Injecting Drug Use and AIDS in Developing Countries: Determinants and Issues for Policy Consideration

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Introduction

Drug use has played a critical role in the spread of the Human Immunodeficiency Virus (HIV) in several developing countries, and threatens to become an important vector for HIV transmission in others. Some governments have begun to develop policies and interventions targeted to injecting drug users, while others are hesitant to recognize the problem. Part of the difficulty in developing HIV prevention strategies for this group is a lack of knowledge about factors influencing drug use and the spread of HIV. Governments and policymakers must have an understanding of the patterns and determinants of drug use and factors leading to the spread of HIV in this group in order to design appropriate interventions and prevention strategies.

HIV transmission among drug users is most often associated with injecting drug use, but there is growing evidence that other types of drug use, including the nasal ingestion and inhalation of cocaine and crack cocaine, as well as use of other stimulants also influence the spread of HIV. Heroin use has been increasing worldwide, and while many users smoke the drug, there is also a trend toward increasing injection in some areas (Stimson 1996). Injecting drug use has been identified in over 50 developing countries, and HIV transmission associated with injecting drug use has been reported in at least half of these (Stimson 1996). In addition, HIV seroprevalence among injectors accounts for the majority or a large minority of all HIV positive cases in some developing countries. Snorting of cocaine and smoking of crack cocaine are also prevalent in several developing countries (Oritz, 1994; Surratt, et al. 1996b). The risky sexual behavior associated with this type of drug use contributes to HIV spread among the non-injecting population.

The high rate of HIV seroprevalence among the drug-using risk group in itself poses a major health problem of international concern. However, drug-related HIV transmission does not remain within the confines of this group. Drug users also function as a “bridging group,” that is, a bridge for HIV transmission between a core HIV risk group and the general population. In most areas where HIV is prevalent among injecting drug users, the drug users act as the primary source for HIV transmission in the heterosexual population and in perinatal transmission as well (Des Jarlais, 1992). Thus, the extent of the HIV pandemic associated with drug use in some developing countries has expanded beyond this risk group to include the sexual partners and children of drug
users. This has important economic and policy implications for decisions regarding HIV prevention and intervention measures targeted to certain risk groups.

Some governments have made an extensive effort to address HIV among drug users. Specific interventions have included needle exchange programs, methadone treatment facilities, and information and education campaigns that promote needle and syringe disinfecting techniques. Some of these programs have met with success, resulting in stabilization of HIV prevalence rates among the injecting drug using population. However, many countries are experiencing an increase in HIV among the partners of IDUs, who are not drug injectors themselves. Additional evidence on behavior change among IDUs indicates that while they are able to reduce risk through decreased needle sharing and increased cleaning practices, they have not changed their sexual behavior, particularly regarding condom use (Jain, et al. 1989; Neaigus, et al. 1990; Des Jarlais and Friedman 1988a; Van de Hoek, et al. 1990).

Given the extent of HIV transmission associated with drug use, it is important to examine determinants of drug use and related behaviors in developing countries where this is currently a problem, and where this may become a problem in the future. This paper will provide a review of literature on injecting drug use and HIV in developing countries. First, levels of HIV infection among drug users in various countries, to the extent that it is available, will be presented. The second section will focus on the role of IDUs in introducing HIV into the general population. Included in this section will be discussion of specific behavioral risk factors associated with HIV transmission. Third, I will present the patterns of drug use in developing countries and discuss factors influencing the global diffusion of heroin and injecting drug use. Fourth, specific practices that facilitate the spread of HIV among IDUs will be presented. Fifth, I will discuss interventions to reduce HIV transmission among IDUs, including policies and programs to reduce demand and supply of drugs, as well as programs of harm reduction. Finally, I will review issues to consider when developing HIV policies and programs targeted to injecting drug users. Several countries have an opportunity to reduce the likelihood of full-scale HIV/AIDS epidemics by quick action featuring targeted, proven interventions to injecting drug users; however, political and cultural factors may constrain governments and NGOs in developing HIV prevention strategies.
Levels of HIV Infection Among Injecting Drug Users

HIV Prevalence among IDUs. Table 1 presents estimates of HIV seroprevalence among IDUs in developing countries. Countries differ in the timing of the introduction of HIV into the drug using population and levels of HIV infection in this population. In some countries where injecting drug use is found, such as Hong Kong, Nepal, and Singapore, HIV seroprevalence is virtually nonexistent, while in other areas, such as Brazil, Thailand, Manipur, and Yunnan Province, China, levels of HIV infection in IDUs are reported to have stabilized at 50 percent or higher in some cases (Stimson, 1993; Des Jarlais, et al. 1992; Poshyachinda, 1993). IDUs in several towns in Asia have prevalence rates above 60 percent. The highest rates have been found in Ruili in Yunnan Province at 82 percent in 1991 (Zheng, et al. 1993), Chiang Rai in Northern Thailand at 61 percent in 1989 (Poshyachinda 1992), the state of Manipur, India at 73 percent in 1992 (Sarkar, et al. 1993), and several towns in Myanmar, including Yangon (74 percent), Mandalay (84 percent), and Myitkyina (91 percent) (Department of Health 1993). There is no indication that these high rates are decreasing, with prevalence continuing at between 60 and 70 percent in Manipur (Sarkar, et al. 1993), around 75 percent in Myanmar (Department of Health 1993), and about 30 percent in Bangkok (Weniger et al. 1991).
Table 1. HIV Prevalence Among IDUs in Selected Developing Countries.

<table>
<thead>
<tr>
<th>Country/City</th>
<th>HIV Prevalence Among IDUs</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandalay</td>
<td>74.3</td>
<td>Stimson 1994</td>
</tr>
<tr>
<td>Myitkyina</td>
<td>58.0</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Yangon</td>
<td>91.0</td>
<td>Jain, et al. 1994</td>
</tr>
<tr>
<td>Taunggyi</td>
<td>74.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38.0</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipur</td>
<td>55.0</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Mizoram</td>
<td>67.0</td>
<td>Jain, et al. 1994</td>
</tr>
<tr>
<td>Nagaland</td>
<td>6-10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yunnan Province</td>
<td>13.3</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td></td>
<td>43-82</td>
<td>Zheng, et al. 1994</td>
</tr>
<tr>
<td>Thailand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangkok</td>
<td>38.0</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>North</td>
<td>34.6</td>
<td>Brown, et al. 1994</td>
</tr>
<tr>
<td>South</td>
<td>28.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>39.3</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rio</td>
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<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Santos</td>
<td>35.0</td>
<td>WHO 1994</td>
</tr>
<tr>
<td></td>
<td>62.0</td>
<td></td>
</tr>
<tr>
<td>Viet Nam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ho Chi Minh</td>
<td>8.7</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td></td>
<td>40-44</td>
<td>Hien 1995</td>
</tr>
<tr>
<td>Nha Trang</td>
<td>90.0</td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>32.8</td>
<td>U.S. Bureau of the Census 1995</td>
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<tr>
<td>Malaysia</td>
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<tr>
<td>Uruguay</td>
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<tr>
<td>Bahamas</td>
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</tr>
<tr>
<td>Egypt</td>
<td>7.6</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>4.7</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Mexico</td>
<td>1.3</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>South Africa</td>
<td>0.6</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>&lt;1.0</td>
<td>Ch’ien 1994</td>
</tr>
<tr>
<td>Nepal</td>
<td>1.0</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Philippines</td>
<td>1.6</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.2</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
<tr>
<td>Taiwan</td>
<td>0.1</td>
<td>U.S. Bureau of the Census 1995</td>
</tr>
</tbody>
</table>
Role of IDU-HIV Infection in Specific Epidemics. Injecting drug use is important in the HIV epidemic in developing countries in both Asia and South America. In China, about 70% of all HIV infections are among IDUs. The proportion of HIV cases attributed to IDUs is also substantial in Brazil at 27 percent, and in the Southern cone countries of Chile, Argentina, Uruguay, and Paraguay at 30 percent. Important trends are also evident in India. IDU-related HIV infections make up only about 6-20 percent of all HIV infections nationwide. However, while the states of Manipur, Mizoram, and Nagaland account for less than 1 percent of the total population in the country, they contribute nearly 16 percent of the total number of HIV positive individuals. Most of the HIV positive cases from these states are among IDUs (Narain, et al. 1994; Sarkar et al. 1993). In addition, the epidemic in Myanmar, one of the most serious in Southeast Asia, began with the infection of large numbers of IDUs in the late 1980s, with prevalence rates in this group continuing at 60 to 70 percent since 1992 (AIDSCAP et al. 1996).

The dynamics of the epidemic spread in Asia have been reconstructed using epidemic chronology, geographical proximity and known migration patterns (Stimson, 1994a). The first cases of HIV among IDUs were identified in Bangkok in 1987, with subsequent rapid spread in this city in 1988. Eight months later, the pattern was repeated in southern Thailand near the Malaysian border and in northern Malaysia. Also within eight months, HIV among IDU spread to northern Thailand. To the south, the first cases of HIV among IDU were identified in Singapore two years later in 1990. HIV infection was identified in Myanmar and Yunnan in 1989, and also in Manipur (which is on the direct heroin-trading route from Myanmar) at this same time.

Rapid Spread of HIV. Some countries have experienced very rapid increases in HIV seroprevalence among IDUs in a short period of time, going from 0 percent seroprevalence to 50 percent in six months in some cases (Figure 1) (Des Jarlais, et al. 1992; Stimson, 1993; Poshyachinda, 1993; Brown, et al. 1994; Jain, et al. 1994; Sarkar, et al 1996; Narain et al. 1994; Sarkar, et al. 1991). For example, HIV infection among IDUs in Bangkok increased from 0-1 percent between 1985 and 1987 to 32-43 percent in 1988 (Poshyachinda 1992). In Chiang Rai, seroprevalence rose from 1% in 1988 to 61% in 1989. Similarly, in Manipur, the first seropositive IDU was identified in October 1989 and within 6 months prevalence in this group increased to 56 percent (Sarkar, et al. 1991).
Two factors seem to increase the likelihood of rapid transmission. First, lack of awareness of an HIV threat among IDUs appears to facilitate HIV transmission (Des Jarlais, et al. 1992). These researchers have found that in all areas that experienced rapid transmission, it occurred before IDUs perceived a threat from HIV. Second, the presence of mechanisms for efficient mixing, including shooting galleries, use of dealers’ works, and groups of IDUs that purchase and inject drugs together, influence HIV transmission (Des Jarlais, et al. 1992).

Figure 1. Cities/Counties that have experienced rapid diffusion of HIV among IDUs.

Source: Stimson 1996

The HIV epidemic has stabilized at high seroprevalence levels in some areas due to continued high-risk syringe sharing, the high prevalence rate which increases the odds of sharing with an HIV-positive IDU, the high infectivity of new cases of infection, and the mobility and mixing between injectors (Stimson, 1996). The following section provides more detail on prevalence estimates for certain cities and areas within developing countries.
Asia

*China*. HIV seroprevalence among IDUs is found mainly in Yunnan Province, in southwest China. In October 1989, almost 100 HIV infections were identified among drug users in a detoxification treatment center in Ruili County, Yunnan Province. HIV testing in Ruili, Longchuan and Luxi counties in 1993 in this state have found seroconversion rates per hundred person years among IDUs of 40 percent, 12.2 percent, and 0 percent, respectively. Another study of 182 IDUs tested in Langdao village in Ruili County (bordering Myanmar) found a 43.4 percent HIV seroprevalence rate (Xia, et al. 1994; Zheng, et al. 1994). Male IDUs in Yunnan account for about 78 percent of all AIDS cases in China (Xiwan, 1996).

*Hong Kong*. While injecting drug use has been prevalent here since the 1950s, HIV seroprevalence remains low. Annual surveys of street addicts have been done since 1991, and of 8000 or more drug addicts screened, only 9 cases of HIV have been identified by the end of 1993 (Ch’ien 1994; Lee, et al. 1993; Wong, et al. 1993; Poshyachinda, 1993).

*India*. Like Bangkok, Manipur state in northern India has experienced a very rapid increase in HIV seroprevalence among IDUs. In 1991, the number of IDUs in Manipur alone was estimated at 20,000. From 1986 to September 1989, no seropositive cases were found among samples of 2,322 IDUs. However, from October 1989 to June 1990, 54 percent of IDUs sampled (over 2,000) were seropositive, and in 1992, 67 percent were reported to be HIV-positive. Drug addiction is not considered to be as high in other areas in India, but systematic surveillance begun recently indicates that addiction is much more frequent than realized. In many cities pockets of drug users have been found, but HIV-seropositive IDUs are still almost totally restricted to the north-eastern region. HIV-seropositivity has also been identified among IDUs in Mizoram (at 6-10 percent) and Nagaland (at 50 percent), two other states which border Myanmar. In addition, recent unpublished data indicate that HIV infection has reached IDUs in Madras, where over 10 percent of a sample of nearly 100 IDUs tested positive (Jain, et al. 1994; Poshyachinda, 1993; Sarkar, et al. 1996; Sarkar et al. 1993; Narain, et al. 1994). In India itself, sexual transmission accounts for 70-75 percent of HIV infections, with about 15-20 percent of infections attributable to injecting drug use. However, in the northeast area, which includes Manipur and Nagaland, most infections are due to injecting drug use (Narain, et al. 1994).
**Indonesia.** By December 1993, there were a reported 49 cases of AIDS and 144 cases of HIV infection, of which IDUs accounted for only 2 and 1, respectively. There are no official statistics on numbers of injecting drug users because Indonesia only maintains statistics for overall substance abuse, including alcohol. Observers have reported physical signs of injecting drug use in sex workers and other populations at frequencies suggesting that injecting drug use is greatly underestimated (Jalal, et al. 1994).

