

HIV Infection and Risk Behaviors among Intravenous Drug Users in Low Seroprevalence Areas in the Midwest

ABSTRACT

We studied behavioral factors that place intravenous drug users at risk for the acquisition and transmission of the human immunodeficiency virus (HIV) in a sample of 855 individuals not in drug treatment, living in central and southwestern Ohio. The HIV seropositivity rate for the sample was 1.5%. Three factors were significantly related to HIV infection: homeless shelter residence (odds ratio [OR] = 7.7, 95% confidence interval [CI] = 3.0–20.0), travel to northeastern HIV hyperendemic areas (OR = 5.2, 95% CI = 1.8–15.4), and recent male homosexual or bisexual behavior (OR = 11.2, 95% CI = 2.9–43.9). (*Am J Public Health*. 1991;81:1642–1644)

Harvey A. Siegal, PhD, Robert G. Carlson, PhD, Russel Falck, BS, Ling Li, MBA, Mary Ann Forney, PhD, Richard C. Rapp, MSW, Kathy Baumgartner, MS, William Myers, MS, and Morton Nelson, MD, MPH

Introduction

Intravenous drug users (IVDUs) are at high risk for contracting the human immunodeficiency virus (HIV).¹ In the United States, epidemiologic studies have focused primarily on assessing the risk behaviors of IVDUs in high (>15%) HIV seroprevalence areas. Risk factors associated significantly with high HIV seropositivity include the following: minority status, male homosexual or bisexual behavior, a history of sexually transmitted diseases (STDs), frequency of injection, cocaine injection, drug use in shooting galleries, and sharing of drug injection equipment.^{2–5} While studies of IVDUs in low seroprevalence areas have identified similar risk behaviors, these have generally not been associated significantly with positive serostatus.^{6–9}

This paper first describes the prevalence of HIV risk behaviors reported by 855 active IVDUs in a low seroprevalence area of the Midwest. It then examines the relationships among sociodemographic variables, residence and mobility patterns, drug-use patterns, sexual behaviors, and HIV infection.

Methods

From March 1989 to July 1990, 855 IVDUs were recruited from the streets in the metropolitan areas of Columbus and Dayton, Ohio, by indigenous outreach workers. To be eligible for the study, subjects had to have injected some drug at least once in the previous 6 months, be at least 18 years of age, and not have been in drug treatment in the 30 days prior to data collection.

Data were collected using the AIDS Initial Assessment Instrument (AIA), developed by the National Institute on Drug Abuse for its AIDS outreach and prevention projects. All 855 IVDUs voluntarily agreed to have a sample of their blood screened for HIV antibodies. Serum samples were initially screened using the Ab-

bott enzyme-linked immunosorbent assay. Confirmation tests consisted of Western blotting and were considered positive when antibodies to two of three bands were detected: gp 160/120, gp41, p24.

Based on the results of descriptive statistics, Mantel-Haenszel odds ratios (OR) with 95% confidence intervals (CI) were calculated to compare seropositive and seronegative IVDUs on selected variables. Chi-square tests corrected for continuity were employed to assess significant associations.

Results

Males constituted 75% of the sample. Seventy-eight percent of the sample were Black, 21% were White, and 1% belonged to other racial groups. The median age was 36.

Drug and Needle Use Behaviors

Striking in this sample are the high rates of cocaine use: 79% had injected cocaine in the previous 6 months while 68% reported smoking crack cocaine occasionally, weekly, or daily. Sixty-one percent had injected heroin, and 43% had injected heroin mixed with cocaine (speedball).

About half (49%) reported sharing needles or syringes within the last 6 months. Only 31% reported injecting drugs in a shooting gallery, and almost one quarter (23%) of the IVDUs claimed that they always used a new needle and syringe.

The research for this paper was conducted at Wright State University, School of Medicine, Substance Abuse Intervention Program, Dayton, Ohio; Columbus Health Department, Columbus, Ohio; and Montgomery County Combined Health District, Dayton, Ohio.

Requests for reprints should be sent to Harvey A. Siegal, PhD, Professor and Director, Wright State University, School of Medicine, Substance Abuse Intervention Programs, PO Box 927, Dayton, OH 45401.

This paper was submitted to the journal November 15, 1990, and accepted with revisions May 6, 1991.

