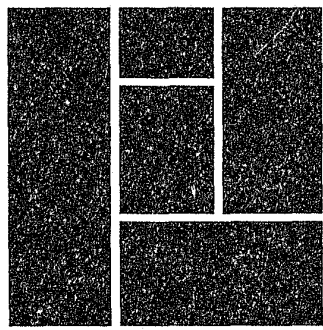


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**AIDS AND HEROIN:
STRATEGIES FOR CONTROL**

by

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Abstract

Needle-sharing by heroin addicts and other intravenous (IV) drug users is the second most frequent means of AIDS transmission, and the fastest growing one. The spread of the AIDS virus (HIV) among heroin users threatens not only the users themselves, but also their sexual partners and children. Since many heroin users have non-heroin-using sexual partners--particularly since many prostitutes are either heroin addicts or the sexual partners of addicts--the spread of HIV among heroin users poses a threat to the wider community. Controlling that threat is essential to controlling the AIDS epidemic.

The frequency of HIV infection among heroin users and their sexual partners and children depends on the availability of heroin, the availability of sterile injection equipment, the knowledge of HIV risks among users and their attitudes toward needle sharing, and the availability of various kinds of treatment for heroin use. Public policy can influence each of these factors.

Most current discussion of HIV-prevention strategies for intravenous drug users focuses on the availability of needles, the supply of drug treatment, and the education of drug users. Law enforcement efforts to combat heroin selling could also help prevent the further spread of AIDS. To date, however, neither enforcement agencies nor public health authorities have seriously considered the value of law enforcement as an AIDS control strategy. Street-level drug enforcement has enormous, and largely untapped, potential to limit the spread of the virus.

AIDS education directed toward intravenous drug users can be a powerful and inexpensive AIDS prevention measure; the keys to success are outreach and incentives to participate in the programs (including, but not limited to, clean needles). Enforcement and treatment programs create opportunities for AIDS education; those opportunities are currently under-utilized.

Drug treatment programs have potentially important effects on HIV transmission, but the relationship is a complex one. Public health goals are best served by giving treatment priority to infected persons in areas with a low rate of HIV infection and to uninfected persons in areas with a high rate of infection. In addition, many persons in methadone programs not only go back to using heroin but also continue using other drugs intravenously during their treatment. Thus, simple expansion of drug treatment capacity--particularly adding methadone slots in areas where most heroin users are already infected--is not an obviously good approach to controlling the spread of HIV.

In sum, neither current police practices nor current treatment practices are well-designed for AIDS control. Enforcement efforts against street-level drug distribution and the operation of "shooting galleries" should be stepped up, while enforcement of the laws against needle possession should be de-emphasized. The choice of treatment modes, treatment admission priorities, and treatment goals needs to be rethought. AIDS education programs will be more effective if they are coordinated with enforcement and treatment.

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AIDS AND HEROIN: STRATEGIES FOR CONTROL

The AIDS virus (HIV) can be transmitted from one intravenous drug user to another if they share injection equipment. Needle sharing by drug users, principally heroin users, is the second most common--and the fastest growing--route of HIV infection. It poses a threat not only to the drug users themselves, but also to the wider community. In a large proportion of HIV infections transmitted through heterosexual activity, the partner first infected was exposed to the virus through needle-sharing. The vast majority of AIDS cases among newborn children are also traceable to intravenous drug use by one or both parents. As the Watkins Commission stated in its June 1988 report to the President, "Our nation's ability to control the course of the HIV epidemic depends greatly on our ability to control the problem of intravenous drug abuse."¹

This paper discusses how to reduce the intravenous-related transmission of HIV. We start by analyzing the factors that determine the number of intravenous drug users who are infected with HIV. Five factors stand out:

Acknowledgments: Gary Negbaur and David Woodruff provided extensive research assistance of the highest quality; Steve Molinari and Salvatore di Menza of the National Institute for Drug Abuse and William Hopkins of the New York State Division of Substance Abuse were extremely generous with their time and information. An earlier version of this paper was presented at a RAND Corporation seminar; David Kanouse and Anthony Pascal made helpful comments at that seminar and later. John Kaplan, Theodore Hammet, and Harvey Fineberg read and commented on previous drafts. Felicity Skidmore and Kerry Smith did extensive editing, and Stephen Hitchner extensively revised the penultimate draft. Many of the ideas of this paper were first worked out in collaboration with students in the Public Policy Analysis Program at the University of Rochester.

1. "Report of the Presidential Commission on the Human Immunodeficiency Virus Epidemic" (the Watkins Commission). Washington, D.C.: U.S. Government Printing Office, June 1988, p. 94.

- o The **initiation rate** at which new heroin users join the current user population;
- o The **quit rate** at which current users cease using heroin, with or without professional help;
- o The **relapse rate** at which ex-users rejoin the current user population;
- o **Needle-sharing and sterilization practices** among heroin users; and
- o The **pattern of mixing** between infected and uninfected users;

With these factors identified, we then discuss five possible interventions to reduce HIV infection through intravenous drug use:

- o **Changes in laws and regulations about needles** to influence sharing and sterilization practices;
- o **Outreach and drug education** to reduce rates of heroin use, reduce sharing and increase sterilization;
- o **Drug law enforcement** directed at street-level dealers and drug users to influence initiation, quit and relapse rates and needle-sharing practices;
- o **Expanded drug treatment capacity** to increase the quit rate; and
- o **Priority admission to treatment programs** for infected heroin users in low-prevalence areas and for uninfected users in high-prevalence areas, to reduce the probability of needle-sharing between infected and uninfected persons.

We conclude that both treatment officials and the police could substantially increase their contribution to controlling AIDS by changing their current organizational routines and operating policies.

AIDS and Intravenous Drug Use in the United States

An estimated 500,000 persons in the U.S. are regular, heavy heroin users of the type commonly described as "addicts."² An additional 750,000 to 1.5 million people use heroin less frequently.³ A heroin user not yet infected with HIV can become infected if he or she

2. Kaplan, John, The Hardest Drug: Heroin and Public Policy. (Chicago: University of Chicago Press, 1983), p. 2.

3. Chambers, Carl D. and Leon G. Hunt estimate 1.4 million total users for 1974 in The Heroin Epidemics, (New York: Spectrum, 1975). Institute of Medicine, National Academy of Sciences, Confronting AIDS: Directions for Public Health, Health Care, and (Footnote 3 Continued on Next Page

uses an unsterilized needle or syringe previously used by a person already infected. No one knows what proportion of heroin users share needles, and understanding of the circumstances that contribute to sharing remains incomplete.

As of July 25, 1988, there were 69,085 AIDS cases reported in the U.S. Of these, 19 percent involved heroin users who were not at risk from homosexual sex.⁴ These statistics almost certainly understate the number of cases and deaths related to heroin. Many intravenous drug users receive inadequate health care and may never be diagnosed properly. In addition, most of those infected with HIV have yet to show signs of clinical AIDS, and thus have not been detected.

In New York City, an estimated 50 to 60 percent of regular heroin users are already infected; in Boston, 25 to 40 percent.⁵ Other cities show lower rates of HIV infection, but given the fact that seroprevalence (the rate of positive antibody tests) in New York City went from 25 percent to between 50 and 60 percent in just two years, low infection rates today carry little reassurance about the future. If seroprevalence among addicted intravenous drug users is 20 percent nationally, roughly 100,000 addicts--plus some proportion of the 750,000 to 1.5 million less-frequent users--are now infected. More than half--perhaps all--

(Footnote 3 Continued from Previous Page)

Research, (Washington: National Academy Press, 1986), p. 58 (henceforth NAS), gives a figure of 750,000 addicts and 750,000 who use less frequently.

4. AIDS Program.. Center for Infectious Diseases, Centers for Disease Control. "Aids Weekly Surveillance Report." July 25, 1988, from CDC's recorded broadcast (henceforth CDC).
5. Des Jarlais D.C. and S.R. Friedman. "AIDS and the sharing of equipment for illicit drug injection: a review of current data." Prepared for the National Institute on Drug Abuse, January 12, 1987, p. 10.

Burack, J. and M. Schuster. "Intravenous Drug-Related AIDS: A Prevention Plan for Boston." Policy Analysis Exercise. John F. Kennedy School of Government, Harvard University. Unpublished, 1988.

These estimates based on treatment populations, may not represent the entire heroin-using population. Whether they tend to overestimate prevalence because users in treatment tend to have many years of heavy use behind them, or to underestimate it because those in treatment have been less active users recently, is hard to guess. Rates among sporadic heroin users have not been estimated.

of those infected will eventually contract clinical AIDS.⁶

Heroin-related HIV infection is not confined to heroin users. Most heroin users have sexual partners who do not use heroin.⁷ Approximately 12 percent of women reported to have AIDS appear to have been at risk only because they had sexual partners who were infected intravenous drug users.⁸ The vast majority of pediatric AIDS cases can be traced to intravenous drug use in one or both parents.⁹ Studies of all newborns delivered at Boston City Hospital in January, 1988, showed seroprevalence of 1.8 percent--nearly 2 of every 100 babies--while anonymous testing in New York City revealed seroprevalence as high as 2.3 percent in one borough.¹⁰

The toll from heroin-related HIV has not fallen equally on all ethnic groups. Blacks and Hispanics make up 20 percent of the U.S. population, but account for 39 percent of reported AIDS cases, a phenomenon due largely to heroin-related AIDS.¹¹ More than three quarters (77 percent) of pediatric AIDS cases are among minority groups.¹²

6. Moss, Andrew R., Peter Bacchetti, Dennis Osmond, Walter Krumpf, Richard, Chaisson, Daniel Stites, Judith Wilber, Jean-Pierre Allain, James Carlson, "Seropositivity for HIV and the Development of AIDS or AIDS-related Conditions: 3 Year Follow-Up of the San Francisco General Hospital Cohort," British Medical Journal, March 12, 1988, pp. 745-750.

