

Behavioral Research in HIV/AIDS Primary and Secondary Prevention: Recent Advances and Future Directions

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Great advances have been made over the past decade in behavioral research on how to help persons avoid contracting HIV infections (primary prevention) and how to reduce or alleviate adverse consequences among persons who are living with HIV disease (secondary prevention). Within the primary prevention areas, research has shown the effectiveness of risk-reduction interventions undertaken with individuals, couples, small groups, communities, and at a social policy/structural level. Advances in HIV medical care have also created important new challenges and roles for behavioral scientists in the area of HIV secondary prevention. This article concludes by identifying key emerging issues in HIV behavioral research that will require attention in the years ahead.

It has now been more than 20 years since the first cases of AIDS were identified. Since that time, a global HIV epidemic has unfolded. Worldwide, over 36 million people have contracted HIV infection and 16 million people have now died of the disease (UNAIDS, 2000). Approximately 712,000 Americans have been diagnosed with AIDS, and at least 40,000 Americans continue to contract HIV infection each year (Centers for Disease Control and Prevention [CDC], 1999). In the United States and in other affluent western countries, the advent in 1996 of new highly active antiretroviral therapies (HAART) for the treatment of HIV disease produced a decline in annual AIDS death rates relative to the period before these regimens became available (Centers for Disease Control and Prevention, 1997). However, HAART treatments do not produce long-term benefits for many persons living with HIV disease (Deeks, Smith, Kolodny, & Kahn, 1997), and they are unaffordable in most world areas. The HIV epidemic remains a grave global public health threat.

Although the threat posed by HIV/AIDS is as great as it ever was, there have been important new research developments in our understanding of how to help persons protect themselves from contracting HIV infection (primary prevention) and how to prevent, minimize, or alleviate adverse health and psychological consequences among persons who already have HIV infection (secondary prevention). In this article, we will review research advances made over the past decade in both HIV primary prevention and secondary prevention, and then discuss emerging issues that will benefit from behavioral medicine research attention in the period ahead.

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What Is Working in HIV Primary Prevention?

In the United States, AIDS first appeared in the gay community and among injection drug users (IDUs), and both groups remain heavily and disproportionately affected by HIV/AIDS. Of cumulative adult AIDS cases diagnosed in the United States, approximately 48% have been among men who have sex with men (MSM) and about 22% have been among IDUs. However, cumulative AIDS diagnosis statistics can obscure current trends in new HIV infection incidence. These data show that—while MSM and IDUs remain highly overrepresented in new HIV infection rates—women, racial and ethnic minorities, and young people are also especially vulnerable (CDC, 1999). HIV in the United States is increasingly a disease that is associated with youth, poverty, and social disenfranchisement. Although fewer Americans are contracting HIV than in the epidemic's peak years of the early 1980s, those most at risk are younger and harder to reach than ever before. The number of new HIV infections occurring annually in the United States is unacceptable given that this is a disease that is preventable through behavior change.

What We Have Learned About the Effectiveness of HIV Primary-Prevention Interventions

With the aim of developing appropriate approaches for HIV prevention interventions, a great deal of early behavioral research on AIDS sought to identify psychological, social, and situational factors associated with patterns of high-risk sexual or drug-use behavior practices. Using multiple assessment strategies (such as cross-sectional quantitative surveys, longitudinal cohort studies, and qualitative methods) undertaken with many different populations, a relatively consistent set of high-risk behavior predictors has emerged. These include risk-related *cognitive and attitude factors* (including incorrect beliefs about risk, negative attitudes toward condoms, weak intentions to change behavior, poor perceived self-efficacy for enacting behavior change, and negative outcome expectancies concerning safer sex), *poor risk reduction skills* (in areas such as correct condom use, sexual negotiation or assertiveness, and risk-reduction personal problem solving), *relationship factors* (with patterns of safer sex more likely in casual,

transient, or "first time" partnerships than in affectionate, ongoing, or primary relationships), *limited social and peer normative supports for risk-reduction behavior change*, and *situational factors* that contribute to risk, such as concurrent substance-use problems (see reviews by Kalichman, 1998a; Kelly, 1995). Many of the factors identified as determinants or contributors to high-risk behavior are psychological in nature, whereas others involve risk factors that are amenable to change through the use of behavioral interventions. For these reasons, interventions designed for HIV prevention have often been based on social-cognitive theory (Bandura, 1986), the theory of reasoned action (Fishbein & Ajzen, 1975), the health belief model (Becker & Rosenstock, 1984), the stages-of-change model (Prochaska & DiClemente, 1983), and other psychological theories. In several instances, theoretical models specific to HIV risk behavior have been advanced (Catania, Kegeles, & Coates, 1990; Fisher & Fisher, 1992), usually integrating key constructs of broader and more general behavior change theories.

Over the past decade, a substantial body of research has established the effectiveness of theory-based and culturally tailored interventions to assist persons in changing high-risk aspects of their sexual or injection-related HIV risk behavior. Many of the research studies demonstrating the effects of HIV primary-prevention interventions have used rigorous randomized clinical trial designs, and some have measured not only behavior change but also STD or HIV incidence as outcomes. As Coates (1990) and Waldo and Coates (in press) have pointed out, HIV prevention approaches can be conceptualized in terms of their level of intervention. In this review, we will focus on what has been learned about HIV risk-reduction interventions conducted in face-to-face contexts, interventions directed toward communities, and through social-policy change approaches. Selected studies will be described in more detail.

HIV Prevention Undertaken With Individuals in Face-to-Face Interventions

One of the most urgent questions facing service providers who work with populations at risk for HIV infection is what type of intervention can be offered to help clients reduce their risk-behavior practices. Not surprising, this question is of great importance in service settings such as sexually transmitted disease (STD) clinics, drug treatment programs, and programs reaching gay or bisexual men. However, it is also of relevance in school settings, in programs that serve out-of-school youth, and in settings that provide services to persons who are homeless, have serious mental health problems, are seeking contraception or reproductive health care, or are sexually active in areas with high STD, drug use, or HIV rates. High-risk behavior and HIV prevalence have been documented in these populations (Carey, Weinhart, & Carey, 1995; Susser, Valencia, Miller, Tsai, Meyer-Bahlburg, & Conover, 1995).

Because of the need for effective face-to-face interventions, a good deal of research has sought to identify HIV risk-reduction approaches that can be undertaken with individuals, couples, or small groups. Most of the interventions studied in these research trials have combined together a number of components, including risk-reduction education, exercises to encourage the development of positive attitudes, beliefs, and intentions concerning behavior

change, activities to strengthen risk-reduction behavior skills, such as by practicing correct condom use and role playing sexual communication or assertiveness skills, risk-behavior self-management strategies, problem solving about the application of risk-reduction strategies in one's own relationships, and reinforcement of support for behavior-change efforts. The behavioral objectives of these interventions have usually included reductions in rates of unprotected sexual intercourse and increased condom use, or the adoption of other safer sexual practices. In research with adolescents, the impact of intervention on abstinence and delay of sexual activity onset have sometimes also been examined.

