

OUT LOOK

Special Series on HIV/AIDS

This is Part I of a two-part series on HIV/AIDS prevention and treatment in low-resource settings.

Preventing HIV/AIDS in Low-Resource Settings

Human immunodeficiency virus (HIV), the virus that causes AIDS (acquired immune deficiency syndrome), affects people of all ages and nationalities—particularly people 20 to 40 years old. AIDS destroys families, first turning stable households into one-parent families, and then leaving parentless children in the care of siblings, grandparents, or institutions. It attacks the powerless and most vulnerable: women unable to protect themselves, youth who do not understand their risk, and infants infected around the time of birth or while breastfeeding. In addition to suffering the debilitating effects of the disease, many are rejected by family, friends, and their community.

The HIV epidemic is fueled by a number of broader environmental, political, cultural, and social contexts. In many disadvantaged communities, successful programs must address problems such as poverty, gender inequities, migration, and violence, all of which can fuel the HIV epidemic.

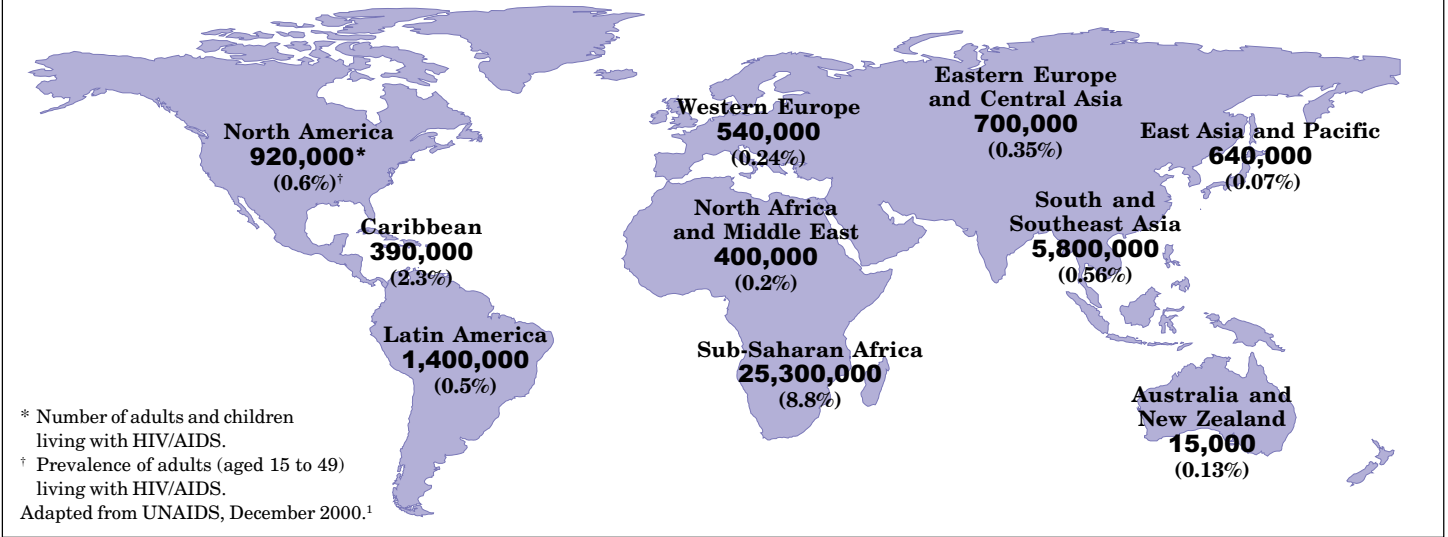
Worldwide, over 36 million people were infected with HIV at the end of 2000, 95 percent of them in developing countries (see Figure 1).¹ When HIV/AIDS was first recognized in 1981, an estimated 227,000 adults were infected; in 1990, 10 million were infected.² AIDS has killed almost 22 million people; in 2000 alone it accounted for 3 million deaths. Approximately 1.4 million children have HIV/AIDS, and almost ten times that number (13 million) are orphans because of the disease.¹ In some countries of sub-Saharan Africa, where 20 percent or more of adults are infected, HIV/AIDS is expected to reverse recent gains in life expectancy by the year 2015.^{1,3}

While sub-Saharan Africa currently bears the brunt of the pandemic, infection rates are rising in many parts of the world, including parts of Asia (for example, India, China, and Cambodia). Prevalence also is high in Central America and the Caribbean. In the Russian Federation, more new HIV infections were registered in 2000 than in all previous years combined.¹

