazil. Int J STD AIDS 1993; 4:135–141.
- Fay O, Taborda M, Fernandez A, et al. HIV seroprevalence among different communities in Argentina after four years of surveillance. VII International Conference on AIDS, Florence, Italy; 1991. Abstract No. M.C.3263.
- Chequer P, Castilho E, Gomes MRO, et al. Fifteen years of AIDS epidemic in Brazil: Trends over time and perspectives. XI International Conference on AIDS, Vancouver; 1996. Abstract No. Mo.C.1439.
- Rangel A, Telles P, Bastos F, *et al.* HIV risk in 1DUs in Rio de Janeiro: Psychological predictors and implications for intervention. XI International Conference on AIDS, Vancouver; 1996. Abstract No. Tu.C.2495.
- de Carvalho HB, Mesquita F, Massad E, et al. HIV and infection of similar transmission patterns in a drug injectors community of Santos, Brazil. J Acquir Immune Defic Syndr Hum Retrovirol 1996; 12(1):84–92.
- Loures LA, Bittencourt L, Marques F, *et al.* Dealing with a paradox: The national syringe exchange program in Brazil. XI International Conference on AIDS, Vancouver; 1996. Abstract No. We. C.3562.
- Bueno RC, Mesquita F, Haiek R, et al. Bleaching among IDUs in the city of Santos: Results of an intervention by an outreach team. XI International Conference on AIDS, Vancouver; 1996. Abstract No. Pub.C.1259.
- Conte M, D'Avila S, Mayer R, *et al.* The syringe pass. AIDS stay: AIDS prevention program for injection drug users. XI International Conference on AIDS, Vancouver; 1996. Abstract No. We.C.3567.
- Stimson GV. The global diffusion of injecting drug use: Implications for HIV infection. VIII International Conference on AIDS, Amsterdam; 1992. Abstract No. 1748.
- 64. Brettle RP. HIV and harm reduction for injection drug users. AIDS 1991; 5:125-136.
- Des Jarlais DC, Friedman SR, Ward TP. Harm reduction: A public health response to the AIDS epidemic among injecting drug users. Ann Rev Public Health 1993; 14:413–450.
- 66. Heather N, Wodak A, Nadelmann E, O'Hare P, eds. *Psychoactive Drugs and Harm Reduction: From Faith to Science.* Whurr Publishers, London; 1993.
- Jacquez J, Koopman J, Simon C, Longini I. Role of the primary infection in epidemic HIV infection of gay cohorts. J Acquir Immunodefic Syndr 1994; 7:1169–1184.
- Friedman SR, Des Jarlais DC, Ward TP, et al. Drug injectors and heterosexual AIDS. In: L Sherr, ed. AIDS and the Heterosexual Population. Chur, Switzerland: Harwood Academic Publishers; 1994; 41–55.
- Ball A, Des Jarlais DC, Donoghoe M, et al. Multi-centre Study on Drug Injecting and Risk of HIV Infection. Geneva: World Health Organization; 1994.
- Laumann EO, Gagnon JH, Michael RT, Michaels S. The Social Organization of Sexality: Sexual Practices in the United States. Chicago: University of Chicago Press; 1994.
- Vanichseni S, Des Jarlais DC, Choopanya K, et al. Condom use with primary partners among injecting drug users in Bangkok, Thailand and New York City, United States. AIDS 1993; 7: 887–891.
- Desenclos JC, Papaevangelou G, Ancell-Park R. Knowledge of HIV serostatus and preventive behavior among European injecting drug users. *AIDS* 1993; 7:1371–1377.

# Interventions for Men Who Have Sex with Men

# PETER AGGLETON, SHIVANANDA KHAN, and RICHARD PARKER

# INTRODUCTION

Throughout the HIV/AIDS pandemic, the development of prevention programs for men who have sex with men in developing countries has proved to be especially problematic. While AIDS was first identified among gay and bisexual men in industrialized countries such as the United States, the epidemiological significance of HIV transmission linked to homosexual and bisexual behavior has been highly variable (and often hotly debated) in many parts of the developing world. Preconceived notions about the nature of human sexuality and the presumed relationship between certain kinds of sexuality and HIV/AIDS have often been more important than empirical research or epidemiological data in driving both policy making and programmatic responses to the epidemic. Perhaps even more worrisome, stigma and discrimination associated with homosexuality and bisexuality would seem to be especially intense and have clearly impeded the implementation of behavioral interventions and prevention programs targeted to men who have sex with men in many parts of the developing world.

This chapter aims to explore the ways in which the relationship between homosexual behavior and HIV/AIDS has been conceived in different parts of the developing world and to examine the implications of these conceptions for the development of behavioral interventions and prevention programs for men who have sex with men. It then describes the relatively small number of intervention

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programs that have been documented in a number of developing countries and assesses the extent to which these programs might potentially serve as models for the development of more extensive prevention activities in the future. Finally, it discusses the theoretical and methodological approaches that seem most likely to succeed in reaching diverse populations of men who have sex with men and the potential relevance of such approaches in developing country settings.

# MEN WHO HAVE SEX WITH MEN IN THE DEVELOPING WORLD

While the relative importance of HIV transmission among gay and bisexual men was apparent from the very beginning of the epidemic in countries such as the United States, the United Kingdom, the Netherlands, and Australia, this was decidedly not the case in many parts of the developing world. Particularly in Africa, virtually no cases of HIV infection through homosexual contact were initially recorded, and the notion that homosexual behavior might play even a secondary role in what was perceived to be an epidemic driven exclusively through heterosexual transmission was in large part either rejected or denied. In South and Southeast Asia, where the epidemic appears to have arrived somewhat later but to have spread especially rapidly after its initiation, homosexual transmission has been widely reported, but for the most part in addition to a range of other modes of transmission that have been equally significantly linked, in particular, to heterosexual contacts and injecting drug use, especially in countries such as India and Thailand. And even in Mexico and Central and South America, where the earliest cases of AIDS in virtually all of the countries in the region were initially reported among homosexual men, the rapid shift in epidemiological patterns over the course of the past decade from predominantly homosexual to predominantly heterosexual transmission has directed attention away from homosexual behavior in the face of what is perceived to be the far more widespread risk of heterosexual transmission.<sup>1,2</sup>

The extent to which the epidemiological picture in each of these regions is in fact an accurate representation of the reality of the epidemic is open to debate. In its general outlines, it is probably more or less correct. One of the important lessons of the international AIDS pandemic, however, has been a growing awareness of the sometimes significant gulf that may separate lived social reality and the categories of modem science. Among the earliest insights from social research on HIV/AIDS, for example, was the understanding that sexual behavior often fails to conform to subjective sexual identity; that homosexual or bisexual behavior may not necessarily translate into a distinct "homosexual" or "bisexual" identity, either at the individual or at the collective level. Indeed, the introduction into the HIV/AIDS research literature in the late 1980s of the behaviorally based category of "men who have sex with men" was itself an attempt to acknowledge the fact that many

men may engage in same-sex interactions (often as well as opposite-sex interaction) without necessarily defining or identifying themselves as sexually different or distinct because of it. This disparity between lived behavior and the categories that science uses to investigate and document such behavior has led to lingering doubts about the extent to which epidemiological data correctly reflect epidemiological reality. This is because nonnormative behaviors, such as same-sex intercourse, may often go unreported and may therefore play an important role in transmission of HIV that is unacknowledged in epidemiological studies.

The picture is made even more complicated by the existence of a third variable, erotic desires, and by the situational specificity of much sex between men. Erotic desires and responses are of particular importance in some cultures when it comes to understanding nonnormative sexual behaviors and practices, especially when the latter involve transgression of some kind.3,4 Contexts are also important in that they make patterns of behavior seem reasonable and acceptable that in other circumstances might be unthinkable and unenactable. Thus, the sexual segregation and social hierarchy characteristic of most penal environments, many military environments, and some religious settings may actually facilitate male-to-male sex.<sup>5–7</sup> While often unacknowledged and undiscussed (sometimes even by the men involved), the acts of mutual masturbation, fellatio, and anal penetration that occur within these settings can be important in determining social prestige, gender identity within and sometimes beyond that setting, and sexual health status [both positively from the point of view of sexual fulfillment, and negatively from the point of view of sexual fulfillment, and respectively from the point of view of sexual fulfillment, respectively from the point of view of sexual fulfillment, respectively from the point of view of sexual fulfillment, respectively from the point of view of sexual fulfillment, respectively from the point of view of sexual fulfillment, respectively from the point of view of sexual fulfillment, respectively from the point of view of sexual fulfillment respectively from the point of view of sexual fulfillment respectively from the point of view of sexual fulfillment respectively from the point of view of sexual fulfillment respectively from the point of view of sexual fulfillment respectively from the point of view of sexual fulfillment respectively from the point of view of sexual fulfillment respectively fulfillment respectively fulfillment respectively fulfillment respectively fulfillment respectively fu

In spite of the important differences in HIV/AIDS epidemiology in the three major regions of the developing world, questions about the possible unacknowledged role of homosexual and bisexual behavior have emerged, though in different ways, in each region. Throughout sub-Saharan Africa, for example, a growing literature has suggested that some same-sex contacts may be more common than previously recognized,\* particularly among special populations such as military and prison populations, migrant workers, beach workers, and so on, but also among the population more generally.<sup>8</sup> Homosexual behavior among men has been reported as common but clandestine in northern Sudan<sup>9</sup> and Standing and Kisseka<sup>10</sup> have reported its present-day existence among groups as diverse as the Kikuyn in Kenya, the Hausa in Nigeria, and mine workers from a variety of groups in South Africa. Homosexual behavior between men linked to the achievement of rank or social status has been extensively documented in Kenya,11 as well as elsewhere in East Africa. In Botswana, it has been reported that up to 15% of urban and semiurban residents may have homosexual experience,<sup>12</sup> and in a number of African countries including South Africa, small subcultures or communities orga-

\*Although it must be acknowledged that a rich historical and anthropological literature exists detailing the presence of male homosexuality among different peoples across the African continent.

nized in large part around same-sex relations exist.<sup>13</sup> It has recently been suggested that underreporting of homosexual behavior is common throughout Africa because "homosexuality is highly stigmatized in most African societies."<sup>14</sup>

In Asia, homosexual behavior has been widely reported in both Islamic<sup>15,16</sup> and non-Islamic societies.<sup>17–19</sup> Recent studies suggest that even in contexts where male homosexuality has until recently been officially denied, there may be well-developed homosexual networks and subcultures, along with allied forms of male sex work and prostitution. In Pakistan, for example, a number of studies have recently demonstrated the existence of homosexual relations, albeit in forms accommodating both to Islam and to familial expectations and demands.<sup>20,21</sup> Generally speaking, however, sex between men in most parts of Asia needs to be set against the backcloth of strong family and community expectations to heterosexual norms, the expectation that everyone will marry, and the desire to protect kin from the shame that any open acknowledgement of the homosexuality or bisexuality of a family member is seen as bringing with it.

In Mexico, Central America, the Caribbean, and South America, there is a rich and well-developed literature concerning varying forms of homosexual and bisexual behavior, along with associated sexual identities and relations.<sup>3,22–30</sup> While behavioral forms and associated sexual cultures vary from country to country and between social classes within countries, the importance of "activity" and "passivity" in sexual relations continues to be emphasized in the majority of accounts, with self-understanding and social ascription varying according to whether a man is seen as penetrating or receiving in anal and oral sex. This is not to claim that reversals in sexual roles do not occur, or that there is any natural concurrence between outward physical signs of masculinity or femininity and preferred sexual behaviors. As in all countries, it is quite possible for a man to behave in a particular way in one relationship and another way in another. Moreover, behaviors and roles vary within relationships over time. Overlaid on these relatively traditional patterns of homosexuality and bisexuality in Mexico and Central and South America are more modem forms and identities, linked in many cases to the impact of international gay culture and movement.<sup>31</sup>

In both Asia and Latin America, where what might be described as emerging gay and lesbian communities have become more visible over the course of the past decade,<sup>32</sup> the recognition of some acknowledged cases of HIV infection linked to homosexual behaviors has often gone hand in hand with a certain disparity in the male–female ratio of cases presumably linked to heterosexual transmission. The higher levels of cases among males suggest that unacknowl-edged bisexual behaviors may play a more important role in the dynamic of the epidemic than would at first appear to be the case.<sup>33</sup>

In the face of growing evidence that men who have sex with men are an important population vulnerable to HIV infection everywhere in the world—and often vulnerable because of their clandestine and marginal status in society—there

has been only very limited guidance in relation to the development of prevention programs and behavioral interventions aimed at reducing risk behavior. Key problems still remain with the availability of social research data that might be used in designing prevention programs and defining appropriate target populations for behavioral and other kinds of intervention. This is especially true, for example, in regard to the behavioral differences that may make it necessary to distinguish, in many intervention programs, between men who do in fact identify as gay, homosexual, or bisexual; men who have sex with men (or with men and women) but who do not identify themselves as homosexual or bisexual; and other potentially at-risk populations such as male or transgendered sex workers, men involved in situational same-sex interactions in prisons or migrant labor settings, and so on. This lack of available research data on such issues has been seriously aggravated by persistent denial of the importance of homosexual or bisexual behavior in relation to HIV transmission in many settings, which also has meant that research on these questions has almost never received priority as a part of the organized response to the epidemic. Most of the data that are available have been collected by alternative or poorly funded researchers or research groups whose work has been accomplished more because of their commitment to it than because of any priority within broader, more official research agendas.33 Research on men who have sex with men in order to better develop and then monitor prevention programs and behavioral interventions therefore remains an urgent priority throughout the developing world.

# INTERVENTIONS WITH AND FOR MEN WHO HAVE SEX WITH MEN

Of more concern than the general lack of social and behavioral research on men who have sex with men in the developing world is the serious absence of significant intervention programs. In preparing this overview, a range of different literature searches were carried out, but only a handful of publications could be identified that document prevention programs or behavioral interventions directed toward men who have sex with men in developing countries, and virtually no published reports were found that evaluate (systematically or otherwise) the impact of those few programs that do exist. Following a review of published literature, a largely manual review of conference presentations was then carried out, in particular through review of abstracts from international and regional AIDS conferences, documenting a slightly expanded range of prevention projects but unfortunately with severely reduced documentation typical of the limited framework of conference abstracts.

Finally, perhaps most productively, as a last resort, the now quite extensive "gray" literature (including annual reports by various types of funding and development cooperation agencies, working papers, and similar informal publica-

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tions) on HIV/AIDS was reviewed, to the extent that our own personal and institutional archives permitted. An important network of colleagues working on related issues in a range of developing country contexts was consulted and asked to contribute any available records they might have access to. While the picture that emerges from these three different sources of information (scholarly publications, conference presentations, and unpublished or informally published reports) is most certainly incomplete, it offers some sense of the kind of work that has thus far been carried out, as well as the serious limitations of the efforts that have thus far been mounted to address the vulnerability of men who have sex with men to HIV infection.

It is worth reflecting on why there exists so serious an absence of wellevaluated intervention studies in this area. In our view, this is perhaps best explained not by any lack of theoretical rigor on the part of those few individuals, organizations, and groups that have conducted work in this important field. Rather, its cause lies in the systemic denial by governments, health authorities, and funding agencies that sex between men in developing countries is anything other than of marginal significance insofar as the AIDS epidemic is concerned. Such denial links, almost certainly, to the manner in which nonheterosexual behaviors are understood in these same countries—most usually as deviant and perverse forms of behavior, activities that are threatening to the dominant social order and worthy subjects for approbation, discrimination, and stigmatization. Similar views of course continue to be expressed in developed countries today, as well as by some representatives of international agencies with the power to radically reorient research and intervention agendas.<sup>33</sup>

# Africa

By far the most limited prevention efforts would seem to characterize sub-Saharan Africa, where we were unable to uncover other than a handful of documented AIDS prevention programs or behavioral interventions directed to men who have sex with men. While anecdotal reports of prevention activities among the gay community in South Africa were reported by a number of colleagues, it has not been possible to identify any formally documented prevention programs in this setting. In North Africa, the Association Marrocaine de Lutte contre Le Sida, however, has conducted outreach work with male sex workers in Casablanca and Marrakesh, the aim being to raise HIV and AIDS awareness and promote condom use.<sup>34</sup> While limited information has been collected on the sexual practices and self-perceptions of the men concerned, as well as on the number of contacts made and the numbers of condoms distributed, information concerning the medium to longer-term effects of the outreach work is not available.

It would be wrong to assume that because there have been few HIV-related health promotion interventions among men who have sex with men in Africa, there

are not pressing needs in this context. Studies cited earlier clearly show that sex between men occurs in countries throughout the continent. Moreover, the absence of intervention programs for men who have sex with men is as much result of denial and homophobia on the part of donors, development agencies, and national authorities as it is a consequence of the inadequate attention presently given to the HIV prevention and care in Africa more generally.

# Asia

The situation in Asia is also marked by a relative neglect of men who have sex with men as an important population for HIV/AIDS prevention programs, but fortunately it is not characterized by the kind of absolute denial and discrimination that still seems widespread throughout much of sub-Saharan Africa. In a number of South and Southeast Asian countries, for example, important programs directed to men who have sex with men and to the newly emerging gay communities found in many countries have now been initiated. Unfortunately, very few of these programs have been systematically evaluated (or even documented) in ways that make it possible to reconstruct their basic premises and design, and most of what we know about them is thus based on popular or journalistic reports, conference abstracts of highly varied quality, and word-of-mouth information from colleagues working in the Asia–Pacific region.

The disparity between published or documented reports and word-of-mouth information is often significant, however, as in the striking case of Thailand. While there are a number of published studies of homosexual and bisexual behavior in this country,<sup>35–37</sup> and the existence of a relatively large gay subculture with extensive commercial establishments (bars, saunas, escort services, etc.) might lead one to expect that interventions for men who have sex with men would be common, frequent references to Thai prevention programs on the part of a number of our colleagues could not be confirmed with published reports or even conference presentations. This disparity calls attention to the extent to which, in spite of the extensive publications dealing with HIV/AIDS, prevention work (particularly in the developing world) continues to be poorly documented and disseminated, limiting our ability to effectively learn from the lessons of projects and programs that have been carried out.

