

Strategies for Primary HIV Prevention That Target Behavioral Change

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In the absence of a vaccine or cure, behavioral change remains the major method to prevent transmission of the human immunodeficiency virus (HIV). Public awareness campaigns that disseminate information about the risks and routes of transmission, although important, have an insufficient influence on the behavioral changes essential to reduce the risk of HIV infection. Because of the complex interplay of cultural and psychosocial influences that guides human behavior, specific programs to decrease high-risk behavior have been developed for target populations. In this report, tested initiatives for preventing HIV infection are summarized and their success evaluated for men who have sex with men, injection drug users, and women of minority racial groups. Objective evidence of reductions in high-risk behavior in these 3 groups, which account for the majority of HIV transmissions in the United States, has critical implications for reducing the overall rate of new HIV infections.

The rate of new HIV infections in the United States peaked in the mid-1980s at an estimated incidence of ~160,000 cases per year. Although the incidence then decreased steadily until the early 1990s, it has since remained relatively unchanged, with ~40,000 new cases diagnosed per year [1]. For the most recent reporting period (2001–2004), new cases of HIV infection were attributed to the following activities: sexual contact between men who have sex with men (MSM), 44% of cases; sexual contact between heterosexual persons, 34% of cases; injection drug use (IDU), 17% of cases; and high-risk behavior by MSM who are also injection drug users, 4% of cases [2]. Less than 2% of new cases of HIV infection were attributed to perinatal transmission or other causes. The percentage of new cases that were diagnosed in women increased from 15%

during 1981–1995 to 27% during 2001–2004 [2]. A total of 47% of new infections during 1981–1995 occurred in non-Hispanic white persons, but <30% of new infections were detected in this population during 2001–2004. Comparisons between data from 1981–1995 and data from 2001–2004 suggest that the percentage of new infections involving Hispanic individuals is increasing modestly but that the percentage involving non-Hispanic African Americans, among whom ~50% of new infections are now diagnosed, has increased at a steeper rate.

The continued occurrence of new HIV infections is discouraging because of the preventability of HIV transmission through changes in behavior [3]. Because of effective methods of screening blood supplies and protecting newborns from vertical transmission, almost all new HIV infections in the United States are now attributable to either unprotected sexual contact or IDU [1]. The mechanisms by which these transmissions occur and the steps needed to circumvent the risk of infection are well established. As a result, it is reasonable to assume that HIV infection can be eliminated as a significant health problem if individuals at risk can be identified and induced to adhere to proven risk-reduction practices [3].

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Human behavior is complex and not attributable to a single motivator. For example, the fact that it is often difficult to weigh short-term reward against long-term risk suggests that there are compelling forces that do not cede easily to behavioral change. Smoking and excess calorie consumption are prominent examples of human behaviors that are frequently refractory to change, despite their well-established adverse effects on health. Because the rates of HIV transmission are substantial even among populations that are well informed about their relative risks, education about the mechanisms of HIV transmission and about strategies to avoid infection can be considered essential but insufficient. The challenge is to further develop programs targeting populations at high risk for HIV infection, by equipping individuals with behavioral skills to reduce their risk of infection and by addressing barriers to change that persist despite sufficient knowledge about HIV.

Effective programs for reducing HIV transmission among MSM, among injection drug users, and among women from minority racial groups represent critical routes to the control of the HIV/AIDS epidemic in the United States. Many programs grew out of community-based initiatives that addressed the HIV epidemic, and objective and evidence-based methods to test the efficacy of these programs are now being used to provide benchmarks against which to measure improvements and alternatives. These programs have the potential to bridge the gap between what is understood about the methods used to prevent HIV infection and actual reductions in the incidence of HIV infection. In terms of the immediate impact on the control of the HIV/AIDS epidemic in the United States, no area of research may be more important. In this report, tested initiatives for preventing HIV infection are summarized and their success evaluated for MSM (by S.A.S.), injection drug users (by F.L.A.), and women of minority racial groups (by G.W.).

