



Published in final edited form as:

Drug Alcohol Rev. 2008 January ; 27(1): 39–45.

Barriers and missed opportunities to HIV testing among injection drug users in two Mexico – US border cities

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Abstract

Introduction and Aims—Despite increasing HIV prevalence in cities along the Mexico – US border, HIV testing among high-risk populations remains low. We sought to identify barriers associated with HIV testing among injection drug users (IDUs) in Tijuana and Ciudad Juarez, the two largest Mexican border cities located across from San Diego, California and El Paso, Texas, respectively.

Design and Methods—In 2005, 222 IDUs in Tijuana and 205 IDUs in Ciudad Juarez were recruited by respondent-driven sampling and administered a questionnaire to collect socio-demographic, behavioural and HIV testing history data. Blood samples were provided for serological testing of HIV, hepatitis C virus (HCV) and syphilis.

Results—Only 38% and 30% of respondents in Tijuana and Ciudad Juarez, respectively, had ever had an HIV test. The factors associated independently with never having been tested for HIV differed between the two sites, except for lack of knowledge on HIV transmission, which was associated independently in both locales. Importantly, 65% of those who had never been tested for HIV in both cities experienced at least one missed opportunity for voluntary testing, including medical visits, drug treatment and spending time in jail.

Discussion and Conclusions—Among this high-risk IDU population we found HIV testing to be low, with voluntary testing in public and private settings utilised inadequately. These findings underscore the need to expand voluntary HIV education and testing and to integrate it into services and locales frequented by IDUs in these Mexico –US border cities.

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Keywords

barriers; HIV; injection drug use; Mexico; testing

Introduction

The two largest cities on the Mexico – US border are Tijuana and Ciudad Juarez, with populations of 1.3 and 1.2 million, respectively. Both are part of the sister or ‘twin’ cities that dot the Mexico – US border. Tijuana’s sister city is San Diego, California and Ciudad Juarez’s are El Paso, Texas and Sunland Park, New Mexico. Many major cities along Mexico’s northern border are also situated on major drug trafficking routes [1,2]. Local drug use increases northwards along these routes, with prevalence of ever having used illegal drugs (including marijuana) reaching 9.2% in Ciudad Juarez and 14.7% in Tijuana [3]. Although this is low compared to illicit drug use in the United States (with 46% of adults having used illicit drugs in their lifetime), it is concerning, as these cities have two to three times the prevalence of drug use compared to the Mexican national average of 5.3%, and evidence indicates that local drug use is rising [4,5]. Studies suggest that there are at least 6000 injection drug users (IDUs) in Ciudad Juarez (injecting primarily heroin or heroin with cocaine) and 6000 – 10 000 in Tijuana (injecting primarily heroin or heroin with methamphetamine) [6,7; Pollini *et al.*, submitted]. Human immunodeficiency virus (HIV) prevalence is relatively low in Mexico compared to the rest of the Americas, but has been increasing recently along the Mexico – US border [8,9]. Injection drug users with unsafe injection practices and other high-risk behaviours are an important population at risk of HIV infection in this region.

Rising HIV prevalence among IDUs in other settings has been associated with explosive epidemics that spread to the general population [9,10], which raises a concern for this border region. In 2003, a study of pregnant women admitted to the Tijuana General Hospital while in labour revealed an HIV seroprevalence of less than 1% for non-injecting women, 4.9% for women whose sexual partners were IDUs and 6.1% for women who injected drugs [11]. With 200 000 people crossing daily at the San Ysidro border station between Tijuana and San Diego, and more than 130 000 daily crossings at the El Paso – Ciudad Juarez border [12,13], these mobile urban cities provide enormous potential for cross-border transmission of infections. The fact that 53% of Tijuana’s residents and 41% of those in Ciudad Juarez were born outside the states in which these cities are located contributes to the challenge of controlling the spread of infections such as HIV [2,14].

It is well established that voluntary HIV counselling and testing (VCT) is a cornerstone to HIV/acquired immune deficiency syndrome (AIDS) prevention. The US Centers for Disease Control and Prevention (CDC) includes testing as one of the five critical components to HIV prevention [15]. Although only one component to a successful HIV reduction effort, VCT has been shown to reduce risk behaviours effectively and improve knowledge of HIV transmission. Early HIV diagnosis can reduce ongoing transmission by facilitating access to medical care, education and behavioural change through promotion of condoms, fewer sexual partners and safer injection drug use practices [16,17]. Yet in a study conducted in 2003 among IDUs in Tijuana, only half had ever had an HIV test [7].

