
Implications of Directly Observed Therapy in Tuberculosis Control Measures Among IDUs

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Synopsis

Tuberculosis (TB) is a rapidly growing problem among injecting drug users (IDU), especially those infected with human immunodeficiency virus. The authors review IDUs' responses to current TB control strategies and discuss the implications of their findings for the proposed implementation of directly observed therapy (DOT), a method for ensuring that patients take prescribed medication.

Field workers carried out 210 ethnographic interviews with 68 IDUs in a Brooklyn, NY, community during 1990-93. Case studies suggested that many IDUs are uninformed about TB and often misinformed about their personal TB status. Ethnographic interviews and observations indicated that the threat of TB-related involuntary detainment may lead IDUs to avoid TB diagnostic procedures, treatment for TB, or drug abuse treatment, and to avoid AIDS outreach workers and other health-related services. IDUs who tested positive for the purified protein derivative (PPD) of TB sometimes have left hospitals before definitive diagnoses were made, because of a perceived lack of respectful methadone therapy to relieve the symptoms of withdrawal from drugs.

Current TB diagnosis and treatment systems are, at best, inadequate. The threat of TB-related detention discourages some IDUs from seeking any type of health care. There is an urgent need to educate IDUs about TB and to educate and sensitize health care providers about the lifestyles of IDUs. DOT may help in servicing this difficult-to-serve population, particularly if techniques are incorporated that have been developed for other successful public health interventions for IDUs.

THE RESURGENCE OF TUBERCULOSIS (TB) since 1985 and the advent of multidrug-resistant strains of TB portend potentially devastating consequences in New York City, as well as in many other parts of the country.

The overall public health response has been hesitant and on a small scale (1-8). In 1992, there were 3,811 new cases of TB reported in New York City, an increase of 152 percent since 1980, nearly 5 times the national case rate (9). A recent study noted that "many public health agencies have been allowed to deteriorate and are now in a reprehensible state" (10). Other studies have shown that the lack of a well-organized infrastructure to support TB control measures may allow the epidemic to continue ex-

panding, especially among injecting drug users (IDU) and other at-risk persons in underserved minority group neighborhoods (11-14).

Recent publications have suggested policies to reduce TB transmission (15-19). Although there appears to be wide agreement that the cost of incarceration (estimated to be nearly \$250,000 per patient [7]) is much greater than the cost of social services and medical care, incarceration of TB patients who fail to follow treatment regimens has been proposed (20-24). Moreover, while "failure to adhere to the course of prescribed therapy has characterized patients of all social classes and educational levels," (16) health care professionals have focused their pessimism about patients' willing-

ness to complete long-term TB treatment primarily on patients who have such additional burdens as homelessness, mental illness, drug addiction, or infection with the human immunodeficiency virus (HIV) (11–15). However, much less discussion has concerned how current medical care practices often make patient compliance difficult or impossible.

IDUs in New York City have an unusually high rate of HIV seroprevalence. IDUs with HIV infection are likely to progress to acquired immunodeficiency syndrome (AIDS) more rapidly if infected with TB. Although they are arrested often, IDUs are adept at avoiding being identified as users, as shown by the so-called war on drugs, which has been largely ineffective in stemming street-level drug distribution or use in New York City. By incarcerating drug offenders in overcrowded prisons, the war on drugs likely has increased TB transmission (19, 25), and it may have accelerated the efforts of street-level users and distributors to develop more sophisticated techniques for evading law enforcement (26).

The ability of IDUs to avoid detection affects the outcomes of public health TB prevention and control strategies. IDUs report that they avoid medical providers because of their fears of detention for TB treatment and their perception that they are received at hospitals with contempt and lack of understanding. The consequences of those negative experiences and perceptions may be to deter IDUs from seeking medical or drug abuse treatment, thus exacerbating the TB epidemic, rather than helping to bring it under control, although the extent of this phenomenon requires further investigation. Directly observed therapy (DOT) has been suggested as a way to increase patient compliance with courses of medication for tuberculosis control and therapy (10, 15, 16). We present data suggesting that an admixture of the lessons drawn from successful AIDS prevention programs, as well as current knowledge about DOT, may prove useful in efforts to effectively control the TB epidemic.

