

Disparities in HIV Prevention Services, Infection  
Rates and Mortality:  
A Comparison of Drug Users in Puerto Rico and New York

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## Executive Summary

There is a public health emergency among drug users in Puerto Rico. Drug users in Puerto Rico are becoming infected with HIV at rates that are among the highest anywhere in the United States. In 2002, Puerto Rico had the sixth highest rate of new AIDS cases among all the states in the United States, and the rate of children living with the disease was almost double the national average. It also has one of the largest numbers of reported AIDS cases among Caribbean nations. Puerto Rico's AIDS epidemic has been driven largely by injection drug use.

This report presents findings from the Alliance for Research in El Barrio and Bayamón (ARIBBA) research study, which compared HIV-related risk behaviors, HIV infection rates and mortality rates of 800 Puerto Rican injection drug users and crack smokers in East Harlem, New York with 399 of their counterparts in Bayamón, Puerto Rico. The study, conducted from 1996 to 2004, was funded by the National Institute on Drug Abuse. It is among the most comprehensive studies ever undertaken on HIV risk behaviors of drug users in Puerto Rico. The study used both quantitative and qualitative methodologies and the findings are based on initial and follow-up interviews and HIV tests.

This report presents the study's main findings, many of which have been published in scientific journals. The report also includes findings from a federally funded study on trends in Puerto Rico's drug treatment services, and an examination of death rates among project participants.

The study found that drug users in Puerto Rico became infected with HIV at a rate almost four times higher than Puerto Rican drug users in New York, and they died at a rate that was more than three times as high. The findings indicate that drug users in Puerto Rico are more likely than drug users in New York to engage in injection drug use and sexual behaviors that put them at risk of becoming infected with HIV. In addition, they have fewer prevention resources available to them. HIV prevention programs that have been proven to reduce the number of drug users who contract the virus, such as methadone maintenance and needle exchange programs, are scarce in Puerto Rico, and the availability of drug treatment programs in Puerto Rico declined by over one-third during the period examined. Additionally, the use of healthcare services among drug users in Puerto Rico is relatively low. For example, significantly fewer HIV positive drug users in Puerto Rico were taking HIV-related medications than in New York.

While the AIDS epidemic in Puerto Rico has been driven mainly through infections among injection drug users, the disease has wide-reaching health and social effects. Drug-related transmission has historically been HIV's main route into heterosexual and non drug-using communities, suggesting that it is a factor in the rate of AIDS among Puerto Rico's general population, including children. Additionally, HIV affects the families of those who are infected and depletes resources from healthcare systems that are already over-burdened.

The rate of new HIV infections can be reduced. HIV prevention programs for drug users reduce risk behaviors, thereby reducing transmission rates and the number of new infections. In fact, the study found that drug users in Puerto Rico who had migrated to New York, where there are substantially more HIV prevention programs, were less likely to practice high risk HIV-related drug injection than drug users who remained in Puerto Rico.

This report concludes with recommendations for public health officials and policy makers on ways to address the public health threat posed by the rate of HIV/AIDS among drug users in Puerto Rico. The recommendations, based on prior research on interventions that reduce HIV transmission, include 1) increasing the number and funding of methadone maintenance treatment programs and other drug treatment modalities, 2) increasing resources for street outreach projects, so that drug users can get current information about risk reduction and receive referrals to drug treatment and healthcare services, 3) increasing access to clean needles through pharmacy distribution and needle exchange programs, 4) increasing access to medical treatment for HIV-infected drug users, so that they can be healthier over a longer time period and their likelihood of infecting others is reduced, 5) developing an island-wide HIV surveillance system to monitor new infections and direct resources to where they are most needed, and 6) creating an island-wide task force to monitor and address the HIV/AIDS epidemic among drug users.

The report is organized in seven sections. Part I, *Sources of Information*, provides detailed information about the comparative Puerto Rico-New York research project (ARIBBA), including study locations, participant recruitment, and the information collected. Part II, *Overview of AIDS and HIV in Puerto Rico*, compares the epidemic in Puerto Rico to the United States and discusses the epidemic among Latinos. Part III, *Characteristics of Study Participants*, presents baseline demographic and drug use characteristics of the study participants. Part IV, *HIV-Related Drug Injection and Sex Risk Behaviors*, compares the risk behaviors of Puerto Rican drug users in Puerto Rico and New York, and Part V, *HIV Prevention and Health Services*, describes the services that participants reported using in the months before their interviews, and shows the reductions in drug treatment services in Puerto Rico between 1998 and 2002. Part VI, *HIV Prevalence and Incidence, and Mortality Rates*, compares the infection and mortality rates of participants in both locations. The final section, *Discussion and Recommendations*, presents specific steps that health officials and policy makers can take to reduce the number of people who become infected with HIV in Puerto Rico. The appendices include a bibliography of ARIBBA articles and citations for reports that are referenced.

## Acknowledgments:

The ARIBBA study was supported by the National Institute on Drug Abuse (NIDA), Grant Number RO1DA10425. The study was directed by Sherry Deren, Ph.D., Principal Investigator at the National Development and Research Institutes, Inc. (NDRI) in New York City and by Co-Investigators Rafaela R. Robles, Ed.D. and Hector M. Colon, Ph.D. at the Universidad Central del Caribe in Bayamón, Puerto Rico. This report was written by Milton E. Mino, Senior Research Associate at NDRI and Sherry Deren, Ph.D., Principal Investigator.

We thank the many ARIBBA staff members who worked tirelessly and with dedication to conduct this study. The New York staff included: Jonny Andia, Ph.D., Project Director; Rosa Arroyo, Field Site Supervisor; Nadina Correa, Senior Outreach Worker; Susan Fabian, Interviewer; Gabriela Gavilano, Research Assistant; Romulo Gil, Interviewer; Javiel Hurtado, HIV Counselor; Sung-Yeon Kang, Ph.D, Data Coordinator; Denise Oliver-Velez, Ethnographer; Carmen Ortiz-Priester, Administrative Coordinator; Miguel Santiago, Security-Reception and Cesar Valentin, Interviewer. The staff in Puerto Rico were: Myrna Cabassa-Almodovar, Coordinator-Supervisor; Myra González-Collazo, Outreach Worker-Interviewer; Rafael Quiñones-Beltrán, Outreach Worker-Interviewer; Ann Finlinson, Ph.D. Ethnographer; and Wanda Trinidad-Martínez, Outreach Worker-Interviewer.

The investigators acknowledge the many individuals who supported and encouraged our efforts to disseminate the study's findings. This includes the following persons from the Centers for Disease Control and Prevention: T. Steve Jones, C.D.C. Fellow, Division of HIV/AIDS Prevention; Danni Lentine, MPH, Public Health Analyst, Division of HIV/AIDS Prevention; Angel Ortiz Ricard, J.D., Project Officer, Prevention Programs Branch. We also thank the following persons from the Substance Abuse and Mental Health Service Administration: Claudia Richards, Senior Public Health Advisor/Team Leader, Performance Partnership Branch, Division of State and Community Assistance, CSAT; and David C. Thompson, HIV/AIDS Team Leader/Public Health Advisor, CSAT. We also appreciate the encouragement provided by Dennis DeLeon, Director, Latino Commission on AIDS, and are especially grateful to NIDA, our sponsor, for supporting our research. Most of all, we express our appreciation to the study's research participants, many of whom participated in the hopes that the findings would be used to benefit their communities.

The drug treatment provider surveys were funded by the Substance Abuse and Mental Health Service Administration, Contract Numbers 270-95-0026 and 270-98-7056. The information regarding mortality was derived from data provided by the Office of Vital Statistics, New York City Department of Health, the Demographic Registry of the Puerto Rico Department of Health and the National Death Index of the National Center for Health Statistics.

Please direct requests for additional information about the study to Sherry Deren, Ph.D., Principal Investigator, National Development and Research Institutes at 71 West 23<sup>rd</sup> Street, 8<sup>th</sup> Floor, New York, N.Y 10010 or via email at: [deren@ndri.org](mailto:deren@ndri.org). Additional copies of this report can be obtained from Milton E. Mino at the above address or via email at [mino@ndri.org](mailto:mino@ndri.org).

The conclusions and recommendations presented in this report were developed by the study investigators and do not necessarily represent the views or policies of NDRI, the Universidad Central del Caribe, the National Institute on Drug Abuse or any other federal agencies.

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## Part I. Sources of Information

The findings presented in this report come primarily from the Alliance for Research in El Barrio and Bayamón (ARIBBA) research project. The following is a summary of the ARIBBA research design and methodology.

### **Overview of the ARIBBA Project**

The ARIBBA research project is a longitudinal study, funded by the National Institute on Drug Abuse, which compared the HIV- related risk behaviors of 800 Puerto Rican adult injection drug users (IDUs) and crack smokers recruited in East Harlem, New York with 399 of their counterparts in Bayamón, Puerto Rico. The participants were recruited between January 1998 and August 1999 and follow-up interviews were conducted through 2003. The study was conducted by two teams of researchers; one at the National Development and Research Institutes, Inc. (NDRI) in New York and one at the Universidad Central del Caribe in Puerto Rico.

This report presents the study's main findings. To date (October, 2004), twenty-four articles based on findings from the ARIBBA study have been published in scientific journals and the findings have been presented at more than forty scientific conferences. The published articles have compared study participants in the two locations, including their injection-related HIV risk behaviors, sex-related risk behaviors, and their utilization of drug treatment, healthcare and needle exchange programs. The articles have also examined factors that affect risk behaviors, such as the influence of peers on drug injection practices and histories of physical and sexual abuse. Other publications have reported on the study design, including its integration of quantitative and qualitative methodologies, the ethnographic methods used to identify participant recruitment locations, and the development of a biculturality scale used in the survey instrument.

Citations are provided throughout this report for findings that have been published. Findings that have not yet been published, that were presented at conferences, published as part of another study, or that are from secondary sources, are identified as such. A complete bibliography of the study's publications is provided in Appendix A. Since the publications examine different aspects of HIV risk among the study participants, different statistical analyses and sample sizes were used. We therefore encourage the reader to refer to the original sources for a complete discussion of the methodologies used in each analysis.

### **Research Design**

The ARIBBA study design was uncommon in that it compared persons of the same ethnic background—Puerto Rican—in two locations. This design allowed us to compare study participants of the same background who lived in two different environments, East Harlem, New York and Bayamón, Puerto Rico. We also examined the risk behaviors of participants who had emigrated from Puerto Rico to New York, referred to as “migrants”, with drug users recruited in New York who were not migrants. Doing so allowed us to examine whether HIV-related risk behaviors differ in an environment with few HIV prevention resources, compared with an environment where there are many.