7. For a provocative discussion of this problem, see "Mapping the epidemic: Geography as Destiny," Discover, April 1988.

8. Estimate based on CDC, op.cit., p. 1; women exposed this way may be severely undercounted.

9. Der Jarlais, Don C., Samuel R. Friedman and William Hopkins, "Risk Reduction for the Acquired Immunodeficiency Syndrome Among Intravenous Drug Users," Annals of Internal Medicine, 103 (1985), pp. 755-759.

10. Donegan, S.P., K.C., Edelin and D.E. Craven, "Prevalance of antibodies to human immunodeficiency virus in fetal cord blood at a municipal hospital." Abstract submitted to the 4th International Conference on AIDS; Stockholm Sweden (1988).

New York State Department of Health, "AIDS in New York State Through 1987" (pamphlet, 1988) p. 10.

These studies measure the HIV infection rate among mothers, rather than among children; about one-half of the children of infected mothers will themselves be infected.

11. CDC, op.cit., p. 1.

12. Ibid.

So far it appears that nearly all intravenous-drug-related AIDS cases result from heroin use, and throughout this paper we will refer to "heroin-related" HIV infections. However, some unknown number of people inject themselves with drugs other than heroin, including cocaine, amphetamines, and diazepam (Valium), and a significant proportion of heroin users also inject other drugs.¹³ We know very little at present about whether other drug injectors share needles to the same extent that heroin users do, how much the two groups overlap, or what the prevalence of infection is among those who inject drugs other than heroin. But since the current population of cocaine snorters and crack smokers is several times as large as the current heroin-using population, even a moderate shift from current patterns of cocaine use back toward intravenous use (the predominant mode of cocaine use two decades ago) could substantially increase the number of persons at risk of AIDS through sharing needles. Devising policies to meet this still largely hypothetical threat poses a difficult, and perhaps unrewarding, challenge.¹⁴

As the rate of HIV transmission falls among homosexual men, intravenous drug use will account for an increasing share of new infections. The disproportionate concentration of heroin use in poor and minority communities implies that the disparities in HIV infection prevalence between minorities and non-Hispanic whites, and between rich and poor, will rise. The high level of indigence among heroin users and the high costs of treating AIDS patients imply that the public health system will face substantial burdens from heroin-related AIDS. One recent study estimates that Boston alone will ultimately spend between \$12

13. For anecdotal description of this practice, see Landis, Bill. "Hooked: The Madness in Methadone Maintenance," Village Voice, April 5, 1988.

14. Promiscuous heterosexual sex in the "rock houses" (or "crack houses") where the smokable form of cocaine is sold and used seems to be spreading syphilis and perhaps transmitting HIV. See Peter Kerr. "Syphilis Surge with Crack Use Raises Fears on Spread of AIDS," New York Times, June 29, 1988, pp. B1.C3. This link between AIDS and nonintravenous drug use requires a different approach than the ones discussed here.

million and \$40 million providing care to heroin users who become infected in 1988.¹⁵ A similar estimate for New York State would reach \$95 million.¹⁶

Factors Determining the Number of Heroin-Related AIDS Cases

The number of HIV-infected heroin users can be thought of as the product of two factors: (a) the number of heroin users, and (b) the proportion of them who are infected. Reducing either factor (without increasing the other) will reduce the total. Any proposed policy can be considered from the perspective of its effects on the size of the heroin-using population and on the risk each user faces.

The size of the pool of heroin users depends on the rates of flow into and out of that pool: initiations of new users, quits by current users, and relapses by former users [Figure 1]. To some extent, those rates depend on historical and cultural factors--attitudes, customs and past practices--both local and national, which may change only slowly in response to public interventions. But the rates also depend on the price of heroin and the difficulty that heroin users experience in making purchases, and these two factors may be subject to deliberate modification, notably by drug law enforcement. (Such interventions are discussed below in the section headed "Law Enforcement and Its Effects.")

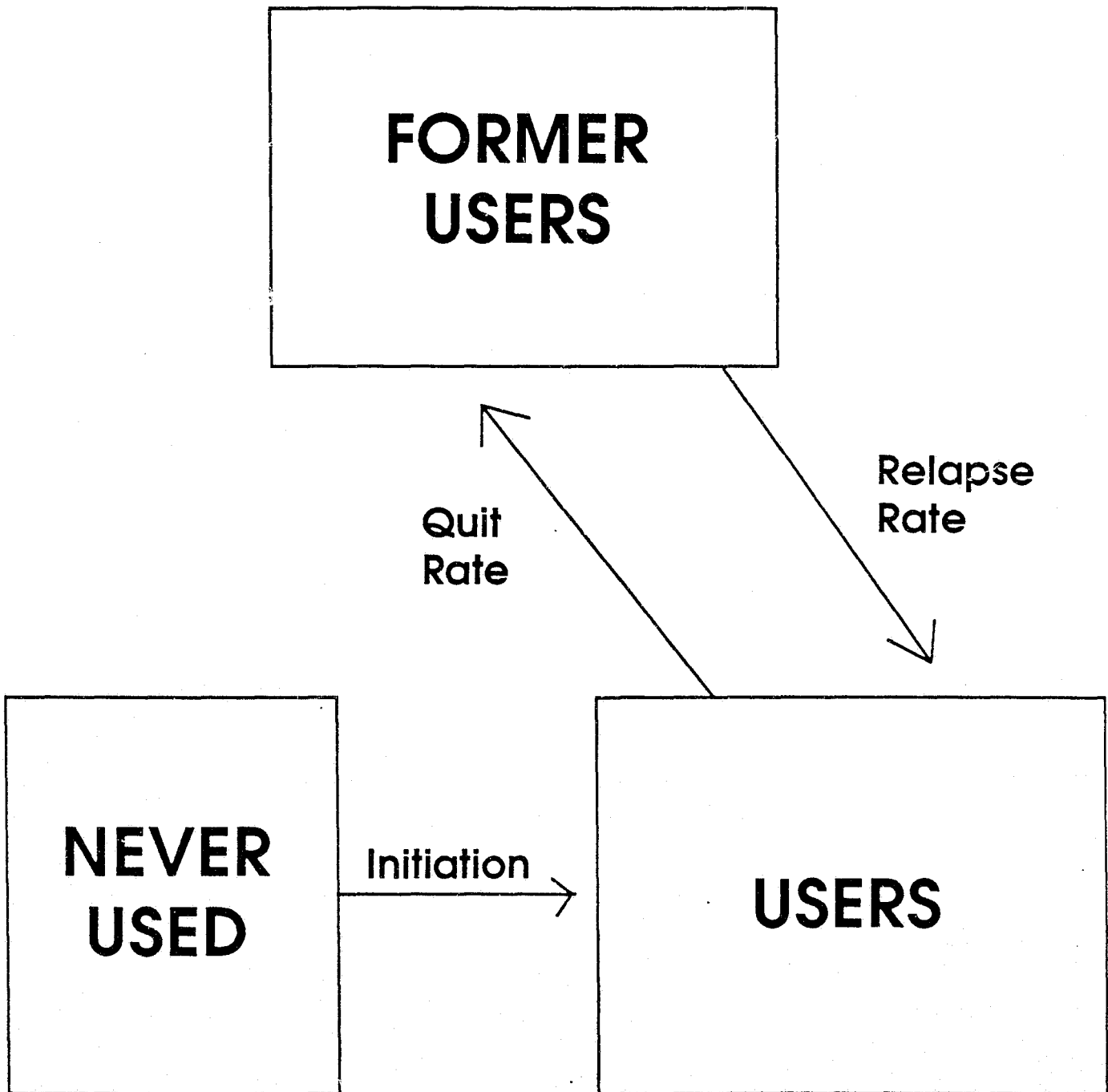
The undisputed fact that some heroin users will go to great lengths to ensure themselves of continued heroin supplies is sometimes used to argue that changes in price and the difficulty of purchase will have only negligible impact on initiation, quit and relapse

15. Burack and Schuster, *op. cit.*, p. 15.

16. Based on 1909 intravenous drug users expected to contract AIDS in New York this year (Sue Kain, AIDS Epidemiology Program, New York State Health Department, personal communication June 1988) and the estimate from Burack and Schuster of \$50,000 of care for each person with AIDS.

Figure 1

HEROIN USE



rates. But the conclusion does not follow from the evidence: some current users may be easier to influence than others, and it is likely that potential new users as a class are easier to influence than current users.¹⁷ Studies of the initiation of tobacco use among adolescents suggest that price changes as small as 10 percent will have substantial influence on initiation rates;¹⁸ there is no reason to think that changes in the difficulty of purchase will not be at least equally powerful.

Even if the initiation rate is sensitive to changes in the price and availability of heroin, it is sometimes argued that the current rate of heroin initiation is already so low that decreasing it further is unimportant. The bulk of the current heroin-using population, it is said, began using heroin in the period 1967-1972, and the subsequent history of heroin use in this country has involved largely the aging of that cohort. Advocates of this viewpoint maintain that the onset of AIDS has greatly reduced the number of persons who begin heroin use, particularly in the New York metropolitan area where the AIDS risk associated with heroin use is so high and so well known.

A number of facts lead us to question this optimistic view. However, if it were the case that very few new users were entering the heroin pool, attrition due to death or abstinence would lead to a steady decline in the total number of heroin users. Though measurements of the total heroin-using population are unreliable, no such decline has been observed. Treatment and enforcement professionals alike describe the heroin population as stable rather than declining. About 15 percent of high school seniors in the class of 1986

17. Moore, Mark H., "Policies to Achieve Discrimination in the Effective Price of Heroin," American Economic Review, Vol. 63, No. 2, May 1973.