The HIV/AIDS pandemic has an increasingly significant impact on women, who are infected primarily through heterosexual sex. In 2000, women accounted for 47 percent of the adult HIV/AIDS population, up from 25 percent in 1992.¹

This issue of *Outlook* is the first in a two-part series on the prevention and treatment of HIV/AIDS in developing countries. This article focuses on selected issues related to

Figure 1. Adults and children living with HIV/AIDS and adult prevalence rate, 2000.



prevention of HIV/AIDS transmission, including strategies for strengthening women’s ability to protect themselves and their infants. This issue does not address transmission via use of injectable drugs or nonsterilized needles for medical use, which play a significant role in HIV transmission in some parts of the world (for those who have used HIV-infected injection devices as well as their sexual partners).

Overcoming Stigma and Discrimination

HIV thrives in an atmosphere of silence and secrecy. The stigma, real or feared, of HIV/AIDS often is a barrier to HIV-prevention programs. If people are uncomfortable discussing their risk of infection with health care providers due to concerns about discrimination or a lack of confidentiality, they may avoid HIV testing and treatment of symptoms. Those who suspect they are infected may choose to hide their disease from friends and family for fear of abandonment.

Community leaders and health care professionals can help decrease the stigma of AIDS by avoiding discriminatory policies and practices, messages of fear, and implications that HIV/AIDS is a shameful disease. Communities also must encourage acceptance, compassion, and understanding of infected individuals. Programs that involve people living with HIV/AIDS, media campaigns, and educational interventions in schools, police departments, and worksites can help decrease stigma by increasing knowledge and promoting discussion about HIV/AIDS. Community mobilization and involvement of groups most affected by stigma (such as injectable drug users, sex workers, and people living with HIV/AIDS) also can be important.⁴

Communication for Behavior Change

Communications activities aimed at changing behavior have been a critical component of efforts to address a range of health issues such as child survival, reproductive health and family planning, and HIV/AIDS. Theoretically, communication activities aimed at changing behavior fall along a continuum that balances the number of clients reached with program impact. Positive, sustained impacts on attitudes, social norms, and behavior change are best achieved through programs that use a mix of communication activities and interventions at both the individual and community levels.

Interpersonal communications—such as peer education, counseling, and small group discussions—reach fewer people but tend to have a greater impact on promoting behavior change. Interventions such as street theater performances or community mobilization efforts reach broader audiences with messages that can be tailored to meet the community’s norms and needs. An evaluation of a street theater program in several inner-city communities in India’s Tamil Nadu State reported an increase in audience members’ knowledge about HIV and improvements in self-reported attitudes towards people living with HIV/AIDS.⁵

Macro-level interventions encompass print material and mass media (radio and television talk shows, dramas, and popular songs). For example, thousands of people in Africa, Asia, Latin America, and the Caribbean have heard or seen the character “Emma” promote condom use and compassionate care for people with HIV/AIDS. Created by the USAID-funded AIDSTECH project for peer-education among West African women, “Emma Says” has appeared in comic books, theater, film, video, and a photonovella,

and reaches a large number of people with health information and messages.⁶

Information, education, and communication (IEC) programs for HIV/AIDS are most effective when they create an environment conducive to HIV/AIDS prevention by working with key political, religious, and community leaders; addressing sensitive issues; and changing community norms. In Jamaica, for example, interaction with leaders in the media and music industries broke down cultural restrictions about discussing sexuality issues on the radio.⁶ Similarly, work with barangay (village) officials in the Philippines helped to alter local attitudes and norms that prevented communities from confronting the health aspects of commercial and casual sex.⁷ Because behavior change is a gradual process, such programs must maintain a sustained effort and involve their target audience in the design of effective messages.