Methods

A study of relationships between social factors and the risk of HIV infection among IDUs was conducted in a Brooklyn, NY, community during 1990–93. That predominantly Latino community had a population of 102,572 persons, of whom 42,066 (41 percent) received some form of public assistance in 1990 (27). Thousands of IDUs and crack smokers, many of them homeless, resided in or used drugs in that neighborhood. The community contained several major drug-selling areas. It had one TB chest clinic, which until

mid-1992 had one X-ray machine, which was non-functional. The clinic was staffed by 1 physician and 2 nurses, who saw about 90 patients a day (personal communication, Public Health Nurse, New York City Department of Health, Chest Clinic, Bushwick, Brooklyn, July 18, 1992).

We used data obtained from ethnographic interviews and observations to study issues related to the TB problem among IDUs. Ethnographic interviews allow the person being interviewed to relate his or her experiences at length. The strength of the ethnographic technique is the descriptive richness and depth of understanding provided the interviewer and, in this particular application, its ability to reveal the subject's cultural and social viewpoint. The weakness of the technique lies in the difficulty occasioned by the necessity to generalize from small samples that have been purposely, rather than randomly, selected.

We completed 210 ethnographic interviews with 68 drug users, 46 women and 22 men; 28 were Latino, 22 were black, and 18 were white. Their mean age was 31.2 years. Although 85 percent (58 persons) said that they smoked crack cocaine, many were IDUs who said that they infrequently smoked crack. Sixty-eight percent (46 persons) were IDUs with a mean of 13 years of injecting experience. Four said that they exclusively sniffed heroin. Most of the interviews were semi-structured or informal and were conducted in the project's research storefront. The interviews were usually tape-recorded and transcribed, and they generally lasted about 40 minutes. A few interviews were conducted in such settings as shooting galleries, apartments, or cars. Those were often informal or casual interviews of shorter duration (20 to 30 minutes).

Respondents who participated in tape recorded interviews were paid \$10 per interview. Respondents were not paid for informal or casual interviews that were not tape recorded. Many interviews were documented in the form of field notes. Systematic observation of drug users in their usual surroundings took place on a daily basis, including observations in shooting galleries, crackhouses, abandoned buildings, outside settings, and apartments where drugs were shared. Before each interview or an extended visit to an indoor drug-use location, participants were informed of the exact nature of the research and consent obtained. In one instance, a subject also gave the researchers informed consent to access her medical records for the specific purpose of verifying her TB status and course of treatment.

The ethnographic interview component was part of a larger study in which 796 structured interviews with IDUs were completed. Those interviews emphasized

HIV risk factors and social networks. As part of the brief medical history section of the interview, subjects were asked, "Have you ever been told by a doctor, nurse, or other health care professional that you had tuberculosis?" Subjects who answered *yes* were asked how long ago they had received their first TB diagnosis and what was their most recent TB diagnosis.

Results

In the medical history section of the larger, structured survey, 9 percent (65 of 723 respondents) reported that they had been told by a physician, a nurse, or other health care professional that they had TB. Of the 65 respondents, 60 percent (39 respondents) said that they were diagnosed for the first time within the last 3 years, suggesting that awareness of TB infection among IDUs may be a growing phenomenon. Not surprisingly, there was a significant association between having TB and being HIV-seropositive. Among those who reported having been told they had TB, 62 percent (36 respondents) were HIV-positive. Among those who had not received a TB diagnosis, 37 percent (240 respondents) were HIV-positive ($P < 0.0001$).

Observations in shooting galleries and other drug-use locations showed that IDUs did little in the way of preventing TB infection, such as by ventilating shooting galleries, despite knowing that some of their shooting-gallery acquaintances had active cases of TB. No instances of IDUs taking TB medication or attending a local TB clinic for checkups or medication were observed or reported.

Among the 68 IDUs who participated in 1 or more interviews, 15 percent (10 participants) reported that they experienced some possible symptoms of TB, such as high fever or heavy sweating, that were severe enough for them to be admitted to a hospital. None stayed long enough for a purified protein derivative (PPD) test for TB to be read, or for other diagnostic tests to be performed. The primary reason cited by IDUs for leaving a hospital was a perception of uncaring or contemptuous attitudes of hospital personnel or threats of involuntary detainment.

They reported that physicians were reluctant to prescribe methadone for most heroin addicts who had begun to experience withdrawal symptoms after admission, such as nausea, vomiting, body aches, diarrhea, or sweats and chills. When their acute TB-related symptoms subsided, all 10 IDUs who had gone to a hospital with possible symptoms of TB left to obtain street drugs to alleviate withdrawal pains. TB diagnostic tests on those IDUs were completed

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only when they entered drug detoxification programs or jail. The following case studies exemplify subjects' problems encountered in hospitals and other institutional settings.