## Research Methods

The ARIBBA study is based on quantitative and qualitative ethnographic methods.<sup>1</sup> The quantitative component included structured interviews and HIV testing with participants at several time points. The qualitative methods included mapping the geographic study areas, focus groups with drug users, field observations of service providers and drug buying, selling and using areas, and in-depth ethnographic interviews.

## Communities

Participants in New York were recruited in East Harlem, a neighborhood in Northern Manhattan that covers approximately 3 square miles. At the start of the study, East Harlem, also known as “*El Barrio*” and Spanish Harlem, had a population of 110,000 residents, 52% of who were Latino (primarily Puerto Rican), 41% African American and 7% White. The neighborhood had one of the highest total cumulative AIDS rates in New York City—4,594 per 100,000 persons.<sup>2</sup>

Study participants in Puerto Rico were recruited from the municipality of Bayamón, part of the San Juan metropolitan area and located southwest of San Juan. Bayamón is home to approximately 220,000 people and is a predominantly urban area comprised of 45 square miles. At the start of the study San Juan had the 6<sup>th</sup> highest AIDS rate among U.S. metropolitan areas.<sup>3</sup>

Participants in both locations were recruited between January 1998 and August 1999. The Bayamón and East Harlem recruitment areas were divided into three and five recruitment sectors, respectively, which were identified through ethnographic mapping techniques. Recruitment sectors were similar in size and daily recruitment locations were randomly selected from within the sites. Trained outreach workers, who were indigenous community members and who had previously conducted similar research and HIV-related work in the areas, identified potential study participants.

## Procedures

To be eligible for the study, participants in both locations had to meet the following criteria: 1) 18 years of age or older, 2) self-report as Puerto Rican and 3) report injecting drugs or smoking crack within the past 30 days.

Prospective study members who met the criteria were asked to come to the field site, where staff provided information about the study and informed consent was obtained. Urinalysis testing, using Roche ONTRAK, was administered to confirm heroin or cocaine use within the previous 48 hours. Participants were interviewed using a computer assisted baseline interview, which took an average of one and a half hours to complete, and they

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<sup>1</sup> A detailed description of the study’s design, recruitment methods and its use of quantitative and qualitative methods was published in: Deren, et al. (2003). “Integrating Qualitative and Quantitative Methods: Comparing HIV-Related Risk Behaviors Among Puerto Rican Drug Users in Puerto Rico and New York.” *Substance Use and Misuse*. Vol. 38, No. 1, pp.1-24, 2003. Please refer to this article for additional findings and methodology.

<sup>2</sup> Ibid.

<sup>3</sup> Centers for Disease Control and Prevention. (1999). HIV/AIDS Surveillance Report. Vol. 11, No. 1, Table 4, based on July 1998-June 1999 AIDS cases per 100,000 population.

were paid a \$15 research stipend in New York and \$20 in Puerto Rico. After the interview, study members received HIV pretest counseling and were offered HIV testing, using ORASURE. Participants who were tested were given a follow-up appointment approximately one week later to return for test results and post-test counseling. Participants were interviewed at baseline, and at approximately 6, 36 and 42 months after baseline. More than 80% of the participants received at least one follow-up interview.

The survey instrument gathered data to examine a variety of possible influences on HIV risk behavior. The instrument included items to assess the following characteristics: demographics, psychological status (e.g., depression), social (e.g., networks of other users), health related (e.g., HIV status), cultural (e.g., biculturality), environmental (e.g., availability of needle exchange programs), lifetime and past 30 day history of drug use, drug treatment, and 30 day history of injection and sex-related risk behaviors. The instruments were translated from English to Spanish and then back-translated to ensure comparability in both languages. All study protocols and interview instruments were approved by the local Institutional Review Boards.

## Part II. Overview of AIDS and HIV in Puerto Rico

### **Puerto Rico's AIDS Epidemic Compared to the United States and the Americas**

Puerto Rico has one of the highest rates of HIV infection and AIDS in the United States. With a population of 3.8 million people, Puerto Rico ranks 27<sup>th</sup> in size compared to the nation's fifty states.<sup>4</sup> Yet according to the Centers for Disease Control and Prevention (CDC), as of December 2002, Puerto Rico had the eighth largest number of cumulative AIDS cases among adults and adolescents—almost 27,000 people.<sup>5</sup> In 2002, 1,139 people in Puerto Rico were newly reported to have AIDS—a rate of 29.5 per 100,000 persons in the population—the sixth highest rate of all U.S. states and territories<sup>6</sup>. In the same year, Puerto Rico also had the 8<sup>th</sup> highest estimated rate of children 13 years or younger living with AIDS—7.9 per 100,000 persons, almost double the national average rate of 4.2.<sup>7</sup>

Puerto Rico also has one of the highest rates of HIV/AIDS in the Caribbean and in Latin America. The number of reported HIV and AIDS cases are often underestimated because many people do not know that they are infected and because many countries, particularly those with limited resources, do not have adequate surveillance and monitoring systems. However, based on known cases, Puerto Rico is among the Caribbean nations with the highest number of cumulative AIDS cases.<sup>8</sup>

Puerto Rico is often omitted from comparative regional and nationwide studies of HIV infection and AIDS diagnoses. While the explanation for the exclusion is beyond the scope of this report, geo-political factors may play a role. Comparisons of HIV and AIDS within the Caribbean are usually based on differences between independent nations and therefore do not include Puerto Rico since it is a commonwealth of the United States. Likewise, comparative studies within the U.S. are often limited to the 50 states and do not include U.S. territories. As a result, although the HIV/AIDS epidemic in Puerto Rico is one of the largest domestically and in the Caribbean, it is often overlooked in nationwide and regional analysis.

### **HIV/AIDS Among Latinos and Puerto Ricans**

Latinos in the United States have been disproportionately impacted by HIV since the start of the epidemic and they are now the largest ethnic or racial group in the United States. While Latinos comprise 13% of the nation's population, they account for 19% of all

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<sup>4</sup> United States Census Bureau, Census 2000. Based on Census data accessed at <http://factfinder.census.gov>

<sup>5</sup> Centers for Disease Control and Prevention. (2002). "HIV/AIDS Surveillance Report", Vol. 14. Cases reported through December 2002.

<sup>6</sup> Ibid, Table 14.

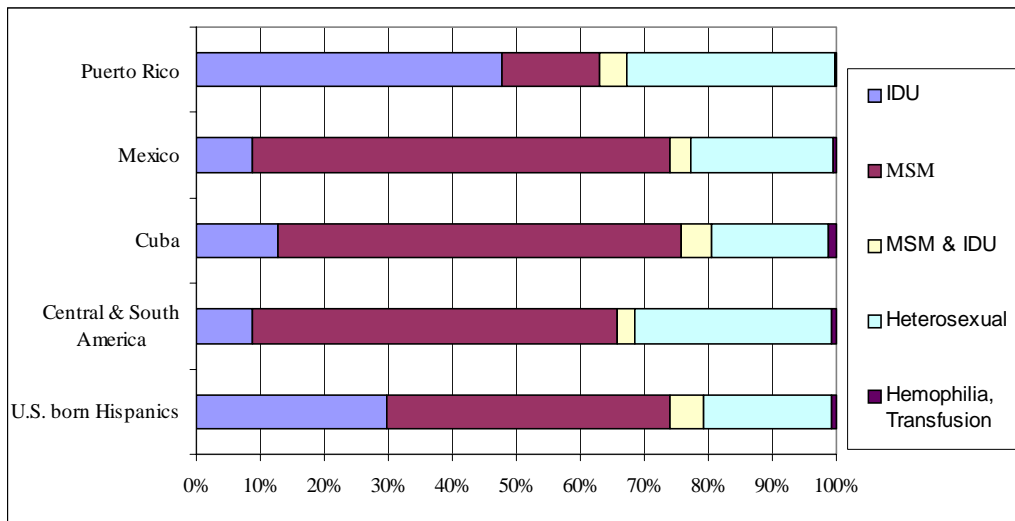
<sup>7</sup> Ibid, Map 2.

<sup>8</sup> The cumulative total number of reported AIDS cases in Latin American and Caribbean nations can be found in: Pan American Health Organization, (2002). "AIDS Surveillance in the Americas", June 2002. According to this report, as of June 2002, Puerto Rico had the highest reported number of cumulative AIDS cases of any country in the Caribbean. Relative to its population size, Puerto Rico has the largest percentage of reported AIDS cases of any country in Latin America.

AIDS cases through 2002.<sup>9</sup> The rate of infection among the Puerto Rican community, however, has been the highest of any Hispanic group.<sup>10</sup>

The majority of HIV positive Puerto Ricans, including those living in the United States and in Puerto Rico, contracted the virus through injection drug use or through sex with an HIV positive drug user. This contrasts with HIV positive Latinos of other nationalities, whose primary HIV transmission route has been through sexual contact between men (men who have sex with men, MSM). In 2002, the main exposure category for foreign born Latinos who were diagnosed in the United States, including Cubans, South Americans, Mexicans and other Central American groups, was through sexual contact between men (see Graph 1).<sup>11</sup> According to the CDC, the largest risk category among Puerto Ricans in the U.S., who were born in Puerto Rico, was injection drug use (more than 50% are IDU or both IDU and MSM), whereas drug injection accounts for less than 20% among all of the other foreign-born Latino groups noted. Furthermore, forty-eight percent of the cumulative number of U.S. AIDS cases among adults and adolescents through the end of 2002 are attributed to MSM, compared to 17% in Puerto Rico during the same period.<sup>12</sup> (not shown)

Graph 1. Risk Categories of AIDS Cases Among Foreign and U.S. Born Hispanics in the U.S., by Birthplace



Differences in HIV transmission risk categories that relate specifically to Puerto Ricans are lost when examining U.S. HIV and AIDS data among Latinos overall. Some Latino groups are much larger than others—Mexicans, for example, comprise almost 60% of the country’s Hispanic population while Puerto Ricans make up about 10% (Graph 2).<sup>13</sup>

<sup>9</sup> C.D.C., 2002.

<sup>10</sup> Montoya, et al. (1999). “Estimated HIV risk among Hispanics in a national sample of drug users”. *Journal of Acquired Immune Deficiency Syndrome*, 21(1), 21-50.