18. Warner, Kenneth E., "Consumption Impacts of a Change in the Federal Cigarette Excise Tax," in The Cigarette Excise Tax (Cambridge, MA: Institute for the Study of Smoking Behavior and Policy, Harvard University, John F. Kennedy School of Government, 1985.

report that some, most, or all of their friends take heroin; this number is unchanged from the figure for the class of 1975.¹⁹

About one percent of high school seniors in 1986 reported having at least experimented with heroin; that proportion had not changed between 1980 and 1986, the last year for which published data are available.²⁰ The one percent figure projects to a total of more than 40,000 heroin initiations by the age of 18 for each annual cohort. The survey number is likely to underestimate the actual prevalence of heroin experimentation because it excludes high school dropouts. Since the reported median age of first use of heroin in treatment populations is approximately 18, our best estimate of total per-cohort initiations would be about twice the age-18 figure: perhaps 100,000 per annual cohort, by no means a negligible number. The fact that only a minority of this group will progress to heavy, chronic heroin use is only moderately comforting in the fact of AIDS.²¹

As indicated earlier, the size of the heroin pool is influenced by quit and relapse rates as well as by initiation rates. Quit and relapse rates are affected not only by the price and availability of heroin, but also by the availability of drug treatment. (See "Drug Treatment and Its Effects." below.) Treatment availability and enforcement pressure may be complementary; enforcement pressure boosts demand for treatment and makes backsliding more difficult, while the availability of treatment may increase the effective price-elasticity of demand for heroin, thus boosting the impact of any given enforcement activity on the quantity of heroin consumed.

The infection risk that any given heroin user faces depends largely on his or her needle-sharing and sterilization practices (and on the HIV infection rate among local heroin

19. Johnston, Lloyd D., Patrick M. O'Malley, and Jerald G. Bachman, National Trends in Drug Use and Related Factors Among American High School Students and Young Adults, 1975-1986, Rockville, MD: National Institute on Drug Abuse, 1987, p. 144.

20. Johnston et al., p. 27.

21. The tendency of chronic, heavy cocaine users, particularly crack users, to use heroin as well is another reason to worry, since the cocaine-abusing population has clearly been growing over the past five years.

users). These factors too have substantial components of custom and habit which vary greatly from one city to another, but are likely to be somewhat malleable to public interventions. (See "Determinants of Needle Sharing and Ways to Reduce It." below.)

A Simple Transmission Model

We can develop a simple model of HIV transmission within any group of heroin users by focusing on three factors:

- o **Contact-specific risk (p)**, the probability of infection for an uninfected person sharing a needle on one occasion with one infected person;
- o **Contact frequency (n)**, the number of risky contacts; and
- o **Partner-population seroprevalance (s_{pos})**, the rate of infection among the population with whom an individual has risky contact.

Contact-specific risk, the first factor, probably varies across individuals: some persons may be more likely than average to infect others or more susceptible than average to infection. But for any single well-defined contact such as needle sharing, we can imagine there being a central tendency, p . For heroin users, the effective contact frequency, the second factor, depends on the frequency of injection and the number of people who have used the same needle since the last time it was effectively sterilized.

To see how the model works, assume for the moment that an uninfected individual is sharing needles with infected individuals, and that the probability of infection for any one contact is independent of the probability of infection for any other. Thus we have:

p = the probability of infection after one contact;

$(1-p)$ = the probability of remaining uninfected after one contact;

$(1-p)^n$ = the probability of remaining uninfected after n contacts; and

$[1-(1-p)^n]$ = the probability of being infected after n contacts.

The last of these probabilities, the probability of being infected after n contacts, rises toward 1 (certainty) as n increases, provided that p is greater than zero. The larger p is, the faster the probability of being infected after n contacts rises.

Now, instead of assuming that all partners are infected, assume that partners are randomly drawn from a pool with a particular seroprevalence. This can happen in either of two polar ways, or in an unlimited number of intermediate patterns. In the polar cases, either a single partner is selected and the entire series of contacts, in this case needle-sharing, is performed only with that partner ("fidelity") or, alternatively, a new partner is drawn on each occasion ("partner switching"). Fidelity is much safer regardless of the prevalence of infection among potential partners, but particularly if it is relatively low. The probability that the chosen partner is infected puts an upper limit on the probability of transmission, no matter how frequent the risky contacts. The probability of infection after n contacts is: $p \cdot s_{pos} \cdot [1 - (1-p)^n]$, which rises toward the fraction s_{pos} as n increases. If only 20 percent of potential partners are infected, a person choosing only one of them runs no more than a 20 percent chance of infection, no matter how risky or frequent the contacts.

If, instead, the person chooses a new partner each time, the cumulative risks are higher. Instead of putting an upper limit on the cumulative transmission probability, the fact that prevalence is less than unity simply reduces the risk of any single contact. As the number of contacts increases, so does the risk of infection, rising toward certainty. Algebraically:

$p \cdot s_{pos}$ = the probability of infection after one contact;

$(1 - p \cdot s_{pos})$ = the probability of remaining uninfected after one contact;

$(1 - p \cdot s_{pos})^n$ = the probability of remaining uninfected after n contacts; and

$1 - (1 - p \cdot s_{pos})^n$ = the probability of being infected after n contacts.

As the prevalence of HIV in the population rises over time, mutual fidelity causes partner seroprevalence to rise more slowly. Thus the number of partners, independent of number of contacts, helps determine the probability of infection. Therefore, heroin users who patronize "shooting galleries," which are centers of needle-sharing among large and shifting groups, run greater infection risks than those who use heroin with equal frequency in settings less conducive to sharing.

This simple model abstracts from differences among individuals that may affect the probability of infection from a single contact, and from the possibility that per-contact risk varies with the number of contacts. It highlights the three factors crucial to controlling the probability that any heroin user will become infected with HIV: specific risk, contact frequency, and partner seroprevalence. It reminds us that any policy intervention to reduce HIV transmission risk has to work on one or more of these factors and that policymakers must worry about increasing one while decreasing another.

Before we turn to a discussion of policy options, we should note two other phenomena that are relevant in any assessment of policies to alter risk:

- o **Risk compensation**, which takes place when individuals respond to a reduction in the risk of some activity by increasing its frequency, thus offsetting the benefits of risk reduction;²² and
- o **Side effects**, which occur because individuals may respond to reductions in risk in ways that incur, or impose, forms of harm other than the one for which the risk was reduced.

These phenomena are related but distinct, as the example of condom distribution illustrates. Consider a population of persons who fear sexual infection with HIV. This fear will, other things being equal, tend to reduce their sexual activity, but not to zero. The remaining activity will still result in some number of transmissions.

Now introduce condoms, which reduce transmission risk per act (but, again, not to zero). If the level of of sexual activity remained unchanged but condoms were used, the result would be lower risk per act, an equal number of acts, and therefore fewer transmissions. But persons aware of the reduction in per-act risk that condoms create might choose to increase their sexual activity. This kind of behavior is called risk compensation:

22. Philip Cook originally brought the literature on this topic to our attention. Most of this literature pertains to accident prevention and crime. See, e.g., Orr, L., "Incentives and Efficiency in Automobile Safety Regulation" Quarterly Journal of Economics and Business 11 No. 3, Autumn 1982; Cook, P., "Criminal Incapacitation Effects Considered in an Adaptive Choice Framework," in The Reasoning Criminal, D. Cornish and R. Clarke, eds. (New York: Springer-Verlag, 1986); Cook, P., "The Supply and Demand For Criminal Opportunity," in Crime and Justice: An Annual Review of Research, Michael Tonry and Norval Morris, eds. (Chicago: University of Chicago Press, 1986).

If condoms, while reducing per-act risk, increase the number of acts, the use of condoms will be a somewhat less effective AIDS-prevention technique than a simple comparison of infection risk with and without condoms could lead one to hope.²³

Unwanted side effects pose a different problem. Someone who viewed sexual activity (in a particular context) as bad in itself might object to condom distribution (e.g., in schools or prisons) simply because of its likely effect on the rate of sexual activity, independent of its effects on HIV transmission. But that objection would be very different from the objection based on risk compensation.

Policy debates often confuse risk compensation and side effects, or treat one as the other. In order to evaluate the effects of various proposed interventions, and to understand the trade-offs such interventions entail, we need to keep the distinction clear. Debating whether an intervention will or will not reduce HIV transmission, and by how much, is a separate argument from the one over whether we are willing to pay the price in unwanted side effects for whatever reduction occurs.

We will next look more specifically at ways to reduce the transmission of HIV within a heroin-using population of any given size. In a later section we will consider measures to reduce the size of the heroin-using population.

Determinants of Needle Sharing and Ways to Reduce It

Were it not for needle sharing, heroin users would be at no more risk of AIDS than anyone else. Any serious attempt to break the link between heroin use and AIDS must include identification of the reasons for needle sharing and development of policies to reduce it.

23. Where the risk reduction is relatively small or the effect on behavior very large (unlikely in the case of condoms), risk compensation can actually increase the number of unwanted events.

Explanations for Sharing

Heroin users have a long history of sharing needles, and sharing serves a number of symbolic functions in the relations among users, regardless of its practical consequences. Sharing needles is an important part of the initiation ritual for many users.²⁴ Users share needles with one another to display trust and friendship.²⁵ Policy interventions devised to reduce needle sharing, whether through education or through changes in the legal status or availability of needles, must take these symbolic reasons for the behavior into account.

Heroin users also have strictly practical reasons for sharing needles. Primary among these are restrictions on the availability of needles and syringes and the risk of arrest and punishment for their possession. In the United States, the purchase of needles requires a prescription in 11 states (California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania and Rhode Island) and the District of Columbia.²⁶ Possession of injection equipment without a prescription is typically a misdemeanor.

The states that have outlawed possession of drug injection equipment contain the majority of heroin users in the U.S. In these states, users must either fashion their own injection equipment (using such unlikely materials as eye droppers), purchase it in an illegal market, or use someone else's needle. Needles are often scarce, frequently expensive (in New York, reportedly several dollars apiece), and of uncertain provenance. For those inclined to illicit enterprise, selling needles--with their low ratio of value to bulk--competes poorly with selling heroin. This may explain why there is not more organized leakage of

24. Des Jarlais, Friedman, and Strug, op. cit.

25. Feldman, H.W. and P. Biernacki. "The Ethnography of Needle Sharing among Intravenous Drug Users and Implications for Public Policies and Intervention Strategies." Presented at the Technical Review Meeting on "Needle Sharing Among Intravenous Drug Abusers: National and International Perspectives." Bethesda, MD., May 18-19, 1987. Cited in Burack and Schuster, op. cit., p. 6.