Case 1. Case 1 was Ms. J., a self-described HIV-positive, 33-year-old black woman IDU, whose tape-recorded remarks she agreed to be quoted. J. was admitted to hospital A via ambulance with a high fever. In the emergency room, she was diagnosed as having pneumonia and possibly TB. Although J. had been to that hospital several times within the last year, that visit was the first time she was told that she might have TB. When her fever subsided, J. began to experience severe heroin withdrawal symptoms.

J.: They didn't want to detox me. They the doctor said that they cannot detox me and treat TB at the same time. First of all, they said that they don't want to give anyone methadone because it's not helping us, anyway.

Interviewer: Did the doctor also tell you that giving you methadone would conflict with the TB treatment?

J.: No. He never told me that. For 24 hours, no methadone. For 48 hours, nothin'. Finally, I got up to go and I said I was leaving. The nurse went and told the doctor and the doctor said, "Well, listen, you got TB, and if we have to, we will restrain you and call the police, because you're a danger to society and we can't let you go out." And I said to him, "Let me tell you something, fuck you and society. If you do not medicate me, I'm gonna tear this fuckin' place up." So he said, "OK, let me talk to somebody else." And he talked with somebody else, and they came up with 10 milligrams. And it didn't do nothin'. It would make me all right for a little while, and then ... hey, I got a habit, a terrible habit.

J. left the hospital to go out and "get straight." The following weekend, her high fever returned and

the ambulance was summoned again. The hospital staff began to run the same tests that they had been unable to complete on her previous visit, but ran into a similar problem, which was the physician's reluctance to prescribe methadone. By the end of the second day—with no prospect of more methadone—J. walked out of the hospital for good. J. said that she would not go there voluntarily, and would even ask ambulance drivers to take her to a different hospital should she have another medical emergency. Two weeks later, J. made calls to several inpatient detox programs at local hospitals to try to arrange a bed for herself. She was refused admission to those programs because she admitted that she had active TB. She explained how she finally arranged treatment at a different hospital.

J.: (The other treatment places) said no. I had to be medically cleared of TB and then placed into detox. When I called (hospital B), I didn't tell them that I had TB. Also, when I went in, they asked if I had any medical problems and I said no. I told them next day. They asked, "Why did I do that?" And I said, "Because I was tired of detox turning me down." They said that they thought that that was a pretty dirty trick. Then they found me a private room. They tested me with chest X-rays and sputum and they said that it was active, but before I left, it wasn't. And they gave me methadone, so I don't understand why (hospital A) couldn't.

Note that according to her medical record at hospital B, J. was PPD-positive, but did not have active TB; yet she continued to believe—even after she was discharged—that when she entered the drug detox program she had active TB, but by the time she was discharged, it was no longer active. Clearly, there was some element of miscommunication. J.'s account of her stays in the hospitals suggests that there was great potential for miscommunication. Her relationship with her social worker at hospital B suggests that potential.

J.: I had a social worker there. She was a real bitch. She didn't do anything for me. I asked her to help me get the MQ11 (a form to identify HIV-positive persons for social security benefits) completed and told her I wanted to get into some place before I was discharged, or I would go right back to the street. She [the social worker] told me that "We don't house nobody and we don't put nobody in no kind of apartment, so you can't expect that." And

everything I asked this lady, she don't do that. She didn't do anything. The Brooklyn AIDS Task Force called me while I was there and asked for her name. They said that they tried to call her but they couldn't get through. They (the hospital) discharged me to the street without any kind of medical advice. No nothin'. She said that "Because you were written up five times [for cursing at the social worker], I'm not giving you any referrals." And I said, "So what?" And that was that. Since then I've been staying in the street, in parking lots. Wherever I can stay.

J. was by no means an easy patient for the hospital staff. The fact that she was "written up" five times while in that hospital for cursing at her social worker speaks to her contentiousness. Although the ethnographic interviews did not focus on IDUs' experiences in hospital settings and did not specifically ask questions related to that topic, 14 of 16 IDUs who had sought medical care mentioned such conflicts as a reason why they were not able to complete inpatient treatment for TB-related or other symptoms. Local hospitals in Brooklyn were singled out as being particularly punitive toward drug users. One IDU explained that she went to a hospital in Manhattan to treat an abscess on her neck because "that's the only hospital that doesn't discriminate against drug addicts." Only two IDUs among the 16 who had sought medical care at hospitals said that they had a positive experience while being treated at a hospital.

