Trends in the AIDS Epidemic Among New York City's Injection Drug Users: Localized or Citywide?

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ABSTRACT *The New York City injection drug user acquired immunodeficiency syndrome (IDU AIDS) epidemic accounts for almost one quarter of AIDS cases in IDUs in the United States. Recent studies have reported declines in seroprevalence and risk behaviors among IDUs in New York City during the 1990s. These trends, however, are based on studies primarily conducted in the city's central borough of Manhattan. This article analyzes data from all five boroughs of New York City to examine trends over phases of the epidemic and to determine the level of prevention services available; an exploratory qualitative study was also conducted to assess access to prevention services and injection practices in areas in the "outer boroughs." Findings indicated that (1) borough differences in services and behaviors existed from early in the epidemic; (2) services have been concentrated in Manhattan; and (3) declines in seroprevalence were greatest among Manhattan-recruited IDUs. Enhancing access to services for IDUs in the boroughs outside Manhattan may be needed to continue the positive trends in all areas of New York City.*

INTRODUCTION

With approximately 50,000 cases of acquired immunodeficiency syndrome (AIDS) among injection drug users (IDUs), New York City has the largest urban drug use human immunodeficiency virus (HIV) epidemic in the world.¹ The New York City AIDS cases among IDUs have accounted for almost one quarter of the total number of IDU AIDS cases and one tenth of all AIDS cases in the United States.¹ The estimated size of the city's HIV-seropositive IDU population (approximately 70,000) is five times greater than the two next largest metropolitan statistical areas combined.²

A majority of heterosexually transmitted AIDS cases among females involve sexual contact with a male IDU.² Therefore, the nearly 9,000 cases of AIDS diagnosed in New York City women reporting this risk factor³ may also be considered part of the IDU AIDS epidemic. This article uses available historical data to explore trends in the New York City AIDS epidemic to evaluate whether recent reports of declining seroprevalence in this population do, in fact, apply to New York City as a whole.

Long-term studies based primarily in New York City's central borough of Man-

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hatten closely monitored the HIV/AIDS epidemic among IDUs through data collected continuously from the late 1970s through 2000. Many IDUs residing throughout the city's five boroughs have enrolled in treatment in Manhattan. Various studies,^{1,4-13} including a long-term cohort study in the Bronx, have monitored a pattern that began with rapid spread of the virus during the late 1970s through the early 1980s. Early studies^{14,15} indicate that IDUs had become aware of AIDS risk; by 1983, they had begun to reduce risk behavior. During the 1980s, there were approximately 10 years between HIV infection and diagnosis of AIDS.¹⁶ Newly diagnosed cases among IDUs peaked in all boroughs in 1993-1994 and in 1994 began declining (New York City Department of Health, Office of AIDS Surveillance, unpublished data, 2000), reflecting, respectively, the early period when HIV spread rapidly and the subsequent development of awareness of how AIDS was transmitted. Beginning approximately in 1986, information about AIDS was widely disseminated in the IDU population partly through organized outreach and education activities. Seroprevalence rates, which had reached above 50% by 1984, stabilized until the early 1990s at about that level.^{4,5} This period of stabilization represented a balance among four major factors: new infections among IDUs and their partners, a loss of seropositive individuals (mainly due to AIDS-related deaths), the entry of initiates into the IDU population, and conscious behavioral risk reduction.^{4,5,8,9} In addition, widespread use of syringe-exchange programs (SEPs) began in the late 1980s, several years before they were legalized.¹⁷ In the early 1990s, a large-scale expansion of government-supported prevention programs began—primarily methadone maintenance treatment programs (MMTPs) and SEPs.⁹ Further reductions in risk behavior were documented, and considerable evidence for a first actual decline in a very large HIV epidemic among IDUs was presented.¹

A question remains, however, as to whether this decline occurred throughout the city. With an area of 321.8 square miles, New York City's five boroughs (the Bronx, Brooklyn, Queens, Staten Island, and Manhattan) are also individual counties. The population of each borough (with the exception of Staten Island) is in excess of 1 million. Most studies of HIV seroprevalence and risk factors conducted in New York City have been Manhattan based, even though they may have included subjects who resided in other boroughs. This article analyzes data from New York City by borough as an exploratory study to suggest approaches for assessing whether the encouraging trends over the last decade occurred primarily in Manhattan or were reflective of the city as a whole.