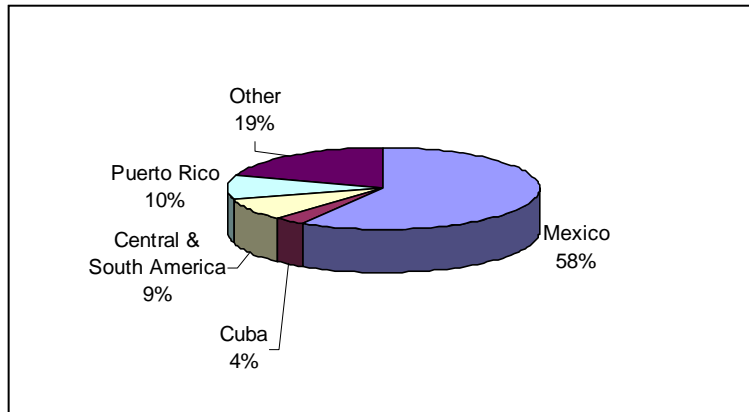
<sup>11</sup> C.D.C., 2002. Note: Graph is based only on cases with an identified risk category.

<sup>12</sup> C.D.C., 2002. Tables 3 and 6, respectively.

<sup>13</sup> U.S. Census Bureau. (2001). “U.S. Census Brief: The Hispanic Population”.

When Latino sub-groups are combined as one group on HIV reporting systems and surveillance reports, Puerto Ricans are subsumed into the broader category. Since most HIV positive Puerto Ricans became infected through injection drug use while other Latinos were infected primarily through sex between men, and because Puerto Ricans comprise a relatively small percentage of the Hispanic community nationwide, conclusions based on “Hispanic” HIV/AIDS infection rates and risk categories miss or obfuscate important distinctions, and can therefore be misleading.

Graph 2. Distribution of Hispanic Population in the U.S.



The CDC and local and state health departments distinguish between foreign born Latinos, including those born in Puerto Rico, but generally combine U.S. born Hispanics into one group when collecting data on HIV/AIDS and on other health statistics. This process does not permit making comparisons between different U.S. born Latino groups or from comparing immigrant and non-immigrant Hispanics of the same background. Because U.S. born Latinos now outpace immigrants as the main source of growth within the Hispanic population<sup>14</sup>, it is increasingly important to be able to study differences among sub-groups.

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<sup>14</sup> R. Suro, J. Passel, (2003). “The rise of the second generation: Changing patters in Hispanic population Growth”. Pew Hispanic Center.

## Part III. Characteristics of Study Participants

### Baseline Demographic Characteristics

Approximately half of the participants recruited in New York City were born in Puerto Rico, and 45% were born in New York. By contrast, 86% of the participants in Puerto Rico were born there.<sup>15</sup> The majority of participants were male; 73% of those in New York and 79% of the Puerto Rico sample (Table 1). The drug users recruited in Puerto Rico were significantly younger than those in New York, an average of 33 years of age versus 38 years among their New York counterparts. Twenty percent of the participants in Puerto Rico were HIV positive compared to 25% of those in New York.

Table 1. Baseline Socio-demographic & HIV Status of Study Participants

	NYC N=800	Puerto Rico N=399	Statistical Significance
<i>Birthplace</i>			<.001
New York	44.8%	11.5%	
Puerto Rico	52.0	85.8	
Other	3.3	2.7	
Gender (male)	73%	79.3%	<.05
Age (mean)	38.4	33.2	<.001
HIV Positive	25.3%	20.1%	
<i>Education</i>			.05
< High school	61.6%	54.4%	
High school or GED	25.9	30.2	
> High school	12.5	15.5	
<i>Income (prior 30 days)</i>			<.001
<\$500	37.1%	39.0%	
\$500 - \$999	37.8	26.3	
>\$999	25.1	34.8	
<i>Marital Status</i>			<.05
Single	46.2%	49.4%	
Married or common law	25.9	19.0	
Separated/divorced/widowed	27.9	31.7	
Ever in jail or prison	87%	74%	<.001
<i>Residential Status</i>			<.001
Parent's house	13%	43%	
Own house	31	15	
Other's house	25	19	
Temporary housing	10	3	
Homeless <sup>16</sup>	22%	19%	

<sup>15</sup> Table 2 is based demographic characteristics that were published in the following papers: Cortes, et al. (2003). "The use of the Puerto Rican biculturalism scale with Puerto Rican drug users in New York and Puerto Rico". *Journal of Psychoactive Drugs*, Vol. 35 (2), April-June 2003. Deren, et al. (2003). "Integrating Qualitative and Quantitative Methods: Comparing HIV-Related Risk Behaviors Among Puerto Rican Drug Users in Puerto Rico and New York." *Substance Use and Misuse*. Vol. 38, No. 1, pp.1-24, 2003.

<sup>16</sup> Unpublished.

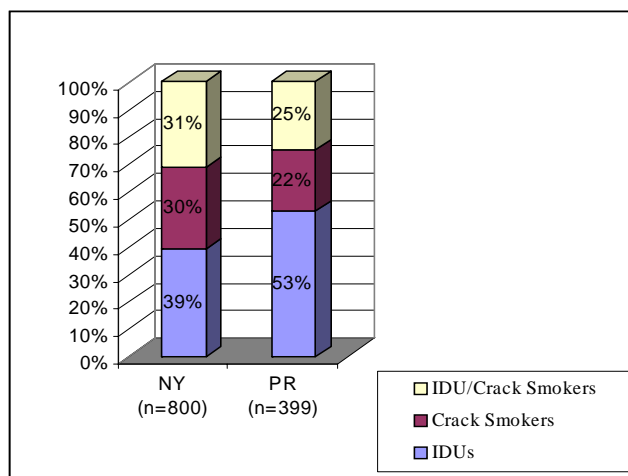
Participants in Puerto Rico were more likely to have completed high school or to have a GED than participants in New York, 46% versus 38%, respectively. The majority of participants in both sites were poor. About 40% of all participants reported incomes of less than \$500 in the 30 days prior to their baseline interviews. About a third of those in Puerto Rico reported incomes over \$999 during this period, compared to a quarter of their New York peers. About half of the participants in both sites were single and the New York participants were more likely to be married or in common law relationships, 25% compared to 19% in Puerto Rico.

The majority of participants reported having been in jail or prison at some point in their lives. Eighty seven percent of the New York sample and approximately three quarters of the sample in Puerto Rico reported having been incarcerated. The two groups also differed in their residential status. Almost half (43%) of participants recruited in Puerto Rico lived in their parents' home, compared to 13% of those in New York. Similar proportions in both locations were homeless<sup>17</sup>—19% and 22% in Puerto Rico and New York, respectively.

**Baseline Drug Use Patterns**

The ARIBBA study recruited drug users who injected drugs, smoked crack or did both, in the month before their first interviews.<sup>18</sup> As Graph 3 shows, drug users recruited in Puerto Rico were more likely to have used drugs through injection only than users in New York, 53% versus 39%, respectively. In New York, 30% of users used crack only, compared to 22% of the Puerto Rico sample. Overall, about three-quarters of all study participants had injected drugs within the 30 days prior to the baseline interview. Those in New York were more likely to have also used crack.

Graph 3. Drug Use Categories for Survey Sample, Past 30 days

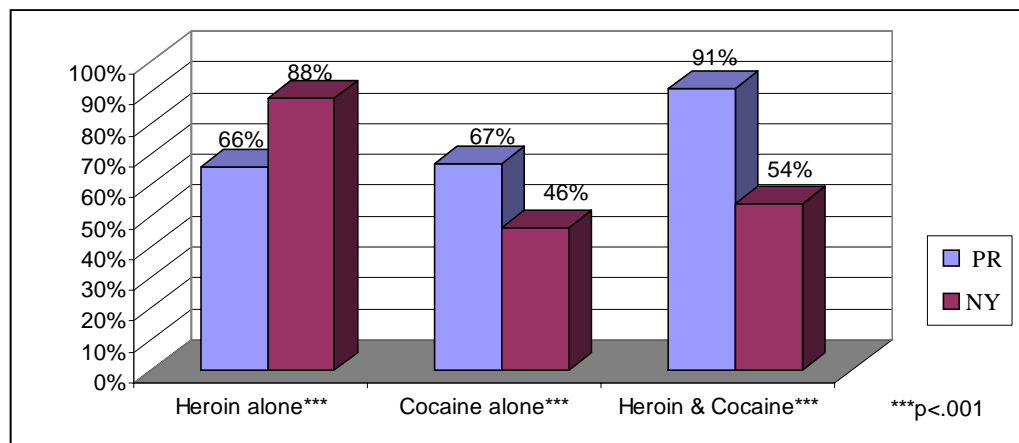


<sup>17</sup> Homelessness included those who reported living on the streets, in an abandoned building or shelter.

<sup>18</sup> The following drug use characteristics were published in: Deren, et al. (2003). "Integrating qualitative and quantitative methods: Comparing HIV-related risk behaviors among Puerto Rican drug users in Puerto Rico and New York." *Substance Use and Misuse*. Vol. 38, No. 1, pp.1-24, 2003. Please refer to this article for additional findings and methodology.

There were differences between participants in the two study sites in the substances that they injected in the month before their first interview.<sup>19</sup> As Graph 4 shows, ninety-one percent of drug injectors in Puerto Rico reported injecting a combination of heroin and cocaine, called a *speedball*, compared to 54% of users in New York. Drug injectors in Puerto Rico were also more likely to have injected cocaine alone; two thirds, compared to less than half of New York participants. In contrast, injection drug users in New York were more likely to have injected heroin by itself—88% versus 66% of users in Puerto Rico. Finally, the injection of cocaine alone and the injection of speedballs, both of which were more common among drug injectors in Puerto Rico, were each found to increase the frequency of drug injection by about 30% (not shown).

Graph 4. Drug Use Patterns of IDUs: Drugs Injected, Past 30 Days



<sup>19</sup> The findings regarding drug injection frequency among the study’s IDUs were published in: Colon., et al., (2001). “Between-city variation in frequency of injection among Puerto Rican injection drug users: East Harlem, New York, and Bayamón, Puerto Rico.” *Journal of Acquired Immune Deficiency Syndrome*, 27, (4). Please refer to this article for additional findings and methodology.