The interviews reveal the marked aversion among IDUs to going to a hospital altogether (except detox during cold weather). Furthermore, the New York State public health representative stationed at our project's research storefront estimated that he advised about 10 clients per day to seek medical treatment for a variety of ailments, but that they refused to follow his advice (personal communication, Sylvester Johnson, New York State Department of Health, AIDS Institute, AIDS Counselor, August 8, 1993).

Case 2. Mr. B. is an example of an IDU who voluntarily sought hospital care on his own initiative, but whose experiences in the hospital led him to discharge himself against medical advice, and to avoid all contact with the medical treatment system thereafter. B., a self-described HIV-positive, 29-year-old Puerto Rican, was an IDU who ran a neighborhood shooting gallery where J. was a frequent customer. The field notes show that he was admitted to a local Brooklyn hospital (hospital C) with

possible symptoms of pneumonia and TB (high fever and heavy sweating). Those symptoms had persisted, and his condition had deteriorated for several weeks prior to his seeking admission to the hospital. Once admitted, as in J.'s case, methadone was not given. Moreover, a definitive diagnosis of TB was not confirmed, because B. left the hospital as soon as his acute symptoms subsided.

He said that he left the hospital in order to alleviate his withdrawal symptoms, and because he had been threatened by his doctor with involuntary detention for noncompliance with a complete TB diagnosis procedure and possible treatment. When B.'s symptoms returned several weeks later, he resisted going to a hospital. He had heard negative stories, such as threats of detention and withholding methadone, from IDUs in his gallery (including J.), who had been at other hospitals.

At least four other regulars from his shooting gallery had told him that they had tested PPD-positive and believed that they had TB, but were not currently receiving or seeking treatment. Within days of his discharge, B.'s symptoms returned. He tried to compensate for his deteriorating health by ingesting extraordinarily large amounts of drugs, thereby masking his condition. B. was visibly sick, sweating profusely and rapidly losing weight. Yet, he refused to seek medical care, despite frequent admonitions by project staff members and other IDUs, his companions in the shooting gallery.

A chance to receive treatment for his problems came a few weeks later, when David Condliffe, then Director of the New York City Mayor's Office of Drug Abuse Policy, went to the neighborhood to observe conditions among drug users, to urge them to enter drug treatment, and to talk with them about the reasons for their reluctance to enter drug treatment. To encourage their cooperation, he offered immediate entry to a treatment facility, which is difficult for an addict to obtain in New York City. Responding from the second floor of the burned-out shell of the shooting gallery building, B. said that he was not interested in the offer. While other drug users in the gallery went downstairs to sign up for treatment, B. refused to go down or give Mr. Condliffe an opportunity to persuade him otherwise. He turned his attention to other things as a way of ignoring continuing appeals to avail himself of the unusual opportunity.

Two weeks later, B. developed a large abscess on the back of his hand as the result of unsanitary injection practices. When the abscess burst, B. continued to refuse to go to the hospital and wrapped his hand in a soiled handkerchief. He tried to clean it

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with alcohol swabs he took from bleach kits left in the shooting gallery by AIDS outreach workers. Though clearly in pain, B. refused to go to a hospital, because he feared he would never get out. A few weeks later, in mid-September 1992, B. was arrested for selling drugs and was sent to Rikers Island. It is possible that B. simply did not desire drug treatment when it was offered. But it is noteworthy that before he was threatened with detention at a local hospital, he had been much more receptive to outreach workers who suggested he seek drug abuse treatment. Like many drug users in the neighborhood, J. and B. were incarcerated several times during 1992 in the stepped-up war on drugs in their neighborhood. As a result of such efforts, many IDUs had the additional fear of incarceration as a consequence of non-compliance with TB treatment.

Case 3. Mr. L., a self-described HIV-positive, 31-year-old Puerto Rican IDU, was another shooting gallery operator. He regularly shared drugs with both B and J. In September 1992, L. was arrested by police on outstanding warrants and sent to Rikers Island for 3 months. A review of the M11Q form that physicians completed at Rikers Island showed that he tested PPD-positive, but that his subsequent chest X-ray was normal. Isoniazid (INH) preventive therapy and vitamin B₆ were prescribed for him as precautionary measures.

