

INTRODUCTION

Two health epidemics in the United States have overlapped with disastrous results: drug abuse, a chronic relapsing disorder, and human immunodeficiency virus (HIV) infection, the cause of AIDS. Because these epidemics have affected a wide range of areas from medical care to law enforcement, the cost to society is substantial, both in tangible and intangible terms. A fatal link between the two epidemics compounds the problem, as the multiplicity of HIV transmission modes makes drug users, intravenous (IV) drug users in particular, a critical group in the spread of HIV infection.

Three modes of transmission connect drug abuse and HIV infection. One occurs among IV users of drugs, primarily heroin and cocaine, who share injection equipment that is contaminated with infected blood. Through sexual transmission, the second mode, infected IV drug users may pass HIV to their sexual partners. In particular, crack, a smokable and powerful form of cocaine, is associated with sexual behaviors at high risk of HIV transmission. The third mode of transmission occurs during pregnancy or shortly after birth, when women infected through IV drug use or by IV drug-using sexual partners may transmit the virus to their infants.

The use of psychoactive substances ranges from casual and recreational use to abuse and dependence or addiction. Although all degrees of drug use, if associated with certain behaviors, put users at risk of HIV infection, more frequent high-risk behaviors, of course, increase the likelihood of viral transmission. Substance dependence, the most severe condition, is characterized by compulsive use and loss of control over drug use (6). Continued use despite adverse consequences, failed attempts to stop, considerable time spent procuring the drug, and symptoms of tolerance and withdrawal are characteristic of substance dependence. A substance abuser continues use despite social, occupational, psychological , or

physical problems or despite recurrent use in physically hazardous situations. Casual users, the least serious category, take certain drugs only occasionally or in low or moderate doses, usually in social contexts, and do not exhibit the maladaptive behavior patterns associated with substance dependence and substance abuse. Casual use still poses risks to the individual and society since any needle-sharing or drug-associated high-risk sexual behaviors may transmit HIV and other infections.

In this Background Paper, the terms drug abuse and drug dependence are used interchangeably, and the term drug abuser also includes drug addicts, who have lost control over their substance use.

Drug abuse is a chronic relapsing disorder; its pattern of relapses and remissions resembles other chronic diseases, such as arthritis and chronic depression. Similarly, no treatment exists to totally eradicate the condition. Unlike treatment for acute conditions, such as a broken leg or a simple infection, treatment for drug abuse shares the same objectives as treatment for other chronic conditions: 1) amelioration of symptoms (e.g., impaired functioning) and 2) prolongation for as long as possible of symptom-free intervals (e.g., maintenance of the desired behavior changes).

Preventing the spread of HIV among drug abusers is a formidable task. That drug abuse is a chronic relapsing condition and that drug abusers are a heterogeneous population with other social and behavioral problems pose obstacles to effective treatment. Moreover, the increasing use of injectable and smokable cocaine, coupled with the lack of an effective medication to treat cocaine abuse, makes even more difficult the control of HIV. Sexual behavior appears more difficult to modify than needle-sharing behavior. This fact further underscores the diligence required to halt this tremendous public health challenge (341).

This OTA Background Paper has a dual role: it examines evidence for the effectiveness of treatment for drug abuse and evaluates the role of drug abuse treatment as a strategy to prevent HIV spread. Because most IV drug users are not in treatment, the study also examines other approaches to HIV prevention among this high-risk group.¹

The remainder of this chapter summarizes the main findings. Chapter 2 reviews the current situation regarding drug use and HIV infection in the United States. Chapter 3 provides background information about the drugs of abuse and various treatment modalities. Chapters 4 and 5, respectively, review the existing literature on the effectiveness of drug abuse treatment and on its role in preventing HIV infection. The various appendixes describe the method of the study; acknowledge experts in the field “who provided valuable advice; describe drugs of abuse other than opiates and cocaine; summarize a cost-benefit analysis of drug abuse treatment; and review highlights from the most recent National Drug and Alcoholism Treatment Unit Survey.

SUMMARY OF THE FINDINGS

Magnitude of the Problem

HIV is transmitted through sharing contaminated needles and other equipment used to inject drugs. The sharing of injection equipment is a common practice throughout the United States in areas of high and areas of low HIV seroprevalence, with reported rates of sharing among IV drug users as high as 70 to 100 percent (8). Heroin and cocaine alone or in combination are the most common injectable drugs, while amphetamines are popular in certain parts of the country. Overall, the estimated number of IV drug users in the United States ranges from 1.1 to 1.8 million (64,220,307). Using data through 1985, the National Institute on Drug Abuse (NIDA) estimated that there are 500,000 IV heroin addicts; 250,000 IV heroin users who are not addicts; 475,000 IV cocaine users; 150,000 overlapping IV

cocaine and heroin users; and 25,000 IV users of other drugs (282). Given estimation problems and the passage of time, however, the actual number of IV drug users may differ substantially (282).