26. 1987-1988 Survey of Pharmacy Law (Chicago: National Association of Boards of Pharmacy, 1987).

"works" (the street term for a user's needle and other drug paraphenalia) from the states where they are legal into states that prohibit them.

Even in states where needles are legal they may not be available to heroin users through commercial channels. Many store owners and pharmacists prefer not to serve "junkies" for fear of attracting an unsavory clientele with a propensity to shoplift. Police sometimes pressure pharmacists not to sell needles to heroin users.

Heroin users also value convenience. Many live from day to day, the same way they purchase their supply of heroin. Sharing needles, either with friends or in shooting galleries maintained by drug dealers, reduces the amount of time they have to spend searching for them, and eliminates the need to buy them. Unless needles are readily available in the neighborhoods heroin users frequent, users will continue to buy them from their dealers, to share them, or both. Substantial anecdotal evidence shows that even users knowledgeable about the risk of HIV infection will share needles if there is no other way to get their fix.²⁷

How important is the legal status of needles in determining the frequency of needle sharing? Because needles are restricted items in most of the states with large heroin-using populations (Michigan, Ohio, Texas, Florida, Maryland, Georgia and Louisiana are the major exceptions), it is difficult to evaluate the separate effects of culture and legal regime on needle sharing in the U.S. However, a close correlation between the legal status of needles and the prevalence of HIV is not readily apparent. Cities with high rates of HIV infection among heroin users, such as New York City and Baltimore, may be found both in states where needles are restricted (New York) and in states where needles are unrestricted (Maryland). The same is true of cities with low rates of HIV infection, such as Oakland, California and Portland, Oregon.

Nor does the European experience support the view that legal needles lead to low rates of HIV infection. Northern Italy, for example, has very high rates of HIV infection

27. See, for example, Flynn, Sean. "The Needle Dealer: Guerilla War Against AIDS." The Boston Phoenix, June 3-9, 1988. p. 1.

among heroin users (50 to 70 percent in 1987) despite the fact that needles are legally and widely available, even being sold in supermarkets.^{28,29} In Amsterdam, where heroin use is legal, the infection prevalence is roughly 30 percent.³⁰ Needle exchange programs, which make sterile needles legally available, have been tried in seven countries and, by themselves, have had no observable effect on the AIDS epidemic.³¹

One important example runs counter to this, however, and may demonstrate that untimely changes in needle policy can hasten the spread of disease. In Edinburgh in the early 1980s, a legal retailer of needles was closed and local pharmacists began to enforce an unofficial ban on the selling of needles to drug users. This apparently led to a sharp increase in sharing and may have contributed to the drastic increase in the prevalence of HIV infection, which went from near zero to 51 percent in just two years.³²

Effects of Law and Policy on Needle Availability

If the sharing of needles leads to HIV infection, and if users share needles because they are scarce or illegal, legalizing needles and making them readily available will stop the spread of HIV among drug injectors; so goes the argument for the various needle

28. Des Jarlais and Friedman, "HIV infection among intravenous drug users: Epidemiology and risk reduction," AIDS 1987 No. 1, p. 69.

Ancelle R. and E. Buning, "Incidence and problems of AIDS and HIV infections in European Community countries." Presented at Workshop on Epidemiological Surveys on AIDS: Epidemiology of HIV Infections in Europe Spread Among Intravenous Drug Users and the Heterosexual Population; Berlin, 1986. Quoted in Des Jarlais and Friedman (N.I.D.A. 1987). op. cit., p. 7.

29. Des Jarlais and Friedman (N.I.D.A. 1987), op. cit., p. 69.

30. Buning, E.C., A.D. Verster, and C. Hartgers, "Amsterdam's policy on AIDS and drugs." December 1987. Cited in Burack and Schuster, op. cit., p. 51.

31. Burack and Schuster, op. cit., p. 52.

32. Robertson, J.R., A.B.V. Bucknall, P.D. Welsby, J.J.K. Roberts, J.M. Inglis, J.F. Peutherer, R.P. Brettell. "Epidemic of AIDS related virus-(HTLV-III/LAV) infection among intravenous drug abusers." British Medical Journal, Volume 292.22 February 1986, p. 527.

distribution, legalization, and exchange programs that have been proposed in this country and implemented in a number of others. Though this chain of reasoning is far from perfect --notably in its assumptions that users share needles primarily because they are illegal and that making needles readily available will therefore drastically decrease sharing--it does have a powerful, simple logic. However, the actual effects of distribution and exchange programs, both existing and proposed, are more complex. Such programs have the potential to produce both risk compensating behavior and unwanted side effects.

Legalization and Distribution of Needles. If the illegality of needles were the problem, legalizing them would appear to be the solution. But as we have noted, legality by itself does not seem to be strongly correlated with needle sharing. Simply legalizing needles would not solve many problems of availability. Nor would it address the cultural values heroin users ascribe to sharing or the users' frequent need for immediate access to injection equipment, both powerful factors behind needle sharing.

The disadvantage of legalization would be any increase in intravenous drug use that might result. To whatever extent heroin users have restricted their use because of the cost or difficulty of obtaining injection equipment or their fear of sharing, their injection frequency might increase. To the extent that potential heroin users have stayed away from the drug due to fear of AIDS, they might now take it up, reassured by the availability of needles. Even if the unavailability of needles deters few potential heroin users, there are millions of users of other drugs--amphetamines, tranquilizers, and cocaine--who might inject them if injection equipment were handy. Injection tends to be a more powerful and less expensive mode of drug abuse than snorting or swallowing. Users "converted" from oral to intravenous drug use would face both more serious risks of overdoses and other routine risks of illicit drug use and, if they shared needles, some risk of HIV infection. While the effect of needle legalization on needle use has never been measured, it would be rash to assume that it is zero. Since one frequent effect of heavy drug use is impaired judgment and loss of

self-control, it may be easier for a nonuser to stay away from injection altogether than for a drug injector to avoid sharing or remember to sterilize his "works" every time he shoots up.

One step beyond legalizing needles would be to distribute them freely to heroin users. This is the approach used in Amsterdam, where outreach workers in vans distribute needles, methadone, and advice to the city's heroin users. Such a program certainly would address the problems of scarcity and availability, and mobile versions of it could deal even with heroin users' short planning horizons. When coupled with education, as in Amsterdam, a distribution program also could counter cultural imperatives to share needles and lead generally to safer behavior by users (the percentage of Amsterdam's users who share needles reportedly dropped from 70 percent to 20 percent³³). Opponents of such plans, including ex-addicts, have expressed fears that needle distribution (or even exchange) would send an undesirable "mixed message" about social attitudes toward heroin use. Their concerns may be valid, but there is no evidence that residents of states where needles are now legally available are more tolerant of heroin use.

Needle exchange. Needle exchange programs have proven so far to have greater political acceptability in this country (at least in some cities) than simple needle distribution. New York City has recently received state dispensation to pilot test an exchange program, and the Boston City Council approved a mayoral request to petition the Massachusetts legislature for permission to operate a similar program (the legislature refused).³⁴ Needle exchange differs from distribution in that users can receive new needles only if they turn in an equal number of old ones. The advantage of needle exchange programs is that they escape some of the perceived problems of encouraging drug use and many of the potential side effects of a large-scale increase in the supply of needles.

33. Buning, Verster and Hartgers, op. cit.

34. Burack and Schuster, op. cit., is a report prepared for one Boston City Councillor in support of a needle exchange and education program and describes the program, the legal apparatus surrounding it and some of the political strategy used by its supporters.

The disadvantage of needle exchange is that if users share because needles are scarce, an exchange program by itself will have little effect on their sharing, since it will not increase the supply of needles (except as new-for-old exchanges increases the supply of sharp needles).³⁵ The key to the program proposed for Boston is a heavy focus on education and outreach along with the distribution of needles. Other programs test needles as they are returned; evidence of sharing (e.g., multiple blood types) is grounds for removing a user from the program. To the extent that exchange programs bring users in contact with education about HIV risks and with resources for treatment and health care, they seem likely to contribute to the fight against AIDS. By themselves, they do not offer either much benefit or much risk. As with needle distribution, viewing needle programs as independent initiatives is a mistake: needle programs of all types are best thought of as incentives for participation in AIDS education programs.

Reducing Needle Supply

If increasing the supply of needles has risks, what about reducing it? This might be done by requiring more rigorous inventory control policies from pharmacies and hospital supply rooms, from which "works" are sometimes diverted into the black market. If syringes carried factory batch numbers, those confiscated on the street could be traced back to the point of diversion. Alternatively, legitimate injection equipment could be redesigned to make reuse technically impossible, thus shutting off supply at the source.³⁶

The resulting scarcity of "works" might discourage the initiation of some potential heroin users, drive existing users into treatment or unsupervised abstinence, and help prevent non-intravenous users of illicit drugs from changing their mode of administration.

35. This point was made by David Kanouse at a Rand Corporation Seminar. Needles get progressively duller and more painful with use, so an addict with an old needle has an incentive to share someone else's newer one.

36. See David R. Zimmerman, "The Engineer's Role in Halting AIDS," Technology Review, October 1988, p. 22.

But remaining users, confronted with growing needle scarcity, would tend to increase needle-sharing. The Edinburgh experience is anything but reassuring on this point. Perhaps attempts to reduce black market supplies of "works," combined with exchange programs, would yield a combination of benefits. However, actually mounting such a combined operation--involving enforcement, regulatory and treatment agencies--would pose a daunting managerial problem.

Needle Sterilization and Bleach Distribution

Changing needle supply is not the only way to change the frequency of behavior that risks transmitting HIV. The virus is quite fragile, and can be killed by heat or by a wide variety of chemicals, including household bleach. Users who share needles can prevent HIV transmission by sterilizing the "works" after each person uses them.

Providing bleach and teaching users how to sterilize their "works" is thus an alternative to needle distribution and exchange programs. Since it avoids actually handing out the equipment needed to commit an illegal act, bleach distribution seems to attract far less political opposition than do needle distribution or exchange programs.

