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Jeffrey D. Fisher

Department of Psychology, University of Connecticut, Storrs, Connecticut

Stephen Misovich

Department of Social Sciences, Hillyer College, The University of Hartford, West Hartford, Connecticut

Diane L. Kimble

Department of Psychology, University of Connecticut, Storrs, Connecticut

Beth Weinstein

Connecticut Department of Public Health, Hartford, Connecticut.

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Dynamics of HIV Risk Behavior in HIV-Infected Injection Drug Users

Jeffrey D. Fisher,^{1,2,4} Stephen J. Misovich,³ Diane L. Kimble,¹ and Beth Weinstein²

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Forty-six HIV-positive individuals with a history of injection drug use participated in a questionnaire and interview study assessing their HIV risk behaviors, and their HIV risk and prevention information, motivation, and behavioral skills related to injection drug use and sexual behavior. High levels of past and current risky injection drug use and sexual behavior were reported. HIV risk reduction information was generally high, and many participants reported provention attitudes and supportive perceived norms toward HIV risk reduction behaviors. However, many did not intend to engage in these preventive behaviors, and some reported deficits in prevention behavioral skills. Interview data revealed the presence of many perceived barriers to safer injection and sexual behaviors. These included withdrawal-related concerns, and concerns about negative social consequences of engaging in safer behaviors. Possible ways of incorporating these findings into interventions for reducing risk behaviors in seropositive injection drug users are discussed.

KEY WORDS: injection drug users; HIV-seropositive; HIV risk behavior; AIDS.

INTRODUCTION

The incidence of HIV and AIDS among injection drug users (IDUs) and their partners is expanding, and in some U.S. urban centers as many as 50% of all IDUs are HIV-infected (e.g., Des Jarlais *et al.*, 1994). It is currently estimated that the sexual partners of IDUs are one of the fastest growing populations of people with HIV and AIDS (Centers for Disease Control, 1995; Otten *et al.*, 1994). Risky behaviors by IDUs are the most common source for heterosexual transmission of HIV, and for perinatal transmission of HIV to infants (Centers for Disease Control, 1994).

Factors which have been associated with risky

behavior in IDUs include *informational deficits*, including a lack of knowledge about HIV transmission and prevention, and the use of incorrect "decision rules" to decide whether or not to practice safer behaviors (e.g., rules to the effect that if one is in a monogamous relationship with a partner, safer sex is unnecessary) (e.g., Harris and Kavanagh, 1995; Stevens *et al.*, 1993; White *et al.*, 1993). A second factor implicated in IDUs' unsafe behavior involves *motivational factors* related to HIV prevention, including antiprevention attitudes and social norms, and perceptions of low vulnerability to HIV (e.g., Kowalewski *et al.*, 1994; Krepcho *et al.*, 1993; Latkin *et al.*, 1995; Schilling *et al.*, 1992; White *et al.*, 1993; Zapka *et al.*, 1993). Lack of the requisite *behavioral skills* for engaging in safer injection drug use and sexual practices (e.g., inability to clean needles correctly, or to discuss HIV-related issues effectively with a partner) have also been associated with risky behavior among IDUs (e.g., Kowalewski *et al.*, 1994; Schilling *et al.*, 1993; Weiss *et al.*, 1993; White *et al.*, 1993). Finally, factors associated with substance abuse (e.g., addiction, experiencing withdrawal) have been implicated in risky behavior among IDUs (e.g., Latkin *et al.*, 1995).

¹Department of Psychology, University of Connecticut, Storrs, Connecticut.

²Connecticut Department of Public Health, Hartford, Connecticut.

³Department of Social Sciences, Hillyer College, The University of Hartford, West Hartford, Connecticut.

⁴Correspondence should be addressed to Jeffrey D. Fisher, PhD, Department of Psychology, U-Box 20, Room 107, 406 Babbidge Road, University of Connecticut, Storrs, Connecticut 06269-1020 (e-mail: JFISHER@UCONNVM.UCONN.EDU).

To date, almost all of the research on factors associated with risky behavior in IDUs has been performed with individuals whose antibody status is unknown, or who are HIV-negative. Little is known about the dynamics of risky behavior in *HIV-positive* IDUs. There are reasons to believe that the dynamics of risky behavior may be different for HIV-positive and HIV-negative IDUs, and for HIV-positive and -negative populations more generally. For example, different types of information deficits may characterize HIV-positive and HIV-negative individuals. For HIV-negative people, there is an information processing bias leading them to assume that sexual (and possibly needle sharing) partners are probably also HIV-negative, which may elicit risky behavior (Misovich *et al.*, 1997). For HIV-positive individuals, there may be an opposite tendency—to assume that partners are probably also HIV-positive—which could similarly lead to risky behavior. With respect to motivation, both negative attitudes toward prevention and nonsupportive social norms are likely to cause risky behavior in both HIV-positive and HIV-negative populations. However, while risky behavior in many HIV-negative individuals appears to be motivated by a belief that they cannot contract HIV (e.g., Hammer *et al.*, 1996; van der Pligt *et al.*, 1993; Weinstein, 1989), risk in some HIV-positive individuals may be motivated by a need to deny their own antibody status. HIV-positive individuals may also engage in risky behavior because they may be motivated to deny that their partners could be HIV-negative, and thus that they could transmit HIV to them (J. D. Fisher *et al.*, 1998; Johnson and Marks, 1996). Further, while perceived vulnerability to becoming HIV-infected is a critical motivator of *safer* behavior for HIV-negative individuals (e.g., Ishii-Kuntz *et al.*, 1990), for HIV-positive people concerns about infecting others with HIV, and about personally avoiding reinfection and secondary infection, may play a significant motivating role (J. D. Fisher *et al.*, 1998). Finally, while a lack of the requisite behavioral skills for practicing clean needle use or safer sex may occasion risky behaviors in both HIV-negative and HIV-positive individuals, for HIV-positive people, risk may also be fostered by insufficient skills to disclose one's antibody status to partners. Such skills deficits have been found to be associated with risk among HIV positive individuals (e.g., Poku and Linn, 1994).

Understanding the dynamics of risky behavior in seropositive individuals is important, since there is increasing evidence that while many HIV-seroposi-

tives initiate substantial behavior change after being notified of their antibody status (e.g., Casadonte *et al.*, 1990; Kamenga *et al.*, 1991), a significant minority of HIV-infected IDUs and other HIV-infected individuals continue to engage in behavior that can transmit HIV to uninfected others after serostatus notification (e.g., Kalichman, 1996; Kalichman *et al.*, 1996; Poku and Linn, 1994; Singh *et al.*, 1993). Current estimates of the number of HIV-infected IDUs who continue to engage in *risky sexual behavior* vary widely. Kalichman *et al.* (1996) reported that 22% of HIV-positive men participating in substance abuse support groups and HIV prevention programs reported having recent, multiple unprotected sexual intercourse partners. Among HIV-positive, sexually active, illicit-drug-using men in Atlanta, Washington, D.C., and San Juan, 28% reported having had vaginal or anal sex without a condom in the past 30 days (Kalichman, 1996), and Singh *et al.* (1993) reported that 29% of a sample of seropositive Hispanic IDUs continued to practice risky sexual behaviors. In a study of continuing risky behavior among seropositive IDUs in London (Rhodes *et al.*, 1993), about three fourths had had vaginal or anal intercourse with an opposite sex partner in the previous 6 months. Only 16% percent always used condoms with their primary partners, while 56% always used condoms with their secondary partners. Finally, Ehrhardt *et al.* (1995) reported that fully 86% of a group of HIV-positive women with an injection drug use history reported having unprotected sex in the previous 6 months.