Of all IV drug users, 80 to 90 percent are not in treatment at any given time (216a,332a,341). Among users not in treatment who volunteered to participate in U.S. urban outreach programs from 1987 to 1989, 34 percent injected predominantly heroin, 31 percent cocaine, 33 percent combinations of heroin and cocaine, and 2 percent amphetamines or other drugs (340). Heroin was the predominant drug for almost 60 percent who reported *daily* drug injection. Most of these volunteers, 60 percent, had previously been in treatment. Substantial proportions engaged in behaviors that put them at high risk of contracting or transmitting HIV: 78 percent reported sharing drug injection equipment with another IV drug user; 20 percent shared equipment with strangers; and 48 to 85 percent, depending on the type of sexual activity, never used a condom (340).

Of approximately 350,000 drug clients in treatment in fall 1989, about 41 percent had used drugs intravenously (332a). Public and private facilities across the country reported treating almost 1 million drug users of all kinds during the year ending with September 1989.

The association between drug use and HIV infection is not confined to IV drug use. Sexual behaviors associated with the crack epidemic, such as sex for drugs, casual sex with multiple partners, and careless sex while high on drugs, put drug users at increased risk of HIV infection (112). In 1988, about 1 million people in the United States had used crack in the past year, and about 0.5 million had smoked it in the past month (330). Among 1988 high school seniors, about 3 percent reported having smoked crack during the previous year (320a).

Counting drug users and their sexual partners, an estimated 1.8 million people are at risk of contracting HIV (318). Currently, IV drug use is the second most common risk behavior reported for AIDS cases in the United States, surpassed only by unsafe sex among homosexual or bisexual men. In several Northeastern States and Puerto Rico, the number of

¹This paper does not examine issues related to drug abuse and HIV infection among adolescents. These issues are addressed in an upcoming OTA Report on adolescent health expected to be published in early 1991.

adult AIDS cases among IV drug users exceeds those among homosexual men (335). Among women with AIDS through May 1990, about 70 percent were associated with IV drug use or an IV drug-using sexual partner (349). Moreover, about 70 percent of the children with AIDS who were presumably infected through perinatal transmission had mothers who were IV drug users or sexual partners of IV drug users.

African-Americans and Hispanics constitute 20 percent of the U.S. population, but 44 percent of AIDS cases through May 1990 (304a,349). In AIDS associated with drug use, these groups have also been disproportionately affected; they have accounted for 79 percent of AIDS among IV drug users, 77 percent of AIDS among heterosexual partners of IV drug users, and 85 percent of children presumably infected through mothers who were IV drug users or sexual partners of IV drug users (349).

Because of AIDS' long gestation period, current AIDS cases reflect drug use patterns and high-risk behaviors that occurred 5 or more years ago. The impact of more recent trends of heavy cocaine and crack use, which are associated with high-risk behaviors for transmitting HIV, is yet to come.

Although declining trends in casual use of illicit drugs have been reported from national surveys, these figures may underestimate the magnitude of the problem. The major surveys exclude certain population groups that have a higher likelihood of drug abuse, such as homeless people and those in prisons and jails (304,330). In addition, the magnitude of underreporting may have increased in recent years, as social tolerance toward illicit drug use has decreased (304).

Assessing the Effectiveness of Drug Abuse Treatment

This Background Paper focuses on the three treatment approaches that have been subjected to the most evaluation: outpatient methadone maintenance programs, residential therapeutic communities (TCs), and outpatient drug-free (ODF) programs. Although other medications besides methadone are being developed and evaluated, none is in widespread use. Traditional TCs and ODFs fall

into the category of programs that on philosophical grounds do not employ medications.

Evaluations of the effectiveness of treatment assess whether a particular treatment approach has reduced behaviors associated with drug abuse, chiefly the frequent use of heroin or cocaine. Certain methodological problems handicap interpretation of the results. Almost all evaluations have studied groups of people entering treatment programs and compared their behaviors before and after treatment. Recovery from drug abuse, however, may be influenced by many factors, such as previous treatment episodes, involvement with the criminal justice system, pressure from family and friends, and religious involvement. These factors may interact or operate independently.

Without randomly assigning people to treatment and having a control group for comparison, one cannot separate the effect of treatment from the effect of other factors that might affect behavior, such as the individual circumstances of the people who choose treatment (see ch. 4). Interpretation is rendered more difficult by the lack of information about the history of drug abuse careers. Although some people reduce or eliminate drug use without treatment, not enough is known about the natural history of this chronic, relapsing condition to estimate how many would improve regardless of the intervention. In addition, the results generally consist of behaviors reported by the drug abusers studied, reports that may be biased. On average, however, these self-reports have been found to conform to other sources of information (149,267).