While the available information is also highly limited, the situation in India is in many ways similar. The emphasis here, as in most other parts of Asia, has been on a disparity between a small, emerging gay community with a number of nascent gay rights organizations and a much larger population of non-gayidentified men who can only be reached with great difficulty by HIV prevention programs. In general, gay organizations have served as the point of departure for outreach activities aimed at reaching non-gay-identified men and at building a stronger sense of gay community among this population. In spite of the possible contradictions implicit in such a strategy, important efforts have nonetheless been initiated by a number of organizations. In the early 1990s, for example, a non-governmental group in Mumbai (Bombay) began to publish *Bombay Dost* (an Indian word meaning *friend*), a magazine printed quarterly in English with a Hindi section and targeted to gay men and lesbians. The group also began marketing condoms with Hindi and English language instructions on proper usage, and an active program of networking took place with other organizations throughout the country.<sup>38</sup> Subsequently, the Humsafar Trust, also in this same city, has provided a wide range of AIDS-related information and services through printed materials, a library of resources, support groups, and "street counselors" who can be accessed by leaving messages on a publicized voice mail system. Further work has been carried out among non-gay-identified men who have sex with other men, including the "massage boys" of one of Mumbai's beaches, in certain public sex environments, and within several other sexual networks. Systematic evaluation of this work has yet to be undertaken.

A variety of programs and interventions to promote the sexual health of men who have sex with men exist elsewhere in India. In Calcutta, for example, the Counsel Club has launched an outreach gay magazine called *Pravartak* to reach substantial numbers of gay-identified middle-class men in Calcutta and surrounding areas, and there are plans to extend this work so as to meet the needs of men who have sex with other men but who do not see themselves as gay. In Lucknow, Friends India publishes a quarterly gay magazine called *Sacred Love*, which promotes HIV-related risk reduction through its articles. None of these projects and activities has yet been subjected to impact or outcome evaluation.

In spite of a number of preliminary studies<sup>39-41</sup> documenting the complex and clandestine character of most same-sex relations in India, there have been relatively few more broad-based programs, and a widespread denial of homosexual behavior as a key element in HIV transmission in India still seems to be a major problem even among AIDS prevention workers.<sup>39</sup> Some notable exceptions to this trend, however, can be seen in the work of the Community Action Network in Chennai (Madras), which has conducted a number of interventions among *hijra\** in the city, as well as among groups of non-gay-identified male sex workers in the same city,<sup>42</sup> Elsewhere in Tamil Nadu, the Praktiti sexual health project has been working with truck drivers to promote sexual risk reduction in relations with other men. In Cochin, in the state of Kerala, the Indian Council for the Prevention of AIDS has undertaken some limited sexual health promotion among local male-to-male sexual networks. Again, these interventions and activities have not been

\**Hijra* are biological males who through socialization define themselves as "women in men's bodies." They have an ancient cultural tradition across South Asia and are a socially stigmatized and marginalized group, living in small communities under the leadership of a guru. They are often defined by others as eunuchs or hermaphrodites, or as transvestites and transsexuals by Westerners. Chennai has several *hijra* colonies.

rigorously evaluated for their effectiveness in promoting risk reduction and reducing the number of new HIV infections.

Elsewhere in Asia, lively debates continue about how to best address the sexual health needs of men who have sex with men. In Bangladesh, for example, three contrasting frameworks of motivation and identity have been documented involving men who have sex with men: those among a few English literate middleclass men for whom the term "gay" is an adequate self-description; those for whom sexual identity is linked more closely to who is giving and who receiving in acts of penetration; and those for whom sexual access to other men was perceived as a matter of "discharge," urgency, and relief rather than a question of desire or longing.<sup>43</sup> In this same country, the Association for Health and Social Development has been undertaking prevention work among students and members of the professional and middle classes in the manner of an activist gay-oriented group, while the Bandhu\* Social Welfare Society has been undertaking education about HIV and AIDS, condom distribution, and facilitating access to STD treatment services among men who do not identify themselves as gay, but for whom the role taken in penetration is more salient. Neither program has yet been formally evaluated.

In Pakistan, small-scale work has been undertaken, particularly in Peshawar and Karachi. Most of this has involved the distribution of leaflets and the provision of information through networks of friends. While there is evidence that male-to-male sex may be common in many parts of Pakistan,<sup>20</sup> and while male sex workers are known to exist in most major cities,<sup>21</sup> there are no organized gay groups or targeted sexual health programs for men who have sex with men in the country. The situation is undoubtedly complicated by the fact that "carnal intercourse" or sodomy is punishable by up to 10 years in prison with hard labor and by the fact that under Shar'ia law participants in male-to-male sex can be condemned to death.

Sri Lanka hosts a small number of projects and activities among men who have sex with men. Companions on a Journey is a gay group founded in 1994, whose agenda is to develop gay support networks, decriminalize homosexual behaviors, and provide AIDS awareness and promote sexual health among gay men and those with emerging gay identities. The organization runs a drop-in center and has begun outreach work among male sexual networks, promoting community building and safer sex within these same networks. There are good links with several other organizations working on human rights issues. While a number of other agencies have been involved in HIV prevention activities among male sex workers and their clients, the focus of much of this work has been on relations with foreign tourists, leaving well-developed sexual exchange networks among local men largely unexamined and unprovided for. None of these interventions and programs have been subjected to other than the most informal kinds of evaluation.

<sup>\*</sup>The word bandhu means "friend."

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In Singapore, particularly given the existence of strict legal regulations condemning homosexual behavior, the problem of reaching clandestine populations of men who have sex with men has been especially difficult. As a result, at least one documented prevention program relied on outreach work as the key strategy for reaching men in settings associated with same-sex contracts. Wallet-sized invitations were distributed for events organized by the intervention team, where games and quizzes were conducted focusing on AIDS-related issues such as HIV testing, safer cruising, and safer sex practices. A four-session risk reduction workshop (adapted from similar workshops run by North American and Australian gay groups) was also organized. Over a 2-year period, from 1990 through 1992, attendance at these events is reported to have jumped from 5 to over 200 participants, though evaluation of the outcomes of this work has been limited, as most participants have failed to respond to knowledge, attitudes, and beliefs surveys conducted by the organizers.<sup>44</sup>

The Library Foundation, a nongovernmental organization in the Philippines, has sought to promote greater HIV/AIDS awareness among men who have sex with men. Beginning in the early 1990s, it developed a series of eight weekendlong workshops on healthy interactions and values in which 15 to 30 participants discuss HIV/AIDS, safer sex, and the organization of homosexuality and gay life in the Philippines. Pre- and postworkshop surveys have been reported.<sup>45,46</sup> From 1992 to 1993, as this program was extended, the Library Foundation has reported that an increasing sense of gay community has been developed through interpersonal networking and periodic social activities and that program emphasis has increasingly focused on moving beyond HIV/AIDS information in order to address issues of empowerment and community mobilization.<sup>47</sup> Additional work has been conducted among male sex workers in the Philippines to promote risk reduction, raise self-esteem, and encourage greater awareness of HIV-related risks. Evaluation of this work has focused primarily on men's responses to the work-shops and training sessions offered, and longitudinal follow up is needed.<sup>48</sup>

Also in the Philippines, targeted outreach work has been carried out by the ReachOut AIDS Education Foundation in the only acknowledged gay bathhouse in Manila. Although detailed evaluation findings have not been published, it is reported that a knowledge, attitudes, and behavior (KAB) survey was carried out with patrons of the bathhouse, and that the results were used to develop a safer sex brochure, which was distributed together with condoms and lubricant. Safer sex seminars have also been organized for patrons, and initial results suggest an increased level of knowledge, improved assessment of personal risk, and increased use of Condoms inside the bathhouse.<sup>49</sup>

In Vietnam, the Nguyen Friendship Society has been reported as having carried out a range of educational, outreach, and other activities (including condom distribution) to men who have sex with men in Ho Chi Minh City.<sup>50</sup> Additionally, fashion events have been organized so as to promote AIDS awareness and

enhanced self-esteem among men who have sex with men in the city. This work at present remains unevaluated. Similarly, in Indonesia innovative but as yet unevaluated outreach work has taken place among different groups of men who have sex with men in a range of locations including Surubaya.<sup>51</sup>

In reviewing the still sketchy reports from a number of Asian countries, a number of patterns seem to emerge. First, those projects that have been carried out have almost always been conducted by small, nongovernmental, gay, or gayemergent organizations with limited staff and resources (which also explains the reason why documentation has been limited). Much of this work has focused on outreach activities that seek to reach men who have sex with men in settings where they congregate, socialize, or meet sexual partners. Increasingly, a number of groups have also begun to initiate meetings and workshops aimed at drawing men into greater involvement with AIDS prevention programs and organizations. And, increasingly, as in the case of the Library Foundation in the Philippines, emphasis has also been placed on notions of collective empowerment and of building a stronger sense of gay community as a way of providing social support for risk reduction.

#### Central and South America

Many of the same approaches that have begun to emerge in Asia for AIDS prevention and intervention directed to men who have sex with men have also characterized recent work carried out in Mexico and Central and South America. Here, as in Asia, small nongovernmental gay organizations have tended to take the lead role in developing intervention and prevention programs, and as a consequence of this neither the scale nor the documentation of such work has been comparable to what one might expect if formal governmental programs had been developed. At the same time, however, there seems to have been a greater partnership in some parts of Central and South America between nongovernmental organizations and university-based researchers, offering greater support for documentation and evaluation of project activities. In addition, in many sites, both financial and technical support have been provided by international agencies such as the United States Agency for International Development (USAID) through its various AIDS prevention programs and contracts, a factor that has surely provided greater structure but that has also perhaps led to a reliance on intervention models originally developed in the United States and adapted to developing country contexts only with a degree of difficulty.

In Mexico, a range of HIV prevention activities have been undertaken by gay rights organizations such as Colectivo Sol. Their *A Todo Vapo* project in the public steam baths of Mexico City has aimed to inform clients and bathhouse managers about STD and HIV transmission, safer sex practices, and condom use. Condoms and water-based lubricants have been distributed as part of this work.<sup>33</sup>

In Costa Rica, where a well-developed gay subculture coexists with more traditional homosexual and bisexual forms, a wide range of prevention activities have been undertaken by the Instituto Latinoamericano de Prevención en Salud (ILPES). These include a telephone information line, holistic workshops in which sexual health concerns are addressed within the broader framework of self-understanding and self-esteem, work in prisons, and outreach work in a variety of locations including male brothels. A recent evaluation of the holistic workshops organized by ILPES with gay men showed them to be effective in reducing the incidence of reported unprotected insertive and receptive sex.<sup>27</sup>

Among the long-term project activities thus far developed in South America, as well as the best documented, has been the work carried out by Cáceres and his colleagues and collaborators in Peru.<sup>29,52,53</sup> Initiated in 1988 in collaboration with the homosexual and lesbian movement in Lima and the USAID-funded AIDSCOM Project, an educational intervention was developed for a cohort of 50 homosexual and bisexual men from the middle class in Lima. The men in the cohort attended a program of three workshops offering information about HIV/ AIDS and eroticizing safer sex practices through the use of group dynamics and audiovisual materials. Pre- and postworkshop questionnaires were applied, as well as a follow-up questionnaire 1 month after the last workshop session, and a nonintervention control group was maintained for purposes of comparison. The study documented a relatively high initial level of information about HIV/AIDS and consequently relatively little increase in information, as well as significant willingness to change risk behavior as a result of participation in the workshops. Unfortunately, however, detailed quantitative data concerning levels of information and behavior change were not presented.<sup>52</sup>

This early intervention study was extended in the early 1990s through the work of the Via Libre Association in Lima in collaboration with the USAIDfunded AIDSTECH Project. Following the conduct of a survey on AIDS-related knowledge, attitudes, beliefs, and practices among 223 gay and bisexual men,<sup>54</sup> a 3<sup>1</sup>/<sub>2</sub>-hr workshop was developed to improve HIV and STD risk perception, increase motivation and skills related to prevention, and develop solidarity with people living with HIV/AIDS. Pre- and postworkshop questionnaires were used to evaluate knowledge, attitudes, and perceived skills, and a follow-up survey was used to compare recent behavior with that of a noninterview control group as well as to assess the accuracy of risk perception. Participants were recruited through advertisements in the "personals" section of a popular magazine that announced the screening of gay videos promoting safer sex, and workshops were conducted for a total of 90 participants. The majority of the participants were described as lowincome outsiders of a gay community who were primarily interested in watching the videos but who stayed on for the workshops. The program was reported to have raised knowledge (p = 0.013) and decreased discrimination against people living with HIV/AIDS (p = 0.0312), with a high percentage (97%) of the participants approving of the workshop methodology.<sup>53</sup>

While the work by Cáceres and colleagues in Peru is largely unique among intervention studies for men who have sex with men in developing countries given its emphasis on systematic evaluation of interventions through the use of control groups and quasi-experimental designs, it is probably in Brazil that the largest number and most varied range of project have been carried out. A number of very early activities, such as the maintenance of an AIDS hotline and free condom distribution services, were developed during the mid- to late 1980s by a variety of gay rights organizations, such as Atobá in Rio de Janeiro and the Grupo Gay de Bahia in Salvador.<sup>55</sup> For the most part, however, as with the projects developed in other parts of the developing world, these initiatives were both poorly funded and relatively unsystematic.

One important exception to the relatively few, small-scale intervention programs that have characterized the response to HIV/AIDS in most other developing countries, however, has been the Homosexualities Project developed for men who have sex with men in Rio de Janeiro and São Paulo from mid-1993 until the end of 1997.<sup>55,56</sup> This project, which was developed in collaboration by the Brazilian Interdisciplinary AIDS Association (ABIA), the Pela VIDDA Groups in Rio de Janeiro and São Paulo, and the Institute of Social Medicine at the State University of Rio de Janeiro, was based on a number of key assumptions: (1) that high-risk practices continue to be common in spite of relatively widespread knowledge and information about HIV/AIDS; (2) that the continued practice of high-risk behaviors on the part of men who have sex with men is closely associated with social isolation and psychological conflicts caused by widely disseminated prejudice and discrimination in relation to homosexuality and bisexuality; and (3) that it is only by responding to this wider context of sexual oppression and by situating AIDS prevention positively as a key element in the construction of a culture of safer sex as community practice,<sup>57</sup> responsive to and respectful of the universe of sexual or erotic meanings described above, that we can effectively respond to the epidemic.

Taking these assumptions as a point of departure, the project sought to develop a range of activities and strategies aimed at demystifying the relationship between homosexuality and HIV/AIDS and at creating a supportive social environment for risk-reducing behavioral change on the part of the emerging gay community. It aimed to address the stigma and discrimination related to homosexuality in Brazilian society, seeking to demystify homosexual behavior and develop a more realistic assessment, on the part of the population as a whole, of the relationship between AIDS and homosexuality. Intervention methods included a range of outreach activities aimed at reaching men who have sex with men in the diverse sites in which the intervention was carried out.

In order to monitor the impact of intervention activities, cross-sectional surveys of homosexual and bisexual behavior were carried out in both 1993 and 1995, and results were compared with data collected in 1990. In 1990, 65.6% of the men sampled reported having practiced receptive anal sex at least once during the month prior to the interview, and 35.5% reported having done so without

the use of a condom. By 1993, the number reporting receptive anal sex remained steady at 66.0%, but those reporting receptive anal sex without a condom had dropped quite significantly to only 21.0%. By 1995, the number reporting receptive anal sex was 76.7% of the sample, but those reporting receptive anal sex without a condom had remained steady at 22.0%. Receptive anal sex with a condom, in contrast, had increased from 35.4% in 1990, to 59.3% in 1993 and 68.7% in 1995. These important changes in rates of unprotected receptive anal sex were also evident in rates of unprotected insertive anal sex. In 1990, for example, 76.4% of respondents reported insertive anal sex during the 6 months prior to interview, but only 34.0% reported having used a condom. In 1993,72.0% reported insertive anal sex, but the percentage reporting having used condoms increased to 64.0%. In 1995,76.3% reported insertive anal sex, but the percentage reporting having used condoms was 73.0%.<sup>58</sup>

Throughout Brazil, a growing range of programs and interventions have sought to address the needs of men who have sex with men, as well as men involved in sex work or in prison. AIDS service organizations and gay groups such as GAPA-Minas Gerais in Belo Horizone, GAPA-Ceará in Fortaleza, Nuances in Porto Alegre, and Grupo Dignidade in Curitiba have all initiated prevention programs, in large part funded by the National AIDS Program of the Brazilian Ministry of Health.<sup>58</sup> In a number of cases, special programs have been developed for behaviorally bisexual men, sex workers, and men in prisons.<sup>5,58,59</sup>

Increasingly, throughout Latin America, a growing range of HIV/AIDS and gay organizations have become involved in similar kinds of prevention activities. The Corporación Chilena de Prevención del Sida and the Centro Lambda in Santiago, Chile, for example, have developed an exchange program with ABIA in Brazil<sup>60</sup> and have initiated a range of prevention activities directed to gay and bisexual men.<sup>61</sup> As in Asia, these initiatives have for the most part been relatively small scale, and much evaluation work remains to be done. Nonetheless, by focus-ing on strategies such as street outreach and community-building and mobilization, important steps have begun to be taken to redress the previous lack of attention to one of the most vulnerable population groups in virtually all of the countries in the American region.

# SOME GENERAL PRINCIPLES

In this final section, we will reflect on the studies so far reviewed to identify a number of general principles relating to successful HIV prevention among diverse groups of men who have sex with men in developing countries. We drew attention earlier to the lack of well-evaluated intervention studies in this important field of HIV prevention activity. In contrast to the situation in countries such as the United States, where gay men have formed a key population in intervention

research, well-designed studies of intervention outcomes and effectiveness among men who have sex with men in the developing world are few and far between. In part this is a result of the social invisibility of men who have sex with men in these same settings and in part it is a consequence of official denial, first that such men exist and second that their needs are important in the context of HIV prevention. In spite of this, however, a number of key principles can be discerned in the more successful interventions and prevention programs implemented to date. They include:

- Recognition of the diversity of such men and their HIV prevention and broader sexual health needs.
- Recognition that in a clear majority of societies worldwide, marriage is in effect compulsory for men, and that this needs to be taken into account when developing interventions and programs.
- Recognition of (1) the diversity of individual and social identities than can accompany sex between men; (2) the manner in which such identities are often structured by gender and/or by notions of assumed activity (insertiveness) and passivity (receptiveness) in anal and oral sex; and (3) how in some cultures/situations it may be just as "manly" to have sex with women and men as it is to have sex with women alone.
- Recognition that concepts of homosexuality, bisexuality, and gayness have little meaning outside the West and make little sense to perhaps the majority of men who have sex with other men worldwide.
- Recognition that sex between men may be described in a range of local vocabularies as "fun," "something that happens," and so on, and that efforts to assess the frequency and nature of such acts using Western terminologies and conceptual frameworks may be seriously limited.
- Recognition of the value of gay community attachment for those few (but growing numbers of men) who define themselves as gay and show confidence in their emerging sexual identity.
- Recognition of the value of community outreach work in public sex environments, bars, and other environments where men may meet other men in order to have sex.
- Recognition that for overall program effectiveness, interventions and activities may need to be developed and promoted through a range of agencies, including (but not limited to) existing and emergent gay groups and organizations, accessible, appropriate, and nonjudgmental sexual health services, and so forth.