To our knowledge, no studies have characterised barriers to HIV testing or described existing opportunities for HIV testing in Mexico’s growing IDU population. The objective of this study was to identify factors associated with never having had an HIV test and missed opportunities for testing in Tijuana and Ciudad Juarez in an effort to guide future initiatives in HIV prevention.

Methods

Study population

Cross-sectional interviewer-administered surveys were conducted among 222 IDUs in Tijuana and 206 IDUs in Ciudad Juarez from February – April 2005. Participants were selected through respondent-driven sampling (RDS) in order to achieve a more representative sample of this hard-to-reach population and to be able to adjust for any recruitment bias [19]. A group of ‘seeds’ were selected based on diversity of gender, location and drug preferences, and given three uniquely coded coupons to refer IDUs in their social network until approximately 200 were recruited at each site. Monetary reimbursements for participation in the study were determined by site to compensate participants for time and transportation costs. Seeds also received \$5 compensation for each participant they recruited. The eligibility criteria included minimum age of 18 years, having injected drugs within the previous month (verified by checking track-marks and asking drug preparation questions) and being capable of providing informed consent. Institutional review boards of the University of California, San Diego and Tijuana General Hospital approved the study’s protocol.

Data collection and laboratory testing

Subjects provided a blood sample by venipuncture for serological testing of HIV, hepatitis C virus (HCV) and syphilis. Trained staff administered quantitative surveys in Spanish to collect information on socioeconomic and demographic profiles, drug-use practices, sexual behaviour and HIV testing history. Participants were tested in the field for HIV antibody using the Determine rapid test (Abbott Laboratories, Abbott Park, IL, USA). Laboratory testing was performed at the San Diego County Public Health Laboratory or New Mexico State Laboratory. Depending on the laboratory, HIV-positive and indeterminate results were confirmed with a Western blot, HIV enzyme immunoassay (EIA) and/or HIV immunofluorescence assay. All samples were tested for anti-HCV antibodies by an EIA test and for syphilis antibody with the rapid plasma reagin (RPR) test. Reactive HCV samples were retested with an EIA to confirm, and reactive syphilis samples were confirmed using a *Treponema pallidum* particle agglutination assay (TPPA). All participants received pre- and post-test counselling and test results were given at 1-month follow-up visits. Referral to treatment and counselling on risk reduction was provided to participants where indicated.

Statistical analysis

Analyses were based on 427 subjects: 222 subjects in Tijuana and 205 in Ciudad Juarez (one Ciudad Juarez subject lacked data on prior HIV testing). Descriptive statistics and χ^2 tests were used to compare socio-demographic and behavioural characteristics between people who reported having ever been tested for HIV and those who had not; comparisons were made overall and then stratified by site.

Univariate logistic regression was used to identify factors associated with never having had an HIV test. Variables associated with the outcome at a p value ≤ 0.1 were considered for further analysis. Correlation matrices and diagnostics were examined to explore possible collinearity of variables and identify outliers. Forward stepwise logistic regression was used to construct multivariate models manually to determine variables associated with HIV testing history. At each step, standard errors and confidence intervals were checked to explore possible confounding. Two-sided p values < 0.05 were considered statistically significant. A Hosmer – Lemeshow value of > 0.1 indicated a good fit.

Results

Sample characteristics

The IDUs sampled in Tijuana and Ciudad Juarez were similar in gender, age, marital status, income and education. About 92% of participants in both cities were male, median age was 34 years, median education completed was 7 years and median age of first injection was 18 – 19 years. In Tijuana the RDS-adjusted prevalence of syphilis was 25% [95% confidence interval (CI), 12 – 40] compared to 3% (95% CI, 0.6 – 6.4) in Ciudad Juarez. The RDS-adjusted HCV antibody prevalence was 97% (95% CI, 94 – 99.5) in Tijuana and 96% (95% CI, 93 – 98) in Ciudad Juarez and HIV was 0.6% in Tijuana (95% CI, 0.1 – 1.3) and 2.9% (95% CI, 0.5 – 6.0) in Ciudad Juarez.

