ADAPTING EFFICACIOUS INTERVENTIONS
Advancing Translational Research in HIV Prevention

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The Human Immunodeficiency Virus (HIV) has infected approximately 1.5 million people in the United States. Type 1 translation research (basic research, methods development, and efficacy trials) has yielded multiple efficacious behavioral HIV prevention programs. Type 2 translation research (dissemination and effectiveness studies) has been less prevalent or successful. Adaptation of efficacious interventions for culturally diverse populations has received increasing researcher attention, and empirical validation of adaptation procedures promises to help bridge the gap between Type 1 and Type 2 studies. In this article, the authors briefly discuss the development, testing, and dissemination of efficacious HIV prevention programs and then focus on research-based principles and processes that can guide researchers' adaptation efforts and steps that researchers can take to help empower practitioners to conduct science-based adaptation. Greater collaboration between researchers and service providers to test adaptation frameworks promises to benefit both research and practice.

Keywords: *translation; adaptation; HIV prevention; research-based interventions*

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The field of behavioral HIV prevention research has advanced significantly in the past decade. This has been especially true for Type I translation research, including basic research, methods development, and controlled prevention program efficacy trials (Sussman et al., 2006). Type II translation research, which tries to bring programs proven efficacious under highly controlled conditions to the "real world" with all its human and fiscal constraints, has lagged sorely behind (Sussman et al., 2006). Despite advances in dissemination mechanisms (Card, 2001; Neumann & Sogolow, 2000), few effectiveness trials or dissemination trials, components of Type II translation research, have been attempted, and even fewer have yielded positive outcomes.

This article seeks to address the gap between Type I and Type II translation research by offering tips for researchers on how to adapt an HIV prevention program proven efficacious under a Type I paradigm to meet the needs of groups that differ culturally from those with whom the program was initially validated. We also offer suggestions for how researchers can help build the capacity of service providers to conduct adaptations that are based on research-based principles. The article places particular emphasis on the importance of modifying an efficacious program to meet the needs of its new target population and community context while retaining fidelity (or adherence) to its core components, which were, in all likelihood, responsible for its efficaciousness in the original Type 1 controlled trials.

TYPE 1 TRANSLATION RESEARCH: DEVELOPMENT AND EFFICACY TESTING

Since the HIV/AIDS epidemic began, behavioral scientists have produced a large body of basic research identifying HIV risk and protective factors across diverse populations. Based on this accumulating information, researchers and their service agency and community partners have developed, tested, and refined a variety of primary prevention interventions designed to reduce risky sex and substance misuse behaviors. Under researcher-controlled conditions, a number of these have shown behavioral efficacy among groups such as men who have sex with men (Herbst et al., 2005), injection-drug users (Meade & Sikkema, 2005; Metzger & Navaline, 2003), young people (Robin et al., 2004), heterosexual men (Exner, Seal, & Ehrhardt, 1999;

Neumann et al., 2002), and heterosexual women (Mize, Robinson, Bockting, & Scheltema, 2002; Neumann et al., 2002). Overall, these programs have been theoretically guided and culturally tailored, emphasizing the development of cognitive, social, and technical competencies associated with reducing risky sex and/or substance misuse practices (DiClemente, Wingood, Del Rio, & Crosby, 2002; Kelly & Kalichman, 2002).

The biomedical research track has both improved the clinical picture of affected individuals and complicated the population risk equations confronted by behavioral scientists. The development of highly active antiretroviral therapy (HAART) in 1996 has contributed to a decline in annual AIDS death rates in the United States (Centers for Disease Control and Prevention [CDC], 1997; Valdiserri, 2003). But ironically, successful treatment has contributed to a decrease in the perceived severity of HIV and AIDS and a corresponding increase in HIV-related risk behavior (DiClemente, Funkhouser et al., 2002; Flaks, Burman, Gourley, Rietmeijer, & Cohn, 2003). HIV seropositive persons' risky sex and drug use behaviors can transmit HIV to seronegative partners; increase the risk of spreading other sexually transmitted infections, which can in turn increase HIV transmission risk; and result in superinfection with a more virulent, often treatment-resistant HIV variant (Blackard & Mayer, 2004; McGowan et al., 2004). Failure to adhere to HAART protocols among seropositive persons undergoing treatment has been shown to lead to incomplete virologic suppression and the development of drug-resistant strains of HIV that can be transmitted to others (Reynolds, 2004; U.S. Department of Health and Human Services, 2004). Studies suggest that strict protocol adherence is crucial for achieving viral suppression, but in practice, the average compliance rate is estimated at about only 50% (Reynolds, 2004).

These dynamics suggest that both primary and secondary prevention programs are vital to curbing the epidemic (Colfax & Dawson-Rose, 2004; Janssen & Valdiserri, 2004). In response, recent public health initiatives by the CDC and others have included recommendations for HIV prevention among HIV-positive people (CDC, 2001b, 2003; Gordon, Forsyth, Stall, & Cheever, 2005; Institute of Medicine, Committee on HIV Prevention Strategies in the United States, 2001; Janssen et al., 2001), and efforts to develop and rigorously evaluate secondary behavioral prevention interventions have increased. Several of these interventions have shown positive behavioral effects

(Crepaz et al., in press), including reducing the numbers of sexual partners among men (Johnson, Hedges, & Diaz, 2003); improving consistency of condom use among African American women (Fogarty et al., 2001); reducing unprotected intercourse and/or increasing condom use among men and women (Kalichman et al., 2001; Richardson et al., 2004), including serodiscordant couples (Padian, O'Brien, Chang, Glass, & Francis, 1993); reducing the frequency of sexual risk behaviors among depressed persons (Kelly et al., 1993); and achieving positive impacts on sex and substance misuse–related behaviors among injection drug users (Margolin, Avants, Warburton, Hawkins, & Shi, 2003). To date, these programs have been based on variants of Social Cognitive Theory (Bandura, 1994), although there is increasing recognition that multilevel interventions that focus on structural and ecological factors (e.g., community norms, institutional policies, and public policies and laws) and individual-level factors are important in secondary (as well as primary) prevention efforts (Poundstone, Strathdee, & Celentano, 2004; Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005).