Project RESPECT is the largest trial of an HIV risk-reduction intervention directed toward individual clients seen in one-on-one counseling (Kamb et al., 1998). The study randomly assigned almost 6,000 STD clinic patients to one of three individual counseling models offered in conjunction with HIV testing: (a) a standard care, didactic, risk education-only control condition; (b) a two-session brief counseling intervention that focused on personal risk-reduction behavior-change goal setting; or (c) an enhanced four-session intervention based on principles based on the theory of reasoned action (Fishbein and Ajzen, 1975) and social-cognitive theory (Bandura, 1986). The enhanced intervention sessions used counseling procedures that sought to change self-efficacy, attitudes, and perceived norms concerning condom use, accompanied by behavior-change goal setting between sessions. At 3-month follow-up, 44% of participants who received the brief two-session counseling and 46% of those who received the enhanced four-session interventions were more likely to report no unprotected intercourse than those who received didactic risk education alone (38%). Laboratory tests biologically confirmed that incidence of new STDs was 30% lower among brief and enhanced counseling participants relative to controls. Allen et al. (1992) conducted a prospective cohort study evaluating the effects of a similar individual counseling approach with 1,458 women in Rwanda, Africa. The intervention included an AIDS educational videotape followed by group discussion about condoms, condom distribution, and HIV counseling and testing. The study found that only 7% of women had ever used condoms before the intervention, but that 22% used condoms regularly 1 year later. In addition, the prevalence of gonorrhea declined from 13% to 6%, and the number of HIV seroconversions decreased from 4.1 to 1.8 per person/year.

Although some interventions conducted with individuals have had positive effects, one might expect that work with couples would carry even greater benefits because both members of the sexual dyad are then involved in the behavior-change intervention. Padian, O'Brien, Chang, Glass, and Francis (1993) carried out an intervention for couples with one HIV-infected and one uninfected partner in HIV-serodiscordant couples. The intervention included risk-reduction education, the modeling of correct condom use, couple role-play and problem-solving activities around HIV infection issues, and social-support provision. Among couples receiving this intervention, the proportion of dyads reporting consistent condom use increased from 49% at baseline to 88% at follow-up. No seroconversions of the uninfected partners were observed over an average follow-up period of 16 months. Although the study used a longitudinal cohort rather than control-group design, its findings suggest positive effects for interventions directed toward HIV-serodiscordant heterosexual couples.

In contrast to the relatively modest number of HIV prevention intervention trials undertaken with individuals or couples, a much larger number of randomized outcome studies have been carried out using small-group interventions. These include projects with gay or bisexual men (Kelly, St. Lawrence, Hood, & Brasfield, 1989; Peterson et al., 1996; Roffman et al., 1997; Valdiserri et al., 1989), women at high risk for HIV infection (Carey et al., 1997; DiClemente & Wingood, 1995; Hobfoll, Jackson, Lavin, Britton, & Shepard, 1994; Kalichman, Rompa, & Coley, 1996; Kelly et al., 1994), adolescents (Jemmott, Jemmott, & Fong, 1992; Rotheram-Borus, Koopman, Haignere, & Davies, 1991; St. Lawrence, Brasfield, Jefferson, Alleyne, & Shirley, 1995), university students (Fisher, Fisher, Misovich, Kimble, & Malloy, 1996), and patients seen in inner-city STD and health clinic settings (National Institute of Mental Health [NIMH] Multisite HIV Prevention Trial Group, 1998). In addition, randomized trials of small-group HIV prevention interventions have been undertaken with more specialized but AIDS-vulnerable groups, including homeless persons (Susser, et al., 1995), persons with severe and persistent mental illness (Kalichman, Sikkema, Kelly, & Bulto, 1995; Kelly, 1997; Kelly et al., 1997; Nyamathi, Leake, Flaskerud, Lewis, & Bennett, 1993), and military conscripts in high HIV-incidence countries (Celentano et al., 2000).

Although the populations studied in small-group HIV prevention interventions are diverse, the procedures used in most of these interventions have a good deal in common. All of the interventions have involved substantial amounts of contact time with participants, always more than 4 hr and sometimes including as many as twenty 90-min group meetings. Usually drawing on constructs of social-cognitive and reasoned-action theories, the interventions studied in these trials have attempted to increase participants' knowledge about HIV prevention steps, strengthen behavior-change motivations, teach risk-reduction skills, and encourage behavior-change goal setting. Because risk-producing behaviors, situations, relationships, and social contexts vary greatly for persons of different genders, sexual orientations, ages, and cultures, all of these successful interventions have been tailored to address the needs of the client groups involved.

As an illustrative example, the NIMH Multisite Prevention Trial Group (1998) was undertaken in STD clinics and inner-city health service settings at seven sites across the United States. Approximately 3,700 participants were randomized to either a single-session AIDS education control group or to a seven-session small-group HIV risk-reduction intervention that used teaching, group discussion, attitude-change activities, role-play and practice exercises, and goal setting for behavior change between sessions. These activities were intended to produce change in cognitive, motivational, and behavioral mediators of high-risk sexual practices. Throughout a 12-month follow-up period, participants who attended the seven-session group program were more likely to use condoms consistently or to abstain from sex. The mean frequency of unprotected intercourse acts in the past 3 months decreased from 25% to 12% among participants in the intervention condition, and the percentage of intercourse occasions protected by condoms increased from 23% to 60%, all greater changes than found in the control group. Intervention participants (28%) were less likely than controls (35%) to report STD symptoms over the 12-month follow-up period, and men in the intervention group had lower

gonorrhea incidence (0.9%) at follow-up than men in the control condition (1.5%).

Intensive, small-group risk-reduction interventions of this type have generally been shown to produce moderate to large effect sizes on behavioral outcomes, such as rates of unprotected sex and levels of condom use (Kalichman, Carey, & Johnson, 1996). The scientific literature documenting the efficacy of these interventions is now sufficiently large and consistent that the intervention model has been judged ready for dissemination to service providers (National Institutes of Health [NIH], 1997). Strengths of intensive, small-group HIV prevention interventions include their transportability to many kinds of service delivery settings, the existence of well-defined protocols that can guide program implementation by service providers, and use of an intervention approach with enough intensity to allow clients to receive substantial assistance for making change in what may be longstanding and complex risk behaviors. A limitation of these approaches is that, except in clinic-based or institutional settings where clients attend the group program as a part of their usual service routines, it may be very difficult to engage community members to seek out intensive multiple-session programs that require great motivation and time commitments.