**Malaysia.** This country lacks systematic assessment of HIV among IDUs. Reports indicate that many heroin users administer the drug by inhalation, but from 25-50 percent are estimated to be injectors. By June 1995, a total of 12,660 HIV positive cases have been identified, of which 77 percent were injecting drug users (Kin 1995). Routine HIV testing of drug dependents admitted into treatment facilities found a rate of between 2 and 30 percent HIV seropositivity among IDUs from various parts of the country. The national average of HIV among IDUs is about 10 percent (Kin, 1995). One study tested IDUs who entered a detoxification ward in the city of Kelantan and found that 30 percent were positive (Singh, et al. 1993). 76 percent of IDUs had traveled to Thailand in the preceding 5 years, of which 32 percent were seropositive. This was associated with injecting behavior and not sexual contact there. HIV probably spread among the IDU population in Malaysia from the north (Singh, et al. 1993).

**Myanmar.** The first case of HIV in an injecting drug user was identified in 1989. Seropositivity in this group increased rapidly, from 17.3 percent in 1989 to 62.8 percent in 1990 to 77.2 percent in 1991. HIV surveillance is conducted in 27 sample cities (Poshyachinda, 1993). Extremely high seroprevalence (above 70 percent) among IDUs is found in Myitkyina, Bhamo, and Mandalay (Department of Health, Myanmar). Estimates of the number of IDUs are difficult to obtain, and mainly come from treatment centers in cities. Much less is known about prevalence of IDUs and level of HIV infection among them in rural areas.

**Pakistan.** There was no history of IDU until after the Afghan war, when drugs flowed from Afghanistan to Pakistan for export. This has produced a rapid increase in availability of heroin. There are an estimated 3 million drug users in Pakistan. However, these estimates are about 6 years old, and likely to be understated. In the past, it was believed that injection drug use was uncommon, but recent evidence from Karachi, Pakistan’s largest city, suggests that about
20-25 percent of drug users inject their drug. There is little official recognition of injection drug use, and no official surveillance of HIV in this group (McCormick, 1995).

Thailand. Injecting drug users were the first wave of the HIV epidemic in this country. Seroprevalence among IDUs exploded in 1988, going from 16 percent in the spring to 46 percent in the fall of that year. Incidence rates remain above 10 percent, even though infection levels have stabilized at 35-40 percent (Des Jarlais, et al. 1992; Vanichseni and Vaniyapongs 1995). Many studies of HIV among IDUs have been undertaken in Bangkok, where the number of IDUs has been estimated at approximately 32,000 (Vanichseni and Vaniyapongs, 1995). Prevalence is also high in areas in Northern Thailand, including Chiang Rai (Brown, et al. 1994; Poshyachinda 1992). HIV infection among IDUs represent 38 percent of all HIV infections in this country (U.S. Bureau of the Census).

Viet Nam. The first individual was identified with HIV infection here in 1990. Few infections were found until 1992. Between 1992 and 1993, an increasing number of HIV-infected persons were identified, occurring mostly among injecting drug users in the southern provinces. Seventy nine percent of HIV positive cases identified are IDUs. HIV prevalence was found to be 44 percent in a drug rehabilitation center in Ho Chi Minh city, and 90 percent in Nha Trang. There are differences in injecting drug use between the northern and southern regions of Viet Nam, with more IDUs and higher seroprevalence among those in the south (Hien 1995).

Latin America

Argentina. Drug injectors are the second largest category of HIV transmission in Argentina. The first AIDS case in an IDU was reported in 1987, and since then, the proportion of AIDS cases attributed to injecting drug use has increased, rising from 11.3 percent in 1987 to 39 percent in 1991 (Libonatti, et al. 1993).

Brazil. Drug injectors have become the second largest HIV transmission category in Brazil, making up more than one-quarter of all AIDS cases reported by 1991. Brazil annually reports about half of all AIDS cases from Latin America and the Caribbean. AIDS was first discovered among IDUs in Sao Paulo in 1983. In the period between 1983 and 1986, IDUs represented only 3 percent of the national registered AIDS cases. In 1992 this increased to 24 percent. Most HIV cases among IDUs occur in Rio de Janeiro and Sao Paulo state. In Rio, testing
on IDUs in treatment and on the street have estimated HIV prevalence among IDUs at between 35 and 38 percent. Sao Paulo state has the highest rate of HIV among IDUs, accounting for 67 percent of all AIDS cases in Brazil. In the city of Santos, Brazil’s most important harbor, there are an estimated 2500 IDUs infected with HIV. One study found an HIV prevalence rate of 57 percent among IDUs. In the city of Sao Paulo, Brazil’s largest city, prevalence of up to 76 percent has been found among IDUs (Lima, et al. 1992; Libonatti, et al. 1993; Des Jarlais, et al. 1992).

**Columbia.** Studies on drug use in Bogota in the last five years have shown changes in patterns of drug use, the substances used, and routes of administration. Columbia does not have a history of injecting drug use; most drugs are smoked. However, in the last few years there has been an increase in injection drug use of locally produced heroin. Most of injecting drug users in this city are also sex workers. As of 1995 there are 12,600 cases of HIV reported, but there is no information available regarding the relationship between HIV and injecting drug use (Perez-Gomez; 1995).

**Africa**

**Nigeria.** Heroin and cocaine use have increased in Lagos and other big cities in Nigeria in the past 5-10 years. Although hospital samples do not indicate high numbers of injectors, injecting is suspected in the hard-to-reach drug users. Informal reports suggest that the city of Lagos has some 50-100,000 injecting drug users. Substance users are not a target sample in national HIV seroprevalence surveys, so little is known about seroprevalence in this group. In addition, no attempt has been made at a national level to study HIV status among drug users. Isolated clinical cases of HIV among non-injecting users have been reported (Adelekan, 1995; Mann, et al. 1992; Stimson, 1993).

**South Africa.** Until 1991-1992, virtually no heroin or cocaine existed in South Africa. Young people were using the synthetic opiod “Wellconal” as a heroin substitute, and this became the most common injection drug of dependence. Routine HIV testing of these drug users from 1988 to 1992 found no seropositive cases. However, routine testing was discontinued due to lack of government funds. In the last 5 to 6 years, heroin and cocaine have become widely available, and new drug using trends, such as increased injection, are expected (de Miranda, 1995).
Prevalence of HIV among Drug using Youths. Studies of street children in cities in Brazil have found high rates of HIV among youths, many of whom inject drugs as well as engage in prostitution. One study performed from 1987-1988 among 3,389 street youths (between 10 and 18 years old) in Rio de Janeiro found a seroprevalence rate of 1.5 percent. This translates into an estimated 70,000 to 110,000 adolescent children who are HIV positive in Brazil (Surratt and Inciardi 1996). Of the 68 children who reported injecting drug use as their main risk behavior, seroprevalence was 13.2 percent (Surratt and Inciardi 1996). A more recent study in Rio de Janeiro conducted between 1991 and 1993 found an HIV seroprevalence rate among 126 street children of 6 percent (Adams, et al. 1994). This study also found that 94 percent of the children reported HIV risk behavior.

Sexual behavior among street youths is commonly associated with drug use, and there are low rates of condom use in this group as well. Among the sample of street children from Belo Horizonte, 82 percent reported having sex while under the influence of drugs and/or alcohol (Campos et al. 1994). Another 1992 study of 62 street children found that 48 percent of children engaged in sex, but only 33.3 percent reported any use of condoms (Campos et al. 1992).

Role of IDUs in Introducing HIV into the General Population


The WHO Multi-City Study (1994) found high levels of sexual activity and low levels of condom use in Rio de Janeiro, Santos, and Bangkok, as well. In Rio and Santos, about 80 percent
of IDUs had sex on at least a monthly basis, and in Bangkok this was 52 percent. In addition, of those reporting sexual activity, many had sex with casual partners (defined as sexual partners that are not considered primary partners). About 28 percent of IDUs in Bangkok had sex with casual partners on at least a monthly basis. In Rio de Janeiro, about 70 percent of IDUs reported having monthly casual partners, and in Santos, this number was over 50 percent. Of those reporting sexual intercourse, however, many IDUs reported never using condoms with casual partners (about 45 percent in Bangkok and Santos, and 70 percent in Rio). Low rates of condom use among IDUs has also been reported in Malaysia, and Yunnan Province, China (Singh, et al. 1993; Zheng, et al. 1994).

One study in Manipur, India, an area which has experienced an explosive spread of HIV among injecting drug users, has found that 50-70 percent of injectors have reported a sexual experiences within the last 5 years (Sarkar, et al. 1993). The median number of heterosexual partners was three in the five years before the study. Although sexual activity among the drug using population was lower than the general population, there was still evidence of at least some sexual activity in this group. In addition, condom use was extremely low, with only 3-5 percent of injectors reporting even occasional use of them (Sarkar, et al. 1993). Another study in India found that over 30 percent of married male and female injecting drug users had extramarital sex, and less than 2 percent of them used condoms (Sarkar, et al. 1996). Data on rates of condom use among IDUs and non-injecting drug users indicate that rates may be lower among injectors. One study in Delhi, India revealed that condom use among IDUs was lower than among non-injecting drug users (Kumar, et al. 1996).

Sexual Contact with Commercial Sex Workers. There is also evidence that IDUs have sexual intercourse with commercial sex workers. Research in India has found that 50 percent of IDUs in Mizoram had multiple partners, including prostitutes (Narain, et al. 1994). Studies in Manipur have found high rates of sex with commercial sex workers among IDUs, with 10 to 16 percent of injecting drug users having a history of exposure to commercial sex workers (Sarkar, et al. 1993). Also, researchers in Thailand found that 24 percent of HIV-infected male IDUs in 1989 had had commercial sex with a mean of 3.2 commercial sex workers in the previous 6 months (Vanichseni, et al 1991).
The prevalence of injecting among prostitutes is another important factor when examining the role of IDUs in introducing HIV into the general population. In some cities, such as New York (Des Jarlais, et al 1989a), and Rio de Janeiro (Lima, et al. 1994), HIV was probably introduced into the local area from men who have sex with men (MSM) and then spread to the IDU population from MSM who also inject drugs. Injecting is a common practice among male and female prostitutes as well as among male transvestites engaged in prostitution in some cities in Brazil and Columbia (Lima, et al. 1992; Surratt, et al. 1996a; Inciardi and Surratt, 1996; Perez-Gomez 1995). In a sample of male sex workers from Rio de Janeiro, 26 percent injected cocaine, 28 percent tested positive for HIV, and 66 percent self-identified as either bisexual or heterosexual, having a median of 3 partners in the 30 days prior to the interview. In addition, among male transvestite sex workers interviewed in this same project, 64 percent were HIV positive, with injecting drug use the only statistically significant factor related to seropositivity. These transvestites engage in both receptive and insertive anal sex with primarily heterosexual male clients, and thus may play a role in the heterosexual transmission of HIV (Surratt, et al. 1996a; Inciardi and Surratt 1996). The HIV seropositivity in these particular groups of injectors and their sexual behavior clearly place the larger population at risk for contracting HIV.

**Transmission rates from IDUs to the general population.** Evidence mentioned above suggests that IDUs can transmit the virus to their heterosexual partners, and through these partners to children. The pattern found in most countries is that once HIV infection is well-established in the IDU population, they act as a “bridge” through which HIV reaches the wider heterosexual population. (Des Jarlais, 1992; Lima, et al. 1992). Prevalence data and additional research in certain areas show that HIV has begun to spread from the high-risk population of IDUs to the general population. HIV seroprevalence of 0.5-1 percent among pregnant women in the city of Bombay and in the state of Manipur, India was found in 1991, just a few years after the first AIDS cases were found (Lal 1994; Singh, B.N., et al. 1993). In Manipur, the majority of AIDS cases have occurred among the IDU population, so it is likely that HIV in pregnant women has been transmitted mainly through IDUs. In addition, among non-injecting sexual partners of IDUs tested, 6 percent were found to be HIV-positive within 2 years of the first HIV case in the IDU population (Sarkar, et al. 1993). HIV among heterosexual partners of IDUs has also been observed in Yunnan Province, China. Researchers interviewing both IDUs and their spouses in
three counties found that 49 percent of IDUs were seropositive, none of the wives of IDUs used condoms, and 10 percent of the wives were HIV positive. Based on the duration of infection among IDUs, it was estimated that the heterosexual transmission rate here was 6.4 percent per annum per person (Zheng, et al. 1994).