TYPE 2 TRANSLATION RESEARCH: DISSEMINATION AND REPLICATION

Accompanying these advances in intervention development and efficacy testing have been advancements in how best to promote dissemination, adoption, and faithful implementation of efficacious interventions in real-world agency contexts. In 1993, with funding from the National Institute on Child Health and Human Development (NICHD), Sociometrics Corporation initiated development of the Program Archive on Sexuality, Health and Adolescence (PASHA; http://www.socio.com/pasha.htm), a collection of practitioner-focused replication kits for empirically validated teen pregnancy and youth STD and HIV prevention programs (Card, 2001; Card, Niego, Mallari, & Farrell, 1996). Each program included in PASHA has been selected by a Scientist Expert Panel based on content relevance, methodological rigor, and evidence of a positive effect on fertility or STD- and HIV-related sexual behaviors.[1] For each selected program, archive staff acquire the original program materials and package them in a user-friendly box (the program package or replication kit) that contains all the materials needed to replicate the program in a new site

(e.g., curriculum guide, participant workbook, videos). In collaboration with the original developer, the materials are reformatted, as needed, to increase their visual appeal and usability among prevention practitioners. In addition, a user's guide is prepared that describes the program's history, rationale, and original evaluation methods and findings, and provides guidelines and tips for program implementation. Two starting points for reevaluating the replicated program are also included in each kit: the original outcome evaluation instrument(s) and a set of generic outcome questions measuring the archive's targeted outcome variables (Card, Peterson, Niego, & Brindis, 1998). With funding from the National Institute of Allergy and Infectious Diseases, Sociometrics developed a similar collection of replication kits for adult primary HIV–prevention interventions, the HIV/AIDS Prevention Program Archive (http://www.socio.com/happa.htm), in the late 1990s (Card, 2001; Card, Benner, Shields, & Feinstein, 2001). Free technical assistance by Sociometrics' senior research staff is provided to purchasers of the kits to help them address issues related to the planning, implementation, and evaluation of the intervention in the new context.

Meanwhile, in 1996, the CDC launched Replicating Effective Programs (REP; see http://www.cdc.gov/hiv/projects/rep/default.htm), an initiative to build the capacity of local HIV prevention agencies to implement and sustain effective interventions by making intervention materials, training, and technical assistance more widely available to them, and by encouraging researcher-practitioner collaboration in behavioral HIV prevention work (Neumann & Sogolow, 2000). Through REP, the CDC has funded a number of developers of efficacious programs to produce replication kits for their behavioral and social HIV prevention interventions. Originally developed in hardcopy format, materials are now being placed on CD-ROM and on the Internet to facilitate broad cost-effective diffusion (C. Collins, personal communication, October 23, 2005). The CDC is also currently providing training, technical assistance, and other resources to promote the replication of these programs in a variety of service agency contexts through the related Diffusion of Effective Behavioral Interventions (DEBI) Project (see http://www.effectiveinterventions.org). Under the CDC and Sociometrics initiatives, replication materials have now been disseminated to hundreds of service organizations.

Although Sociometrics and the CDC have documented that program materials for efficacious interventions have been acquired

by a large number of service provision agencies across the country, only limited data are available on the quality of implementation or the effectiveness of these programs in practitioner-controlled service agency contexts. Sociometrics' field test of program packages for 12 of the efficacious youth-focused sexual risk reduction programs originally included in PASHA found varying fidelity to the implementation in the original controlled trial (Niego, Park, Kelley, Peterson, & Card, 1998). Promising behavioral outcomes for several programs were noted, but very small sample sizes and use of a synthetic comparison group (because of limited study resources) reduced the utility of the findings for assessing program effectiveness.

CHALLENGES IN MOVING FROM TYPE I TO TYPE II TRANSLATION RESEARCH

Moving an intervention from the highly controlled setting of an efficacy trial to the real-world setting of an effectiveness study presents a number of challenges. One key issue concerns adherence to the original intervention protocols. There is widespread agreement in the HIV prevention literature that interventions that have demonstrated efficacy in research trials are most likely to achieve similar (positive) outcomes in additional sites when they are implemented with high fidelity to the procedures of the original trial—that is, when they have adhered to the delivery of the same activities or services, with the same duration, intensity, and formats, with clients and in cultural settings that are similar to those in the research trial. However, practitioners often lack the levels of staffing, funding, and training that are needed to implement the intervention as it was designed. As a result, they commonly make alterations to the intervention to accommodate their resource levels (Gandelman & Rietmeijer, 2004; Gordon et al., 2005; Niego et al., 1998; Oliva, Rienks, Udoh, & Smith, 2005). Furthermore, most efficacious programs have been tested with a specific target population (e.g., African American women; men who have sex with men) in a single cultural context ("Adapting," 2005). Service providers often consider these programs, as originally implemented, to be culturally inappropriate for their target populations and communities (Miller, 2001). Whether researcher-driven or practitioner-driven, successful replication of a program in a different cultural environment requires an understanding

of how and in what ways to retain fidelity to the original program versus how to adapt it to the new context (Green & Glasgow, 2006). The remainder of this article discusses the need for cultural adaptation, suggests research-based principles and procedures for guiding the adaptation process, and proposes ways in which researchers can help empower practitioners to conduct science-based program adaptation.