Manhattan is the central borough of New York City, with the largest concentration of major teaching and research hospitals in the United States. These facilities enroll large numbers of low-income or uninsured patients who otherwise would not have access to care.

Manhattan is also the smallest in area of the five boroughs, with the greatest availability of public transportation and highest concentration of population and health care facilities. The very large rapid transit rail system (known as the subway) consists of many separate lines, nearly all of which pass through Manhattan, providing a high level of service for that borough's residents, both within the borough and to points outside. Due to Manhattan's special circumstances, health and social programs are conveniently located to nearly all neighborhoods. This program characteristic, proximity, is often decisive in determining whether low-income, uninsured, or stigmatized populations can access health and other services.

Historically, HIV/AIDS prevention programs have also been unevenly distributed across the city. For example, SEPs, legal in New York City since 1992, exist

in only three of five New York City boroughs. Recent research in New York and elsewhere indicates that there is a significant relationship between geographic proximity to legal syringe distribution locations and safer injection practices.^{18,19} The unequal distribution of both general health and HIV-specific prevention services on the borough (county) level may have been an important factor in shaping the New York City IDU epidemic and may have contributed to possible differences in trends among the five boroughs.

Research on IDU populations in New York City who reside in communities that are relatively underserved by effective HIV/AIDS prevention interventions, such as SEPs and MMTPs,²⁰ can enhance our understanding of the impact of varying levels of access to prevention services. In addition, assessment of the geographic variation in seroprevalence and risk behaviors can assist in placing additional prevention programs where the greatest number of new infections may be avoided.

Although a late 1980s study of street-recruited IDUs showed higher HIV seroprevalence in the Bronx compared to Brooklyn and Queens,²¹ to date no studies of HIV seroprevalence and HIV risk factors among IDUs have included subject intake sites in all five boroughs. No concurrent studies taken together permit comprehensive comparisons on the borough level.

Given the extent and magnitude of the epidemic in New York City among IDUs and their sexual partners, it is important to consider borough-level differences, as well as phases of the epidemic, in describing long-term trends. The initial phase of the IDU-related epidemic in New York City can be explored by retrospective examination of AIDS case rates on the borough level. Data on heterosexually transmitted AIDS among women through 1993 reflect HIV infections occurring in the decade prior to widespread knowledge of the dangers of heterosexual transmission of HIV²² (since estimated time from HIV infection until AIDS diagnosis was approximately 10 years during this period).¹⁶ For the next phase, 1994–1999 borough-level comparisons of newly diagnosed IDU AIDS cases among both sexes and heterosexually acquired cases among women reflect behavioral and other factors occurring roughly from 1984 to 1989, when knowledge about AIDS transmission and education and outreach efforts originated and were developed.

The 1990s declining phase of the epidemic has been characterized by continuing behavioral risk reduction to avoid HIV and establishment of large-scale public prevention programs.⁹ For this period, it is possible to examine recent seroprevalence rates and the presence of prevention programs by borough.

Objectives for this study were to first to conduct analyses of existing data to (1) examine trends in New York City AIDS cases and HIV prevalence by borough and phase of the epidemic and (2) determine the level of prevention programs available in New York City by borough over time and second to conduct an exploratory qualitative study to assess (1) injection practices in selected geographically remote areas of New York City and (2) assess the extent to which IDUs in these communities, with less access to syringe exchange and drug treatment, utilized such services.

METHODS

Two methods were used: (1) the compilation and analysis of existing data on historical AIDS case rates, recent HIV seroprevalence, and HIV prevention service levels by borough and (2) a qualitative study conducted in Staten Island and Rockaway, Queens—two communities an hour or more travel time from Manhattan and with less access to services.