Other studies demonstrate that seropositive IDUs continue to practice risky *injection drug practices*. For example, McCusker *et al.* (1994) found that nearly half (45%) of the HIV-positive IDUs in a residential drug treatment sample had injected drugs with used, uncleaned needles during the previous 3 months. In a study of seropositive IDUs in London, 46% reported borrowing or lending used needles and syringes in the previous 6 months (Rhodes *et al.*, 1993). Among HIV-infected individuals, many of whom were IDUs or likely to have been infected by IDUs, approximately 40% continued risky needle use or sexual behavior following notification (Cleary *et al.*, 1991). Finally, a study of IDUs in Puerto Rico, 46% of whom were HIV-positive, found widespread risky behaviors, including sharing, renting, and borrowing needles and other injection equipment (Colon *et al.*, 1992).

While there are disturbing levels of residual risky sexual and injection drug use behaviors among IDUs,

it is important to note that studies have found that, over time, HIV-positive IDUs reduce their risky behaviors more than HIV-negative IDUs (e.g., Deren *et al.*, 1998). Nonetheless, the high overall level of seropositivity among IDUs (e.g., Des Jarlais *et al.*, 1994), coupled with the high level of continuing risky behavior among *seropositive* IDUs, highlights the need to understand better the causes of risky behavior in this population. The need to understand better the risk dynamics among seropositive IDUs is bolstered by the strong potential for HIV transmission from seropositive IDUs to sexual and needle-sharing partners, as well as perinatally to infants. To date, scant research has been conducted to understand the reasons for continuing risk behaviors among seropositive IDUs.

One study of HIV-positive individuals that included IDUs concluded that some HIV-infected individuals may continue to engage in risk behaviors because they simply do not recognize the level of HIV transmission risk of their behaviors (Cleary *et al.*, 1991). Another study suggested that some HIV-positive IDUs may engage in continued risk behavior because they are not aware of their risk of reinfection with HIV or other pathogens (Kwiatkowski and Booth, 1998). This research also found that HIV-infected IDUs who continued to practice risky sexual behavior were more likely to be White, to have experienced HIV/AIDS symptoms, to have injected cocaine more than other drugs, to live with a primary partner, or to be younger when they first used drugs or tested HIV-positive. Friedman *et al.* (1994) reported that increased condom use among HIV positive IDUs was associated with having a non-drug-using (and presumably HIV-negative) primary relationship partner. In another study (Metsch *et al.*, 1998), gender (being male), and following safer injection practices were associated with increased *safer sexual behavior* among HIV positive IDUs. In contrast, gender (being female), education (i.e., being less educated), being homeless, and following safer sexual behaviors were associated with changes to *safer injection practices*.

Additional studies have highlighted other reasons for continued risky behaviors among HIV-positive IDUs. In a sample of HIV-positive men who have sex with men (MSM) with a drug use history, Poku and Linn (1994) reported that while biological factors (e.g., addiction to drugs and sexual needs) were a major determinant of continued high-risk behavior (e.g., continuing to share needles or to have unprotected sex), a fear of social stigma (e.g., rejection,

abuse) from sexual or needle-sharing partners was also a major factor in remaining risky and failing to reveal one's antibody status, or failing to communicate one's desire to practice safer sex. In a study of HIV-positive women, many of whom had used injection drugs, alcohol, or crack during the prior month, perceived self-efficacy in influencing others' behavior was found to be the strongest predictor of condom use with steady partners (Kline and Van Landingham, 1994).

Overall, several isolated variables have tentatively been associated with continued risky behavior in HIV-positive IDUs in research that has generally been atheoretical in nature. The focus of the present theoretically based study is to identify a more complete set of factors associated with risky behavior in HIV-positive IDUs, with the goal of ultimately using this knowledge to design effective, conceptually based HIV prevention interventions for this population. While much is known about the factors associated with risky behavior in IDUs whose antibody status is unknown or in HIV-seronegative IDUs, too little is known about the dynamics of risk in HIV-positive IDUs.

To provide a conceptual framework to understand better the risk dynamics in HIV-infected IDUs, this research utilizes the information-motivation-behavioral skills (IMB) model of HIV risk behavior change (J. D. Fisher and Fisher, 1992; W. A. Fisher and Fisher, 1993). The IMB model proposes that deficits in HIV risk reduction information, motivation, and behavioral skills are the causes of much HIV risk behavior, and that increases in these elements can be viewed as fundamental determinants of HIV risk behavior change (J. D. Fisher and Fisher, 1992; W. A. Fisher and Fisher, 1993). According to the model, *information* that is directly relevant to HIV transmission and HIV prevention is an initial prerequisite of HIV risk behavior change. *Motivation* to engage in HIV preventive acts, which is a function of attitudes toward HIV preventive acts, social norms regarding performance of such acts (Ajzen and Fishbein, 1980; Fishbein and Middlestadt, 1989), and perceptions of personal vulnerability from risky behavior (both for oneself and one's partner) is a second determinant of behavior change. *Behavioral skills* for performing specific HIV preventive acts, including objective skills for performing such acts (W. A. Fisher, 1990; Kelly and St. Lawrence, 1988) and a sense of self-efficacy for doing so (Bandura, 1994), are a third critical determinant of behavior change. The current research utilizes questionnaire and interview meth-

ods to identify information, motivation, and behavioral skills deficits associated with HIV risk behaviors, as well as to determine the actual level of risk behaviors in a sample of HIV-positive IDUs.

METHODS

Participants

Forty-six HIV-seropositive adults who had a history of injection drug use were recruited to participate in a tape recorded interview *and* a written survey assessing their HIV risk reduction information, motivation, behavioral skills and HIV risk and HIV preventive behavior. Participants were recruited through community-based organizations and support groups for HIV-seropositive IDUs, including the Hispanic Health Council, the Hartford Dispensary, the Windham AIDS Program, the New Perceptions Program, the Gay and Lesbian Health Council in Hartford, and AIDS Project Hartford. All participants were given the option of responding to the interview and survey in either English or Spanish. All participants took part in both the interview and the survey.⁴

Twenty-six of the respondents were men, and 20 were women. They ranged in age from 23 to 56 years, with an average age of 39.9 years. Fifty percent were African-American, 35% were Hispanic-American, and 13% were White; 1 respondent was Asian-American, and none of the participants reported being "other." This racial and ethnic pattern reflects the fact that HIV infected IDUs in Connecticut are predominantly members of minority groups (Connecticut Department of Public Health, Personal Communication, 1997). Regarding education, 52% of interviewees reported having a high school education

but no higher, 26% had less than a high school education, and 17% had some college education; 1 had earned an associate's or bachelor's degree in college. For the most part, they reported extremely low household incomes. The majority (56%) earned less than \$5,000 per year, while 35% earned between \$5,000 and \$10,000, and 6% reported earning from \$10,001 to \$20,000 per year. Participants generally reported only having had sex with other-sex partners (87%), while 4% reported having sex with both same- and other-sex partners, and 9% reported having sex only with same-sex partners.