ADAPTATION AS A VEHICLE FACILITATING THE MOVE FROM TYPE I TO TYPE II TRANSLATION RESEARCH

The need to reach culturally diverse populations with effective HIV prevention strategies has been increasing, particularly given both the changing face of the epidemic and the changing demographic profile of the United States as a whole. Although the overall HIV infection incidence rate in the United States has slowed from an estimated 150,000 cases per year in the mid-1980s to a current estimate of 40,000 annually (CDC, 2004b), the disparities in HIV and AIDS rates between White Americans and members of other racial and ethnic groups continue to grow. In particular, although African Americans and Hispanics represent 12% and 13% of the U.S. population (Grieco & Cassidy, 2001), respectively, together they accounted for about 70% of new AIDS diagnoses in 2001 (CDC, 2002). Currently, racial and ethnic minorities represent the majority of new AIDS cases, the majority of Americans living with AIDS, and the majority of deaths among persons with AIDS in the United States (Henry J. Kaiser Family Foundation, 2004). The gender profile of the HIV and AIDS epidemic in the United States is also changing. Women account for a growing proportion of victims of the epidemic, rising from an estimated 14% of adults and adolescents living with AIDS in 1992 (CDC, 1998) to 22% as of the end of 2003 (CDC, 2004c). African American females are at particular risk: In 2003, the estimated AIDS rate among Black (not Hispanic) females was 50.2 per 100,000, whereas the estimated rate among White (not Hispanic) females was only 2.0 per 100,000 (CDC, 2004c). In 2000, HIV/AIDS were among the top three causes of death for African American women ages 35 to 65 (National Center for Health Statistics, 2002). In addition, significant demographic shifts in the U.S. population have occurred during the past two

decades and are expected to continue into the future, including large increases in the percentages of the total population that are members of racial and ethnic minority groups, are foreign born, or speak a language other than English at home (Day, 1996; Grieco, 2001; Guzmán, 2001; Malone, Baluja, Costanzo, & Davis, 2003; Shin & Bruno, 2003), further supporting the potential benefits of tailoring interventions for diverse cultural groups.

The empirical literature suggests that when target populations or cultural settings are different from those in the research trial, adaptations to the intervention may make the program as effective or even more effective than it was in the original research (Kelly, Heckman, et al., 2000). In particular, a large body of research in HIV prevention and related fields suggests that when an intervention is tailored to the linguistic needs, developmental level, and cultural background of its clients (including culturally specific risk issues, protective factors, and service delivery preferences), it is possible to enhance community support, client participation, and program satisfaction, outcomes, and institutionalization (CDC, 2001a; Kelly, Heckman, et al., 2000; Kennedy, Mizuno, Hoffman, Baume, & Strand, 2000; Kirby, 2002; Pedlow & Carey, 2004; Raj, Amaro, & Reed, 2001; Scott, Gilliam, & Braxton, 2005; Stanton et al., 2005; Vinh-Thomas, Bunch, & Card, 2003; Wilson & Miller, 2003). For example, Kennedy and colleagues (2000) worked with four U.S. sites to tailor the efficacious Be Proud! Be Responsible! HIV–risk reduction curriculum, originally developed and evaluated with African American male teens (Jemmott, Jemmott, & Fong, 1992), to fit the needs of their local audiences, which included both male and female youth from various ethnic backgrounds. Local focus groups, a survey of recent behavioral science literature, and input from local curriculum specialists all provided input to the tailoring process. At the three sites where the full evaluation design was implemented (i.e., a pretest, posttest, and 1-month follow-up with treatment and control and comparison groups), statistically significant effects on at least one behavioral measure were observed. In addition, the authors note that when the project began, none of the school systems in the participating communities used a complete version of an empirically-validated curriculum. By the end of the project, all sites had active support from their local school systems, some eventually adopted the intervention, and no organized community resistance to the explicit prevention messages and condom demonstrations had been reported.

However, it is also possible to adapt programs in ways that enhance local acceptance but undermine the original program's positive effects. For example, Stanton and colleagues (2005) report on the adaptation and testing of Focus on Kids, a sexual risk reduction intervention that had previously demonstrated efficacy with urban African American youth with high rates of HIV and STDs in Baltimore (Stanton et al., 1996), for use with rural primarily Caucasian youth with low HIV and STD rates in rural West Virginia. In this study, a less altered version of the Focus on Kids curriculum was compared to a more highly altered version. In both versions of the curriculum tested, because of community concerns, the condom use content was decreased. In addition, in the more highly adapted version, focus groups and individual interviews with youth, parents, teachers, and school and county administrators and data from risk prevalence studies in the state were used to inform additional changes. These included (among other changes) a further reduction of condom-related activities and a greater focus on abstinence. Ultimately, neither version of the curriculum demonstrated positive behavioral outcomes, although the less modified curriculum had a greater impact on condom use perceptions.

The mixed success of program adaptation efforts raises the issue of what principles and procedures can promote successful adaptation of programs for different cultural contexts. Although the scientific study of HIV prevention program adaptation is a relatively new endeavor, some principles and procedures have begun to emerge from the empirical literature.

PRINCIPLES AND PROCESSES FOR CONDUCTING RESEARCH-BASED PROGRAM ADAPTATION

Research-based principles and procedures for adapting HIV prevention interventions have emerged through collaborative intervention planning and evaluation efforts involving academic researchers, service providers, and community partners. These principles and procedures are summarized as a series of steps in Table 1 and described in further detail below.

1. *Know the target population and community context*. Successful cultural adaptation of an empirically validated program requires an understanding of the HIV-related needs and assets of the target

TABLE 1
Summary of Research-Based Adaptation Steps

1. Know the target population and community context.
2. Select the program that best matches the population and context.
3. Retain fidelity to the "core program."
4. Systematically reduce mismatches between the program and the new context.
5. Document the adaptation process and evaluate the process and outcomes of the adapted intervention as implemented.

population and local community, including the cognitive, attitudinal, emotional, behavioral, and ecological factors that increase or decrease HIV risk. Such an understanding facilitates the setting of relevant, acceptable, and realistic program goals with respect to HIV risk and protective behaviors and their mediators, such as HIV-related knowledge; sex and drug use–related communication, negotiation, and refusal skills and self-efficacy; and motivation to reduce risky behaviors or increase protective ones. Understanding HIV-related needs and assets also facilitates identification and refinement of activity or service content and formats that will be appropriate for the target population. In addition, involving target population and community members actively in the needs and assets assessment process can help build acceptance and readiness for the program in the local community (NICHD, 2002; Sormanti, Pereira, El-Bassel, Witte, & Gilbert, 2001).[2] Multimethod needs and assets assessments are common in researcher-led program development and adaptation studies. They often involve collaborations among researchers, service agencies, and community partners to conduct literature reviews, surveys, focus groups, in-depth interviews, and/or direct observations of service delivery practices (e.g., Dévieux, Malow, Rosenberg, & Dyer, 2004; Malow, Dévieux, & Rosenberg, 2001; Malow, Jean-Gilles, Dévieux, Rosenberg, & Russell, 2004; L. O'Donnell, San Doval, Duran, & O'Donnell, 1995; Tortolero et al., 2005) that result in a comprehensive picture of target population, community, practitioner, and researcher perspectives. In practitioner- led program planning efforts, such comprehensive assessments are often not possible, because of resource constraints. Focus groups with clients and Web sites and reports that synthesize the findings of government-sponsored data collection efforts (e.g., such as the CDC's Behavioral Risk Factor Surveillance System or Youth Risk Behavior Surveillance System)

are commonly the main sources of needs and assets assessment data in these efforts.