## Part IV. HIV-Related Drug Injection and Sex Risk Behaviors

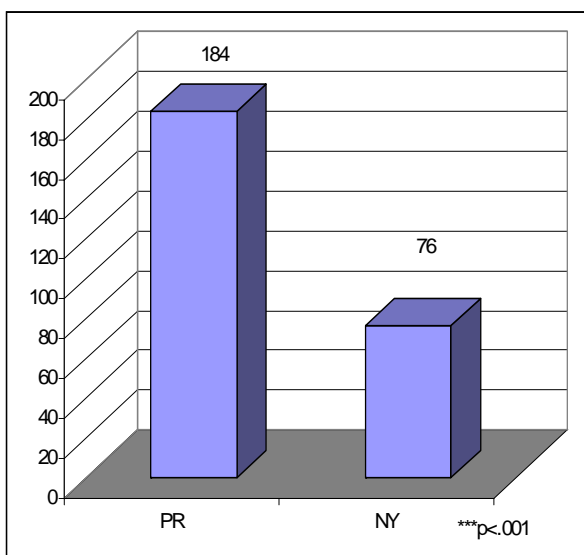
In this section we examine the HIV-related drug injection practices and sexual behaviors of participants, as reported at baseline (for the 30 days prior to the interview). Based on these behaviors study participants in Puerto Rico were at significantly greater risk for becoming infected with HIV than participants in New York.<sup>20</sup>

### Drug Injection Behaviors and HIV Risk

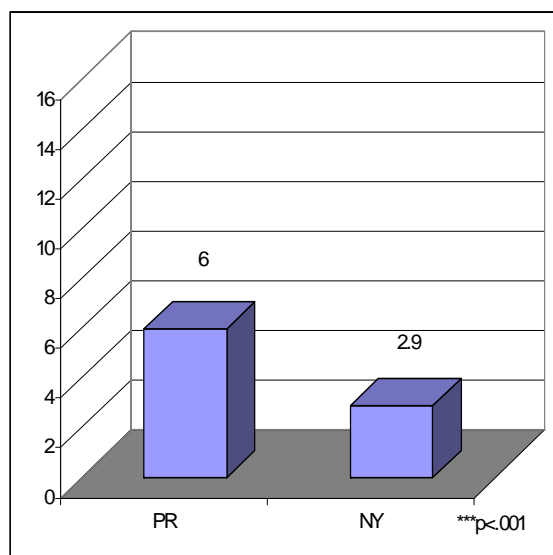
Drug injectors in Puerto Rico injected drugs more often and reused syringes more frequently than their New York counterparts. In the thirty days before their baseline interviews, study members in Puerto Rico injected drugs more than twice as often—an average of 184 times a month, versus 76 times in New York, and they reused each syringe more than twice as often, an average of six times per needle compared to 2.9 times, respectively (Graphs 5 and 6). Reusing syringes increases the likelihood that they will clog, which in turn increases the risk that drug injectors will use someone else's needle.

### Injection-Related Risk Behaviors

Graph 5. Frequency of Injection\*\*\*



Graph 6. # of Times Each Syringe Used\*\*\*



During a focus group with injection drug users in Puerto Rico, participants explained how a clogged syringe is related to risky drug injection. According to one focus

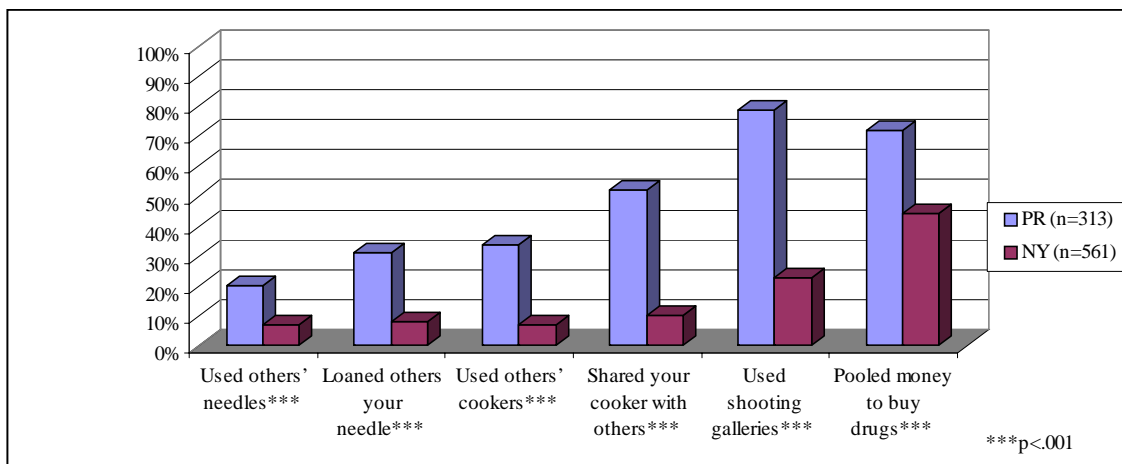
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<sup>20</sup> This section's findings regarding drug injection practices were published in the following articles: Colón, et al. (2001). "Joint drug purchases and drug preparation risk behaviors among injection drug users." *AIDS and Behavior*, 5 (1), 85-96; Finlinson, et al. (2000). "Syringe acquisition and use of syringe exchange programs by Puerto Rican drug injectors in New York and Puerto Rico: Comparisons based on quantitative and qualitative methods." *AIDS and Behavior*, 4 (4), 341-351. Deren, et al. (2003). "Integrating Qualitative and Quantitative Methods: Comparing HIV-Related Risk Behaviors Among Puerto Rican Drug Users in Puerto Rico and New York." *Substance Use and Misuse*. Vol. 38, No. 1, pp.1-24, 2003.

group member, “If my syringe clogs and I have to ask to borrow one, it doesn’t matter to me if it’s infected or whatever, what’s important is to get a fix (*curarme*).”

Study participants in Puerto Rico were almost three times more likely to use someone else’s needle and almost four times more likely to loan someone their needle (Graph 7). They were also more likely to share paraphernalia used to prepare and inject drugs, such as cookers and rinse water. In addition to HIV transmission risk, other research has shown that sharing drug injection paraphernalia increases the risk of Hepatitis C (HCV) transmission.<sup>21</sup>

Graph 7: Injection Related Sharing, Past 30 days, Baseline Interview.



Drug shooting galleries are environments that increase the risk of contracting HIV because they are associated with sharing injection equipment. Almost 80% of participants in Puerto Rico, compared with 23% of those in New York, used injection shooting galleries in the month prior to their first interviews. Buying drugs collectively also increases the risk of contracting HIV because persons who pool their money for drugs are more likely to share needles and injection paraphernalia. Approximately three-quarters (72%) of drug injectors in Puerto Rico pooled their money together with other drug users to purchase drugs, compared to 44% of those in New York.<sup>22</sup>

The majority of study participants in both locations had been in jail or prison at some point in their lives—74% in Puerto Rico and 87% in New York.<sup>23</sup> Those who injected drugs while they were incarcerated practiced high risk drug injection during their

<sup>21</sup> Hagan, et al., (2001). “Sharing of drug preparation as a risk factor for Hepatitis C”. *American Journal of Public Health*. 91:42-46.

<sup>22</sup> Deren, et al., (2003). “The utility of the PRECEDE model in predicting HIV risk behaviors among Puerto Rican injection drug users.” *AIDS and Behavior*., Vol. 7, No.4.

<sup>23</sup> For findings regarding incarceration and HIV risk please see: Andia, J. F., et. al. (in press). “Factors associated with injection and non-injection drug use during incarceration among Puerto Rican drug injectors in New York and Puerto Rico. *The Prison Journal*.

incarcerations. Almost a third of the participants in Puerto Rico who were injection drug users reported injecting drugs during their last incarceration, significantly more than the 12% who reported the behavior in New York. Among those who injected in prison, about three-quarters of those in Puerto Rico shared injection-related equipment with other users, compared to slightly over half in New York. In contrast to Puerto Rico, where injecting drugs during the last incarceration was more common, 37% of users in New York practiced non-injection drug use during their detentions, compared to 14% in Puerto Rico. Almost three-quarters of drug users in Puerto Rico reported being in a prison association or gang (e.g., Netas, Latin Kings) during their last incarceration, compared to about a third of users in New York (Table 2).

Table 2. Incarceration & HIV Risk Behaviors of IDUs

	<b>Puerto Rico N=241</b>	<b>New York n=555</b>
Injected while incarcerated	31%	12%***
If yes, shared equipment	74%	52%**
Non-injection drug use while incarcerated	14%	37%***
Gang affiliation while incarcerated	73%	32%***
**p<.01; ***p<.001		

#### **Sex Behaviors and HIV Risk**

Previous research has shown that drug users who smoke crack are at high risk for sex-related HIV infection. We therefore examined the sex-related risk factors of crack smokers separately from the sexual risk behaviors of injection drug users (some of whom had also smoked crack).<sup>24</sup> As Table 3 shows, crack smokers in both locations were more likely than drug injectors to have had sex in the 30 days prior to their baseline interviews. About three-quarters of study participants in both study sites who used crack only reported engaging in sex, compared to about half of those who injected drugs. Among those who reported sexual behavior, women drug injectors and crack smokers were more likely than men to trade sex for drugs or money. Women in Puerto Rico who injected drugs or smoked crack were more than twice as likely than their counterparts in New York to have exchanged sex for drugs or money. Both male and female drug injectors and crack smokers in Puerto Rico were more likely to have had multiple sex partners than those recruited in New York.

<sup>24</sup> Findings regarding sex risks were published in: Deren, S., et al. (2003). "Integrating qualitative and quantitative methods: Comparing HIV-related risk behaviors among Puerto Rican drug users in Puerto Rico and New York." *Substance Use and Misuse*, 38 (1): 1-24. The findings regarding "multiple sex partners" were presented at: Deren, S., et al., (November 2003). "Comparing the San Juan and New York City HIV Epidemics among Puerto Rican Drug Users: Evidence of a Public Health Emergency in San Juan". HIV Center for Clinical and Behavioral Studies. New York, N.Y.

Table 3. Sex Related Risk Behaviors, Past 30 Days

	IDUs+		Crack Users	
	Puerto Rico n=312	New York n=561	Puerto Rico n=88	New York n=239
Engaged in sex	45%	58%***	76%	70%
<i>Traded sex</i>				
Males	10%	8%	30%	14%*
Females	78%	32%***	62%	28%***
<i>Multiple sex partners</i>	36%	27%*	58%	27%***
+ Includes those who also used crack; *p<.05; ***p<.001				

Study participants in Puerto Rico who had sex were also more likely to have had unprotected sex than those in New York.<sup>25</sup> As shown in Table 4, in the 30 days prior to their baseline interviews, 80% of participants in Puerto Rico who reported sex with their main partner had unprotected sex, compared to 64% of participants in New York. Among users who reported having sex with a casual partner, almost 70% of those in Puerto Rico had unprotected sex, a rate almost double that of participants in New York. Study participants were least likely to have unprotected sex with paid partners (about one-third in both locations). During focus groups and individual qualitative interviews, participants in both study sites said that condoms were more likely to be used in New York than in Puerto Rico. The reasons attributed to their more frequent use included religion and culture, as well as their greater availability and free distribution.<sup>26</sup>

Table 4. Unprotected Sex by Partner Type, Past 30 Days

	New York	Puerto Rico
Main	64%	80%**
Casual	36	69***
Paid	35	37
**p<.01; ***p<.001		

<sup>25</sup> The following findings were presented at: Deren, S., et al., (November 2003). "Comparing the San Juan and New York City HIV Epidemics among Puerto Rican Drug Users: Evidence of a Public Health Emergency in San Juan." HIV Center for Clinical and Behavioral Studies. New York, N.Y.