In part for this reason, there has also been interest in determining the efficacy of brief HIV prevention interventions. Some of these trials have met with success. O'Donnell, San Doval, Duran, and O'Donnell (1995) evaluated an intervention that combined a specially produced video intended to increase positive attitudes and intentions for condom use with a facilitated small-group discussion focused on skills building and personal risk-reduction goal setting. Following participation in the intervention—which lasted about 40 min—28% of STD clinic patients used coupons to redeem condoms relative to a 21% rate of condom taking among control group patients (O'Donnell et al., 1995). Subsequent research found that the same intervention also produced reductions in STD reinfection incidence among clinic patients who attended the program (O'Donnell, O'Donnell, San Doval, & Duran, 1998). At 17-month follow-up, 23% of men who received the video-based intervention had new STDs compared with 27% of controls. Among high-risk men with multiple partners, 25% of those who attended the intervention had subsequent STDs relative to 32% of controls.

Belcher et al. (1998) evaluated the effectiveness of an intervention composed of a single 2-hr session conducted with at-risk women in one-to-one counseling. The brief program included risk education, activities to sensitize participants to their personal risk on the basis of data obtained in a baseline assessment, role playing of situations that require sexual communication skills, and personal risk-reduction goal setting. Women who received the brief intervention, relative to women who had attended an AIDS education-only control group, reported less-frequent unprotected intercourse in the past 3 months ($M = 8.2$ vs. 17.2 occasions) and had higher levels of condom-protected sex (66% of intercourse occasions protected vs. 42% for controls).

HIV counseling and testing is one of the most widely used interventions in the AIDS field and is advocated for persons high in risk because early knowledge of HIV serostatus allows persons to access treatment and may also motivate behavior change. Voluntary HIV counseling and testing appears partially successful as an HIV prevention strategy in western countries. Infected individuals and those in serodiscordant relationships reduce their risk

behavior following testing, although meta-analysis shows limited behavior-change effects produced by counseling and testing among those who learn they are uninfected (Weinhardt, Carey, Johnson, & Bickman, 1999). In developing countries with higher HIV prevalence, testing and counseling may carry greater impact. Coates and colleagues (Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000) reported on the effects of a brief intervention that combined HIV testing, serostatus feedback, risk-reduction counseling, and condom provision for individuals and sexual-partner dyads in Kenya, Tanzania, and Trinidad. Over 4,000 participants were randomly assigned to either the counseling and testing intervention or to a health-education control group. At 7-month follow-up, the proportion of HIV counseling and testing participants who reported unprotected intercourse with nonprimary partners declined by 35%, relative to a reduction of 13% among controls.

Although these studies found positive effects for the brief interventions they evaluated, other research has shown that brief interventions—even when using the same procedures as their extended counterpart programs—produce less sexual risk-reduction behavior change (Peterson et al., 1996). Whether brief HIV prevention interventions will be effective is likely to depend on not only the intervention procedures used but also the initial behavior-change motivation of participants, the complexity of their risk-behavior patterns, and the behavior-change barriers that they face. In situations of high motivational “teaching opportunity,” such as at the time of diagnosis with an STD (Kamb et al., 1998; O’Donnell et al., 1995), relatively brief interventions may have a greater likelihood of success than in other circumstances.

Community-Level HIV Prevention Interventions

In contrast to face-to-face interventions that provide behavior-change assistance to individuals or small groups, community-level approaches are directed toward populations or specific population segments vulnerable for contracting HIV infection. These interventions seek to reduce the prevalence of high-risk behavior practices in community populations by bringing about population-level changes in risk awareness, social norms concerning safer sex, condom-use attitudes or intentions, and collective self-efficacy for the enactment of behavior change. Controlled trials of community-level HIV prevention interventions have been conducted with gay or bisexual men (Kegeles, Hays, & Coates, 1996; Kelly et al., 1991, 1992, 1997), women (Lauby, Smith, Stark, Person, & Adams, 2000; Sikkema et al., 2000), and IDUs (Stephens, Simpson, Coyle, McCoy, and the National AIDS Research Consortium, 1993), and in programs targeting multiple hard-to-reach subgroups within communities (CDC AIDS Community Demonstration Projects Research Group, 1999).

The intervention approaches evaluated in these trials have differed in their approaches. One series of intervention outcome studies undertaken by Kelly et al. (1997) used principles derived from diffusion of innovative theory (Rogers, 1983), which postulates that new behavioral trends in a population can be initiated when a sufficient number of natural, popular opinion leaders (POLs) within the population are observed to model new innovative behaviors. Applied to the issue of HIV prevention, interventions based on this model have identified, trained, and then engaged cadres of POLs to systematically disseminate risk-reduction

messages endorsing condom use and safer sex to members of their own social networks during everyday conversations. Frequent and sustained conversational messages delivered by persons already known and liked by others in their social groups can increase risk awareness and strengthen peer norms that favor safer sex. Across a series of community-level controlled outcome studies undertaken with men patronizing gay bars, it has been shown that when cadres of POLs are trained and enlisted to take on these HIV prevention endorsement roles, they can bring about reductions in the sexual risk behaviors in the larger populations of which they are members (Kelly et al., 1991, 1992, 1997). Reductions of approximately 30% from baseline levels in the prevalence of high-risk behavior among community population members have consistently been found, confirming the robustness of this POL endorsement community-level intervention approach.

Other research has evaluated community-level HIV prevention interventions that incorporated elements of the POL model but also added additional components. Kegeles et al. (1996) reported on the effects of a program for young MSM that combined HIV prevention outreach by a core group of POLs, along with an HIV prevention publicity campaign and small-group risk-reduction sessions undertaken in community venues. Relative to a longitudinal cohort that was followed in a comparison city, a cohort of young MSM in the intervention city showed reductions in sexual risk behavior comparable with those found by Kelly et al. (1997). In another variant of this approach, Sikkema et al. (2000) carried out a large-scale HIV-prevention intervention for women living in 18 low-income housing developments. In 9 control housing developments, AIDS education materials and condoms were made available to women. In 9 intervention developments, risk-reduction workshops were first offered to all women living in the developments. This was followed by a phase of ongoing HIV prevention conversations, social events, and community activities that were organized and carried out by health councils composed of women who were identified as popular among their female housing development neighbors. Risk-behavior surveys were undertaken with all women living in all developments at baseline and at 1-year follow-up. Between baseline and follow-up, the percentage of women in intervention housing developments reporting any unprotected intercourse declined from 50% to 38%, and the percentage of their intercourse occasions that were condom protected increased from 30% at baseline to 47% 1 year later.