MSM: HOW DO WE BOOST THE EFFECTS OF EFFICACIOUS INTERVENTIONS?

Transmission of HIV among MSM continues to be a major driver of the HIV epidemic in the United States. Recent data suggest that 44% of new HIV infections are due to sexual contact between MSM and that an additional 4% are due to high-risk behavior among MSM who are also injection drug users [1]. Of new infections in males, 70% are diagnosed in MSM. Although the annual number of new HIV infections among MSM decreased from the mid-1980s through the 1990s, this trend has now reversed, with increasing numbers of new HIV infections in MSM recorded annually since 2001 [4].

There is a large body of data, including findings from 3 meta-analyses [5–7], that support the premise that behavioral interventions can be efficacious in reducing the frequency of high-risk behavior among MSM. In a recent update of a Cochrane analysis published in 2003 [5], 54 behavioral interventions in-

volving 16,224 participants from 40 randomized trials were evaluated using meta-analytic techniques [6]. The interventions comprised 26 small-group strategies, 18 programs directed at individuals, and 10 community-level programs. Thirty-eight behavioral interventions to prevent HIV infection were compared with control interventions involving minimal or no emphasis on preventing HIV infection. Participation in a behavioral intervention was associated with a 27% reduction in the rate of unprotected sex (95% CI, 15%–37%), compared with participation in comparison conditions. In addition, the proportion of individuals who never engaged in unprotected sex increased by 16% in the active-interventions group. The other 16 behavioral interventions, in which patients received some form of counseling on preventing HIV infection, yielded a 17% reduction in the rate of unprotected sex (95% CI, 5%–27%), compared with interventions that involved standard or other programs to prevent HIV infection.

In another meta-analysis of behavioral interventions to prevent HIV infection in MSM, data from 33 studies evaluated in 60 randomized controlled trials revealed that the odds of unprotected anal intercourse were 23% lower (OR, 0.77; 95% CI, 0.65–0.92) for participants in behavioral interventions, compared with participants in nonintervention groups [7]. The behavioral interventions targeted individuals, groups, and/or communities and were more likely to be successful in reducing high-risk sexual behavior if they had an interpersonal skills training component, were conducted over multiple sessions, were based on a theoretical model, and used several delivery methods.

The primary end point of Project EXPLORE, one of the largest studies designed to evaluate risk modification, was the incidence of HIV infection [8], unlike the other studies discussed above, in which self-reported high-risk sexual behavior was the major study outcome. In this study, 4295 MSM in 6 US cities were randomized to an experimental arm involving 10 one-on-one counseling sessions that emphasized motivational interviews or to a control arm involving twice yearly counseling sessions based on the guidelines of the Project RESPECT model. This model consisted of HIV counseling and testing and was demonstrated to be efficacious in a study of heterosexual patients at sexually transmitted diseases (STD) clinics [9]. Participants in the experimental arm also received a booster counseling session 3 times per year. At the end of a 3-year follow-up period, the rate of unprotected receptive anal intercourse with partners who were infected with HIV or whose HIV serostatus was unknown was 20.5% lower (95% CI, 10.9%–29.0%) in the experimental arm, compared with the control arm. In addition, the rate of HIV acquisition in the experimental arm was 18.2% lower than that in the control arm, although the difference was not statistically significant (95% CI, –4.7% to 36.0%). However, the latter result should

be viewed in the context of several design-specific considerations. First, patients in the control arm received an intervention based on the Project RESPECT model, which was previously established to be effective for preventing HIV infection in heterosexual persons [9]. Hence, showing a difference between 2 active interventions is more difficult than showing a difference between an intervention and standard care. Second, participants were followed for up to 4 years, with the largest effects seen during the first 18 months. Hence, if the study design had been similar to those of previous studies, in which shorter follow-up periods (e.g., 1 year) were used, the difference in the incidence of HIV infection would have been greater. This underscores the possibility that behavioral interventions can reduce the risk for HIV and suggests the need for more-potent interventions or for booster interventions that complement established interventions, to ensure that changes in sexual behavior are maintained.