As the HIV epidemics mature, transmission from IDUs to their wives and sex partners becomes the most important route of infection among females, as has occurred in some developed countries (AIDSCAP 1996). For example, the United States has experienced an increase in AIDS cases among heterosexual partners of IDUs throughout the 1990s (Morbidity and Mortality Weekly report 1996). From 1990 to 1991, cases in this group increased 23 percent among women and 19 percent among men. While the annual increases in the number of cases associated with IDUs continue to occur, these increases have been progressively smaller while AIDS incidence among heterosexual partners of IDUs has continued to increase steadily.

**Models of transmission from IDUs to the general population.** Theoretical work and modeling have been done in addition to empirical studies regarding intra- and inter-group HIV spread. HIV transmission from IDUs to the general population depends on “mixing,” that is, the extent to which injecting drug users practice sexual activity only among themselves (assortative mixing) or with non-injecting drug users (disassortative mixing). The shape of the AIDS epidemic curve (i.e., how fast prevalence rises, when it plateaus, and the difference in saturation among distinct groups) depends on proportions of the population in high, medium, and low risk groups, and the pattern of mixing that occurs. When relatively few individuals comprise the high risk group, and where little mixing occurs, an epidemic curve that has multiple peaks will occur. The first peak develops for the high risk group, followed by a period of declining incidence of HIV after saturation in this group, followed by a much larger epidemic of longer duration in the low risk group (Anderson 1996). HIV seropositivity among IDUs tends to increase rapidly then plateau in some areas (e.g., Bangkok and Manipur, India). Following this is another major wave involving women in low risk groups (as seen in HIV prevalence among antenatal women in India). In regard to HIV spread from IDUs to the general population, this implies that first, a period of decline in incidence among a high risk group does not signify the end of the epidemic, and second, the pattern of mixing is influential in determining the epidemic.
Anderson (1996) simulated a model of the AIDS epidemic in the heterosexual community in a developing country. Although he used commercial sex workers as the high-risk group parameter, the same model can be applied using injecting drug users. He assumed moderately assortative mixing (e.g., injecting drug users have sex with both injectors and non-injectors) and found that HIV saturation in the high-risk group occurred about forty years before saturation in the general population (assumed to be in a low-risk category). If mixing had been weakly assortative to random mixing, HIV saturation in the low-risk group would have occurred much earlier. Clearly, the key variable determining the spread of HIV is mixing: the more assortative the pattern of mixing, the less the degree of spread to the general, low-risk population. However, even limited disassortative mixing (mixing with individuals from a different, or non-risk group) results in a sustained prevalence level in the general population for a period of many years.

It has already been established that IDUs do have sexual intercourse with non-injecting partners in many developing countries, indicating that disassortative mixing occurs between IDUs and the general population. However, relatively little is still known about the sexual networks of IDUs, and the characteristics of their sexual partners - whether they themselves tend to be in high, medium, or low-risk groups. Until more research on sexual networks is done, it is not possible to predict the extent of the AIDS epidemic resulting specifically from injecting drug users to the general population.
Patterns of Drug Use in Developing Countries

Geographical Prevalence of Injecting Drug Use. Injecting drug use exists in over 50 developing countries, and HIV has been identified in this population in over half of these countries. Table 2 lists the countries where both injecting drug use and HIV among IDUs have been found (WHO, 1994; Stimson and Choopanya 1996).

Table 2. Developing Countries Reporting Injecting Drug Use and HIV among IDUs (in bold).

<table>
<thead>
<tr>
<th>ASIA</th>
<th>LATIN AMERICA/ CARIBBEAN</th>
<th>AFRICA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>Argentina</td>
<td>Cote d’Ivoire</td>
</tr>
<tr>
<td>Cambodia</td>
<td>Bahamas</td>
<td>Egypt</td>
</tr>
<tr>
<td>China</td>
<td>Bolivia</td>
<td>Gabon</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>Brazil</td>
<td>Ghana</td>
</tr>
<tr>
<td>India</td>
<td>Chile</td>
<td>Mauritius</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Columbia</td>
<td>Morocco</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>Costa Rica</td>
<td>Nigeria</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Dominican Republic</td>
<td>Senegal</td>
</tr>
<tr>
<td>Myanmar</td>
<td>Ecuador</td>
<td>South Africa</td>
</tr>
<tr>
<td>Nepal</td>
<td>El Salvador</td>
<td>Tanzania</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Guatemala</td>
<td>Tunisia</td>
</tr>
<tr>
<td>Philippines</td>
<td>Haiti</td>
<td>Uganda</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>Honduras</td>
<td>Zambia</td>
</tr>
<tr>
<td>Singapore</td>
<td>Jamaica</td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>Mexico</td>
<td></td>
</tr>
<tr>
<td>Taiwan</td>
<td>Nicaragua</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>Panama</td>
<td></td>
</tr>
<tr>
<td>Viet Nam</td>
<td>Puerto Rico</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uruguay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Venezuela</td>
<td></td>
</tr>
</tbody>
</table>

Source: Stimson and Choopanya, 1996.

High prevalence of injecting drug use exists in countries in both Asia and South America, and is beginning to be seen in some countries in Africa. Table 3 provides estimates of the number of injecting drug users for selected countries. Estimates of the number of injecting drug users usually come from treatment facilities, and may understate the prevalence of injecting drug
use. Prevalence of IDUs is very high in Thailand, Argentina, Puerto Rico, Hong Kong, and Malaysia, and in some areas in India. Heroin is the main drug injected in countries in Asia, while in South America drug users inject primarily cocaine (Mann, et al, 1992).

Table 3. Estimates of Number of IDUs for Selected Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Number IDUs</th>
<th>Rate per 100,000</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>90,000</td>
<td>8</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>33,500</td>
<td>573</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td>India</td>
<td>50,000</td>
<td>6</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td>Manipur</td>
<td>15,000-40,000</td>
<td></td>
<td>Sarkar et al. (1996)</td>
</tr>
<tr>
<td>Nagaland</td>
<td>1,500</td>
<td></td>
<td>Sarkar et al. (1993)</td>
</tr>
<tr>
<td>Mizoram</td>
<td>2,800</td>
<td></td>
<td>Sarkar et al. (1993)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>700-800</td>
<td>&lt;1</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td>Malaysia</td>
<td>30,000-35,000</td>
<td>182</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td>Philippines</td>
<td>400-500</td>
<td>&lt;1</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td>Singapore</td>
<td>30-50</td>
<td>2</td>
<td>Poshyachinda (1993)</td>
</tr>
<tr>
<td>Thailand</td>
<td>50,000-100,000</td>
<td>6</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td></td>
<td>100,000-240,000</td>
<td></td>
<td>Brown et al. (1994)</td>
</tr>
<tr>
<td>Americas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>900,000</td>
<td>6</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1,000</td>
<td>33</td>
<td>Mann, et al. (1992)</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>30,000-40,000</td>
<td>1,078</td>
<td>Mann, et al. (1992)</td>
</tr>
</tbody>
</table>

In Asia, heroin injecting has been practiced in Hong Kong since the 1950s and in Thailand since the 1960s, however, drug injecting is a recent phenomenon in many countries, having been identified only in the 1980s in China, India, Lao People’s Democratic Republic, Myanmar, Nepal, Sri Lanka, and Viet Nam (Stimson, 1993; Poshyachinda, 1993; Suwanwela and Poshyachinda, 1986). India has also experienced a dramatic increase in injecting drug use in some areas, including Manipur, Madras, Mizoram, and Nagaland states. The highest rates of injecting drug use occur in the cities, but in certain areas, including Thailand and Yunnan province in China, many IDUs are found in the rural areas and hill tribes as well (Weniger et al. 1991).
In the regions of South and Central America and the Caribbean, high prevalence of
injecting drug use is found mainly in Brazil, Argentina, and Puerto Rico, but some level of
injecting has also been identified in other countries in these regions (see Table 2). In South
America, cocaine, rather than heroin, is injected by most IDUs.

**Global Spread of Injecting Drug Use.** Injecting drug use has been spreading
internationally in both developed and developing countries due to political, economic, and social
conditions and changes, drug control strategies, law enforcement, and local culture and tradition
(Stimson, 1993, 1996; Des Jarlais, 1992). In the 1970s and 1980s, injection of illicit drugs began to
increase in countries in Asia and South America. As yet there is no definitive explanation for the
increase in injecting drug use in these countries, but three hypotheses have been suggested as

First, illicit drug use occurs along drug production and drug trafficking routes (Des Jarlais,
et al. 1992; Stimson, 1993; Inciardi, 1992; Sarkar, et al 1993). Particularly relevant are the areas
referred to as the “Golden Triangle” and the “Golden Crescent.” The Golden Triangle is a major
heroin producing region which comprises the area in Southeast Asia where the Lao People’s
Democratic Republic, Myanmar, and Thailand meet. (Inciardi, 1992; McCoy and Inciardi, 1995).
The Golden Crescent is the second major heroin producing region, and includes districts in the
Northwest Frontier Province of Pakistan, the adjacent Badakhshan area of Afghanistan and the

The increase of injecting drug use in some countries in Asia, including Thailand,
Myanmar, the Lao People’s Democratic Republic, Yunnan Province in China, Viet Nam, and
also the northeastern states of India (including Manipur, Mizoram and Nagaland) has been
attributed to the availability of inexpensive heroin, grown (from poppies) and produced in the
Golden Triangle and distributed along drug trafficking routes in these countries (Stimson 1993,
1994). For example, until the 1960s, opium was produced in the Golden Triangle region for
export for refining in the Mediterranean basin. As heroin was refined elsewhere, it was not
available for local consumption, and opium was the drug most commonly used in Southeast
Asia. However, from the late 1960s onward, the Golden Triangle region experienced an
expansion of the refining of opium into heroin. The development of heroin refining was
influenced by successful law enforcement against production in the Mediterranean countries and
later in Mexico, as well as lower production costs and the growth of the world market (Stimson 1996). Markets for heroin emerged due to the refining and distribution of heroin in the Golden Triangle region, and resulted in availability of the drug at low cost. In addition, enforcement and government activity against dissident groups in Myanmar and the development of new transport networks caused drug trade routes to shift from Myanmar to a route that went through Shan State to Yunnan Province, China and on to Hong Kong (Stimson 1996). Yunnan Province has experienced a corresponding increase in heroin abuse.

Availability of inexpensive heroin is not relegated to countries surrounding the drug producing regions. Countries in Africa, particularly Nigeria, Cote d'Ivoire and South Africa, have become part of the international heroin and cocaine trafficking route, and have experienced increases in injecting drug use in the last 5-10 years. (Stimson, 1993; Mann, et al. 1992; Adelekan, 1995; Adelekan and Stimson 1996).

It is also important to note that there are temporal and regional variations in patterns of heroin use that seem to be influenced by drug production and trafficking routes. Many countries have experienced a shift from predominantly opium smoking, to smoking of heroin (“chasing the dragon”), to injection of heroin, and these shifts correspond with availability of injectable grade heroin (Stimson and Choopanya 1996). For instance, in Madras, India, injection as a route of administration of heroin was uncommon, with most drug users smoking brown sugar heroin (unrefined heroin) until the mid-to late-1980s. Injecting was not reported until 1987. Several factors seem to be related to the shift to injection, including the increased availability of injectable-quality heroin from young people who migrated from Manipur and brought in heroin from South-east Asia. By 1990, injecting was increasingly found in many areas of Madras (Stimson and Choopanya 1996). Similarly, Thailand experienced a shift in the pattern of drug administration which coincided with increased drug production and trade in the Golden Triangle. Within a period of 25 years many drug users Thailand switched from smoking to injecting heroin (Stimson and Choopanya 1996). Other countries, including China (Yunnan Province), Myanmar and Viet Nam have had similar experiences. While the mechanisms of this transition are somewhat unclear, it is accurate to state that where injectable-quality drugs are available, injecting drug use occurs.
Regional variations in the prevalence of smoking versus injecting heroin also exist, and these again correspond to drug production and trade routes. For example, in Myanmar, the areas close to the heart of the poppy growing regions tend to have higher prevalence rates of opium smoking than heroin injecting. However, in areas further from the growing regions and closer to the heroin distribution routes, injecting is more common than smoking (Stimson and Choopanya 1996). Similarly, in certain regions in China along the drug trade route (Yunnan, Guangxi, Guangdong and Sichuan provinces), heroin injecting is common. Drug users in provinces remote from the drug trade routes tend to use less injectable drugs such as “yellow crust” (heroin and opium) and opium (Zheng et al. 1995).