Results of a large-scale trial of a community-level HIV prevention were also reported by the CDC AIDS Community Demonstration Projects Research Group (1999). The project was implemented in five cities and targeted a variety of different groups in each city, including commercial sex workers, IDUs and their sexual partners, nongay-identified MSM, high-risk youth, and residents of areas with high STD rates. The intervention consisted of outreach contacts made by nearly 1,000 volunteers and staff to target population members in community venues. The outreach used “role-model stories,” presented verbally and through picture books, that portrayed how persons similar to the target-population member were making behavior changes to reduce their risk for contracting HIV. In addition, small media materials—including community newsletters, pamphlets, and cards—were used to deliver similar role-model stories targeted to each population, and condoms and bleach kits were widely distributed. Cross-sectional interview data-collection collection waves took place with mem-

bers of each target population over a 3-year period in intervention and matched comparison communities. Evidence was found of increased condom use with main and nonmain partners, as well as greater rates of condom carrying in the intervention communities. Consistent condom use for at least 6 months with main partners increased from 9% to 17% and with nonmain partners from 25% to 33%. Thus, across interventions that target specific populations, venues, or catchment areas, community-level HIV risk-reduction interventions have produced positive effects and have reached persons who do not attend facility-based programs.

Structural, Policy, and Environmental HIV Prevention Interventions

The HIV prevention approaches reviewed to this point have been intended to change persons' psychological, behavioral, or social characteristics related to risk by influencing attitudes, intention, skills, normative perceptions, or other mediators. Another approach that has met with considerable success involves bringing about change in social structures or policies that affect risk behavior. Structural interventions include promoting change in laws, policies, and operational procedures that influence risk behavior, whereas environmental interventions are those that impact on living conditions, resources, or social opportunities related to risk or safety (Sweat & Denison, 1995).

One of the most striking examples of how structural interventions can reduce HIV risk involves the effects of enhanced access to clean needles among IDUs living in the community. By tradition, many municipalities, states, and countries have long had laws or policies that limited the availability of syringes as a strategy to discourage drug abuse. However, lack of access to clean needles also encouraged needle reuse or sharing and, thus, the spread of HIV among IDUs. In response to AIDS, needle exchanges for IDUs were initiated in many cities within the United States and in many countries abroad. These programs have had a positive effect in reducing both the frequency of needle sharing among IDUs (Watters, Estilio, Clark, & Lorvick, 1994) and also in leveling the prevalence of HIV infection among drug injectors in cities or countries that have adopted larger-scale needle exchange programs (DesJarlais & Freidman, 1996) without increasing the number of persons who use drugs. Another example of how syringe-access policies influence HIV risk behavior can be found in the experience of Connecticut, which instituted legislative changes that made syringes available in pharmacies for the first time without prescriptions. Following the policy change, more IDUs purchased new syringes at pharmacies and fewer IDUs in Connecticut reported that they shared needles with others (Groseclose et al., 1995).

Structural and environmental interventions have also been undertaken to prevent sexually transmitted HIV infections. One of the best-known examples of this approach is the Thailand government's "100% Condom Program" instituted in brothels. This policy intervention requires that commercial sex workers and their clients always use condoms, and mandates that brothel management enforce the policy. Condom use is monitored in brothels, and STD rates among workers are regularly monitored. Brothel owners are sanctioned by the Thai government for noncompliance with these policies, including closure for repeated violations. Implementation of this policy increased levels of condom use to over

90%, and resulted in a decrease of over 75% in rates of STDs diagnosed among commercial sex workers (Hanenberg, Rojanapithayakom, Kunasol, & Sokal, 1994).

Structural and environmental interventions to prevent HIV need not be complex to be effective. In developing countries and among populations in the United States without easy access to condoms, the distribution and social marketing of inexpensive or free condoms can constitute a significant intervention because risk-reduction objectives cannot be achieved under conditions in which condoms are not available. Research has shown that, in the presence of "traditional" STDs, the transmission of HIV infection between heterosexual partners is biologically more efficient (Wasserheit, 1992). If STDs are HIV transmission-risk cofactors, more effective STD treatment in high STD-prevalence population segments may serve to reduce rates of sexually transmitted HIV. Mass STD treatment programs undertaken in African countries with extremely high STD prevalence have been shown to reduce heterosexual HIV transmission in some studies (Grosskurth et al., 1995), but not in others (Wawer et al., 1999). Nonetheless, aggressive STD treatment services may be a structural or environmental intervention with the potential of reducing HIV transmission rates in at least some circumstances.

Contemporary Issues in HIV Secondary Prevention

To this point, we have considered research related to HIV primary prevention. HIV secondary prevention involves the prevention or alleviation of adverse conditions among persons who already have HIV infection. In the following sections, we review recent developments in research concerning the social and emotional adjustment of people living with HIV/AIDS. First, we focus on the challenges faced by patients living with HIV/AIDS in adjusting to a rapidly changing treatment environment, HIV treatment adherence, mental health aspects of improved health, and responses to HIV treatments. We then turn to examining the outcomes of secondary-prevention intervention outcomes, including interventions to improve emotional and immunologic health and to prevent the spread of HIV from infected to uninfected persons.

Psychological Adjustment in a Rapidly Changing Treatment Environment

Major breakthroughs in managing the HIV/AIDS crisis have occurred with the advent of combination therapies for treating HIV infection. Combinations of drugs that target different stages of the HIV replication cycle can effectively suppress viral replication and slow HIV disease progression. The impact of combination HIV therapies in extending the lives of people with HIV infection has been substantial. New HIV treatments continue to become available, with several classes of antiretroviral medications currently approved, and more being evaluated in clinical trials. The rapid expansion of HIV treatment options, although enormously beneficial, also makes it more complicated for many people living with HIV to participate in their own treatment decisions.

In addition to the sheer number of drug regimens to consider, HIV treatment decisions must take into account the choice between treating HIV early in the course of infection or waiting before starting medications. On the one hand, treating early and

slowing the initial progress of HIV may extend the survival time of many HIV-infected persons (Ho, 1995, 1996). On the other hand, the effects of combination therapies may diminish over time because of treatment resistance. Patients on long-term anti-HIV drug regimens, especially those not fully adherent to their regimens, can develop medication-resistant HIV strains, potentially reducing their sensitivity to an entire class of drugs and restricting future treatment options. Concerns about the long-term use of combination HIV therapies have therefore led some individuals to delay starting combination treatments until later points in their HIV infection. HIV treatment guidelines also periodically change as new information emerges from clinical trials. Thus, unlike treatment decisions facing persons with other chronic illnesses that have more stable treatment protocols, patients with HIV/AIDS and their providers must remain vigilant to an ever-changing treatment environment.

Treatment Adherence

Strict adherence to HIV drug regimens is essential for reaching and maintaining therapeutic levels of antiretrovirals and avoiding development of drug-resistant HIV strains. HIV therapies demand strict dosage-taking adherence, making them among the most challenging treatments with which to adhere. Earlier in the history of HIV treatment, as many as one third of people taking reverse transcriptase inhibitors discontinued their use (Samet et al., 1992), and an additional one third intentionally altered their prescribed use (Aversa & Kimberlin, 1996). In a more recent national survey of physicians and patients, Gallant and Block (1998) found that 89% of HIV care providers rated treatment adherence as a serious problem in their practice. Among patients taking combination therapies, Gallant and Block found that 43% reported lapses in treatment adherence during the previous week and 26% said that they had missed a dose of their prescribed medications in the past day. Even such modest levels of nonadherence have been associated with treatment failure (Catz, Kelly, Bogart, Benotsch, & McAuliffe, 2000; Mayer, 1999).