Although research on drug abuse has intensified, no completed studies have evaluated treatment for crack. Nor are evaluations of more recent variations in traditional approaches, such as shorter residential programs and self-help groups, yet available.

Methadone Maintenance

Efficacy and Effectiveness--Methadone is a synthetic narcotic used to treat dependence on opiates. Heroin, the most frequently abused opiate, is administered mainly by injection. When administered regularly in adequate doses, methadone can reduce the craving for heroin, prevent the onset “

of opiate withdrawal symptoms, and block euphoria from heroin. Daily methadone is administered orally, usually to outpatients. By reducing drug craving and fear of withdrawal and blocking euphoria from heroin, methadone enables heroin abusers to reduce IV drug use and associated risky behaviors.

Although all methadone maintenance programs share the objective of reducing opiate use and changing behavior, they vary in their orientation, with some emphasizing eventual cessation of drugs, including methadone, and others accepting indefinite maintenance on methadone. In addition, methadone maintenance programs vary in methadone dose, counseling and other rehabilitative services, policies regarding discharge and readmission, take-home privileges, and frequency of urine testing.

Methadone's ability to reduce use of heroin and other illicit opiates has been shown in numerous studies over 25 years. Consistent evidence and strong study designs bolster this conclusion.

For example, in a randomized controlled trial of maintenance on methadone v. placebo, after 3 years, 56 percent of those maintained on methadone remained in treatment, while only 2 percent given placebo remained (227). Although monthly heroin use among those on methadone stabilized at about 35 percent, 63 percent of the control group compared with only 5 percent of the methadone maintenance group were removed from treatment because of persistent heroin use. A natural experiment comparing clients involuntarily discharged when a clinic closed with a matched sample in a continuing clinic found similar results (207). Of those involuntarily discharged, 55 percent resumed heroin addiction compared with 31 percent in the continuing clinic.

Reports of opiate use before and after treatment have found the same pattern (see table 1-1). On average, 75 percent of the clients in long-term methadone maintenance have ceased illicit opiate use (258). Methadone maintenance programs also retain 55 to 85 percent of their clients for a 2-year

Table 1-1-Percent Self-Reported Outcomes by Clients in Methadone Maintenance Treatment, Selected Studies

Category	DARP ^a		TOPS ^b		Ball Study ^c	
	Before treatment	Year after treatment	Year before treatment	Year after treatment	In treatment 0.5 to 4.5 years	In treatment over 4.5 years
Opiate use ^d	100	36	63.5	16.7	15.8	3.4
Cocaine use ^d	NA	NA	26.4	17.5	26.6	17.2
Criminal activity	88	27	31.8	19.0	11.1	9.4
Employment ^e	33	57	24.2	20.1	NA	NA

ABBREVIATION: NA = Not available.

^aDARP, the first federally funded national multimodality study of treatment effectiveness, began in 1969. Findings refer to white and black males only. Data refer to all clients who were admitted to treatment, regardless of the length of time spent in treatment. Average followup rates were 79 percent for cohorts admitted to treatment from 1969 to 1971 and from 1971 to 1972 and 64 percent for the cohort admitted in 1973 to 1974.

^b TOPS, a federally funded national multimodality study, began in 1979. Results pertain to the 68 percent of clients who stayed in treatment at least 3 months. The average response rates for a sample of 1,539 clients, regardless of time in treatment, were 80 percent for the year before treatment and 75 percent for the year after treatment.

^c Ball and colleagues conducted a cross-sectional study of six programs in the Northeast. The study sample was a representative sample of clients including new admissions and clients already in treatment.

^d Daily opiate use for DARP, weekly or more frequently for TOPS, and use during the past 30 days for the Ball study.

^e Criminal activity refers to any arrest during one's lifetime before treatment or in the year following treatment in the DARP study; self-reported involvement in predatory crimes, excluding crimes related directly to drug use, in the TOPS study and any criminal activity in the past 30 days in the Ball Study.

^f Employment refers to employment half-time or more during the year before treatment or during the year after treatment in the DARP study, and to full-time employment in the TOPS study.

SOURCE: Ball, Corty, Meyers, et al. (20); Hubbard, Marsden, Rachal, et al. (149); Simpson, and Sells (272).

period, rates far higher than those of other modalities for treating drug abuse (258). These retention rates may in part be related to patient selection. Since Federal guidelines for methadone maintenance specify that clients must have received previous treatment, they may be older and further advanced in the addiction career compared with other drug abusers (13).

