Prevention and Treatment of HIV Infection in Injection Drug Users in the Bronx

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ABSTRACT

Human Immunodeficiency Virus-1 infection is prevalent among injection drug users nationwide, and is especially prevalent here in the Bronx and New York City. Injection drug users are at increased risk for acquiring and transmitting HIV infection primarily because of unsafe injection practices and high-risk sex behaviors, but several studies have tested risk reduction interventions for injection drug users and found them to decrease these risk behaviors. The most successful risk reduction interventions mobilize peers, involve community outreach, and work in conjunction with substance abuse treatment programs. Other successful interventions for reducing HIV transmission risk among injection drugs users rely on medical providers to offer individualized risk reduction along with medical treatment for HIV. In this article, we review HIV prevention and treatment programs that have helped stem the HIV epidemic among injection drug users in the Bronx.

INTRODUCTION

A large percentage of new HIV infections and existing AIDS cases are attributable to injection drug use, particularly in New York City, and most strikingly in the Bronx. In this paper we describe HIV prevention and treatment programs for injection drug users (IDUs), focusing on New York City and the Bronx.

HIV prevention is broadly defined as protecting individuals from contracting HIV infection, preventing HIV-infected persons from passing the infection on to others, and preventing HIV disease progression in those who are already infected. Prevention of HIV transmission among IDUs is achieved primarily through risk reduction interventions, which are often provided in the context of substance abuse treatment. These interventions target both injection drug use and sexual risk behaviors, and can be directed towards individuals or towards larger social networks or cultures. HIV prevention can also be successfully offered to IDUs in the context of medical treatment, by increasing knowledge of HIV transmission among those who are already infected and counseling them about risk reduction. To illustrate the local relevance of these HIV prevention strategies, we describe how some prevention efforts are being applied to combat the HIV epidemic among IDUs in the Bronx.

PREVALENCE OF HIV/AIDS IN INJECTION DRUG USERS

Injection drug use is the second most common vector for the spread of HIV, after unprotected sex (Figure 1). Since the start of the HIV epidemic, over one-third of all AIDS cases in the US have been attributed to injection drug use, either among IDUs (25%), among persons who report sexual contact with IDUs (4%), or among persons who report both injection drug use and male-to-male sexual contact (6%) (Centers for Disease Control and Prevention [CDC], 2002a, 2002b).

The state of New York has the largest number of new HIV infections in the country, almost twice that of any other state, with approximately 11,000 new infections diagnosed in 2002 (CDC, 2002b). In that year, the CDC also reported that New York State had the largest number of people living with AIDS in the United States. It is estimated that 30-50% of IDUs in New York State are infected with HIV (New York State Department of Health, 2002). The distribution of HIV diagnoses in NYC by borough is shown in Figure 2. Of those diagnosed in the Bronx, 14% of the men and 9% of the women had a history of injection drug use (New York City Department of Health and Mental Hygiene, 2004b). Further, among all HIV-infected IDU women in NYC, the largest percentage (33%) live in the Bronx (New York City Department of Health and Mental Hygiene, 2004b).

In addition to injection drug use, other risk behaviors for HIV transmission are highly prevalent in the Bronx. In 2003, one in 12 adults in the Central and South Bronx reported at least one high-risk behavior for HIV infection, including injection drug use, unprotected anal intercourse, or exchange of sex for drugs or money (New York City Department of Health and Mental Hygiene, 2003). Once infected with HIV, Bronx residents are three times more likely to be hospitalized for HIV/AIDS-related illnesses than other New Yorkers, and the death rate due to AIDS is three times higher in the Bronx than in the rest of the city (New York City Department of Health and Mental Hygiene, 2003).

RISK BEHAVIORS AND HIV TRANSMISSION

IDUs are at risk for transmitting HIV both through sharing injecting equipment and through other behaviors associated with drug use, such as unprotected sex and exchange of sex for drugs or money (Nadeau et al.,
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In 2000, HIV infection among drug users was spread through unsafe injection practices, such as sharing needles or other drug paraphernalia (73%), through hetero- or homosexual sex with an IDU (26%), or through vertical transmission from a drug-using HIV-infected mother to her child (1%) (Avants et al., 2000; Somlai et al., 2003; Woods et al., 1999). Risk behaviors for HIV transmission in IDUs generally fall into two categories, unsafe injection practices and unsafe sex behavior. In a sample of HIV-infected drug users, Avants et al. (2000) reported that 66% of these users engaged in either unsafe injection or sex behaviors, and 42% said they engaged in both types of risk behaviors.