The spread of drug use and injecting can also be examined in terms of innovation and diffusion from upper and middle-classes to poorer classes. In Western Europe, heroin injecting was initially adopted by small groups of individuals, such as jazz musicians, bohemians, and students (Stimson and Choopanya 1996). However, with the increase in heroin produced in South-east Asia in the 1970s and distributed in Europe, injecting spread rapidly to new groups, and subsequently became associated with poor and disadvantaged social groups. The same pattern can be seen in Nigeria. Over the past 15 years there has been an increase in the use of heroin and cocaine as a result of increased trafficking through this area. While consumption of these drugs initially occurred among middle class elites, heroin and cocaine are now used by all classes (Adelekan 1995). Increased availability and decreased prices afford poor individuals greater access to drugs previously limited to wealthier groups.

At the individual level, there are differences in the timing of transition from snorting or inhaling (“chasing the dragon”) to injecting, and whether that transition is made at all. Some drug users move from snorting or sniffing to injecting within 6 to 12 months, while others remain dependent on inhaling for over a decade (Strang, et al. 1992). There are several explanations and theoretical perspectives that contribute to understanding this shift in behavior; however, no one model of transition can be specified. Transition at the individual level depends both on contextual factors, including economic, political, and normative influences, as well as individual behavioral factors and individual relationships (see Strang, et al. 1992 for a review of relevant perspectives). Understanding changes in route of drug administration is important for considering HIV
prevention programs. Interventions may need to be tailored to specific types of drug users in different stages of their drug careers.

The second hypothesis explaining increased prevalence of injecting drug use is related to law enforcement and drug-related policies. Efforts by law enforcement to control drug use have the effect of increasing drug prices and decreasing availability, thereby creating a need for efficient distribution and consumption of drugs (Des Jarlais, et al. 1992; Inciardi, 1992; Stimson, 1993). Highly processed drugs, such as heroin and cocaine, are more compact and, therefore, more easily transported and distributed than other forms of drugs, such as opium. In addition, injection is a more efficient route of drug administration because none of the drug is lost as it is when smoked. Injection provides a rapid delivery of drug to the brain and a reportedly more intense drug effect (Des Jarlais et al, 1992; Inciardi, 1992, McCoy and Inciardi, 1995; Auerbach 1994). These factors become important to the drug user when drugs are expensive and not readily available. A pilot study of IDUs in Malaysia found that one of the primary reasons cited for administering the drug by injection was to economize on expenses of drugs (Kin 1995). There is also evidence of a temporal relationship between law enforcement efforts to control opium smoking in cities such as Bangkok, Calcutta, and other areas in India, and a subsequent increase in heroin injection (Des Jarlais, et al. 1992; Sarkar, 1995).

In addition, the experience of Southeast Asia discussed above indicates that national drug enforcement policies can result in re-routing of drug transportation, which in turn influences drug consumption patterns. Successful law enforcement efforts against heroin refining in the Mediterranean were partly responsible for the expansion of heroin refining in the Golden Triangle, resulting in increased availability and use of heroin in this area (Stimson, 1996). Also, in the mid- to late 1980s, Thailand began to vigorously pursue law enforcement efforts against opium and heroin production, and implemented crop-replacement programs in opium growing regions in the northern hill areas (Tullis 1995; Stares 1996). These policies have resulted in decreased production of heroin in this country (though not decreased trafficking), with cultivated hectares of opium poppy cut in half (United States, Department of State 1993). However, these drug control efforts also resulted in the displacement of production of opium and heroin into the neighboring country of Laos (Stares 1996; Tullis 1995). Since then, illicit heroin production and trafficking have increased in this country.
Third, increased injecting drug use can be seen as part of modernization of some developing countries (Des Jarlais, et al. 1992; Inciardi, 1992). Improved transportation routes and infrastructure and the availability of industrial chemicals facilitate processing and transportation of illicit drugs (Inciardi, 1992). For example, in India, the prevalence of IDUs corresponds with the path of national highway 39, which originates from a town bordering Myanmar, and cuts across urban areas of Manipur state to reach Nagaland (Sarkar, et al. 1993). IDU prevalence is lower in areas further from this highway.

**Demographic characteristics of IDUs.** Data indicate that worldwide, the majority of injecting drug users are men (usually upward of 75 percent), and are relatively young, typically in their early twenties to late-30s. Many IDUs are married to non-injecting partners, and education levels vary depending on the country. However, most of what is known about IDUs comes from samples of IDUs in urban areas, and information on IDUs in rural areas comes mostly from small samples from a limited number of regions or villages in a limited number of countries. This makes it difficult to generalize about socioeconomic characteristics of all IDUs. Table 4 presents demographic characteristics of samples of IDUs from selected countries and regions within those countries. Socioeconomic status of IDUs varies across countries. In some areas, such as Bangkok, IDUs seem better off (e.g., have higher education and higher rates of employment). While in others, including Yunnan Province, China, IDUs have very low levels of education. In Yunnan Province in China, IDUs living in rural areas have low levels of education, with one estimate of an average of 2.7 years, and another with about 27 percent receiving no formal education (Xia et al. 1994; Zheng, et al. 1994). A high percentage of IDUs here are married (83 percent in one sample from Longdao village in Ruili county) (Xia, et al. 1994). Characteristics of IDUs in urban areas differ a bit, with higher education levels found in the city. Of IDUs in treatment in a facility in the city of Kunming (Ruili County), over half were employed, 64 percent had at least middle school training, with a median education of 9 years (McCoy, et al. 1996b).

The samples of IDUs in Manipur, India, are also fairly well-educated and tend to be employed, with 78 percent in Manipur able to read up to high school or college levels, and 53 percent employed (Sarkar et al. 1996). In Thailand, as in many other developing countries, IDUs are mainly economically deprived, although they tend to be employed as unskilled workers (Des Jarlais, et al. 1992). Among IDUs in Bangkok, 70 percent are employed. Rio de Janeiro and
Santos, Brazil, also have relatively high rates of employment among IDUs (about 55 percent and 50 percent, respectively).

Demographic characteristics may differ between drug users who inject heroin and those who use heroin through other routes of administration. For example, in the study of drug users in villages in Yunnan Province, injectors were more likely to be young (20-39), ethnic minorities, and unmarried, compared to non-injecting drug users who inhaled opium and heroin (Zheng et al. 1994).

Table 4. Demographic Characteristics of Injecting Drug Users in Selected Areas.

<table>
<thead>
<tr>
<th>Location</th>
<th>% Male</th>
<th>% Employed</th>
<th>% Married</th>
<th>Mean$^1$ or Median$^2$ Age</th>
<th>Mean$^1$ or Median$^2$ Years Education</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangkok, Thailand (n=601)</td>
<td>95%</td>
<td>69%</td>
<td>7.5%</td>
<td>29.8$^1$</td>
<td>7.4$^1$</td>
<td>WHO 1994</td>
</tr>
<tr>
<td>Rio de Janeiro, Brazil (n=479)</td>
<td>87%</td>
<td>52%</td>
<td>13%</td>
<td>27.8$^1$</td>
<td>11.0$^1$</td>
<td>WHO 1994</td>
</tr>
<tr>
<td>Santos, Brazil (n=220)</td>
<td>58%</td>
<td>49%</td>
<td>4.5%</td>
<td>28.7$^1$</td>
<td>5.6$^1$</td>
<td>WHO 1994</td>
</tr>
<tr>
<td>Manipur, India (n=450)</td>
<td>95%</td>
<td>47%</td>
<td>40%</td>
<td>24.0$^2$</td>
<td>(78.5% finished h.s.)</td>
<td>Sarkar et al. 1991</td>
</tr>
<tr>
<td>Yunnan Province Villages (n=282)</td>
<td>98%</td>
<td>na</td>
<td>37-83%</td>
<td>27.0$^1$</td>
<td>2.7$^1$</td>
<td>Xai et al. 1994; Zheng et al. 1994</td>
</tr>
<tr>
<td>Kunming City (n=620)</td>
<td>75%</td>
<td>44%</td>
<td>na</td>
<td>22.0$^2$</td>
<td>9.0$^2$</td>
<td>McCoy et al. 1996</td>
</tr>
</tbody>
</table>

a. Computed by taking the midpoint value of age ranges, grouped as follows: <20, 20-24 years, 25-34 years, 35-44 years, 44+ years (20 and 44 used as value from lowest and highest categories, respectively).

b. Computed by taking the midpoint value of ranges, group as follows: 0-4 years, 5-9 years, 10-14 years, 15+ years (15 used as value from highest category).

**Mobility of IDUs.** IDUs travel extensively both abroad and in their own countries, and inject drugs in these other areas. The WHO Multi-City study (1994) found that substantial proportions of IDUs from all cities in the study, including Bangkok (78 percent), Rio de Janeiro
(62 percent) and Santos (53 percent) reported having injected outside their home city within the previous two years. Some of this travel is due to “drug tourism” - where IDUs go to areas where drugs are less expensive to buy them (Simons, 1994). Travel is also due to the drug trade, with IDUs traveling to transport drugs, and to search for employment. When IDUs travel between cities, they are unlikely to carry drugs and injecting equipment with them, for fear of being caught by customs officials or other law enforcement personnel. In this case, traveling drug users may be more likely to share equipment with IDUs from other cities (WHO 1994). In Bangkok and Rio de Janeiro, about 72 percent of IDUs shared needles outside the city in the last two years, and in Santos, about 48 percent reported sharing outside their city. Also, a survey done in Malaysia found that those who traveled to Thailand in the last 5 years were more likely to be infected with HIV than those who had not traveled there (76 v. 26 percent) (Singh, et al. 1993).

**Drug Use among Youths.** There is a sizable population of youths in developing countries who use illicit drugs. In the Republic of Korea, a survey conducted in 1987 revealed that 1.4 percent of working adolescents reported drug use, and prevalence among institutionalized youths was even higher, at 9.6 percent. About 90 percent of these youths injected drugs (Poshyachinda 1993). High school students in Rio de Janeiro also report injecting drug use. One survey of students from private and public high schools schools found that 0.7 percent of the students reported injecting drug use at some time in their life (Lima et al. 1992).

Drug use among “street youths” (homeless, orphans, or delinquents) is prevalent in a number of areas, including Brazil, Nigeria and South Africa. In Brazil, it is estimated that from 7 to 8 million children live and/or work on the streets. One survey of street children in Sao Paulo, found that 45 percent were heavy drug users (Dimenstein, 1992). Another study in Belo Horizonte (a large city northeast of Rio de Janeiro) revealed that 84 percent of children living full-time on the streets had histories of illicit drug use, and 10.6 percent reported injecting drug use (Campos, et al. 1994). Drug use among street children in Rio de Janeiro is also a problem. One review cites a study where 39 percent of youths interviewed reported drug use to be a problem for them (Surratt and Inciardi 1996). In Nigeria, heroin and cocaine are increasingly being used by young people. In a sample of 217 street youths in a rehabilitation camp in 1993, 87 percent were using cocaine and 89 percent were using heroin, compared to 47 percent and 51 percent using cannabis and alcohol, respectively (Adelekan 1995).
Factors that Facilitate the Spread of HIV Among Injecting Drug Users

**Injecting practices and HIV Risk.** HIV is transmitted among injecting drug users (IDUs) primarily through the sharing of infected injecting equipment. Equipment includes needles, syringes, and other paraphernalia, such as “cookers” (spoons or containers for dissolving the drug), “cottons” (filters), and washwater used to rinse needles and syringes and dissolve drugs. (McCoy and Inciardi, 1995; Chitwood et al. 1990). When drugs are injected intravenously, contact between the paraphernalia and the user’s blood is virtually guaranteed (McCoy and Inciardi 1995). In addition, certain sharing practices among IDUs contribute to HIV risk.

“Booting” is a process that uses a syringe to draw blood from the user’s arm, mixes the drawn blood with the drug already taken into the syringe, and injects the blood-drug mixture into the vein. Booting leaves traces of blood in the needle and syringe, thus placing subsequent users of the equipment at risk (McCoy and Inciardi 1995). “Frontloading” and “backloading,” also called syringe-mediated drug sharing, refer to a practice where two or more IDUs use one syringe to prepare the drug, then divide it by squirting some of the solution into one or more additional syringes. The drug is transferred by either removing the needle of the recipient syringe (frontloading), or removing the plunger (backloading). Although these practices do not involve sharing of the actual needle or syringe, HIV can be transmitted if the syringe used for mixing has been previously contaminated (Stark, et al. 1996).

In addition to injecting with syringes, IDUs in some areas also use self-made equipment to inject their drugs. For instance, in parts of south-east Asia, IDUs inject with blow-tubes, which are lengths of polythene tubes with needles attached; drip sets; eyedroppers or inkdroppers with an attached needle, and disposable and glass syringes. In Mandalay, in 1989, 52 percent of IDUs reported using self-made equipment (Stimson 1994). IDUs in India have also been observed using ink-droppers as injecting equipment (Sarkar et al. 1993). This self-made equipment is often in poor condition and difficult to sterilize.