A number of priorities exist in relation to future research in the field of intervention and program evaluation. They include studies to better document the processes, outcomes, effects, and effectiveness of specific interventions across a range of contexts. Ideally, these should be conducted not by outside agencies but in partnership with affected communities and groups, using concepts and analytic frameworks appropriate to the local context, and aiming to be respectful of the diverse range of beliefs, self-understandings, and identities shared by men who have sex with other men. This is no small challenge, given the ways in which sex between men is systematically denied or rendered invisible in many developing countries. The sustained commitment of policymakers, public health specialists, researchers, and nongovernmental organizations will be required if such priorities are to be acted on.

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# REFERENCES

- 1. Mann J, Tarantola D, Netter T, eds. *AIDS in the World*. Cambridge, MA: Harvard University Press; 1992.
- 2. Mann J, Tarantola D, eds. AIDS in the World II. Oxford, England: Oxford University Press; 1996.
- 3. Parker R. Bodies, Pleasures and Passions: Sexual Culture in Contemporary Brazil. Boston: Beacon Press; 1991.
- Larvie P. Natural born targets: Male hustlers and HIV prevention in urban Brazil. In: Aggleton P, ed. Men who Sell Sex—International Perspectives on Male Prostitution and AIDS. London: UCL Press; 1998.
- Longo P, Oliveira S. Why Are We Hard to Reach? Poster presented at the XI International Conference on AIDS. Vancouver, Canada; 1996.
- 6. Anonymous. Men, the hidden victims. WorldAIDS September 1993.
- Schifter J, Madrigal J, Aggleton P. Bisexual communities and cultures in Costa Rica. In: Aggleton P, ed. Bisexualities and AIDS—International Perspectives. London: Taylor and Francis; 1996; 99–120.
- 8. Moodie TD. Migrancy and male sexuality in South African gold mines. J S Afr Stud 1988; 14(2): 228–256.
- Ahmed SA, Kheir AH. Sudanese sexual behavior, socio-cultural norms and the transmission of HIV. In: Dyson T, ed. Sexual Behavior and Networking: Anthropological and Sociocultural Studies on the Transmission of HIV. Liége, Belgium: Editions Derouaux-Ordina; 1992; 303.
- 10. Standing H, Kisseka MN. Sexual Behavior in sub-Saharan Africa: A Review and Annotated Bibliography. London: Overseas Development Administration; 1989.
- Shepherd G. Rank, Gender and homosexuality: Mombasa as a key to understanding sexual options. In: Caplan P, ed. *The Cultural Construction of Sexuality*. London: Tavistock 1987; 240–270.
- 12. Botswana Ministry of Health. AIDS Update 1. Gabarone: Ministry of Health; 1987.
- 13. Gevisser M, Cameron E. Defiant Desire: Gay and Lesbian Lives in South Africa. New York and London: Routledge; 1995.
- 14. National Research Council. Preventing and Mitigating AIDS in sub-Saharan Africa. Washington, DC: National Academy Press; 1996.
- 15. Schmidt A, Sofer J. Sexuality and Eroticism among Males in Moslem Societies. New York: Harrington Park Press; 1992.
- 16. Murray S, Roscoe W, eds. Islamic Homosexualities. New York: New York University Press; 1997.
- 17. Jackson P. Dear Uncle Go: Male Homosexuality in Thailand. Bangkok: Bua Luang; 1995.

- Tan M. Silahis: Looking for the missing Filipino bisexual male. In: Aggleton P, ed. Bisexualities and AIDS—International Perspectives. London: Taylor and Francis; 1996; 207–225.
- Pan S, Aggleton P. Male homosexual behavior and HIV-related risk in China. In: Aggleton P, ed. *Bisexualities and AIDS—International Perspectives*. London: Taylor and Francis; 1996; 178–190.
- Khan B. Not-so-gay life in Pakistan in the 1980s and 1990s. In: Murray S, Roscoe W, eds. Islamic Homosexualities. New York: New York University Press; 1997; 267–274.
- Mujittaba H. The other side of midnight: Pakistani male prostitutes. In: Murray S, Roscoe W, eds. Islamic Homosexualities. New York: New York University Press; 1997; 275–296.
- Carrier J. De Los Otros: Intimacy and Homosexuality among Mexican Men. New York: Columbia University Press; 1995.
- De Moya EA, Garcia R. AIDS and the enigma of bisexuality in the Dominican Republic. In: Aggleton P, ed. *Bisexualities and AIDS—International Perspectives*. London: Taylor and Francis; 1996; 121–135.
- Royes H. Jamaican Men and Same-Sex Activities: Implications for HIV/STD Prevention. Washington, DC: Academy for Educational Development (AIDSCOM Project); 1993.
- Leiner M. Sexual Politics in Cuba: Machismo, Homosexuality and AIDS. Boulder, CO: Westview Press; 1994.
- Lumsden I. Machos, Maricones and Gays: Cuba and Homosexuality. Philadelphia: Temple University Press; 1996.
- Madrigal J, Schifter J. Hombres que Aman Hombres. San José, Costa Rica: Ediciones Ilep-Sida; 1992.
- 28. Lancaster R. That we should all turn queer? Homosexual stigma in the making of manhood and the breaking of a revolution in Nicaragua. In: Parker R, Gagnon J, eds. *Conceiving Sexuality: Approaches to Sex Research in a Postmodern World.* New York: Routledge; 1995; 135–156.
- Cáceres C. New representations of male bisexuality in Latin America and the prevention of AIDS. Paper presented at the 10th International Conference on AIDS, Yokohama, Japan, 1994.
- Cáceres C. Male bisexuality in Peru and the prevention of AIDS. In: Aggleton P, ed. Bisexualities and AIDS—International Perspectives. London: Taylor and Francis; 1996; 136–147.
- Roberts M. Emergence of gay identity and gay social movements in developing countries: The AIDS crisis as catalyst. Alternatives 1995; 20:243–264.
- Parker RG, Gagnon JH. Conceiving Sexuality: Approaches to Sex Research in a Postmodern World. New York and London: Routledge; 1995.
- McKenna N. On the Margins: Men Who Have Sex with Men and HIV in the Developing World. London: Panos Institute; 1996.
- 34. Himmich H. Interview. Global AIDS News 1992; 2:x-xx.
- Sittitrai W, Brown T, Virulrak S. Patterns of bisexuality in Thailand. In: Tielman RAP, Carballo M, Hendricks AC, eds. *Bisexuality and HIV/AIDS: A Global Perspective*. Buffalo, NY Prometheus Books; 1991; 97–117.
- Jackson P. Kathoey><gay><man: The Historical emergence of gay male identity in Thailand. In: Manderson L, Jolly M, eds. *Sites of Desire/Economies of Pleasure*. Chicago: University of Chicago Press; 1995.
- Sittitrai W, Sakondhavat C, Brown T. A survey of men having sex with men in a northeastern Thai province. Thai Red Cross Society: Program on AIDS; Research Report No. 5; 1992.
- World Health Organization. Effective approaches to AIDS prevention. Report of a meeting. Geneva, 26–29 May 1992. Geneva: World Health Organization, Global Program on AIDS; 1993.
- Oostvogels R, Kantharaj K, Radhakrishnan KM, et al. Assessment of transsexual and homosexual activity in Madras, India. Paper presented at the 9th International Conference on AIDS, Berlin, Germany; 1993.
- 40. Raghavan U. Evaluation of a pilot study designed to help men who have sex with men (MSM). Poster presented at the 10th International Conference on AIDS, Yokohama, Japan.

- Khan S. Under the blanket: Bisexualities and AIDS in India. In: Aggleton P, ed. Bisexualities and AIDS—International Perspectives. London: Taylor and Francis; 1996; 166–177.
- 42. Bindhumadhavan PR, Krishnamurthy P, Kantharaj K. Innovative Experimentation in AIDS Education to Eunuch (Ali). Madras, India: State AIDS Cell Project.
- Khan S. Through a window darkly: Men who sell sex to men in India and Bangladesh. In: Aggleton P, ed. Men Who Sell Sex—International Perspectives on Male Prostitution and AIDS. London: UCL Press; 1998; 195–212.
- 44. Ong W, Chan RKW, Kaan SK. An outreach program to gay and bisexual men in Singapore. Poster presentation at the 13th International Conference on AIDS, Amsterdam, The Netherlands; 1992.
- 45. Nierras T, Austero B, Santos J, et al. HIV/AIDS and the Filipino gay male community. Poster presented at the 13th International Conference on AIDS, Amsterdam, The Netherlands; 1992.
- 46. Tan ML. From bakla to gay: Shifting gender identities and sexual behaviors in the Philippines. In: Parker RG, Gagnon JH, eds. *Conceiving Sexuality: Approaches to Sex Research in a Postmodern World.* New York and London: Routledge; 1995; 85–96.
- 47. Saba SJ, Austero S, De Real A, et al. Accessing and educating men who have sex with men. Poster presented at the 9th International Conference on AIDS, Berlin, Germany.
- Tan ML. Walking the tightrope: Sexual risk and male sex work in the Philippines. In: Aggleton P, ed. Men Who Sell Sex—International Perspectives on Male Prostitution and AIDS. London: UCL Press 1998; 241–261.
- Fleras J. Safer sex promotion inside a gay bathhouse. Poster presented at the 9th International Conference on AIDS, Berlin, Germany; 1993.
- 50. Nguyen Friendship; http://www2.best.com/~utopia/tipsviet.htm#ngu, 1997.
- Boellstorff TD, Oetomo D. Community outreach in Indonesia: A practical and sustainable technique for HIV prevention. XI International Conference on HIV/AIDS, Vancouver, Canada, 1996. Abstract Pub.D1414.
- 52. Cáceres C, Mariscal F, De la Vega E, et al. Educational intervention in a cohort of homo/bisexual men towards a change in high-risk behavior for HIV infection: An assessment of the process and its effects. Poster presented at the 5th International Conference on AIDS, Montreal, Canada, 1989.
- 53. Cáceres C, Rosasco A. An HIV/AIDS prevention program for homosexually active men who do not necessarily identify themselves as gay in Lima. Paper presented at the 9th International Conference on AIDS, Berlin, Germany, 1993.
- Cáceres C, Rosasco A, Stalker M. Determinants of risk behavior among gay and bisexual men in Lima. Poster presented at the 8th International Conference on AIDS, Amsterdam, The Netherlands, 1992.
- ABIA. Projeto Homossexualidades. Boletim ABIA Especial. Rio de Janeiro: Associação Brasileira Interdisciplinar de AIDS; 1994.
- 56. Terto V Jr, Quemmel R, Almeida V, et al. AIDS prevention for men who have sex with men in Rio de Janeiro and São Paulo. Paper presented at the Tenth International Conference on AIDS, Yokohama, Japan, 1994.
- Watney S. Safer sex as community practice. In: Aggleton P, Davies P, Hart P, eds. AIDS: Individual, Cultural and Policy Dimensions. London: Falmer Press; 1990; 19–34.
- Parker R, Terto V Jr, eds. Entre Homens: Homossexualidade e AIDS no Brasil. Rio de Janeiro: ABM; 1998.
- Oliveira S, Longo P. Sex of the angles: Sexual transmission of HIV in Brazilian jails. Poster presented at the XI International Conference on AIDS, Vancouver, Canada, 1996.
- Parra V, Frasca T, Gacitúa M, et al. Bilateral cooperation between Chile and Brazil to train AIDS educators and researchers. Poster presented at the XI International Conference on AIDS, Vancouver, Canada, 1996.
- Gauthier L, Parra V, Frasca V. An integrated strategy for gay and bisexual men in Santiago, Chile. Poster presented at the XI International Conference on AIDS, Vancouver, Canada, 1996.

# HIV Prevention for the General Population

# GAIL A. W. GOODRIDGE and PETER R. LAMPTEY

#### INTRODUCTION

Extensive spread of HIV appears to have begun in the late 1970s and early 1980s among men and women with multiple sexual partners in East and Central Africa, and among homosexual and bisexual men in certain urban areas of the Americas, Australasia, and Western Europe. By the end of 1996, there were an estimated 30 million cumulative infections worldwide, with over 90% in developing countries.' During 1996 alone, an estimated 3.1 million new infections occurred, with the majority of newly infected adults between 15 and 24 years old. HIV/AIDS prevalence in women and children is almost 35 times higher in the developing world than in the industrialized world.<sup>1</sup>

We are in the second decade of the HIV/AIDS pandemic but still in the first decade of serious prevention efforts. The United States spent \$3 billion for AIDS care and research in 1996 and \$500 million on prevention. In contrast, developing countries spent a combined total of \$600 million on prevention efforts, and the epidemic has outstripped the resources available for prevention and care.<sup>2</sup>

Prevention activities vary a great deal, depending on the stage of the epidemic, the target population being reached, the availability of resources, the geographic area, as well as social, structural, and environmental factors that enhance the spread of HIV. Most interventions are directed at reducing individual and societal risk factors; improving availability, access, and quality of health services; changing relevant policies; and improving the gender inequities that put women at

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risk for HIV. Throughout developing countries, the overall magnitude of the response to the HIV epidemic has been grossly inadequate, and expectations about what could be achieved quickly have been unrealistic. Data from limited surveillance systems indicate that current interventions are probably not yet having a major impact on the epidemic in most countries. However, there have been a number of success stories, such as the decline in HIV prevalence in young military recruits in Thailand, the decline in prevalence in young antenatal women in Uganda, and significant declines in high-risk behavior in Nepal<sup>3,4</sup> (S. Mills, personal communication). It is extremely difficult to assess the impact of most intervention programs due to the absence or poor quality of evaluation data.

The responses to the epidemic in developing countries often comprise the following elements:

- Mass education campaigns aimed at enhancing awareness and improving knowledge of HIV/AIDS by the general public.
- Small-scale community-based interpersonal interventions targeted at populations at high risk of HIV/AIDS.
- Interventions aimed at improving sexually transmitted infection (STI)/ HIV services for the general population, for example, strengthening sexually transmitted infection STI/HIV services and integrating HIV/STI into FP/MCH services.
- Social marketing programs that use consumer-centered approaches to sell condoms to the general population of consumers.
- Contextual interventions directed at changing the structural and environmental conditions that put individuals at risk of STI/HIV or create an environment that encourages high-risk behavior.

This chapter will discuss interventions that are primarily directed at reaching large segments of the general population. It will include mass education campaigns, improvement of STI/HIV services, social marketing programs, and contextual interventions. Interventions that target high-risk populations are discussed in other chapters.

# NOTABLE INTERVENTIONS

As noted above, programs to reach the general population cover a broad spectrum of activity. This chapter examines select efforts individually; however, it is important to emphasize that the effectiveness of these programs is enhanced by the presence of other programs, making attribution of the impact or effectiveness of each program individually difficult. The authors also note a dearth of articles on rigorously evaluated interventions for the general population in peer-reviewed publications, an issue raised further in the discussion section of this chapter.

#### HIV Prevention for the General Population

# Mass Media

Mass media has been used for several decades as a tool to communicate with the public on health matters. Media has been used to increase awareness of a health issue; effect attitudes to create support for individual or collective action; and to remind or reinforce knowledge, attitudes, or behavior.

Mass media campaigns have demonstrated their effectiveness in disseminating information broadly. A national survey in the United States found that television was identified as the most frequently mentioned source of information on AIDS.<sup>5</sup> Campaigns in developing countries as a rule have not been formally evaluated. However, the numerous general population knowledge, attitudes, behaviors, and practices (KABP) surveys conducted in countries where such campaigns have been undertaken provide ample evidence that (1) mass media (radio and television) rank high as primary sources of information on HIV/AIDS issues, and (2) that the levels of knowledge about transmission and prevention of HIV are nearly universally high. Such studies suggest that mass media have been quite successful in thoroughly disseminating correct information to the general population about this disease in a relatively brief time.<sup>6</sup>

There remains, however, an absence of unanimity regarding whether mass media can be effective in changing and sustaining changes in attitudes and, more importantly, behavior. The Stanford Heart Disease Prevention Program, which attempted to reduce cardiovascular risk factors in the general population in two northern California communities through the use of mass media health education campaigns, was successful in bringing about favorable changes in dietary practices.<sup>7</sup> The national STOP AIDS campaign in Switzerland, which employed the use of posters, advertisements, and television spots from 1987 through the early 1990s, also reports success in increasing condom use by the sexually active population.<sup>8</sup> A recent French AIDS campaign also found it possible, effective, and acceptable to the public to use mass media to advance beyond information to communication on "the real risk a person or their sexual partner(s) may face."<sup>9</sup>

Other media campaigns have not fared so well. Mass media campaigns in the United States relying on fear messages primarily to reduce alcohol consumption or other drug use have proven less successful and may have even resulted in increasing use of these substances as a result of the increased attention to these substances in the popular media.<sup>10</sup> A 1993 sexually transmitted infection mass media awareness campaign in Australia targeted males, encouraging them to have sexual health checkups. The campaign resulted in increased clinic attendance by both sexes and all age groups and increased testing of "worried well" individuals rather than higher-risk patients, despite the campaign's targeted strategy.<sup>11</sup> These studies suggest the need to carefully develop and test messages and channels communicating them.

The major advantages and benefits of mass media programs are the use of a

powerful and effective medium to reach large numbers of people; with a strategy of audience segmentation, they can also reach diverse audiences. These are usually expensive but may be a cost-effective way of reaching the general population.

The major drawbacks of mass media programs include difficulties in reaching people of diverse education, economic, ethnic, and social backgrounds through mass media; problems pertaining to the acceptability of the messages to different audiences and advocacy groups; the often prohibitive cost of providing quality and effective mass media programs by the public sector in most developing countries; and the lack of availability of the appropriate infrastructure and technical skills essential to develop quality programs.

Despite these drawbacks, mass media information and education programs for the general public are often the first step in national AIDS prevention efforts.<sup>12,13</sup> These programs are designed to:

- Improve knowledge about HIV/AIDS.
- Enhance awareness.
- Promote safer sexual behavior.
- Reduce misconceptions about HIV transmission.
- Prevent discrimination against those infected with HIV.
- Mobilize public support for people living with HIV and AIDS (PLWHA).

The extent and timing of these campaigns, the choice of media, and the content, style, and message have varied widely. In many instances, these programs have been poorly designed, inadequately researched, seldom evaluated, and underfunded.

Studies on programs conducted in industrialized countries suggest that if programs for the general public are well designed and carried out on a large enough scale, they can reach most of the population and may motivate some to adopt safer behavior.<sup>6,7</sup> The use of multiple communication channels can improve effectiveness;<sup>14–16</sup> and a number of these studies provide evidence of the usefulness of specifically supplementing mass media with interpersonal communication.<sup>17–18</sup> For the greatest impact, however, computer modeling suggests that mass media education campaigns must be combined with targeted, community-based interpersonal prevention programs, social marketing of condoms, and interventions that improve the availability and effectiveness of STI services.