<sup>26</sup> Findings from the study's qualitative interviews regarding sexual risks were published in: Oliver-Velez, et al. (2002). "Sexual risk behaviors of Puerto Rican drug users in East Harlem, New York and Bayamón, Puerto Rico." *Culture, Health and Sexuality*, Vol. 5, No. 1, 19-35.

## Part V. HIV Prevention and Health Services

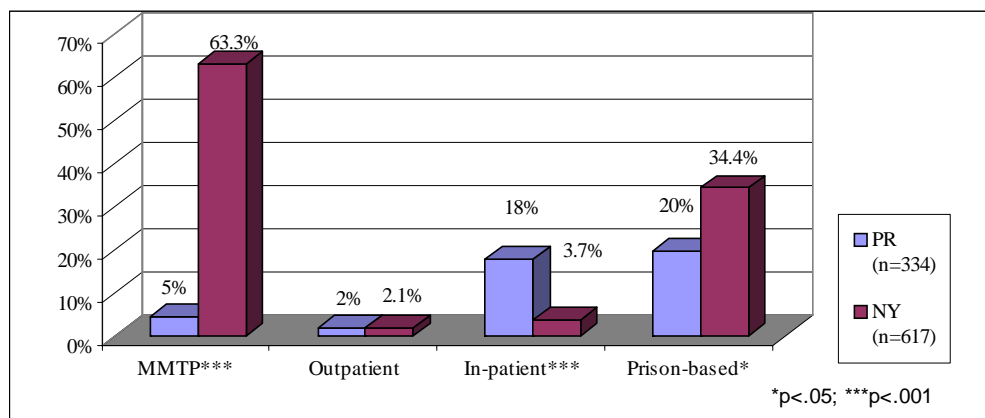
In this section we compare the utilization of drug treatment and HIV prevention programs among study participants in Puerto Rico and New York. We also include the findings from another federally funded study that surveyed Puerto Rico's drug treatment services in 1998 and 2002. The injection risk behaviors of drug users who emigrated to New York from Puerto Rico are compared with those injectors who are not migrants and with injectors in Puerto Rico.

### Drug Treatment Programs

There are substantially more drug treatment and risk reduction programs available to drug users in East Harlem, New York than in Bayamón, Puerto Rico. At the time that participants were recruited (1998 to 1999) there were five methadone maintenance treatment programs with 12 clinics operating in East Harlem. In contrast, Bayamón had just one methadone program with a single clinic site.

There were also significant differences in the types of drug treatment programs that participants used.<sup>27</sup> At the 6 month follow-up interview, participants were asked about the types of drug treatment programs they had used during the prior six months. Participants in New York were 14 times more likely than those in Puerto Rico to have used a methadone maintenance treatment program (MMTP)—63% versus 5%, respectively (Graph 8). Residential/inpatient drug treatment was the most common form of drug treatment used by participants in Puerto Rico. Eighteen percent reported using inpatient/residential treatment compared to four percent in New York. Among those who were incarcerated during the six month follow-up period, participants in New York were more likely than those in Puerto Rico to receive drug treatment, 34% versus 20%, respectively. Overall, participants in Puerto Rico were less likely to report use of drug treatment. Approximately fifty-six percent (55.7%) received drug treatment during the past year, compared to 79.4% in New York, (not shown).

Graph 8. Drug Treatment Services, Prior Six Months



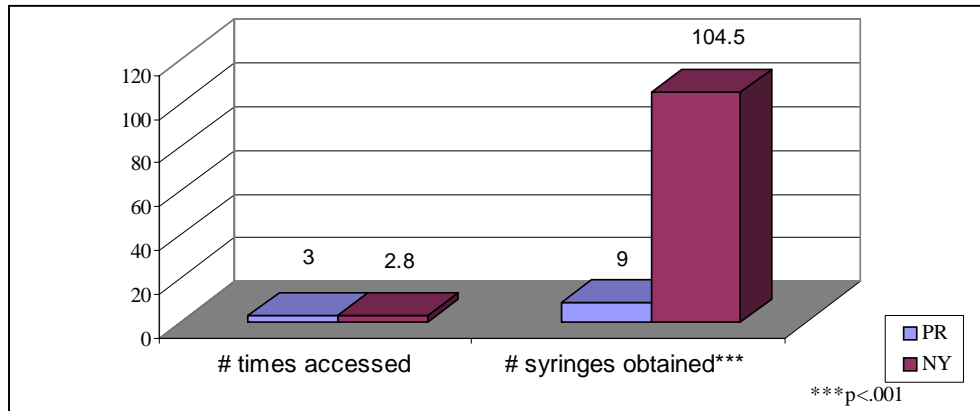
<sup>27</sup> The following findings were published in: Robles, et al., (2003). "Determinants of Health Care Use Among Puerto Rican Drug Users in Puerto Rico and New York City." *Clinical Infectious Diseases*. 37 (Suppl 5):S392-403. Please refer to this article for additional findings and methodology.

### Needle Exchange Programs

East Harlem had four needle exchange programs (NEPs) at the start of the study, while in Bayamón there was one mobile program. In addition, the East Harlem NEPs operated for more hours per week and had less restrictive exchange policies. Study findings also show that drug users in Puerto Rico received fewer services from needle exchange programs than their counterparts in New York.<sup>28</sup> Drug injectors in both locations used needle exchange programs at similar rates—an average of three times in Puerto Rico and 2.8 times in New York, during the 30 days before their baseline interview (Graph 9). There were, however, significant differences in the number of needles they obtained and in the percentage who received referrals to other programs. Drug injectors in New York received an average of 105 needles from syringe exchange programs during the 30 days prior to the interview, while in Puerto Rico they received an average of nine. These differences are particularly striking in view of the finding that drug injectors in Puerto Rico injected drugs more than twice as often as those in New York (see Graph 5).

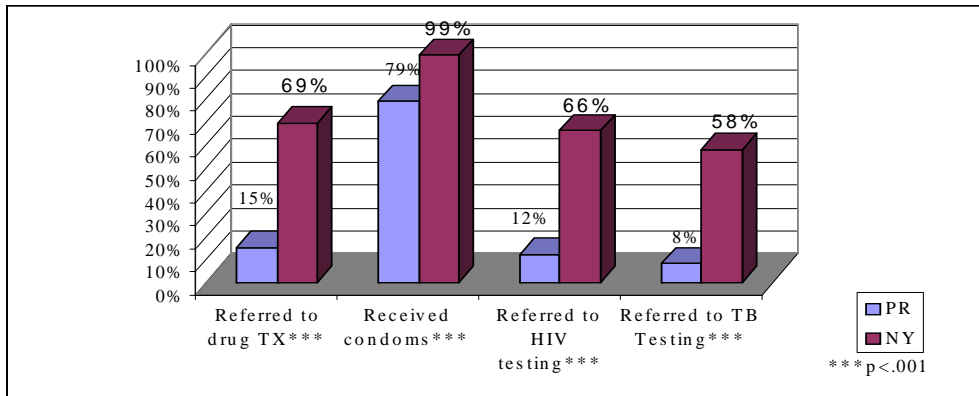
In addition to distributing new syringes, needle exchange programs can provide referrals to drug treatment programs and healthcare services. In comparison to New York, drug users in Puerto Rico received significantly fewer referrals from needle exchange programs in the month before their first interview. Only 15% of injectors in Puerto Rico were referred to a drug treatment program, compared to almost 70% of their counterparts in New York (Graph 10). Twelve percent of injectors in Puerto Rico were referred to an HIV testing facility and 8% to a tuberculosis testing site, compared to 66% and 58%, respectively, in New York. Finally, nearly all participants in New York received condoms from needle exchange programs, compared to 80% in Puerto Rico.

Graph 9. Use of Needle Exchange Programs and Services Received



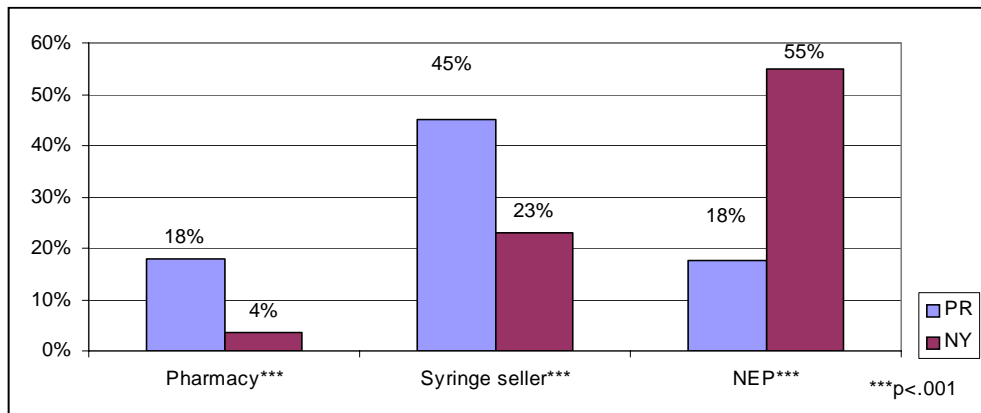
<sup>28</sup> This section’s findings regarding needle exchange programs were published in: Finlinson, et al. (2000). “Syringe Acquisition and Use of Syringe Exchange Programs by Puerto Rican Drug Injectors in New York and Puerto Rico: Comparisons Based on Quantitative and Qualitative Methods.” *AIDS and Behavior*. Vol. 4, No. 4. Please refer to this article for additional findings and methodology.

Graph 10. Use of Needle Exchange Programs and Services Received



Study participants in Puerto Rico obtained syringes from sources different than participants in New York. In the month before their baseline interview over half of the needles used by New York injection drug users were obtained through syringe exchange programs, while only 18% of the needles used by participants in Puerto Rico came from this source. (Graph 11). Private sellers were the most common source of needles in Puerto Rico: 45% of the syringes used by drug injectors came from private sellers, compared to 23% in the New York sample.

Graph 11: Source of Syringes



The ethnographic component of the study found that syringe sellers in Puerto Rico are often older men and women who do not use illegal drugs. They typically buy syringes in bulk from pharmacies and then sell them individually for \$1.00. However, according to participants interviewed in focus groups and information obtained through participant observation, the \$1.00 cost prevents some drug injectors from buying as many new syringes as they need.