In San Francisco, bleach is distributed in pocket-sized containers with rubber tops. Heroin users are taught to sterilize their equipment by inserting the needle through the rubber top and pumping the bleach into and out of the syringe a few times, and then rinsing with water. The whole process takes a matter of seconds; this should minimize the importance of users' impatience to shoot up.

Needle distribution does no good unless users remember not to share; bleach distribution does no good unless users remember to use the bleach. Sporadic compliance does little good. But for a user who remembers what he is doing, the use of bleach is every bit as good as a new needle. The question is whether bleach distribution is as potent as needle distribution or exchange in creating and maintaining effective needle-hygiene habits.

Effects of Police Activity on Needle Sharing

The police sometimes make arrests for possession of needles and other drug paraphernalia, and may confiscate or destroy needles (the latter is sometimes done, without legal authority, even where needles are not restricted items). Although the intent is to reduce heroin use, and although such arrests and confiscations make the life of a heroin user marginally harder and less attractive, there is no evidence that heroin use is markedly reduced as a result. At the same time, these activities do have the unfortunate side effect of discouraging users from maintaining their own "works," thus encouraging needle-sharing.

Confiscating "works" or arresting heroin users for their possession also tends to encourage users to patronize "shooting galleries" where they may borrow or rent injection equipment. Galleries are places of indiscriminate risky contact, where many persons--and not the same group each time--share a single needle, and where professional injectors, or "hit men," inject a succession of customers using the same works.³⁷ Shooting galleries stand to the needle-related spread of HIV as the bathhouses stood to its spread among homosexual men, yet shooting galleries flourish in some cities without any serious police attempt to suppress them.

This analysis suggests two changes in the current policies of many police departments to help slow HIV transmission: first, a de-emphasis on arrests for needle possession; second, increased enforcement efforts against the operators and customers of shooting galleries (and closing the galleries themselves). A reduced risk of arrest for needle possession--even without a change in law or a public announcement of a new policy--would make it easier for users to maintain their own "works." Increased police attention to shooting galleries would discourage promiscuous needle-sharing. Both changes would tend to reduce HIV transmission.

37. For description of shooting-gallery rituals, see Des Jarlais, D.C., S.R. Friedman and D. Strug, "AIDS Among Intravenous Drug Users: a Sociocultural Perspective," in The Social Dimensions of AIDS: Methods and Theory, D. Feldman and T. Johnson, eds. (New York: Praeger, 1986).

An informal survey conducted for this study indicates, however, that police departments have made few changes in their enforcement policies as a result of the AIDS epidemic.³⁸ Many of the departments surveyed have spent considerable energy in educating officers about self-protection, particularly from needle "sticks," but none has seen the threat of AIDS as requiring new approaches to either "works" or shooting galleries. When asked if they had changed policies to reflect the threat of AIDS, five departments responded immediately by discussing efforts to protect officers. Police still commonly confiscate injection equipment regardless of its legal status; one officer cited an off-the-record policy of "getting needles off the streets" in an effort to fight AIDS. Raids on shooting galleries were rarely or never conducted in the surveyed cities.

Continued arrests for, and confiscations of, "works" stem either from a failure to analyze the likely impact of such activity on HIV transmission or an analysis that reached a conclusion different from ours. The failure to take shooting galleries seriously as an enforcement target seems to have deeper roots.

Before the AIDS outbreak, shooting galleries might have seemed relatively benign as places for heroin users to shoot up and nod off, particularly if the alternatives were street corners, parks and doorways. The galleries protected users from exposure and criminal victimization, while sparing neighbors and passers-by from unpleasant reminders of the extent of the local heroin problem. Those arguments are still valid; we think, however, that the AIDS problem is easily important enough to outweigh them.

But police departments do not, by and large, consider the protection of public health among their high-priority assignments, particularly not the health of persons who are frequent lawbreakers. "You don't understand," said one ranking officer in a big-city

38. Survey conducted in May and June of 1988 by Gary Negbaur of BOTEK Analysis Corp., Cambridge, MA., of police officials in New York, Atlanta, Houston, Miami, Chicago, San Francisco, Los Angeles and Seattle (henceforth "Negbaur survey").

narcotics bureau in explaining why shooting galleries were not a target of his department. "As far as most cops are concerned, the faster all the junkies die, the better."³⁹

User Knowledge and the Effects of Outreach and Education

Heroin users' knowledge about the risks of needle-sharing, and the ways they respond to that knowledge, ultimately will determine the course of the epidemic among them. Some direct and indirect evidence indicates that many users do know about the risk of HIV infection and are taking at least some steps to protect themselves, including using safer injection practices.⁴⁰ One study of heroin addicts entering treatment in New Jersey, for example, found that half gave fear of HIV infection as one reason for entering treatment.⁴¹ Even early in the AIDS epidemic, studies in New York found that the market for clean needles had grown dramatically with the threat of HIV infection, though the usefulness of this trade in reducing HIV transmission was reduced by the fact that used needles were sometimes repackaged and sold as new by street vendors.⁴²

There is also some evidence that AIDS education for intravenous drug users can improve needle practices. After a substantial education effort in San Francisco, for example, which included the distribution of bleach, the proportion of users reporting the use of bleach for needle sterilization increased from 3 percent to 76 percent and at least some samples showed slower rates of increase in infection than before the program.⁴³ Also,

39. Interview conducted by Mark Kleiman, September 1986.

40. Friedman, S.R., D.C. Des Jarlais and J.L. Sothoran. "AIDS health education for intravenous drug users." Health Education Quarterly (Winter 1986), p. 384.

41. Jackson, J.. "Developing a community approach." Presented at "AIDS in the Drug Abuse Community and Heterosexual Transmission," Newark, 1986, quoted in Des Jarlais and Friedman (Aids 1987), op. cit., p. 67.

42. Des Jarlais, D.C., Hopkins S.. "Free needles for intravenous drug users at risk for AIDS; current developments in New York City." Correspondence, New England Journal of Medicine 313:23, 1985.

43. Watters, J.K., D.M. Iura, K.W. Iura. "1986 Prevention and Education Services to Intravenous Drug Users Through The Midcity Consortium to Combat AIDS: (Footnote 43 Continued on Next Page

medical reports from San Francisco show a drastic reduction in emergency room admissions for heroin-related problems, which may reflect an overall decline in heroin use.⁴⁴ While San Francisco may be a special case because of the heightened awareness of AIDS in all sectors of the city, the proportion of users in Amsterdam who reported sharing needles also fell sharply--from 70 percent to 20 percent--after a two-year needle exchange and education program.⁴⁵

The success of these and other programs shows that heroin users are potentially very interested in learning more about the risks they run and suggests the enormous potential that education programs might have for HIV control. Amsterdam's needle distribution succeeds at least in part because of users' fear of AIDS and the ongoing education the program offers about avoiding the disease. San Francisco's successful bleach distribution program is entirely educational. One New Jersey program, which offers heroin users coupons good for immediate admission to treatment, has even managed to convince a substantial portion of the users it reaches to enter treatment, including users who had never been in treatment previously.⁴⁶

In general, the most successful programs so far seem to have achieved their success by using ex-heroin users to communicate their message.⁴⁷ Other important characteristics of successful outreach programs include the ability actually to reach out, to find users in their

(Footnote 43 Continued from Previous Page)

Administrative Report on the First Six Months." Quoted in Freidman S.R., D.C. Des Jarlais, D.S. Goldsmith, "An overview of current AIDS prevention efforts aimed at intravenous drug users," Journal of Policy Issues (forthcoming).

44. NIDA Division of Epidemiology and Statistical Analysis, E.S. Department of Health and Human Services. Community Epidemiology Work Group Proceedings, December 1987: Epidemiology of Drug Abuse and Issues Among Native American Populations.

45. Buning, Verster and Hartgers, op.cit.

46. Des Jarlais, Friedman, Goldsmith, op. cit.

47. Jackson, J.F., S. Neshin, "New Jersey Community Health Educator Project: Impact of Using Ex-Addict Educators to Disseminate Information on AIDS to Intravenous Drug Users." International Conference on Acquired Immunodeficiency Syndrome. Paris, June 23-25, 1986.

natural surroundings and deal with them there, and the offering of some incentive to listen, whether it is clean needles, coupons for treatment, or vials of bleach.

One potentially significant opportunity for outreach is now largely neglected. A recent study shows that in some places up to 51 percent of females and 38 percent of males arrested by police report having used one or more drugs intravenously.⁴⁸ Many of these people return to the street after a relatively short time. Once out of confinement, they may contribute to the spread of AIDS through needle sharing and risky consensual or commercial sex.⁴⁹ The period of confinement could be used to disseminate information about the danger of AIDS, the value of good needle hygiene practices, and the availability of drug treatment, and possibly to distribute vials of bleach.

As venues for educational efforts, jails and lockups have both advantages and disadvantages. Arrestees may not be in a friendly state of mind toward public authorities (though how closely outreach workers would be identified with the arresting authority is open to question).⁵⁰ On the other hand, they represent literally a captive audience and have just been reminded of one of the disadvantages of the heroin lifestyle. Educational materials for use in such setting could stress AIDS as a reason to quit, while accepting the reality that not all of those arrested will quit and thus giving explicit advice about needle hygiene.

48. Wish, Eric D., Joyce O'Neil, and Virginia Baldau, "Lost Opportunity to Combat AIDS: Drug Abusers in the Criminal Justice System." presented at the National Institute on Drug Abuse Technical Review session on Aids and Intravenous Drug Use. July 1, 1988. p. 6. The numbers cited are based on interviews conducted in San Diego, which had the highest reported rate of intravenous drug use among arrestees in the five cities surveyed.

49. The percentage of injectors who currently share needles varied from a low of 5 percent among males in New York (believed by the researchers to be underreporting) to a high of 50 percent among females in Los Angeles. 22 percent of females had been arrested for sex offenses, presumably prostitution. Ibid., Table 7, Table 2.

50. Given that Wish et al. were able to obtain interviews from over 90 percent of the arrestees they approached, the possibility of successful outreach in this context is at least realistic.