Analysis of Existing Data

In view of a changing epidemic from the 1970s through 2000, we examined three periods during which HIV/AIDS and prevention services trends might have varied by borough. For the first phase (prior to 1984), we compared, by borough through 1993, the ratio of numbers of cases among male IDUs to numbers of heterosexually transmitted AIDS cases among women. These AIDS diagnoses reflect an epidemiological phase when HIV infections were acquired in the nearly general absence of knowledge about the risk of heterosexual transmission.

To examine results of changes in the second phase, 1984–1989, which included the spread of knowledge of AIDS, initiation of risk reduction efforts, and the development of large-scale AIDS education and outreach efforts, we compared the borough-level distribution of newly diagnosed AIDS cases in the 1994–1999 period to all years prior to 1994.

For the third phase, 1991–1996, which included the expansion of prevention services and a declining epidemic, we compared both HIV seroprevalence rates and levels of prevention services in each borough. Three sources of data were utilized: (1) seroprevalence data by borough collected by the New York City Department of Health, (2) the number of available MMTP slots and sites in each borough (collected by the New York State Office of Alcohol and Substance Abuse Services throughout the 1990s), and (3) the number of SEP sites and the total number of hours of access for each borough, obtained from the New York City AIDS Institute in 2000. (We did not attempt to quantify community-based HIV education and outreach programs. Definitional problems, as well as the wide range of programs that would need to be identified and classified, put that task beyond the scope of this study.)

Qualitative Data

In an exploratory study, we collected qualitative data by interviewing key informants (two in Staten Island and two in Rockaway), as well as conducting focus groups (two in each community). Health and social service personnel served as key informants. For Staten Island, key informants included the head of a major AIDS outreach and prevention agency and the manager of HIV health services at a large hospital. For Rockaway, our key informants included the coordinator of education programs at an AIDS services agency and an HIV counselor in a large community hospital's outpatient drug treatment program. AIDS outreach and prevention organization staff members and currently active IDUs (recruited by the outreach program staff) served as members of separate focus groups in each location.

RESULTS

Data on AIDS Cases by Epidemic Phase

Table 1 presents, by borough, the numbers of male IDU cases, the numbers of diagnosed AIDS cases among women attributed to heterosexual transmission, and the ratio of these figures for the period 1980–1993. Note that, while the number of heterosexually transmitted cases among women in Manhattan was smaller than in Brooklyn or the Bronx, the three boroughs had comparable numbers of IDU-related AIDS cases. Also, the ratio of male IDU cases to heterosexually transmitted cases among women was higher in Manhattan than in each of the other boroughs. This suggests fewer heterosexual transmissions to female sex partners per each HIV-infected male IDU in Manhattan than in the other boroughs.

TABLE 1. Ratio of male injecting drug user (IDU) AIDS cases to female heterosexual AIDS cases through 1993 by borough

	Male IDU AIDS cases (n)*	Female heterosexual AIDS cases (n)	% City (total)	Ratio of male IDU to female heterosexual AIDS cases
Manhattan	7,940	785	21%	10 : 1
Queens	3,382	503	13%	6.7 : 1
Staten Island	622	111	3%	5.6 : 1
Brooklyn	6,708	1,216	33%	5.6 : 1
Bronx	5,841	1,116	30%	5.2 : 1

Source: Adapted from New York City Department of Health, Office of AIDS Surveillance (OAS). *AIDS in the Boroughs and Neighborhoods of New York City*, Volume 3, New York, NY: New York City Department of Health, Office of AIDS Surveillance; 1999, and unpublished updates for OAS.

*Does not include men reporting sex with men.

Table 2 shows the numbers of newly diagnosed AIDS cases in each borough for the pre- and post-1994 periods. The rate of decline in new cases among IDUs was higher in Manhattan than in each of the other boroughs. In the early period, the total of newly diagnosed AIDS cases among IDUs was highest in Manhattan. In the later period, more new cases were diagnosed in both the Bronx and Brooklyn than in Manhattan. In addition, the number of newly diagnosed heterosexually transmitted AIDS cases among women in both the Bronx and Brooklyn continued to exceed those in Manhattan. In 1999, for the first time, total of IDU-related AIDS cases in an outer borough (Brooklyn) surpassed that in Manhattan.