Voluntary Counseling and Testing (VCT)

While it is widely agreed that people have the right to know their HIV status, HIV testing can be emotionally devastating for people who must cope with the news of a positive result without appropriate counseling. Combined voluntary counseling and HIV testing has been effective in encouraging people to protect themselves and their partners, and in helping people adjust to the knowledge that they are infected.⁸

In one of the most comprehensive studies of VCT, some 3,120 individuals and 586 couples in Kenya, Tanzania, and Trinidad were randomly assigned to participate in either VCT or a basic health education group with the option of VCT given at the one-year follow-up. The VCT group self-reported a 35-percent reduction in unprotected intercourse with both steady and casual partners during the year following the initial testing and counseling, compared with a 13-percent reduction in the group that received basic health information. Individuals in the comparison group who accepted counseling and testing at the first follow-up visit self-reported a drop in rates of unprotected intercourse to a level equal to that of the initial VCT group after one year.⁹

The cost of VCT makes it a feasible public health intervention. Based on the study in Kenya, Tanzania, and Trinidad, the hypothetical cost of VCT was estimated to be comparable to the cost of sexually transmitted infection (STI) services and childhood immunizations. Critics of VCT point out that VCT programs are more expensive and time-consuming than programs that provide health education, however.

Programs considering the addition of a VCT component need to carefully consider the attitudes of the community in which their clients live; they also should be equipped to provide adequate medical, psychological, and social-support

services to people infected with HIV. HIV testing and subsequent knowledge of HIV status can bring emotional distress, stigma, discrimination, abandonment, and violence, especially for women. In many African countries, women have refused testing or neglected to return for test results.¹⁰ Where VCT is not feasible, counseling alone on risk factors and prevention strategies is an important first step. (For more information on counseling, see *Outlook*, Volume 13, Number 1.)

Reproductive Health Programs Can Help

As the magnitude and consequences of HIV/AIDS and other STIs become more widely recognized, especially among women, integrating HIV-prevention strategies into reproductive health and primary care facilities (including family planning and antenatal care services that target women) becomes critical.

Family planning: counseling and contraception.

Integrating HIV/AIDS-prevention services with family planning is an attractive option since family planning clients—generally women—often need HIV/AIDS-prevention services, and those seeking methods to prevent HIV acquisition or transmission often need family planning services as well.

In any prevention effort, the dual goals are to prevent people from being infected with HIV and to prevent those who are infected from transmitting the virus to others.

HIV Tests: Slow to Rapid

Standard HIV testing requires clients to return for their results several days, weeks, or even months later. The procedure begins with an enzyme-linked immunosorbent assay (ELISA) performed on a blood sample. If the result is positive, a second ELISA test is performed. If the second test is inconclusive, a Western Blot or an immunofluorescence assay is performed.

Requiring clients to return to the clinic to learn their test results has several disadvantages. For many clients, travel time, distance, and transportation costs, as well as ambivalence about learning their HIV status, may preclude them from returning. For others who do return, the tests sometimes are lost or delayed.

Rapid HIV tests that give reliable results in less than two hours are now available and cost about the same as laboratory tests. No special equipment is required, and clinic staff can be trained to perform the tests. Concerns have been raised about the use of rapid tests, however, as the need for effective counseling may be greater since, in theory, clients have had less time to prepare themselves for an HIV-positive result.¹¹

Family planning programs can counsel people on contraceptive methods that prevent transmission of HIV and provide information on relevant issues such as mother-to-child HIV transmission as well as treatment of other reproductive tract infections. Some programs also can provide HIV testing and appropriate counseling, which can help reduce high-risk behaviors. Where such services cannot be provided, appropriate referral mechanisms should be established.

Other than abstinence or mutually monogamous relationships between uninfected partners, male and female condoms provide the most effective protection against both pregnancy and HIV/STIs when used correctly and consistently. Diaphragms and cervical caps provide modest barrier protection against bacterial and some viral cervical infections such as gonorrhea and chlamydia. Their effectiveness against HIV transmission, however, is uncertain.

Nonoxynol-9, a spermicide, partially protects against some bacterial STIs, but its effects on HIV are much less promising than anticipated. A clinical trial involving 1,000 sex workers in four African countries found that nonoxynol-9 was not effective in preventing HIV infection; in fact, the more frequently women used nonoxynol-9, the higher their risk of becoming infected.¹²

Oral contraceptives, other hormonal contraceptives, and intrauterine devices (IUDs) do not provide any protection against HIV or other STIs; women should be encouraged to use condoms in conjunction with these methods to protect themselves against HIV and STIs. Some studies have indicated that there may be an increased risk of HIV infection in women using oral contraceptives and

an increased risk of transmission to the women's partners, but no conclusive data are yet available (see *Outlook*, Volume 17, Number 1).