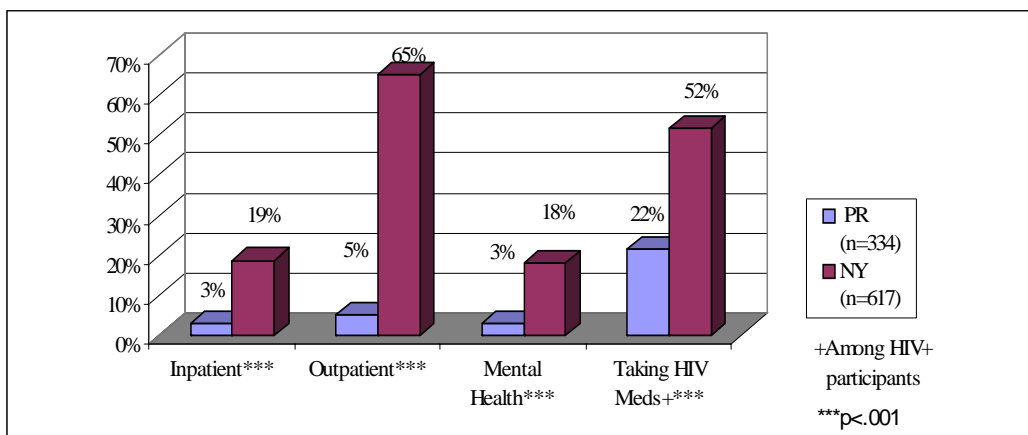
Drug users in Puerto Rico were more likely to obtain their syringes from pharmacies—18% compared to 4% of those used in New York. A possible explanation for the difference is that during the time that study participants were recruited, New York law required a prescription to buy needles while in Puerto Rico they could be purchased over the counter. In 2001, New York State enacted the Expanded Syringe Access Demonstration Program (ESAP), which allows the purchase of up to 10 syringes from

pharmacies without a prescription. Although drug users in Puerto Rico were not legally prohibited from buying needles from pharmacies during the period examined, study findings suggest that the practice is discouraged. For example, some pharmacies require proof of a medical condition that necessitates using a syringe and others do not sell individual needles. Participants also reported that they were sometimes harassed by the police for carrying drug paraphernalia.

**Use of Health Services and HIV Medications**

At the six month follow-up interview, study members were asked about the types of health services that they had used over the previous six months. Participants who were HIV positive were asked whether they were taking HIV medications.<sup>29</sup> Drug users in Puerto Rico were significantly less likely to report using HIV-related medical and mental health services or to have taken HIV medications. Only 3% used inpatient medical health services and 5% used outpatient services, compared to 19% and 65%, respectively, in New York. Drug users in Puerto Rico were also six times less likely to use mental health services—3% compared to 18% in New York. Perhaps most alarming, among participants who were HIV positive, 22% in Puerto Rico reported taking HIV-related medications, compared to 52% in New York.

Graph 12: Use of Health Services and HIV Medications



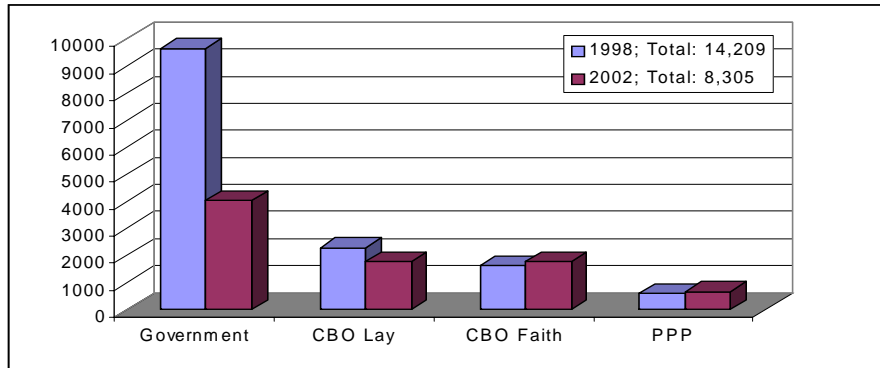
**Declines in Puerto Rico’s Drug Treatment Services and Capacity**

The number of people who received drug treatment services in Puerto Rico declined during the study period. Surveys of all drug treatment providers in Puerto Rico,<sup>30</sup> conducted in 1998 and in 2002, found that the number of persons who received some type of drug treatment declined by almost 42% during this period. As shown in Graph 13, in 1998 over 14,000 persons were treated in a drug treatment program and in 2002 this number had declined to 8,300.

<sup>29</sup> The following findings were published in: Robles, et al., (2003). “Determinants of Health Care Use Among Puerto Rican Drug Users in Puerto Rico and New York City.” *Clinical Infectious Diseases*. 2003:37 (Suppl 5).

<sup>30</sup> Mental Health and Anti Addiction Services Administration. PR SANAP Provider Survey 2002. Hato Rey, Puerto Rico, 2004, 35 pp.

Graph 13. Drug Treatment Services in Puerto Rico: Number of Patients Treated in Past Month, by Type of Provider and Survey Year.



There was also a significant decline in the number of persons who received alcohol treatment in Puerto Rico between these two years: 3,700 patients in 1998 and 2,200 in 2002, a 39% reduction (Table 5). The capacity of treatment programs, as measured during a one month period, declined by 35%, from approximately 21,000 to about 14,000. The use of these programs also declined, from running at 86% capacity in 1998 to 78% in 2002. The decline in use may be due to drug users learning of the reductions in treatment slots, which discouraged them from trying to enroll in treatment. Finally, the number of full time drug treatment program employees also dropped sharply, from almost 3,000 in 1998 to about 1,900 four years later—a 37% decline.

Table 5. Drug Treatment Services: Comparison of 1998 and 2002 Surveys

	<b>1998</b>	<b>2002</b>	<b>Change</b>
<i>Population Treated</i>			
Primary drug condition	14,209	8,305	-41.6%
Primary alcohol Condition	3,740	2,265	-39.4%
<i>Treatment Capacity</i>			
Static capacity (one month)	20,870	13,632	-34.7%
Capacity utilization	86%	77.5%	-9.8%
<i>Direct Service Staff</i>			
FTEs	2,989	1,894	-36.7%

### Risk Behaviors Decline after Emigrating to Environment with More HIV Prevention Resources

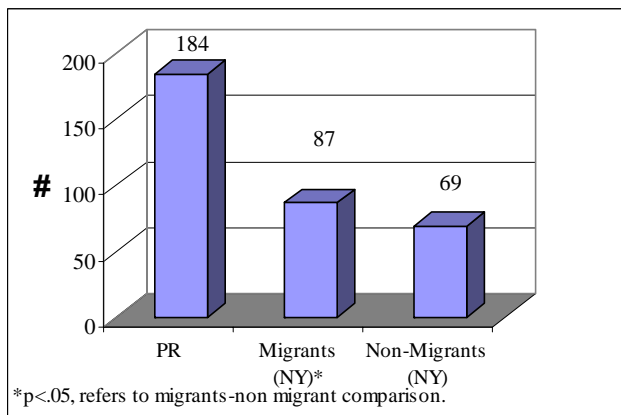
We also examined the risk behaviors of injection drug users who had injected drugs in Puerto Rico and who had emigrated to New York City.<sup>31</sup> A substantial proportion of the sample of injectors recruited in New York (39%) were migrants. Migrants were defined as those who had injected drugs in Puerto Rico and who used drugs there for at least one year.

Overall, migrant drug users practiced riskier HIV-related drug injection than non-migrant injectors recruited in New York. For example, 41% of migrants who injected drugs shared injection paraphernalia (during the 30 days prior to the baseline interview), compared to 28% of non-migrants (not shown). However, migrants engaged in less risky injection behaviors than study participants in Puerto Rico. As shown in Graphs 14 and 15, migrants in New York were more likely to report high HIV-risk injection than non-migrants in terms of their frequency of monthly injections (87 versus 69, respectively) and in the use of shooting galleries (32% versus 18%, respectively). However, migrants were less likely to report high HIV-risk injection behaviors than the injection drug users recruited in Puerto Rico.

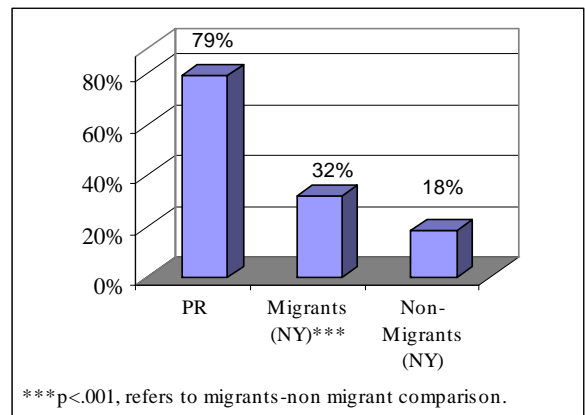
The differences suggest that the greater availability of drug treatment and HIV prevention programs in New York helps reduce injection risks. Some migrants emigrated to New York to obtain drug treatment services. During focus groups with migrant drug injectors, several participants said that they had traveled to New York to enroll in methadone maintenance treatment programs and obtain other services.

Graphs 14 and 15. Frequency of Injections and Percentage Using Shooting Galleries in Past Month among IDUs in Puerto Rico, and NY Migrant and Non-Migrant IDUs.

14. Frequency of Injections



15. Use of Shooting Galleries



<sup>31</sup> The following findings were published in: Deren, et al. (2003). "Migration and HIV risk behaviors: Puerto Rican drug injectors in New York City and Puerto Rico". *American Journal of Public Health*, 93, 5:812-816.

## Part VI. HIV Prevalence and Incidence, and Mortality Rates

In this section we provide a brief historical overview of HIV prevalence and incidence among injection drug users, followed by prevalence and incidence data for study participants. During the course of the research some participants died and so we also compare the mortality rates between study sites.

### Overview of HIV prevalence among Injection Drug Users

HIV prevalence rates measure the proportion of persons in a sample who are HIV positive at a given point in time, irrespective of when they became infected. The data are useful in monitoring the virus' historical progression. HIV incidence data, however, describe the number of new infections reported within a specific time period and are therefore a better tool for assessing current HIV prevention and public health service needs.

Injection drug users have been among the groups most impacted by the AIDS epidemic. Through the end of 2002, a cumulative total of 877,275 adults and adolescents in the United States were estimated to have ever been diagnosed with AIDS.<sup>32</sup> Of these, 34% were infected either through injection drug use or a combination of injection drug use and male-to-male sexual contact, making drug injection the second most common HIV transmission route after male-to-male sexual contact.<sup>33</sup>

The AIDS epidemic among injection drug users in New York City has been one of the largest local AIDS epidemics in industrialized countries.<sup>34</sup> By the mid 1980's and early 1990's, half of the drug injectors in New York City and in Puerto Rico were estimated to be HIV positive.<sup>35</sup> By 1996, the HIV prevalence rate among injection drug users in New York City declined to about 25%.<sup>36</sup> Recent data show that the rate has continued to decline, to less than 20%.<sup>37</sup> Baseline data from the ARIBBA study, as well as our prior research, indicate that HIV prevalence among drug injectors in Puerto Rico also declined, to approximately 20% by the end of the 1990's.<sup>38</sup> Comparative HIV prevalence rates in New York City and Puerto Rico among injection drug users not enrolled in treatment, between 1992-1999, are shown in Graph 16.