Recent HIV Seroprevalence Rates

Data are presented on recent changes in HIV seroprevalence rates collected at sexually transmitted disease (STD) clinics (see Table 3).²³ This study is unique in New York City in that it collects seroprevalence data on IDUs from sites located in each borough. (The data for Staten Island were not available. The New York City Department of Health does not release study results if there might be a risk of breach in confidentiality due to small cell sizes.²³) These data are based on subjects reporting any drug injection since 1978 who attended a citywide network of STD clinics. During the period of large-scale HIV prevention interventions, declines in HIV seroprevalence ranged from 2% (Queens) to 11% (Manhattan). The decline in the seroprevalence rate was significant in Manhattan ($P < .05$, χ^2 for trend), but not in any of the other boroughs.

Availability of Prevention Services

Table 4 presents the numbers of individual MMTP treatment slots and sites, percentages of each borough's in-treatment IDUs enrolled in MMTP outside their borough of residence, numbers of SEP sites, and total hours of operation of SEPs. On the borough level, MMTPs and SEPs appear to be heavily concentrated in Manhattan. Fully half of all MMTP sites are located in Manhattan, as well as 45% of available slots (New York State Office of Alcoholism and Substance Abuse Services, unpublished data). Similarly, 48% of SEP sites are located in Manhattan, as well as 43% of all operational hours of access.²⁴ As can be seen in the table, except for Manhattan residents, many MMTP clinic users are likely to reside in boroughs

TABLE 2. New York City injecting drug user (IDU) AIDS cases and female heterosexual AIDS cases by borough prior to 1994 and 1994–1999

	Newly diagnosed IDU AIDS cases			Female heterosexual AIDS cases			Combined totals of IDU and female heterosexual AIDS cases		
	<1994	1994–1999	% Change	<1994	1994–1999	% Change	<1994	1994–1999	All years
Manhattan	10,588	5,388	–97	785	862	+10	11,373	6,250	17,623
Brooklyn	9,661	5,634	–71	1,216	1,448	+19	10,877	7,082	17,959
Bronx	8,044	5,481	–47	1,116	1,401	+26	9,160	6,882	16,042
Queens	4,558	2,690	–69	503	669	+33	5,061	3,359	8,420
Staten Island	809	524	–54	111	94	–15	920	618	1,538
Total	33,660	19,717		3,731	4,474		37,391	24,191	61,582

Source: New York City Department of Health, Office of AIDS Surveillance, unpublished data, 2000.

TABLE 3. Changes in HIV seroprevalence among New York City injecting drug users in sexually transmitted disease clinics by borough: 1991–1993 and 1994–1996

	1991–1993		1994–1996		% change	<i>P</i> *
	No. tested	% HIV+	No. tested	% HIV+		
Manhattan	246	38	301	27	–11	.006
Brooklyn	159	33	129	26	–7	.127
Bronx	327	30	251	26	–4	.290
Queens	94	29	95	27	–2	.759

Source: Adapted from New York City Department of Health, Office of AIDS Research. *HIV Seroprevalence Update*, New York, NY: New York City Department of Health, Office of AIDS Surveillance; 1997.

*Chi-square test.

other than where the service is provided, ranging from 19% of those from Staten Island to 38% of those from Queens.

Qualitative Studies

The following is a summary of findings based on key informant interviews and focus groups related to issues of levels of drug injection, access to prevention services, and risk behaviors. These interviews and focus groups were conducted in two areas of New York City that are relatively inaccessible to HIV prevention and other health and social services.