Research has found that IDUs in developing countries do share injecting equipment to a large extent. The WHO Multi-City Study of drug injecting, conducted from 1989-1992 provides extensive information on particular drug-related risk behaviors in Rio de Janeiro and Santos, Brazil, and Bangkok, Thailand, as well as in other cities in developed countries (see Appendix 1
for information on study). Samples of drug injectors both from treatment facilities and from the street were taken, and extensive data gathered on drug sharing and sexual behavior. In Bangkok, 55 percent of IDUs reported sharing equipment on a monthly basis. Thirty percent of IDUs in Rio de Janeiro reported this behavior, and about 53 percent in Santos shared equipment on at least a monthly basis (WHO 1994). Researchers in India have also found evidence of extensive needle sharing among IDUs. Samples of injecting drug users from Manipur and Nagaland report regular sharing of equipment in 83-96 percent of cases (Sarkar, et al. 1993; Narain 1994). Equipment sharing is also prevalent in Yunnan province, China, with 100 percent of a sample of 282 injecting drug users reporting sharing (Zheng, et al. 1994).

Given that injecting drugs with HIV-positive equipment virtually guarantees transmission of the virus, the important issue becomes exposure to infected equipment, and behavior or conditions facilitating exposure. One factor associated with rapid transmission of HIV among IDUs is the presence of a mechanism for “efficient mixing,” where IDUs have access to others’ injecting equipment (Des Jarlais, et al. 1992). In parts of south-east Asia, sharing often occurs in drug injecting shops, where IDUs pay a “professional injector” to inject them with the shop’s equipment. Shops tend to have only one set of equipment that is shared among the many IDUs who attend each day (Stimson 1994b). Other common injecting sites at which equipment is often shared include semi-public venues such as private dwellings, parks and other open spaces, graveyards, and under bridges (Stimson et al. 1996). Prisons are also locations for efficient mixing in some areas, including Bangkok (Des Jarlais 1992).

The venues for efficient mixing are similar to what are termed “shooting galleries” in the United States. Shooting galleries are locations, usually in urban areas, where IDUs go to rent equipment when they do not have access to their own. Galleries are typically located in basement apartments, abandoned buildings, or in run-down apartments or hotel rooms (McCoy and Inciardi 1995). IDUs rent injecting equipment from the gallery operator, and return the equipment after use. This equipment is usually not disinfected or cleaned before renting it to the next user (McCoy and Inciardi, 1995). In cities that do not have shooting galleries, IDUs may rent equipment from the individual who sells them their drug, then return it afterward. This equipment is then passed on to the next IDU who purchases drugs from the dealer. Also, in cities where
drug distribution and equipment is limited, IDUs gather together in groups to purchase and share drugs, using the same equipment (Des Jarlais, et al. 1992).

Researchers have found significant associations between exposure to HIV and use of shooting galleries. In Miami, one research worker systematically collected used needles and syringes from shooting galleries throughout the city (Chitwood, et al. 1990). Overall, 10% of needles and syringes were found to contain the HIV-1 antibody. They also found that HIV was present even in needles on which no visible blood was present. In addition, laboratory tests indicate that HIV-1 may be present in other paraphernalia, including cookers, cottons and washwater (McCoy, et al. 1996a).

The probability of an IDU becoming infected with HIV varies depending on HIV seroprevalence in the particular population and sharing behavior. McCoy and Inciardi (1995) calculated probabilities of an IDU encountering an HIV-infected needle or syringe, given a 10 percent seropositivity rate among IDUs. A user shooting up just one time a day in a shooting gallery would have a 90 percent chance of using an HIV-infected needle within 21.5 days. Shooting up three times a day reduces the amount of time for an encounter with a seropositive needle to 7 days, and those shooting up 5 times a day would encounter an infected needle in just 4 days. Although this type of HIV infection probability has not been calculated for sharing venues in developing countries, in some areas such as Myanmar, seroprevalence is so high among IDUs that many new injectors become infected within 6 months of their first injection experience.

The risk of HIV transmission among IDUs who share equipment is lower when equipment is cleaned and disinfected properly. There is some evidence that IDUs do clean their equipment, however, many use inappropriate techniques. The WHO Multi-City report found that of those who shared equipment, in all three cities (Rio, Santos, and Bangkok) over 60 percent (of the 95% who reported cleaning) used rinsing in cold water most frequently, which is not an effective means of killing HIV. One study in Yunnan province found that some IDUs sterilized their equipment through boiling it, and this was negatively associated with HIV infection (Xia, et al. 1994). However, researchers in Manipur, India found that 62 percent of IDUs never cleaned their equipment, and the majority of those that do clean primarily used tap water, which is an
ineffective method. Bleach, which does disinfect injecting equipment, is not available as a household item in India, and so is not routinely used or promoted as a cleaning method.

**Reasons for needle-sharing.** Ethnographic research has provided some insight into reasons that IDUs share injecting equipment. One study in Manipur, India interviewed 47 current and ex-IDUs in 1995 (Eicher 1996). IDUs cited fear of arrest and harassment by police and community authorities as reasons for not carrying their own syringes and bleach. IDUs in Malaysia also reported that risk of police arrest from carrying paraphernalia were reasons they share (Kin 1995). In addition, IDUs tend to share equipment when they begin injecting, as they depend on others to teach them how to inject (Friedman, et al. 1989a). The IDUs interviewed in both Manipur and Malaysia reported being injected by others for a period of time when they began injecting (Eicher 1996; Kin 1995).

**Injection of Cocaine v. Heroin.** Some studies have found a relationship between frequency of injection and HIV, which indicates a possible association between cocaine injection and HIV (Friedman, et al. 1989a; Robles, et al. 1992; Kin 1995). The physiological effects of drugs influence the pattern of use, where those who inject cocaine tend to do so more often, compared to heroin injectors (Friedman, et al. 1990; Mann, et al. 1992; McCoy and Inciardi 1995). Heroin tends to be relaxing, and its effects last for several hours. Cocaine injection, however, produces a rapid stimulation that only lasts about 15 minutes. Observation of cocaine injectors indicates that the drug is injected frequently, up to 4 or 5 times an hour, resulting in “binge” injecting that may last several days. (Friedman, et al. 1990; McCoy and Inciardi 1995; Auerbach, et al, 1994). In addition, while cocaine injectors typically begin binges with their own injecting equipment, the frequency of use results in needles becoming dulled and clogged relatively quickly. Also, cocaine users tend to become confused about who’s “works” belong to whom. Both factors result in an increased likelihood of sharing with others (Friedman, et al. 1990; McCoy and Inciardi, 1995).

Studies on the relationship between cocaine and heroin injecting have been inconclusive. It is not known whether the type of drug used is associated with the speed of HIV spread among the IDU population (Des Jarlais, 1992). Many studies in the United States do show stronger associations between the frequency of cocaine injection and HIV infection compared to heroin injection (Novick, et al. 1989; Des Jarlais and Friedman 1988b; Garfein, et al. 1996). Several
studies have found a higher HIV seroprevalence rate among cocaine injectors than heroin injectors, even when controlling for other behavioral factors (Anthony, et al. 1991; Garfein, et al. 1996). These studies suggest potential serious HIV epidemics among IDUs in South America, where cocaine is the most common drug injected (Des Jarlais, 1992; Lima, et al. 1992).

Despite some evidence that cocaine injection increases HIV transmission, however, the areas that have experienced the most rapid spread of HIV among IDUs are those in which heroin is the most common drug injected (Des Jarlais, et al. 1992). More research is needed to determine the exact relationship between type of drug injected and HIV.

New IDUs. Most studies of risk factors for HIV among injecting drug users find that length of injecting is positively related to seropositivity, meaning that new IDUs are at less risk of HIV transmission than experienced IDUs (Friedman et al. 1989a). Two explanations for this are that either new drug users share injection equipment less often, or they share equipment primarily with other new users, who are less likely to be infected with HIV. However, some studies in developed countries have found that new IDUs practice risky injection behavior, including sharing needles and syringes, more often than IDUs who have been injecting a long time. New IDUs are typically initiated into injecting by a relative or friend, who also tend to be new users, and are less likely to come into contact with experienced IDUs right away (Friedman, et al. 1989a; WHO 1994).

Fear of AIDS does not seem to deter drug users from beginning to inject as a method of administration. Data from one study in the United States found that fear of AIDS is not yet a factor that affects the expectations of heroin sniffers as to whether or not they will start injecting (Des Jarlais, et al. 1989b). The WHO Multi-City Study (1994) found a high rate of new injectors among all IDUs. In Bangkok, 43 percent of injectors had been injecting less than 6 years. In Rio de Janeiro, 47 percent were new injectors, and in Santos, Brazil 50 percent of all injectors were new.

The term “new injector” has different meanings, depending on the length of time the practice of injecting has been prevalent in a certain country. For instance, the practice of injecting has been prevalent in some developed countries since the 1960s, with some IDUs reporting injecting careers of up to 20 years (Des Jarlais et al. 1992). In these countries, drug users who have been injecting only 5 years would be considered “new.” However, in countries such as
Myanmar, the practice of injecting has only been increasing since the late 1980s (Stimson 1994). In countries such as this, all injectors can be considered “new” injectors. This distinction is important in terms of knowledge of safe injecting practices and consequences of risky injection: in countries where injection is relatively new, users may not be aware that sharing equipment is a risk factor for HIV infection.

**Socioeconomic Status and HIV.** Socioeconomic status can be considered a “risk factor” in that it is related to HIV seropositivity in some areas. A study in Buenos Aires, Argentina revealed that 66.2 percent of IDUs of low socioeconomic status were infected, compared to only 36.6 percent of drug injectors of higher socioeconomic status (Libonatti et al. 1993). Des Jarlais, et al (1992) note that social integration, as reflected in socioeconomic status, influences HIV risk behavior among IDUs. In one study in the United States, IDUs with extremely low incomes were more likely to be infected with HIV (Schoenbaum, et al. 1989). In addition, of the 5000 street addicts interviewed through the WHO Multi-City Study, IDUs who lived in shelters or boarding houses were more likely to be infected with HIV (Friedman, et al. 1991). Being a member of an ethnic minority has also associated with higher seroprevalence among IDUs in the U.S. and Amsterdam (Selik et al. 1988; Selik, et al. 1989).

A comparison of IDUs from New York and Bangkok also points out the importance of social integration in HIV risk. In New York, the majority of long-time injectors are unemployed and members of minority groups. However, in Bangkok, most IDUs are employed (70 percent) and almost all belong to the ethnic majority. Bangkok IDUs were more successful in implementing risk reduction behavior than those in New York (Des Jarlais, et al. 1992; Des Jarlais, et al. 1995a). In addition, Neaigus, et al. (1994) examined social relationships and risk behavior and found that injectors who had more frequent social contacts with non-injectors engaged in lower levels of injecting risk behavior.

**Other practices associated with HIV risk.** Frequency of injecting and length of time as injectors also contribute to HIV risk (Friedman, et al. 1989). One study of IDUs in Puerto Rico found that injecting 4 times a day and injecting 6 or more years were associated with HIV seropositivity (Robles, et al. 1992). Another study done in Rio de Janeiro found that IDUs who injected four or more times a week or have been injecting drugs for more than 5 years were significantly more likely to be HIV positive (Telles, et al. 1992). Researchers in Argentina also
found that length of time of drug use was significantly associated with HIV serostatus (Bonhevi, et al. 1993). Duration of drug injecting for more than 5 years was also related to HIV seropositivity among a group of IDUs studied in Malaysia (Kin 1995).

Countries at risk. Examination of the factors that influence the global spread of injecting and rapid transmission of HIV indicate that countries in which injecting drug use is increasing or already prevalent are at risk for HIV transmission among IDUs. South-east and south-west Asian countries are particularly vulnerable. These countries are located near centers of heroin production (the Golden Triangle and the Golden Crescent). Researchers believe that injection will spread in Bangladesh, Cambodia, parts of China, the Laos, Pakistan, and Viet Nam, as other routes of drug trafficking are made difficult (Stimson, 1993). Nigeria and other countries in Africa are also becoming drug transportation routes, which places them at risk for increased injecting. A third vulnerable area for HIV transmission among IDUs is South America, where local cocaine production has led to increased use of cocaine, and injection of this drug. Countries such as Columbia and Venezuela, which are experimenting with poppy growing and heroin production, have seen increases in injecting drug use (Stimson, 1993; Perez-Gomez 1995).

Interventions to Reduce HIV Among IDUs

This section will describe some intervention strategies for preventing HIV in the injecting drug user population. Specific emphasis will be placed on intervention components that seem to be most effective in changing behavior of IDUs. Although it is difficult to make specific recommendations regarding appropriate policies and prevention efforts for each country, some general observations will be presented. Most notably, many intervention programs have been successful in encouraging certain types of risk reduction among IDUs. Injecting drug users can and do change their drug use behavior under certain circumstances. However, research indicates that while injecting drug users change their needle-sharing and cleaning practices, HIV prevention efforts have not been successful in the realm of sexual behavior, particularly with regard to condom use. IDUs still report low rates of condom use with their partners. In light of the previous discussion of IDUs as a bridging group for HIV transmission to the general population through sexual risk behavior, policies and interventions must focus on this aspect of behavior.
change, as well as injecting risk factors. In addition, intervention efforts emphasizing sexual behavior change should target, at a minimum, the steady sexual partners of IDUs as well as the IDUs themselves.