Methadone maintenance's role specifically as a means to prevent HIV infection has been examined in about a dozen studies. In New York City, San Francisco, Sweden, and Italy, drug abusers who have entered treatment early in the epidemic and remained in treatment have consistently had lower seroprevalence rates than those who entered later (1,36,40,132,228,291,295,374,376). Methadone maintenance thus may have exerted a protective effect by reducing IV drug use.

Although IV heroin use can be curtailed with sufficiently high doses of methadone, methadone cannot address pharmacologically the concurrent IV or non-IV use of other drugs, most notably cocaine. It has been observed, however, that a proportion of IV drug users stop using IV cocaine while on methadone maintenance (149). The use of IV cocaine is of particular relevance to efforts to halt the spread of the HIV epidemic, since IV cocaine use appears to be associated with a greater frequency of injections and sharing of injection equipment (110). It has also been associated with an increased risk of HIV infection among methadone maintenance clients (49,276). These complexities further underscore the need for a range of prevention interventions to reduce the spread of HIV transmission.

OTA finds that there is strong and consistent evidence that methadone maintenance treatment can reduce illicit opiate use and HIV transmission. This protection is a direct result of methadone maintenance's ability to reduce or eliminate abusers' desire to inject drugs, heroin in particular. In addition, studies have shown methadone maintenance clients reducing their criminal activity and living stable and productive lives.

Methadone Dosage--Research establishes whether an intervention is efficacious in achieving its goals. Even an efficacious intervention, however, if

employed sub-optimally, may prove ineffective. Despite methadone's ability to reduce heroin use, considerable variability exists in reported rates, with as high as 57 percent of clients reporting some level of heroin use in some programs (21). Although this variability may be attributed to client characteristics, evidence points to non-client related variables (21). Such variation suggests that somewhere in the implementation process, effectiveness may have been compromised.

Insufficient methadone dosage may at least partly explain the differences observed. An adequate dosage is needed to prevent drug craving and withdrawal symptoms and block heroin's euphoria. Methadone dosage has been shown to be related to effectiveness, clients' remaining in treatment, and HIV seropositivity (40,66,69,98,130,376).

Research indicates that a daily dosage in the range of 50 to 100 mg, with a mean of 80 mg, is sufficient for most patients (130). A daily dose of 60 mg is considered to be close to the lowest effective dose (257). Pooled data on dosage from 6 methadone programs found an inverse relationship between daily methadone dose and frequency of heroin use (98). At a daily dose of 35 mg or less, a little over one-third of the clients used heroin regularly. By contrast, at 80 mg per day, there was practically no opiate use. A recent survey of 24 methadone maintenance programs around the country revealed that daily average dosages ranged from 21 to 67 mg, and 21 of the 24 programs administered an average daily dose below 60 mg (299).

Interim Methadone--The concept of interim methadone calls for temporary provision of methadone and HIV counseling, without additional ancillary services, to IV drug users who are on waiting lists until treatment space in a comprehensive program becomes available. Interim methadone, which has been proposed exclusively as an alternative to continued heroin injection in the street, has the potential to contribute to HIV prevention efforts. In a randomized experiment among those on waiting lists in New York City, prevalence of heroin use, needle use, and mean number of days since last injection were lower in the interim methadone group than the control group (264).

Concerns have been expressed that adopting interim methadone would worsen methadone maintenance programs, for example, by permanently reducing the services provided (235,241a,363). These concerns are worth considering. The urgency of the HIV epidemic, however, adds an additional dimension and warrants a clear focus on societal priorities. Individuals who respond to methadone will reduce IV use of heroin. Any sustained reduction in injection frequency is likely to reduce the rate of HIV transmission and shrink the pool of people at risk. From a public health perspective, this is a need that should not be ignored. Interim methadone may be more appropriate for certain areas with large number of IV drug users and waiting lists, such as New York City. Nevertheless, interim methadone is an immediate response to an urgent situation.

Other Treatment Modalities

Therapeutic Communities--Traditional TCs are residential programs with a planned duration of treatment of approximately 18 to 24 months. The fundamental philosophy of these programs is that

drug abuse reflects personality problems and chronic long-standing deficiencies in social, educational, and marketable skills. TCs provide a highly structured and often confrontational environment, where peer pressure along with counseling and therapy is intended to produce attitude and value changes and a drug-free lifestyle.

