

## AIDS Risk Reduction and Reduced HIV Seroconversion among Injection Drug Users in Bangkok

### ABSTRACT

Human immunodeficiency virus (HIV) seroconversion was studied in a group of 173 injection drug users in Bangkok, Thailand, who had been previously tested for HIV and were interviewed and retested in the fall of 1989. Ten percent of the group had seroconverted. Two factors protected against HIV seroconversion: having stopped sharing injection equipment in response to the acquired immunodeficiency syndrome (AIDS) and having a regular sexual partner. The association between self-reported deliberate risk reduction and reduced HIV seroconversion among persons continuing to inject illicit drugs indicates that injection drug users can change their behavior in response to AIDS and will accurately report on the behavior change, and that the changes can protect against HIV infection. (*Am J Public Health*. 1994; 84:452-455)

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### Introduction

Human immunodeficiency virus (HIV) infection has been reported among injection drug users in over 50 different countries.<sup>1,2</sup> Large-scale risk reduction, followed by stabilization of HIV seroprevalence, has been observed among injection drug users in many cities, including New York,<sup>3</sup> Stockholm,<sup>4</sup> San Francisco,<sup>5</sup> Innsbruck,<sup>6</sup> Vienna,<sup>7</sup> and Edinburgh.<sup>8</sup> In all of these cities, however, the association between risk reduction and reduced HIV transmission has been shown only at the community level. To date, there have been no reported studies showing that practicing "safer injection" because of concern about acquired immunodeficiency syndrome (AIDS) reduces the likelihood of HIV seroconversion at the individual level. No study of syringe exchange to date has linked individual use of syringe exchange to a lower risk of HIV seroconversion.<sup>9-13</sup> Similarly, no study has yet shown a protective effect of bleach disinfection against HIV seroconversion at the individual level.<sup>14</sup>

The absence of an individual-level linkage between deliberate risk reduction and reduced HIV seroconversion reinforces the common belief that persons who continue to inject illicit drugs cannot change their AIDS risk behavior and that they will not accurately report their risk behavior. These beliefs have been cited by policymakers in the United States as a rationale for opposing AIDS prevention programs that involve legal access to sterile injection equipment.<sup>15,16</sup>

We report here evidence that deliberate AIDS risk reduction behavior has a protective effect on HIV seroconversion

at the individual level among persons continuing to inject illicit drugs in Bangkok, Thailand. Transmission of HIV among injection drug users in Bangkok had been among the most rapid in any population. In studies of injection drug users attending drug abuse treatment clinics in Bangkok, seroprevalence increased from 1% in late 1987 to 15% in March 1988 to 43% in the fall of 1988.<sup>17,18</sup> As public health officials became aware of the spread of HIV among injection drug users in Bangkok, AIDS education/prevention programs were rapidly implemented, including prominent posters in drug abuse treatment clinics. Staff at these clinics encouraged injection drug users not to "share" injection equipment and to purchase sterile injection equipment at pharmacies (prescriptions are not required); educated injection drug users about

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**Editor's Note:** See related annotation by Chitwood (p 350) in this issue.

**TABLE 1—Selected Demographic and Drug Use Characteristics of Bangkok Injection Drug Users (n = 173) Who Previously Tested HIV Negative**

	No.	%
<b>Gender</b>		
Male	163	94
Female	10	6
<b>Ethnicity</b>		
Thai	172	99
Other	1	1
<b>Jail history since time of first injection<sup>a</sup></b>		
Yes	121	71
No	50	29
<b>Frequency of giving, lending, or selling injection equipment in previous 6 months<sup>a</sup></b>		
Never	77	45
Less than once per week	66	39
One or more times per week	28	16
<b>Stopped sharing injection equipment since hearing about AIDS</b>		
Yes	111	64
No	62	36
<b>Injected heroin</b>	173	100
<b>Injected other drugs in combination with heroin</b>	11	6

Note. The average age of the subjects was 31.54 years (SD = 8.56 years).