Research has identified several factors related to HIV treatment nonadherence. Poor adherence with antiretrovirals is associated with negative beliefs and perceptions about treatment efficacy and the potential for adverse outcomes (Mehta, Moore, & Graham, 1997). Hard-to-tolerate side effects common among these drugs predict the discontinuation of medication use (Deeks et al., 1997). As is the case with many treatments for other chronic illnesses, adverse side effects—even when temporary—interfere with HIV treatment adherence (Rabkin & Chesney, 1998), particularly when the side effects are severe (Catz et al., 2000). The adverse influence of side effects on adherence may be most pronounced when they occur in concert with HIV disease symptoms, reinforcing the belief that medications are detrimental to one's overall health (Siegel, Schrimshaw, & Dean, 1999).

Treatment nonadherence can also be attributed to the burdens of complicated regimens that disrupt an individual's daily routines (Morse et al., 1991). Among persons enrolled in an AIDS-medication clinical trial, doses of antiretrovirals were most often missed because of forgetting (43%), sleeping through a dose (36%), being away from home (32%), changing routine (27%), being too busy to take a dose (22%), feeling sick (11%), and depression (9%, Hecht, 1997). HIV treatments are particularly

burdensome because the lives of some persons affected by AIDS are complicated, hectic, and unpredictable (Besch, 1995). For example, homeless persons living with HIV infection have been characterized as being at particularly great risk for antiretroviral nonadherence. The simple basic resources required to store multiple drugs and keeping track of required doses and frequencies pose enormous challenges to homeless persons (Bangsberg, Tuskys, Hecht, & Moss, 1997; Lyman, 1997). In a study of homeless persons living with HIV/AIDS, Bangsberg et al. (2000) found that the median proportion of antiretroviral pills taken was 67%, as measured by electronic monitoring, and that 62% of homeless persons maintained less than 90% adherence according to pill counts. Another key factor in medication adherence is the relationship between patient and provider. Patients who trust their providers and are satisfied with their quality of care are more likely to adhere to antiretroviral treatment regimens (Ickovics & Meisler, 1997; Stall et al., 1996). People who refuse to take antiretrovirals commonly state that they believe their drugs are ineffective and toxic (Perry, Ryan, Ashman, & Jacobsberg, 1992). In contrast, high levels of adherence to antiretroviral regimens is related to optimistic beliefs and perceived benefits of taking anti-HIV drugs (Samet et al., 1992).

Managing complicated antiretroviral regimens requires complex cognitive skills that can be easily disrupted by factors such as substance abuse, neurocognitive impairment, and poor literacy. For example, Singh et al. (1996) found that HIV-seropositive patients with a history of injection drug use were more likely to be treatment nonadherent than those who had not used injection drugs. Nonadherent patients are also more likely to experience symptoms of depression and to lack adaptive coping strategies (Catz et al., 2000). O'Connor and Samet (1996) noted that substance-abusing patients present considerable challenges to the medical management of HIV infection because of a host of problems including resistance to comply with instructions, potential drug interactions, and conditions of living in poverty. Poor literacy skills also interfere with the medical management of HIV infection. Despite careful screening and selection process of patients, as many as 20% of people in AIDS clinical trials do not comprehend instructions for taking antiretroviral therapies (Chesney, 1997). Studies have found that HIV-infected patients who missed taking antiretroviral medication in a 2-day time frame had greater difficulty comprehending simple medical instructions compared with persons who were treatment adherent (Kalichman, Ramachandran, & Catz, 1999). The association between reading literacy and antiretroviral adherence appears robust, with literacy significantly predicting treatment adherence after controlling for several confounding factors, including years of education (Kalichman, Benotsch, Suarez, Catz, & Miller, 2000). Although HIV treatments are becoming simpler to manage, such as through reduced dosing, multidrug pills (e.g., Combivir, Trizivir), and blister packs (Muir, Sanders, Wilkinson, & Schmader, 2001), patients who are most challenged by environmental and cognitive conditions will likely experience continued difficulty achieving strict adherence. Thus, HIV treatment adherence will likely remain a significant problem in the growing population of substance abusing and economically disadvantaged persons living with HIV/AIDS.

Psychological Aspects of Improved Health and Treatment Response

Renewed prospects of hope offered by HIV combination therapies may carry health-promoting benefits. Hope and optimism were common characteristics of people living with HIV/AIDS even in the era before the potent class of protease inhibitor agents and combination therapies (Rabkin, Remien, Katoff, & Williams, 1993). Positive attitudes, and even unrealistically optimistic beliefs, about one's prognosis may improve health and perhaps even extend longevity (Reed, Kemeny, Taylor, Wang, & Visscher, 1994; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). For example, Low-Beer et al. (2000) found that the initiation of anti-HIV therapy was associated with reductions in depression over a 1-year period. Reduction in depression resulting from access to promising therapies may be due to increased hope and optimism, but other factors such as improved health and co-occurring life changes must also be considered. The same people who had once battled their way through bureaucracies to access disability benefits may now consider returning to work or school, making career changes, and other life-redefining decisions (Brooks & Klosinski, 1999). Returning to work is often considered the landmark for successful HIV treatment in the era of combination antiretroviral therapies. However, the potential loss of disability benefits, barriers to disclosing HIV serostatus to employers and coworkers, managing medication adherence while on the job, and avoiding work-related stress are among the challenges encountered when considering a return to work. These issues are becoming increasingly common for many people who experience positive clinical health outcomes with combination HIV treatments (Kalichman & Ramachandran, 1999). Personal relationships are also likely to be reevaluated in the context of the prospect of a life that will be longer than one thought, and roles of being AIDS caregivers and AIDS care recipients change as health improves (Rabkin & Ferrando, 1997).

Although HIV medication regimens produce positive health outcomes for many people living with HIV, between 15% and 35% of participants in clinical trials testing combination drug regimens do not demonstrate clinical benefits, and the results appear even worse for people treated outside of research protocols. For example, Fatkenheuer et al. (1997) found that between 30% and 64% of persons taking various combinations of antiretrovirals experienced only marginal clinical benefits within 6 months of starting therapy. Other patients experience positive initial health responses to combination drug regimens, but these benefits disappear over time. Treatment failure can occur when: (a) combination therapies do not produce clinically meaningful reductions in viral load; (b) side effects of the therapies become intolerable and lead to discontinued treatment; and (c) initial positive responses to treatment diminish (Kalichman, 1998b). Rabkin and Ferrando (1997) described the psychological ramifications of each of the possible ways in which treatments fail. Failing to respond when combination therapies are initiated may lead to feelings of personal injustice and being cheated. Rabkin and Ferrando also describe how people may experience a sense of betrayal, feeling misled about the promises of combination therapies. The development of such severe side effects that treatment must be discontinued, however, may lead to self-blame for not being able to tolerate a potentially effective treatment. Finally, experiencing initially successful clin-

ical responses to combination therapies that then diminish may be interpreted as another false promise about the effectiveness of HIV treatments, and can create a sense of hopelessness and unwillingness to try new therapies.