Procedures

Participants were recruited to complete a questionnaire and to participate in a 1-hr interview conducted by one of several trained interviewers who were affiliated with local health departments and HIV-related community-based organizations. Interviewers recruited only HIV-infected IDUs who were known to them through public information (e.g., the individual belonged to a support group for HIV-positive IDUs) and did not recruit participants through confidential records. Research participants were offered \$20 for their involvement in the study. Prior to the interview, the participant was asked whether he or she would prefer to be interviewed by somebody other than the person who had recruited them and to reschedule that participant's interview if necessary. Participants were also given an informed-consent form, which described the purpose of the study and let them know that some questions could make them uncomfortable, and that they could discontinue participation at any time without loss of compensation.

Questionnaire

The survey instrument consisted of self-administered scales designed to assess participants' levels of HIV risk and HIV preventive behavior associated with injection drug use and sexual activity, as well as participants' levels of HIV risk reduction information, motivation, and behavioral skills. This survey was adapted from previous assessments of HIV prevention information, motivation, behavioral skills, and HIV risk and HIV prevention behaviors used with other populations such as gay men, college students, and urban adolescents, which have shown suf-

⁴When interpreting the *interview data*, it should be remembered that the percentages of interview respondents who are viewed as making a particular response are based on the trained researchers' perceptions of whether or not a particular idea was endorsed, rather than on the type of "hard data" available in questionnaires. Nevertheless, in many cases, a particular participant's interview audiotape was listened to by more than one trained researcher, and the interrater reliability between the researchers was very high. In addition, much of the interview data was obtained in response to open-ended questions. Therefore, if a participant did *not* include a particular viewpoint in his or her response, this does not mean that he or she would not endorse it, but only that he or she did not generate this idea spontaneously. Thus, percentages of interview respondents described as endorsing particular viewpoints may sometimes underestimate the percentage of HIV-positive IDUs who would endorse those viewpoints on more structured, closed-ended questionnaires.

ficient reliability and validity (e.g., J. D. Fisher *et al.*, 1994; Misovich *et al.*, 1998).

HIV Risk and HIV Preventive Injection Drug Use Behaviors. Participants were asked to describe their recent drug use history, and their performance of risky and preventive injection drug use behaviors during the previous 2 months. To assess participants' *recent drug use history*, individuals were asked to indicate, by answering yes or no, whether or not they had taken each of a number of drugs (e.g., alcohol, amphetamines, crack, cocaine, heroin, and marijuana) during the previous 2 months. To assess their *injection drug use behavior* during the previous 2 months, individuals were first asked to indicate, by answering yes or no, whether or not they had used injection drugs during that interval. In addition, they were asked to indicate how many times they injected drugs during the previous 2 months. To assess their *safe and unsafe injection drug use behavior*, participants were asked to respond, on a 5-point scale ranging from "never" to "often," how frequently they had engaged in a series of injection drug use behaviors. These consisted of cleaning needles with bleach prior to sharing them, using new needles when injecting drugs, getting new needles by purchasing them or obtaining them for free, sharing needles that had not been cleaned, injecting drugs in a shooting gallery, and renting needles. Cleaning shared needles may not be as effective in stopping HIV transmission as consistently using new needles (which are legally available Connecticut, the state in which the present research was conducted). However, we included items related to cleaning needles, because cleaning needles is still recommended when new needles are not available (e.g., Kalichman, 1996). For each of these items, respondents were also given the option of indicating that the behavior was not applicable to them because they had not injected drugs during the previous 2 months. Participants were also asked to indicate, by answering yes or no, whether or not they currently had a clean needle handy for use if they were to inject drugs.

HIV Risk and HIV Preventive Sexual Behaviors. The survey also included a series of items to assess participants' past and recent levels of *HIV risk and HIV preventive sexual behaviors*. Past sexual behaviors were assessed through an item asking them to report approximately how many sexual partners they had had during their lifetimes, and how frequently during the past 10 years they had practiced safer sex by using a condom during sexual intercourse. The latter item was measured using a 5-point scale ranging

from "always" to "never." The participants' recent sexual behaviors were first assessed by having them answer "yes" or "no" to a question asking if they had engaged in vaginal or anal sexual intercourse during the previous 2 months. Next, participants were asked to indicate the percentage of the time that their sexual intercourse during that interval was protected by the use of a condom. Additionally, participants were asked to indicate, on a 5-point scale from "never" to "always," how frequently their sexual intercourse during the past 2 months was performed while under the influence of alcohol or drugs, and whether they had sexual intercourse most frequently with men or women. Finally, they were asked to report whether or not they had a main sexual partner, and if so, whether they had sexual intercourse with anyone else, as well as whether their primary partner was HIV-positive.

According to the IMB model of HIV risk behavior change (e.g., J. D. Fisher and Fisher, 1992; J. D. Fisher *et al.*, 1996; W. A. Fisher *et al.*, in press), HIV risk behavior is often occasioned by deficits in individuals' levels of HIV prevention information, motivation, and behavioral skills, and remediating these deficits often results in improved HIV preventive behavior. For this reason, we included measures of HIV risk reduction information, motivation, and behavioral skills.⁵

HIV Prevention Information. HIV prevention information was assessed with two sets of items with a true-or-false response format. One set of items measured the participants' HIV prevention information associated with *injection drug use*, while the other tapped their knowledge of HIV prevention information associated with *sexual practices*. The former scale consisted of six items assessing the participant's knowledge of what constitutes safe and risky needle use practices, misconceptions related to needle clean-

⁵The individual items assessing HIV prevention *motivation* and *behavioral skills* were not summed to form overall scales assessing each of these constructs. This was due to the fact that the three behaviors assessed for each construct (i.e., abstaining from injection drug use, avoiding sharing uncleaned needles, and using condoms during sexual intercourse) may likely be associated with quite different attitudes, norms, and behavioral skills. For example, individuals who have strongly positive attitudes regarding their avoiding sharing needles may not also possess positive attitudes toward abstaining from injection drug use, because the latter entails the cessation of a valued behavior. In effect, rather than summing individuals' scores across each target behavior on the motivation and behavioral skills measures, we attempt to present a "profile" of the levels of motivation and behavioral skills associated with each target behavior separately.

ing (e.g., that cleaning needles with bleach can make them useless for drug injection), their knowledge of HIV transmission through different routes, including drug preparation equipment, and their belief in risky injection-drug-use HIV prevention heuristics (e.g., that it is unnecessary to practice clean needle use with familiar injection-drug-using partners; Misovich *et al.*, 1996, 1997). The latter, the sexual behavior information scale, consisted of five items assessing participants' knowledge of the effectiveness of condom use in preventing HIV transmission, the relative risk of oral sex and sexual intercourse for HIV transmission, and their knowledge of correct condom use (e.g., that they should not be lubricated with oil-based materials such as Vaseline). The sexual behavior information scale also assessed participants' belief in risky sexual HIV prevention heuristics (e.g., that safer sexual practices are unnecessary with familiar or trusted sexual partners; Misovich *et al.*, 1996, 1997).