Note that although L. did not have active TB, he believed he did and that the doctor had "cured" him while in Rikers Island. The medication, he believed, would suffice to prevent the disease from coming back. L. said that the doctor told him that he would have to take the medication for a year. A call to the attending physician at Rikers Island showed that their standard instructions to HIV-positive patients who are prescribed INH is that they should take the medication for the rest of their lives.

When discharged in December 1992, L. went back to the neighborhood and spoke of his resolve to

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"clean up" his life, obtain housing, and take his TB medication until no longer necessary. However, L. said he had not been referred to a clinic or provided with TB medications to take after his release. He had merely been given a completed M11Q form and told to present it at an office in Manhattan. Within a day, L. was observed injecting cocaine at two drug-user locations. Within a week, L. had taken over management of a local shooting gallery. At the end of April 1993, L. was rearrested and sent back to Rikers Island.

When visited there by the interviewer in July, he spoke of his concern that his T-cell count had dropped significantly (by more than 200) since his last checkup. When asked whether he had been put on preventive therapy for TB, he said that he had been prescribed no medication by the physicians at Rikers Island. He said that he knew that inmates with TB were housed in a different building and insisted that he did not have the disease. He said that he saw no reason why he should take any TB medication. When visited again in August 1993, L. said that the nursing staff had begun to give him daily doses of INH and vitamin B6. He said that he understood that INH was for TB, but did not understand why he had to take it, since he did not have TB and felt quite healthy. He went on to boast that at 5 feet, 5 inches in height, he could bench press 315 pounds, felt "like a bull," and saw himself as a model of peak physical condition. He said that he did not understand why the nurses had told him that he would have to take the INH the rest of his life. When the interviewer explained that this was a course of preventive therapy, he expressed fear that he would not be able to comply with a regimen that required daily doses, since he was homeless and lived in such an unstable environment.

Discussion

Data from formal interviews conducted in the neighborhood as part of the larger study indicate that

TB is a growing problem among IDUs, especially those who are HIV-positive. However, as the cases of J. and L. illustrate, there is a serious lack of understanding among those who test PPD-positive as to their TB status. Both J. and L. believed that they had active TB, in spite of the fact that their medical records indicated that they did not. They reported that their physicians had told them that they had TB and that they were temporarily "cured," but that the cure was contingent upon them continuing to take their medication. Those patients' lack of understanding about their health status with respect to TB suggests that greater effort is needed to educate both at-risk populations and their health care providers about TB and the differences between TB and other diseases.

Although J. did not have active TB, she was PPD-positive. The Centers for Disease Control and Prevention has recommended a course of 12 consecutive months of INH preventive therapy for all HIV-positive or HIV-status-unknown IDUs (28). Some physicians recommend that persons who are HIV-positive take a combination of INH and multivitamins as prophylaxis for the rest of their lives.

J. reported that she did not receive INH or multivitamins while in the hospital, or a prescription for them upon discharge. Her medical record seems to confirm this, as it contains no mention of INH or multivitamins having been prescribed, either while she was in the hospital or at her discharge, which was against medical advice.

Not instituting a program of preventive therapy, or not providing appropriate outpatient referrals in the cases of J. and L., are indicative of major failures in the health care role of local hospitals and the New York City health care system.

City correctional institutions. We found that more than 40 percent of our sample of 796 IDUs were HIV-positive and at high risk of developing active TB, if infected with TB bacteria. Yet, none of our subjects, to our knowledge, had been put on a course of preventive therapy. According to several health care providers we interviewed, a major stumbling block to providing care for that population is that Medicaid does not reimburse physicians for TB preventive therapy visits, although it does reimburse for the treatment of the active disease.

Information from interviews and observations suggests that the study neighborhood is a community that is seriously ill-prepared to deal with an outbreak of TB. There were minimal services for TB diagnosis and treatment and no TB-focused outreach to at-risk populations within the community. The case studies suggest that many local hospitals lack a cohesive or

well-conceived approach to the TB epidemic. For example, at one local hospital, physicians from the medical units did not usually consult with physicians from the substance abuse units when they treated an IDU. One exasperated social worker who was familiar with that impasse, as well as the high rate of AMA discharges (discharge against medical advice) among IDUs, was that IDUs "should learn to be vigorous self-advocates" to be assured of adequate methadone therapy while in the hospital. Yet many IDUs who were interviewed reported that their efforts to obtain methadone therapy were met with resistance and contempt by hospital staff.