Male condoms. Male condoms are highly effective at preventing HIV transmission when used correctly and consistently. To stop the spread of HIV/AIDS and other STIs, it has been estimated that condom use must increase from the current 6 to 9 billion condoms per year to 24 billion per year.¹³ Although programs have encountered barriers to condom use, innovative approaches have helped overcome some of these challenges.

For example, in regions where the supply of condoms is insufficient, distribution is unreliable, or the cost is too high, social marketing programs have increased access to and availability of condoms (see box, page 6). Social marketing of condoms to the general public (rather than marginalized groups such as sex workers) also can help improve the public perception of condoms as well as their knowledge of correct use.⁶

Condom use may be impossible for some women because it requires cooperation from partners. Many women risk emotional and/or physical abuse if they suggest condom use to partners, which carries an accusation of infidelity.¹⁴ As described below, the female condom has helped some women to overcome this problem.

Condom promotion to high-risk groups—sex workers, truck drivers, military personnel, injectable drug users, and men who have sex with men—has long been an important component of HIV/STI control programs. Programs for sex workers have been both criticized and acclaimed for attempting to mobilize the most vulnerable and least powerful groups to protect themselves. In Thailand, condoms have been widely adopted by sex workers and their clients because of the government's policy of requiring 100-percent condom use in brothels, which was initiated in the early 1990s. This policy took some of the responsibility for negotiating condom use out of the hands of sex workers, and was supplemented with condom subsidies and intensive health education among brothel-based sex workers. Reported condom-use rates in brothels increased to about 90 percent; reported STIs among brothel customers declined by more than 75 percent.¹⁵

Female condoms. The female condom is a soft, transparent, polyurethane sheath that a woman can insert into her vagina before intercourse. The method is becoming more acceptable and available in some developing countries.^{16,17} Women in countries as diverse as Costa Rica, Indonesia, Mexico, and Senegal say that the female condom allows them to take the lead in protecting themselves and demonstrating the importance of safe sex to their partners.¹³

Still, the female condom often is not as acceptable as other contraceptive methods. In a comparative study in



One-on-one counseling about HIV risk can be key to any communication effort. A Zambian video, "Challenges in AIDS Counseling," illustrates a session between an HIV counselor and an at-risk woman. Photo courtesy of Johns Hopkins University/CCP.

Uganda, women ranked the female condom as less acceptable than the sponge and foaming tablets, but more acceptable than spermicidal foam, gel, and film.¹⁸ Women in Zambia disliked the female condom because it was too big, intimidating, and expensive, and it made noise during intercourse.¹⁹ Researchers are incorporating women's ideas and concerns in an effort to improve the female condom design. Some surveys have found that practice using the female condom can help overcome initial reluctance.¹⁶

Reports have been mixed about women's ability to control use of the female condom. In Zambia, women had difficulty persuading their husbands to accept its use. In studies in Namibia and South Africa, however, some women said that men would accept the condom because it belonged to women. Men in Namibia confirmed this, saying that they would accept and use the female condom.¹⁷

Even at a subsidized cost of US\$0.60 each, female condoms are too expensive for many women in developing countries.²⁰ Donor organizations, including UNAIDS, are working to increase access to the female condom and reduce its cost. Although the high price is an incentive to reuse female condoms, the safety and feasibility of this practice have not been determined;²¹ research on cleansing and reusing female condoms is underway.

Reducing STIs. The presence of ulcerative or inflammatory conditions caused by STIs increases susceptibility to HIV acquisition and the likelihood of transmission. Appropriate treatment of curable infections has the potential to reduce HIV incidence. For example, a large-scale study of the impact of STI treatment on HIV transmission in Mwanza, Tanzania, found that using a syndromic management protocol to treat symptomatic reproductive tract infections helped reduce HIV incidence by approximately 40 percent in a community in the early stages of the HIV epidemic (HIV prevalence of around 4 percent).²² It is important to note that STIs often are asymptomatic in women, which complicates STI control efforts.

A second study in Rakai, Uganda—a community with a mature HIV epidemic (HIV prevalence of 16 percent)—found that using periodic mass treatment of STIs with antibiotics showed no impact on reducing HIV incidence. In addition to higher baseline HIV prevalence, the high prevalence of genital herpes—known to be a cofactor in the spread of HIV—may help explain the seemingly contradictory results of the two studies.²³

Reaching the Hard-to-Reach

Some of the populations most affected by HIV/AIDS infection also are the most difficult to reach through

Some of the populations most vulnerable to HIV/AIDS infection also are the most difficult to reach.

conventional primary health care programs such as family planning clinics. Adolescents, sex workers, refugees, and unmarried women are among the groups that may not have access to or seek services from conventional reproductive health programs. Health workers may need to take extra steps in order to provide these audiences with the information they need about HIV/AIDS prevention. Targeted information campaigns, improved client-provider interaction, more flexible services, and outreach

programs can help overcome these challenges.