HIV Prevention Motivation. Participants' level of motivation to practice safer sexual and injection drug use behavior (e.g., use of condoms, avoiding the sharing of uncleaned needles) was assessed through several different indicators. These included measures of participants' attitudes and perceived norms toward safer sexual and drug use behaviors and their behavioral intentions regarding their future practice of HIV preventive behavior. Additionally, participants' perceived vulnerability (or likelihood) of transmitting HIV to others through unsafe behaviors was assessed.

To determine participants' *attitudes toward performing HIV-preventive behaviors*, participants were asked to rate each of three HIV preventive behaviors (abstaining from injection drug use, avoiding sharing uncleaned needles, and always using condoms during sexual intercourse) on a 5-point semantic differential scale ranging from "very good" to "very bad." These ratings were used to assess participants' attitudes (Aact) toward critical HIV preventive behaviors (Ajzen and Fishbein, 1980; Fishbein, 1980).

In order to assess participants' *subjective social norms for HIV preventive acts* (i.e., perceptions of generalized social normative support for HIV prevention), they were asked to respond to items measuring the extent to which they believe that "most people who are important to them" think they should perform each of the three HIV preventive behaviors listed above (Ajzen and Fishbein, 1980; Fishbein, 1980). Participants responded to each item according to a 5-point semantic differential scale ranging from "very true" to "very untrue." This provided a mea-

sure of social normative support (SN) for HIV preventive behavior.

Participants' *behavioral intentions* (BI) (Ajzen and Fishbein, 1980; Fishbein, 1980) to perform each of the three HIV preventive behaviors were measured by having them rate a statement affirming their intention to engage in each behavior during the next 2 months on a 5-point scale, ranging from "very true" to "very untrue."

Finally, participants' *perceptions of vulnerability* concerning their potential to transmit HIV to others were tapped by four items created for this research. Two items assessed their perception of the likelihood that their sexual and drug use partners already were HIV-positive (e.g., "what are the chances that the person or persons you share needles with already have HIV?"). The two remaining items assessed their perception of the likelihood that they could transmit HIV to a partner either by having unprotected intercourse or sharing unclean needles with them (e.g., "if you shared uncleaned needles, how likely is it that you would transmit HIV to your needle-sharing partner?"). The response options for these items were 5-point semantic differential scales ranging from "very likely" to "very unlikely." Each item also permitted the respondents to indicate that the question was not applicable to them, because they had not engaged in the behavior in question.

Behavioral Skills. Participants' behavioral skills related to HIV preventive behavior were assessed by two items asking them to rate how hard it would be for them to practice only safer drug use behaviors (e.g., using only new needles), and how hard it would be for them to practice only safer sexual behaviors (e.g., using condoms). Participants were asked to rate the difficulty of these behaviors on a 5-point semantic differential scale, ranging from "very hard" to "very easy" to do. Similar items have been utilized to tap behavioral skills in research by J. D. Fisher *et al.* (1996). Recent work by Williams *et al.* (1998) has shown that these self-report items correlate reasonably well with trained observers' ratings of the quality of participants' actual behavioral performance of the requisite skills for engaging in safer sexual behaviors.

Interview

A 1-hr interview protocol was designed to obtain further information about participants' practice of risky and safer injection drug use and sexual behaviors. The protocol included questions about the parti-

cipants' HIV risk and preventive behaviors associated with both injection drug use and sexual practices, and the social and emotional circumstances in which risky and safer practices took place. Participants were also asked to describe barriers to prevention that they had experienced. For instance, they were asked if they had shared needles since discovering they were HIV-positive, and also asked to describe the circumstances in which they shared needles. After obtaining a detailed description of participants' needle-sharing behaviors, they were asked to describe what they believed had led them to share uncleaned needles (if they had done so), and to describe what may have helped them to avoid this practice (if they had successfully avoided sharing needles). Finally, participants were asked for recommendations for developing an HIV risk reduction intervention for seropositive IDUs. Specifically, participants were asked *who* they thought would be able to run such an intervention successfully, *where* interventions should be held, and *what* the contents of an HIV risk reduction intervention for IDUs should be.

The interviewers were trained to interact with participants in a nonjudgmental manner and to attempt to elicit an accurate description of the circumstances of participants' safer and risky injection and sexual behaviors. Efforts were made to hire interviewers and researchers who were ethnically diverse. The ten interviewers consisted of two women and eight men, of whom six were White, two were African-American, and two were Hispanic-American. To ensure that minority HIV-positive IDUs were interviewed by racially and ethnically similar interviewers, the Hispanic-American and African-American interviewers conducted a disproportionately large share of the interviews.

RESULTS

The results presented below include the interview data, as well as the participants' questionnaire data. To present a more coherent overall picture, when both types of data are available, they are presented under the same headings (e.g., risky drug injection practices).

Risky Drug Injection Practices

Recent Drug Use History

The questionnaire data revealed high levels of drug and alcohol use during the 2 months prior to

administration. Over one third (38%) of participants reported using crack cocaine, 76% reported using cocaine, 79% reported using heroin, 68% reported using alcohol, and 37% reported using marijuana in this interval.

Risky Injection Drug Use

In addition to high levels of current drug use, risky injection practices were reported by a majority of the respondents. On the questionnaire, over half (56%) reported having shared uncleaned needles at least once after discovering they were HIV-positive. Their reports of their recent injection drug use behaviors suggested widespread risk as well. The majority (71%) reported injecting drugs during the previous 2 months. Of those who had done so, 44% reported sharing needles, and fully 41% of the respondents who had injected drugs during that interval reported that they had shared *uncleaned* needles at least once.

The interview data also indicated that sharing needles was common among respondents. The majority (69%) reported sharing needles after finding out that they were HIV-positive. The high potential for HIV transmission from this behavior is underscored by the fact that 46% of the respondents reported that since they had become HIV-positive, an HIV-negative person had asked to share needles with them. Of those who had been asked to share by an HIV-negative person, 48% reported doing so.

In the interviews, of participants who had requested to share others' needles after discovering their HIV status, 57% said they had done so because they did not have a needle handy themselves. Others reported sharing needles to avoid withdrawal from drugs (31%), or because they discovered, when they were about to inject drugs, that their needle was broken (17%). Participants who reported requesting to share others' needles were also given the opportunity to describe with whom they had shared. Many reported sharing with relationship partners (38%), friends (24%), "running buddies" (38%), family members (14%), people they knew were HIV-positive (7%), and, often, anyone with a needle (24%). Overall, sharing needles with a wide range of partners was common.