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<sup>32</sup> The number cited excludes cases among children under thirteen. C.D.C., 2002. Vol. 14, page 12, Table 3.

<sup>33</sup> Ibid.

<sup>34</sup> Des Jarlais, et al., (2000). "Behavioral Risk Reduction in a Declining HIV Epidemic: Injection Drug Users in New York City, 1990-1997". *American Journal of Public Health*, July 2000, Vol. 90, No. 7

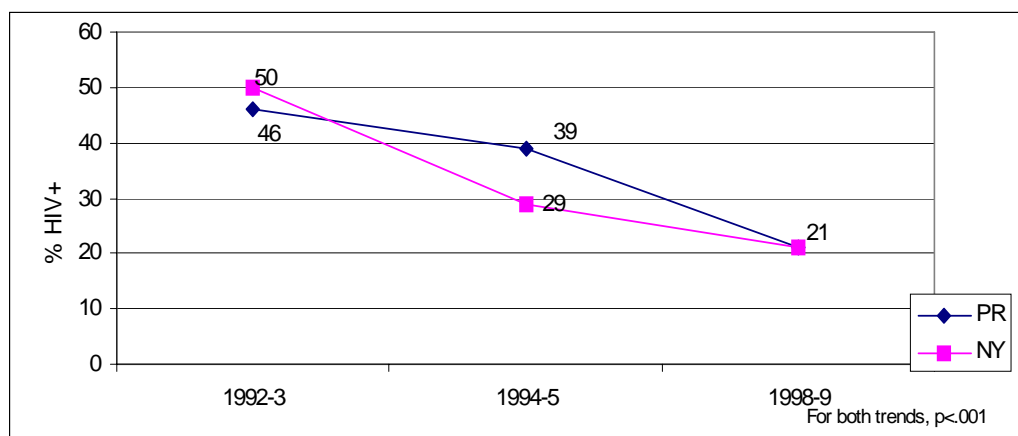
<sup>35</sup> Des Jarlais, et al., (1994). "Continuity and change within an HIV epidemic." *JAMA*. 27:121-1227.; Robles, et al. (1993). *Handbook on risk of AIDS: Injection Drug Users and Sexual Partners*. Westport, CT: Greenwood Press, 256-274.

<sup>36</sup> Des Jarlais, et al., (1998). "Declining seroprevalence in a very large HIV epidemic: Injecting drug users in New York City, 1991 to 1996." *American Journal of Public Health*. 88:1801-1806.

<sup>37</sup> Des Jarlais. "Trends in HIV among IDUs in New York City. Presented at: 14<sup>th</sup> International AIDS Conference 2002; Barcelona, Spain.

<sup>38</sup> Deren, et al., (2001). "Trends in HIV seroprevalence and needle sharing among Puerto Rican drug injectors in Puerto Rico and New York: 1992-1999." *Journal of Acquired Immune Deficiency Syndromes*. 26:164-169.

Graph 16. HIV Seroprevalence Among IDUs, 1992-1999.



A combination of prevention efforts, including outreach, HIV counseling and testing, needle exchange and drug treatment programs, are credited with reducing HIV prevalence among injection drug users. The high mortality rate among drug injectors infected before the mid 1990's, when antiretroviral therapies were introduced, also contributed to the decline in prevalence.

In the mid-1990s it was estimated that the highest U.S. HIV incidence rates among drug injectors were in New York (4.4 per 100 years at risk) and in Puerto Rico (4.9 per 100 year at risk), compared to an overall estimated rate of 1.5 among injection drug users throughout the United States.<sup>39</sup> By the end of the 1990's the HIV incidence rate among New York City drug injectors was estimated to have declined to less than 1 per 100 years at risk.<sup>40</sup> Recent estimates of HIV incidence among injection drug users in Puerto Rico have not been published and there are no current incidence data on crack users in either New York or Puerto Rico.

#### Overview of HIV Prevalence and HIV Incidence Among Study Participants

At baseline and follow-up interviews, ARIBBA study participants in both locations received HIV counseling and testing.<sup>41</sup> At baseline, 20% of the participants in Puerto Rico were HIV positive compared to 25% in New York. Three follow-up interviews were conducted at approximately 6, 36 and 42 months after the initial interview. Overall, more than 80% of the sample participated in at least one of the three follow-up interviews. The HIV incidence analysis is based on participants who were HIV negative at baseline and who had two to four interviews. The sample size was 723 persons; 455 in New York and 268 in Puerto Rico.

<sup>39</sup> Holmberg, S. (1996). "The estimated prevalence and incidence of HIV in 96 large metropolitan areas". *American Journal of Public Health*. 1996; 85:642-654.

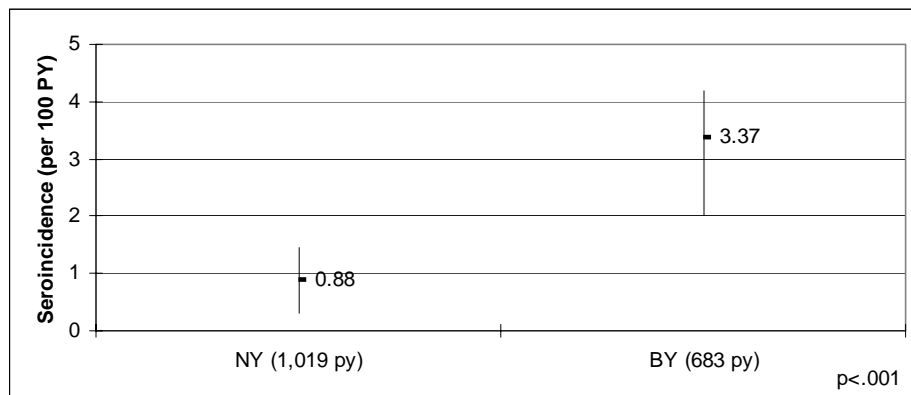
<sup>40</sup> Des Jarlais, et al., (2000). "HIV incidence among injection drug users in New York City, 1992-1997: Evidence of a declining epidemic." *American Journal of Public Health*. 90:352-359.

<sup>41</sup> The findings that follow can be found in: Deren, et al., (2004). "HIV incidence among high risk Puerto Rican drug users: A comparison of East Harlem, New York and Bayamón, Puerto Rico". *Journal of Acquired Immune Deficiency Syndrome*, 36 (5): 1067-1074

Participants in Puerto Rico who were HIV negative at baseline became infected with the virus at a rate that was almost four times higher than their New York counterparts. Graph 17 shows the rate at which HIV negative participants contracted the virus (per 100 years at risk) and the corresponding 95% confidence intervals. In New York, the rate was .88 per 100 years at risk, compared to 3.37 per 100 years at risk in Puerto Rico. The rate in Puerto Rico is among the highest recently reported among populations of drug users anywhere in the United States.

If examined as the percentage of persons in the baseline sample who became infected, in Puerto Rico, 23 of the 268 (8.58%) drug users who were HIV negative at their initial interview contracted the virus by follow-up. By comparison, nine of the 455 (1.97%) HIV negative participants in New York became infected.

Graph 17: HIV Seroincidence Rates of Study Participants, per 100 PY.



**Predictive and Protective Factors.**

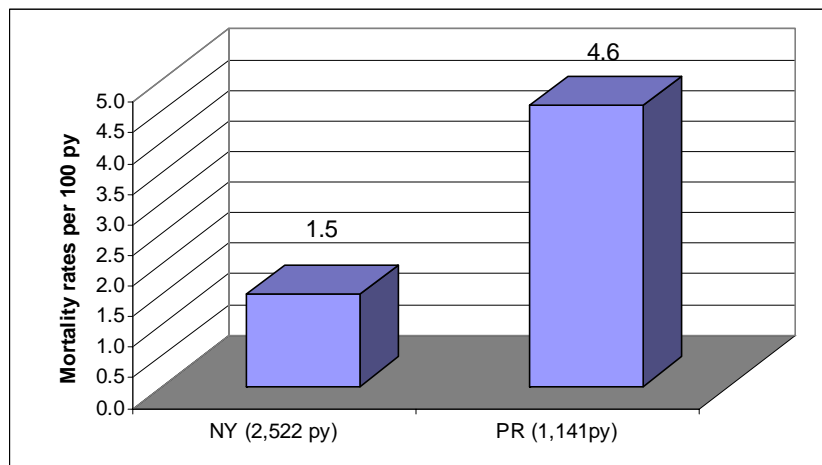
We examined the baseline variables that were significantly associated with HIV incidence, including predictors of infection as well as protective factors. Among participants in both locations, more frequent drug injection was associated with becoming infected. Participants who became infected injected drugs an average of 204 times a month, compared to an average of 116 times among those who did not become infected. In New York, smoking crack was significantly related to becoming infected with HIV, and in fact, all of the persons who became infected in New York were crack smokers. (Some of them had also injected drugs.)

In Puerto Rico, younger age and injecting drugs in a drug shooting gallery were significantly related to becoming infected with HIV. Being enrolled in a methadone program was protective in not becoming infected. None of the participants in Puerto Rico who became infected were enrolled in a methadone program at baseline.

### Comparison of Mortality Rates of Study Participants

Using data from the Center for Disease Control and Prevention National Death Index we examined the mortality rates of study participants.<sup>42</sup> The mortality rate among participants in Puerto Rico was more than three times larger than among participants in New York. The preliminary mortality rate through December 2001 was 4.6 per 100 years at risk in Puerto Rico, compared to 1.5 per 100 years at risk in New York. (Graph 18)

Graph 18: Preliminary Mortality Rates Among ARIBBA Participants, Death Rates per 100 PY, as of December 2001.