To test some of the hypotheses regarding emotional reactions to HIV treatment responses, Catz, Kalichman, Benotsch, Miller, and Suarez (2001) conducted an analogue study that asked persons with HIV to respond to clinical case vignettes. This study found that feedback of increased HIV viral load, an indicator of unsuccessful treatment, resulted in ratings of highly negative perceived adverse emotional consequences. Specifically, individuals who read a vignette depicting a situation in which a person with HIV who was being treated with antiretroviral therapies and whose viral load increased reported that they found this situation emotionally distressful. However, observational studies have not consistently confirmed these analogue study findings. In a prospective study of HIV positive persons undergoing antiretroviral therapy, Rabkin, Ferrando, Lin, Sewell, and McElhiney (2000) did not find changes in emotional distress following increases in viral load. Rather, distress reactions occurred in response to the onset of HIV symptoms, as has been reported in previous research (Kessler et al., 1991). In another prospective study, Kalichman, DiFonzo, Austin, Luke, and Rompa (in press) found only slight and clinically nonsignificant changes in depressive symptoms in relation to increases in viral load. However, persons who experienced an increase in viral load held less positive attitudes toward HIV treatments after their viral load changed. For individuals who experienced suppression of their viral load to undetectable levels, however, there was a clear and clinically significant improvement in depressive symptoms, signally a positive emotional response to positive treatment outcomes. Thus, negative reactions appear to occur in response to symptom onset whereas persons who experience HIV viral suppression do experience parallel improvements in their emotional health.

Coping Improvement and Mental Health Interventions

The need for mental health and coping intervention research for people living with HIV/AIDS has been recognized from the earliest days of the disease. From a community services perspective, empirical studies of support groups and people with HIV infection who attend support groups have suggested benefits stemming from the stress buffering effects of increased social support (Green, 1993; Kalichman, Sikkema, & Somlai, 1996). Support groups that target specific sources of emotional distress, improve tangible support, and address health information needs have demonstrated mental health benefits. The potency of support groups appears to be enhanced by including theoretically based techniques for stress management and improved coping efficacy. These positive outcomes have been observed in randomized controlled intervention studies.

Stress reduction and coping improvement interventions that are based on cognitive and behavioral theories and delivered to small groups have shown positive effects on the mental health of people living with HIV/AIDS. Studies of gay and bisexual men living with HIV/AIDS demonstrate improved emotional adjustment and reduced stress. Kelly et al. (1993), for example, reported one of the first randomized trials testing a coping and stress management intervention in a randomized controlled study design. Sixty-eight

men experiencing moderate depression were randomized to one of three study conditions: (a) an eight-session coping and stress management intervention grounded in concepts derived from social-cognitive theory; (b) an eight-session social-support-group intervention modeled after closed support groups available in the community; or (c) an individual counseling on demand control condition. Results showed that both the cognitive-behavioral and social-support groups improved in their mental health adjustment compared with the individual therapy control condition. The social-support group, however, had the greatest overall improvement at a 3-month follow-up assessment; 86% of the social-support-group participants demonstrated clinically significant improvement on an index of distress severity, whereas nearly two thirds of the comparison condition showed clinical deterioration. The cognitive-behavioral group demonstrated a pattern of change intermediate between the social-support groups and the control condition.

Coping effectiveness training is another cognitive-behavioral mental health intervention model tested with HIV-positive men (Chesney, Folkman, & Chambers, 1996). On the basis of Lazarus and Folkman's (1984) stress and coping theory, coping effectiveness training emphasizes the use of emotion-focused and problem-focused coping strategies as they best fit stressors that are perceived as uncontrollable or controllable, respectively. Coping effectiveness training also includes instruction in the effective use of social support, maintenance training, and workbook exercises. In a test of the approach, the theory-based coping effectiveness intervention was compared with a time-matched HIV education and a waiting-list control group in a pretest-posttest design. The study found that men who received the coping efficacy training reported less perceived stress, reduced emotional distress, less AIDS burnout, and improved coping efficacy compared with both of the control conditions. In another trial, Eller (1995) examined the effects of two brief and focused cognitive and behavioral stress-reduction techniques; guided imagery and progressive muscle relaxation. Compared with a standard-of-care control group, both treatment conditions demonstrated reductions in depression. These studies suggest that limited cognitive-behavioral therapy has promise in treating the stress and negative emotions in HIV infected persons, at least in the short term.

A series of studies have also demonstrated the short-term effects of cognitive-behavioral stress management (CBSM) interventions on the emotional health of HIV-positive gay and bisexual men. For example, Lutgendorf et al. (1997) tested a 10-session CBSM intervention that included didactic components to educate group participants about stress and the benefits of relaxation, cognitive restructuring, coping skills training, assertiveness training, anger management, and identification of social supports in comparison with a waiting-list control group. Gay men who received the CBSM treatment demonstrated reductions in anxiety and dysphoria relative to the control group at the postintervention assessment. The declines in distress occurred in the context of already low levels of distress at baseline; reductions in depressed mood occurred most often in men who were not clinically depressed. Similar results have been reported in other studies of CBSM interventions for people living with HIV infection (Cruess et al., 2000; Lutgendorf et al., 1998). In each case, CBSM group interventions have had positive effects on the emotional health of

individuals exposed to the intervention relative to a waiting-list control group assessed from preintervention to postintervention.

Behavioral Interventions to Improve Immunological Health of People Living With HIV/AIDS

In addition to targeting improved mental health outcomes, behavioral interventions for people living with HIV/AIDS have aimed to improve the physical health and immunologic functioning of people with HIV/AIDS. Antoni et al. (1991) reported one of the first controlled intervention trials that sought to improve immune functioning in people living with HIV/AIDS through cognitive-behavioral intervention. Gay and bisexual men were enrolled in a cognitive-behavioral therapy group prior to notification of their HIV antibody test. The treatment tested by Antoni et al. (1991) was similar to the CBSM interventions described above. The study showed that CBSM increased CD4 cell counts, or T-Helper cells, and natural killer immune cells, as well as demonstrating trends towards increased cell-mediated immune function. However, Lutgendorf et al. (1997) did not find effects of a CBSM group intervention on HIV-related health markers, but did find differences in herpes simplex virus antibodies, offering modest evidence for immune benefits of the treatment. Cruess et al. (2000) also reported reductions in herpes simplex virus antibodies following CBSM and found that reductions in stress that resulted from home practice of relaxation skills were associated with decreases in herpes antibodies. Other studies from this same research group further support the effects of relaxation and other behavioral skills included in CBSM interventions on various immune system markers (e.g., Antoni et al., 2000; Cruess et al., 2000; LaPerriere et al., 1990). However, it is important to note that these findings, for the most part, are observed only in tests of immediate postintervention effects and that there is limited evidence that the observed changes in immune markers, although reflecting statistically significant effects, translate to clinically improved health.