Outreach programs deserve further study and a more refined understanding of their success. Such study should include needle exchange and distribution programs, programs that offer treatment, and those that teach sterilization and distribute bleach, all in the service of education. The costs of outreach, in dollars and unwanted side-effects, are very low.⁵¹

Law Enforcement and Its Effects

The number of new HIV infections among heroin users depends not only on needle-sharing activities and needle hygiene practices, but also on the number of heroin users. The number of users depends in turn on initiation, quit, and relapse rates, all of which respond to changes in the conditions of heroin availability. Since heroin availability can be manipulated by enforcement of the laws against selling and possessing heroin, drug law enforcement is a potential tool for controlling the AIDS epidemic. Using that tool skillfully depends on understanding how law enforcement influences heroin market conditions and how those conditions affect the size of the heroin-using population.

The Two Prices of Heroin: Dollars and Search Time

If we hold other things constant, the demand for virtually any good or service tends to decrease as its price increases: other things being equal, consumers demand less of a good the more expensive it is. In this respect drugs, including heroin, resemble most other goods. In another important respect, however, heroin and other illicit drugs differ from other goods: the non-money "transaction costs" of making a purchase are substantial compared with the money costs and vary enormously from place to place and from buyer to buyer. These transaction costs take many forms, including the time spent searching for a seller (either a seller with whom the buyer has established a connection or one bold enough

51. Burack and Schuster, *op.cit.*, p. A2. For a program involving twenty-four street outreach workers and two mobile outreach vans, they estimate a cost of approximately \$1,000,000 per year.

to sell to a stranger who may be an agent of the police); the risk of being sold a heroin mixture that is too dilute, too potent, or adulterated with some poison; the risk of being robbed or assaulted; the risk of arrest; and so on.

All of these transaction costs are likely to be higher for new users than for experienced ones, and higher for those who live far from "heroin corners" than for those whose neighborhoods are filled with heroin buyers and sellers. For many purposes it is convenient conceptually to combine all of these non-money transaction costs of heroin purchase as a single measure of the difficulty of "scoring." That measure is sometimes referred to as "search time."⁵²

In general, higher search times will tend to reduce consumption just as higher dollar prices do. From the perspective of the buyer, search time acts as a second "price" that must be paid for heroin. From the perspective of the seller, however, search time and money price are very different. An increase in money price yields increased revenues from each sale, even as it reduces the number of sales, but an increase in user search time reduces the dealer's sales without any offsetting increase in unit revenue. This insight can help shape enforcement strategy. The two "prices" of heroin give the police two different approaches to affect heroin consumption.

Determinants and Effects of Dollar Price. As with other goods, increasing the price of heroin should result in a decrease in use. Enforcement aimed at drug importers and wholesalers raises the money price of drugs.⁵³ By imposing risks on importers and distributors, enforcement efforts increase the amount of compensation that drug dealers will require to enter the market. Though other factors, such as the oligopoly power of large dealing organizations, may contribute to the price of heroin, the drug's illegality and enforcement against its distributors account for much of its high price.

52. Moore, Mark H., "Policies to Achieve Discrimination in the Effective Price of Heroin." American Economic Review, Vol. 63 No. 2, May 1973.

53. Reuter, Peter, and M.A.R. Kleiman. "Risks and Prices: An Economic Analysis of Drug Abuse." in Tonry and Morris, op. cit.

Increases in the price of heroin will decrease current users' consumption to some extent, even if only modestly. From the perspective of disease control, decreased consumption reduces the number of risky contacts (n in our risk equation) and thus reduces risk. Price increases also may appear as decreases in purity at the original price, with a negative effect on consumer satisfaction and a decrease in the probability that a person who tries heroin once will go on to heavy, chronic use. (Offsetting this, some addicted users may respond to lower purity with increased injection frequency.) If increases in the price of heroin drive up the quit rate, and if those who quit have a higher-than-average prevalence of HIV infection, the remaining users also will be better off, as they face a lower infection prevalence among those with whom they share. (More complex effects on infection prevalence also could occur; see "Treatment and Seroprevalence" below.)

Price increases also may lower the initiation and relapse rates, with important consequences for disease control. New users are the least likely to have their own "works" and the least likely to be already infected. This puts them at great risk for becoming infected. Any intervention that reduces the initiation rate significantly will have a major beneficial impact on overall HIV infection rates. The same is true with the relapse rate, for the converse reason. If users who quit have a longer-than-average history of use and are more likely than the average user to be infected, discouraging their return to heroin use can help protect those who continue to use, just as encouraging their quitting did.

Questions have been raised about the possibility and desirability of substantially increasing the money price of heroin. The benefits of money price increases brought about by tightened enforcement--benefits in the form of reduced consumption--will be offset at least partially by further impoverishment and a possible increase in criminal activity among the remaining (smaller) population of heroin users.⁵⁴ However, limiting price decreases is valuable, because it will help to avoid a wave of new heroin initiations.⁵⁵

54. Moore, Mark H., "Limiting Supplies of Drugs to Illicit Markets." Journal of Drug Issues, Spring 1979. Kleiman, M.A.R., "Liberalism and Vice Control." Journal of Policy Analysis and Management, Vol. 6, No. 2 (1987), p. 245.

Brown, George F. and Lester P. Silverman, "The Retail Price of Heroin: Estimation and Applications." Journal of the American Statistical Association, September 1974.

Determinants and Effects of Search Time. Heroin users rarely buy a large supply of the drug at one time, both because they cannot afford to and because they lack the self-control to carry supplies from day to day without consuming them. This means daily purchases, and a daily search for a seller. The symptoms of heroin withdrawal make delay, let alone failure, in finding a source very unpleasant for chemically-dependent users.

Though the immediate short-run demand of strongly addicted heroin users is not likely to change much in response to search time (except involuntarily, as extended search time becomes search failure), in the longer run users will react to increases in search time as to increases in money price, that is, by reducing the quantities they demand. This reduction is likely to take the form of an increased probability of quitting and a reduction in the probability of relapse. More importantly, difficulty in buying will tend to discourage new users, reducing the initiation rate.⁵⁶

While the money price of heroin responds to high-level enforcement efforts against drug trafficking networks, search time is sensitive to enforcement directed at retail (street-level) transactions. Higher money prices will sustain or replace dealer networks in the face of increased enforcement pressure; lengthened search times, by contrast, inconvenience the buyer without providing income to the seller, who may face both increased risks of arrest and slower sales as he tries to remain inconspicuous and to avoid selling to law enforcement agents. If the dealer raises money prices as enforcement pressure grows, he risks driving away hard-to-replace established customers. This reasoning leads to an important conclusion for drug enforcement policy: Enforcement at the retail level may be able to achieve the same, or greater, drug abuse reduction benefits than enforcement at the

55. The price of heroin has been on a downward trend over the past decade. The price rose sharply in the early 1970s in response to the ban on poppy cultivation in Turkey and the disruption of the Marseilles-New York "French connection." Since then it has fluctuated between \$2.00 and \$2.50 per pure milligram, which means it has fallen steadily in constant-dollar terms. Recently, purity-adjusted prices have fallen substantially due to very large increases in retail purities. "Black tar" Mexican heroin in the West and Asian-origin heroin in New York have both been reported with retail purities over 50 percent; retail purities above 10 percent were virtually unknown as recently as 1983.

wholesale level, with significantly lower costs for government, users, and the already embattled communities that must live with user crime.

There is some empirical evidence that concentrated crackdowns on retail-level heroin dealing can break up street markets and drive users into treatment. To be effective, retail crackdowns require a sustained effort (intermittent "sweeps" have little impact), a substantial investment at the beginning, and sufficient court, jail and (ideally) treatment resources to follow through on the arrests made. But the high cost of AIDS--in human suffering, lives lost, and public funds expended--justifies even very large investments in retail drug enforcement. After the market has been broken up, a smaller effort may then suffice to keep it under control, as enforcement resources are spread over fewer dealers and users.⁵⁷

What If Heroin Were Legal?

There has been a recent flurry of public discussion about the legalization of currently illicit drugs.⁵⁸ Though the idea has drawn only derision from lawmakers, we may still ask the question. "What if heroin were legal? Would its use disappear as a factor in HIV transmission?" The legalization of heroin would certainly have major repercussions for its use.⁵⁹ Were heroin legal, its price would drop, needles would be freely and legally available (perhaps in combination with heroin in one-shot disposable packages), and users would not need to fear harassment by police. If legal one-shot disposable syringes already loaded with heroin successfully displaced illegal heroin, or if heroin were legally sold in

56. Moore. "Policies" op. cit. This paper also points out that when increased search time is the result of enforcement pressure, new users will face particular difficulty in buying.

57. Kleiman, M.A.R., "Crackdowns: The Effects of Intensive Enforcement on Retail Heroin Dealing," February 9, 1988. Program in Criminal Justice Policy and Management, John F. Kennedy School of Government, Harvard University. Working Paper #88-01-11.

58. See Nadelmann, Ethan A. "U.S. Drug Policy: A Bad Export." Foreign Policy No. 70. Spring 1988, p. 89; John Kaplan, "Taking Drugs Serious. The Public Interest. No. 92. summer 1988, pp. 32-50; Peter Reuter, "Legalizing Drugs?" Baltimore Sun, May 27, 1988, p. 1N.

smokable form analagous to "crack" cocaine, intravenous drug use might virtually disappear as a mode of HIV transmission.

Legalization would also have unwanted side-effects, however, to set off against its benefits in controlling AIDS. One major side-effect would probably be a substantial increase in heroin consumption. Such effects are difficult to predict quantitatively, as are some of the likely benefits of legalization--a reduction in property crime by heroin users, reduced revenues to organized crime groups, and so forth. Still more complicated are the potential effects of heroin legalization on the legal status of other currently illicit drugs. The decision about heroin legalization thus will--and probably ought to be--made on grounds other than its effects on the AIDS epidemic.