Talking to youth about HIV/AIDS. Adolescents often lack reliable information on basic reproductive health issues, the skills to negotiate safe and healthy sexual relationships, and access to affordable and confidential reproductive health services (see *Outlook*, Volume 16, Number 3, on adolescents). Young people account for half of all new HIV infections in sub-Saharan Africa, and girls are at higher risk for infection during each sexual contact than boys. HIV/AIDS programs for youth have found that:

- School-based curricula that include peer education, role play, and social interaction skills have decreased sexual activity among youth.^{24,25} In Peru, young people participating in a peer program to promote responsible and healthy sexual behavior were significantly less likely to initiate sexual activity during the intervention period than those not participating.²⁶
- Programs targeting young people who already are sexually active can provide important sexual information and the skills necessary for youth to protect themselves from HIV, STIs, and unwanted pregnancy. Programs that seek to help young women protect themselves must be sensitive to the fact that sex sometimes is forced, coerced, or exchanged for cash and other forms of support.
- Sexuality education, including condom promotion for sexually active youth, is essential; programs should be interactive and focus on communication, negotiation, and skills building. Most studies find that such education does not encourage sexual activity and, increasingly, that sexuality education can increase communication among young people and adults.^{27,28}
- Youth respond well to interactive programs and activities, peer educators, and outreach at places of recreation or work, or on the street. The Lentera program, for example, which is part of the Indonesia Planned Parenthood Association, reaches out to gay youth in the outdoor areas where they gather at night. The outreach workers provide valuable

information, condoms, and referrals to health and other support programs.²⁹

- Helping young people develop skills and talents can offer them economic viability and a more optimistic outlook for their future, which in turn may result in a reduction of risky behaviors.

Involving men. In some regions, men have less access to health services than women. Programs must work to provide men with basic information about HIV/AIDS and the ways they can protect themselves and their families. Information on sexuality education and gender issues also is important.^{30,31} Programs such as the Society for Women and AIDS in Africa are developing projects that involve men in reproductive health and encourage responsible sexuality and open communication with partners and children about preventing HIV/AIDS.³²

Reaching men through programs in workplace settings and institutions such as the military and police department offers significant potential for promoting condom use and other risk-reduction strategies. The Royal Thai Army, for instance, mobilized its command structure to institutionalize a prevention program based on principles of participation, social influence, and sexual risk assessment. The intervention focused on increasing condom use, reducing alcohol consumption and brothel patronage, and improving sexual negotiation and condom skills. Over 18 months of follow-up, STIs were diagnosed less frequently among men in intervention groups than control groups (after adjusting for baseline risk factors).³³

Social Marketing Programs

Social marketing efforts can help HIV/AIDS-prevention programs. Social marketing typically uses advertising and media to promote products or healthy behaviors. In the context of HIV prevention, social marketing programs often promote the sale and distribution of a specific condom brand, bought at a subsidized price and made easily accessible to the public. Mass-media campaigns are incorporated to increase brand recognition, overall acceptance of condoms, and communication about HIV prevention. In Nepal, the AIDS Control and Prevention (AIDSCAP) Project created a cartoon mascot, Dhaaley Dai, for the Dhaal condom brand (meaning shield). The mascot, developed to target truck drivers crossing the India-Nepal border, was featured prominently in billboards, advertisements, sales displays at roadside stands, and radio and television segments. The media campaign increased recognition and created an easy entry into conversations with outreach workers about condoms and STIs/HIV.⁶

Outlook, Volume 14, Number 3, and the Reproductive Health Outlook website (www.rho.org) provide more information about the importance of men's involvement in reproductive health.