The Centers for Disease Control and Prevention (CDC) has developed a systematic means to disseminate successful evidence-based interventions. The Replicating Effective Programs facilitates the implementation of HIV-infection prevention interventions that have been demonstrated to be effective. Two of the programs specifically focus on MSM. The first intervention, the Popular Opinion Leader, is a structural intervention based on the premise that community norms and behaviors are often initiated by small groups of opinion leaders in a given population [10]. In this approach, well-liked men who frequent bars where gay men predominate are trained to promote safer sexual practices during conversations with peers and other individuals in these and other settings. The second intervention is called the Mpowerment Project [11]. This approach targets young gay men and involves formal outreach through “Mpowerment” groups, which consist of 8–10 young men who meet for 2–3 h to discuss safer sexual practices, as well as informal outreach. Both interventions are well described on the CDC’s Replicating Effective Programs Web site [12]. Intervention materials are available to community programs interested in developing similar models.

Although the interventions reviewed above have generally shown statistically significant reductions in behavior associated with a high-risk for HIV infection, these reductions have generally been moderate in magnitude. Identifying variables affecting the risk of HIV infection among MSM may therefore play a critical role in directing interventions to persons who are most vulnerable and, possibly, most resistant to behavioral interventions. In a recently conducted multivariate analysis of data generated by Project EXPLORE, significant risk factors for transmission of HIV included use of amphetamines; heavy use of alcohol; any use of alcohol or drugs before sexual activity; presence of certain depressive symptoms; presence of gonorrhea; unprotected receptive intercourse, regardless of the part-

ner’s HIV serostatus; insertive anal intercourse with HIV-positive partners; and ≥ 4 current male sex partners [13]. These results complement findings from a large telephone survey of MSM in 4 US cities [14]. In the survey, the researchers examined the associations between both high-risk behavior and positive HIV serostatus and the following psychosocial factors: depression, polydrug abuse, childhood sexual abuse, and partner violence. Not only were the prevalences of these factors found to be high among MSM, but an additive effect was found regarding their association with high-risk behavior and prevalence of HIV infection. Accordingly, men associated with one of these factors were more likely to have engaged in high-risk sex or to be infected with HIV than men associated with none of these factors; men associated with 2 of these factors were more likely to have engaged in high-risk sex or to be infected with HIV than men associated with 1 of these problems; and men associated with 3 or 4 of these problems had a higher likelihood of having engaged in high-risk sex or to be infected with HIV than men associated with 2 of these factors.

Data outlined in this section suggest that future HIV prevention interventions for MSM should address comorbid psychosocial health problems to achieve optimal effectiveness. Many of the validated intervention models are based on the disciplines of social psychology and target HIV-associated norms, beliefs, attitudes, and/or general behavior. The interventions do not necessarily account for the influence of psychosocial problems that may moderate their efficacy, particularly among MSM for whom the risk of HIV acquisition is highest. Addressing psychosocial and/or substance abuse–associated comorbidities may increase the efficacy and effectiveness of psychosocial interventions to reduce the rates of high-risk behavior and HIV acquisition among MSM.

INJECTION DRUG USE AND HIV INFECTION: INTERDEPENDENT HEALTH ISSUES

Injection drug use is the second most common mode of HIV transmission, after sexual transmission [2]. During 2001–2004, seventeen percent of HIV transmissions were attributed to IDU involving contaminated injection equipment [2]; data included IDU episodes that were directly associated with HIV transmission. In 2000, a total of 20.1% of all HIV infections were attributed directly to sharing contaminated injection equipment, whereas another 4% of IDU-associated infections were recorded among MSM [15]. The remaining 4% of infections were associated with sexual contact, primarily between a previously uninfected female and an infected male with a history of IDU. Vertical transmission to a child from an infected mother who had acquired HIV either through IDU or through sex with an infected male injection drug user also contributed to a small but not insignificant number of IDU-associated infections.