Specific risk behaviors related to injection drug use include using unsafe injecting equipment, such as used needles, and sharing injecting equipment with HIV-infected persons. In addition, both long duration of injection (more than nine years) and first drug injection before the age of 25, have been associated with higher rates of HIV infection (Monterroso et al., 2000; Somlai et al., 2003). Injecting equipment that can transmit HIV includes not just needles, but also supplies such as cookers, spoons, cotton, and rinse water. These paraphernalia can be contaminated with HIV-infected blood from a previous user, and have been shown to be more likely to be shared than needles (Broadhead et al., 1998; Woods et al., 1999). In one recent study, 27% of HIV-infected drug users reported sharing drug paraphernalia, while only 12% reported sharing needles after use (Purcell et al., 2004). The same study found that 65% of HIV-infected drug users shared drug paraphernalia with other HIV-infected drug users, while only 33% shared needles.

Risk factors for sexual transmission of HIV include multiple sex partners, infrequent condom use, unprotected anal intercourse, HIV-infected sex partners, and exchange of sex for drugs or money (Monterroso et al., 2000; Somlai et al., 2003). Several studies have shown that high-risk sex behaviors are common among IDUs, though less common if HIV infection is present. In one sample of HIV-uninfected IDUs, Somlai et al. (2003) found that the majority (90%) reported unprotected sex in the last three months, one-third engaged in unprotected anal intercourse, and two-thirds of the women had traded sex for drugs or money. In contrast, Purcell et al. (2004) found that a minority (28%) of HIV-infected IDUs reported high-risk sex behaviors.

**INTERVENTIONS TO PREVENT HIV IN INJECTION DRUG USERS**

Despite many barriers to HIV risk reduction among IDUs, including ongoing drug use, homelessness, medical and psychiatric illness, poverty, and unemployment (Des Jarlais and Friedman, 1998; Purcell et al., 2004), several studies have shown that behavioral
change to decrease HIV risk behaviors can be achieved (Table 1). To be effective, HIV prevention programs must be comprehensive and target a variety of risk behaviors (Margolin et al., 2003; Prendergast et al., 2001; Semaan et al., 2002). In addition, prevention programs should include interventions that target individual, social and structural needs (Des Jarlais, 2000; Leshner, 1998). Individual level interventions affect an individual’s knowledge, behavior, or attitude towards injection drug use (Des Jarlais, 2000). Social level interventions impact the way IDUs interact with each other and with non-IDUs in their social networks. Structural level interventions improve the safety of the environments in which people inject drugs (Des Jarlais, 2000).

**Individual Level Interventions**

HIV prevention interventions at the individual level provide information, skills, and support that can reduce both injection and sex risk behaviors for HIV transmission (CDC, 2000a; Leshner, 1998). Many interventions include information distribution, modification of attitudes or beliefs about health behavior, and skill-building techniques to assist with behavior change (Broadhead et al., 1998; HIV Prevention in Clinical Care Working Group, 2004; McMahon et al., 2001; Semaan et al., 2002). Individual level interventions may occur within substance abuse or other treatment programs, or involve outreach methods to reach IDUs who are not in treatment for substance abuse. In a meta-analysis of 33 studies in which 94% of participants were IDUs, Semaan et al. (2002) found that individual level interventions that reduce sex risk behaviors shared certain characteristics: an informational component, a harm reduction component, condom availability, access to HIV testing, and an emphasis on changing peer norms surrounding sex behavior (Semaan et al., 2002).

In addition to interventions based in treatment programs, several studies have examined outreach-based interventions. Such efforts aim to effect behavior change on an individual level by training near-peer outreach workers to provide street based risk reduction education and services. Services might include distribution of educational materials about HIV, information about prevention and locally available services, face to face counseling regarding individual HIV risk, and distribution of condoms and equipment to clean needles (Coyle et al., 1998; Kumar et al., 1998). Most street-based outreach efforts also include off-street sessions that include HIV testing and counseling, couples counseling, role-playing exercises, and skills-building for condom use and needle cleaning techniques (Coyle et al., 1998; Kumar et al., 1998).

![FIGURE 2: HIV Diagnoses in 2002 in New York City by Borough (New York City Department of Health and Mental Hygiene, 2004a)](image_url)
Social Level Interventions

Interventions at the social level consider the influence of environment and people on a person’s social network (Des Jarlais, 2000; Latkin, 1998). A person’s social network is defined by social relationships, ranging from intimate sexual relationships, to family and friends, to roles in the larger community. Social network interventions address the effect of these environmental factors on a person’s risk behaviors, and recognize that transmission is dependent on these relationships. (Neaigus, 1998).

Peer leaders can be effectively utilized in social interventions. Latkin (1998) conducted a study in which peer leaders made public commitments to risk reduction, provided behavioral and skills modeling, and illustrated how to address behavioral cues in natural settings. Several studies have also shown that among IDUs, peers can access other IDUs more effectively and more economically than non-IDU outreach workers (Broadhead et al., 1998; Latkin, 1998; Neaigus, 1998).