There is a distinction among programs intended to reduce the demand for drugs, those that intend to reduce the supply of drugs, and those that focus on reducing harm associated with drug use (particularly HIV), though not necessarily through reducing the demand for or supply of drugs. Demand reduction programs, which usually take the form of drug treatment facilities, focus on discouraging drug injection altogether and tend to promote abstinence. Risk or harm reduction interventions, on the other hand, involve encouraging safer injection behavior, but do not necessarily promote abstinence from injecting drug use. Generally, both demand and harm reduction interventions are implemented by public health departments and/or private organizations concerned with the welfare of drug users. Drug supply reduction strategies are typically national-level policies which focus on enforcement of laws against drug production, trafficking, sale and use. Drug enforcement is usually the responsibility of national and local law enforcement agencies. These policies are not specifically aimed at reducing HIV among injecting drug users, but they may have unintended consequences for the patterns of drug use and HIV risk behavior among drug users in different countries.

**Harm Reduction Strategies.** Des Jarlais (1995) summarized the argument for implementing harm reduction programs to prevent HIV among IDUs. First, non-medical use of psychoactive drugs is inevitable in societies that have access to these drugs, therefore, drug policies cannot be based on the belief that drug use can be eliminated. Second, drug misuse will produce social and individual harms, therefore drug policies cannot be based on the belief that drug users will use drugs safely. Third, drug policies must be pragmatic; that is, they must be assessed on their results, not on whether they are sending correct, incorrect or mixed messages. Fourth, drug users are part of the larger society, and as such, should not be socially isolated from the community. And fifth, drug use leads to harms through a variety of mechanisms, all of which need to be addressed in interventions.

In general, effective risk reduction programs for IDUs implemented in both developed and developing countries include educational programs, drug abuse treatment, syringe exchange, over-the-counter syringe sale, and community outreach and bleach distribution programs (Des
It has been recognized that education and information alone may not cause a reduction in risky behavior among IDUs (Flowers, et al. 1991; Campbell and Waters 1987; Becker and Joseph 1988). However, education combined with group interactions and exercises seems to be more effective (McCoy and Inciardi 1995; Jemmott, et al. 1992). Behavior is difficult to change in individuals when it is habitual and reinforced by peers and/or community norms. Many researchers agree that successful risk reduction programs involve redefining traditional peer group norms (such as sharing needles) as unacceptable, with the new risk reduction behaviors as more appropriate (McCoy and Inciardi 1995; Auerbach 1994.) In addition, there is growing consensus that effective prevention programs should include the promotion of treatment for reducing drug use, providing the means for safer injection, and promoting safer sex (Des Jarlais and Friedman, 1996).

Table 5 provides a summary of some harm reduction measures and evaluations of these in both developed and developing countries. These include needle exchange programs (NEPs), bleach distribution, and programs which rely on a community outreach and peer leader approach to service delivery. The latter two approaches are usually included in both NEPs and bleach distribution, but I consider them separately, as these strategies are vital to the success of harm reduction programs.

**Needle Exchange Programs (NEPs).** Needle exchanges are established in order to increase the availability of sterile injection equipment, and to remove contaminated needles from circulation among IDUs participating in the program (Normand, et al. 1995). These programs are expected to increase the supply of needles and reduce the amount of sharing by IDUs. Needle exchanges also tend to include services such as education concerning risk behaviors, referral to drug treatment programs, and provision of condoms. Negative outcomes that may result from NEPs include an increase in improperly discarded needles, an increase in drug injectors, or the perception that the government condones drug use. Needle exchange programs have been implemented in locations in a variety of developed countries. Two comprehensive reviews of literature which evaluated needle exchange programs in Australia, Canada, the Netherlands, Sweden, the United Kingdom and the United States were performed by the U.S. General Accounting Office (1993) and the University of California at San Francisco in 1993 (Lurie, et al. 1993). The GAO review concluded that needle exchange programs were successful in reaching
injecting drug users and providing a link to drug treatment and other health services (Normand, et al. 1995). It also found consistent evidence of a reduction in needle sharing and a reduction in the frequency in injecting drug use in two programs.
Table 5. Harm Reduction Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>City/Country</th>
<th>Evaluation Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needle Exchange</td>
<td>Australia, Canada, Netherlands, Sweden, U.K., U.S.A.</td>
<td>Review of studies on evaluations of 9 programs in these countries - GAO, 1993</td>
</tr>
<tr>
<td></td>
<td>U.S., Canada, Europe</td>
<td>Review of evaluations and site visits to 33 programs in 15 cities - Lurie, et al. 1993</td>
</tr>
<tr>
<td></td>
<td>Kathmandu, Nepal</td>
<td>Maharjan, et al. 1994; Maharjan and Singh 1996</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>Evaluation not yet conducted</td>
</tr>
<tr>
<td>Bleach Distribution</td>
<td>San Francisco</td>
<td>Watters 1994; Neigus et al., 1990</td>
</tr>
<tr>
<td></td>
<td>Chicago</td>
<td>Wiebel et al., 1990</td>
</tr>
<tr>
<td></td>
<td>Churachandpur, Manipur</td>
<td>Chatterjee et al., 1996</td>
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<tr>
<td></td>
<td>Kathmandu, Nepal</td>
<td>Maharjan and Singh 1996</td>
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<tr>
<td>Community Outreach</td>
<td>Bangkok</td>
<td>Choopanya et al., 1991</td>
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<tr>
<td></td>
<td>Churachandpur</td>
<td>Chatterjee et al., 1996</td>
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<tr>
<td></td>
<td>Kathmandu, Nepal</td>
<td>Maharjan and Singh 1996</td>
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The review conducted by the University of California of 33 needle exchange sites examined four possible positive outcomes, including reduction in drug-related and sexual risk behaviors, increase in referrals to drug abuse treatment, and reduction in HIV and other infection rates. The report also addressed the possible negative outcomes mentioned above. The review panel concluded that there was not clear evidence that NEPs decrease HIV infection rates, but that most of the IDUs who are involved in the programs demonstrate reduced HIV drug risk behavior, but not decreases in sexual risk behavior (Normand, et al. 1995). In addition, most NEPs provided referrals to drug abuse treatment. The report also concluded that NEPs do not increase the number of improperly discarded needles, and have not resulted in an increase in the number of injecting drug users in the community. This latter result was determined by examining the ages of injectors. If NEPs have the effect of encouraging those not currently injecting to begin injecting, then an increase in the number of young newer injectors at the needle exchange programs would be expected. This was not found to be the case (Lurie et al. 1993). Evidence from other NEPs is consistent with these findings. Heimer, et al. (1993) assessed the effect of the New Haven needle exchange by examining demographic data obtained from program participants from 1990 to 1991. They found that the mean age and mean duration of injection did not change over time. In addition, researchers in Amsterdam examined the hypothesis that NEPs would provide a chance for non-injectors to “mix” with injectors, thus increasing the opportunity for non-injectors to begin injecting (van Ameijden et al. 1994). They found that the proportions of heroin users who smoke and those who inject have remained constant since needle exchanges were implemented in the city. U.S. data also support the conclusion that NEPs do not increase the number of drug users. Watters (1994) found that in San Francisco, the mean age of injecting drug users actually increased between 1986 and 1992 (from 36 to 42), where a decrease in age would be expected if the number of newer injectors increased. The author also reported that the median frequency of injecting declined from 1.9 to 0.7 injections per day, and the percentage of new initiates into injection decreased from 3 to 1 percent.

A needle exchange program instituted in Kathmandu, Nepal also provides evidence of harm reduction among IDUs as a result of participation in the program. In this sample of 127 IDUs using an NEP, the mean frequency of injecting fell from 24.4 per week to 17 per week. Unsafe injections decreased by 50 percent, the number of persons with whom equipment was
shared decreased by 21 percent, and the number of times equipment was shared decreased by 29 percent. HIV prevalence among IDUs in Kathmandu also has remained low, at less than 2 percent (Maharjan, et al. 1994).

In addition to reduced risk behavior among participants in needle exchange programs, there is evidence of reduced infectivity of the syringes exchanged through NEPs. Studies of the New Haven, Connecticut needle exchange program reveal that prior to the distribution of sterile injecting equipment, the HIV-positive rate of syringes collected from the street was 0.675, and 0.917 from shooting galleries (Normand, et al. 1995). Within 3 months, the HIV-positive rate for needles returned to exchanges decreased by one-third.

Some cities with high seroprevalence have seen a substantial reduction in needle sharing practices, resulting in stabilization of HIV seroprevalence among IDUs (Des Jarlais, 1992; Watters, 1994). Much of the success is attributed to availability of clean needles through both exchange programs and legal over-the-counter sale. For example, trends in injection behavior among IDUs in Bangkok, where HIV prevalence in this group is estimated at about 37 percent, show a decrease in sharing needles. The percentage of IDUs reporting injecting once a month or more with used needles fell from 39 percent in 1989 to 22 percent in 1993 (Suwanee, et al. 1994). One important factor in reduced sharing of injection equipment appears to be ready access to sterile equipment (Des Jarlais et al. 1992). Legal sale of needles also contributes to a decline in risk behavior. In the state of Connecticut, USA, needles have been available from pharmacies without a prescription since 1992. Between 1992 and 1995, the percentage of IDUs who share needles decreased from 71 percent to 15 percent (Span 1996).

While safer injection programs appear to reduce HIV risk behavior among IDUs, they have not resulted in the complete elimination of HIV transmission in this group (Des Jarlais, 1992). Three unsolved problems are linked with safer injection programs such as needle exchange. First, many IDUs, particularly new injectors, are not reached by these programs. The second problem is consistent provision of clean equipment so that IDUs using the program have access at the times when they are most likely to inject. The third problem is the propensity of IDUs to relapse back into unsafe injecting behavior after a certain amount of time of safe injecting.
Costs of Needle Exchange Programs. The costs of needle exchange programs vary, ranging from $18,628 to $325,951 in one sample of 18 different programs (Lurie et al. 1993). The proportion of budgets actually spent on needles also varies, from 2 percent in Boston and New Haven to 47 percent in the Tacoma Pharmacy Exchange, with the proportion in each program depending on the number of needles exchanged. (Normand et al. 1995). Lurie et al (1993) also estimated that the median cost per participant contact across seven programs was $1.35. This is consistent with WHO (1993) estimates of needle exchange programs in Nepal and Tacoma. The total costs for the NEP in Nepal after one year of operation was estimated at $7,333 (U.S. dollars), and the cost per client contact (of a total of 2,287 contacts) was $3.21 (WHO 1993). This cost is only slightly higher than costs of the Tacoma Needle Exchange in Washington, USA, which were estimated at $2.25 per contact.

Lurie and associates (1993) also attempted to measure the cost-effectiveness of programs by estimating the number of HIV infections averted and associated cost-effectiveness (program cost divided by number of HIV infections averted). They estimated the cost-effectiveness of a hypothetical NEP with specific characteristics (high volume of needles exchanged, limited counseling and referral services) using three different models, one which only took into account HIV infections attributable to needle-sharing, one which included averted infections among injectors as well as their sexual partners and offspring, and one which combined characteristics of both. All three models estimated that the hypothetical needle exchange program had a large impact on averted infections, and cost substantially less than the $119,000 estimated lifetime medical costs associated with HIV ($12,000, $3,773 and $9,375, respectively for each model).

NEPs may also have beneficial economic effects. There is some evidence that these programs may reduce local government spending on law enforcement (Hernandez, et al. 1996), as NEPs can refer IDUs into treatment facilities and reduce the number incarcerated, and the incidence of HIV. One study compared the costs of medical treatment for HIV positive jail inmates with the cost of operating an NEP in San Diego, California (Hernandez, et al. 1996). Researchers found that the annual excess medical cost for treating HIV-positive IDUs was $15,768 per person, or $5.3 million for all infected IDUs in the area. Operational costs for San Diego’s underground NEP totaled $14,000 per year to provide clean needles to 2,500 clients. Prevention of one HIV infection per year among incarcerated IDUs would balance the costs of
the NEP, and any additional savings from decreased jail recidivism would result in additional economic benefits.

**Bleach Distribution.** Use of bleach has long been recognized as an effective technique for sterilizing injecting equipment. Many bleach distribution programs are incorporated into needle exchange programs, and tend to rely on a community outreach approach. Bleach distribution programs in San Francisco and Chicago were instituted in the 1980s (Watters 1987; Watters 1994; Wiebel et al., 1990). Evaluations of these indicate increased use of bleach by program participants. In the San Francisco program, the percent of IDUs in the program who used bleach increased from 3 percent to 76 percent (Watters 1994). Similarly, in Chicago, two-thirds of IDUs in the program reported an increase in bleach use, and one-third of those reported always using bleach (Wiebel et al. 1990). A bleach distribution program was also instituted in Churachandpur, Manipur, India. Bleach kits are distributed on the street by outreach workers. In the first year of the intervention, it was estimated that 790 of the town’s 800 IDUs were reached, and knowledge of bleach as a disinfectant rose from 3 to 99 percent in one year. Intention to use bleach also increased from 2 percent to 79 percent, and actual use of bleach increased from 31 percent to 72 percent after one year (Chatterjee et al., 1996). For countries where sterile needles are difficult, if not impossible, to obtain for injecting drug users (for both economic and political reasons), bleach distribution may be a viable and effective alternative.