TABLE 1—Serostatus and Risk Factors

Factor	n	Serostatus		$\chi^2_{c^a}$	P Values	Odds Ratio	95% Confidence Interval
		% Positive	% Negative				
Sex							
Male	639	1.6	98.4	0	1	1.1	.31–4.1
Female	216	1.4	98.6				
Ethnicity							
Black	664	1.5	98.5	0	1	.95	.26–3.5
White	189	1.6	98.4				
Daily injection							
Yes	297	2.4	97.6	1.36	.24	2.2	.76–6.5
Daily cocaine injection							
Yes	150	3.3	96.7	2.66	.10	3.0	1.0–8.8
Crack use							
Yes	584	1.4	98.6	.07	.79	.72	.24–2.2
Use of shooting gallery							
Yes	330	1.8	98.2	.07	.79	1.4	.46–4.1
Always used new needles							
No	655	1.8	98.2	1.04	.31	3.7	.55–25.1
Ever shared or rented needles							
Yes	421	2.1	97.9	1.38	.24	2.4	.74–7.4
Homeless shelter residence							
Yes	90	6.7	93.3	14.12	.000	7.7	3.0–20.0
Epicenter travel ^b							
Yes	70	5.7	94.3	6.17	.01	5.2	1.8–15.4
History of STDs							
Yes	336	2.4	97.6	1.84	.18	2.5	.84–7.4
Number of sex partners							
Multiple	452	1.6	98.4	.82	.37	2.6	.57–12.0
Condom use							
Yes	216	1.9	98.1	.61	.44	2.1	.59–7.8
Homo/bisexual males ^c							
Yes	22	9.1	90.9	6.17	.01	11.2	2.88–43.8

^aChi-square test corrected for continuity.
^bFor this study northeastern HIV epicenters include New York, NY, Newark, NJ, and Jersey City, NJ.
^cThe AIDS Initial Assessment Instrument is designed to assess risk behaviors in the 6 months preceding the interview. If a respondent reports no sexual activity, there is no mechanism to determine sexual orientation. Of the 10 seropositive males, sexual orientation is known for 7 participants: 5 report heterosexual behavior and 2 report homosexual behavior. Given these small numbers, results must be interpreted cautiously.

Sexual Practices

The majority of IVDUs (93%) reported having sexual relations within the previous 6 months; 58% indicated having multiple partners. Almost 40% of the IVDUs reported a history of at least one STD. Of all those IVDUs sexually active in the previous 6 months, 96% reported sexual behaviors that we categorized as heterosexual, 2% as bisexual male (3% female), and 2% as homosexual male (4% female).

HIV Seropositivity and Risk Behavior

The seropositivity rate for the total sample was low—1.5% (13 of 855 subjects). A greater percentage of seropositive subjects injected drugs on a daily basis compared to seronegative participants (54% vs 34%, respectively), reported a higher daily cocaine injection rate (38% vs 17%), and were more likely to live in a homeless shelter (46% vs 10%), to travel to HIV epicenters (31% vs 11%), to have

multiple sex partners (78% vs 57%), to have a history of STDs (62% vs 39%), to have ever shared needles or syringes (69% vs 48%), and to use new needles less frequently (7% vs 24%).

Three variables were associated significantly ($P < .05$) with seropositivity (Table 1). Those persons living in a shelter were seven times more likely to be infected (OR = 7.7, 95% CI = 3.0–20.0), while those who had traveled to a northeastern HIV hyperendemic area within the previous 2 years were five times more likely to be seropositive (OR = 5.2, CI 1.8–15.4). Finally, homosexual/bisexual males who were sexually active in the 6 months prior to the interview were 11 times more likely to be HIV positive (OR = 11.2, CI = 2.9–43.9).

Discussion

Our results are generally similar to previous research in low seroprevalence

areas.^{6–9} The widespread practice of AIDS-related risk behaviors in this mid-western locale provides the potential for higher infection rates in the future. At present, however, variables typically associated with HIV infection in high seroprevalence areas, such as race and ethnicity, use of shooting galleries, and frequency of injection had little predictive power, although many results are in the expected direction. In contrast with previous studies,^{10–11} Whites and Blacks were about equally likely to be seropositive.

While our analyses are based on a small number of seropositive cases and should be interpreted cautiously, several new findings emerged. The results encourage some speculation about the movement of HIV to low seroprevalence areas as well as the key mechanisms for local dispersion. The significant relationship between travel to northeastern hyperendemic areas and HIV seropositivity is a new finding among IVDUs in low seroprevalence areas.