A key component of assessment that may be overlooked in the adaptation process is an explicit consideration of how culture should be defined in the project and how multiple cultural identities within the target population may be related to HIV risk behaviors and prevention efforts. Wilson and Miller (2003) have pointed out that in the field of HIV prevention, "culture" tends to be considered mainly in terms of oppressed racial or ethnic groups. However, across other disciplines, culture is generally defined as comprising widely shared sets of values, institutions, practices, and beliefs that (a) emerge as groups adapt to their environment and (b) are learned through social interactions that provide contexts for behavior and influence behavior (Brown, 1991; Scheer, 1994; Wilson & Miller, 2003). Under this broader view of culture, social groupings defined by multiple dimensions, such as gender, age cohort, sexual orientation, shared geography, and common interests or experiences (such as substance use, HIV-positive status, and sexual abuse history), all constitute cultural categories. Each cultural affiliation is associated with a set of attitudes, beliefs, values, and socioeconomic circumstances that can mediate HIV risk behavior (Hoban & Ward, 2003; Malow et al., 2001; Raj et al., 2001; Scott et al., 2005; Wilson & Miller, 2003). For example, a person's definitions of health and illness, beliefs about what causes HIV and how to prevent it, values concerning gender roles in sexual relationships, and attitudes toward communicating with sexual partners or service providers about sexual or drug-related behaviors are all shaped by their various cultural identities (L. O'Donnell et al., 1995; Raj et al., 2001; Zenilman, Shahmanesh, & Winter, 2001). Thus, within any cultural group that is defined by one, two, or even more social dimensions, there are members with multiple, overlapping cultural affiliations (Dévieux, Malow, et al., 2004; Hoban & Ward, 2003), some of which may be more salient to group members than others (Dushay, Singer, Weeks, Rohena, & Gruber, 2001; Malow et al., 2001; Wilson & Miller, 2003). Furthermore, cultural identities—and cultures themselves—change with time, which means that HIV prevention messages that are relevant for and acceptable to a group at one point in time may need to be updated periodically (Castro, Barrera, & Martinez, 2004; Kennedy et al., 2000; Malow et al., 2001). Defining the term culture in the context of the specific prevention effort and identifying relevant cultural

categories are therefore important steps in the process of considering how the needs, assets, and preferences of a population and community influence HIV risk and protective behaviors, access to and receptivity to use of prevention services, and the potential success of different prevention approaches.

2. *Select the program that best matches the population and context*. Selecting an empirically validated intervention that is the best possible match for the new context will minimize the cost and challenge of the adaptation process. The research-based literature in HIV prevention and related fields (e.g., Backer, 2001, 2003; CDC, 2001a; Kirby, 2001; Miller, 2001, 2003; Solomon & Card, 2004) suggests that the match between program and context is maximized when there is the following:

- The intervention has shown strong empirical evidence in a rigorous research study of having achieved behavioral and/or health status goals that are relevant for (i.e., address the needs of) and acceptable to the new target population and community.
- The theory of change that underlies the intervention addresses mediators of risk behavior (e.g., beliefs, skills, social norms, self-efficacy, intentions) that have been shown through needs and assets assessment to be the major mediators of risk behavior among the new population.
- The content and methods of the intervention are appropriate for the target population's risk level, developmental level, and cultural and linguistic background and are acceptable to the target population and local community. Community norms and beliefs—e.g., the (scientifically unsubstantiated) belief that educating adolescents on the proper use of condoms encourages early sexual behavior—often present significant challenges to the adoption of empirically validated interventions that take controversial approaches (Hare, Orians, & Goodman, 1998; McCoy, Malow, Edwards, Thurland, Rosenberg, in press; NICHD, 2002; Stanton et al., 2005). In some cases, extensive community involvement in the adaptation process can increase community acceptability of an intervention (e.g., Kennedy et al., 2000), but in other cases, acceptability remains low and results in significant curricular changes that ultimately may undermine program outcomes (e.g., see the previous discussion of the Focus on Kids adaptation [Stanton et al., 2005]).
- The intervention approach and activities are good matches for agency philosophy and available resources, including funding, staffing (e.g., number, credentials, skills, etc.), facilities, equipment, and time that staff can spend with the target population. As was mentioned above, mismatches between an intervention and the agency context commonly lead to a failure to fully implement the program as it was planned.

- A set of intervention materials is available to program planners and implementers, along with access to adaptation assistance (e.g., training, technical assistance) from the intervention's original developer, evaluator, or current distributor.

In practice, there is often no empirically validated intervention that is an ideal match for the new context, resulting in a need for adaptation to reduce or eliminate the sources of mismatch.