Reducing Mother-to-Child Transmission

Of the 14,500 people infected with HIV each day, 11 percent are infants who get the virus from their mothers. More than 3 million children have been infected in this manner since the beginning of the pandemic; 90 percent of these are in Africa.³⁴⁻³⁶ Mother-to-child transmission of HIV (also called perinatal or vertical transmission) can occur during pregnancy, delivery, or breastfeeding, and is influenced by multiple factors such as maternal viral load and the type of delivery method. The overall risk of transmission in developing countries ranges from approximately 25 to 45 percent.³⁵

In contrast, in developed countries where a range of therapeutic and behavioral interventions are available, overall mother-to-child transmission has dropped to 4 to 6 percent.³⁷ The risk of mother-to-child transmission can be reduced through antiretroviral therapy for the mother and infant, and by reducing the exposure of the infant to HIV during delivery and breastfeeding.

Ideally, programs aimed at preventing mother-to-child transmission should not end with therapy directed at the infant; they should be part of care for the mother after delivery that includes treatment and prevention of illnesses related to HIV, palliative care, nutritional advice, and links to organizations that can ease the social and psychological challenges confronting the HIV-infected mother.³⁸

Drug therapy. Drug therapy in trials conducted in developing countries has reduced mother-to-child transmission by about 37 percent among women who breastfeed and by 50 percent or more among women who do not breastfeed.^{10,36} Over the past 10 to 15 years, several antiretroviral regimens consisting of zidovudine (formerly known as AZT) alone and zidovudine and lamivudine have been used.

More recently, nevirapine has been shown to be more effective in reducing mother-to-child transmission; nevirapine regimens also are shorter, simpler, and less expensive than zidovudine regimens. In a comparative study in Uganda,¹⁰ statistically significant differences in rates of HIV infection in infants of infected mothers taking zidovudine or nevirapine regimens were reported: 21.3 percent and 11.9 percent, respectively, at 6 to 8 weeks of age, and 25.1 percent and 13.1 percent at 14 to 16 weeks. All infants were breastfed initially and 96 percent were breastfeeding after 14 to 16 weeks. The zidovudine regimen required that pregnant women receive 600 mg of zidovudine orally when they went into labor and 300 mg every three hours until delivery; their infants then received 4 mg/kg

orally two times a day for seven days. For the nevirapine regimen, women were given a single dose of 200 mg orally when they went into labor, and their infants received a single dose of 2 mg/kg within three days of birth. The single-dose nevirapine regimen costs approximately US\$4,¹⁰ the zidovudine regimen generally costs significantly more.

Some researchers have proposed universal treatment with nevirapine for all pregnant women prior to or at the time of delivery in areas where HIV prevalence is known to be high and access to HIV testing is low. The cost and acceptability of this approach is unclear, however. Furthermore, this strategy must balance the safety and ethics of overtreating uninfected women and their infants against waiting until VCT services can be put into place to target treatment.

Labor and delivery care. Interventions to prevent HIV transmission during labor and delivery have focused on reducing infants' exposure to HIV-infected blood and vaginal secretions. Health care providers can reduce the risk of transmission during birth by avoiding invasive procedures such as amniotomies or episiotomies. Vaginal lavage to disinfect the vagina before birth was thought to have some potential in preventing transmission during delivery; the data to date, however, show no reduction in HIV transmission.³⁹ Some reports from observational studies conducted in the United States and Europe show reductions in HIV transmission to infants born by elective cesarean section. Along with safety concerns, the cost and availability of elective cesarean section make it an impractical intervention in low-resource settings.^{39,40}

Breastfeeding. Although breastfeeding can result in mother-to-child HIV transmission, failure to breastfeed also can lead to significant health risks to the infant in some settings. The World Health Organization (WHO) has issued guidelines in order of priority for pregnant women with HIV infection. These include

- using formula if it is affordable and can be safely prepared (animal milk also may be used if it is safely prepared);
- breastfeeding exclusively only for the first three to six months;
- expressing breastmilk and heating it to kill HIV, and feeding the infant with a cup rather than a bottle or nipple; and
- engaging a wet nurse who does not have HIV.

WHO recommends breastfeeding for women who do not know if they are infected.^{34,41}

Programs must consider these and related issues before reaching an appropriate decision. Women who do not breastfeed lose the contraceptive effect of breastfeeding and will need counseling to choose another method.⁴² Infants also lose the protective effects and nutritional

value of breastmilk. In addition, the stigma of HIV/AIDS works against WHO recommendations to use alternative feeding methods: the majority of women in developing countries breastfeed, and not breastfeeding often is interpreted as a sign of HIV infection or child neglect.

Does Male Circumcision Reduce Risk?