Although methadone acts only on narcotics abuse, TCs serve individuals with a host of different primary drugs of abuse. Evaluations conducted in the 1970s and 1980s consistently found substantial reductions in heroin and cocaine use among people who remained in treatment (table 1-2) (76,81,149, 272). Clients of Phoenix House, a large traditional TC, reduced heroin use from 86 percent before treatment to 5.8 percent 2 years after treatment (76). Similarly, according to a national study begun in 1979, TC clients who remained in treatment at least 3 months reduced heroin use from about 31 percent 1 year before treatment to about 12 percent the year after treatment and cocaine use from about 28 percent before to about 16 percent the year after treatment (149). These studies also found reductions in criminal activity and increases in employment.

Table 1-2-Percent Self-Reported Outcomes by Clients in Therapeutic Communities, Selected Studies

Category	DARP ^a		TOPS ^b		Phoenix House ^c	
	Before treatment	Year after treatment	Year before treatment	Year after treatment	Before treatment	2 year after treatment
Opiate use ^d	100	39	30.9	11.5	86.0	5.8
Cocaine use ^d	NA	NA	27.6	155	NA	NA
Criminal activity ^e	95	33	60.9	28.9	76.2	29.8
Employment ^f	20	61	15.3	27.7	26.4	48.8

^aDARP, the first federally funded national multimodality study of treatment effectiveness, began in 1969. Findings refer to white and black males only. Data refer to all clients who were admitted to treatment, regardless of the length of time spent in treatment. Average followup rates were 79 percent for cohorts admitted to treatment from 1969 to 1971 and from 1971 to 1972 and 69 percent for the cohort admitted in 1973 to 1974.

^b TOPS, a federally funded national multimodality study, began in 1979. Results pertain to the 45 percent of clients who stayed in treatment at least 3 months. The average response rates for a sample of 1,282 clients, regardless of time spent in treatment, were 88 percent for the year before treatment and 81 percent for the year after treatment.

^c Study conducted at Phoenix House, one of the largest traditional therapeutic communities in *New York City*. A sample of 1974 to 1975 admissions was followed and results pertain to both graduates and dropouts. The followup rate was 67.1 percent.

^d Daily opiate use for DARP, weekly or more frequently for TOPS, and daily use for the Phoenix House study

^e Criminal activity refers to any arrest during one's lifetime before treatment or in the year following treatment in the DARP study; self-reported involvement in predatory crimes, excluding crimes related directly to drug use, in the TOPS study; and at least one episode of criminal activity during any month of observation in the Phoenix House study.

^f Employment refers to employment halftime or more during the year before treatment or during the year after treatment in the DARP study, and to full-time employment in the TOPS study, and to employment full-time for at least 50 percent of employable months in the Phoenix House study.

SOURCE: De Leon, (76); Hubbard, Marsden, Rachal, et al. (149); Simpson and Sells (272).

It should be noted, however, that TCs' contribution is clouded by high dropout rates among the clients. Approximately 30 to 50 percent of those who enter leave within the first 30 days. Overall, the retention at 1 year is between 15 and 25 percent, and actual completion rates for programs of 18 to 24 months range from 10 to 15 percent (75). This limited ability to retain clients is related to the rigorous, demanding, and confrontational nature of the TC environment. Apparently, retention rates reflect considerable self-selection by clients. At least in the early 1980s, TC residents had more severe problems than clients in methadone maintenance and ODF programs (149). This factor may influence the size and the direction of the observed treatment effect and retention rate. Measured improvements in drug use, criminal activity, and employment have also been observed in 30 to 35 percent of individuals who leave treatment without completing the 18 to 24 months planned duration (76,80).

The consistency and magnitude of the results is consistent with the effectiveness of TCs in reducing drug abuse among its clients. It is difficult, however, to interpret the evidence. Given the high dropout rates and lack of an external comparison group, one cannot rule out the possibility that some would have

improved without treatment or that those who remained and improved were unusual in some way. Based on available evidence and their knowledge of drug abuse patterns, many experts in this area have concluded that TCs in fact reduce heroin and cocaine use (33,75,76,77,84,149,248). But until further studies address the outstanding methodological problems, OTA cannot come to a firm conclusion regarding the relative contribution of TCs to reducing heroin and cocaine abuse.

Outpatient Drug-Free Programs--ODF programs represent a diverse collection of programs with little uniformity, whose common denominator is their drug-free philosophy and outpatient nature. They vary from casual drop-in centers and recreational facilities to highly demanding daytime programs with structures similar to TCs.