While numerous studies exist on the use and effectiveness of mass media in health promotion in general and HIV prevention in particular in industrialized countries, comparable studies in developing country settings are far fewer, particularly regarding Asia and Latin America. This chapter reviews applicable case studies conducted in developing countries using mass media (public service announcements, radio dramas), popular communication channels such as theater, and print media for HIV/AIDS. It also assesses multifaceted interventions aimed at segments of the general population such as men at work sites and religious communities. The chapter concludes with an examination of social marketing interventions.

#### Electronic Media

In 1988, the National AIDS Prevention Program of Peru with assistance from Johns Hopkins University/Population Communication Services and the Population Council designed, conducted, and evaluated a mass media campaign to increase correct knowledge of transmission routes and preventive measures for HIV. The campaign was part of a larger project that included seminars for influential persons, establishment of an information clearinghouse, and training of family planning outreach workers in HIV/AIDS prevention. While baseline research provided evidence that knowledge of AIDS was already high - over 85% of the respondents could name four main transmission routes - the research also identified high levels of inaccurate information. For example, 61% reported that AIDS was transmitted in public baths, 56% thought one could contract the virus from casual contact with an infected person, and 43% stated that mosquitoes transmitted the virus. The primary target audience of the campaign was men and women under age 35. Three television spots were developed based on baseline research and focus group discussions and placed in the media at saturation levels: for example, three television spots were broadcast over six television channels approximately 140 times per week; radio spots ran approximately 97 times per day over the 12 stations during a 6-week period; and three slides were shown over 4000 times in 22 movie theaters over 9 weeks. Although a press campaign was not a part of the strategy, very positive press coverage and editorial support endorsed the campaign.

A follow-up general population survey was conducted using a probability sample of 1900 persons matching the baseline survey. Nearly 80% of the respondents reported seeing the television spots and 54% heard the radio spots. The campaign was successful in reducing misconceptions about HIV transmission routes: The beliefs that public baths and casual contact with an infected person transmit HIV dropped 14% to 47% and from casual contact with an infected person by 13% to 43%. Misconceptions about air and mosquitoes also diminished. Knowledge about condoms as a prevention measure increased by 9% from 71% to 80% and respondents reporting ever used a condom increased by 5% (from 36% to 41%). Reported condom use in the past month also increased by 3%.<sup>19</sup>

The television campaign used a technique called "claymation," which uses animated clay dolls, that was new to Peru at the time, thus creating some viewer interest. The technique was also found to be more culturally acceptable than the use of live actors for the delicate subject matter. The campaign was successful in reducing misconceptions about HIV/AIDS, although at the end of the campaign over 40% of the population still held to inaccurate beliefs that public baths and casual contact with PLWHA could result in contracting the virus. The campaign
was apparently less successful in motivating the adoption of prevention behaviors, in this case condom use.

## Twende na Wakati ("Let's Go with the Times") Radio Drama

The 204-episode radio drama Twende na Wakati developed by the Tanzanian Ministry of Health and the United Nations Fund for Population Assistance (UN-FPA) was broadcast over 2 years from 1993 to 1995, on the government radio network. Using an "entertainment-education" strategy, the radio programs were aired in seven regions (covering 50% of the adult population of the country) in Kiswahili and addressed themes related to family planning, HIV/AIDS, population size, national modernization, and other health issues (e.g., alcohol abuse, spousal communication). The drama presented the struggle of traditional versus modem values and behaviors through positive and negative role models. The evaluation strategy included: (1) annual national surveys of 3000 respondents in 1993,1994, and 1995 in treatment and control areas; (2) focus group interviews with radio listeners; (3) demographic and health surveys; (4) family planning clinic intake data; (5) a content analysis of letters to the radio station and a follow-up mailed questionnaire to the letter writers; (6) script content analysis; and (7) a review of the number of condoms distributed by the national AIDS control program in treatment and control areas.

The results from the evaluation strategy indicate that listenership to the program was high—52% of the adults in the treatment area reported listening to the drama.<sup>20</sup> Of those who listened, 61% of listeners reported talking to a friend or spouse about individual episodes; 24% reported discussing HIV/AIDS content with others.

Regarding behavior change, 72% of listeners to the radio program in 1994 and 82% of the listeners in 1995 reported adopting an HIV/AIDS prevention measure as a result of *Twende na Wakati*; of these, 77% reported reducing the number of sexual partners and 16% reported using condoms. Both men and women reported reducing the number of partners. Men who had more than one partner demonstrated significant increases in the use of family planning over the life of *Twende na Wakati* from 7.7% of men in 1993 to over 39% in 1995. The average number of partners for male respondents in the past year in the treatment area decreased from 2.3 in 1993 to 1.7 in 1995 compared to a less pronounced decrease in the control group from 2.2 to 1.9 partners. The average number of sexual partners for female respondents in the treatment area dropped from 1.9 in 1993 to 1.2 in 1995. The control group of females also noted partner reduction comparable to the treatment group at 1.8 to 1.3 partners. A review of the condoms distributed by the national AIDS control program in the treatment areas and control area demonstrates a significant uptake in condom distribution.

## Nshilakamona ("I Have Not Yet Seen It") Radio Drama

The Health Education Unit of the Zambian Ministry of Health with the assistance from the USAID sponsored AIDSCOM project produced and broadcast *Nshilakamona*, a 39-episode radio drama to address the absence of public recognition of AIDS. The characters — two Lusaka families each with a teenage daughter and their everyday friends — were developed based on Bandura's social learning theory to serve as models whose behavior change could help listening Zambians to adopt behaviors to reduce their risk of HIV. The drama also sought to change people's attitudes about women as the primary carriers of HIV and about the ability of people to care for others afflicted with AIDS without becoming ill themselves. The radio drama ran in 30-minute segments from August 1991 to June 1992 in Bemba, the most common local language in Zambia.

The drama was evaluated by the Annenberg School of Communication at the University of Pennsylvania via a prelaunch baseline survey among 1600 men and women in April/May 1991, and a follow-up survey with an equal number of men and women in June/July 1992 to test the diffusion of knowledge from the listening public to the general public. Those with high access to the radio program (i.e., those who owned radios) were compared with low-access samples and the effects of access were then controlled against reported outcomes. About 45% of the sample in the two treatment provinces (Copperbelt and Northern) reported listening to the program, although fewer than one third of the sample were regular listeners. The results of the study indicate an improvement in the accuracy of the general population's knowledge of AIDS and in their awareness of being at risk; however the evaluators were not able to link the changes solely to the radio drama, since the reported changes were noted equally among those who listened to the drama and those who did not.<sup>21</sup> Also, given that numerous other programs were in effect during the period of the radio drama (specifically, 11 other radio programs, one television program, and numerous seminars), the evaluators were unable to attribute the change clearly to the drama. The evaluators gave the drama high marks for the quality of the production, the attention to formative research with the target audience, the clarity of the messages, and its success in reaching a significant portion of available listeners. They acknowledge the difficulty in attributing change to a specific radio drama, particularly given its positioning among a multitude of complementary, supportive programming.

## Popular Theater: Miujiza Theatre

The use of popular theater has also been a staple of HIV/AIDS programs. In most instances these programs can be defined as informal community productions written, directed, and produced by novice community members. An innovative

program in Kenya selected professional playwrights and trained actors from Nairobi's Phoenix Theater who formed a theatrical company known as the Miujiza ("Promise") Players. A total of eight one-act plays were commissioned and performed by the company in 112 performances at work sites and 29 performances before military audiences in Nairobi, Eldoret, and Mombasa. Community members around the work sites were also invited to attend the free performances. The plays were designed to be interactive and the actors were trained in HIV/AIDS education to facilitate audience discussion following each performance. Linkages were made to the Kenya condom social marketing program: Condoms were distributed at each performance and, more importantly, retail distribution was strengthened in sites where the plays were to be performed.

The program was assessed through focus group discussions conducted 3 months or more after the plays were performed with individuals who attended the plays in eight sites. The focus group discussions revealed impressive recall of the messages of the plays and consensus that the subject matter was presented in themes relevant to their lives. The focus group participants reported discussing the plays with friends, family, and co-workers. Further, it was their general perception that individuals they knew were adopting safer sexual behaviors particularly by reducing the number of their sexual partners. While respondents reported the value of the plays in helping to shape changing attitudes and new behaviors, they also noted the contribution to these changes of work site peer education programming and other HIV/AIDS prevention efforts in their communities.<sup>22</sup>

#### Print Media

A weekly column on HIV/AIDS ran in the *East African Standard* newspaper each Sunday from 1990 through 1996, funded by United States Agency for International Development (US AID) and the World Health Organization (WHO). The last 2 years were funded by Family Health International's USAID-funded AIDS Control and Prevention (AIDSCAP) project in Kenya. The objectives of the program were (1) to provide a national forum for experts to respond to AIDS issues; (2) to increase knowledge on sexually transmitted diseases (STDs) and AIDS, correct misinformation, and promote discussion; (3) to present stories and problems of PLWHA "in a dignified manner" to destigmatize AIDS; and (4) to provide a format for answering possibly embarrassing questions asked anonymously. The column used three formats: letters from readers, special issues columns (which addressed issues such as women, witchcraft, and insurance), and "portraits of the problem," which profiled individuals infected and affected by HIV/AIDS.

Following the completion of AIDSCAP funding for the column, a simple qualitative assessment strategy was implemented to provide program managers with feedback on the perceived usefulness of the column. The evaluation design

was developed to provide insights into the perceived strengths and weaknesses of the column to aid future programming rather than to address the effectiveness of the intervention per se. Two focus groups (one with young journalism students and a second with HIV/AIDS program planners) and four in-depth interviews (two newspaper editors, the columnist, and a reader) were conducted. The respondents generally reported that the column was successful in providing information and clearing misconceptions and creating a compassionate response to PLWHA. Some felt, however, that the column, while addressing regional concerns (e.g., circumcision, wife inheritance), focused too prominently on urban issues and did not speak clearly enough on condom use and specific misconceptions regarding condom use.<sup>23</sup> The column was identified in an independent newspaper poll of readers as one of the three most popular pieces in the newspaper.

# INTERVENTIONS AIMED AT IMPROVING STI/HIV SERVICES FOR THE GENERAL POPULATION

Mass media offers an important means of reaching broad segments of the population. Mass media alone, however, is insufficient to prevent HIV. As noted above, most communication experts agree that interpersonal communication is useful to facilitate and support individual behavior change by providing a means for interactive discussion and skills strengthening. Reaching the general population through one-on-one or small-group initiatives can help individuals consolidate disparate messages into thoroughly considered practical strategies for behavior change.

For behavior change programs to be effective, they require complementary services and systems to treat STI and increase access to condoms. Interventions to improve services must be designed to address the unique needs, opportunities, and characteristics of their intended users. Segmenting the general population into more homogeneous subgroups allows programs to focus more intensively on the intended users of those services. This section describes programs for the following segmented general population subcommunities: adults with STIs, men at work sites, sexually active women in the general population, and Muslims.

## Improving Services for Adults with STIs

Although improved STI treatment has been recommended as an important HIV prevention strategy for some years, data to substantiate this view have been limited. A randomized control trial was conducted in Mwanza, Tanzania, from November 1991 to December 1994, to examine the relationship between improved STD case management and HIV incidence in the general population. The intervention involved improving STI services within an existing primary health care sys-

tem by training staff in the WHO-recommended STI syndromic treatment algorithms, ensuring regular drug supply, and establishing regular supervisory visits to the clinics to ensure quality of care; establishing an STI reference center; and conducting health education in the community. In six treatment communities and six pair-matched control communities, two random cohorts of approximately 1000 adults, aged 15 to 45 years, were surveyed at baseline at follow-up 2 years later.

HIV prevalence at baseline was 3.8% in the intervention communities and 4.4% in the control communities.24 At follow-up, 71% of the original cohort was seen. Among the originally seronegative cohort members, 1.2% had seroconverted in the intervention communities while 1.9% seroconverted in the control communities. Behavior research reported no change in the sexual behavior in either group. The conclusion of the study authors is that improved STI treatment reduced HIV incidence by approximately 40% in the treatment communities.

This study is significant not only in its findings, but also in that it employed a system that is potentially replicable in typical resource-poor settings in developing countries. Projects to improve STI services in developing countries have been a standard component of numerous national AIDS control programs. The Mwanza results should give added impetus to this critical work and stimulate greater international attention to the difficulties of ensuring adequate antibiotic supplies for STI programs.

## Mass Treatment of Adults for STIs in Rakai

A controversial strategy for controlling STIs is being tested via a communitybased, single-blinded, randomized trial of mass treatment on the incidence and prevalence of STIs and incidence of HIV in the Rakai district of Uganda. A total of 58 villages were grouped into 10 "superclusters" based on social-sexual networks and the clusters were randomly selected for control and intervention arms. Over 5700 consenting adults aged 15 to 59 years were enrolled in each arm. Each subject is visited twice a year at home where they respond to a detailed questionnaire addressing sociodemographic, health, behavioral, and social network issues. The subjects provide serological samples, urine, and vaginal swabs. All intervention-arm participants receive single-dose STI treatment (azithromycin, ciprofloxacin, metronidazole); participants with symptomatic or serological evidence of syphilis receive intramuscular benzathine penicillin. Control group participants receive single, oral-dose antihelminth treatment and iron-folate. Baseline STI rates were high and comparable in both groups: 12% rapid plasma reagin (RPR) + treponema pallidum hemagglutination assay (THPA) confirmed, 24% positive Trichomonas, 4% positive Chlamydia in women aged 15 to 29; 24% positive Hemophilus ducrevi serology; and 17% HIV positive. Preliminary followup data 6–9months after initial mass treatment reported significant declines in the intervention versus control groups in genital ulcer disease (GUD) (0.7% vs. 1.9%);

any current male symptom (2.4% vs. 4.9%); any female symptom (13.1% vs. 15.7%); and female *Trichomonas* (8.8% vs. 24.7%).<sup>25</sup>

## Men at Work Sites

Work site programs have been a staple of national AIDS prevention efforts particularly in Africa since the early years of the epidemic. They present an effective means for reaching men who are otherwise not readily accessible to public health services. Men working in the formal sector, by the nature of their work, can be away from home for long periods of time (e.g., as long-distance drivers or miners living in camps away from their families) and therefore may practice higher-risk behaviors. Finally, work site programs provide an opportunity for engaging the private sector in HIV/AIDS prevention. These programs typically consist of behavior change and maintenance interventions provided through peer education, distribution of condoms, and improved STI services.

From 1990 to 1993, Family Health International, under its USAID-funded AIDS Technical Support Project (AIDSTECH), tracked a cohort of male factory workers in Bujumbura, Burundi, exposed to an HIV prevention intervention at their work site. The intervention consisted of an outreach program conducted by the National AIDS Control Program providing free HIV testing and counseling, free condom distribution, on-site educational sessions, and distribution of small media (prevention posters) at the work site. These efforts were designed to encourage a reduction in the number of sexual partners and increase in the use of condoms by the workers. Linked behavioral and biological data were collected on the cohort and demonstrate the effectiveness of behavior change on seroconversion rates.

Among sexually active seronegative men followed over time, the study reported that men with more than one sexual partner were twice as likely to seroconvert as men with only one partner. During the study, the percentage of men reporting more than one partner declined from 43% in 1990–1991 to 21% in 1992– 1993. Men with a self-reported occurrence of urethritis during the observation period were three times more likely to seroconvert. The percentage of men reporting an episode of urethritis declined from 7.1% in 1990/91 to 2.7% in 1992/93. Men with a self-reported occurrence of GUD were 4.5 times more likely to seroconvert to HIV than men without GUD. The number of men reporting an occurrence of GUD decreased during the study period from 3.8% at the beginning of the program to 1.4% in 1992–1993. Among the whole cohort (i.e., seronegative and seropositive men), men who reported using condoms "some of the time" were twice as likely to report an STI as men who used condoms all of the time. While 80% of the men over age 35 had never used a condom, condom use did increase significantly among younger men (age 20-24). The percentage of young men reporting consistent use of condoms increased from 21% in 1990-1991 to 36% in 1992-1993.26

In Zimbabwe, a recently completed randomized clinical trial of 40 factories reported a 24% decline in incidence of HIV as a result of peer education services.<sup>27</sup> Comparable workplace interventions have been conducted in communities across the developing world. Although evaluation strategies in most instances have not been as rigorous as the interventions reported in Burundi, behavior change has been reported from similar interventions in a number of countries, for example, Uganda,<sup>28</sup> Zaire,<sup>29</sup> Zimbabwe,<sup>30</sup> and the Dominican Republic.<sup>31</sup>

# Reaching Sexually Active Women through Integrated HIV/STI and Family Planning Programming

General population women are at serious risk for HIV infection. These women are difficult to reach because often they do not have access to necessary health education support and because the source of their risk—often their spouse's behavior—is exceedingly difficult for them to address in the context of their cultural, economic, and social situations. Since the early 1990s, HIV/AIDS program planners have sought to reach women by integrating HIV/AIDS into ongoing family planning services. In 1992, the International Planned Parenthood Affiliation (IPPF) developed and tested an integration model with three of its affiliates: BEMFAM/Brazil, ASHONPLAFA in Honduras, and FAMPLAN in Jamaica. Going beyond simply adding HIV/AIDS to their clinic and outreach programs, IPPF totally repositioned their programming around the expanded concepts of sexual reproductive health.

IPPF anticipated (and met) significant initial resistance to this new strategy from its family planning staff. This new focus required several perceptual changes in how the affiliates approached their work, that is, requiring more counseling and interpersonal dialogue rather than one-way information-giving and broadening their attention from contraceptive methods to addressing the reproductive health issues of their clients, including STIs and baniers to condom use. It also required significant additional training for staff to become competent in (and comfortable with) discussing human sexuality and to overcome judgmental values that hinder them from effectively communicating with clients on sexual risk behaviors. IPPF used a participatory training approach to allow staff to discuss and overcome their concerns.

To date, the evaluation conducted of this new program has been limited to changes in service statistics and the assessments of staff perceptions and performance. In 1995, nearly 45,000 individuals were counseled in reproductive health and sexuality in the three affiliate clinics, over 12,000 participated in clinic-based group counseling sessions, and over 60,000 individuals were reached through community-based projects.<sup>32</sup> Earlier reluctance by affiliate staff to promote condoms (in lieu of other "more effective" methods of family planning ) has been overcome. In Jamaica, condom distribution increased from 60,000 in 1992 to over

245,000 in 1994. In Brazil, where condoms were previously actively discouraged by family planning providers, over one third of family planning acceptors now accept condoms as their primary method of family planning or for dual protection from pregnancy and STIs, including HIV. The affiliates report a notable improvement in the quality of services provided to their clients and a widely shared perception by service providers that they are making a more important contribution to the lives of their clients since expanding their services.