The CDC estimated that ~28% of AIDS cases in the United States in 2000 were attributed directly or indirectly to IDU [15]. Since then, the percentage of new HIV infections attributable to IDU has decreased to 17% [2]. IDU has been the most important risk factor for HIV acquisition among women; 57% of HIV-infected women acquired infection from IDU, compared with 31% of HIV-infected men [15]. The contribution of IDU to the risk of HIV infection overall and to the risk among women is greatest among minority racial groups. In 2000, IDU-associated AIDS accounted for 26% of all AIDS cases among African Americans and 31% among Hispanic persons, compared with 19% of all cases among white persons [15]. Because of the important impact of IDU on the risk of acquiring HIV, whether by direct or indirect transmission, interventions that target high-risk behavior have a major potential role in the control of the HIV/AIDS epidemic. Reduction of IDU-associated HIV transmission can be effectively achieved by 2 routes. One route involves providing adequate uncontaminated injection equipment and teaching safe-injection practices. The other involves treating the underlying chemical dependency, thereby eliminating the route of exposure. The first route directly targets HIV risk behaviors rather than the complex motivations that fuel addictive behaviors, whereas the second route has the advantage of producing a spectrum of health and social benefits not limited to protection from HIV infection itself.

Reducing exposure to contaminated needles has been demonstrated to be one of the most effective methods of reducing injection-related HIV transmission. In a recent review of 7 studies, provision of free syringe-exchange programs was found to reduce HIV transmission by as much as 33%–42% in a variety of settings and to be highly cost-effective because of the reduced need for health services among injection drug users [16]. The relative protection from IDU-related harm improved if recipients were accessible to outreach and if syringe exchange was convenient. Although less validated as a means to prevent HIV infection, other strategies, such as provision of safe-injection rooms for injection drug users [17, 18] and decriminalization of drug-injection paraphernalia [19, 20], have also been developed as strategies to reduce transmission of HIV via contaminated injection equipment.

Community-based outreach programs with risk-reduction strategies targeting injection drug users have been evaluated in numerous prospective studies but in no randomized controlled trials. A compendium of 36 prospective studies from community settings that targeted injection drug users for risk-reduction strategies has been published [21]. Approximately two-thirds of these studies were conducted in nonclinical settings, whereas the remaining programs were conducted in clinical settings. They support the conclusion that these programs are associated with a decrease in high-risk behavior. Although the

quality and design of these studies ranged broadly, most compared high-risk behavior before the intervention with high-risk behavior after the intervention. In general, postintervention behavior involved reduced use of drugs; reduced reuse of syringes and other injection equipment, such as cookers or cotton; and increased participation in substance-abuse treatment programs. These outreach programs were also associated with an increased use of condoms and a reduction in the practice of unsafe sex. Only one of the studies included in this review, however, reported a correlation between a reduction in high-risk behavior and a reduction in new cases of HIV infections. In addition, very few of the studies included a control group.

Peer counseling has demonstrated some initial promise in reaching target populations of injection drug users with relevant risk-reduction strategies. Peer counseling is based on social identity theory and uses the influence of peers to promote behavioral change. In a randomized study of 250 injection drug users with or without HIV infection (94% of whom were African American), an intervention consisting of ten 90-min sessions of peer counseling was compared with a control group composed of standard counseling with a professional therapist [22]. At the end of the 6-month study, participants in the peer counseling group were 3 times as likely to report a reduction in injection-associated high-risk behavior and 4 times as likely to report increased condom use with casual sex partners than participants in the control group. The authors attributed the efficacy of the intervention to the credibility engendered by the peers providing the counseling. As such, the peer counseling reflects on the social identity shared between the subject and the peer. Similar peer counseling has been undertaken with promising results in IDU treatment centers, such as methadone clinics. Most of these programs have also involved multiple structured sessions tailored to provide information and counseling in the context of the individual's knowledge, motivation, and behavioral skills. The HIV Holistic Recovery Program (HHRP), which consisted of 12 manual-guided sessions, was compared with standard drug-treatment counseling in a group of patients with or without HIV infection at a methadone clinic [23]. Compared with methadone-receiving control patients, individuals in the HHRP were more likely to reduce their high-risk behavior, opioid use, and addiction severity. These sessions were adapted using the information, motivation, and behavioral skills model for behavioral change. The HHRP is now part of the Diffusion of Behavioral Interventions (DEBI) program posted on the CDC's Web site [24]. Recently, the HHRP was reduced to four 45-min sessions, and results are similar to those for the 12-session intervention [25].