**Peer counselors/community outreach.** As mentioned previously, outreach programs and utilization of peer counselors in intervention programs are not distinct interventions, as many harm reduction programs use these strategies. Outreach intervention has been successful in cities in the United States and Europe as well as in developing countries, resulting in marked decreases in needle-sharing (Des Jarlais, et al. 1992). In Hong Kong, where HIV seroprevalence among IDUs is very low, rehabilitated IDUs are trained as interviewers and peer counselors to educate injectors on the street about harm reduction techniques. Analysis indicates a rising awareness of risk factors among these IDUs and declining risk behavior (Ch’ien, 1994). Harm reduction programs in Churachandpur, Manipur and Kathmandu both incorporate community outreach strategies. As already mentioned, this approach has been successful in reaching 790 out of 800 IDUs in Churachandpur. The low seroprevalence of HIV among IDUs in Kathmandu has been partly attributed to a street-based outreach strategy (Maharjan and Singh 1996). Bangkok has also
experienced some success in risk reduction among IDUs after instituting AIDS education programs in treatment centers and through community outreach. In 1989, 92 percent of IDUs interviewed reported that they had changed their behavior to reduce their risk for HIV (Choopanya et al. 1991). In addition, 80 percent said they obtain their injection equipment from a pharmacy instead of from other IDUs. HIV prevalence in this population has stabilized since 1991 at about 37 percent.

The importance of the peer outreach model is evidenced by the role of social integration, social networks and norms in risk reduction among IDUs. In Bangkok, 70 percent of IDUs are employed and in the ethnic majority. IDUs in this city were more successful in changing needle-sharing practices than were a comparison group of IDUs from New York City, where most are not employed and are in the ethnic minority (Des Jarlais, et al. 1992). In addition, among IDUs in Bangkok, having a regular sexual partner, an indicator of social integration, had a protective effect against seroconversion (Des Jarlais, 1994). Another study of outreach efforts in Bangkok and Rio de Janeiro, Brazil identified behavior change among IDUs, and found that social network factors were important in influencing this change (Des Jarlais, et al. 1995a). Talking about AIDS with drug-using friends was significantly related to behavior change in both cities. In addition, talking with sex partners about AIDS, years of education, and knowing that someone can have AIDS and look healthy were related to behavior change. In both cities, there is evidence that large-scale behavior change among IDUs is associated with stabilization of HIV seroprevalence and decline in HIV incidence. The results suggest that AIDS prevention programs for IDUs should take into account social influences of peers and family.

Another study done on IDUs from Manipur, Nagaland, and Mizoram states in India found that the most important reasons cited by 60-90 percent of injectors for initiating injecting drug use was peer pressure and the influence of friends (Sarkar, et al. 1993). This points to the potential for successful behavior change using peer leaders to influence IDUs.

**Risk Reduction in Sexual Behavior**. As discussed in a previous section, most studies find that IDUs are sexually active, with the majority reporting sexual activity within a specified time frame (usually 6 months or a year prior to the interview), and most reporting non-IDU heterosexual partners (Donoghoe, 1992). In addition, condom use among IDUs is infrequent. While evidence indicates that IDUs have been able to change their drug using behavior to reduce
their risk for HIV, there has been less success in changing their sexual behavior. Early studies from the UK, New York, San Francisco, Amsterdam, and Edinburgh indicate that all reported higher rates of risk reduction in needle sharing cleaning practices than in sexual behavior (Donoghoe, 1992; Van de Hoek et al. 1990; Morrison 1988; Hart et al. 1989). More recently, results from the WHO Multi-City Study found that among IDUs interviewed in Rio de Janeiro only 29 percent reported a change in sexual behavior, compared to 53 percent who reported changes in drug injecting behavior due to concern about AIDS (Des Jarlais, et al. 1995a). In addition, a study in Manipur found that widespread availability of HIV testing and awareness of HIV seropositivity was not associated with safer sex behavior. Of 787 IDUs who were provided HIV testing and counseling, 93 percent reported being aware of HIV transmission through sex, and 37 percent tested positive for HIV. However, only 16.5 percent of sexually active IDUs had ever used condoms, even after testing and counseling (Sarkar et al. 1996).

While risky sexual behavior among IDUs remains prevalent, changes on a limited scale have been observed. Some studies have found an association between knowledge of HIV status and sexual behavior change. For example, one study in Puerto Rico found that drug users (both IDUs and crack smokers) who tested positive for HIV were less likely than those who tested negative to report sexual activity with their steady partners (57 v. 73 percent). Of those who were sexually active, 57 percent of those who were HIV-positive used condoms compared to only 13 percent of those who tested negative. However, there were no significant differences between HIV- positive and HIV-negative drug users in the use of condoms with casual partners (Colon et al. 1996). In addition, among IDUs and crack smokers interviewed from a drug treatment center in Campinas, Brazil, 36 percent reported more frequent condom use and 28 percent reduced their number of sexual partners because of the AIDS epidemic (Azevedo Renata, et al. 1996). Research in developed countries also reveal that there has been limited change in sexual behavior among IDUs, mostly decreases in numbers of sexual partners and small increases in condom use (Donoghoe 1992). Another study in Bangkok compared IDUs who tested positive, those who tested negative, and those who were not tested (Des Jarlais, et al. 1992). A greater percentage of IDUs who tested positive compared to the other two groups reported always using condoms with their primary partner (29 percent v. 11 and 9 percent, respectively), and always using condoms with their casual partners (57 percent v. 30 and 33 percent, respectively). However, there were still
a great many HIV-positive IDUs who did not use condoms - 29 percent never used condoms with their main partner or casual partners, and over 40 percent used them only sometimes.

Researchers recognize that HIV interventions targeted to IDUs must incorporate specific sexual behavior components in order to reduce this type of risky behavior. In addition, interventions that include the partners of IDUs in the sexual behavior component have met with some success (Des Jarlais, et al. 1992; Donoghoe 1992; McCoy and Inciardi, 1995; Auerbach, et al. 1994). For example, the Miami Community Outreach intervention, which started in 1988, targets both IDUs and their sexual partners and includes both drug use and sexual behavior components. Some changes were noted among half the women enrolled, however, others made no changes and in a minority, increased HIV risk was reported (McCoy et al. 1990). In addition, a community-level intervention in California targeted women at high risk for HIV (injecting drug users, commercial sex workers, and sex partners of IDUs). By the end of the study, women who had been exposed to the intervention were significantly more likely to report consistent condom use with both main partners and non-main partners (Corby and Wolitski 1996).

One particularly successful large-scale intervention designed to increase condom use among commercial sex workers and their clients was implemented in Thailand (Rojanapithayakorn and Hanenberg, 1996). The “100% Condom Program,” implemented and controlled by the Thai government through the Department of Communicable Disease Control (DCDC) of the Ministry of Public Health (MPH), enforced condom use in commercial sex establishments, with a resulting increase in condom use from 14 percent in 1989 to 90 percent in 1994. The success of the condom program among CSWs in Thailand, however, occurred within a specific political and social context that may not exist for other high-risk groups such as IDUs. The Thai government has tolerated and controlled prostitution for many years, and monitors STDs among CSWs through 85 government clinics countrywide. An infrastructure through which to implement the condom program was already in place. Also, there was a great deal of governmental pressure involved in legally enforcing condom use, and this type of enforcement would be virtually impossible among IDUs and other drug users. It is unlikely that such a program would be a viable means through which to increase condom use among IDUs.

**Harm Reduction Strategies Associated with Low Seroprevalence.** Some cities in both developed and developing countries have been able to maintain low seroprevalence among IDUs
(<5 percent) (Des Jarlais, et al. 1995b; Ch’ien 1994; Lee, et al. 1993; Wong, et al. 1993; Poshyachinda, 1993). One study identified three common prevention components present in at least five of these cities (including Glasgow, Scotland; Lund, Sweden; Sydney, Australia; Tacoma, Washington; and Toronto, Canada) which may help explain this phenomenon (Des Jarlais, et al. 1995b). First, prevention activities were implemented when HIV seroprevalence was still low. Second, sterile injection equipment is made available on a large scale, either through needle exchange programs or legal over-the-counter sale of needles and syringes. Third, community outreach programs, which disseminate AIDS information and risk-reduction supplies to IDUs, exist in these cities. Through outreach, trust is built between IDUs and health care workers, and outreach workers provide referrals to other services, such as drug abuse treatment, and HIV testing and counseling. The experience of these cities demonstrate that introduction of HIV into the injecting drug using population does not necessarily lead to rapid transmission of HIV in this group. The factors discussed above may be instrumental in preventing spread of HIV in countries that are already experiencing rapid spread, and in those that may experience rapid spread in the future.

The above criteria can be used to compare the different HIV prevalence rates among IDUs in countries in Asia. To date, some countries, including Hong Kong and Nepal, have experienced very low HIV prevalence rates among IDUs. In other countries, such as Thailand, China, India, Myanmar, and Viet Nam, HIV has increased rapidly among IDUs, reaching prevalence levels above 50 percent. Comparing Hong Kong (where almost no HIV cases have been found among IDUs) and Thailand (where seroprevalence levels among IDUs increased rapidly and stabilized at about 35-40 percent), highlights some importance differences in treatment of IDUs. In Hong Kong, injecting drug use has been common since the 1950s and in Thailand since the 1960s. Methadone clinics have been in operation in Hong Kong since 1972 (Choi, et al. 1996), while there have been very few methadone facilities in Thailand until recently (Des Jarlais, 1992). Very few IDUs in Hong Kong report a history of needle sharing. One survey of over 18,000 IDUs found that only 8.6 percent had ever shared needles in their drug-taking history, and most sharing occurred only during their initiation into injecting (Choi, et al. 1996). Needle-sharing in Thailand is much more common, however. One study revealed that over 50 percent of IDUs in Bangkok reported using a needle or syringe that had been used by someone else in the last 6 months.
Thailand has experienced risk reduction among IDUs in the absence of wide-scale needle exchange programs or methadone maintenance, but seroprevalence has stabilized at relatively high levels (Des Jarlais, et al. 1992). While Hong Kong may yet experience increased HIV incidence among IDUs, the availability of methadone treatment prior to widespread introduction of HIV could have a protective effect for IDUs here.

In addition, Nepal has taken early prevention measures for HIV among IDUs. In Kathmandu where there are approximately 1,500 IDUs, extensive harm reduction programs have been implemented since 1992 by a group called the Lifesaving and Lifegiving society. This NGO provides education, condoms, bleach, needle exchange and primary health care to about 650 IDUs. They have built collaborations with the Ministries of Home Affairs and Health and with the law enforcement community, while ensuring a confidential and non-judgmental atmosphere (Peak et al. 1994). HIV seroprevalence among IDUs is very low, at about 1 percent as of 1993 (U.S. Bureau of the Census 1995). Whether seroprevalence remains low in the years to come may depend on continued and large-scale harm reduction efforts.

The experience of countries in Asia (as well as in the above-mentioned cities in developed countries) has implications for prevention efforts in countries such as Nigeria, Cote d’Ivoire, and other African nations, in which injecting drug use exists, but in which HIV prevalence is still low in this group. Evidence indicates that early harm reduction efforts which are based on a community outreach approach, whether they consist of methadone treatment, needle exchange, or availability of sterile injecting equipment, are important components to the prevention of rapid spread and high seroprevalence among IDUs.

While certain intervention strategies are associated with risk reduction in injecting behavior and low seroprevalence in some areas, the relative effectiveness of specific program components is not yet known (Des Jarlais, et al. 1992). Many programs provide multiple services, and it is difficult to partition out behavior change associated with each type of service1. While intervention efforts have resulted in behavior change in injecting practices, less success has been noted in interventions designed to change sexual behavior.

1 Difficulty in determining effectiveness of HIV intervention programs is heightened by inadequacy of outcome evaluations. Reviews of HIV intervention evaluations have found that many are methodologically inadequate, lacking control group designs, relying on small sample sizes, failing to report pre-intervention measures, and having short follow-up periods and high attrition rates (Oakley et al., 1995).
**Demand Reduction Strategies.** The demand reduction strategy has a two-fold advantage in both reducing HIV risk and reducing drug abuse (Des Jarlais, 1992). Studies of methadone patients in New York City have shown that those who entered methadone treatment early in the HIV epidemic were less likely to be HIV-positive than IDUs who entered treatment later (Abdul-Quader, et al. 1987; Schoenbaum, et al. 1989). Other research has found an association between availability of methadone treatment and lower rates of HIV seropositivity (Rezza, et al. 1988; Blix and Gronbladh, 1988). Methadone treatment has been associated with low levels of risk behavior among IDUs in Hong Kong (Choi, et al. 1996). Only 1-2 percent of the 18,000 injectors interviewed reported sharing needles in the last month, and of those, the majority (58-81 percent) stopped sharing after counseling at the clinics. In addition, Farrell, et al. (1994) reviewed studies of methadone treatment results and concluded that long-term methadone prescribing was an effective means to reduce injecting and sharing behavior and rates of HIV infection, as well as to reduce dependence on illicit opiates, criminal activity, and drug-related mortality.