## Intervention with a Muslim Community

In 1989, Muslim religious leaders in Uganda became concerned with the growing problem of HIV/AIDS in their community. Spurred on by the work of other religious denominations, a national AIDS education workshop for Muslim religious leaders was convened. As a result of this workshop, the Islamic Medical Association of Uganda sought and obtained funding from USAID to support a community-based HIV/AIDS prevention program in two districts with high proportions of Muslim residents: Mpigi and Iganga. Over 1200 religious leaders and religious workers and 1700 community volunteers were trained to conduct education, counseling, and community support to reduce risk behaviors through discussions in the Mosque and in family home visits. Condom education, originally omitted from the program because of perceived religious sensitivities, was included as a prevention strategy in the project's second year in response to community interest and KABP data that demonstrated to Imams the existence of and need to address risky sexual behavior in their community. The project provided modest samples of condoms and informed community members of public and private sector sources of condoms in their communities.

The project was evaluated 2 years after its launch through a multileveled strategy including assessment of process data, observations based on field visits, interviews with community leaders and project staff, and a follow-up KABP with community residents that was compared with a baseline survey. The project did not use an experimental design; however, the follow-up survey interviewed individuals exposed to the program (defined as meeting one-on-one with an Imam or family AIDS worker) as well as individuals reportedly not exposed to the program. The evaluators reported on both "exposed" and "unexposed" community members for comparison of project impact.

Over the life of the program, nearly 120,000 families were reached with AIDS education and counseling. The project targets were to achieve "statistically significant" increases in correct knowledge about HIV, self-reported use of condoms, and the perception of HIV risk associated with a polygamous lifestyle as well as a reduction in the reported number of sexual partners. The project reported the results shown in Table 1.

The follow-up KABP also found a statistically significant increase in knowl-

Indicator	Baseline (%)	Follow-up (%)
Percent of total respondents reporting "ever use" of a condom	10	15
Percent of males reporting "ever use" of a condom	15	25
Percent of men reporting having one partner	51	
Of men exposed to the program		$62^a$
Of men not exposed to the program		39
Percent of men reporting having two or more partners	49	
Of men exposed to the program		38
Of men not exposed to the program		61
Percent believe that condoms are an important HIV prevention strategy	55	
Of those exposed to the program		$82^a$
Of those not exposed to the program		66

Table 1. Intervention with a Muslim Community: KABP Results

<sup>a</sup>Denotes statistically significant change.

edge of a source in the public and private sectors for obtaining condoms. The evaluators attributed any positive changes in knowledge, attitudes, and behavior change among the unexposed respondents to complementary national HIV/AIDS prevention activities ongoing during the project. Conversely, it should be noted that some of the reported change by those exposed to the intervention may also be attributable to these other prevention activities.

## Condom Social Marketing

Social marketing is defined as the design, implementation, and evaluation of a program designed to change an individual's behavior in ways that are in the individual's or society's interests.<sup>33</sup> It differs from other health education strategies only in its approach, not its aims. Social products such as desired behaviors, ideas, or use of products (e.g., condoms) are promoted and sold using the same principles applied in the commercial sector. Increased use of seat belts and reduced rates of smoking, drug use, and driving under the influence of alcohol in industrialized countries are examples of behavior change influenced by interventions with important social marketing components. Condom social marketing (CSM) was first launched over 20 years ago to increase family planning in India, Colombia, Jamaica, and Sri Lanka. These pioneering efforts demonstrated the hypothesis that individuals would be willing to pay an affordable price for contraceptives in exchange for greater accessibility to and individual choice of these products. With the advent of AIDS, CSM has proven to be a leading strategy in the promotion of condom use and increased availability of this product.

CSM programs combine vastly expanded condom accessibility with consumerfriendly promotion. Brand-name condoms are sold through a variety of sale points, including traditional chemist and small retail shops, and an array of nontraditional outlets, such as bars, hotels, restaurants, market stalls, sidewalk vendors, brothels, kiosks, taxis, boat launches, bakeries, bookstores, barber/beauty shops, and fastfood outlets.<sup>34</sup> In addition to greatly expanding access to condoms, CSM programs have reduced social taboos surrounding condom use through the use of both conventional and nonconventional advertising, comedy, street theater, and promotional items. Many of the CSM-sponsored activities combine education and entertainment that make them appealing to young people especially. In Africa, the CSM activities include "condom soirées," which are rallies featuring music, games, and dancing, interspersed with HIV education and condom promotion.

CSM is one of the most successful HIV interventions, especially in sub-Saharan Africa. Prior to the onset of the HIV/AIDS epidemic, condoms constituted less than 1% of contraceptive methods in the region.<sup>35</sup> In the last 15 years, condom sales in sub-Saharan Africa have increased from less than 1 million to over 200 million as a result of social marketing.<sup>36</sup>

Since condoms are sold rather than distributed free, social marketers confidently translate condom sales into increasing use of the product, especially once commercial outlets are initially stocked. In 1997, Population Services International (PSI) and its associate organization, DKT International, were responsible for implementing CSM projects in over 30 countries in Africa, Asia, the Middle East, the Caribbean, and South America. Over 3 billion condoms have been sold by PSI and DKT through their CSM programs worldwide; 1.8 billion of these have been sold in Bangladesh alone, a country where PSI has been promoting CSM since the late 1970s.<sup>37</sup>

The advantages of CSM are that it is client centered and focuses programming planning around the needs and perceptions of the client; it relies on commercial distribution systems, and thus ensures wide accessibility of its products; it can adapt to varied commercial/economic/political situations; and it effectively generates significant consumer interest and ability to discuss topics previously not addressed broadly and openly. The disadvantage of CSM is that it requires a high level of start-up and implementation funding and, as a result of its own success, requires large volumes of condoms.

*OK And Trust in Vietnam.* Vietnam reported an estimated 60,000 cases of HIV in 1997 and projects 350,000 cases by the year 2000. A CSM program was launched by DKT International under the authority of the National Committee for Population and Family Planning in 1993, with a pilot condom sales program in seven provinces. The program, expanded nationally 2 years later, sells two brands of condoms: *Trust*, the original condom brand marketed by DKT, which at 9 cents per three-pack targets a sophisticated, socially responsible consumer; and *OK*,

which sells at 4.5 cents for a three-pack and is targeted to the average man on the street. *Trust* was the first condom distributed in Vietnam to include user instructions in Vietnamese. Since OK's introduction in 1994, sales of *Trust* have stabilized and have been overshadowed by sales of OK, which have increased from half a million in 1994 to approximately 25 million in 1996, as illustrated in Fig. 1.

Like most CSM programs, the DKT Vietnam program relies heavily on product advertising and promotion. The typical monthly advertising strategy includes up to 200 30-second television spots on 14 televisions stations, up to 30 60-second radio advertisements on national and Ho Chi Minh City radio stations, advertisements in 12 newspaper and magazines, and product promotional signs on 20 public transportation buses. These media are supplemented with regular sponsorships of body-building contests, bicycle races, badminton contests, and a buffalo fighting festival at which a variety of promotional items (e.g., T-shirts, key chains, shorts, hats, lighters, stickers, ties, clocks) are distributed or used for contest prizes.38

As Fig. 2 shows, condom sales in Vietnam for *Trust* and *OK* condoms have steadily increased since their launch in 1993. As importantly, however, the figure shows that the entire condom market has grown over this period, refuting the speculation that CSM sales are achieved by diverting customers from higher-priced commercial products.

By 1997, the DKT condoms were available in over 7500 outlets nationwide and the program had set a target of selling 177 million condoms between 1997 and 2000. This would represent a 200% increase over sales during the first 4 years of the program.<sup>38</sup>



Figure 1. DKT/Vietnam annual condom sales by brand. , OK; , Trust. Source: DKT International.



Condoms Distributed, in millions

Figure 2. Condom distribution in Vietnam, 1991–1995. 🖾, Trust, OK; 📕, other condoms.

*Haiti 's Pante Condoms.* PSI launched its *Pante* condoms CSM program in Haiti in 1989. At 1 gourde (7 cents) per three-pack, the price of *Pante* condoms follows the general rule of thumb for pricing CSM products, that is, that a 1-year supply should cost no more than 1% of per capita gross national product. Like all CSM programs, the *Pante* condom program relies on an aggressive advertising and promotion strategy including radio, billboards, promotional materials, and support for special events including open-air concerts and carnival floats and promotions. The program also uses a commercial product distributor to ensure accessibility through major commercial outlets around the country.

The Haiti program is notable for the creative use of alternative distribution systems. Partially in response to severe gas shortages from the trade embargo with Haiti during the Cedras regime and partially in response to the inability of the commercial distributor to expand outlets quickly enough, the Pante condom program developed an innovative strategy for mobilizing Haiti's nongovernment organizations (NGOs) active in HIV/AIDS and family planning to become Pante distribution outlets. Although some NGOs were initially hesitant to become sales agents for condoms, their inability to obtain free donor-supplied products during the embargo eventually diminished their reluctance. At present, their involvement in condom sales not only expands their client services, but also contributes financial earnings to these economically fragile institutions. The CSM program also expanded Pante distribution by launching an "independent vendors" program, particularly to reach potential "off-the-beaten-path" neighborhood outlets. Potential entrepreneurs in neighborhoods across Port-au-Prince are identified, trained in condom distribution, and provided starter Pante stock. Revenues from the initial stock are used to purchase additional products. By 1996, sales from NGOs and independent vendors each accounted for approximately one third of total program sales and have resulted in significantly expanding the number and types of outlets for *Pante* and increasing access to the product by women.<sup>39</sup>

Eight years after the launch of the program, *Pante* condoms are available in 95% of the country's communes, nearly 25 million condoms have been sold, and average monthly sales have reached over 600,000 per month in a country with a population of 7.2 million people.<sup>39</sup>

*Hiwot Condoms in Ethiopia.* DKT's CSM program in Ethiopia also employs a creative distribution system: bicycles. The program fitted local bicycles with large metal baskets that allow the rider to transport a case of packaged *Hiwot Trust* condoms to small shops and kiosks for greater coverage of the Addis Ababa market. The DKT effort was launched under the staunchly anticapitalist Mengistu regime in Ethiopia in 1990, demonstrating the ability of these programs to adapt to their current economic–political conditions. Condom sales for the Ethiopia program have grown rapidly over the 7 years since its launch from half a million in 1990 to nearly 2 million per month in 1997. A total of nearly 90 million condoms have been sold through this program.<sup>40</sup>

## Measures of Success in CSM Programs

CSM programs have become quite comprehensive program efforts, employing diverse behavior change communication techniques. The measure of success for CSM programs generally focuses on its bottom line: the numbers of condoms distributed. Indicators such as "couple year of protection," a term used in family planning referring to the number of contraceptives required to protect one couple for 1 year, are sometimes applied to CSM programs, although debate about the relevance of this term for HIV/AIDS prevention continues. PSI has also developed an alternative indicator, "annualized sales per capita," which measures sales against the total population size. CSM planners consider a national program successful if it achieves sales equaling 0.6 condoms per capita per year by the third year. A more challenging long-term target is one condom per capita per year. Using this indicator, Table 2 presents the ten most successful PSI programs and their annualized sales per capita in 1996.<sup>40</sup>

While this annualized sales per capita number is useful to normalize sales across programs, it does not account for condoms purchased by the informal sector and sold outside of the country's borders, which is reputedly significant in some countries. It also does not address the positive impact of CSM condom advertising on free distribution and commercial sales of other condom brands, which can also be significant, as Table 2 illustrates.

	Annualized sales per capita
Bangladesh	1.26
Botswana	1.08
Cambodia	0.87
Côte d'Ivoire	0.84
Zambia	0.81
Burkina Faso	.071
Cameroon	0.68
Pakistan	0.66
Togo	0.64
Malawi/Haiti/Central African Republic	0.61
1	

 Table 2.
 1996 Successful CSM Programs

#### **Contextual Interventions**

Many significant, large-scale changes in the reduction of risk behavior and in individual self-protective behavior can be attributed to changes in social structure and environment. Over the past 20 years, individual approaches to the cessation of smoking encouraged many people in the United States to stop; however, not until smoking was banned in many public places did the prevalence of smoking significantly decline.<sup>41,42</sup> Sweat and Denison<sup>43</sup> cite the example of laws requiring the use of car seat belts as a structural–environmental intervention. They note several advantages to such interventions in encouraging behavior change including that they hasten the development of new social norms and set out prescribed behavior that through adherence can lead to rapid social acceptance.

To change and sustain preventive behaviors, HIV/AIDS interventions need to address individual risk factors as well as societal, structural, and environmental factors that put individuals at risk. For example, population displacement and social disruption caused by political unrest, armed conflict, and natural disasters have facilitated the rapid spread of HIV in western, central, and southern Africa. The low status of women, lack of sexual negotiation skills, low literacy rates, and lack of employment opportunities have made women highly vulnerable to STI/ HIV in developing countries. High taxes on condoms and STI drugs have reduced the affordability and availability of these essential products for HIV prevention.

Some of these structural and environmental interventions such as changes in taxation laws, reduction in sex, race, and gender discrimination, instituting condom-only brothels, or teaching sexual negotiation skills to women are feasible with HIV prevention programs. However, other complex and difficult interventions such as development programs, alleviation of poverty, literacy programs, creation of job opportunities, and prevention of civil unrest and natural disasters

require multisectoral and long-term solutions that are beyond public health interventions.

The advantages of contextual interventions are that they uniquely can create an important supportive environment in which individual behavior change can take place, and the issues they address can have useful multiplier effects on other social, economic, and cultural problems. The disadvantage of this type of intervention is that policy change happens slowly and is often beyond the influence of any one sector to effectively address.

#### 100 Percent Condom-Only Brothels

Structural-environmental interventions aim to create changes in systems or in the legal structure to reduce risk behaviors. In 1989, Thailand's Ministry of Public Health pilot tested a structural intervention to reduce the risk associated with the use of commercial sex workers by instituting a "100 percent condom-only brothels" policy. Under this policy all brothels were required to encourage the use of condoms in all commercial sexual transactions. The government supported this policy by providing a consistent supply of condoms to brothels and a mass media campaign to encourage greater condom use to prevent HIV transmission.

Addressing commercial sexual transactions is a general population strategy in Thailand, since visits to female sex workers is a common occurrence by men across all age and socioeconomic levels. One study of a representative sample of young Thai men (army conscripts), for example, found that 81% of the men



**Figure 3.** HIV screening of 21-year-old Thai males prior to induction into the army. Data refer to May of the year. Source: Ministry of Public Health, government of Thailand.

reported a lifetime exposure to commercial sex workers and 57% reported visiting commercial sex workers within the year prior to their conscription.<sup>44</sup>

Early results of this policy suggested that condom use increased significantly and the incidence of STIs among sex workers decreased notably.<sup>45</sup> In August 1991, the government extended this program nationwide. From 1989 to 1993, condom use reportedly increased from 14 to 94% of all commercial sex acts.<sup>46</sup>

The impact of this policy has been tracked in seroprevalence surveys of army recruits in the semiannual conscription process. These data are considered descriptive of the general population (particularly the rural, less-educated male population), since conscription is conducted by random selection. Beginning in 1992, studies began to show a slowing of the rate of increase in HIV seroprevalence among new military conscripts, and in 1994, total seroprevalence rates among recruits declined from 3.5% in 1992 and 3.7% in 1993 to 3.0% (see Fig. 3). This decline in seroprevalence was seen in all regions of the country.<sup>47</sup> As demonstrated in Fig. 4, a very dramatic decline in the number of STI cases treated in government clinics has also been reported since 1990.<sup>48</sup>

## Facilitating Church Involvement in HIV/AIDS

Another example of a structural-environmental approach is to take advantage of the ubiquitous presence of the church as a social and educational institution in the developing world, by marshaling it to create a context propitious to preventing the spread of HIV and mitigating the impact of AIDS. A program in Kenya through MAP International, sponsored by the USAID-funded AIDSCAP



**Figure 4.** Number of cases of STD treated at government clinics in Thailand. ■, men; ■, women Source: Ministry of Public Health, government of Thailand.

project of Family Health International, sought to demonstrate the effective use of Christian churches in addressing the AIDS epidemic. The program was designed to upgrade the skills of religious and lay community members to support HIV/ AIDS education, counseling, and care through training workshops using specially developed curricula for pastors, lay church teachers, and youth, and to facilitate the formulation of church policies that would define an appropriate, activist role for the church.

At the beginning of the project, only 38% of pastors and lay leaders felt motivated and competent to address HIV/AIDS in their communities. After 4 years, however, the project managed to engage over 100 ministers and lay leaders in intensive, two-staged, regionally based training; these participants had, in turn, engaged themselves in activities such as prayers, visits, Bible readings, counseling, and material support with over 56,000 persons. The project was also successful in mobilizing religious leaders to formulate policy statements in support of HIV/AIDS programming. In Nyanza Province, Kenya, pastors from 12 Christian churches formulated a policy statement that (1) identified HIV/AIDS as a disease rather than a "curse or witchcraft"; (2) addressed traditional practices (physical cleansing, inheritance rituals, burial rituals, and widow shunning) that can facilitate transmission of HIV/AIDS; (3) encouraged adoption of marriage policies such as monogamous marriage and premarital HIV testing; and (4) promoted open discussion on "the needs of married people to fulfill each other emotionally and physically within marriage."

## DISCUSSION

The programs and interventions cited above represent a small sample of the many efforts conducted worldwide since the beginning of the HIV epidemic. Each of these programs was evaluated using qualitative and quantitative methodologies generally accepted at the time. Most proclaim their interventions to be successful; however, few would assert the methodologically more complex conclusion of "program effectiveness." In fact, in searching the English-language peer-reviewed published literature on effective HIV prevention programs for the general public in developing countries, very few citations emerge.

## Constraints to Conducting Program Effectiveness Evaluation

The authors attribute this paucity of attention to intervention effectiveness to the following key factors:

• *Presumed effectiveness.* One of the common characteristics of many public health programs is the emergency environment in which programs

are launched. In the initial interest to respond rapidly to an epidemic, the rush to do something usually results in seeking to imitate the success of others. In the case of HIV/AIDS, many programs were modeled after and adapted from the response to the epidemic in homosexual men in the United States, as well as family planning and other reproductive health interventions within and outside of the developing world. Many of these "model" interventions had been extensively evaluated. Although the adaptation of these models to new settings and target groups has not been thoroughly tested, there is a widely held presumption that mass media, community-based outreach, peer education, social marketing, and even contextual interventions will succeed if properly implemented.