A meta-analysis of 37 randomized, controlled trials evaluating 49 independent intervention strategies in 10,190 participants supports behavioral intervention as a strategy to reduce IDU [26]. Overall, these strategies were associated with a re-

duction in IDU, a reduction in trading sex for drugs, and an increase in use of condoms. The most effective interventions provided information on reducing high-risk behavior during IDU and during sex or focused on safer injection practices. The most successful interventions included both individual and group sessions, were composed of many interactive and skills-building sessions, and were manually guided. These behavioral interventions, which had high levels of patient retention, were more successful in persons of color than in white persons. Unlike condom use, which peaked initially after the intervention sessions but decreased over time, reductions in IDU tended to be well maintained. The overall impact of behavior-based interventions, however, was modest. Rates of reduction in high-risk behavior ranged from 15% to 25% across studies. Such modest effects are not surprising in the context of the well-established difficulty of achieving sustained abstinence in patients with chemical dependency.

Appropriately, strategies to reduce high-risk behavior among injection drug users are not restricted to injection drug users who are not infected with HIV. Among HIV-seropositive patients, chemical dependency can be a barrier to both access to and adherence with antiretroviral therapy, and this in turn increases infectivity and the likelihood of HIV transmission [27]. Linking injection drug users to the health care system through programs targeting drug treatment often has important implications not just for the health of the individual but also for their propensity to transmit HIV.

HIV transmission among injection drug users can be reduced by effectively increasing their access to and use of sterile injection equipment, by treating their chemical dependency, and by treating their HIV infection. With rare exception, studies consistently show that syringe-exchange programs have resulted in marked decreases in HIV transmission among injection drug users [16]. These studies demonstrate that syringe-exchange programs are highly efficacious at reducing HIV transmission, cost-effective, feasible, and devoid of negative consequences. The benefits have been replicated in many settings, and syringe-exchange programs are linked to improved access to HAART and medical care [28, 29]. They are also applicable to vulnerable populations who have been socially and medically disenfranchised from traditional systems of care. Despite these demonstrated benefits, syringe-exchange programs remain unsupported by the US government.

Many conditions commonly observed in injection drug users, including viral hepatitis, mental illness, poverty, incarceration, homelessness, and a poor relationship with the existing traditional health care system, complicate treatment of HIV infection and efforts to prevent HIV transmission [30]. Because the epidemics of IDU, substance use disorder, and HIV infection are interrelated it is critical to consider treatments for one disease in the context of the others [31]. Opiate-substi-

tution therapy, involving drugs such as methadone and buprenorphine, effectively reduces IDU-associated HIV transmission but does not reduce the risk of sexual transmission of HIV [32]. Thus, facilitating entry into a drug treatment program is a primary goal for preventing HIV infection and transmission among injection drug users. Although methadone treatment must be administered in limited, highly structured drug-treatment settings, buprenorphine may be prescribed by primary care and HIV specialists to improve access to HAART [33].

The level of HIV viremia has been correlated with the risk of HIV transmission [26]. Thus, facilitating linkage to medical care, initiating antiretroviral therapy, and improving adherence to treatment will reduce the risk of HIV transmission. In one small feasibility study of 13 HIV-infected heroin injectors whose caregivers had refused to give them combination antiretroviral therapy, a flexible and user-friendly mobile health clinic linked to a syringe-exchange program provided combination antiretroviral therapy to all study subjects, and 85% had an undetectable HIV-1 RNA level after 6 months of therapy [34]. This approach was further demonstrated to be efficacious in the only randomized, controlled trial of directly administered antiretroviral therapy (DAART) involving injection drug users, resulting in improved virological, immunological, and treatment-adherence outcomes [35]. Further subset analyses of the individuals receiving DAART found improved outcomes among those who also had routine access to health care and supportive case management [36].