Demand reduction in the form of drug treatment is an important component to HIV prevention among IDUs, and can be complimentary to harm reduction strategies as well. Evaluations of needle exchange programs have found that one important outcome is the provision of referrals to drug treatment (Normand et al. 1995). The New Haven, Connecticut needle exchange program reported that participants requested drug treatment at a rate of 25 percent, and the percentage entering treatment increased from 15 to 18 percent after one year of program operation (Normand et al. 1995). These programs, particularly those that rely on community outreach efforts, have become the leading local source of referrals into drug treatment (Hagan, et al. 1992; O’Keefe, et al. 1991).

Drug treatment programs that encourage abstinence have significant limitations. Methadone treatment is opiate-specific and does not eliminate injection of drugs other than heroin (including cocaine). Also, the relapse rate in drug treatment centers is very high. For example, in drug treatment centers in both Kunming in Yunnan Province, and in centers in Myanmar, the relapse rate has been reported to be between 80 and 85 percent (McCoy et al. 1996; Stimson 1994). In addition, follow-up is relatively unsuccessful due to geographical distance and transport, and patient unwillingness to attend.
One particular factor that may impact the high relapse rate is mandatory treatment, where IDUs are placed in treatment by law enforcement or families against their will. This raises not only ethical concerns, but questions of efficacy of HIV prevention through demand reduction. McCoy, et al. (1996) studied the Kunming treatment center in Yunnan Province, China. Eighty percent of the patients at this drug detoxification facility are mandated by law enforcement to go, and many report not necessarily wanting to stop their drug habit. As mentioned above, they observed an 80 percent relapse rate within 2 years.

Another problem with reliance on drug abuse treatment for HIV prevention is lack of appropriate facilities. For example, Myanmar has a yearly throughput capacity of about 2,000 to 2,200 for all drug abuse facilities countrywide. However, the number of registered drug abusers has been estimated at 20,000 to 100,000 (Stimson 1994). In Manipur, India, IDUs are forced into treatment by law enforcement and family members (Sarkar, et al. 1993). Since there are a limited number of beds in the few treatment facilities that do exist, prisons are often used as detoxification centers. Imprisonment has not induced large-scale behavior change, despite the fact that over 50 percent of addicts have been in prison in their lifetime. Abstinence, rather than harm reduction, is emphasized and no counseling support is available. In one survey of 450 injectors interviewed, only 2 percent expressed a desire to stop their drug habit because of imprisonment (Sarkar, et al. 1993). Data on IDUs in Manipur indicate a high level of knowledge about HIV transmission and safe injecting behavior compared to the general population (Sarkar, et al. 1996). Many report wanting to stop sharing equipment, yet many have also continued to practice unsafe needle sharing. This is attributed to the lack of rehabilitation facilities and counseling available to IDUs (Sarkar, et al. 1996).

Finally, treatment programs do not help those who refuse to go into treatment. They also tend to be expensive and take a long time to implement (WHO, 1993). Alternative approaches, including harm reduction strategies, may be equally or more effective than demand reduction programs. These include education on the need to reduce needle-sharing, instruction on cleaning and disinfecting injection equipment and bleach distribution and needle exchange programs (WHO, 1993).

**Drug Supply/Enforcement Policies.** Policies designed to curtail drug supply may have limited effectiveness, and in some cases may even cause a shift in drug transportation routes,
thereby increasing the supply and use of drugs in areas around the new trade routes (Stimson, 1993; Stimson, 1996). For example, Mauritius experienced an increase in brown sugar heroin smoking in the 1980s as a consequence of becoming a drug trafficking country. New legislation and stricter enforcement of drug policies controlled this epidemic in 1987 and 1988. This was followed by a temporary reduction in the supply of heroin, but an increase in the consumption of alcohol and licit psychoactive drugs. Since 1991, heroin again has been on the rise, with the predominant route of administration through injecting (Stimson, 1996).

Drug enforcement policies which target specific substances also have had limited effectiveness, and can result in increased use of other drugs. For example, in India, as a result of active vigilance by the Excise Department and enforcement of strict legal penalties on the heroin drug user population, there was a reduction in the supply of heroin and a corresponding increase in price. This brought about a decline in the number of exclusive heroin users, but these drug users instead switched to injecting synthetic opiates. While the injection of heroin decreased as a result of drug enforcement policies, overall injecting behavior did not change (Pal, et al. 1990). This indicates that drug enforcement policies targeted at specific substances (such as opiates) may have the effect of decreasing use of that substance, but also have the effect of increasing use of other substances, resulting in no overall change in the extent of substance abuse.

Enforcement policies also influence drug trade routes. Prior to the 1980s there was very little use of opioid drugs or cocaine in West Africa. However, this area became an important trafficking route for cocaine from South America and heroin from South-East Asia en route for Europe and North America. Law enforcement efforts in Nigeria against transport and travelers originating in Nigeria have helped cause a shift in drug trade routes to the Cote d’Ivoire, Zambia and Zimbabwe (Stimson, 1993).

The policy of drug supply control has limited effectiveness in curtailing drug use. In fact, the final report issued by the WHO Multi-City Study group recommends that there needs to be a shift in commitment from law enforcement to strategies which focus on public health and social conditions in responding to the problem of drug injecting (WHO 1994).
Issues for Policy Consideration

Measurement and Sampling. Most research done on injecting drug users in developing countries draws samples from urban areas. Also, while some attempt has been made to take samples of IDUs from the streets, most of the information we have currently comes from samples of IDUs in treatment. There are obvious methodological problems associated with this, particularly generalizability. Samples of IDUs also tend to be relatively small, especially those drawn from rural village settings.

Some data indicate that injecting drug use may occur in a different context in rural areas and in different countries. For example, IDUs in some areas use different kinds of injecting equipment, and this depends on access to syringes which may be due to personal economic situation or availability on a country-wide basis. The lack of knowledge about IDUs in rural areas makes it difficult to design intervention programs in these areas. What works in urban areas (e.g., needle exchange programs in a central location which is easily accessible) may not be appropriate for rural settings. In addition, IDUs from rural areas may have very little access to information on AIDS and HIV prevention, and may be at even greater risk due to lack of knowledge than populations in urban areas.

Legal Context Surrounding Drug Use. In some countries (e.g., China, Myanmar, India), drug users are required by law to register with the government and undertake medical treatment for their problem. A drug user who fails to register or refuses to take treatment may be sent to prison. Also, in some areas, individuals are required to report drug users to authorities, making it difficult for outreach workers to assist IDUs in areas other than drug abuse treatment. Illegality of drug use presents a dilemma for governments in addressing the problem of HIV among IDUs. In particular, it may be difficult for governments to approve harm reduction strategies because they are seen as condoning drug use. Some governments have been unwilling to address the issue head on due to legal constraints and the cultural context surrounding drug abuse. There has been some suggestion that non-government organizations (NGOs) may be able to provide some of these services in place of the government. For example, in the U.S., private groups started implementing needle exchange programs even when possession laws were in effect. India has a vast network of NGOs and there is support for the idea of utilizing these networks for HIV
intervention programs. However, NGOs may not provide a viable solution for other countries. For example, NGOs in Myanmar tend to be connected in some way to government departments (Stimson 1994). Independent NGOs are rare, thereby limiting their capability to act on behalf of IDUs.

**Drug Enforcement Policies.** Policies directed toward reducing drug supply and those toward reducing harm may be conflicting. Drug enforcement policies have the goal of reducing supply, which increases the price of drugs. As mentioned previously, drug users may switch to injection as a more efficient route of administration when supply of drugs are limited, an unintended and undesirable effect in terms of reducing risk of HIV infection. Also, in many countries, drug addiction is the responsibility of both law enforcement and the health sector, which can lead to conflicting aims and practices. Increased law enforcement efforts against drug use makes it more difficult for health workers to provide services to IDUs. In addition, in some countries, the government and/or the military is involved in the production and distribution of drugs, either taking an active role through direct involvement or a passive role in taking bribes to look the other way. This has implications as to how far governments are willing to go to control drug abuse.

**Provision of sterile injection equipment.** In some countries such as India and Myanmar, there is not an adequate supply of sterile needles even for hospital use. This makes it difficult to argue that governments should fund provision of sterile needles to a relatively marginalized group such as IDUs. In addition, bleach is not available as a household item in some countries, and therefore is not widely available for use by IDUs. These problems can be addressed, however. Bleach is a relatively inexpensive item in developed countries, and may be inexpensive to import as well. This strategy could be particularly appropriate in countries where needles are in short supply. One additional benefit to increasing availability of bleach is that it can by used by the general population. This may make provision to injecting drug users more acceptable in the eyes of government, the public, and funding agencies.

**Risk Reduction in Sexual Behavior.** Matters of a sexual nature, especially condom use, may be difficult to discuss among couples in some country contexts. In addition, many individuals in areas in developing countries lack knowledge about condoms. For instance, condom use in Myanmar is extremely rare, with one study finding that among drug addicts in
Phar Khant, 80 percent had never even heard of condoms (Stimson 1994). Condoms can be found in open markets here, but are in very limited supply. Lack of open discussion about condom use and knowledge of condoms is not an insurmountable barrier, however. Governments can take steps to initiate campaigns aimed at increasing condom use, and indeed, many have done this already. In addition, anecdotal evidence indicates that government leaders from some developing countries are more willing to openly discuss sexual behavior and condom use than injecting drug use. Sex may be less of a taboo topic than drugs, given the focus on sexual behavior due to the HIV epidemic. This indicates that campaigns directed toward condom use among IDUs may be politically acceptable at the policy level.

**Conclusion**

Several important issues emerge from this review. First, policies related to drug control and enforcement are relevant to the spread of HIV. Injecting drug use spreads in countries where there is increased supply of heroin and cocaine, particularly those close to drug production areas and on drug trafficking routes. Drug enforcement policies are not necessarily effective in controlling the drug supply, and may even have negative consequences for neighboring countries when drug trade routes shift. The spread of injecting drug use has been followed by the rapid spread of HIV in this population in several areas, including Yunnan Province, China; Manipur, India; and Bangkok, Thailand. This could very likely occur in other countries in South America, Asia and Africa, as injecting is reportedly increasing in countries in these areas. Rapid spread of HIV infection among IDUs can be avoided, however, as evidenced by Hong Kong and Nepal, as well as other cities in developed countries. The key factors that reduce the likelihood of rapid spread are acknowledgment of injecting drug use as a potential problem, and early intervention efforts that include harm reduction, as well as demand reduction strategies.

Second, injecting drug users do change their risky injecting behavior as a result of certain types of harm reduction programs, and may even reduce risk without large-scale intervention efforts. The two important components to harm reduction programs are education and provision of the means with which to change behavior. The means may include sterile needles (either
through needle exchange programs or availability in pharmacies without a prescription), bleach, and/or drug rehabilitation programs. Appropriate prevention efforts will be different for each country, depending on social and economic circumstances, as well as the political environment. However, even politically conservative countries must acknowledge injecting drug use and its potential consequences, and address these issues accordingly.

Finally, given that IDUs act as a bridge group of HIV transmission to the low-risk heterosexual population and are slow to change sexual behavior on their own, interventions should promote condom use both to IDUs and their sexual partners. While interventions which include sexual behavior components are still in the early stages of development and have met with only limited success, focus on this aspect is vital to reduce the risk of HIV for the general population. Ignorance of the potential for HIV spread among IDUs, and lack of prevention programs targeted toward IDUs will result in increased HIV prevalence in this group, and transmission to other low-risk groups, including heterosexual partners of IDUs and their children.
Appendix 1. WHO Multi-City Study on Drug Injecting and Risk of HIV Infection

In 1989 the World Health Organization initiated a comparative study of drug injecting behavior and HIV infection which involved 13 cities, including Athens, Bangkok, Berlin, Glasgow, London, Madrid, Naples, New York, Rome, Rio de Janeiro, Santos, Sydney, and Toronto. In Phase I, researchers recruited 6390 drug injectors between October 1989 and March 1992 both from treatment facilities and from the streets. A standardized questionnaire was developed to collect detailed information on drug use behavior, sexual behavior, and other demographic characteristics, and HIV tests were performed on all participants. The study report identified additional need for collection of information from a wider range of developing countries, the development and utilization of more rapid methods of assessment, the application of qualitative methods to examine the context of IDU, and identification of critical intervention points and effective interventions. As a consequence, Phase II is being designed to address these issues and gather information from additional cities in both developing and developed countries, and is scheduled to begin sometime in 1997.
References