- *Economic limitations.* The best methodology to assess effectiveness of HIV prevention programs is a randomized controlled trial. These are expensive, difficult to conduct, and raise ethical concerns related to the use of study and control groups. They require both financial and human resources that are scarce in developing countries. Randomized clinical trials such as the multisite counseling and testing study in Kenya, Tanzania, and Trinidad, the Mwanza STI study, and the Rakai mass therapy study are multimillion dollar research efforts that take years to design and implement.
- ٠ Methodological constraints. As suggested above, most interventions do conduct some level of outcome evaluation. Although capacity and funding constraints can jeopardize the quality of these efforts, even wellfunded and competently conducted studies will face limitations and circumstances that will call into question the attributability of results to the particular intervention. For example, the validity of most outcome indicators reported condom use versus actual condom use versus biological effectiveness (i.e., reductions in HIV or STI incidence), has yet to be established. As most of the evaluations of interventions above noted, the interventions were taking place in a vast sea of competing programs that, in the absence of a randomized controlled trial methodology, obfuscate reported results of any single intervention. Additionally, program evaluations that adopt biological or behavioral indicators as measures of their success rarely also examine the quality of program implementation as a critical variable influencing the outcomes of the program; an enumeration of program inputs may not suffice in understanding the content of the program that has influenced outcomes.

With the exception of the Mwanza and Rakai randomized controlled trials, most of the programs noted in this chapter wrestled with the methodological constraints noted above, including operating in an environment of complementary prevention programs. As the Uganda Muslim community intervention demonstrated, knowledge of condoms as an important prevention strategy increased among both those exposed and not formally exposed to the program, although positive behavior change reportedly occurred only among individuals exposed to the program. This may suggest that those not formally exposed to the program were in fact reached through other education efforts or that knowledge is more susceptible to community diffusion from the exposed population to the unexposed than is motivation to change behavior.

The length of interventions as well as the timing of their evaluations can also affect reported outcome. Thus, for example, increases in knowledge reported from the Peru mass media campaign, while moving in a positive direction, still left over 40% of the population believing in key misconceptions about HIV transmission. The duration of the campaign (6 weeks) may have been too short or, alternatively, the timing of the evaluation (immediately following the campaign) may have been too soon to allow diffusion of information from the campaign to occur. Similarly, while condom use in the Muslim intervention in Uganda increased, the fact that condom education started late in the intervention (in the second year of a 2-year intervention) may help to account for the still low levels of use among those exposed to the intervention.

Equally important as the duration of interventions is the selection of indicators to measure effectiveness. Outcomes such as reductions in the number of partners and increased condom use are end products of a long and complex set of intermediary considerations, actions, and decisions that may take a significant period of time to achieve. Program evaluations that focus exclusively on the ultimate behavioral objective miss the opportunity to track movement along the decision and trial continuum that may be created as a result of the program. A growing consensus among communication experts suggests there is a need to increase the sensitivity of indicators to address the various steps along the behavior change continuum. These steps can be articulated as precontemplation before any thought of changing behavior, *contemplation* when serious thought is given to adopting safer behaviors, *preparation* or *trial* when plans are made to adopt the behavior, *action* when the behavior is purposefully practiced, and *maintenance* or *sustained behavior* when the new behavior clearly replaces the older, less healthy behavior habit.<sup>49</sup>

Some of the interventions clearly approached evaluation from a program monitoring point of view. The assessments of the Miujiza Theater program and the AIDSWATCH newspaper column, for example, were designed to gather targeted information from key publics about the program rather than for the purpose of assessing intervention effectiveness. This seems a reasonable approach when the purpose is to fine-tune an HIV prevention communication methodology.

Despite the various limitations of the evaluation methodologies, the interventions reported here appear to affirm a number of conclusions noted in studies

looking at HIV prevention and other types of health behavior change in industrialized countries. These include:

- The reported results of each of the mass media campaigns suggest that efforts focusing on education/information exchange can increase levels of knowledge, although behavior change (e.g., condom use as reported in the Peru mass education campaign) may be less successful.
- Mass media programs presenting real-life situations (e.g. radio dramas, plays, and write-in newspaper columns) that provide opportunities to model healthy behaviors can contribute to behavior change and the perception that behavior change is occurring in a given community.
- Interventions for the general population should make use of audience segmentahtion by sex or other defining characteristics (e.g., religion or STI patients).
- Improved HIV/STI services for the general population are effective in reducing STI and HIV and complement behavior change interventions.
- Interpersonal communication provided by well-trained or outreach workers can facilitate and support behavior change.
- Active promotion of condoms can be acceptable within all (even religiously conservative) environments.
- Prevention programs take place in a specific cultural, social, and economic milieu. Success can be facilitated by creating an enabling environment through legal action, engaging gatekeepers, and changing cultural and social norms.

# Critical Factors to Effective Programming

Critical to the success of prevention programs will be the quality with which they are implemented. A review of the projects mentioned in this chapter and our 10-plus years of addressing HIV/AIDS in developing countries suggests a number of important conclusions and observations that can shape effective prevention programs for the general public:

- 1. *Effective design.* Successful programs require clear, competent designs building on best practices and an inherent theoretical framework. Effective project design requires full participation of the target audience from the stage of formative research through outcome evaluation; articulating clear goals and objectives; carefully choosing the methodology to suit the needs of the target audience; negotiating linkages with other appropriate projects and systems; and building in the potential for sustainability by ensuring consistency with local community resources over the long term.
- 2. Sufficient time. A critical element of effective design is the allocation of

sufficient time for the intervention to operate and to ensure it is fully integrated into the community and can be sustained by them.

- Quality implementation. Attention to day-to-day implementation of the design through the adoption of adequate monitoring, review, and design modification systems increases the likelihood of successful outcomes. An appreciation for ongoing project adaptation is an essential element of project monitoring.
- 4. Program coordination. Individual projects generally take place in an environment of complementary efforts. Projects that take advantage of such opportunities, that is, that actively link with CSM programs, STI services, advocacy programs, and even broader economic development efforts, can maximize their resources and encourage productive synergies of efforts.
- 5. Timely, appropriate evaluation. A well-designed evaluation should be an integral component of any prevention program. Evaluations should not be conducted until the intervention has had sufficient implementation time. Although this would seem self-evident, the experience of many HIV/AIDS programs is that evaluations are conducted too early in response to external, donor-driven time frames. Additionally, program evaluation needs to examine the quality of implementation as well as behavioral outcome data, since the former can often illuminate the latter.

# FUTURE DIRECTIONS

Primary HIV/STI prevention programs for the general public are essential to reduce the ever-expanding individual and societal vulnerability to HIV. The effectiveness of these programs, however, will be significantly enhanced by the development and availability of an effective HIV vaccine, effective and affordable antiviral therapy, gender-friendly STI diagnostics, and female-controlled barrier methods. Research is ongoing in these areas. It is also imperative that changes in structural and environmental factors that can reduce vulnerability to HIV be implemented. Current primary HIV/STI prevention programs described in this chapter may be considerably improved by building on the lessons of efforts around the globe regarding prevention and care partnerships, key audience engagement, and appropriate and creative prevention and assessment tools.

## Expanding the HIV/AIDS Partnership

It is evident that the HIV/AIDS epidemic has already overwhelmed the resources of the public sector as well as that of individuals, households, and communities in many countries; and for many the worst is yet to come. To slow

down this epidemic, particularly as it advances to broader segments of the community, we need to draw on the resources of not only the public sector, donor agencies, NGOs, and private volunteer organizations, but to substantially involve the private commercial sector in both prevention and care.

The private sector has had some involvement in the implementation of AIDS in the workplace programs in a number of countries, but these activities have reached only a small proportion of the work force. Private industry in countries with advanced epidemics have been severely impacted by absenteeism, increased funeral costs, and the costs of training and replacing employees lost to HIV/AIDS. These costs may lead to as much as a 20% reduction in a company's profits.<sup>50</sup> The private sector could be involved in HIV/AIDS prevention and care in the following ways:

- Create supportive HIV/AIDS policies in the workplace and provide prevention and care services for the industry's employees and their families. They should ensure a discrimination-free environment in the workplace for those living with HIV.
- Provide cash or in-kind contributions toward the national HIV/AIDS prevention effort, for example, provision of free air time.
- Provide technical expertise and institutional support in selected areas of HIV/AIDS prevention, for example, the use of industry's considerable expertise and infrastructure in marketing to support HIV/AIDS prevention, or the use of efficient distribution facilities to reach large segments of the general population with commodities.
- Through advocacy, use its considerable influence on government to keep HIV/AIDS as a priority public health problem and ensure that adequate resources are devoted to it.
- Change structural and environmental factors that increase the vulnerability of their employees and their families to HIV/STI, for example, the need for men to work in distant sites without accommodation for families.

The establishment of a viable private–public sector partnership can increase resources and expand the scale of HIV/AIDS programs, particularly to the general population.

## Expanding the Use of Successful Interventions

Social marketing has been successfully used to promote social products such as desired behaviors (e.g., use of seat belts) and use of products (e.g., oral rehydration therapy, condoms, and other contraceptives). Social marketing of condoms has been the most successful component of HIV/AIDS prevention programs; however, its use has been limited in some countries because of government restrictions and religious opposition to the promotion and use of condoms. Barriers to condom social marketing need to be removed in order to improve the availability and accessibility in HIV prevention programs.

Application of social marketing principles, however, should not simply be limited to condoms. These principles can be utilized in behavior change interventions for reducing individuals' sexual risk and for expanding and improving treatments for STIs. The marketing of "social products" such as safer sex, mutua fidelity, abstinence, delayed sexual debut by teenagers, as well as the female condom would also likely contribute to a reduction in individual sexual risk. Anc the marketing of improved STI symptom recognition, improved health-seeking behavior, and increased availability of effective and affordable prepackaged STI therapy would lead to more effective treatment of STI. The consumer-centered principles of social marketing can also be adapted to promoting policy reform to policymakers.

## Expanding Programs to Effectively Reach General Population Women

Women and female adolescents are especially vulnerable to HIV/AIDS, and current HIV prevention programs do not adequately address their needs. Their vulnerability is a result of biological susceptibility to STI/HIV and social vulnerability because of inability to protect themselves due to lower cultural and socioeconomic status and lack of influence in sexual relations.<sup>51</sup> The greatest source of HIV risk for most sexually active women is their husband or stable partner. The basic elements of primary HIV prevention strategies—partner reduction, condom use, and STI treatment— are directed primarily at men and are not appropriate for the vast majority of women. Most women do not have multiple partners, cannot use the male latex condom without the man's consent, and may be unaware of STIs since they are often asymptomatic in women. Women also bear the brunt of the socioeconomic impact of HIV/AIDS because of their multiple roles in society. They may be living with HIV while fulfilling their roles as mother, spouse, and breadwinner and also caring for an HIV-infected husband and children.

Primary HIV/AIDS programs and contextual interventions should address the needs of women in both prevention as well as care and support. There is an urgent need to involve women in the design and implementation of HIV/AIDS programs, change policies that discriminate against women and increase their vulnerability to STI/HIV, develop STI diagnostics and barrier protection methods for women, and promote other structural and environmental changes to improve the status of women.

#### Expanding Evaluation Tools and Thinking

A number of drawbacks to current HIV/AIDS prevention programs have been discussed earlier. These include (1) the paucity of adequate evaluation data; (2) the

difficulty of attribution of the effectiveness of specific programs because of overlapping programs' effects; and (3) the inordinate expense of conducting effectiveness evaluation through the use of randomized clinical trials. These realities suggest the need for tools that can monitor epidemiological and behavioral trends and assess the overall effectiveness of combined program interventions.

HIV sentinel surveillance is used in many countries to detect the emergence of HIV. Data from such surveys enable policy makers and program managers to track the HIV/AIDS epidemic in different population groups and to set program priorities on geographic areas and population subgroups in order to allocate resources cost effectively. Some countries have begun to also seriously monitor STI prevalence as well. Although such studies provide critical knowledge, they are expensive to maintain and in recent years donor support for biological surveillance has decreased. It is essential that such studies again be placed higher on the priority list of national AIDS control programs.

Behavioral surveillance surveys are designed to quantitatively and qualitatively assess sexual behavior change. They are composed of structured questionnaires and focus group discussions and are administered to samples of target populations in specific geographic areas. The samples can be drawn from subgroups of the population who are highly vulnerable to the impact of the epidemic. The surveillance of behaviors provides a measurement of risk behavior for the transmission of HIV and a profile of risk and vulnerability and tracks behavior changes over time within the HIV/AIDS epidemic. It provides a measurement of the combined effect of different and multiple programs (e.g., social marketing, peer education, mass media), as well as a diffusion of prevention messages and society's natural adjustments to the HIV epidemic (e.g. behavior changes as a result of AIDS deaths). This methodology was developed by the AIDSCAP project of Family Health International in Thailand and is being adapted in several countries including Senegal, Nepal, and Kenya. Behavioral surveillance surveys should not be used to evaluate the outcome of individual single projects, especially when the target is being reached by multiple interventions, but as a tool for measuring behavior changes over time within a target group. This tool should be more widely applied.

When feasible, HIV sentinel surveillance should be combined with behavioral surveillance surveys. Together, these surveys provide an opportunity to integrate the interpretation of behavioral and biological data in order to accurately determine HIV/AIDS trends in the country. The implementation of these two surveys at the national, regional, or district levels also provides valuable data to assess the combined impact of programs.

Finally, it is important for program planners to be more discerning in the development of their evaluation strategies. Evaluation designs should match the type of program, that is, whether the program is testing an innovation or implementing an accepted and proven program strategy. This will allow us to maximize

resource funding allocated to evaluation. Greater attention also needs to be paid to developing tools that can be used effectively by NGOs and community-based groups at the project level to monitor program implementation quality.

Programs for the general population represent an ever-increasing portion of the budgets of national AIDS control programs. Prudent resource allocation suggests that the general population should be segmented into more homogeneous subgroups to allow more effective programming. The effectiveness of our strategies will also depend on our ability to think creatively about expanding partnerships and methods for reaching target populations.

## REFERENCES

- 1. Joint United Nations Program on HIV/AIDS, press release. 28 November 1996.
- 2. White House 1997 National AIDS Strategy. National AIDS Policy Office.
- Stoneburner RL, Carballo M. An assessment of emerging patterns of HIV incidence in Uganda and Other East African Countries. Final Report to Family Health International AIDSCAP Project. 20 May 1997.
- 4. Rojanapithayakorn W, Hannanberg R. The 100% Condom Project in Thailand. AIDS 1996; 10:1-7.
- Signorielli N. Mass Media Images and Impact on Health: A Sourcebook. Westport, CT Greenwood Press; 1993.
- Beltzer N, Moatti JP, Loundou A, et al. Evaluation of French national media campaign for AIDS prevention: A decision analysis. *International Conference on AIDS* 1992, Amsterdam, The Netherlands. Abstract PoD 5548.
- Stern MP, Farquhar JW, Maccoby N, et al. Results of a two year health education campaign on dietary behavior. Circulation 1976; 54:826–833.
- Wasserfallen F, Stutz ST, Summermatter D, et al. Six years of promotion of condom use in the framework of the National Stop AIDS Campaign: Experiences and results in Switzerland. International Conference on AIDS 1993, Berlin, Germany. Abstract no. WS-D27-3.
- Speisser L, Ramon A, Pele G, et al. Prevention advertising campaigns in France: from a product communication to a communication based on risky situations. *International Conference on AIDS* 1996, Vancouver, B.C. Abstract no. Th.C.4518.
- 10. Brecher EM. Licit and Illicit Drugs. Boston: Little, Brown and Company; 1972.
- Miller CS, Hart G. Reduced disease prevalence at a sexually transmitted diseases clinic during a mass media campaign. *Venereology* 1995; 8(1):37–42.
- 12. AIDS education-A beginning. Popul Rep L 1989; 8:1-32.
- 13. The reproductive revolution: A new survey findings. Popul Rep M 1992; 11:16.
- Flay BR, DiTecco D, Schlegel RP. Mass media in health promotion: An analysis using an extended information processing model. *Health Educ Q* 1980; 7(2):127–147.
- Griffiths W, Knutson AL. The role of mass media in public health. Am J Public Health 1960; 50:515–523.
- Rogers EM. Mass media and interpersonal communication. In: de Sola Pool E & Schramm W, eds. Handbook of Communication. Chicago: Rand; 1973.
- Hanneman GJ. Eisenstock BA, Hunt MF, et al. The Medicine Man Message (Volume 1). Center for Communications Policy Research of the Annenberg School of Communications, University of Southern California; 1977.
- 18. Wallack LM. Mass media campaigns: the odds against finding behavior change. *Health Educ Q.* 1981; 209–261.

- Merritt AP, Kincaid DL, Lujan M, *et al.* Mass media AIDS prevention campaign in Lima Peru. Presentation at 117th Annual Meeting of the American Public Health Association. Chicago, Illinois. October 23–26, 1989.
- Rogers EM, Vaughan PW, Swalehe RMA. Effects of an entertainment-education radio soap opera on family planning and HIV/AIDS prevention behavior in Tanzania. Unpublished report. March 27, 1996.
- Yoder PS, Jornik R, Chirwa BC. Evaluating the program effects of a radio drama about AIDS in Zambia. Stud Fam Plan 1996; 27(4):189–203.
- Ojakaa D. Evaluation of AIDSWatch Newspaper Column Project. A report prepared for Family Health International/AIDSCAP Kenya. Unpublished report. Jan/Feb 1997.
- Ojakaa D. Evaluation of AIDSWatch Newspaper Column Project. A report prepared for Family Health International/AIDSCAP Kenya, May 1997.
- Grosskurth H, Mosha F, Todd F, et al. Impact of improved treatment of sexually transmitted diseases on HIV infection in rural Tanzania: Randomized controlled trial. Lancet 1995; 346530–536.
- Wawer MJ, Sewankambo NK, Gray RH, et al. Community-based trial of mass STD treatment for HIV control, Rakai, Uganda: Preliminary data on STD declines. International Conference on AIDS 1996, Vancouver, B.C. Abstract no. Mo.C.443.
- 26. Saidel T. HIV surveillance among factory workers in Bujumbura. Unpublished data. 1990-1993.
- 27. Cates W. IMC Newsnet 3(3); 25 August 1997.
- McCombie S, Hornik R. Evaluation of a workplace-based peer education program designed to prevent AIDS in Uganda. Working Paper #1011. Philadelphia, PA: Annenberg School of Communications! Center for International Health and Development Communication; 1992.
- 29. Laga M, Alary N, Nzila AT, et al. Condom promotion, sexually transmitted disease treatment and declining incidence of HIV-a infection in female Zairian sex workers. Lancet 1994; 344:246–248.
- Williams G, Ray S. Work against AIDS. Workplace-based AIDS interventions in Zimbabwe. Strategies for Hope No. 8. ACTIONAID/AMREF, Oxford, 1993.
- Centro de Orientacion e Investigacion Integral. HIV/AIDS prevention in the workplace. Final report. AIDS Control and Prevention (AIDSCAP) Project. May 1997.
- 32. Becker J. Integration of HIV/STD prevention and family planning: Lessons learned by IPPF/WHR and family planning associations in Honduras, Brazil and Jamaica. Presentation to USAID Population Health and Nutrition Center, STD continuing education series. September 12, 1996.
- 33. Price J, Goodridge G, Lamptey P, et al. Social Marketing and HIV Prevention: Consumer-centered approach to achieving behavior change. AIDS (in press).
- Lamptey P, Goodridge G. Condoms in control of sexually transmitted diseases. In: Dallabetta G, Laga M, Lamptey P, eds. A Handbook for the Design and Management of Programs. AIDSCAP/ FHI, Washington, D.C. 1996; 73–103.
- Liskin L, Wharton C, Blackburn R. Condoms: Now more than ever. *Popul Rep H* 1990; 23(8): 1–36.
- 36. Population Services International. Annual Report 1995/96. Washington DC: Author.
- 37. Brown AK. PSI April 1997 Sales Report. Washington, DC: Population Services International.
- DKT International. New Breakthroughs in Social Marketing. DKT International 1996-97 Progress Report: Author.
- Cato MR. Haiti Condom Social Marketing Project. Final Report to Family Health International. May 15, 1996.
- 40. Brown AK. 1996 Annual Sales Report. Washington, DC: Population Services International.
- Rigotto N. Trends in the adoption of smoking restrictions in public places and worksites. NY State J Med 1989; 89:19–26.
- 42. Sorensen G, Pechacek T. Implementing non-smoking policies in the private sector and assessing their effects. NY State J Med 1989; 89:11–15.
- 43. Sweat MD, Denison JA. Reducing HIV incidence in developing countries with structural and environmental interventions. AIDS 1995; 9(suppl A):S251–S257.