On the basis of the findings summarized in this section, interventions to alter behaviors that increase the risk of HIV transmission among injection drug users have demonstrated efficacy. So far, data on HIV prevention in injection drug users argue compellingly for individualized services that are tailored to specific needs. If the goal is to reduce HIV transmission among injection drug users, a patchwork of complementary interventions that include effective treatment for drug abuse and should improve access and adherence to HIV treatment should be made available. Although treatment for one condition in the absence of treatment for the other reduces the overall likelihood of preventing HIV transmission, syringe-exchange programs, effective antiretroviral therapy, and behavior counseling offer the potential for reducing the spread of HIV. Programs to treat IDU and programs to treat HIV infection should continue to be pursued independently, even as approaches are developed to address both conditions simultaneously.

Research on ways to reduce HIV transmission among injection drug users has generated several feasible strategies, but such strategies require support. By itself, abstaining from IDU prevents HIV transmission by infected persons, but approaches to reducing the rate of HIV infection are needed that are independent from additional treatment. Although IDU-abstention

programs have clear health benefits, the risk of HIV transmission among injection drug users and to their non-injection drug using sexual contacts is a health risk that deserves to be considered independently. An effective approach to control HIV infection among injection drug users, such as access to uncontaminated needles, cannot be developed without appropriate policy support and funding for strategies that have been objectively demonstrated to be effective.

MINORITY WOMEN: RISK REDUCTION IN A CULTURAL CONTEXT

Of individuals newly infected with HIV during 2001–2004 in the United States, 27% were women [2]. Among women, 69% of the new infections were in non-Hispanic African Americans, even though this racial group represents just 13% of American women. Expressed in relative terms, the rate of new infections among non-Hispanic African American females is 19 times the incidence among non-Hispanic white females and 5 times the incidence among Hispanic females. The racial imbalance for new HIV infections among males is also substantial, but less so than that in females. The infection rate among non-Hispanic African American males is 7 times the rate among non-Hispanic white males and 3 times the rate among Hispanic males. Presumably, most of the HIV-infections among African American women are occurring because of sexual contact with African American male partners.

In African American women, as in other populations bearing a disproportionate burden of the HIV epidemic, the challenge to reduce the risk of new HIV infection lies in delivering information in a form that is accessible and readily translates into appropriate behaviors. Similar to the efforts to reach communities of MSM and injection drug users, a variety of community-based and group counseling initiatives have been developed for women of minority racial groups, several of which can now be considered evidence based [37]. The goal of these programs is to provide strategies to reduce risk behavior in a context that addresses potential barriers to such strategies.

One of the first and now most widely disseminated risk-modification programs specifically designed for African American women is called Sisters Informing Sisters about Topics on AIDS (SISTA) [38, 39]. It is now being used nationwide through the DEBI program sponsored by the CDC. SISTA uses social cognitive theory and the theory of gender and power to provide support that places strategies to avoid HIV infection in a cultural context that extends beyond safe sex. The program consists of five 2-h sessions delivered by peer facilitators in a community setting. In an effort to equip women with the tools they need to make appropriate decisions to protect themselves from HIV, the program places an emphasis on ethnic and gender pride as well as on developing greater awareness of motivations that direct one's own behavior.

In the first of the 5 SISTA sessions, HIV is not even raised as a topic of discussion. Rather, the focus is on such issues as gender and racial identity that will later put the risk of HIV infection into an accessible context. The importance of context is illustrated by the discussion of condom use, which is introduced in the second session. Rather than limiting this discussion to the mechanics of this method of protection, recognition is given to the fact that, for many women, condom use must be negotiated with their sex partners. So, condom use is part of a broader discussion that addresses communication skills and insight into relationships. Participants are also guided to evaluate the risks of emotional, sexual, and physical abuse that might be raised in negotiations about condom use. Over the remaining 3 sessions, participants continue to be guided to increase awareness of potentially conflicting motivations that need to be overcome to increase protection from HIV infection.