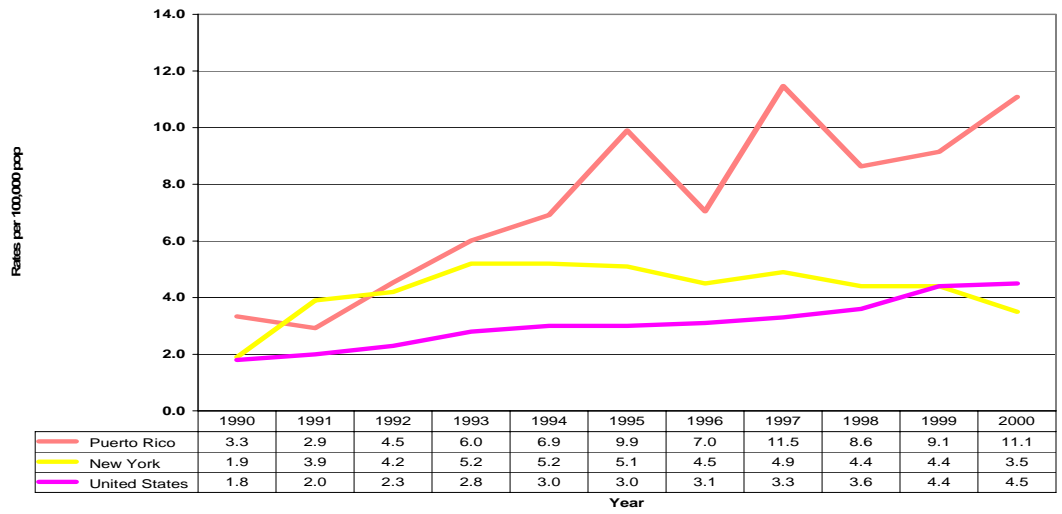


### Comparison of Drug Overdose Death Rates in Puerto Rico, New York State and the United States.

To further assess the impact of drug use on mortality, we examined trends of drug overdose deaths in Puerto Rico and New York State from 1990 to 2000, and compared them to the national average (Graph 19). In 1990, the New York State rate was similar to the national average (1.9 and 1.8 per 100,000 population, respectively). The rate in Puerto Rico was about twice as high (3.3). From 1990 to 1993 the drug overdose death rate in New York State almost tripled, increasing from 1.9 to 5.2 per 100,000. Thereafter the rate declined until the year 2000, when the rate in New York State was 3.5, about three-quarters of the national rate (4.5). In Puerto Rico, the rate began to increase in 1992 and continued an upward trend until 2000, when the rate reached 11.1, more than twice the national rate of 4.5 and three times higher than in New York State.

<sup>42</sup> The following findings were presented at: Deren, S., et al., (November 2003). "Comparing the San Juan and New York City HIV Epidemics among Puerto Rican Drug Users: Evidence of a Public Health Emergency in San Juan." HIV Center for Clinical and Behavioral Studies. New York, N.Y.

Graph 19. Age adjusted drug overdose death rates, Puerto Rico, New York State, and the United States, 1990 to 2000.



Source. Puerto Rico Demographic Registry and National Center for Health Statistics (CDC/DHHS).

## Part VII. Discussion and Recommendations

The drug users who were interviewed in Puerto Rico engaged in riskier drug-using and sexual behaviors than their counterparts in New York. In Puerto Rico, participants who were injection drug users injected more frequently, shared syringes and drug paraphernalia more often, and were more likely to have multiple sex partners and engage in unprotected sex. They also had fewer HIV prevention resources and drug treatment programs available to them than study participants in New York, and the capacity of drug treatment programs in Puerto Rico declined by over a third between 1998 and 2002. The combination of high risk behaviors and lack of access to services increased the likelihood that they would become infected with HIV.

Participants in Puerto Rico who were HIV negative at their baseline interview became infected at a rate that was almost four times higher than their New York counterparts, and they died at a rate that was more than three times higher. The HIV incidence rate in Puerto Rico is among the highest recently found among populations of drug users anywhere in the United States.

While the findings of this study provide evidence of a public health emergency among drug users in Puerto Rico, it has broader social and public health implications. HIV and AIDS impose financial strains on an already overburdened healthcare system. Moreover, HIV's primary transmission route in the non-drug using and heterosexual populations has historically been related to injection drug use and is likely a contributing factor to the rates of infection in the general population, including children. Nationwide, the CDC estimates that 52% of all pediatric AIDS cases through 2002 were related to injection drug use. In Puerto Rico, the rate of children 13 years of age or younger who are living with AIDS is almost the double the national average.

There is no single method to prevent HIV transmission among drug users or other populations. However, the AIDS epidemic, now in its third decade, has led to the development and evaluation of several prevention interventions proven to be effective. Together these interventions can have a significant impact in reducing HIV risk behaviors, thereby decreasing the number of persons who become infected.

The recommendations that follow are based on HIV prevention and risk reduction interventions that have been scientifically evaluated and shown to reduce the injection and sex risks of drug users. Their efficacy is supported in the research literature by numerous rigorously conducted studies and evaluations on HIV prevention among drug users. The first three recommendations are among those cited in the National Institutes of Health 1997 *Consensus Statement on Interventions to Reduce HIV Risk*, a document written by a non-federal, non-advocate panel of experts in a range of disciplines, including epidemiology, behavioral and social sciences.<sup>43</sup> These prevention methods form the core of an effective strategy to reduce new infections among drug users. Additional recommendations specific to drug users in Puerto Rico, based on the ARIBBA study findings, are also provided.

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<sup>43</sup> National Institutes of Health, (1997). "NIH consensus statement: Interventions to prevent HIV risk Behaviors", N.I.H., Vol. 15, No. 2.

### **Increase Access to Methadone Maintenance and Other Drug Treatment Programs**

Methadone maintenance treatment has been critical in preventing HIV infections among injection drug users. It is particularly important in Puerto Rico, where the study found that enrollment in a methadone program was protective in not becoming infected. Methadone reduces the addict's physiological dependency on heroin, and can reduce heroin consumption and injection frequency. Methadone maintenance may also lead to cessation of drug use. In addition, methadone maintenance programs can provide other services to support drug use reduction or abstinence, including case management and referral to healthcare, HIV related programs and other drug treatment modalities.

Access to methadone maintenance and to other drug treatment programs should be expanded. This can be accomplished by adding resources to existing programs (to expand program capacity) and by developing new programs in underserved areas, as well as by expanding prison-based drug treatment. The capacity of drug treatment programs in Puerto Rico, which declined by thirty-five percent between 1998 and 2002, should be increased.

### **Increase Street Outreach Programs**

Because of the illicit nature of drug use, drug users, particularly those who inject drugs, are often suspicious of outsiders. They are considered "hard-to reach" and "hidden" populations. For this reason HIV prevention and treatment programs frequently employ street outreach workers, some of whom are recovering drug users and are indigenous to the areas they work in, to reach and engage drug users and provide street-based services. Outreach workers typically provide verbal and written information on ways to reduce HIV risk and information and referrals to health care, social services and drug treatment programs. They also distribute risk reduction materials, such as condoms and bleach kits.

Injecting drugs in a shooting gallery was significantly related to becoming infected with HIV among the study's participants in Puerto Rico. Outreach workers can contribute to reducing the high risk injection that occurs in shooting galleries by referring users there to drug treatment, risk reduction and health programs. More generally, they can refer drug users who are not enrolled in drug treatment programs or using health services, and who are therefore at highest risk of contracting or transmitting HIV. Outreach workers can also target specific sub-groups, such as women crack smokers, who might be at higher risk for infection based on sexual transmission.

### **Increase Access to Clean Needles and Injection Equipment**

Injection drug users who share syringes or injection equipment are at increased risk of HIV infection. If they are already infected, they can transmit the virus to others through sharing needles or other paraphernalia. In the month before their first interview, injection drug users in Puerto Rico reported injecting drugs an average of 184 times a month. Twenty percent used someone else's needle and a third used someone else's injection equipment.

Several studies have evaluated the effectiveness of needle exchange programs and found that they reduce risky drug injection practices. Funding for syringe exchange programs should be increased and services expanded to regions that are under-served. Increasing access to new syringes reduces the likelihood that drug users will share them. Syringes can be distributed through several sources, including needle exchange programs, pharmacies and healthcare workers. Limited funding has led needle exchange programs in Puerto Rico to restrict their hours of operation and the number of syringes that they distribute.

### **Increase Access to HIV Medical Care**

Medical treatments for persons who are HIV positive have advanced significantly since the start of the HIV/AIDS epidemic. Highly active antiretroviral therapy (HAART), which gained widespread use in 1996, has allowed persons who are HIV positive to live healthier and longer lives. There is a need, however, to reach and engage HIV-infected persons who are not enrolled in HIV primary care. Among study participants, nearly half of those in New York City and 78% of those in Puerto Rico reported that they were not taking HIV medications.

Treating drug users poses many challenges to medical providers, including that they may not take their medications on the schedules required, may continue to use drugs and may miss appointments. Some studies have shown, however, that treatment adherence rates among drug users are similar to other groups. Despite the challenges, there are substantial benefits to individuals, as well as to the general population (through decreased transmission risk) to expanding access, engagement and retention of HIV positive drug users in HIV treatment. Expanding access can be accomplished through improving the linkages between drug treatment and HIV/AIDS service providers and through targeted outreach to drug users who are HIV positive and are not in treatment.

### **Develop an HIV Surveillance System**

The HIV/AIDS surveillance system in Puerto Rico monitors the number of persons who are diagnosed with AIDS. An island-wide system for monitoring new infections, HIV incidence, is also needed, to compare infection rates across regions and populations, and to deploy public health and prevention resources to where they are most needed.

### **Create an Island-wide HIV/AIDS Prevention and Treatment Task Force**

An island-wide Task Force can be helpful in developing and monitoring HIV/AIDS prevention and treatment services throughout Puerto Rico. The group should consist of representatives of HIV/AIDS services, drug treatment programs, public health agencies, healthcare services, community and faith-based organizations, harm reduction programs, researchers and persons living with HIV and AIDS.

## **Additional Recommendations**

### **Interventions Requiring Further Investigation**

Findings from the study also suggest that innovative interventions may reduce HIV transmission risk among drug users in Puerto Rico. The efficacy of these interventions can be tested through demonstration projects with evaluation components.

### **Tap the Influences of Prison Associations and Gangs to Reduce Risk**

Drug users who reported injecting drugs while in prison reported high levels of sharing syringes and injection equipment. Three-quarters of participants in Puerto Rico were members of gangs or prison associations during their incarcerations. While these groups are often associated with violence, both in and out of prison, findings from this and other studies suggest that gangs also influence the social norms of its members and what are considered acceptable and unacceptable behaviors. Prison-based gangs and associations can therefore potentially be resources to reduce the high risk behaviors common among incarcerated drug injectors.

### **Train Private Syringe Sellers to Work as HIV Prevention Workers**

Private syringe sellers may be able to serve a broader and more formal role in providing syringes to drug users, particularly during hours when needle exchange programs and pharmacies are unavailable. These merchants are generally local vendors who do not use drugs and who work and live within drug using areas. They were the largest single source of needles among injectors recruited in Puerto Rico. Syringe sellers can be trained as HIV prevention workers, a role in which they would provide drug users with information on risk reduction and refer users to drug treatment programs.

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