- 44. Celentano DD, Nelson KE, Suprasert S, et al. Risk factors for HIV-1 seroconversion among young men in Northern Thailand, JAMA 1996; 275(2):122–127.
- 45. Rojanapithayakorn W. One hundred percent condom program. Paper presented at the 8th International Conference on AIDS 1992, Amsterdam, The Netherlands. Abstract PoD 5654.
- Hannenberg RS, Rojanapithayakorn W, Kunasol P, et al. Impact of Thailand's HIV-control program as indicated by the decline of sexually transmitted diseases. Lancet 1994; 344:243–245.
- Mason CJ, Larkowitz LE, Sitsiripornchai S, et al. Declining prevalence of HIV-1 infection in young Thai men. AIDS 1995; 9(9):1061–1065.
- Surveillance Data, Venereal Disease Control Division, Ministry of Public Health, Government of Thailand, 1996.
- 49. Grimley DM, Riles EG, Mellis JM, et al. Assessing the stages of change and decision making for contraceptive use for the prevention of pregnancy, sexually transmitted diseases and acquired immunodeficiency syndrome. *Health Educ Q* 1993; 20(4):455–470.
- Roberts M, Rau B, eds. Private sector AIDS Policy. African Workplace Profiles. Case Studies on Business Managing HIV/AIDS. AIDSCAP Report. Unpublished, 1996.
- Cohen B, Trussell J, eds. Member on National Research Council Panel on Data and Research Priorities for Arresting AIDS in sub-Saharan Africa. Washington, DC: National Academy Press; 1996.

# Intervention Research for Future HIV Prevention Design and Implementation Considerations

LAURA GIBNEY

# INTRODUCTION

Concomitant with the spread of the HIV pandemic has been the desire to learn more about how to prevent proliferation of the disease in a variety of contexts. This had led to the implementation of increasing numbers of "intervention research" projects. These projects are typically conducted in order to (1) assess the impact of a behavioral change intervention on the reduction of risk behaviors, and in some cases on incidence of HIV or sexually transmitted disease (STD), and (2) learn how to effectively implement such an intervention. An additional purpose can be to (3) demonstrate to policymakers and funding agencies that an intervention can be effectively implemented, with positive benefits to the target group, and is therefore worthy of being sustained, expanded on a larger scale, or replicated elsewhere with support from funding agencies. To serve these purposes it is important that an appropriate intervention be implemented, the research plan for evaluating its impact well-designed, and the results diffused effectively to relevant audiences.

The HIV interventions reviewed in this volume suggest that as the pandemic has matured, so too have the interventions designed to prevent HIV transmission. There has been increasing awareness of the need for tailoring interventions to particular cultural contexts rather than simply adopting models tried elsewhere and a recognition of the value of involving members of the target group in developing and implementing interventions. Yet in many cases, too much of an emphasis still remains on simply disseminating information to target populations rather than promoting acquisition of skills, fostering social norms, and providing

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supportive services (such as a steady supply of accessible and affordable condoms) that may facilitate individuals' behavior change. Moreover, it appears that in parts of the developing world, groups at high risk who are considered marginal in society or difficult-to-reach, such as men who have sex with men, intravenous drug users, and adolescents living in the streets, are not receiving sufficient attention as target groups for interventions.

The interventions reviewed by contributors to this volume also illustrate the paucity of evaluated interventions, particularly ones with well-designed evaluations. This dearth of evaluations may be due to insufficient funds (particularly for more expensive evaluation designs such as randomized experiments) and to the fact that so many of the interventions are implemented by activist organizations (nongovernmental and governmental) without the involvement of researchers and therefore often without an appreciation of the importance of evaluations or the skills to conduct well-designed evaluations. An additional reason, suggested by Lamptey and Goodridge (Chapter 15, this volume), is a presumption of effectiveness on the part of program planners. They argue that program planners, in their haste to respond to the HIV pandemic, have been quick to imitate programs that have been successful elsewhere and have simply assumed that these programs would also be successful in their context; as a consequence they have not been concerned with assessing the outcomes.

It may also be due in part to difficulties in evaluating intervention outcomes. Evaluations that aim to assess impact on incidence of disease, whether it be HIV or another STD, tend to be logistically and financially difficult to do. As a consequence, the vast majority of evaluations that are conducted focus on changes in knowledge and attitudes and on self-reports of behavior change. The credibility of self-reported behavior change, however, remains controversial. Studies of the accuracy of self-reports have divergent results; one study found that self-reported condom use was a valid indicator of risk for STD among adolescents,<sup>1</sup> another found self-reported condom use measures to be subject to substantial reporting bias,<sup>2</sup> and a third indicated that self-reports of frequencies of STD in adolescents were often inaccurate.<sup>3</sup> The potential inaccuracy of self-reported behavior change makes it difficult to determine how effective an intervention has been in altering risk behaviors that will have an impact on HIV incidence.

These challenges in developing and evaluating interventions for HIV prevention have been discussed by contributors to this volume. The current chapter suggests factors to consider in (1) fostering effective collaborations between activists in nongovernmental or governmental organizations and researchers in intervention research projects; (2) selecting interventions to test; (3) developing appropriate research designs for evaluations of interventions; and (4) utilizing the results of intervention research projects to inform project planning and policy-making. Its tone is intended to be suggestive rather than prescriptive, as the purposes and types of intervention research vary, and all issues discussed here are unlikely to be relevant to every HIV intervention research project.

## COLLABORATIONS IN INTERVENTION RESEARCH

The term *intervention research* has no standard, agreed-upon definition. In this chapter it is used to refer to the implementation of interventions, often experimental in nature, in which research on the impact of the intervention, as well as on implementation processes (outcome/impact and process evaluations), is of critical importance to the project. Employing this definition, many of the interventions reviewed in preceding chapters would not be considered intervention research projects, as the evaluation component was frequently minimal.

The dearth of credible evaluations of HIV prevention interventions in developing countries suggests a need for greater collaboration in intervention research between implementing agencies that are doing much of the prevention work in the field and researchers skilled in conducting evaluations. Researchers can have an important role not only in the large Mwanza-style studies that they themselves have spearheaded, but also in studies of smaller, cost-effective interventions implemented by nongovernmental and governmental organizations that have the potential for being sustained and, if successful, possibly replicated (though with tailoring to specific context).

To achieve synergism of the intervention and the evaluation research, and to gain the commitment of the personnel implementing the intervention (service providers) to the research process in which they will participate, collaboration would ideally begin at the earliest stages of designing both the intervention and the evaluation plan. For this collaboration to succeed, both service providers and researchers may need to modify the roles they traditionally play in project development and implementation. Service providers need to recognize the value of research to their project and to others hoping to learn from their experience and must work with researchers to ensure that the needs of a credible evaluation design are met. Researchers, on the other hand, need to be cognizant that the agenda of most implementing organizations is to address to problem of HIV prevention in a local context and not to focus on research intended to generate scholarly publications; hence, research cannot be considered of such primordial importance that all other aspects of the project are subservient to the needs of a rigorous research design.

In assuming a collaborative role with implementing agencies, researchers may need to be more engaged in efforts to have research results inform program planning and policy-making and in striving for the sustainability and possibly replication of the interventions in which they are involved. In their review of HIV interventions implemented in the early 1990s, Choi and Coates<sup>4</sup> concluded that sustained interventions were more likely to lead to sustained behavior change. Rates of high-risk behavior and new infections will increase if interventions are withdrawn. More research on sustainability is therefore needed, examining issues affecting program continuation and change. Such research necessitates researchers being involved with a given intervention beyond the testing and evaluation of

outcomes phase. This longer term involvement may, admittedly, pose challenges to researchers, particularly academic researchers, given the incentives to implement new projects that can generate research funding and publications on outcomes rather than to continue with interventions after their initial impact on behavior or disease has been assessed. Still, if the ultimate goal of intervention research is to prevent HIV transmission, these challenges must be met and more researchers need to focus on issues of program continuation and change.

Researchers (and donors) also need to be cognizant of the competitive environment for funding in which their collaborating organizations, especially nongovernmental organizations (NGOs) often function. This sometimes results in NGOs competing with each other to implement interventions for the same target group and initiating overlapping interventions in an inefficient fashion. It is important that researchers not support with research funding the introduction of an intervention in an area or with a target group that has already been incorporated into an intervention with similar objectives by another organization. Such redundancy can be not only wasteful of resources but may prevent the other organization from properly assessing its intervention's impact due to the interference of a new intervention aimed at their target group. Dialogue with other organizations implementing HIV interventions during the planning stage may lead to greater complementarity and less redundancy of prevention efforts.

## SELECTING AN INTERVENTION TO TEST

When selecting an HIV prevention intervention to test, it is critical that program planners carefully think through *why* and *how* they expect a particular intervention to influence behavior in the desired fashion in a particular context (i.e., what is the theory behind the intervention). This is a frequently neglected step in project planning, leading at times to a disjuncture between the content of an intervention and the objectives it is striving to achieve. As an example, HIV interventions focusing exclusively on disseminating information about HIV to a population that is already quite knowledgeable about the disease are unlikely to lead to a reduction in high-risk sexual behavior. Similarly, an intervention targeting only women and encouraging them to use condoms in contexts where men exercise great control over sexual relationships is likely to enjoy very limited success unless strategies with the potential to appeal to men, such as eroticization of condom use, are planned. Planners who develop such interventions have failed to carefully consider the factors promoting high-risk behaviors or posing barriers to behavioral change and how they might be addressed.

Empirically tested behavioral theories that have proven effective in HIV prevention programs for similar target groups elsewhere may be useful. At a minimum, when a previously tested theory is not used to guide the formulation of an

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intervention, careful consideration needs to be given to the expected linkages between proposed intervention inputs and desired outcomes, prior to the adoption of a particular intervention. It is helpful in this planning process to review empirical studies of interventions implemented elsewhere for similar target groups, become familiar with the theoretical literature on behavior change, and gain a fuller understanding of the context and characteristics of the specific group targeted for intervention.

Also important is whether there are special circumstances in which an intervention is likely to be effectual and circumstances in which it is not. There have been notable successes in North America and Europe of community-based HIV prevention programs targeting gay and bisexual men who identify with gay communities. It is not likely, however, that such models can be translated to successfully prevent HIV among men who have sex with men but who do not feel part of a gay community. This may apply to many young gay men, minority gay men, bisexuals, and straight men who engage in commercial sex with other men. Program planners may need to either implement an alternative intervention specifically targeting the latter group of men or develop a different intervention with a greater potential for reaching both groups. Another possibility is to simply be very explicit about the limited target group for their intervention; in this case it would be only self-identifying gay men.

In planning an intervention research project consideration also needs to be given to the potential an intervention has for being sustained, expanded, or replicated. An intervention research project is usually undertaken with the hope that if successful it will be sustained, expanded, or replicated (though in projects spearheaded by academicians the hope is often simply that if successful the intervention will provide insights useful to the development of other interventions). Unfortunately, all too often this does not occur and even successful interventions languish after the experimental period. To increase the likelihood that an intervention, and more importantly its benefits, will be sustained and possibly brought to a larger scale (serving a larger population), program planners would do well to consider the following factors when selecting an intervention to test:

- The costs of the intervention and possibly its cost-effectiveness relative to other interventions. Interventions are frequently not sustained or expanded because they are perceived to be too expensive.
- Potential sources of funding for the intervention after the experimental period in which the intervention is tested. An important consideration may be whether the revenues from users of the intervention can meet some or all of the recurring costs of the intervention, or if those costs would have to be totally assumed by government sources or other donors (external aid agencies, philanthropic foundations, corporate sponsors). If the latter is true, then efforts to solicit such support should begin early in the program

to avoid the problem that frequently bedevils HIV/STD programs of cycles of stop-start funding rather than the steady flow of funds conducive to the uninterrupted and effective functioning of a program.

- The human resources that would be needed to take the intervention to a larger scale. If, for example, an intervention requires the involvement of volunteer peer educators or health care practitioners trained in treating STD, will there be enough of these individuals able and willing to be involved for a sufficiently long period of time if the intervention is expanded to a larger population? In programs using peer educators, a frequent problem has been, as Ngugi and coauthors illustrate (Chapter 10, this volume), maintaining a sufficient number of active, motivated peer educators; this may be particularly true in places where HIV/AIDS is not yet highly visible to most people given relatively low prevalence levels.
- The social acceptability of the intervention. If a particular model of service delivery is unacceptable to key people in society (e.g., parental opposition to the provision of condoms in school-based clinics or vendor machines), it may be wise to select a less controversial model of service delivery, at least initially. Fostering opposition at an early stage of project implementation can adversely effect not only program continuation but also the willingness of other communities to later participate in an expansion of the program.

Pertinent to the last point is whether the target population, key service providers, and relevant policymakers have been adequately consulted in decision making about an intervention. It is commonly believed to be critical both to the success of the intervention in meeting its objectives and to its being sustained or expanded after the experimental period that the target population be involved in the process of selecting the intervention to be tested. Aggleton and Rivers illustrated (Chapter 11, this volume) how too often in youth programs adult planners have chosen an intervention model only to find out later that it is unacceptable to youth. Consulting with the target population may also be useful in bringing to a program planner's attention potential adverse consequences of a proposed intervention.

Identifying individuals with the influence to assist or undermine an intervention is also important. In large brothels in South Asia, for example, a variety of power brokers are often involved in running the brothels or in allowing their operation to continue; these include property owners, managers, madams and pimps, henchmen, and, sometimes police officials. Gaining the support and in some cases the involvement of these influential individuals in the development of the intervention can be critical to its successful implementation and continuation. This does, however, as Ngugi and colleagues indicated (Chapter 10), give rise to ethical issues pertaining to working with people who may be actively engaged in exploiting commercial sex workers. In such cases, program planners and re-

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searchers will need to decide in conjunction with the intended beneficiaries of the program (the sex workers) whether the objectives of the program are so important as to warrant working with individuals responsible for oppressive aspects of the women's lives.

## DEVELOPING A RESEARCH DESIGN

Selecting an appropriate intervention is one critical aspect of intervention research. A second important aspect is formulating the research design. If the research is intended to not only evaluate the intervention's effects but also to provide information needed for expanding or replicating the intervention, or simply to inform the development of other intervention projects, it is important that researchers and program planners consider whether the research design will provide the information needed to inform program planning and policy-making. This includes the following:

- Infomation on how well the intervention achieved its objectives and at what cost. An outcome-impactevaluation will demonstrate how well an intervention achieved its objectives and a cost analysis will give policy-makers an idea of the level of resources that the intervention required to achieve those objectives. In a multifaceted intervention, it may also be useful to assess, as Marie Laga *et al.*<sup>5</sup> did in their influential study of Zairian commercial sex workers, which components of the intervention were particularly important in influencing the outcomes and to measure dosage responses (i.e., how outcomes were influenced by frequency of exposure to the intervention).
- Information demonstrating that the intervention fills a genuine social need. If the research is to inform program planning and policy-making, and possibly to be used in raising funds to sustain or expand the program, researchers will need to demonstrate that prevention of HIV in the target population is an important problem to address. A needs assessment undertaken at the beginning of the project, as well as utilizing any existing information that illustrates the magnitude of the problem or the potential for a more serious problem if left unchecked, will serve this purpose.
- Information on how the intervention was implemented. To be useful to program planners who seek to expand or replicate the intervention, there must be adequate description of the implementation process. It should point to opportunities and difficulties encountered in service delivery and methods used in overcoming those difficulties and in capitalizing on opportunities.
- Information that can improve the intervention during implementation. As

part of ongoing monitoring of service delivery and of a process evaluation, it is important that researchers provide timely information on any inefficiencies or ineffectiveness of aspects of service delivery. This will enable program managers to make changes that will address these problems while the intervention is being implemented. While such mid-program changes can create problems in conducting a project's outcome evaluation, steps can be taken to minimize those problems.<sup>6</sup>

• Information on unintended or indirect consequences of the intervention. Policymakers and program planners need to be informed of any important unexpected or indirect consequences of an HIV intervention, whether they be of a positive or negative nature. It may also be important to document whether any "expected" adverse effects of an intervention occurred. For example, parents often fear that if adolescents are exposed to programs promoting safer sexual behavior, such as condom use, they will be more inclined to engage in sexual behavior. Similarly, communities sometimes fear that having a needle exchange program will lead to an increase in injection drug use. Even when unsubstantiated, these fears can prevent the future implementation or continuation of programs; hence, researchers need to document whether any such adverse effects did indeed occur when their intervention was implemented.

In addition to these considerations of types of information to gather, is the issue of standard of proof for that information: which research design will provide an adequate standard of proof for the intended audiences for the results. The choice in terms of research design and standard of proof is typically between employing: (1) an experimental research design with treatment and control groups and random assignment of subjects to these groups; (2) a quasi-experimental design in which there are usually treatment and comparison groups, chosen to be as similar as possible, but in which participants (individuals or communities) are not randomly assigned to the two groups; and (3) a nonexperimental design that often has only a treatment group, but if a comparison group is included, no preintervention information is obtained from either the treatment or comparison groups, making it impossible to know if there were baseline differences between the two groups.