3. *Retain fidelity to the "core program."* The empirical literature generally supports that the successful replication of an empirically validated intervention in a new site importantly depends on retaining fidelity to the "core program" while permitting the flexibility to adapt noncore elements to the new population and context (Backer, 2001; Bauman, Stein, & Ireys, 1991; Castro et al., 2004; CDC, 2001a; Kelly, Heckman, et al., 2000; Leventhal & Friedman, 2004; Stanton et al., 2005). Kelly, Heckman, and colleagues (2000) have defined core components as "those features in the intent and design of an intervention that are responsible for the effectiveness of the intervention" (p. 90). They have suggested three ways of identifying core components for a given intervention:

(a) *By means of behavioral and social science theory*. Effective HIV prevention interventions for diverse populations are based on one or more behavioral or social science theories that have been shown to underlie other effective health prevention or promotion programs (CDC, 2001a; Fishbein, Triandis, et al., 2001; Kirby, 2002), such as the Health Belief Model (e.g., Becker, 1988), Social Cognitive Theory (e.g., Bandura, 1994), and the Theory of Reasoned Action (e.g., Fishbein, Middlestadt, & Hitchcock, 1991), among others. These theories emphasize the roles played by such factors as skills, anticipated outcomes, social norms, self-efficacy, and intentions as mediators (or determinants) of HIV risk-related behavior (Fishbein et al., 2001). Interventions based on these theories involve activities that target these determinants. Because such interventions assume that these determinants are directly responsible for behavioral effects, the activities that are hypothesized to influence them can be considered core components. Identifying core components by means of behavioral science theory requires an understanding of the theoretical logic and hypotheses underlying the linkages among key determinants and behavioral outcomes. As departures are devised in

intervention content and implementation details to fit the new context, program adapters should carry an awareness of and adherence to this logic.

(b) *By means of extensive experience with the intervention*. The original program developers and evaluators have extensive experience with the planning, implementation, and assessment of the intervention and through these activities have obtained feedback from participants and staff on the most useful features of the program. Using this knowledge and experience, they can offer judgments on what aspects of the program constitute core versus noncore components. This has to date been the primary source of information on core components in CDC's REP Project (Kelly, Heckman, et al., 2000).

(c) *By means of controlled experiments that conduct componential analyses*. Several HIV prevention studies have assigned subjects to versions of an intervention that differed with respect to specific procedures and/or activities (Jemmott, Jemmott, & Fong, 1998; Kalichman et al., 2005; Kalichman, Rompa, & Coley, 1996; L. O'Donnell et al., 1995) or with respect to duration or intensity (Peterson et al., 1996; Rotheram-Borus, Gwadz, Fernandez, & Srinivasan, 1998) to identify whether these aspects affected program efficacy and therefore could be considered core program elements. Further experimental research to identify core components is crucial to advancing the study of program adaptation (Kelly, Sogolow, & Neumann, 2000; Stanton et al., 2005).

4. *Systematically reduce mismatches between the program and the new context*. In their work on adapting substance abuse programs, Castro et al. (2004) characterize adaptation as the process of altering an intervention in ways that reduce mismatches between various aspects of that intervention and the new context in which it is to be implemented (Castro et al., 2004). When replication of an empirically validated intervention is the goal, the adaptation process should aim to minimize these program-context mismatches while retaining fidelity to the core program.[3]

The dimensions along which such mismatches may occur have been named and characterized somewhat differently across authors. For example, Dévieux, Malow, and colleagues (2004) have built on the work of Bernal, Bonilla, and Bellido (1995) to consider dimensions

of persons (i.e., similarities and differences between intervention participants' and service providers' values and experiences), language, cultural content (i.e., cultural knowledge, beliefs, and practices), and cultural context (i.e., social, economic, political, and spiritual contexts) as they adapted the Cognitive Behavioral Stress Management–Recovering Drug Abusers intervention to address sexual risk behavior, substance abuse, and HAART adherence among ethnic minority, adult, HIV-positive recovering drug abusers in Miami (Dévieux, Malow, et al., 2004). The work of Castro et al. (2004), meanwhile, has also defined three key dimensions to guide adaptation. Cognitive-information processing pertains to the ability of the target population to understand program messages as delivered through specific formats, given their age, developmental level, and language background. Affect-motivation pertains to the potential degree of acceptance or rejection of program messages and delivery formats, based on their congruence or conflict with the target population's cultural values. Environment of the local community refers to structural or ecological factors that may influence program participation and acceptance and application of program messages. Although researchers have chosen to group key concepts under different dimension headings, they share a focus on the importance of addressing deep structure intervention characteristics (Resnicow, Soler, Braithwait, Ahluwalia, & Butler, 2000) or core values, beliefs, norms, and other significant aspects of individuals' and groups' worldviews and lifestyles that influence mediators of HIV-related behavior, such as HIV-related knowledge, condom use attitudes, sexuality and injection drug use communication and refusal skills, and risk reduction motivation, as well as access to and use of intervention services.

It is worth noting that particularly in some urban settings, those undertaking program adaptations are increasingly confronting target populations with significant internal cultural diversity (Dévieux, Malow, et al., 2004; NICHD, 2002). Kirby's (2003) review of the empirical literature on youth-focused sexual risk reduction programs concluded that a number of interventions (e.g., Safer Choices; see Kirby et al., 2004) have demonstrated positive effects with the multiple ethnic groups represented in the broader target population with which they were originally validated. However, in some cases, the content or delivery formats of an intervention may be inappropriate for one or several subpopulations of a new target group. Although in some instances this may necessitate a separate intervention effort for each subpopulation, in other instances, it may be possible to adapt the

program in ways that successfully address needs and preferences that are common to all subgroups. For example, in adapting the Cognitive Behavioral Stress Management–Recovering Drug Abusers intervention for Hispanic and Black HIV-positive recovering drug users of varying national origins, Dévieux, Malow, and colleagues (2004) focused intervention content on common triggers for substance use, unsafe sex, and poor HAART adherence, and the skills needed by all groups to interact more effectively within health care, family, and peer networks. They also changed the program delivery format to single-sex, small-group sessions to accommodate common service delivery preferences within the broad target population. Finally, they adapted the program staffing to include one Black and one Hispanic intervention cofacilitator for each group of participants to help increase comfort and sense of connection with the program. Similar strategies have been proposed by Dusenbury and Falco (1995) for adapting youth substance abuse programs to meet the needs of multiethnic populations.

Although in-depth knowledge of the target population and local community can suggest promising ways in which intervention content and delivery should be adapted, use of a logic modeling process (also called a program modeling or intervention mapping process) can support maintenance of (or intentional deviation from) fidelity to the core program as adaptations are made (Tortolero et al., 2005). In particular, a logic model for the original validated intervention—specifying the theoretical assumptions about the linkages between the intervention's core components, key mediators of HIV risk or protective behavior, and the targeted behaviors themselves—should be developed at the onset and consulted as adaptations are considered. Proposed adaptations should be mapped to a revised model that is compared to the original to ensure adherence to core components. The revised model should also be examined against certain criteria of strength (Kirby, 2004; Sedivy, 2000), such as the following:

- Does the model, in a meaningful way, reflect needs and assets assessment data on the population's HIV-related risk and protective factors, including cultural factors that affect determinants of HIV transmission?
- What is the strength of the evidence that the program components, as planned, can collectively affect the mediators of behavior and that the expected changes in these mediators can significantly affect the targeted behaviors?