Staten Island Unlike in other New York City boroughs (where injection and intranasal use each now account for about half of all admissions to MMTPs),²⁵ nearly all (95%) of new entrants into the MMTP in Staten Island report injection drug use. Consequently, the demand for sterile syringes remains very high in Staten Island, with few legal means for acquiring them within the borough and no SEP. For most IDUs, routine travel outside Staten Island to acquire legal sterile injection equipment is often not practical due to long travel times to other boroughs. Those

TABLE 4. Current methadone maintenance treatment programs (MMTPs) and syringe-exchange programs (SEPs) by borough

	MMTP			% in MMTP enrolled outside borough of residence	SEP		
	No. of sites*	No. of slots	% Total		No. of sites	% Total	Hours/week
Manhattan	35 (50%)	15,214	(45)	3	12	(48)	129 (43%)
Brooklyn	15 (21%)	7,235	(21)	28	7	(28)	102 (34%)
Bronx	14 (20%)	8,827	(26)	28	6	(24)	69 (23%)
Queens	4 (6%)	2,053	(6)	38	0		0
Staten Island	2 (3%)	718	(2)	19	0		0
Totals	70 (100%)	34,047	(100)		25	(100)	300 (100%)

Source: New York State Office of Alcohol and Substance Abuse Services, New York Department of Health AIDS Institute, and Office of AIDS Surveillance as of January 2000, unpublished data.

*Refers to number of locations for methadone pickup.

IDUs who enroll in SEPs in other boroughs (3 among 13 focus group participants) sell syringes not reserved for personal use. According to IDU focus group participants, most Staten Island IDUs buy syringes on the street. Usual street sources include diabetics, who obtain them with a prescription. The street market value is \$3–\$5. (Manhattan street value for syringes is typically \$1). Focus group members reported that all MMTP slots in Staten Island were currently filled. There is a waiting list, sometimes as long as several months, to enroll in MMTP in Staten Island. A peer educator participating in a focus group said that syringe sharing is common in Staten Island due to high street market prices for syringes and the inconvenience involved in legal or illegal acquisition. One IDU focus group participant said, “The word is out on the risk of sharing works. But whether you have a clean syringe when you inject depends on how you organize yourself. Also, a lot of IDUs only go through the motions of cleaning used syringes.”

Rockaway Rockaway is also underserved in terms of SEP and MMTP services. There is no SEP in Rockaway. The nearest SEP is in Brooklyn, at least a 2-hour round-trip by public transportation. There is no MMTP in Rockaway. The nearest MMTP clinic is in Jamaica, Queens, which is also at least a 2-hour round-trip by public transportation.

According to the director of the education program in an AIDS services agency, concerted community outreach to Rockaway IDUs began recently in 2000. Rockaway is years behind many other communities in this respect. Syringes are still typically bought on the street for \$2–\$3. Several IDU focus group participants said that, because of the required investment of time and expense, travel to syringe exchanges in other boroughs is “not worth it.” Another said that, while most IDUs know not to share syringes, many are not educated about the risks of sharing some injection equipment, such as cookers and water.

A counselor in a community hospital said that patients who enroll in an MMTP in Jamaica or in Manhattan might often miss methadone pickups due to problems with the single train line serving Rockaway. Many patients have been removed from the programs because pickups were missed. Clients are then obliged to seek admission elsewhere, even further away.

DISCUSSION

The major limitations of this study are the retrospective nature of the data, the restriction of the qualitative data to only two locations (due to funding limitations), and the lack of consistent behavioral data across epidemic phases and across the boroughs. Nevertheless, in retrospect, it appears that there were epidemiological differences associated with special circumstances of Manhattan from the earliest stages of the epidemic, even before there was much scientific or common awareness of HIV and its implications for IDUs and their sexual partners. A period of very rapid spread occurred from as early as the first one third of the 1970s decade. Nearly a decade had passed before IDUs or the medical and social service communities and media became aware of AIDS and its causes. New AIDS cases among IDUs peaked in all boroughs in 1993–1994, reflecting the period of rapid HIV spread during the previous decade, before first awareness of HIV/AIDS. In the subsequent phase of decline, the data reviewed in this article indicate that the numbers of new cases fell more rapidly in Manhattan.