Cleaning Needles

While the risk for HIV infection associated with sharing needles may be lessened by thoroughly clean-

ing needles and other equipment with bleach, only 34% (of the 69% of interview respondents who reported *ever* sharing needles after discovering their HIV serostatus) also specifically reported cleaning their needles consistently and correctly. From the questionnaire data, of the 44% of IDUs who had shared needles *in the previous 2 months*, fully 56% had “never,” “once,” or “rarely” cleaned them. While consistent, effective cleaning of shared needles was relatively infrequent, the majority of interview respondents (83%) reported having cleaned needles at least once at some point since discovering their serostatus, for the purpose of reducing HIV transmission.

Many factors influenced whether or not interview respondents cleaned needles when sharing them. Of those who mentioned that they had shared needles since they were HIV-positive, 24% said that they had not cleaned needles when they were going through withdrawal from drugs, and 21% said they had not cleaned them when there was not enough time to do so. Respondents also mentioned that they did not clean needles when they did not have water and bleach to do the cleaning (10%). Twenty-four percent of participants mentioned disliking the fact that the process of cleaning needles is complicated and time-consuming. Finally, some individuals suggested relationship-related reasons for not cleaning needles, stating that they did not bother to clean needles obtained from presumed HIV-positive relationship partners (14%).

Keeping Clean Needles Available, and Using Clean Needles

Ensuring that one has a supply of clean needles and avoiding settings where dirty needles are likely to be used are essential HIV preventive behaviors for HIV-infected IDUs. According to the questionnaire data, the majority (81%) of participants who had injected drugs during the previous 2 months had a clean needle somewhere where they could use it at the point in time when they filled out the questionnaire. However, of these respondents, only 53% reported using new needles “often” during those 2 months, and only 50% obtained new needles “often.” Many questionnaire respondents reported avoiding areas where using clean needles would be difficult because of pressures to share dirty needles. More than half (53%) reported never shooting up drugs in a shooting gallery, and 90% reported never renting needles during the previous 2 months.

In the interviews, regardless of whether or not they also reported sharing needles, participants generally reported a wide range of sources from which they had obtained new needles. The most frequently mentioned source of new needles was pharmacies (78%), while the second most frequently mentioned source was a needle exchange van (59%). Other sources mentioned were other, unspecified needle exchanges (22%), friends (11%), diabetics (39%), people on the street (26%), and through theft (11%). When asked what the best source of new needles was, 37% mentioned pharmacies, while others mentioned the needle exchange van (28%) or other needle exchanges (24%). Other sources were rarely or never mentioned. This suggests that overall, needle exchanges, either mobile or fixed, are somewhat more popular than pharmacies, which are also quite frequently used. On the whole, these relatively permanent sources of new needles appear to be more popular than sources such as friends or other acquaintances.

In summary, while some of the participants had reduced the HIV risk of their injection drug use, HIV risk behaviors were commonly reported in this sample. Many reported sharing uncleaned needles with a wide range of drug injection partners, a practice that places their partners at risk for HIV, including treatment-resistant strains, and places the participants at risk for infection with other pathogens. Many participants had obtained new needles from pharmacies and needle exchanges, as well as other sources such as drug use partners, but permanent sources such as pharmacies and exchanges were generally preferred.

Risky Sexual Behavior

In the interviews, the majority (74%) of participants reported engaging in unprotected sexual intercourse following their HIV diagnosis. In the questionnaires, a high incidence of risky sexual behavior was also reported. Over half (65%) reported having had unprotected sex with at least one partner since they found out they were HIV-positive. In addition, during the previous 2 months, over half (56%) reported engaging in anal or vaginal sex. Of these individuals, only 46% reported that they had *always* used condoms, indicating that approximately one fourth (26%) of the survey participants had engaged in unprotected anal or vaginal intercourse during that time interval.

Drugs and alcohol were often used by participants prior to engaging in sexual intercourse. Of survey respondents who reported having sexual intercourse, only 26% reported “never” having sexual intercourse while under the influence of drugs or alcohol during the last 2 months, while 32% had done so “always” or “often.” In the interviews, respondents mentioned a wide range of additional reasons that contributed to their engaging in unprotected sexual intercourse. Some suggested that protected intercourse was unnecessary, because their partner was “probably HIV-positive anyway” (24%). Other reasons given were that one’s partner refused to use condoms (21%), that they were having sex for money or drugs and could not insist that condoms be used (18%), that they were in denial of their HIV status (15%), that condoms were not available (15%), that they were taking drugs at the time (12%), or that their partner was a commercial sex worker (3%).

Revealing One’s HIV Status

In the interviews, participants mentioned revealing their HIV status under several different types of circumstances. Many reported “always” or “sometimes” revealing their HIV status to their sexual partners (24% and 33%, respectively). A small percentage (11%) mentioned revealing their status specifically to prevent another person from having unsafe sex with them. Participants were about equally likely to reveal their antibody status to people with whom they injected drugs. Of those who reported ever sharing needles since their HIV diagnosis, 13% reported “always” telling people with whom they injected drugs (but not necessarily shared needles) that they were HIV-positive, and 40% reported doing so “sometimes.”

Some interview participants also mentioned revealing their status as a warning to others who they saw practicing risky behaviors. Of the 76% of participants who mentioned *ever* revealing their HIV status in any context, 11% mentioned revealing it when they saw others being risky, and 20% reported revealing it when others wanted to engage in risky behaviors with them. Twenty-three percent of those who mentioned revealing their status said they did so when others wanted to share needles with them. Many others mentioned barriers to revealing their antibody status. These included immediate and long-term stigma concerns—that the person might react negatively to them during the interaction (11%), or that

they might tell other people in their social network (6%). Additionally, job-related concerns (i.e., that people in the workplace might find out) were mentioned as barriers to revealing one’s status by 9% of respondents. Some were also afraid that they themselves, or the person they were interacting with, would become upset upon the revelation that the respondent was HIV-positive (6%). The relatively low rate of reported *consistent* self-disclosure and the many perceived barriers to self-disclosure are disturbing in light of recent findings (e.g., Kalichman *et al.*, 1996) that revealing one’s HIV serostatus may be associated with safer sexual behavior for seropositives.

Possible Causes of HIV Risk Behavior

Overall, high levels of HIV risk behavior involving needle-sharing and unprotected sex were reported by study participants. Any sharing of uncleaned needles or unprotected insertive sexual activity with an HIV-infected individual presents a substantial risk for HIV for an uninfected partner. This risk is exacerbated by the fact that IDUs are unlikely to have accurate knowledge of the HIV status of their injection drug use and sexual partners (e.g., Marks *et al.*, 1991; Smereck, 1993). To provide a better understanding of the reasons for the high levels of risky behaviors reported above, we will employ the information–motivation–behavioral skills (IMB) model of HIV risk and preventive behavior (J. D. Fisher and Fisher, 1992). The IMB model suggests that HIV risk and preventive behaviors are a function of an individual’s levels of relevant HIV prevention information, motivation, and behavioral skills. In the following section, we discuss possible deficits in these components of the model that may contribute to the risky behavior reported.