The majority of ODF clients do not use drugs intravenously; in 1987, only 17 percent were IV drug users (332). Among ODF clients in a national study (TOPS) who remained in treatment at least 3 months, only 8.6 percent used heroin the year before treatment, and 4.9 percent the year after treatment (see table 1-3) (149). Similarly, 12.8 percent reported cocaine use a year before and 8.1 percent

Table 1-3-Percent Self-Reported Outcomes by Clients in Outpatient Drug-Free Programs, Selected Studies

Category	DARP ^a		TOPS ^b	
	Before treatment	Year after treatment	Year before treatment	Year after treatment
Opiate Use ^c	100	44	8.6	4.9
Cocaine Use ^c	NA	NA	12.8	8.1
Criminal activity ^d	87	34	33.5	18.7
Employment ^e	24	52	27.1	38.5

^aDARP, the first federally funded national multimodality study of treatment effectiveness, began in 1969. Findings refer to white and black males only. Data refer to all clients who were admitted to treatment, regardless of the length and time spent in treatments. Average followup rates were 77 percent for cohorts admitted to treatment from 1969 to 1971 and from 1971 to 1972 and 70 percent for the cohort admitted in 1973 to 1974.

^b TOPS, a federally funded national multimodality study, began in 1979. Results pertain to the 36 percent of clients who stayed in treatment at least 3 months. Average response rates for a sample of 1,449 clients, regardless of time spent in treatment, were 72 percent for the year before treatment and 82 percent for the year after treatment.

^c daily opiate use for DARP and weekly or more frequently for TOPS.

^d Criminal activity refers to any arrest during one's lifetime before treatment or in the year following treatment in the DARP study, and self-reported involvement in predatory crimes, excluding crimes related directly to drug use, in the TOPS study.

^e Employment refers to employment half-time or more during the year before treatment or during the year after treatment in the DARP study, and to full-time employment in the TOPS study.

SOURCE: Hubbard, Marsden, Rachal, et al. (149); Simpson and Sells (272)

the year after treatment. By the end of the fourth week, however, 36 percent of clients admitted to ODF programs in the TOPS study had dropped out, and by the end of the first year, 86.6 percent had discontinued treatment (149,150).

To interpret the treatment results from ODF programs, several considerations should be kept in mind. People attracted to ODFs compared with other modalities may have less severe problems and better societal functioning and be more amenable to change (149). Moreover, because of the great variety in ODF program content and the absence of a standardized treatment process, conclusions regarding ODF effectiveness may be more tentative than for the other modalities. Research to compare ODF programs requires more systematic data and exploration of organizational elements that may contribute to treatment effectiveness.

IMPLICATIONS OF THE FINDINGS

Reaching People Not in Treatment

Policies to control HIV infection must recognize that most IV drug users are not in treatment. Only 10 to 20 percent of the estimated 1.1 to 1.8 million IV drug users in the United States are in treatment at any time (216a,307,332a). By implication, as many as 1 million or more individuals are engaging in behaviors that place them at high risk for contracting or transmitting HIV. From mid 1988 to early 1989, among IV drug users not in treatment, 69 percent of the women and 75 percent of the men who volunteered information on all risk factors were rated at high risk of HIV infection (325). These high-risk people reported engaging in three risky behaviors: sharing needles, using rented or borrowed needles, and not using bleach to clean their needles.

In demonstration projects conducted since 1987, NIDA has used community-based outreach workers to study interventions to reduce risky behaviors among drug abusers not in treatment (341). From 1987 to 1989, substantial proportions of IV drug users not in treatment in certain U.S. cities reported decreasing IV drug use, from 49 percent in San Francisco to 75 percent in Miami. Similarly, high proportions also reported decreases in sharing or borrowing

injection equipment (341). In another outreach program in San Francisco, IV drug users followed needle hygiene 13 percent of the time in 1986, but 80 percent of the time in 1989 (362). It should be noted, however, that reported reductions in sexual risk behaviors occurred to a lesser degree than drug-associated risk behaviors (341).

Outreach programs have demonstrated the feasibility of reaching people who have traditionally been difficult to contact. Compared with periods before treatment, program participants increased entry into treatment and reduced high-risk behaviors. But given other influences in the community, the relative contribution of the outreach programs to changes is not clear.

These outreach programs have compared behaviors reported by IV drug users randomly assigned to a standard intervention v. an enhanced intervention, which includes more intensive counseling and education (38). At the 6-month followup in two Ohio cities, the frequency of sharing injection equipment, use of shooting galleries, and use of speedball (heroin and cocaine combined) were significantly lower, and the use of bleach to disinfect injection equipment was significantly higher among those receiving the enhanced intervention.

In light of the large number of IV drug users continuing risky behaviors, it is desirable to explore a variety of settings to reach them, such as public health clinics, free-standing HIV counseling and testing programs, correctional facilities, and health-care facilities (341). Opportunities available through drug treatment have not been realized. Although IV drug users are at high risk for HIV infection, in 1989 only 3.5 percent of HIV counseling and testing sites were located in drug treatment centers. In New York City only 13 out of 713 drug treatment centers (approximately 2 percent) provide HIV counseling, testing and partner notification (350).