<sup>a</sup>Data are missing for 2 subjects.

sexual HIV transmission; distributed condoms; and provided HIV testing and counseling. Since the fall of 1988, seroprevalence among in-treatment injecting drug users has stabilized: 45% were HIV positive in the spring of 1989<sup>19</sup> and 39% were HIV positive in the fall of 1989.<sup>18</sup> In the fall 1989 study, 92% of the subjects reported that they had changed their behavior to reduce the risk of developing AIDS, with 59% reporting that they had "stopped sharing" injecting equipment because of concern about AIDS.

## Methods

In the fall of 1989, 601 injection drug users were recruited at the clinics of the Bangkok Metropolitan Administration drug abuse treatment system. Injecting within the past 2 months was

**TABLE 2—Factors Associated with HIV Seroconversion among Injection Drug Users in Bangkok**

	Seroconverted (n = 17)		Did Not Seroconvert (n = 156)		P( $\chi^2$ )
	No.	%	No.	%	
<b>Incarceration since time of first injection</b>					
Yes	16	94	105	68	.026
No	1	6	49	43	
<b>Stopped sharing injection equipment since hearing about AIDS</b>					
Yes	6	35	105	67	.009
No	11	65	51	33	
<b>Number of primary partners in the past 6 months</b>					
None	14	82	85	54	.027
One or more	3	18	71	46	

required for study eligibility. Subjects were selected randomly from among persons who had been in treatment for at least 3 months (n = 342) and randomly from among persons who were entering the treatment system (n = 259). All persons asked to participate agreed to do so. At that time, the primary treatment regimen provided in these clinics was a 45-day methadone-assisted detoxification program, followed by after-care counseling. (Methadone maintenance programming in Bangkok has since been greatly expanded.)

Informed consent was obtained, a risk behavior questionnaire was administered by trained interviewers, HIV test counseling was conducted, and a blood sample was obtained. The questionnaire was developed as part of a multisite World Health Organization study and emphasizes risk behavior in the 6-month period before the interview. Sera were tested for anti-HIV antibodies by double ELISA tests (Wellcome) with confirmation of positive results by Western blot assay (Pacific Health Care) at the Siriraj Hospital laboratory.

Two hundred sixty-three subjects reported that they had previously been tested for HIV, with 173 reporting that their most recent previous test was negative. Retesting of these 173 presented an opportunity to identify risk factors for HIV seroconversion.

Chi-square tests and multiple logistic regression (SAS statistical programs<sup>20</sup>) were used to test associations with HIV seroconversion.

## Results

Table 1 presents selected demographic and drug history characteristics of the 173 subjects reporting a previous HIV-negative test. The mean time between most recent previous test and current test was 9.8 months (SD = 7.2; range = 1–32, median = 8).

Seventeen (10%) subjects had seroconverted by the fall of 1989. Bangkok Metropolitan Administration records were used to validate the previous HIV-negative test for all of these 17 subjects. Assuming that the seroconversions occurred midway between the most recent negative HIV test and the fall 1989 test gave an estimated HIV seroconversion rate of 12.5 per 100 person-years at risk for this sample (95% confidence interval [CI] = 7.6, 17.4).

The 17 subjects who had seroconverted were compared with the 156 subjects who remained seronegative on demographic, drug use, and sexual behavior variables. As shown in Table 2, the three variables that significantly distinguished the seroconverters were (1) having been incarcerated since starting drug injection (a risk factor); (2) reporting that they had "stopped sharing injection equipment in response to AIDS" (a protective factor); and (3) having a primary sexual partner (a protective factor) (a "primary" partner was defined for the subjects as a "regular, most important" sexual partner). The "stopped sharing" variable was constructed from an open format question: "Since you first heard about AIDS, have you done anything to avoid catching the virus yourself, or to prevent

**TABLE 3—Multivariate Logistic Regression Analysis for HIV Seroconversion among Injection Drug Users in Bangkok**

Factor	$\chi^2$	P	Odds Ratio (95% CI)
Did not stop sharing injection equipment	6.475	.01	4.01 (1.38,11.66)
Lacks primary sexual partner	6.589	.03	4.17 (1.13,15.41)

Note. CI = confidence interval.

someone else getting it from you?" Subjects were coded as "having stopped sharing" if they responded to this question by reporting that they had "stopped sharing" injection equipment and if they also responded on the follow-up question that they had "maintained this behavior change."