HIV Prevention Information

Participants as a group were knowledgeable about HIV prevention practices. With regard to *injection drug use*, questionnaire data indicated that over 90% knew that water was not sufficient to clean needles, and over 90% knew that sharing the equipment one uses to prepare drugs for injection (e.g., the “cooker”) can transmit HIV. Interestingly, none believed that safer needle use practices were unnecessary with close relationship partners or close drug

use partners. The latter belief has been found to be endorsed frequently by other groups at risk for HIV (e.g., Misovich *et al.*, 1997; Offir *et al.*, 1993). With respect to *sexual behavior*, many (30%) of the participants did not know that oral sex poses less of an HIV risk than sexual intercourse, that oil-based lubricants such as Vaseline should not be used to lubricate condoms (28% answered incorrectly), or that condoms themselves, when used correctly, are effective in reducing the risk of transmitting HIV (17% answered incorrectly).

HIV Prevention Motivation

In the questionnaires, participants' *attitudes* toward the preventive behaviors assessed were generally positive. The majority (87%) believed that not shooting up drugs at all during the next 2 months would be "very good," while only 4% believed it would be "very bad." Participants were somewhat less positive in their evaluation of never sharing needles without cleaning them first with bleach. While the majority (76%) thought that this behavior would be "very good," 15% thought it would be "very bad." In addition, 85% thought that always using condoms would be "very good," while only 6% thought it would be "very bad."

With respect to *social norms*, the majority (85%) thought that it was "very true" that most people who were important to them thought they should not shoot up drugs at all during the next 2 months. Further, over 90% believed that it was "very true" that important referent others thought they should not share needles without cleaning them first, and that important referent others thought that during this interval, they should always use condoms with every partner during sexual intercourse.

While individuals generally expressed positive attitudes and perceived provention norms toward HIV preventive behaviors, their *behavioral intentions* to perform these behaviors were somewhat less positive. Only 56% believed that it was "very true" that they intended *not* to shoot up drugs during the next 2 months. Nevertheless, 80% believed that they would never share needles without cleaning them first during this interval, and 78% intended to use condoms during every instance of sexual intercourse during the next 2 months. Generally, the levels of provention behavioral intentions reported for the next 2 months in each of these domains were much more favorable than the actual levels of provention behavior (re-

ported earlier) for the *preceding* 2 months. In the absence of any type of behavior change intervention, it is likely that these behavioral intentions reflect an "optimistic bias" or overestimate of one's ability to change relatively controllable behaviors (e.g., Harris, 1996) such as HIV preventive behaviors.

The interview data suggest some elements that may have motivated HIV preventive behavior, as well as others that may have reduced it. Regarding *not sharing needles*, the majority (56%) of respondents thought the main benefit would be avoiding reinfection with HIV or infection with other pathogens. About one third (33%) mentioned avoiding infecting others as being the main benefit. One possible explanation for IDUs being more likely to mention avoiding reinfection compared with avoiding infecting others may be that HIV-positive IDUs may be especially likely to assume that their injection partners are already HIV-positive, an "assumed similarity" effect that has been observed among HIV-positive men who have sex with men (J. D. Fisher *et al.*, 1998; Misovich *et al.*, 1997).

Many *negative* consequences of avoiding needle sharing were also mentioned by interview participants. Nearly one third (30%) thought avoiding sharing needles would cause problems because they would not be able to inject drugs when necessary. Others expressed similar concerns involving reduced needle availability if they did not share with others. Specifically, 9% thought avoiding sharing needles would interfere with their ability to "get high," 11% thought it would make it necessary to obtain new needles, possibly at inconvenient times, 20% thought it might increase their likelihood of having to endure withdrawal, and 6% expressed concerns that avoiding sharing needles would mean that they would have to endure other IDUs' withdrawal discomfort.

Interview participants saw both negative and positive aspects associated with obtaining new needles as well. In general, the positive aspects centered around the greater functionality of new needles and their potential for preventing HIV transmission. Specifically, more than one third (35%) thought that new needles were more effective in injecting drugs compared with older needles. Many (28%) thought that a positive aspect of obtaining new needles was that they were less likely to transmit HIV. An additional 17% thought that a benefit was that one could be sure that they were clean. Negative aspects of obtaining new needles included stigma and embarrassment associated with being identified as a drug user when obtaining needles (39%), the possibility

that other IDUs would observe one obtaining the needles and ask for them (4%), and the cost associated with buying needles (9%). Generally, participants who mentioned negative aspects related to stigma and embarrassment were referring to obtaining needles at pharmacies. More than one fifth (22%) of all respondents mentioned that stigma and embarrassment were problems in obtaining needles in this setting, while none mentioned such problems at needle exchanges. Since obtaining new needles at pharmacies has been found to be effective in reducing needle sharing among IDUs (Groseclose *et al.*, 1995), reducing stigma and embarrassment in this context would be important.

In addition to attitudes and social norms, the IMB model views perceived *vulnerability* to negative outcomes for the self and others to be a third determinant of motivation to practice HIV preventive behavior. Participants' responses to the questionnaire items on perceived vulnerability indicated most were aware of the potential for HIV transmission from themselves to a partner during unprotected sex or through the sharing of uncleaned needles. Most believed that it was "very likely" (80%) or "somewhat likely" (11%) that unprotected sex could transmit HIV to an uninfected partner. Similarly, the majority believed it would be "very likely" (80%) or "somewhat likely" (15%) that sharing uncleaned needles could transmit HIV to an uninfected partner. However, many participants believed, often without objective confirmatory information, that *their* needle-sharing or sexual partners were already HIV-positive. Of the respondents who mentioned sharing needles, the majority believed it was either "very likely" (74%) or "somewhat likely" (20%) that the people they shared with already had HIV. Similarly, of the respondents who reported having sexual intercourse, most believed it was either "very likely" (40%) or "somewhat likely" (38%) that *their* sexual partners already had HIV. In the absence of accurate, objective information, the assumption that one's partners in HIV risk behaviors are the same serostatus as oneself, which has been documented in both HIV-negative populations (e.g., Misovich *et al.*, 1997) and HIV-positive populations (e.g., J. D. Fisher *et al.*, 1997), appears to be a powerful barrier to HIV preventive behaviors. In effect, while individuals believe in the abstract that they can transmit HIV (if they are HIV-positive) or contract it (if they are HIV-negative), they do not believe they can transmit or contract it from the types of individuals with whom they share unsafe behaviors.

HIV Prevention Behavioral Skills

In terms of the IMB model, HIV prevention behavioral skills, in concert with HIV prevention information and motivation, play a deciding role in whether an individual engages in risky or preventive behavior. In the questionnaire component of the research, some respondents reported deficits in behavioral skills related to safer drug use and sexual behaviors, although the majority appeared to possess adequate skills. Over 13% thought it would be either "very hard" or "fairly hard" for them to practice only *safer drug use* behaviors, while over 19% thought it would be "neither hard nor easy." Still, half of the participants (50%) thought it would be "very easy" to perform these behaviors, and 15% thought it would be "fairly easy." For *safer sexual behaviors*, over 15% thought that it would be "very hard" or "fairly hard" to practice only safer sexual behaviors, 13% thought it would be "neither hard nor easy," over 15% thought that it would be "fairly easy," and 54% thought that it would be "very easy."