Despite the desire to enter treatment, some drug abusers cannot do so because space is not available (239,307). In September 1989, facilities for drug abuse clients were operating at close to 80 percent of budgeted capacity (332a). Utilization rates vary by State, public v. private program, for-profit v. not-for-

profit status, and inpatient v. outpatient setting (44a). For example, in October 1987, rates ranged from as low as 28 percent in South Dakota to 98 percent in New York and 109 percent in Puerto Rico and from 88 percent in public State and local units to 61 percent in private for-profit units. Financial barriers also impede treatment for drug abuse. Research has shown that when financial barriers are reduced, drug users who have never been treated seek to enter treatment (341).

Waiting lists and the unavailability of treatment should not be allowed to serve as deterrents to seeking help. Although motivation for entering treatment may vary among abusers, providing treatment achieves the clear benefit of being in contact with drug abusers and exposing them to the benefits of treatment. Subsequent interaction between client and treatment may enhance motivation to stay in treatment. Exposure to treatment may have a positive effect even for those who eventually drop out, since previous treatment episodes may exert a cumulative beneficial effect on the individual. Thus, contact with the drug abusing client in a controlled environment, if effectively utilized, presents tremendous opportunities to both prevent HIV infection and reduce illicit drug use.

Improvement in Quality

Currently, there is shared concern by experts in the field about deterioration in the quality of existing programs, especially among methadone maintenance programs (59,67). The services provided in various drug treatment centers in the United States are by no means uniform. Even within the same modality, differences exist in the number, type, and training of staff and the existence of medical, psychological, vocational, and rehabilitative services. Furthermore, the mere provision of these services is not synonymous with quality, as the way they are provided is also important.

Regulations of the Food and Drug Administration (FDA) and NIDA that set minimum requirements for the use of methadone are not always enforced (FR 54(10):8954-8971, March 1989) (67,299). These regulations are mandatory for any organization dispensing methadone, regardless of

whether the program accepts public funding. The regulations address a variety of issues, such as minimum standards for admission, guidelines for patient evaluation, and minimum standards for the services provided (counseling, vocational, rehabilitative and other social and support services).

These regulations do not ensure, however, that the patient receives an individually determined and medically appropriate dose. This problem has been well recognized. In 1988, AIDS experts in the Public Health Service recommended that Federal methadone regulations be revised to provide more flexible and tailored patient care (307). Both the Public Health Service and the Presidential Commission on the HIV epidemic also recommended establishing quality-of-care guidelines for methadone maintenance and other drug treatment programs (239,307). Besides methadone dose, other components of treatment, such as a case management approach, individual assessment of co-morbidity and severity of addiction, and program staffing and structure, may be related to increased effectiveness (67).

The Methadone Maintenance Quality Assurance System, a new project initiated by NIDA, will collect and publish standardized data from all the methadone maintenance clinics on urine testing and retention by the client's severity and treatment duration (323). These data will allow methadone maintenance programs to be compared and States to make licensing, inspection, and funding decisions (323).

The Presidential Commission on the HIV epidemic has recommended that the scope of programs to treat drug abuse should be expanded to respond to the HIV epidemic (239). These recommendations are supported by the current complexities of drug abuse patterns and the belief that a more comprehensive approach to drug treatment may be needed to effectively address the many problems that drug abusers face. To be effective in reducing drug use and HIV transmission, treatment programs need to recognize and address the high prevalence of multiple drug use, psychiatric comorbidities, other social deficiencies, and the interaction of these factors.

Future Research

During the past 30 years, research on drug abuse treatment has evolved gradually from anecdotal, uncontrolled studies with poor study methods to studies that attempt to conform more closely to research principles. Advances in the sophistication of study design and data analysis will allow future research to address issues that so far have not been adequately researched.

Overall, high quality studies are needed on ways to improve treatment effectiveness and efficiency. It is important to be able to dissect treatment programs to identify their most effective components and to determine which components are most effective for various client groups. With the exception of methadone maintenance for opiate abusers, the relative effectiveness of approaches for different patients and drugs has not been subjected to rigorous analysis. More information is needed on the process of recovery from drug abuse, both natural and treatment-assisted. Better understanding of the natural history of drug abuse would help in designing interventions and evaluating them. Ultimately, research on drug abuse treatment should lead to what has been a common practice in medicine, namely a case management approach with an individually tailored plan to maximize the likelihood of treatment effectiveness.