Participants' characteristics varied by site in multiple ways (all $p < 0.01$). First, only 30% of participants from Tijuana were born in the state of Baja California (where Tijuana is located), while 83% from Ciudad Juarez were born in Chihuahua (where this city is located). The median time participants had resided in Tijuana was 10 years [interquartile range (IQR), 5 – 18] versus 16 years in Ciudad Juarez (IQR, 10 – 27). The median time per day participants spent on the street was 20 hours (IQR, 12 – 24) in Tijuana, compared to 12 hours (IQR, 8 – 15) in Ciudad Juarez. Also, 98% of participants in Ciudad Juarez reported injecting at least once per day compared to 74% in Tijuana. Among men, approximately 44% in Tijuana versus 14% in Ciudad Juarez reported having had sex with a man ($p < 0.01$).

HIV testing and univariate associations

Of the 427 participants, 138 (62%) in Tijuana and 143 (70%) in Ciudad Juarez had never undergone voluntary HIV testing. In total, 12 participants (3%), six from each site, tested positive for HIV. Only one HIV-positive participant per site reported having been tested previously for HIV and then told by a doctor they were HIV-positive. Thus, 10 of the 12 HIV-positive participants were unaware of their HIV status. In both cities, the majority of those who did not know how HIV was transmitted had had no prior testing.

In univariate analysis, not knowing anyone with HIV/ AIDS, responding 'no' to the question 'Have you ever received treatment for a drug-related problem?' and lack of HIV knowledge were associated with increased odds of never having an HIV test in both cities (Table 1). Among IDUs in Tijuana, additional associations included no previous sexually transmitted infection (STI) diagnosis ($p = 0.02$), completing less than a secondary education ($p = 0.02$), selecting 'have not received medical care in the past 6 months' in response to the question 'During the past 6 months, where have you gone most often to get health care?' ($p = 0.01$), spending ≥ 12 hours/day on the street ($p = 0.02$) and being male ($p < 0.001$) (Table 1). For IDUs in Ciudad Juarez, additional factors were being born in the state of Chihuahua ($p = 0.04$), having not lived or worked outside of Mexico in the past 10 years ($p < 0.01$) and not being married ($p = 0.004$) (Table 1).

Multivariate associations with HIV testing

In multivariate analysis, factors associated independently with lack of prior HIV testing in Tijuana included being male, spending ≥ 12 hours/day on the street, never having been diagnosed with an STI by a doctor and reporting not knowing how HIV is transmitted (Table 2). For Ciudad Juarez, risk factors were not living or working outside Mexico in the past decade, not being married, never having received drug treatment and reporting not knowing how HIV is transmitted. Those who reported not knowing how HIV is transmitted had five times increased odds in Tijuana and greater than eight times increased odds in Ciudad Juarez of never having been tested (Table 2).

Missed opportunities for testing

Of the 281 participants who had never had an HIV test, 4% had been diagnosed previously with an STI, 41% had received drug treatment, 21% had received medical attention during the previous 6 months and 30% had ever been in jail (Table 3). This suggests that in both cities 65% of non-testers experienced at least one missed opportunity for testing.

Discussion

This study examines barriers to HIV testing in the two largest Mexican – US border cities. The findings revealed that nearly two-thirds of IDUs had never received an HIV test, which is higher than a 2003 study of Tijuana IDUs [7]. Although HIV prevalence was low in both cities, most HIV-positive IDUs were unaware of their serostatus. Moreover, of the 281 IDUs who had had no prior HIV testing, 65% had had at least one missed testing opportunity. This study's finding of an HCV-antibody prevalence over 95% is probably reflective of common risky injection behaviours and suggests the potential speed with which HIV and other blood-borne infections (BBIs) could spread. Increased prevention efforts, including wider availability of VCT, are crucial, considering the potential for transmission of BBIs among this high-risk population [20].

Correlates of having never been tested for HIV differed between the cities. In Tijuana, non-testers were less likely to have been diagnosed with an STI and more likely to spend more time on the streets and be male. In Ciudad Juarez, non-testers were more often single, and less likely to have been in drug rehabilitation or lived or worked outside Mexico in the past decade.