This study seems to support the findings of Battjes and colleagues⁶ that homosexual/bisexual male IVDUs form a potential route for transmission of the HIV from non-drug-using gay males to heterosexual IVDUs in low seroprevalence areas. Our data emphasize the importance of travel as an additional mechanism for importing the virus into low seroprevalence areas. If the diffusion factors of mobility and homosexual/bisexual behavior are interrelated, future increases in the prevalence of HIV in currently low seroprevalence regions may be expected, given the high levels of risk behaviors. Such scenarios, tentative as they are, emphasize the critical need for preventive interventions in low seroprevalence areas.

Our results also suggest that homeless shelter residence is a potentially high-risk social setting that may serve as an additional indirect mechanism for the dispersion of HIV. While a high seroprevalence rate has been reported among male IVDUs residing in homeless shelters in New York City,¹² the association between shelter residence and seropositivity is a new finding for low seroprevalence areas and might contribute to understanding the natural history of HIV. Shelters bring together many of society's most vulnerable people, allowing intense social interaction. Given the current crack cocaine epidemic with its associated high-risk sexual behavior and disruption of social networks,¹³⁻¹⁴ these interrelated processes are cause for concern.

Future research should examine IVDU mobility, homosexual/bisexual behavior, and social networks particularly as these interface with homeless shelter residence patterns. Focus should be directed toward understanding these factors within and between low and high seroprevalence regions. □

Acknowledgments

This research was supported by grant DA05757 from the National Institute on Drug Abuse.

The authors wish to acknowledge the contributions of Ms. Ruth Frankenfield, RN, MSN, City of Columbus site director, Ms. Diana Alexander, Dayton site director, and members of their staffs.

References

1. Berkelman RL, Heyward WL, Stehr-Green JK, Curran JW. Epidemiology of human immunodeficiency virus infection and acquired immunodeficiency syndrome. *Am J Med.* 1989;86:761-770.
2. Marmor M, Des Jarlais DC, Cohen H, et al. Risk factors for infection with human immunodeficiency virus among intravenous drug abusers in New York City. *AIDS.* 1987;1:39-44.
3. Chaisson RE, Bacchetti P, Osmond D, Brodie B, Sande MA, Moss AR. Cocaine use and HIV infection in intravenous drug users in San Francisco. *JAMA.* 1989;261:561-565.
4. Schoenbaum EE, Hartel D, Selwyn PA, et al. Risk factors for human immunodeficiency virus infection in intravenous drug users. *N Engl J Med.* 1989;321:874-879.
5. McCoy CB, Khoury E. Drug use and the risk of AIDS. *Am Behav Sci.* 1990;33:419-431.
6. Battjes RJ, Pickens RW, Amsel Z. Introduction of HIV infection among intravenous drug abusers in low prevalence areas. *J Acquir Immune Defic Syndr.* 1989;2:533-539.
7. Chandrasekar PH, Molinari JA, Kruse JA. Risk factors for human immunodeficiency virus infection among parenteral drug abusers in a low prevalence area. *South Med J.* 1990;83:996-1001.
8. Wendt D, Sadowski L, Markowitz N, Saravolatz. Prevalence of serum antibody to human immunodeficiency virus among hospitalized intravenous drug abusers in a low-risk geographic area. *J Infect Dis.* 1987;155:151-152. (Letter).
9. Williams ML. HIV seroprevalence among male IVDUs in Houston, Texas. *Am J Public Health.* 1990;80:1507-1509.
10. Selik RM, Castro KG, Pappaioanou M. Racial/ethnic differences in risk of AIDS in the United States. *Am J Public Health.* 1988;78:1539-1545.
11. Lange R, Snyder FR, Lozovsky D, Kaistha V, Kaczaniuk MA, Jaffe JH. Geographic distribution of human immunodeficiency virus markers in parenteral drug abusers. *Am J Public Health.* 1988;78:443-446.
12. Torres RA, Sridhar M, Altholz J, Brickner PW. Human immunodeficiency virus infection among homeless men in a New York City shelter. *Arch Intern Med.* 1990;150:2030-2036.
13. Inciardi JA. Trading sex for crack among juvenile drug users: a research note. *Cont Drug P.* Contemporary Drug Problems 1989;16:689-700.
14. Carlson RG, Siegal HA. The crack life: an ethnographic overview of crack use and sexual behavior among African-Americans in a midwest metropolitan city. *J Psychoactive Drugs.* 1991;23:11-20.