- Does the model reflect characteristics known to be common to empirically validated HIV prevention programs that have taken similar approaches and been validated with similar populations?
- Is there stakeholder consensus on the model?

5. *Document the adaptation process and evaluate the process and outcomes of the adapted intervention as implemented*. A discipline of documentation is essential to advancing the science and practice of program adaptation. In particular, conducting process and outcome evaluation of the intervention as implemented is essential to determining the effectiveness of the adapted intervention in a new context. These findings, along with careful documentation of the process that was used to alter the original intervention, also permit an assessment of the utility of specific adaptation procedures (Backer, 2001; Kelly, Sogolow, et al., 2000; Miller, 2003; Primavera, 2004).

Process evaluation, which includes documentation of what activities or services were implemented, how they were implemented, and with whom, compared to what was planned, can help shed light on the following: (a) what specific combinations of strategies, activities, and services did or did not lead to successful outcomes; (b) whether any negative outcome evaluation findings were the result of poor program theory, poor program implementation, or poor program attendance; and (c) how the intervention might be improved. Yet most HIV prevention intervention outcome studies do not report on process evaluation methods or results but instead simply state or leave the reader to assume that interventions were implemented with high fidelity to their original designs (Kelly, Sogolow, et al., 2000). As interventions are adapted for culturally diverse populations, two types of fidelity become relevant: fidelity to the original intervention (and particularly to its core components) and fidelity to the planned adaptations (Cummins, Goddard, Formica, Cohen, & Harding, 2002; National Campaign to Prevent Teen Pregnancy, 2004; Stanton et al., 2005). Recent adaptation studies in HIV prevention and related fields have used methods such as staff journals, logs, checklists, or surveys; program participant surveys; direct (live) observation by research staff; and review of session audiotapes to document these aspects of service implementation (Dévieux, Jean-Gilles, Rosenberg, Wendell, & Malow, 2004; Dusenbury, Brannigan, Falco, & Hansen, 2003; Miller, 2003). However, detailed process documentation is not widespread, and there is no consensus on what types of tools and measures are

most appropriate for assessing fidelity of either type (Dusenbury et al., 2003; NICHD, 2002).

Outcome evaluation data often comprise self-reported measures of knowledge, skills, attitudes, intentions, behaviors, and STD infection status. An issue that becomes foregrounded in outcome studies of adapted programs concerns the tension between the desire to use the same measures, instruments, and procedures employed in the original study of the program's effects, to facilitate direct comparison of results (Miller, 2003); and the recognition that if these measures, instruments, and procedures are not well matched to the clients' cultural backgrounds, the internal validity of the findings is threatened (Greenfield, 1997). In outcome evaluations, cultural factors, such as value and belief systems, communication norms, literacy levels, and level of schooling, can affect what questions may appropriately be asked, how, and of whom; and how they are interpreted and answered by study participants (Conner, 2004; Greenfield, 1997; Hopson, Lucas, & Peterson, 2000; SenGupta, Hopson, & Thompson-Robinson, 2004). In addition to threatening a study's internal validity, culturally inappropriate frameworks and procedures may raise ethical questions concerning such issues as participants' ability to provide informed consent and the potential of the evaluation to further disempower populations that have already been marginalized (Bamberger, 1999; Dévieux, Jean-Gilles, et al., 2004; Dévieux et al., 2005; Hopson, 1999; Merryfield, 1985; SenGupta et al., 2004).

In response to these concerns, SenGupta et al. (2004) have emphasized the importance of addressing cultural competence in evaluation, which entails being "cognizant, understanding, and appreciative of the cultural context in which the evaluation takes place" (p. 13); making explicit the cultural issues that can pose threats to the internal validity of the study; employing culturally and contextually appropriate methods; and involving members of the target population and community in the interpretation of the findings and decision making about their use. Conner's (2004) evaluation of two HIV prevention interventions for Spanish-speaking Latinos (the *Tres Hombres* program for migrant farmworkers and the SOLAAR[4] program for gay and bisexual urban men) addressed these points by actively involving members of the intervention target population as evaluation advisors. They provided input on appropriate question content, format, and administration procedures and worked collaboratively with the researchers to address challenges that arose. In the case of *Tres Hombres*, for example, focus

groups with members of the target population helped the researchers to develop a small-group oral and written survey format in which a Spanish-speaking staff person read out the questions while following (word by word, with his hand) the written questions on a flipchart. This permitted participants with very limited literacy skills to listen, "icon match" the questions on the flip chart to the written survey in front of them, and respond privately to the questions without having to reveal their limited literacy skills. Target audience members also provided input on the design of special cards that encouraged and facilitated attendance at posttest survey sessions.[5]

Documenting the adaptation process, including procedures used, options considered, and decisions made, is also crucial to the advancement of the adaptation endeavor. This information can shed light on intervention outcome findings and also inform future endeavors by researchers and/or practitioners to adapt the same or another intervention. For example, documentation of changes made to the Focus on Kids curriculum (discussed above) provided insight into the failure of the two versions of the intervention to achieve positive behavioral outcomes and lent support to the notion that identification of core program components should be a priority for HIV prevention program research (Stanton et al., 2005).

RECOMMENDATIONS FOR EMPOWERING SERVICE PROVIDERS TO CONDUCT RESEARCH-BASED PROGRAM ADAPTATION

In addition to using science-based adaptation principles and processes in their research studies, researchers can take steps to build the capacity of prevention practitioners to undertake science-based intervention adaptation in their service provision contexts. Recent data from surveys conducted by the National Campaign to Prevent Teen Pregnancy (Philliber Research Associates & National Campaign to Prevent Teen Pregnancy, 2005) and the Healthy Teen Network (formerly the National Organization on Adolescent Pregnancy, Parenting, and Prevention; P. Paluzzi, personal communication, July 1, 2005) suggest that service providers consider lack of cultural appropriateness to be a key barrier to replicating science-based programs in new sites. By helping empower service providers to conduct research-based program adaptation, researchers and evaluators can address this barrier to more widespread adoption and appropriate implementation of efficacious HIV prevention interventions.