Those findings are similar to those found by Rosenbaum in her study of female heroin users, who complained that they were treated with "intense disrespect" by hospital staff members. She noted that "The attitude of hospital staff can set up a pattern of continued failure to comply with medical prescription for proper health care" (29).

Anecdotal evidence collected from hospital-based drug treatment professionals suggests that many New York City hospitals are increasingly reluctant to admit IDUs because they are considered to be "difficult and expensive" patients to treat. Because of unprecedentedly high rates of PPD-positive tests now being found among hospital staff members, IDU patients are a likely source of TB infection. Despite the dangers and difficulties that IDU patients may pose to hospital staff members, every effort must be made to keep such patients voluntarily in the hospital. This suggests that there may be a need to educate and sensitize members of hospital staffs to the health problems and life circumstances of IDUs. The threat of involuntary detainment for lack of compliance with TB diagnosis procedures or treatment appeared to be as much of an issue for some IDUs as lack of adequate methadone or antagonistic attitudes of hospital staff persons. Some IDUs, such as B., have come to avoid all forms of health-related services, including HIV outreach workers, from fear of being reported to the New York City Department of Health.

Directly observed therapy. DOT has been suggested as a key strategy for TB control (15). Under a community TB prevention and treatment program using DOT, for example, patients could receive therapy without having to leave their neighborhood. They could be treated and managed without hospital admission or involvement with what they find to be a threatening institutional environment.

Programs that are successful in getting patients to comply with TB treatment regimens are programs that are likely to involve more than simply watching

patients take pills several times a week. Implementing DOT adequately on a citywide or nationwide scale for TB prevention and treatment is an expensive proposition; however, the costs of such programs may ultimately be seen as far less expensive than the costs of treating a rising number of cases of the active disease. While DOT programs appear to be gaining in popularity among many health care professionals, the manner and context in which DOT is implemented, in or out of hospital settings, may hold profound consequences for the ultimate success of such a strategy (18). If DOT proves unsuccessful in treatment programs of multi-afflicted populations, incarceration is likely to gain favor as the only remaining alternative (24).

Results from programs that have employed DOT as a strategy for ensuring that difficult-to-treat patients continue to take their TB medication suggest that DOT is not a magic formula for immediately solving the problem (30, 31). For example, in one study in California, only 57 percent of crack users with TB who were placed on DOT successfully completed treatment (31). In that study, DOT meant that "each dose of medication (was) observed and recorded" by a communicable disease technician (CDT) following a patient's discharge from a hospital. CDTs observed medication being taken "at homes of patients or friends, at work, on the street, in the park, at liquor stores, in crack houses, and in other settings" (31).

Even this far-ranging attempt to bring DOT to the patient, rather than to require that the patient come to a hospital or clinic, met with only limited success. Despite such modest success, however, DOT may represent a far more effective and less expensive option than incarceration. Such is their fear of incarceration that many IDUs avoid the persons or institutions that they most need for assistance.

The success of DOT in New York City and elsewhere might be enhanced if it was combined with advances in the field of substance abuse treatment. For example, one approach that may have great potential is combining DOT with low-threshold methadone treatment, which would mean that clients would receive TB medication (or INH and vitamin prophylaxis) when they picked up their methadone. Bayer and coworkers recommend that, to improve patients' likelihood of completing treatment for TB, "An effective plan of treatment should include the provision of a secure residence with a range of social services and treatment options appropriate for each patient. Individuals with substance abuse problems must be encouraged to participate in and be guaranteed access to appropriate inpatient or outpatient treatment" (21).

The successful implementation of programs using DOT in New York City and elsewhere will depend largely upon the adequacy of staff organization, training, and preparation, as well as on the ability to design and implement programs that meet drug users' needs. The experience gathered in AIDS prevention efforts with IDUs suggests some of the ways that DOT might be made more effective (32-34). Outreach workers, syringe-exchange program staff members, and volunteers have learned that IDUs can be worked with in the streets on behalf of their own health. This requires that staff members understand the problems and environments of IDUs and that they show respect for their clients. IDUs have responded to such approaches by reducing HIV risk behaviors, seeking drug treatment, and helping outreach workers in their efforts (35, 36).