Interventions for AIDS-Related Bereavement Among People Living With HIV/AIDS

Mental health interventions for people living with HIV/AIDS have become increasingly specialized as research in this area has evolved. Of particular importance is research that has begun to test interventions to assist people living with HIV-related loss. In one pilot study, a small number of men and women who suffered a personal loss because of AIDS participated in a support group based on cognitive and behavioral coping strategies (Sikkema, Kalichman, Kelly, & Koob, 1995). This nine-session support group focused on identifying and expressing emotions, developing adaptive coping strategies, increasing feelings of support, reducing emotional distress, and avoiding maladaptive coping behaviors. Sikkema et al. (1995) found that the support group was feasible and acceptable, with results suggesting reduced depression, grief reactions, anxiety, somatization, and other symptoms of distress. Although it was based on a small sample without a control group, the study points toward the potential value of support groups for bereaved people living with HIV. More recently, Goodkin et al. (1999) reported the outcomes of a group psychotherapeutic intervention for persons who experienced AIDS-related loss compared with a community services control group. Again testing effects

from pre- to postintervention, participation in the grief-reduction intervention produced significant reductions in dysphoria and distress following the intervention. Thus, complementing the positive short-term effects of group interventions for improved general coping and emotional health, groups that target AIDS-related bereavement suggest similar benefits. Intervention to assist people affected by HIV/AIDS to face other specific problems, such as coping with AIDS stigma, disclosure decisions, and life–death issues are worthy of future study.

Interventions to Prevent HIV Transmission Targeted to HIV-Positive Persons

The vast majority of behavioral interventions to reduce HIV transmission risk behaviors have been conducted with HIV-negative persons at risk for contracting HIV and were reviewed earlier in this article. However, studies have repeatedly shown that approximately one in three people living with HIV infection continue to practice unprotected sexual behaviors and are in need of behavior-change interventions (Kalichman, 2000; Wenger, Kuseling, Beck, & Shapiro, 1994). The limited number of interventions for reducing HIV risk behavior in people living with HIV have used traditional health education and risk-reduction behavioral models and have had disappointing effects (e.g., Cleary et al., 1995). A more promising avenue for targeting sexual transmission risk behaviors in people living with HIV may be to imbed risk-reduction strategies within mental health services. Coates, McKusick, Kuno, and Stites (1989), for example, tested an eight-session group intervention that included systematic relaxation techniques, enhancing healthy behaviors, and increasing stress management skills. Of interest, this intervention included minimal specific sexual behavioral-change content but did assess HIV transmission risk-related outcomes. Compared with a waitlist control group, men randomized to the stress reduction intervention demonstrated fewer sexual partners, but did not change in their rates of unprotected sex.

More recently, Kalichman et al. (2000) reported the results of an intervention designed to reduce sexual transmission risks in people living with HIV/AIDS. In this study, men and women living with HIV/AIDS were randomly assigned to receive either (a) a five-session group intervention focused on cognitive and behavioral coping strategies for practicing safer sex, or (b) a five-session contact matched health maintenance support group/standard of care comparison. Participants in this study were also followed for 6 months after the intervention. The risk-reduction intervention was framed around improved coping and increased self-efficacy for managing disclosure of HIV to sex partners and skills for practicing safer sex over one's lifetime. Results showed that the cognitive–behavioral coping skills intervention resulted in significantly lower rates of unprotected intercourse and greater condom use at follow-up. Mathematical modeling of transmission risk behaviors with HIV-negative sex partners and estimated HIV transmission rates over a 1-year horizon were also significantly lower for the behavioral-skills intervention group. The results help extend the domains of benefits observed following cognitive and behavioral skills and mental health oriented intervention beyond improved coping, stress reduction, and positive immunological changes to include potentially important public health outcomes of reduced HIV transmission.

Emerging Issues in HIV/AIDS Behavioral Research

To this point, we have reviewed recent developments in the fields of HIV primary and secondary prevention. Especially in AIDS, where so much changes so quickly, new issues requiring research attention constantly emerge. We will conclude by identifying several new questions in urgent need of behavioral-science research.

Develop Better HIV Prevention Interventions That Can Reach Those Who Are Hardest to Reach

Focused efforts are needed to develop and then carry out prevention interventions specifically directed to populations where HIV incidence remains high. In the United States, these groups include young and ethnic minority MSM, IDUs and their sexual partners, disadvantaged women, persons who contract STDs other than HIV, and marginalized groups such as persons who are homeless or have serious mental illness. It will be especially important to develop tailored HIV prevention models that can be integrated into community service programs that reach these populations.

Many young gay or bisexual men engage in high-risk practices and continue to contract HIV infection at disproportionately high rates. Young African American MSM account for an alarmingly high percentage of new infections. One study conducted in 1998–2000 in six U.S. cities found that 32% of African American, 14% of Latino, and 7% of White MSM between ages 23 and 29 were already infected (Valleroy et al., 2000). Such findings underscore the importance of sustaining HIV prevention programs so that they continually reach new generations of young people, developing better ways to promote maintenance and not just initiation of behavior change, and evolving new intervention approaches that are tailored to meet the needs of those that remain at risk.

Although there is now a considerable body of research evaluating the effects of HIV prevention approaches, the interventions studies to date have most often involved cognitive–behavioral small-group programs. Although useful in many circumstances, the field will benefit from greater attention to interventions conducted at levels smaller than groups (such as individual or couple approaches) as well as interventions undertaken at larger levels (such as community-level, social-network level, and social-policy approaches).

Most HIV prevention models to date have emphasized the goal of achieving consistent condom use for all sexual acts with all partners. To a great extent, this approach is predicated on the assumption that persons have sex primarily with casual partners where safer sex can often be insisted on without great conflict. Whereas condom use has increased between “first time” sexual partners, rates of condom use fall dramatically as soon even as the time of second sex with the same partner (Ku, Sonnenstien, & Pleck, 1994). Although many persons correctly perceive the need for caution with new or casual partners, safer sex is often seen as less important—or less achievable—with partners who are known, liked, or loved, regardless of their objective risk characteristics. This issue is particularly salient for women, who are more likely to be in an exclusive relationship with one male partner at high HIV risk than to have multiple partners themselves (Wagstaff et al., 1995). Interventions directed toward reducing HIV risk among

persons in steady or primary relationships with high-risk partners are, for the most part, missing from the literature. Risk-reduction outcomes other than consistent condom use—such as concurrent HIV testing by members of a couple and agreements to practice safer sex in any outside relationships—may better fit the long-term personal objectives of many people. In addition, condom use is an HIV prevention strategy that requires the man's cooperation. Apart from a polyurethane pouch device ("the female condom"), sexually-active women lack effective female-controlled HIV preventive steps (Ehrhardt, Exner, Hoffman, & Loeb, 1996). As a result, women with male partners resistant to condom risk remain vulnerable to HIV.