Current Law Enforcement Policies

The spread of HIV among heroin users raises the value of any effort that prevents or limits heroin use. In the process of allocating scarce police resources across a range of competing objectives, this should strengthen the claim that heroin enforcement has on those resources, just as AIDS has developed a powerful claim on public health resources. However, the enforcement of laws against heroin and other intravenous drug use has not received increased attention of late from police departments.⁶⁰ For example, from 1984 to 1987 heroin arrests by the narcotics division of the New York City police department went from 3,104 to 3,385, while those for cocaine in the same period rose from 5,651 to 22,187.⁶¹ This reflects both the spread of crack dealing and the lack of emphasis on AIDS epidemic control as a goal of police departments.

59. Recent studies of alcohol use before, during and after Prohibition suggest that even weakly-enforced drug prohibition can substantially influence consumption. See Aaron, Paul, and David Muston, "Temperance and Prohibition in America." in Alcohol and Public Policy: Behind the Shadow of Prohibition, Mark H. Moore and Dean R. Gerstein, eds., Washington, D.C.: National Academy Press, 1981, pp. 127-181.

60. Negbaur survey of police officials in New York, Atlanta, Houston, Miami, Chicago, San Francisco, Los Angeles and Seattle.

Although the appearance of crack clearly deserves significant police attention, it is still true that heroin, intravenous drug use, and HIV transmission deserve more attention than they receive. Medical records from Los Angeles, Seattle, and Chicago show increasing problems associated with heroin abuse, including substantially increased admissions to emergency rooms and increased demand for treatment resources.⁶² In Miami, 18 to 20 percent of the clients in publicly-supported drug treatment programs list heroin as their primary drug of abuse, yet last year the Dade County police seized less than one ounce of dilute heroin--only about \$5,000 worth.

Interviews with police officials, most of them senior officers in narcotics divisions, indicate that in none of the eight cities surveyed have the police made significant changes in their enforcement policies in response to the AIDS threat.⁶³ The sole exceptions were changes designed to protect officers from infection. Officials from five cities cited an increase in attention to crack as their only significant drug enforcement policy change over the last few years. Every city has its own problems, and some certainly have their hands full fighting both crack and heroin use. Nonetheless, the HIV epidemic deserves more consideration by police officials than it seems to be getting.

Drug Treatment and Its Effects

The most powerful way to stop the spread of HIV among current heroin users would be to get them all to stop injecting heroin and other drugs. Drug treatment increasingly has been the focus of proposed public actions to control the spread of HIV, and many AIDS advocates stress the need to expand drug treatment programs and offer heroin users the assistance they need to quit using. The current slogan is "treatment on demand."

61. Joseph Lisi, Detective Lieutenant in Narcotics Division, New York City Police Department. Personal Communication, August 5, 1987.

62. NIDA Division of Epidemiology and Statistical Analysis, E.S. Department of Health and Human Services, Community Epidemiology Work Group Proceedings, December 1987: Epidemiology of Drug Abuse and Issues Among Native American Populations.

However, analysis suggests a quite complex relationship between treatment and rates of HIV transmission. More need not be better. Modalities differ. Client selection rules matter.

There is considerable debate among practitioners and academics about the relative merits of different forms of drug treatment. Existing modes of drug treatment do not have anywhere near perfect success rates. Nor can "success" in the age of AIDS be defined as merely reducing the frequency of heroin use; something much closer to complete abstinence from the injection of any drug ought to be the goal. Further, the dynamics of infection prevalence can be affected in subtle ways--not all of them beneficial--by changes in treatment policies.

Types of Treatment

Drug treatment comprises four types of programs: detoxification, either in- or out-patient; out-patient drug-free treatment; in-patient drug-free treatment; and, for heroin users, methadone maintenance. "Detox," the first type of program, serves primarily to help users withdraw from physical dependence on drugs. In-patient detox is the most expensive form of drug treatment per day because it involves putting users into a hospital setting where they undergo supervised, chemically-assisted withdrawal. Heroin detox programs usually place users on methadone upon entry, and slowly reduce their dosage over a period of days or weeks. Outpatient detox works essentially the same way, without the hospital environment and consequently with more risk of backsliding.

Outpatient drug-free programs come in a number of forms. Narcotics Anonymous, modelled after Alcoholics Anonymous, costs very little and depends on groups of former users gathering for support. A slightly more resource-intensive type of program brings groups of users together with a professional therapist. Both models depend on frequent meetings, with newly-detoxed users participating every day. The most expensive form of out-patient drug-free therapy, far more common for employed persons with health insurance than for low-income street users in publicly supported programs, consists of sustained

therapy for the user and the user's family, for several hours several times a week for many weeks.

In-patient drug-free programs, or therapeutic communities, place users in a highly restricted and heavily structured residential environment. Though less expensive per day than inpatient detox, therapeutic communities keep clients for many months, making them by far the most expensive programs per client served. All drug-free programs require their patients to withdraw from drugs either in a detox program or on their own.⁶⁴

Methadone maintenance means replacing heroin with another powerful narcotic. Methadone, which provides a fairly smooth detoxification for heroin users, is itself highly addictive. Methadone maintenance can provide an extended withdrawal period for heroin users while they receive other therapeutic services, or it can simply maintain users for long periods of time.

Many of the benefits of methadone programs derive from methadone's legal status rather than from the pharmacological distinction between methadone and heroin. In particular, users can participate for free and thus do not have an expensive drug habit to support. The programs also offer access to other social services. Finally, because programs supply methadone orally rather than intravenously, their clients do not become as "high," or need to dose themselves as often, as street addicts. This allows some of them to maintain regular employment.

In the past, methadone programs have served social control purposes. Many required their clients to abstain from heroin use (or even from use of any illegal drug) and used urine monitoring to verify that abstinence. Repeated "positive" tests, or other forms of misbehavior, could lead to the client's being dropped from the program. Increasing caseloads, and an understandable unwillingness among treatment workers to send a client back to the street in the face of the AIDS threat, have combined to diminish the social-control function of methadone maintenance. Pressure on methadone clients to taper off

63. Negbaur survey.

their doses and become drug-free has also decreased. "Maintenance" has tended to overcome "therapy" in the working life of methadone programs. Rapid expansion of methadone treatment capacity will tend to reinforce these trends.

Measuring the effectiveness of drug treatment programs is quite difficult. However, methadone programs, the most common form of treatment for heroin users, often report that only 15 to 20 percent of their clients will be able to forgo both methadone and heroin for a year.⁶⁵ The number of users in treatment who have been in treatment at least once before testifies to the high relapse rate: in California facilities, 37 percent of patients had been in treatment one to three times before, and 29 percent three or more times.⁶⁶ Some researchers take a particularly dim view of detox programs as a sole treatment.⁶⁷ Another view is that "the lack of outcome difference between . . . treatment modalities provides little guidance for identifying significant dimensions of the treatment process."⁶⁸

Methadone, the most common treatment for heroin use, has no direct effect on the use of other drugs (though counselling or program rules may exert indirect effects). No proven chemical treatment exists for those who use cocaine or other stimulants, and methadone has no value against cocaine use. Indeed, one study estimates that up to 50 percent of heroin users in methadone programs use another drug intravenously during the course of their treatment.⁶⁹ It also seems probable that heroin users who do turn to cocaine use will use the drug intravenously, both because they have acquired the custom of intravenous drug use

64. For the frequency of unsupervised heroin withdrawal, see Kaplan, *op.cit.*, pp. 34-35.

65. Burack and Schuster, p. 48.

66. California Drug Abuse Information and Monitoring Project. [Computer Bulletin Board.] CAL-DADS Treatment Admission Profile, July 1, 1986 - September 30, 1987. Table 9.

67. Platt, Jerome J., Heroin Addiction: Theory, Research and Treatment. 2nd edition (Malabar, Florida: Robert E. Krieger, 1986).

68. Simpson, D. Wayne, "National Treatment System Evaluation Based on the Drug Abuse Reporting Program (DARP) Followup Research." NIDA Research Monograph Series #51: Drug Abuse Treatment Evaluation: Strategies, Process and Prospects. (Rockville: U.S. Dept. of Health and Human Services, NIDA, 1986) pp. 37.

and because injection is by far the cheapest way to take cocaine.⁷⁰ From the perspective of HIV control, this further reduces the benefit that can be expected from methadone maintenance. Given the high rate of backsliding among their clients, methadone programs should provide advice that encourages users to sterilize their needles and avoid needle sharing.

Existing Treatment Capacities and Policies

A commonly-cited problem with respect to AIDS among heroin users is the shortage of treatment capacity for those users who want treatment or are ordered into it by the courts. Only one in seven heroin users in New York, and one in twenty in Boston, is in treatment.^{71 72} One NIDA official estimates that the U.S. has 148,000 slots for intravenous drug treatment, and 1.2 million intravenous drug users in need of treatment. The same official judges that only a minority of this group currently wants to enter treatment. And one study in San Francisco found that 53 percent of users interviewed would not enter treatment if it were available immediately.⁷³ Effective demand will rise, however, if AIDS education programs are successful.

The shortage of treatment slots is complicated in some areas by lack of information. A heroin user applying to a clinic with a waiting list may have no way of knowing that another clinic two miles away has vacancies. When capacity is scarce, a central registry of open slots and a unified waiting list system (administered perhaps by city or state drug

69. Dr. Robert Hubbard, Research Triangle Institute. Personal communication, June 21, 1988.

70. For a discussion of cocaine and cocaine use see M.A.R. Kleiman, "The Changing Face of Cocaine." January 1987. Program in Criminal Justice Policy and Management, John F. Kennedy School of Government, Harvard University. Working Paper #87-01-07.

71. Des Jarlais and Friedman (AIDS 1987). op. cit.

72. Burack and Schuster. op. cit.

treatment authorities) might substantially reduce the proportion of treatment seekers who are forced to wait.⁷⁴

A lack of treatment capacity presents two problems. The first is simply that every user who wants to get into and cannot get in must wait. Those denied admission are likely to continue to use heroin; they either face the risk of infection or pose such a risk to others during the waiting period. The second problem is that heroin users refused treatment on demand may simply return to heroin use and not seek treatment again. Many users seek treatment when their habits become too expensive to maintain, some with the goal of using the detoxification process to reduce their tolerance so they can return to regular use.⁷⁵ If treatment is coupled with successful education efforts, it may reach these users and change their consumption patterns, their needle-sharing behavior, or both. If no treatment is available and these users manage to control their habit on their own, the educational opportunity will be lost.