Multiple logistic regression with backwards elimination was used to examine the statistical independence of the three factors associated with HIV seroconversion. (The wording for the two protective factors was reversed so that they were entered as risk factors.) Results are presented in Table 3; failure to stop sharing and lacking a primary sexual partner remained statistically significant.

Most of the risk behavior questions in the questionnaire asked about behavior in the previous 6 months, although many of the seroconversions may have occurred earlier. We therefore repeated the analyses using only the 103 subjects (10 seroconverters) who had tested negative within the 10 months before the fall 1989 testing (and thus presumably had seroconverted within the previous 5 months). To assess the possibility that recently tested nonconverters did not have sufficient time for seroconversion, the analyses were also repeated omitting the 19 subjects (1 seroconverter) who reported that their previous HIV-negative test was within 3 months before the fall 1989 HIV testing. The same pattern of relationships was found in these two subanalyses as for the 173 subjects. (Data available from the corresponding author.)

## Discussion

In this study, injection drug users who reported practicing safer injection ("stopped sharing injection equipment") because of concern about AIDS were less likely to have seroconverted for HIV. The time period (1987 through 1989) covered by this study was a period

of high rates of both new HIV infections and AIDS risk reduction among injection drug users in Bangkok. Concurrency of high rates of seroconversion and deliberate risk reduction may be an important factor in our ability to show a statistical association between the two processes.

Although lack of documentation of previous HIV tests for the nonconverters is a limitation of this study, the high accuracy of the test reports of the seroconverters and the generally high accuracy of reported HIV test results in another study of injection drug users<sup>21</sup> suggest that few subjects would report a previous test without having been tested.

The 12.5 seroconversions per 100 person-years at risk should *not* be considered as representative of the seroconversion rate among all injection drug users in Bangkok from 1987 through 1989. All subjects in this study would have known about AIDS from their previous HIV counseling and testing and thus would have had some opportunity to change their behavior before HIV seroconversion (although not necessarily before HIV infection). Given the rapidity of the spread of HIV among injection drug users in Bangkok,<sup>19</sup> it is likely that most of the individuals who became infected between 1987 and 1989 did so before they learned about AIDS.

It is not surprising that no specific sexual behavior was associated with HIV seroconversion. The great majority of injection drug users in Bangkok are male, and few have sexual partners who are injection drug users. At the time of this data collection, there were few HIV-infected persons other than injection drug users in the city.

Having a regular sexual partner—an indicator of social integration—had a protective effect against seroconversion in this study. A number of previous studies of injection drug users found that lack of social integration was associated with higher rates of HIV exposure and/or higher rates of risk behavior:

being part of an ethnic minority group; being homeless; having a particularly low income; and residing in a shelter or boardinghouse.<sup>22–26</sup> The mechanisms through which these indicators of social marginalization are related to higher rates of risk behavior or higher rates of HIV infection have not been identified, but such relationships do exist in different national settings.

Reporting that one had stopped sharing drug injection equipment in response to AIDS was strongly associated with not seroconverting in this study. To our knowledge, this is the first time that self-reported deliberate AIDS risk reduction among persons continuing to inject drugs has been associated at the individual level with a reduced likelihood of new infection with HIV. These data provide evidence for the construct validity of self-reported AIDS risk reduction among injecting drug users. (The "validity" of a technique for measuring behavior or psychological/social characteristics refers to whether the technique actually measures what it purports to measure.<sup>27</sup> Construct or "predictive" validity is demonstrated when the measured behavior/characteristic is statistically associated with other behaviors/characteristics according to an explicit theoretical framework. Construct validity for measurement of AIDS risk behavior of injection drug users has been demonstrated through the many studies showing strong associations between self-reported risk behavior and HIV status. Valid measurement of behavior change is, however, a much more difficult task than valid measurement of recent behavior, so that it is important to separately demonstrate validity for self-report measurement of AIDS-related behavior changes.) This finding serves to increase confidence that injection drug users can and will change their behavior to reduce the chances of developing AIDS, that they can and will accurately report such changes in behavior, and that such changes in behavior can directly protect the individual drug injector against infection with HIV. □

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