Clinical Significance and Cost Effectiveness of HIV Prevention

Although several very large trials of HIV prevention approaches have examined the impact of intervention on HIV seroconversion or on STD incidence rates, it has been much more common for prevention research in this area to examine behavior-change endpoints, such as rates of unprotected sex or levels of condom use. Whereas outcomes such as completely consistent and correct condom use or sexual abstinence carry almost certain HIV protective benefits, most interventions produce reduction rather than cessation of HIV risk behavior. Although reductions in risk behavior may attain statistical significance following an intervention, those changes may or may not also carry clinical or public health significance.

The level of behavior change needed to impact significantly on disease incidence outcomes depends on such factors as the probability that one's sexual partner is infected; the type, frequency, and "per episode" transmission probability for various sexual practices; the magnitude and effectiveness of behavior changes made; and other influences (Holtgrave, Qualls, & Graham, 1996; Pinkerton, Johnson-Masotti, Holtgrave, & Farnham, 2001, in press). It is imperative that the field move beyond measuring only behavior changes produced by interventions and also better address the expected disease reduction impact of these behavior changes. In some trials with large samples, adequate follow-up periods, and high STD/HIV incidence, it may be possible to directly measure biological outcomes. In other situations, obtaining corroborative data on participants' rates of STD acquisition or mathematically modeling the impact observed of behavior changes on disease outcomes can provide a context for the interpretation of an intervention's public health significance. Collection of data by researchers on the costs of delivering HIV prevention interventions can also form the basis for analysis of intervention cost effectiveness (Holtgrave et al., 1996; Pinkerton et al., 2001, in press).

Transferring HIV Prevention Technology to Service Providers

Now that the field of HIV prevention research has matured to the point where a number of effective interventions have been identified (NIH, 1997), it is critical to develop methods to efficiently transfer these models to community-based providers of HIV prevention services (Kelly, Sogolow, & Neumann, 2000). AIDS behavioral research findings are usually published in scientific journals that are inaccessible to front-line service providers,

and service agencies often have difficulty gaining the information needed to use science-based HIV prevention approaches (Goldstein, Wrubel, Faigeles, & DeCarlo, 1998; Somlai et al., 1999). To combat an infectious disease epidemic, it is essential to quickly develop strategies that can strengthen information exchange between HIV prevention researchers and the community-based agencies that are often major providers of HIV prevention services. In a study evaluating strategies for transferring research-based HIV prevention interventions to service providers in 74 cities, Kelly, Somlai, et al. (2000) found that most successful intervention adoptions took place when providers received facilitation manuals, were offered on-site staff-training intervention workshops, and had ongoing consultation with the HIV prevention research team. This argues for the importance of improved science/service information sharing. Such information exchange networks will also allow service providers—who often have firsthand knowledge of risk problems in their communities—to provide input necessary to help define an agenda for addressing new and emerging HIV prevention issues.

A Stronger Focus on Global HIV Prevention Issues is Critical

Of the 36 million HIV infections in the world, over 33 million have occurred outside of North America (UNAIDS, 2000), the vast majority in developing and resource-poor countries. For reasons ranging from humanitarianism, ethics, and enlightened self-interest, because we live in an interconnected world, to the practical issue of lessening the potential for social, political, and economic destabilization that could accompany widescale HIV epidemics in tenuously functioning countries (U.S. National Intelligence Council, 1999), it is essential to foster more international collaboration in HIV prevention activities. HIV is raging out of control in world regions with few resources and little experience in prevention based on behavioral-science principles. Prevention models used successfully in western countries will undoubtedly require considerable adaptation to fit within the different cultures, service frameworks, and resource limitations of developing countries. However, behavioral scientists can play important roles as collaborators in the development of more effective HIV prevention approaches for the world regions most in need of them.

HAART medications, even when provided at reduced cost by pharmaceutical companies and with the support of international benefactors, remain unaffordable to the large majority of HIV-infected persons in resource-poor countries. Apart from increasing the availability of affordable antiretroviral drugs, it is essential to develop effective and sustainable health care service delivery infrastructures and behavioral supports to assist persons in developing countries to adhere to the regimens. Most dramatically, the scale of the HIV epidemics raging in Africa—and quickly developing in parts of Asia, Central and Eastern Europe, and Latin America—underscores the urgent need for expanded HIV primary prevention in these world areas. It will always be more cost effective, practical, and humane to prevent vast numbers of HIV infections rather than struggle to treat them.

Integration of HIV Care and Prevention

For many years, HIV prevention was conceptualized mainly from the perspective of helping people not infected to remain

uninfected. By contrast, care services were considered primarily an issue for those people also who are already living with HIV. Although HIV prevention for the uninfected and care services for those with HIV/AIDS are still needed, it is becoming clear that primary prevention is often most successful in the context of care services, and that persons living with HIV often need assistance in avoiding behaviors that can transmit their infection to others.

As HIV increasingly affects those who are young, socially marginalized, and who face other major issues—such as joblessness, substance use, homelessness, mental illness, or a young person's challenge of developing a positive gay self-identity—risk-reduction outcomes are likely to be best when HIV prevention is imbedded in the context of other services. Without basic services, including shelter, employment, substance-abuse treatment access, domestic violence and mental health assistance, or help in facing gay “coming out” issues, it may be difficult for persons at high risk for contracting HIV to successfully change their behavior. Research is needed on integrated care models of HIV primary prevention.

Although most people aware of their positive HIV status refrain from risky practices, a substantial proportion also continue to engage in high-risk transmission behaviors. As HIV-infected persons live longer and healthier lives, they also confront the long-term challenges of maintaining not only treatment adherence but also personal adherence to strategies that prevent transmitting their HIV infection to others. There is a critical need to conceptualize and evaluate intervention that can assist persons with HIV to refrain from high-risk behavior. When developed, such approaches can be used to reinforce and support the behavior change efforts of HIV-positive persons seen in health care and AIDS service settings.

Maintaining a Sense of Urgency About an HIV/AIDS Epidemic That Is No Longer New

When it first appeared, AIDS drew riveted attention from the public, the media, the scientific world, and in the communities where it hit earliest and hardest. However, that was 20 years ago, and AIDS is no longer a new problem. In the United States, declines in deaths caused by HIV/AIDS because of better antiretroviral medications may be creating a false sense of public complacency concerning the disease. One of the greatest challenges that will be confronted in the years ahead will be maintaining a sense of public health, scientific, and policy urgency concerning an HIV epidemic that is no longer new but continues unnecessarily to take too many lives.

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