TABLE 2
Summary of Recommendations for Empowering Service Providers to Conduct Research-Based Program Adaptation

1. Build service providers' capacity to collect and use needs and assets assessment data.
2. Build service providers' capacity to use theory in adaptation.
3. Provide information on efficacious interventions' core components and projected implementation costs.
4. Develop service provider–focused adaptation tools.
5. Collaborate with service providers to identify and test additional resources to support practitioner-driven adaptation efforts.

Some specific recommendations on how researchers can increase service providers' ability to systematically adapt HIV prevention interventions for culturally diverse populations are summarized in Table 2 and discussed briefly below.

1. *Build service providers' capacity to collect and use needs and assets assessment data*. One specific area in which increased service provider capacity would benefit adaptation efforts is that of needs and assets assessment. Practitioners often possess a wealth of practical experience with their target populations, which is very valuable to program adaptation efforts. Although they seldom can access the resources to conduct large-scale, multimethod needs and assets assessments, they do commonly acquire relevant data from the Internet and from focus groups with members of the target population and local community. Credible sources such as the CDC, state and local public health departments, and selected foundations and large nonprofit service and advocacy organizations make a variety of useful data and related information freely available on the Internet. However, the accumulating quantity of information and Web sites can overwhelm practitioners and frustrate their efforts to identify the most relevant and scientifically credible sites. Offering easy-to-use, one-stop shopping Web sites that bring together links to locally relevant sources of information on empirically validated programs and culturally specific risk and protective factors can promote more effective use of the Internet to serve program adaptation objectives. The Wisconsin Department of Public Instruction, for example, has recently launched the "Educators' Resource Center for Youth Sexual Risk Behavior Prevention" (see http://dpi.wi.gov/sspw/hiercindex.html). The Web site is designed to serve staff from Wisconsin schools, community-based organizations, government agencies, and others working to prevent youth sexual risk

taking and its undesired health outcomes. The site provides access to local and nationwide resources that can help facilitate use of evidence-based practices in program development, adaptation, evaluation, and sustainability.

Practitioners also often have access to needs and assets assessment data through focus groups, which have been widely used (generally in combination with other methods) in successful researcher-driven intervention adaptation and tailoring efforts (Dévieux, Malow, et al., 2004; L. O'Donnell et al., 1995; Sormanti et al., 2001). As Sormanti and colleagues have pointed out, focus groups can permit a helpful exploration of the influence of culturally specific factors (such as gender roles and partner communication styles) on mediators of HIV risk behavior. Moreover, as they actively involve members of the target population in dialogue, they can provide an enjoyable experience and sense of involvement and ownership in programming efforts, which in turn can promote more successful recruitment and higher satisfaction and retention rates once program implementation begins (Sormanti et al., 2001). The further step of training practitioners in techniques for conducting focus groups would permit them to better leverage opportunities to collect their own local data to inform adaptation efforts.

2. *Build service providers' capacity to use theory in adaptation.* Another specific area in which increased service provider capacity would benefit adaptation efforts is that of the use of behavioral and social science theories. As was described above, behavioral and social science theories that underlie empirically validated programs are considered crucial to positive behavioral outcomes and have an important role in science-based adaptation processes. Although practitioner-focused summaries of these theories are available free of charge via the Internet (e.g., Glanz & Rimer, 2003), many practitioners have no background in such theories and remain skeptical of the value of theory in prevention program efforts (DeCarlo & Kelly, 1996; Dolcini, Canin, Gandelman, & Skolnik, 2004). Building practitioners' theoretical knowledge and skill in ways that use their practical experience (Dolcini et al., 2004) can increase the appropriate use of theory in adaptation and in program and evaluation planning more generally. Providing such training via the Internet (Kelly, Sogolow, et al., 2000), an "in-person train the trainers" model (e.g., Ramos & Ferreira-Pinto, 2002), or a volunteer program (e.g., Behavioral and Social Science Volunteers Program initiative of the CDC and the

American Psychological Association; see Kelly, Sogolow, et al., 2000) can help to build sustained capacity in ways that do not necessarily require significant expenditures by community agencies that are already facing a scarcity of programming resources.

3. *Provide information on efficacious interventions' core components and projected implementation costs*. As was discussed above, to date, most information on efficacious programs' core components has been based on the experiences and intuitions of program developers and evaluators and not on componential analysis or behavioral or social science theory (Kelly, Sogolow, et al., 2000). Furthermore, this information tends to be very brief and therefore provides only limited guidance to service providers on what aspects of the intervention should not be altered. The core elements identified for each HIV prevention intervention in the CDC's REP Project are generally limited to a brief list of three or four items that summarize in very broad terms a few short-term goals and activities. For example, one core component of the Video Opportunities for Innovative Condom Education and Safer Sex program (L. R. O'Donnell, O'Donnell, San Doval, Duran, & Labes, 1998) is described simply as "conducting skills building to overcome barriers to condom use" (Kelly, Heckman, et al., 2000, p. 92). Additional research on core components of specific interventions is needed (Kelly, Sogolow, et al., 2000; Kennedy et al., 2000; NICHD, 2002; Stanton et al., 2005), and the results of this research should be disseminated in lists of effective interventions and included with intervention materials to facilitate appropriate intervention selection and adaptation. Each set of materials for an empirically validated intervention should also include a detailed logic model that has been reviewed and approved by the original program developer and evaluator, to further facilitate the adaptation process as was described above. Finally, lists of efficacious programs and their replication kits should include information on the cost of implementing the programs so that practitioners can determine whether their current resource levels are sufficient to implement the program with fidelity to the core components and so that they can develop accurate budgets for potential funders of their replication efforts (Kelly, Sogolow, et al., 2000; Pinkerton & Holtgrave, 1998).