The lower number of heterosexual AIDS cases among women in Manhattan

than in the Bronx and Brooklyn during the earliest period of the epidemic (as compared with similar numbers of male IDU-related cases) indicates that safer sex practices may have been more normative in Manhattan than in the other boroughs. Although a host of conditions is likely to have differed among the five boroughs (e.g., with respect to drug use patterns, STD diagnoses and treatment programs, and cultural norms), these may also have included precautions taken to avoid sexually transmitted diseases other than HIV and/or be related to the concentration of medical and/or social service facilities in Manhattan. The combination of a lower number of new AIDS cases among IDUs and continued lower number of heterosexually acquired cases among females in Manhattan than in the other boroughs in the 1994–1999 period suggests important differences in these areas. Conditions for dissemination and reception of information about HIV/AIDS in the middle to late 1980s, whether through word of mouth among IDUs and their sexual partners or between the medical and social services communities and the communities at risk, may have been better in Manhattan than in the other boroughs. While little or no concerted outreach and education efforts existed in the earlier years (1984–1986) of the period that is reflected (1994–1999), large-scale organized education and outreach efforts were developed in the later years (1987–1989). The apparently greater overall impact in Manhattan of the increasing dissemination of information about AIDS risk was likely due to a more extensive preexisting network of medical and/or social services that could reinforce risk reduction among IDUs.

As MMTPs and SEPs greatly expanded in the 1990s, prevention services continued to be concentrated in Manhattan. The recent declining epidemic, including lowered seroprevalence rates, has been concurrent with a rapid expansion of HIV prevention programs in most areas of New York City. For Manhattan in particular, these may now have reached the “critical mass” needed to reduce the level of new HIV infections to the point at which declining seroprevalence can, with confidence, be attributed to reduced HIV risk behavior. As one example, our data show that MMTP treatment slots are concentrated in Manhattan. Consequently, our data also show that a much smaller proportion of Manhattan IDUs than IDUs in the outer boroughs travel outside their borough of residence to access MMTP treatment. This suggests that there may be significantly smaller pools of untreated IDUs residing in Manhattan than in the outer boroughs. Perhaps larger numbers of untreated outer borough IDUs might enroll in treatment were it conveniently located. Convenient access is crucial in respect to a program that in most cases requires in-person, early morning, daily reporting.

The long-term concentration of major prevention programs in Manhattan appears to be related to the greater number of new infections (associated with IDU and female heterosexual transmission) occurring in both the Bronx and Brooklyn, compared to Manhattan, since 1984. Furthermore, given Manhattan’s growing advantage over the other boroughs in availability of prevention programs during the 1990s, an even greater share of new HIV infections may now be occurring in the outer boroughs, and these may be expected to show up as new AIDS cases (or as relatively higher HIV seroprevalence) over the next decade. Continued study of the AIDS epidemic in all the boroughs of New York City is needed to monitor these future trends.

The goal of actually reversing the IDU/AIDS epidemic in all of New York City may depend on enhancing access to HIV prevention services in the boroughs outside Manhattan. Future policy changes at the state and federal levels may have a major impact on the AIDS epidemic among IDUs throughout New York City. First,

over-the-counter syringe sale in pharmacies was recently legalized in New York State²⁶ and became effective January 1, 2001. Pharmacy sales may provide many legal sterile syringe distribution locations where none have existed before. Second, positive results from research on the provision of methadone by individual physicians from private office settings may lead to expansion of these services.²⁷ These changes may greatly increase both the geographic areas and overall numbers of distribution points of these two critical HIV prevention services.

In three prior stages described in this article, the AIDS epidemic in New York City among IDUs and their sexual partners may have been shaped by unequal geographic distribution of prevention and outreach services. A possibly imminent fourth phase of the New York City epidemic, characterized by wide geographic diffusion of sterile syringe distribution and drug treatment sites, offers a valuable opportunity to make these services more easily accessible to all neighborhoods at risk. This may be necessary to ensure that recent favorable trends on the city level continue and result in the further decline in the AIDS epidemic among IDUs and their sexual partners throughout New York City.

ACKNOWLEDGEMENT

This research was supported by the Center for Drug Use and HIV Research at National Development and Research Institutes, Incorporated (National Institutes on Drug Abuse grant P30DA11041).

We thank Renee Quintyne at the New York City Department of Health, Office of AIDS Surveillance, as well as Vince Fenlon at the New York State Office for Substance Abuse Services, for providing borough-level data. We also thank those individuals who participated in the key informant interviews and the focus groups.

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