The interview data also suggested that a majority of the HIV-positive IDUs had the behavioral skills required for *safe needle use*. Participants who reported ever having cleaned needles were asked to describe the proper technique for doing so. Most (70%) were able to describe correctly how to clean needles, but nearly one-fourth (24%) omitted essential steps in their description of correct needle cleaning, and 5% mentioned entirely incorrect techniques. Interview participants who had injected drugs during the previous 2 months were also asked to report the strategies they had used to overcome obstacles to safer needle use. To make sure that they had clean needles handy when they were going to inject, 40% mentioned carrying them, 31% mentioned hiding them in places where they felt it was safe to inject, and 12% mentioned keeping a supply at their home. One additional strategy to ensure clean needle accessibility mentioned by 22% of respondents who currently injected drugs was to avoid sharing needles with other IDUs, further underscoring the observation that informal networks such as friends may not be effective sources of clean needles.

Interview participants mentioned several strategies to ensure that they did not have to share needles with other IDUs. Of those who had injected drugs during the previous 2 months, fully 50% mentioned revealing their HIV status as a way to avoid sharing needles. One fourth mentioned simply refusing to share needles when asked to do so, 12% mentioned

explaining the risks of sharing needles, and 6% mentioned breaking their needle to make sure that sharing it was impossible. Other strategies mentioned as effective to avoid unsafe needle use practices by those who had recently injected drugs included injecting drugs alone, so others would not be tempted to ask to share (16%), and abstaining from drugs altogether (6%). Across all participants, 13% believed that the best way to protect oneself from HIV risk associated with needle use was to abstain from drug injection entirely, and another 13% believed that seeking treatment for drug use was the best strategy.

Suggestions for Risk Reduction Programs

During the interviews, participants were asked what, if any, factors had been especially helpful to them in becoming safer, and what they believed the content of an effective HIV risk reduction program would be. The factors that the IDUs mentioned helping them to be safe with needles were the increased availability of information about the risks of needle use (30%), the increased availability of clean needles (17%), drug treatment (11%), and experiencing the death of others who had practiced unsafe injection (6%).

The suggestions that participants produced regarding the content of effective HIV prevention interventions for HIV-positive IDUs to some extent mirrored these personal experiences. The majority (87%) stated that they would be interested in attending an HIV risk reduction intervention. These IDUs had several suggestions regarding who would be an effective person to run it, where the program should be held, and what the content of such a program should be. Regarding who should conduct the intervention, participants most frequently mentioned that at least one of the facilitators should also be HIV-positive (62%), and that at least one should be a past or current IDU (40%). Some respondents (25%) also mentioned that a medical professional should conduct some component of the intervention.

In terms of the location of the intervention, having it take place in an easily accessible location was considered to be important. Many (42%) mentioned that it should occur in a location where IDUs ordinarily congregate, at a building such as a community center or a church (50%). The majority thought that each session should last either 1 hr (30%) or 2 hr (38%). Many participants (52%) stated that incentives such as food or money would be important in per-

suading HIV-positive IDUs to attend. Providing participants with medical information, both related to HIV prevention and living with HIV, was seen as a necessary component by a majority of participants (52%). Attending to the social and spiritual needs of HIV-positive IDUs was also regarded as essential for an effective program. Nearly half (45%) mentioned that structuring the intervention to provide social support and social events for participants would make it more effective, and 8% stated that incorporating prayer and spirituality would be important. Some participants (12%) advocated using "scare tactics" such as presenting frightening data about deaths from HIV to motivate participants to reduce their own risky behavior. Finally, many participants believed that HIV-positive IDUs would benefit from a wide range of skills training in an intervention. Teaching IDUs safer injection and safer sex skills was mentioned by 40% of the participants, and 20% suggested training general life skills. Showing participants films and conducting roleplays to increase their critical information, motivation, and skills was advocated by 62% of participants.

DISCUSSION

Most previous research on understanding the predictors and the dynamics of HIV risk behavior has focused on populations whose antibody status is unknown or who are predominantly HIV-negative. There is clearly a strong need to extend this research to IDUs who are HIV-infected. The relatively few available studies suggest that a significant minority of HIV-infected IDUs continue to practice risky behavior. Before effective interventions can be created, it is critical to understand more about the levels of risky behavior in HIV-positive IDUs and the reasons why these behaviors occur.

Consistent with the few past studies, this research found relatively high levels of risky behavior since diagnosis in a population of HIV-positive IDUs. Data indicated that over half of participants had practiced risky injection drug behaviors since being diagnosed, and that over 40% of the respondents who had recently injected drugs had shared uncleaned needles during the previous 2 months. Risky sexual behavior was common as well, with nearly 75% reporting engaging in unprotected sexual intercourse following their HIV diagnosis, and approximately one fourth of participants having done so during the previous 2 months. Those who continue to practice

these behaviors may have placed others—and themselves—at great risk.

Our data on information, motivation, and behavioral skills deficits among seropositive IDUs may have important implications for designing behavior change interventions for this population. Past research (e.g., J. D. Fisher and Fisher, 1992; J. D. Fisher *et al.*, 1996) has demonstrated that to be effective, an intervention must have strong information, motivation, and behavioral skills components. Our findings indicate that information about HIV transmission and prevention are generally quite high in the study sample, so an intervention would not have to devote much attention to increasing this type of HIV knowledge. However, some HIV prevention heuristics (e.g., J. D. Fisher *et al.*, 1998; Misovich *et al.*, 1997) appeared to be contributing to HIV risk behavior. Specifically, a major obstacle to HIV-preventive behavior for seropositive IDUs is the assumption that their sexual and needle use partners are already HIV-positive. As a result, it would seem to be critical to correct this assumption in order to increase preventive behavior.

Interventions designed to reduce HIV transmission among HIV-infected IDUs may address the problem of assumed similarity of HIV status (J. D. Fisher *et al.*, 1998; Misovich *et al.*, 1997) in multiple ways. First, it may be possible to point out to participants that they themselves may have contracted HIV from an individual who assumed that they were HIV-positive, especially if they were infected by a relationship partner or by an individual in a location where many IDUs share needles, since in both contexts it is often assumed that others are HIV-positive. This approach could be reinforced through videotapes or testimonials by HIV-infected IDUs who may have been infected by someone who assumed that they were “probably HIV-positive anyway,” or by testimonials of HIV-infected IDUs who infected others, assuming that they were already HIV-positive. Second, HIV-positive IDUs should be encouraged to promote HIV testing among their steady sexual or needle-sharing partners, to determine their partners’ HIV status. If they are found to be uninfected, obtaining such information is likely to be a potent motivator for HIV-infected individuals to reduce their HIV risk behavior with that person (e.g., Friedman *et al.*, 1994; J. D. Fisher *et al.*, 1998). Overall, making it clear to HIV-infected IDUs that their drug injection and sexual partners may in many cases *not be* HIV positive may help to reduce risky behaviors. Additionally, research (e.g., Markowitz *et al.*, 1995)

suggests that protease inhibitors reduce viral load (and possibly reduce the potential of HIV-positive individuals to transmit HIV to others), and may also keep HIV-positive individuals healthy longer. Interventions should stress that the use of protease inhibitors may benefit both oneself and one’s partners, though they do not at present reduce the need for safer sexual and drug injection practices.