Knowledge about the relative effectiveness of different programs is also important because of the implications for the cost of treating drug abuse. As outpatient approaches, ODF and methadone maintenance programs do not entail the costs of inpatient or residential care. In 1987, annual operational costs per patient position were estimated to be **\$3,000** for methadone maintenance, \$2,300 for ODFs, and \$14,600 for TCs (217). To assess the cost-effectiveness of these interventions, however, requires information about the relative effectiveness of these programs and their respective costs for different types of patients and drugs.

The development and evaluation of techniques to prevent relapse is of crucial importance because of the chronic relapsing nature of drug abuse. The development of medications to assist recovery from

drug abuse is essential, especially with regard to cocaine and crack, drugs whose increasing use is linked to high HIV risk through both IV use and sexual practices.

Federal research underway is addressing many of these areas. NIDA is funding studies to evaluate different approaches to treating cocaine abuse and different interventions to reduce the risk of HIV exposure, especially among African-Americans and Hispanics (327a). Some of this research involves controlled trials. Research is assessing treatment components, such as relapse prevention, behavioral techniques, family therapy, and support groups. Substance abuse treatment among women is also being studied. Other areas covered include improvement in methods to study drug abuse and to enhance the data collection in different States.

Improving technical assistance, to support technology transfer in the field of drug abuse and to encourage implementation of quality assurance mechanisms in treatment is part of the mission of the Federal Office for Treatment Improvement, which was created in January 1990 (332b). This Office is also supporting projects to reduce waiting lists for drug abuse treatment. For fiscal year 1990, it planned to provide grants for treatment improvement demonstration projects in metropolitan areas; for critical populations, such as racial and ethnic minorities, adolescents, and residents of public housing projects; and for criminal justice populations.

It should be noted, however, that the fruits of these efforts will not materialize unless larger numbers of abusers are willing or able to enter and remain in treatment. Thus, research to increase recruitment and retention in treatment is also essential.

CONCLUSIONS

Methadone maintenance is clearly efficacious in reducing opiate use and associated IV use of heroin. Its effectiveness, however, may sometimes be compromised by inadequate doses of methadone. Philosophical and political differences about the use of methadone, such as concerns about substituting one

opiate for another and fears of illegal diversion, have inhibited administration of adequate methadone doses. As a result, methadone's potential to prevent HIV is probably not being realized.

Although methadone is effective for opiate use, it is not a treatment for abuse of cocaine, a pharmacologically different drug. No clearly efficacious treatment for cocaine, whose use in IV and smokable forms is associated with behaviors at high risk of transmitting HIV, is yet available.

Research findings are consistent with the effectiveness of TC and ODF programs. Compared with results for methadone maintenance programs, interpretation of these results is more difficult because low percentages of clients remain throughout the treatment program and the studies lack external control groups. The possibility thus remains that clients who stayed throughout these programs may have improved without treatment. On the other hand, the possible contribution of treatment in assisting these individuals should not be overlooked.

Treatment for drug abuse is not a panacea. Not even methadone maintenance eliminates drug abuse for all clients. Yet any continued sharing of injection equipment or risky sexual behavior associated with drug use places people at risk for HIV transmission. Such a risk is substantial for frequent drug users (abusers and addicts) and smaller but still present for casual users.

Even if treatment for drug abuse is not 100 percent effective, it may markedly decrease drug use for extended periods, and, therefore, decrease the probability of HIV transmission. It should be emphasized that when these interventions are applied on a very large scale, to hundreds of thou-

sands of people, the public health impact of an intervention with even limited effectiveness can be substantial.

Drug abuse, a condition with a long course characterized by relapses to drug use, occurs in people with a variety of other problems, such as psychiatric and non-psychiatric illnesses and family, financial, employment, and legal difficulties. Recovery from drug dependence is not an overnight event, but a dynamic process that occurs over time. The road to recovery may require multiple treatment episodes, with approaches tailored to the needs of different people. Moreover, the treatment needs of an individual and the appropriate interventions may change over time. Responding to these realities, experts advocate an integrated, comprehensive, flexible treatment network (11,149,169,241a).

The United States is confronted with an ongoing epidemic of HIV infection, whose control requires consideration of the medical and epidemiologic characteristics of the disease. Strategies to prevent HIV infection must acknowledge these complexities. Preventing further spread of HIV increases the pressure for reexamination and scientific evaluation of public policies with regard to the availability of syringes and needles. Temporarily providing methadone and counseling, without the additional ancillary services ordinarily part of methadone maintenance, to IV opiate users who are on waiting lists for treatment merits strong consideration.

Only consistent and persistent efforts over time have the potential to break the chain of HIV transmission and stem this lethal infection from spreading further. The impact of incremental, even partial, but sustained reductions due to methadone maintenance and perhaps other drug treatment approaches can be substantial in achieving this goal.