DOT programs might also benefit organizationally from some of the innovations developed in AIDS prevention programs. Ethnographers or sociological field workers who have studied drug injectors can provide valuable guidance for interventions among IDUs. In many cases, ethnographers or field workers have managed HIV prevention projects; in other cases, they have experience in supervising staff members in the field; and some have served as program consultants. In cities where there are HIV-related outreach programs, such as bleach distribution or syringe exchanges for IDUs, the DOT staff should seek the advice of staff members from those programs. In some cases, cooperative relationships in which projects can work together are possible. In at least two American cities, Portland, OR, and Baltimore, MD, and in other countries, drug users have formed their own organizations. They are engaged in AIDS prevention and other projects that address the needs of IDUs, and some AIDS projects have formed drug-user advisory boards that provide advice (37, 38). Similar advisory boards of IDUs might assist TB control efforts as well.

Law enforcement organizations need to be brought into the effort to help prevent a TB epidemic. There is a need to understand the effects that law-enforcement policies and programs have on efforts to control TB. The breakup of drug-use networks by the intensified war on drugs efforts, and incarceration without adequate TB prophylaxis, may make the prison system an epicenter of a TB epidemic. Public safety must be redefined to include public health.

Finally, we must take seriously a dilemma involving policy related to TB control efforts. Detaining patients who remain noncompliant with prevention therapy or treatment may reduce the spread of TB, but produces a reaction among IDUs

that could outweigh any positive effects. If IDUs with TB shun hospitals out of fear of detainment, a greater number of persons would be actively transmitting disease than if the noncompliant were not detained, and many who would be compliant could be deterred from treatment. We have some evidence that this may be occurring, although the extent of the phenomenon remains unclear.

Research can help in resolving this issue. Quantification is needed of the numbers of noncompliant TB patients and of sick IDUs who shun medical treatment. Based on research, models of the numbers of infectious person-days in the community could be developed. While awaiting the results of such research, public health officials should use a cautious approach to the question of detaining IDUs who are noncompliant with TB prevention and treatment procedures and in their public pronouncements about such policies. What may appear to make sense in handling a single case is likely to be counterproductive to efforts to prevent TB on the community level.

References.....

1. Frieden, T. R., et al.: The emergence of drug-resistant tuberculosis in New York City. *N Engl J Med* 328: 521-526, Feb. 25, 1993.
2. Stoneburner, R. L., et al.: Tuberculosis and acquired immunodeficiency syndrome—New York City. *JAMA* 259: 338-345, Jan. 15, 1988.
3. Gordin, B. R.: Tuberculosis control—back to the future? *JAMA* 267: 2649-2650, May 20, 1992.
4. Bloom, B. R., and Murray, C. J. L.: Tuberculosis: commentary on a reemerging killer. *Science* 257: 1055-1064, Aug. 21, 1992.
5. Woodard, C.: Fatal TB spreads. *Newsday*, Nov. 19, 1992, p. 8.
6. Belkin, L.: New York hospitals faltering on TB, state says. *New York Times*, Oct. 23, 1992, p. B1.
7. Specter, M.: TB carriers see clash of liberty and health. *New York Times*, Oct. 14, 1992, p. A1.
8. Brudney, K., and Dobkin, J.: Resurgent tuberculosis in New York City. *Am Rev Respir Dis* 144: 745-749 (1991).
9. New York City Department of Health, Bureau of Tuberculosis Control: Tuberculosis in New York City, 1992.
10. Iseman, M. D., Cohn, D. L., and Sbarbaro, J. A.: Directly observed treatment of tuberculosis—we can't afford not to try it. *N Engl J Med* 328: 578, Feb. 25, 1993.
11. Daley, C. L., et al.: An outbreak of tuberculosis with accelerated progression among persons infected with the human immunodeficiency virus. *N Engl J Med* 326: 231-235, Jan. 23, 1992.
12. Selwyn, P. A., et al.: High risk of active tuberculosis in HIV-infected drug users with cutaneous anergy. *JAMA* 268: 504-509, July 22/29, 1992.
13. Villarino, M. E., Geiter, L. J., and Simone, P. M.: The multidrug-resistant tuberculosis challenge to public health efforts to control tuberculosis. *Public Health Rep* 107: 616-625, November-December 1992.