In response to questionnaire items assessing motivation to practice HIV preventive behaviors, participants generally showed positive attitudes toward safer behaviors, and perceived social support for engaging in them. Interestingly, behavioral intentions to perform safer behaviors were less favorable than attitudes and perceived normative support for prevention. Further, a comparison of behavioral intentions to be safe during the next 2 months with actual recent levels of safer behavior suggests that even the reported levels of behavioral intentions may have reflected an “optimistic bias.” In the absence of a behavior change intervention, one would expect behavioral intentions for the next 2 months to correspond more closely to actual behavior in the past 2 months. Regarding perceived vulnerability of others to HIV transmission through participants’ unsafe sex or unclean needle practices, in the abstract, participants thought it was quite likely that they could infect uninfected others through unsafe sex or unclean needle use. However, the effect of this belief on prevention was mitigated by participants’ often erroneous belief that their partners were likely to be seropositive, and thus that HIV prevention was unnecessary. Again, this suggests that interventions must focus on making it clear to participants that in many cases they *can* infect their partners. Several ways to accomplish this were described above.

Despite the prevention attitudes and norms reported by participants, the interview data suggest that many physiological and social obstacles to prevention exist for HIV-positive IDUs. Regarding unsafe needle use, participants often cited addiction-related reasons (e.g., perceived time pressure due to withdrawal symptoms) for not cleaning needles or for sharing them with others. However, many reasons related to social demands (e.g., partners refusing to practice safer behaviors) were mentioned as well. Many believed that negative social consequences would result from HIV preventive practices (e.g., others would not be able to use their needles, and would suffer withdrawal symptoms, or, if their HIV status was revealed, others might react negatively). Past research has shown that violations of norms for

sharing needles and other drug use equipment are likely to be negatively sanctioned by the drug user's social network (e.g., Guydish *et al.*, 1991). Similar social obstacles were perceived regarding obtaining new needles, in that obtaining needles was seen by many to be stigmatizing and embarrassing.

As with uninfected IDUs, a major barrier to consistent safer needle use for HIV-infected IDUs is the potential inaccessibility of clean needles when injection is necessary, due to drug withdrawal. Our data suggest that despite concerns about embarrassment and social stigma, IDUs are very likely to utilize pharmacies and needle exchanges for needle acquisition. In general, relatively reliable, professional sources of needles appear to be preferred over friends and peers. One reason for this may be the need to know exactly when and where new needles will be available, which is more likely to be realized with pharmacies and needle exchanges than with friends or other acquaintances.

To ensure that HIV-infected IDUs have sufficient access to clean needles, different routes may be taken. First, it may be possible to reduce the perceived negative social consequences of utilizing pharmacies. In addition to encouraging (or even training) pharmacists and other personnel to be more "user friendly" to individuals purchasing needles, perceived negative social consequences can be reduced through direct interventions with IDUs involving guided imagery, roleplays, or other techniques for increasing needle acquisition behavioral skills and increasing one's needle acquisition comfort level. It may also be possible to expand the presence of needle exchanges. Regarding the latter, it will first be necessary to mount strong, effective campaigns to educate the public as to their value. Generally, the provision of needles for IDUs has not been found to increase drug injection (e.g., Des Jarlais, 1996). In the case of needle exchanges, their use may also reduce the number of needles discarded by IDUs, since the needles retain their exchange value after injection. The perceived public benefit of needle exchanges would also be increased to the extent that they become perceived as sources of HIV prevention training and referral for IDUs.

In addition to greater access to clean needles, participants appeared to need increased skills to communicate their HIV status to others more frequently and more effectively. The seropositives in this study did not consistently reveal their HIV status to sexual or injection drug use partners. Since other research has shown that self-disclosure of HIV status by sero-

positives may be associated with lower rates of risky behavior (e.g., Wenger *et al.*, 1994), risk reduction interventions should include a training component designed to increase participants' skills and reduce their concerns related to revealing their antibody status. It may be most useful to imbed such training in an overall program of teaching effective needle-sharing refusal skills. Teaching effective needle-sharing refusal skills to IDUs might reduce HIV transmission in this population, but it would appear to be necessary to pair the refusal skills with skills associated with carrying extra needles, or only injecting in areas where needles are easily available, so that others without needles could be directed to an easy source. Where it is legally possible, having a "foot patrol" of outreach workers with clean needles may reduce the pressure on IDUs who have needles to share them.

On the whole, while the seropositives in this study reported a wide range of HIV risk behavior, which was affected by physiological needs, faulty HIV risk reduction heuristics, antiprevention social motivation factors, and a need for additional HIV prevention skills, many participants also exhibited a willingness to participate in interventions to change their behavior to protect themselves and others. HIV-infected IDUs generally believed that HIV prevention programs for them should be conducted by similar others, along with medical personnel. Most of their suggestions regarding the programs included making sure that they were easily accessible, and involved incentives such as food or money. It was widely perceived that skills training, through roleplays or other techniques, was necessary. In addition to skills training dealing directly with injection drug safety, it was believed that a broader range of social support and life skills training should be supplied.

Some limitations to the current research may be considered. One general limitation of this study involves the relatively small number of participants. Because only 46 respondents participated in the research, and some of them had not engaged in risk behaviors during the time intervals specified in the data collection, it was not possible to compare subgroups (e.g., male vs. female) statistically. A larger number of participants would increase the number of statistical analyses possible; however, it is generally very difficult to obtain large samples of HIV+ IDUs for research purposes. A second limitation of the research involves the informal sampling procedures utilized. Participants were recruited through commu-

nity-based organizations such as local health councils, as well as through drug and alcohol treatment centers. As a result, one possible limitation may be that the individuals recruited were likely to be involved in social service programs, and, as a result, the data collected may not generalize to seropositive IDUs who have not made contact with such organizations. However, individuals who are making contact with social service organizations are an important target population for intervention. Understanding the dynamics of their risk behavior may help us to produce effective interventions that may be initiated immediately upon individuals' contact with social service organizations.

CONCLUSIONS

Overall, the present research has shown both that there are high continuing rates of risky behavior in seropositive IDUs and that critical factors responsible for such behaviors can be elucidated. Interventions that take these factors into account are clearly more likely to be effective in changing HIV risk behavior in seropositive IDUs and in maintaining such change. At present few, if any, such programs are known to exist. Before concluding, several caveats should be mentioned. While this research suggests that new, state-of-the-art interventions must be targeted to seropositive IDUs, it is important to note that such interventions can only be targeted to known seropositives. Individuals who are likely to be seropositive, but who do not know it must be encouraged to be tested for HIV, so that they could then be targeted for intervention. Since HIV-positive individuals are most infectious both early and late in their disease progression (Mellors *et al.*, 1996), encouraging frequent testing for high-risk individuals, followed by intensive behavior change interventions for those found to be seropositive, would help stop transmission among those too early in the disease progression to have noticed symptoms and to have been tested.

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