Another important characteristic of the current treatment environment is that not all users have the same chance of getting treatment. Drug treatment programs will not simply accept all who assert that they have a drug problem. Partly to focus scarce resources on the truly addicted, and partly to reduce the potential for the abuse of methadone programs, many treatment programs require a user to submit evidence of long-term addiction. Federal regulations require that users demonstrate a history of at least one year of drug use before admission to methadone detox programs.⁷⁶ Criteria such as these may, in some circumstances, be inconsistent with the public health goal of maximizing the effectiveness of drug treatment programs in preventing the spread of AIDS.

73. Watters, Iura, and Iura. op. cit.

74. We owe this observation to Michael Smith of the Vera Institute of Justice.

75. Hofmann, F.G., A Handbook on Drug and Alcohol Abuse: The Biomedical Aspects (Second Edition) (New York: Oxford University Press, 1983).

The Effects of Increased Capacity

The availability of treatment to heroin users can affect quit and relapse rates. Treatment selection rules, by selecting either infected or uninfected users, can influence the infection prevalence among the remaining users. Coupled with AIDS education, treatment could also affect the frequency of needle-sharing and of sterilization among the majority of users who return to heroin use after undergoing treatment. The effectiveness of treatment in preventing the spread of heroin-related AIDS will depend on seroprevalence among current users, seroprevalence among those entering treatment, and the extent to which those in treatment begin or continue the intravenous use of drugs other than heroin. Different treatment interventions may influence both the populations reached by treatment and the likelihood that users will return to heroin use or use other drugs intravenously.

Treatment and Seroprevalence. We can assume that drug treatment will benefit all who enter it, even those who later return to drug use. For already infected users, these benefits will come in the form of contact with the public health system and a reduced strain on their immune systems due to reductions in heroin intake and exposure to pathogens such as the hepatitis B virus. To the extent that users receive AIDS education, their sexual partners and any future needle-sharing partners also will benefit. Uninfected users entering treatment will benefit by ceasing to expose themselves to HIV through needle sharing. Occasional backsliding while in treatment will expose uninfected users to some risk; however, lower frequency of injection and never being in the situation of an addict desperate for a "fix" will make them safer, perhaps substantially safer, than users not in treatment. Those who return to heroin use may have learned enough about needle hygiene during their time in treatment to avoid, or at least have a better chance of avoiding, infection. Even for those who eventually become infected with HIV, treatment will extend their lives by putting off their infection; this may be particularly valuable as medical breakthroughs change the face of AIDS treatment. To say that treatment unambiguously benefits those who receive it,

however, does not say much about its overall benefits for disease prevention, or the relative benefits of expanding treatment in different circumstances.

For purposes of illustration, let us examine four stylized situations and the effects of expanded treatment in each:

- o High overall seroprevalence, with those entering treatment having higher HIV infection rates than users as a whole;
- o High overall seroprevalence, with those entering treatment having lower HIV infection rates than users as a whole;
- o Low overall seroprevalence, with those entering treatment having higher HIV infection rates than users as a whole; and
- o Low seroprevalence, with those entering treatment having lower-than-average rates of HIV infection.

Obviously, the net effects of expanded treatment will depend on the proportion of the user population reached by treatment. We do not, however, need this refinement to show the likely directions of the important effects of expanded treatment on seroprevalence.

If seroprevalence among intravenous drug users is high, and higher still among those entering treatment, the effects of expanded treatment will be positive but not very large, particularly if risky behavior remains common. Those in treatment will benefit in the ways discussed above, though for most it will already be too late to prevent HIV infection. Remaining users, and new initiates, will benefit from the drop in average seroprevalence that will accompany the exit from the group of the most-likely infected: they will now be less likely than before to share needles with an infected person. However, if seroprevalence is high to start with, removing a very-high-seroprevalence group from the population will still leave a prevalence so high that current users will continue to be at very high risk of infection, particularly if risky behavior remains common.

In this circumstance, which characterizes the New York metropolitan area, effective AIDS education is essential both for current users and for those in treatment, many of whom will return to needle use (either with heroin or other drugs). Treatment programs can be useful forums for educating heroin-users about AIDS, safe sex, and needle sterilization.

Thus, though the treatment itself may not save many addicts from infection, its role as a disseminator of AIDS knowledge may prove useful.

If seroprevalence among intravenous users is high, but treatment reaches a group with lower-than-average rates of infection, the effects of expanded treatment will be greater. Those entering treatment will be less likely to be already infected, and thus more likely to receive the largest benefit of treatment: the avoidance of HIV infection. However, this will drive up seroprevalence among current users, leaving them with a higher probability of encountering infected partners in needle-sharing. But when seroprevalence is very high to start with, and remaining users have a high probability of being infected or soon becoming infected, this effect may be negligible compared to the benefits of getting uninfected users out of harm's way. The federal rule that only persons with at least one year's addiction history are eligible for methadone detox treatment is likely to have perverse effects in areas where HIV prevalence among heroin users is already high. The longer a person has been using heroin, the more likely he is to be infected already; it is the uninfected user whom it is most urgent to get into drug treatment.

In low-seroprevalence populations, the relative benefits of treating already-infected and still-uninfected users will be reversed. Treatment provided to uninfected users in a low-seroprevalence area will offer smaller disease prevention benefits to those who receive it, since they faced a lower probability of infection while using, but will slightly drive up seroprevalence and risk of infection among the remaining users. Targeting infected users, however, will benefit all users in a low-seroprevalence area: those in treatment will get the benefits of treatment and abstinence from use, while remaining users will face a lower probability of sharing with an infected person. This lower probability of infection will be much more important than it was in the high-seroprevalence area: taking a few infected users from a low-prevalence population can make a dramatic difference in everyone else's risks.

Given this analysis, it might make sense to use HIV screening as an adjunct to the client-selection process for drug treatment, with priority going to infected persons in low-prevalence areas and uninfected ones in high-prevalence areas. Admittedly, such a proposal would attract vigorous controversy.

More of What? Neither therapeutic communities, with their great expense, nor methadone maintenance, with its low success rate in producing needle abstinence, seems to be the best treatment approach to address the heroin/HIV problem. (Therapeutic communities within prisons may represent an exception to this assertion; their costs are lower and their benefits in the form of reduced crime higher than other therapeutic communities.) The great advantage of methadone maintenance, when it was introduced in the 1960s, was its ability to attract clients who were not willing to become drug-free. This advantage may be less important as the fear of AIDS increases the desire of users to get into treatment. A decreased emphasis on methadone maintenance, combined with increased availability of short-term inpatient detox followed by long-term outpatient drug-free programs, might improve the performance of drug treatment in controlling the spread of HIV. But such an approach would be largely futile as long as outpatient drug-free means a few Narcotics Anonymous meetings and one group therapy session per week with a counsellor. Publicly supported outpatient drug-free programs will probably have to move closer to the more expensive privately-paid models if they are to improve their success rates. This would still leave them far less expensive than therapeutic communities.

In an attempt to change user behavior with respect to needle sharing and sexual behavior, some treatment programs have offered HIV antibody testing to all who wish it. In at least one program, such testing led to behavioral changes in the desired direction among both infected and uninfected users.⁷⁷ This combination of testing and treatment may offer users and policymakers a new tool to boost the effectiveness of treatment, with regard both to drug abuse and to slowing the spread of AIDS.

76. Code of Federal Regulations (C.F.R.), Chapter 21, part 291.

Conclusions and Recommendations

The second largest--and the fastest growing--means of AIDS transmission is through sharing needles during intravenous drug use. Heroin use, and intravenous drug use in general, seems destined to become responsible for a much larger part of the AIDS epidemic than it is already. New policies with respect to drug law enforcement, drug treatment and drug education could help reduce the extent of the problem.

Law enforcement pressure against retail drug dealing raises the non-money price (i.e., search time) of heroin, which reduces heroin use without the bad side effects of increasing the money price, and at lower cost for users, government, and the already embattled community that must deal with user crime. Unfortunately, there is little evidence that the police are stepping up their efforts to control heroin use or changing other policies in response to the increased threat of AIDS transmission through needle-sharing by intravenous drug users.

Police currently arrest some users for possessing needles and confiscate the needles. They rarely act to break up the shooting galleries, which are organized meeting places for needle sharing. Both of these policies increase the numbers of people who share needles, thus contributing directly to the spread of AIDS. Therefore:

- o Police should cease making needle-possession arrests and confiscating users' "works."
- o Police should attempt to arrest the operators and customers of "shooting galleries" and to make the premises unavailable for needle-sharing.
- o Police should increase their attention to heroin dealing, particularly in the form of crackdowns on street-level dealers and their customers.

There is some evidence that users are aware of the dangers they run, and are at least potentially receptive to programs that educate them about those dangers and provide information and help in the form of clean needles and in the form of treatment. Therefore:

- o Health authorities should step up education and outreach programs aimed at heroin users, with special emphasis on mobile units and the use of ex-addict outreach workers. Needle exchange and distribution programs are valuable largely as adjuncts to outreach.

No treatment program is likely to eliminate intravenous drug use entirely, or for all users. Therefore:

- o All treatment programs should teach users to sterilize their needles and not to share them if they continue to inject drugs.

The effects of drug treatment in terms of overall benefits for disease prevention depend on the infection prevalence of the overall population compared with the infection prevalence of those entering treatment. Therefore:

- o Treatment priority should be given to uninfected drug users in areas where infection prevalence is already very high and to infected drug users where infection prevalence is low.

Treatment professionals and police alike will need to change their organizational routines and rethink their operating principles in order to increase their contributions to the fight against AIDS. The magnitude of the AIDS threat warrants strong and immediate action.

77. Casadonte, P., D.C. Des Jarlais, T.S. Smith et al.. "Psychological and behavioral impact of learning HTLV-III/LAV antibody test results." Presented at the Second International AIDS Conference, Paris, 1986. Cited in Des Jarlais and Friedman (NIDA, 1987).