SISTA has now been modified for specific age groups, such as adolescents, to tailor discussion of such issues as body image, peer pressure, and the perception of relationships. A study of 522 sexually active adolescent girls aged 14–18 years, who were randomized to participate in a 4-session variation on the SISTA program or to serve as control subjects, confirmed that the intervention prompted favorable changes in behavior [40]. Relative to control subjects, individuals in the intervention program were more likely to have used a condom during their most recent episode of sexual intercourse, less likely to have had a new vaginal sex partner in the past 30 days, more likely to have engaged in condom-protected sex acts, and more likely to have had fewer unprotected vaginal sex acts. They also had better condom-donning skills and were less likely to acquire STDs, such as chlamydial infection.

Underscoring the specific needs of individual populations, a subset analysis of adolescent girls participating in this study revealed that approximately one third had experienced some degree of gender-based violence [41]. It was reassuring to observe that girls with this history also had lower rates of STDs and were more likely to use condoms consistently by the end of the study if they were in the intervention group rather than in the control group. Countering the assertion that women who enter into safe-sex negotiations may face an increased risk of violence, girls with a history of gender-based violence were no more likely than girls without a history of such violence to report a new episode of violence over the course of this intervention.

Through the CDC, ~1000 community facilitators have been trained to lead SISTA interventions in the United States. There are another 1000 facilitators who have enrolled for training. It is estimated that at least 20,000 women have participated in a SISTA intervention. In a further expansion of the basic concept, facilitators trained in SISTA will also be trained in a second program called Women Involved in Life Learning from Other

Women (WILLOW). This program uses a comparable approach to provide similar coping skills to women already infected with HIV [42]. The WILLOW study is one of the first HIV transmission reduction programs for women that has shown efficacy in enhancing mediators of safer sex and reducing high-risk sexual behaviors and incident STDs.

The principles of SISTA are also now being adapted for a new program directed at Hispanic women. Although the 2 programs share principles, the Hispanic program is not a direct translation of the SISTA program. Rather, content is being developed specifically for the Hispanic target population. Moreover, modifications to improve relevance for different populations of Hispanic persons, such as those of Dominican, Mexican, or Puerto Rican origin, are envisioned. Again, the goal is to provide the framework for understanding how the principles of HIV prophylaxis can be applied in the daily life of the target group.

The greatest current oversight in the effort to reduce the risk of HIV infection in African American women may be the paucity of programs specifically directed at addressing the role of African American men. Although SISTA is specifically designed to fight HIV infection through self-actualization and empowerment of women, safe sex is dependent on the cooperation of their partners. The lack of interventions available to reduce high-risk behavior in heterosexual males overall and in African American men specifically may be one of the most significant deficits in the current struggle to control the HIV epidemic in the African American population.

Evidence-based interventions to reduce the risk of HIV among minority women have been associated with an increase in safe sex. As the number of women exposed to these programs increases, it is possible that a herd effect will produce community-wide changes in the perception of HIV-infection risk and the need for prophylaxis. As HIV infection increasingly becomes a disease of minority racial groups, culturally appropriate efforts to reach these populations will have a crucial role in changing the trajectory of the epidemic in the United States.

CONCLUSIONS

In the absence of an effective vaccine, the effort to modify human behavior associated with susceptibility to HIV transmission provides a major opportunity to control the HIV epidemic. Evidence that even well-informed populations often continue to engage in high-risk behavior suggests that dissemination of information about the mechanisms of HIV transmission and the steps required to prevent infection, although important, are not sufficient. Conversely, intervention programs developed specifically for MSM, injection drug users, and women of minority racial groups demonstrate that targeted messages in the context of practical strategies for risk avoidance are effective for reducing high-risk behavior. The expanded use

of these programs should be considered critical to infection control.

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