Structural Level Interventions

Structural interventions can change environmental influences on drug use to reduce HIV transmission risk. An example is the sale of safe injection drug use equipment in community pharmacies. Availability of clean needles and other drug injection paraphernalia reduces the need to resort to unsafe injection practices. The chief merit of structural interventions is that they do not depend entirely on individual motivation to prevent transmission of HIV because the structure of

<table>
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<tr>
<th>LEVEL OF INTERVENTION</th>
<th>TYPE OF INTERVENTION</th>
<th>RESULTS</th>
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<tbody>
<tr>
<td>Individual</td>
<td>Behavioral skills training</td>
<td>• More positive attitudes towards HIV prevention</td>
<td>Eldridge et al., 1997</td>
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<td></td>
<td></td>
<td>• Increased partner agreement/communication about condom use</td>
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<td>• Increased condom application skill and condom use</td>
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<td></td>
<td>Information, motivational counseling, and behavioral skills training</td>
<td>• Decreased unprotected sex</td>
<td>Margolin et al., 2003</td>
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<td></td>
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<td>• Decreased shared needles at treatment, but this effect not sustained over time</td>
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<td></td>
<td>Meta-analysis of 33 interventions, most of which were behavioral</td>
<td>• Reduced sex risk behaviors</td>
<td>Semaan et al., 2002</td>
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<tr>
<td>Social</td>
<td>Peer-based outreach to network members</td>
<td>• Increase in condom use among peers</td>
<td>Latkin, 1998</td>
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<td></td>
<td></td>
<td>• Increase in needle cleaning among peers</td>
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<td></td>
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<td>• Decrease in sharing needles without prior cleaning among network members</td>
<td></td>
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<td></td>
<td>Peer-based outreach</td>
<td>• Higher HIV knowledge test scores</td>
<td>Broadhead et al., 1998</td>
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<td></td>
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<td>• Reduction in needle, cooker, filter and rinse water sharing</td>
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<tr>
<td>Structural</td>
<td>Syringe exchange</td>
<td>• Decreased needle sharing at last injection</td>
<td>Monterroso et al., 2000</td>
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<tr>
<td></td>
<td>Syringe exchange</td>
<td>• Decreased needle, cooker, cotton, and rinse water sharing</td>
<td>Ouellet et al., 2004</td>
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the environment has been changed in a way that reduces risk (Des Jarlais, 2000).

Two examples of structural interventions are pharmacy or health care facility-based syringe access programs and syringe exchange programs. Syringe access programs allow safe injecting equipment and hypodermic needles or syringes to be sold legally and without a prescription at licensed pharmacies, or by health care facilities (New York State Department of Health, 2003). Syringe exchange programs provide the opportunity for IDUs to exchange clean and unsafe needles for safer injecting equipment (Des Jarlais, 2000; Wood et al., 2003). These programs can provide a variety of services to IDUs, such as HIV prevention education, counseling, medical care, and social services. The availability of these additional services increases the likelihood that IDUs will come to the facilities and use the syringe exchange services.

SUBSTANCE ABUSE TREATMENT AS HIV PREVENTION

Substance abuse treatment is an effective method of prevention of HIV infection in IDUs (Cooperman et al., 2005; Marsch, 1998; Monterroso et al., 2000; Rhoades et al., 1998; Sorenson and Copeland, 2000; Woods et al., 1999). On an individual level, substance abuse treatment programs curb risk behaviors by helping patients reduce or stop drug use, thereby reducing needle use, which helps prevent the spread of HIV. Substance abuse treatment programs may also reduce risk behaviors related to sexual transmission of HIV by providing condoms and education about risk behaviors.

MEDICAL TREATMENT OF HIV AS A PREVENTION MEASURE

Treatment of HIV infection comprises prevention of HIV on two levels. It serves as secondary prevention since patients receiving treatment will be less likely to transmit the disease (De Castro and Sabate, 2003). It also serves as prevention of disease progression for persons with HIV infection, since treatment with antiretroviral medications effectively halts disease progression (Gifford et al., 2000; Palella et al., 1998). Components of secondary prevention include education about transmission, counseling to foster necessary skills to reduce transmission risk, and reduction of HIV viral load through antiretroviral therapy.

Secondary Prevention of HIV in the Medical Setting

Doctors have the unique ability to provide individualized HIV prevention in the medical setting. The HIV Prevention in Clinical Care Working Group (2004) recommends that doctors regularly screen all HIV-infected patients for HIV transmission risk behaviors, provide behavioral-skills risk reduction interventions to individual patients or refer patients to such services, and facilitate HIV notification, counseling, and testing for partners of HIV-infected individuals. For IDUs specifically, this Working Group recommends asking about injection drug use history, injecting equipment sharing, numbers of people that a person has shared equipment with, HIV-status of equipment-sharing partners, whether patients use safe or sterile injecting equipment, and barriers to stop injection drug use or to safe injection drug use.