4. *Develop service provider–focused adaptation tools*. Practitioner-focused adaptation guidelines and worksheets that are

based on realistic expectations of service agency capacity and resources need to be developed and validated in service delivery settings (Gandelman & Rietmeijer, 2004; NICHD, 2002). Two projects, in particular, are currently undertaking such an effort. In August 2004, the CDC issued a call for applications for a project titled "Adopting and Demonstrating the Adaptation of Prevention Techniques." This project is supporting several community-based organizations to use CDC-developed draft adaptation guidance to tailor an efficacious program (selected from a list of programs provided by the CDC) for use with an HIV-positive population of men of color who have sex with men. The adaptation guidance was developed with input from internal and external researchers, HIV prevention implementers, and community advocates. Funded applicants are required to monitor and evaluate the adaptation process as well as the intervention that is adapted and implemented (CDC, 2004a). In addition, with a grant from the National Institute of Allergy and Infectious Diseases, Sociometrics Corporation is currently developing and field testing a set of Web-based, practitioner-focused materials (e.g., key concepts, tools, and other resources) to promote culturally competent program Planning (including adaptation), implementation, and evaluation. The two projects will also produce case studies of practitioners' adaptation experiences that can be used to improve future adaptation efforts. The intent is to develop accessible tools in formats that fit learning styles and resource constraints of service providers.

As a complement to these generic (i.e., cross-program) guidelines and tools, researchers can also develop and validate intervention-specific adaptation guidelines for use in service agency contexts. For example, Dévieux, Malow, and colleagues (2004) have produced an instructional manual for their adapted version of the Cognitive Behavioral Stress Management–Recovering Drug Abusers intervention to facilitate subsequent tailoring of the intervention for new target populations with internal diversity in gender, literacy, and ethnic background.

5. *Collaborate with service providers to identify and test additional resources to support practitioner-driven adaptation efforts*. Researchers and evaluators should actively collaborate with service providers to identify additional adaptation-related knowledge and

skills to be bolstered and the specific learning and technical assistance formats that would be most beneficial and cost effective (Gandelman & Rietmeijer, 2004; Morin, Maiorana, Koester, Sheon, & Richards, 2003; Rotheram-Borus et al., 2000). As was referred to in several places above, the increasing reach and decreasing cost of Internet access, along with greater levels of comfort with computer-based communication and learning, are opening up new opportunities for the dissemination of tools and provision of training and technical assistance. Collaborative efforts to develop and test such resources will ultimately advance both the science and practice of adaptation. Such efforts have already paid off in the area of evidence-based behavioral medicine, in which the Reach, Efficacy/Effectiveness, Adoption, Implementation, and Maintenance framework and corresponding tools have been made available to researchers and practitioners via the Internet (http://www.re-aim.org) to facilitate translation of research on behavior change into practice (Dzewaltowski, Glasgow, Klesges, Estabrooks, & Brock, 2004; Klesges, Estabrooks, Dzewaltowski, Bull, & Glasgow, 2005).

Working collaboratively with practitioners to increase their capacity to engage in science-based adaptation will foster greater adaptation technology exchange (Gandelman & Rietmeijer, 2004), or a situation in which the traditional one-way research-to-practice technology transfer framework is replaced by a model in which research and practice can inform each other. This will help to advance not only Type 2 research on HIV prevention program effectiveness and dissemination but also Type 1 research on methods development and program efficacy.

CONCLUSION

Through Type 1 translation research, HIV prevention researchers have successfully identified intervention strategies and developed and tested a number of behavioral interventions in controlled efficacy trials. As these interventions have been disseminated to service provision agencies through Type 2 translation research, the need to adapt them for culturally diverse populations has received increasing attention. Although the scientific study of HIV prevention program adaptation is relatively new, a number of research-based principles

and processes have emerged that can guide researchers' adaptation efforts. Furthermore, researchers can take specific steps to help empower practitioners to conduct their own science-based adaptations of HIV prevention interventions. Greater collaboration between researchers and service providers to test emerging adaptation frameworks in a variety of settings promise to inform both Type 1 and Type 2 HIV prevention research and bridge the gap between them by promoting more widespread adoption and successful replication of empirically validated prevention programs.

Finally, it should be noted that the adaptation principles and processes that are the main focus of this article are not necessarily unique to HIV prevention. Although based mainly on the literature in HIV prevention and youth sexual risk behavior prevention, they already incorporate some research-based practices from the literature of related fields (e.g., substance abuse and treatment). Efforts to identify adaptation's best practices that cross behavioral prevention and promotion areas (e.g., Fixsen, Naoom, Blase, Friedman, & Wallace, 2005) and test them to identify field-specific differences in what is most effective in real world contexts will further benefit research and practice concerning HIV prevention and other behavioral health issues.

NOTES

1. For programs aimed primarily at youth aged 15 or younger, outcomes included a demonstrated salutary impact on fertility or STD- and HIV-related refusal or negotiation skills, intentions, values, or attitudes (Card, Niego, Mallari, & Farrell, 1996). These factors have a demonstrated association with sexual health protective behaviors (e.g., see Kirby, 2001).

2. The National Institute on Child Health and Human Development (2002) points out that this can ultimately cause an internal confound in an evaluation research study if a comparison community that has not participated in a similar needs and assets assessment process is included in the design.

3. We recognize that the boundaries between replicating a program (i.e., maintaining fidelity to core components) with adaptations, adapting a program so much that a new program is created, and developing a hybrid program (i.e., one that blends core components of multiple programs) are necessarily fuzzy, because the core program components of specific interventions have not yet been narrowly or definitively defined (Kennedy et al., 2000; National Institute on Child Health Development, 2002; Stanton et al., 2005). This is why, as discussed above and also below, further research to identify core components is so crucial.

4. SOLAAR is *Superación, Orgullo y Lucha Através de Amor en Relaciones* [Empowerment, pride, and struggle through love in relationships].

5. Other strategies and research-based tips for conducting culturally competent evaluation are offered in a recent series of publications by The California Endowment (e.g., Endo, Joh, & Yu, 2003; Nguyen, Kagawa-Singer, & Kar, 2003).

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