14. Campbell, R., et al.: Probable transmission of multidrug-resistant tuberculosis in a correctional facility—California. *MMWR Morb Mortal Wkly Rep* 42: 48–51, Jan. 29, 1993.
15. United Hospital Fund of New York: The tuberculosis revival: individual rights and societal obligations in a time of AIDS. New York, NY, 1992; pp. 31, 72.
16. Bayer, R., Dubler, N. N., and Landesman, S.: The dual epidemics of tuberculosis and AIDS: ethical and policy issues in screening and treatment. *Am J Public Health* 83: 649–654 (1993).
17. Reichman, L. B.: Fear, embarrassment, and relief: the tuberculosis epidemic and public health [editorial]. *Am J Public Health* 83: 639–641 (1993).
18. Rubel, A. J., and Garro, L. C.: Social and cultural factors in the successful control of tuberculosis. *Public Health Rep* 107: 626–636, November–December, 1992.
19. Annas, G. J.: Control of tuberculosis—the law and the public's health. *N Engl J Med* 328: 585–588, Feb. 25, 1993.
20. Scott, G.: TB tactic: the burger and stick. *Newsday*, Oct. 7, 1992, p. 4.
21. Specter, M.: Tougher measures to fight TB urged by New York panel. *New York Times*, Nov. 30, 1992, p. A1/B2.
22. Concato, J.: Quarantine now. *New York Times*, Sept. 3, 1992, p. A17.
23. Groopman, J.: Uncooperative tuberculosis patients must be quarantined. *The Home News*, Central New Jersey, Feb. 22, 1993, p. A5.
24. Navarro, M.: New York City to detain patients who fail to finish TB treatment. *New York Times*, Mar. 10, 1993, p. A1.
25. Skolnick, A. A.: Some experts suggest the nation's 'war on drugs' is helping tuberculosis stage a deadly comeback. *JAMA* 268: 3177–3178, Dec. 9, 1992.
26. Sviridoff, M., Sadd, S., Curtis, R., and Grinc, R.: The neighborhood effects of street level drug enforcement: tactical narcotics teams in New York. Vera Institute of Justice, New York, NY, July 1992.
27. Department of Commerce: Census of population and housing 1990: summary tape file 3 (New York, machine readable data files). Bureau of the Census, Washington, DC, 1991.
28. CDC: tuberculosis and human immunodeficiency virus infection: recommendations of the Advisory Committee for the Elimination of Tuberculosis (ACET). *MMWR Morb Mortal Wkly Rep* 38: 236–238, 243–250, Apr. 14, 1989.
29. Rosenbaum, M.: Women on heroin. Rutgers University Press, New Brunswick, NJ, 1981, p. 95.
30. Crane, C. M.: Crack cocaine use among persons with tuberculosis—Contra Costa County, California, 1987–1990. *MMWR Morb Mortal Wkly Rep* 40: 485–489, July 26, 1991.
31. Crane, C. M.: Tuberculosis in Contra Costa County, CA: crack cocaine, HIV, and noncompliance. Paper presented at the annual meeting of the American Public Health Association, Washington, DC, Nov. 8–12, 1992.
32. Friedman, S. R., Wiebel, W., Jose, B., and Levin, L.: Changing the culture of risk. *In Handbook on AIDS, IV drug users and sexual behavior in the United States*, edited by B. S. Brown and G. M. Beschner. Greenwood Press, Westport, CT, 1993, pp. 499–516.
33. Rivera-Beckman, J., Friedman, S. R., Clatts, M. C., and Curtis, R.: "Inside"—"outside": social process in street outreach. *In Community-based AIDS prevention among intravenous drug users and their sexual partners; the many faces of HIV disease*. NOVA Research Co., Bethesda, MD, 1991, pp. 23–28.
34. Wiebel, W.: Identifying and gaining access to hidden populations. *In The collection and interpretation of data from hidden populations*. NIDA Research Monograph 98. National Institute on Drug Abuse, Rockville, MD, 1990, pp. 4–11.
35. Neaigus, A., et al.: Effects of outreach intervention on risk reduction among intravenous drug users. *AIDS Educ Prev* 2: 253–271 (1990).
36. Broadhead, R. S., and Fox, K. J.: Takin' it to the streets: AIDS outreach as ethnography. *Journal of Contemporary Ethnography* 19: 322–348, October 1990.
37. Friedman, S. R., de Jong, W., and Wodak, A.: Community development as a response to HIV among drug injectors. *AIDS* 7: 263–269 (1993).
38. Price, C.: AIDS, drug users' organizations and public policy. *AIDS Public Policy* 7: 141–144 (1993).