An experimental design is considered the most rigorous research design as it is the most capable of controlling for outside factors that might affect the validity of inferences about the intervention through randomized group assignment. Very frequently, however, such a design cannot be implemented, as assigning individuals randomly to treatment or control groups is often logistically impossible and in some cases may be considered unethical as it deprives those in the control group of the HIV prevention intervention. Where randomization of individuals is logistically impossible, a community-level approach is sometimes taken, with communities being randomized; some communities receive the intervention and some

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communities do not. Sample sizes and study costs often become prohibitive with this type of design.

Given these logistical, ethical, and cost considerations with experimental designs, intervention research projects frequently resort to quasi-experimental or nonexperimental designs. An example of a quasi-experimental study would be one in which an HIV prevention intervention (the treatment) is introduced into communities that have been chosen strategically but without random selection and is open to all adults in the treatment communities; other communities that are as similar as possible to the treatment communities do not receive the intervention and serve as the comparison group.

The third type of research design, a nonexperimental design, is usually without a comparison group. It is the least scientifically rigorous of the three, but can be useful in suggesting relationships between an intervention and outcomes even when it cannot statistically confirm the relationships. However, in an intervention research project where an intervention is being tested and it is important to confirm the impact of that intervention on the desired outcome, using a nonexperimental design would not be the optimal choice for a research design. Evaluation research is so central to the purpose of intervention research projects that a more credible research design is, where resources permit, preferable.

An important issue in choosing a research design is how rigorous it needs to be in order to be credible to policymakers, program planners, funding agencies, and in some cases academic audiences, who are the target audiences for the research. Will they require an extremely high level of proof, which can only be obtained in a strict experimental design, or will they be satisfied with a less rigorous research design? It should be noted that while researchers can adopt a more modest research design if that is acceptable to their target audience, the design needs to be sufficiently credible that they themselves are confident in the research methodology and able to defend conclusions derived from it.

Also important with respect to the issue of standard of proof is the *outcome* that needs to be measured to be acceptable or convincing to target audiences. For example, will only a demonstration of reduction of incidence of disease (HIV or other STD) be a convincing measure of program effectiveness to policymakers or funding agencies, or will self-reported sexual behavior change be accepted as a valid outcome measure indicating a reduction in risk of disease transmission? Moreover, what outcome measures will best reflect the objectives of the intervention and document its effects?

In addition to deciding which outcomes to measure is the determination of the level at which measurement should take place; for example, should community-level or individual-level measurements be used, or both? In community HIV prevention programs, measures of community-level effects such as STD prevalence in the community are often used, as it is the community that is the target of the intervention. Yet, community-level measures can sometimes be misleading if used
alone in documenting an intervention's impact. They will often show correctly that an intervention had a disappointing effect on the community, in that important reductions in high-risk behavior or in prevalence of disease at the level of the community did not occur. What such an analysis does not consider, however, is that while an intervention was available to the whole community, only a small number of people in the community may actually have been exposed to the intervention. For example, only a minority of youth in the community may have used the STD/ HIV counseling and treatment services provided by the program. For these youth who did actually use the services, the intervention may have been quite successful in influencing behavior change and transmission of disease. Measuring individual outcomes therefore can be useful, as they may demonstrate that an intervention is successful once people are actually exposed to or utilize the intervention services. The problem, as reflected in disappointing community-level effects, may be in getting a substantial proportion of the population to use the services. Examining dosage effects (how outcomes are influenced by level of exposure to an intervention) is one way of exploring this issue.

The timing of measurement of outcomes also requires careful consideration. A common error in HIV prevention interventions, as discussed by Lamptey and Goodridge (Chapter 15, this volume), is not allowing sufficient time for an intervention to be implemented prior to evaluating outcomes. There may not be a sufficiently long period of time of implementation to observe measurable effects for certain of the more important outcome indicators. Measurements of impact on the incidence or prevalence of HIV, for example, may take longer to assess than other outcomes, as researchers need to wait a sufficient period of time to witness program-induced behavior changes and the subsequent impact of those changes on transmission of disease. Outcomes such as changes in behavior, knowledge, and attitudes may be assessed earlier (though an early evaluation will not be informative of whether those changes were sustained). It is important therefore that specific outcomes be measured at an appropriate time for those particular outcomes.

In gathering data for assessment purposes, contributors to this volume have repeatedly emphasized the importance of data triangulation (using both quantitative and qualitative methods to collect different types of data) in the formative planning phases as well as for process and outcome evaluations. Quantitative methods are essential for numerically assessing the magnitude of the HIV/STD problem being addressed, demonstrating behavior changes and reduction in the incidence of disease, and analyzing relationships between variables such as individual background characteristics and behavioral change outcomes. Qualitative methods are important for gaining a fuller understanding of the problem being addressed, the factors influencing the success or failure of an HIV intervention, and difficulties encountered in the implementation process. They are also important in

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interpreting results and providing a cross-check on information obtained from surveys.

A final key issue to consider in selecting a research design is that of cost. The research design chosen cannot require greater resources (material and human) than the program planners can afford to allocate to the research. Prior to deciding on a research design, therefore, a projection of the costs of the research should be made. The following factors will affect research costs:

- *How rigorous (controlled) the research design is.* The more the research design tries to control for external factors outside the intervention that may influence the targeted behaviors, the more expensive the research is likely to be. For example, in most instances a quasi-experimental design will be more expensive than a nonexperimental design, because in a quasi-experiment, data typically have to be collected from both treatment and comparison groups, while in a nonexperimental design there is generally only one group: the treatment group.
- Outcome measures used. Measuring disease outcomes, such as prevalence or incidence of HIV or other STD, will typically be more costly than relying on surveys measuring changes in self-reported behaviors and knowledge. This is due both to the costs of collecting and analyzing clinical data and to the fact that researchers will have to wait longer to assess the impact on disease, as there must be sufficient time allowed for behavioral change induced by the intervention to affect disease outcomes. Also, pertinent to costs will be how many outcome measures are used.
- Data collection procedures. Data collection is often the most expensive part of research. The factors that determine how expensive data collection is include how frequently data is collected; how large the sample size is; how lengthy and involved the data collection instruments are; how much expertise is required for data collection; and how much training is needed for project personnel to use the data collection instruments correctly.
- To hold down costs, researchers and program planners must prioritize the information they wish to collect and determine the kinds of data collection that can be eliminated or reduced where the costs of collecting the data outweigh the value of its contribution to knowledge. Other cost-cutting methods may include using more rapid data collection techniques, such as rapid assessment procedures, and calculating the smallest sample size that can be used in data collection while still being capable of providing sufficient power to reasonably detect differences between the intervention and control groups at a meaningful clinical or public health level of effect.
- The comprehensiveness of the research. Costs will be influenced by how many different components there are to the research. Potential research

components include a needs assessment, monitoring program implementation, a process evaluation, an outcome evaluation, an impact evaluation, and a cost analysis. Where costs are a serious constraint, researchers will have to either include only those components that are essential for obtaining the most critical information, or also include the nonessential components, but assess them less rigorously or extensively. In deciding how comprehensive to make their research design, researchers would do well to heed the advice of Card *et al.*,<sup>7</sup> that with respect to evaluation research it is "better to do a small job well than a big job poorly."

• The complexity of the intervention itself. More complex interventions generally require more costly research designs. Factors affecting an intervention's complexity include whether it is tested in multiple sites or a single site and how many services it delivers. Program planners' choices in terms of the complexity of the intervention will be influenced by resources available and the objective of the intervention.

In addition to overall research design, aspects of the research process can have an important impact on the success of the evaluation. The experiences of many intervention research projects suggest the importance of the following aspects:

• Early and respectful collaboration between researchers and service providers. Close collaboration between service providers in implementing agencies (the NGO or governmental organization) and researchers is most likely to occur if both are involved from the earliest stages of selecting the intervention and formulating a research design. Involvement by service personnel early in the development of the research design can ensure that they do not consider all the data collection they must do (in addition to sometimes submitting to interviews and observations themselves) an unnecessary imposition. Fisher *et al.*<sup>8</sup> found that having supervisors take part in the pretesting of the survey instrument was a good way of providing them with a better understanding of the research process and gaining their commitment to the research.

It is important to realize, however, that the service delivery organization may not be used to collaborating closely with researchers from the initial phase of planning a program. As the division of roles between service providers and researchers can be vague in intervention research, tension may arise over differences in interpretation about who has responsibility for which functions. To reduce the likelihood of such tension and to gain the support and collaboration of service providers, researchers should strive to ensure that service providers understand the importance of research in demonstrating their program's effectiveness and improving service delivery. Such data can, in turn, be useful in fund-raising and gaining support for the intervention. Further, Carol Weiss<sup>6</sup> suggests that researchers develop instruments that measure the factors service providers believe are important and devise simple record-keeping procedures that will not be overly time consuming for the providers to use. Continuously providing feedback to service providers and involving them in the interpretation of findings may also increase their commitment to the evaluation process.

- *Quality control in data collection and data entry.* Adequate training of the people collecting and coding the data, and monitoring their work, is of paramount importance. When data are poorly collected, the credibility of the research and of the intervention itself is in serious jeopardy. Ensuring quality control in the process of entering project data into a computer is also critical as incorrect data entry can lead to erroneous conclusions in data analysis—or to a great expenditure in time and effort to locate and correct the errors and to redo the analysis.
- Ongoing attention to factors extraneous to the intervention that may be influencing behaviors the intervention is striving to change. While an HIV prevention intervention is being implemented, researchers and program implementers need to be attentive to factors external to the intervention, as these factors may influence the risk behaviors the intervention is aiming to change. This attentiveness is critical if researchers are to perceive the role that such extraneous factors may be playing in impeding or facilitating the intervention's achievement of its objectives or simply in making the evaluation of its effects more difficult. For example, if a smallscale intervention is implemented to promote condom use for a specific target group, and during the course of its implementation a larger socialmarketing campaign for condom use is initiated by other organizations. researchers need to be attentive to the implications of the introduction of that other campaign in evaluating the impact of their own intervention. The initiation of this overlapping intervention may make the evaluation of the effects of their own intervention difficult and will certainly need to be taken into account in the analysis and interpretation of the study results.

# USING INTERVENTION RESULTS TO INFORM POLICY-MAKING AND PROGRAM PLANNING

One of the purposes for which intervention research for HIV prevention is often conducted is to inform program planning and policy-making by demonstrating to policymakers and funding agencies that an intervention can be effectively implemented with positive benefits to the target group. It is hoped that policymakers will consider the intervention worthy of being sustained, expanded on a larger scale, or replicated elsewhere. To increase the likelihood of this occurring, researchers and program planners can do the following:

- Write up andpresent the results of the intervention in ways appropriate to the dufferent audiences for the research. For each target audience, researchers and program planners can decide (1) which of the research findings will be of most interest to that particular group, and (2) how those findings can be packaged and presented in a compelling and accessible manner to that group (e.g., via which channels of communication). Too often important results are presented to a scientific audience without being "translated" for policymakers, service providers, and community members.
- Clearly indicate the policy or program implications of the study. Researchers and program planners should not expect the target audiences to figure out for themselves the policy or programmatic implications of the study. These should be explicitly pointed out in the presentation of the intervention's results, either in a written form, as in published or unpublished reports, or orally in conferences and meetings. Scientists are sometimes reluctant to step beyond their research role into this policy advisory role.
- Identify persons or groups in the society who would be willing to serve as advocates for the intervention andprovide them with the information they need to be effective advocates. In some instances, groups outside of the service delivery organization can serve as allies in the effort to persuade policymakers of the importance and feasibility of sustaining, expanding, or replicating a successful intervention. In the case of an intervention to deliver STD treatment services to rural women, for example, women's organizations, associations of medical professionals, and members of the National AIDS Committee might be potential advocates. It may be easier to gain the commitment of these organizations to an advocacy effort if they are involved with the intervention from its early stages. In addition, if the organization implementing the service delivery experiment is well respected and has access to influential policymakers, advocacy may be facilitated.

In utilizing the results of intervention research projects to draw lessons for larger-scale projects or for replication in other sites, it is nonetheless important to exercise caution for the following reasons:

• Intervention research projects often receive special inputs that ordinary service delivery projects would not have. These inputs include higher levels of funding, materials, and personnel, all frequently funded by

donors who will not support ongoing programs. As far as possible, in their outcome evaluations researchers should strive to assess the impact those special inputs had on the intervention's results in order to gauge the likelihood of the intervention succeeding without, or with much lower levels of, those inputs.

- *Scale effects on cost.* Intervention research projects are often conducted on a small scale to assess whether they work prior to being tried on a larger scale. It needs to be recognized, however, that the average costs of a small-scale experimental project may not be the same as those of a larger-scale project, because of scale effects (i.e., higher or lower average costs depending on the scale of the project).<sup>9</sup>
- Worker productivity levels cannot necessarily be replicated. Staff performance in an intervention research project may well exceed what is typically available or sustainable in regular interventions because there can be a higher level of managerial supervision, explicit and implicit training of workers by researchers, greater motivation on the part of workers, and more discriminating selection of workers. Greater staff performance in a research project can contribute both to the success of the intervention, as well as to lower costs of an intervention (higher worker productivity equals lower costs).<sup>9</sup>
- *Effects of observation itself.* An additional reason to exercise caution in using the results of intervention research projects to inform the development of regular (nonresearch oriented) HIV prevention interventions is that the research conducted in an intervention research project may influence the results of the intervention both in the treatment and comparison areas. Having researchers do baseline and follow-up surveys, as well as qualitative research such as in-depth interviews, may influence the quality of service delivery as well as the behavior of the population in both areas. As Ronald Gray<sup>10</sup> states, "the act of observation alters the outcome observed." Even those in the comparison groups who do not have the experimental project in their area may, as a result of having participated in the research (being respondents in surveys and interviews), be motivated to go to other sites to seek out the services in question.

As a consequence of these potential pitfalls in using the results of intervention research projects, Gray<sup>10</sup> argues that the results from such studies cannot be readily generalized to other larger-scale programs. He suggests a phased evaluation in which an innovative project is first rigorously assessed in a restricted study population and is subsequently reassessed when the project is implemented on a larger scale. The latter assessment, however, need not be as rigorous or extensive as the first; careful ongoing monitoring may suffice for this purpose.

Laura Gibney

# CONCLUSIONS

The dramatic spread of the HIV pandemic can lead to an understandable desire to do something quickly to prevent its proliferation; however, while quick action is required, careful planning is important to avoid wasting resources that might have been used in more effective HIV prevention efforts. Given the burden of the disease to humanity, we cannot afford the "lost opportunity costs" of investing resources in ill-fated interventions. A means of avoiding this is for program planners and researchers to engage in a careful planning process in which due consideration is given to the choice of an appropriate intervention, with the greatest likelihood of achieving desired outcomes, and a research design capable of credibly assessing the results of the intervention and providing information pertinent to policy making and program planning.

Helpful to choosing a promising intervention strategy will be learning from the experience of others who have previously implemented HIV prevention interventions, particularly those in similar contexts. The chapters in this volume indicate that much knowledge has been gained about effective approaches to curbing the spread of the disease since the onset of the pandemic, yet a great deal still remains to be learned and documented, particularly in the context of developing nations. Important to increasing our knowledge base is effective dissemination of information about intervention strategies that have been tried in developing countries to date. This dissemination should not be restricted to formally evaluated interventions as much can be learned from the program strategies and implementation processes of interventions whose effects have not been evaluated or have been evaluated with a research design that does not meet the standards required by academic publications. However, given the dearth of evaluated interventions in the developing world, encouragement should also be given to undertaking evaluations of HIV prevention interventions, with a research design as rigorous as resources permit, and to a dissemination process that makes the results of those evaluations accessible to others.

The HIV prevention arena is fortunate in having a multiplicity of actors (governmental policymaking and implementing agencies, NGOs, activist advocates, researchers, donors) with unique skills, knowledge, and resources engaged in HIV prevention globally. Key to exacting the best use of those resources is a spirit of collaboration, striving for complementarity of prevention efforts and building upon our shared achievements. Of particular importance is obtaining high-level commitment by governments (and other donors) to national HIV prevention efforts. Policymakers need to both recognize the importance of HIV/ AIDS and be convinced that they can effectively take action to curb its spread. Intervention research can play a critical role in advocacy in this regard vis-a-vis policymakers, and in informing the developing of effective HIV prevention policies and interventions at both local and national levels, by providing muchdesired information on results and implementation processes of effective and ineffective HIV prevention interventions.

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# REFERENCES

- 1. Shew ML, Remafedi GJ, Bearinger LH, et al. The validity of self-reported condom use among adolescents. Sex Transm Dis 1997; 24503-510.
- Zenilman JM, Weisman CS, Rompalo AM, et al. Condom use to prevent incidence STD: The validity of self-reported condom use. Sex Transm Dis 1995; 22:15–21.
- Clark LR, Brasseux E, Richmond D, et al. Are adolescents accurate in self-report of frequencies of sexually transmitted diseases and pregnancies? Unpublished manuscript. Section of Adolescent Medicine, The Children's Hospital of Philadelphia.
- 4. Choi KH, Coates TJ. Prevention of HIV infection. AIDS 1994; 8:1371-1389.
- Laga M, Alary M, Nzila N, et al. Condom promotion, sexually transmitted diseases treatment, and declining incidence of HIV-1 infection in female sex workers. *Lancet* 1994; 344:246–248.
- 6. Weiss C. Evaluation Research: Methods of Assessing Program Effectiveness. New Jersey: Prentice-Hall; 1972.
- Card JJ, Peterson JL, Green CG. Adolescent pregnancy prevention programs: Designing, monitoring and evaluation. In: Miller B, Card JJ, Pacif R, Peterson JL, eds. *Preventing Adolescent Pregnancy: Model Programs and Evaluations*. Newbury Park, CA: Sage Publications; 1992; 1–23.
- 8. Fisher AA, Laing JE, Stoeckel JE, Townsend JW. Handbook for Family Planning Operations Research Design, 2nd ed. New York: The Population Council; 1991.
- Kenney G, Lewis M. Cost analysis in family planning: Operations research projects and beyond. In: Seidman M & Horn MC, eds. *Operations Research: Helping Family Planning Programs Work Better.* New York: Wiley-Liss; 1991; 411–429.
- Gray R. Research design in the evaluation of operations research projects: A framework. In: Wawer M, Wawer S, Huffman S, et al., eds. Health and Family Planning in Community-Based Distribution Programs. Boulder, CO: Westview Press; 1985; 425–431.

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