Since 1989 researchers have had evidence that circumcised men are at lower risk for acquiring HIV infection than uncircumcised men. A recent meta-analysis found that uncircumcised men in sub-Saharan Africa are approximately two times more likely to be infected with HIV than circumcised men.⁴³ Additional data from a cohort of the Rakai STD Control for AIDS Prevention Study suggest that HIV-positive circumcised men may be less likely to transmit the virus to their female partners, although the numbers were not statistically significant.⁴⁴ While more research is required, various physiological mechanisms have been suggested for a possible protective effect of circumcision, for instance, susceptibility of the foreskin to fissures and ulcerative STIs.⁴⁵

Promoting circumcision as a preventive method, however, remains controversial and involves a range of complex issues, including ethics, resources, culture, and safety. Some critics argue that it would be irresponsible to encourage men to undergo circumcision because they may consider it license to have unprotected sex. Promoting a surgical procedure that can have complications also raises concerns when noninvasive preventive methods exist^{46,47} and may introduce confusing messages in communities trying to discourage female genital cutting traditions.

Developing Additional Prevention Measures

As the HIV/AIDS pandemic continues, researchers around the world are working to develop improved HIV/AIDS prevention and treatment measures. In addition to behavior change, the most promising prevention tools include vaccines against HIV and microbicides.

Vaccines. Vaccines against HIV would provide a significant boost to prevention efforts and are the most promising hope for eradicating HIV/AIDS. The difficulty of developing a vaccine is reflected by the 12 years that have passed between the first laboratory test of an HIV vaccine and the first large clinical trial. Technical challenges include the existence of numerous subtypes of HIV as well as their broad geographic distribution. A vaccine against subtype B, for example, which is prevalent in the United States and western Europe, may be less effective in southern Africa and India, where subtype C predominates.⁴⁸ The first vaccines may only be 40 percent effective,⁴⁹ but mathematical models suggest that even partially effective vaccines would save millions of lives in high-prevalence countries.

Public and private organizations are working to overcome the many technical, programmatic, and ethical issues posed by developing and testing vaccines among uninfected men and women. A number of organizations in the European community, the U.S. National Institutes of Health (NIH), and the International AIDS Vaccine Initiative (IAVI), are providing increased funding for HIV vaccine development. IAVI is coordinating a global initiative to accelerate scientific progress, mobilize community support, and encourage industrial participation in HIV/AIDS vaccine development.⁴⁸

Microbicides. Microbicides are products that, when applied intravaginally, may destroy HIV and other microorganisms that cause STIs. Since microbicides would require little to no partner involvement or negotiation, they would provide women with a powerful new option for HIV prevention. Formulated in contraceptive and noncontraceptive varieties, microbicides also could fill a need for women who want constant protection against STIs but do not want a contraceptive.

Though none are ideal, several candidates for first-generation microbicides are undergoing clinical trials. Furthest along are spermicides that kill or inactivate HIV and other STI pathogens. Other new products, most in the form of gels, prevent pathogens from entering or reproducing in cervical cells, or strengthen the vagina's natural defenses against pathogens.

An effective, widely used microbicide is still five or more years away. More research is needed on safety and effectiveness, acceptability, effects on tests for STIs, long-term use, use during pregnancy, and effects on condom use.⁵⁰

Beyond Prevention

Voluntary testing and counseling, promoting use of male and female condoms, preventing mother-to-child transmission, and managing reproductive tract infections are some of the core HIV/AIDS prevention measures available to reproductive health programs and their clients. Despite the use of these measures, however, HIV infections are increasing exponentially, placing a severe burden on health systems, national economies, and communities.

As the companion to this article, the next issue of *Outlook* (Volume 19, Number 2) will explore the availability and feasibility of treatment for HIV infection and opportunistic infections, as well as palliative care, in developing countries and other low-resource settings.

References

Due to the large number of publications used to prepare this article, the references are included on a separate inserted page.

Readers interested in learning more about specific research approaches related to behavior change communication, voluntary counseling and testing, and other HIV/AIDS-prevention topics will find the AIDSQuest website (www.popcouncil.org/horizons/AIDSquest) useful. AIDSQuest is a resource for researchers and others developing HIV/AIDS-related data-collection tools and includes surveys collected from a range of sources, as well as information on how each survey was developed and used. Methodological tips on designing AIDS-related questions are also featured in AIDSQuest.

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