The CDC has also recently developed the “Serostatus Approach to Fighting the Epidemic (SAFE)” which emphasizes prevention efforts for all HIV-infected patients. The SAFE approach urges medical providers and others in the field to first identify high-risk people, and then encourage them to learn their HIV status (Janssen et al., 2004). Those identified as HIV-infected should then be assisted in utilizing prevention and treatment services.

Medical Treatment of HIV in the Substance Abuse Treatment Setting

The goals of medical treatment for HIV-infected IDUs include prevention of HIV disease progression and opportunistic infections, screening for associated infections such as tuberculosis and hepatitis C, and attendance to psychosocial factors which impact physical health. One important aspect of providing medical treatment for IDUs is to provide care in settings that IDUs regularly access, such as methadone maintenance treatment programs (MMTPs) and community-based organizations.

Medical providers who work in substance abuse treatment programs have a unique opportunity to prevent and treat HIV infection in IDUs. Injection drug users often prioritize drug use over other life concerns, including health care (Des Jarlais and Friedman, 1998). When IDUs access substance abuse treatment, health needs can be assessed and health care can be offered (Sorenson and Copeland, 2000). MMTPs provide an opportunity to engage IDUs in the current standard of HIV care, and decrease their risk of progression to AIDS. Typically patients must start treatment by ingesting methadone at an MMTP daily. After stability in treatment and safe handling of methadone are demonstrated, take-home doses of methadone are permitted. The result of this structure is that MMTPs can serve as day-treatment programs in which a variety of services can be provided, such as vocational counseling and psychiatric and medical care, in addition to substance abuse treatment. Service providers at MMTPs can often be more flexible and accommodating to patients since the patients come to the program so frequently.

There are a variety of advantages to treating HIV in the
MMTP setting. Doctors, as well as counselors and other staff in MMTPs, can help HIV-infected patients increase their confidence in risk reduction techniques, identify barriers to safe injection and sex behaviors, increase their social supports, and increase their behavioral skills (Avants et al., 2000). HIV-infected IDUs in MMTPs are more likely to receive antiretroviral therapy and have higher rates of adherence than those not in MMTPs (Sambamoorthi et al., 2000). Because adherence is important to preventing both HIV transmission and disease progression (Janssen et al., 2001; Palella et al., 1998), patients with barriers to adherence to antiretroviral regimens can have their antiretroviral medications dispensed by nursing staff daily along with methadone. Barriers to adherence include homelessness, psychiatric issues, and cognitive impairment (Hinkin et al., 2002; Loughlin et al., 2004). Because several antiretroviral medications have significant interactions with methadone (Bart et al., 2001; McCance-Katz et al., 2002), coordination of methadone maintenance treatment with antiretroviral treatment is maximized when the same medical provider is providing both services.

**Medical Treatment of HIV in the Social Service Setting**

Community-based organizations can also develop programs to prevent and treat HIV. Such programs might provide medical treatment, case management services, or needle exchange services. A benefit of providing medical care in a community-based setting is

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<th>TABLE 2: LOCAL PREVENTION AND TREATMENT EFFORTS FOR HIV-INFECTED IDUS</th>
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<td><strong>LEVEL OF INTERVENTION</strong></td>
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<td>Individual</td>
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1. AECOM: Albert Einstein College Of Medicine
that doctors are able to connect with individuals who are often reluctant to seek medical care due to fear of discrimination or inability to manage complex health care systems (Heller et al., 2004; Purcell et al., 2004).

LOCAL EFFORTS FOR PREVENTION AND TREATMENT OF HIV IN INJECTION DRUG USERS

Several local programs utilize the intervention and treatment options described in this review. In particular, two programs affiliated with the Albert Einstein College of Medicine and Montefiore Medical Center provide comprehensive medical and substance abuse treatment to IDUs, as described above and in Table 2.

CONCLUSIONS

Prevention of HIV among IDUs is critical to minimize the spread of HIV in the US. Many IDUs remain at high risk for transmission of HIV, through both unsafe injection practices and high-risk sex behaviors. At the same time, IDUs face multiple challenges to engagement in medical care. Special efforts must be made to effectively target this population. Studies have shown that HIV prevention programs are most effective when they utilize a variety of methods targeting both individual risk behaviors and risk behaviors affected by social norms. We have described several local interventions that are successfully addressing prevention and treatment of HIV among IDUs.

One element common to successful programming, both locally and nationally, is that services are brought to IDUs in community settings, such as community-based clinics, substance abuse treatment programs, needle exchange programs, and on the street. Locating programs in these settings ensures that IDUs will have access to available prevention and treatment services. Additionally, co-localizing medical care, social services and risk reduction services increases the likelihood that IDUs will receive comprehensive care. Integration of these typically separate domains may be a key factor in reducing the prevalence of HIV and the morbidity and mortality associated with HIV.

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