Migration has been linked to lower socioeconomic status, limited access to health services, power inequalities, social and cultural alienation, a breakdown of family units and fear of deportation and violence [21–24]. However, migration may also have benefits, such as increasing exposure to HIV/AIDS education. For instance, we found that participants in Ciudad Juarez who had not lived or worked outside Mexico in the past decade were less likely to have had an HIV test than migrants. It is possible that more mobile Ciudad Juarez residents, who migrated from or worked abroad (primarily the United States), were more aware of the risk of HIV through exposure to programmes attempting to connect migrant populations to health care. For instance, since 1996 Programa Compañeros, a nongovernmental organisation in Ciudad Juarez, has had education projects targeting transborder IDUs (Ramos *et al.*, submitted).

In Ciudad Juarez, unmarried IDUs were less likely to have been tested for HIV (Table 2), possibly a result of social instability. Similarly, Tijuana IDUs who spent 12 hours or more per day on the street were less likely to have been tested. Such people may be highly marginalised and distrustful of traditional health-care services, suggesting that alternatives, such as mobile health clinics, may help to reach these populations. In Tijuana, a mobile clinic called the *prevemovihl* was implemented in 2005 to promote outreach to the city's most vulnerable populations. The National Center for the Prevention and Control of HIV/AIDS (CENSIDA) and the state of Baja California recently added two more *prevemovihls* to the Baja California harm reduction efforts. Although there are no such vehicles in Ciudad Juarez, the harm reduction programme and needle exchange are very mobile, in that outreach workers bring materials and supplies directly to shooting galleries and other locations where IDUs congregate. However, mistrust and isolation need to be addressed on several levels. Health promotion campaigns highlighting the benefits of HIV testing have proved effective in settings where stigma and other barriers are at play [25]. Further, in addition to testing and treatment, drug users need access to temporary and long-term housing, as well as family support for single parents.

Our study found that opportunities for voluntary testing in public and private settings were utilised inadequately. This was similar to a 10-year retrospective chart review of US patients seen at an HIV intake clinic, which showed that HIV testing was recommended to only one in five STI clinic patients [26]. In our study, those without prior HIV testing in Ciudad Juarez were less likely to have been in drug treatment, and those in Tijuana were less likely to have been diagnosed with an STI. This suggests that some providers are sensitised to the importance of HIV testing and are probably offering VCT, but there were many missed opportunities for testing. Drug treatment facilities, doctor visits and time in jail are opportunities to offer HIV testing. In the US state of Rhode Island, routine HIV testing at entry into correctional facilities identifies approximately one-third of all people who test positive in the state [27]. A key strategy of the CDC's HIV prevention campaign is to make VCT a routine part of medical care [28]. A 2002 study offering routine HIV testing to patients entering one of four hospital-associated urgent care centres found that, among the 3068 patients tested voluntarily, HIV seroprevalence was 2.0%, underscoring the effectiveness of routine testing [29]. In the current study, at least 255 HIV testing opportunities were missed, and 182 participants (65%) without prior testing experienced at least one missed opportunity. Missed testing opportunities may reflect insufficient HIV services, lack of testing standards or lack of awareness of the availability or importance of HIV testing. Further studies and information on why this gap in opportunities for testing and actual utilisation exists along the Mexico – US border are needed.

In studies in the United States and Canada, homosexual men have traditionally had higher rates of HIV testing [30–32]. Although 44% of male IDUs in Tijuana reported having had sex with men (MSMs), these participants were not more likely to have been tested for HIV. Different social norms regarding homosexuality in Mexico and the tendency of MSMs in our sample not to self-identify as 'homosexual' may have led to lowered risk perception. Male gender, regardless of sexual orientation, was associated with lower prevalence of testing, similar to a US study of IDUs which found that women tested for HIV more often than men [33].

Lack of knowledge of how HIV is transmitted was associated with a lack of HIV testing for both cities, as reported elsewhere [34–36], reinforcing the need for continued intensive education to address gaps in such knowledge. However, as this was a cross-sectional study and causal relationships cannot be determined, it is possible that knowledge of HIV transmission increased as a result of HIV testing, as opposed to predicting testing.

Study limitations included limited sample size and cross-sectional design. Also, the 'knowledge of HIV transmission' variable used in the analysis was based on self-reported knowledge. However, we were fairly confident of this variable, in that 99% of participants reporting knowledge of HIV transmission also identified correctly one or more ways HIV is transmitted. Although we used sampling methods to achieve a random and representative sample, we do not know if the seeds encountered refusals. However, of recruits who returned with a coupon, almost all were eligible and willing to participate.

This study provided valuable insights into testing barriers and suggests direction for prevention programmes in Tijuana and Ciudad Juarez. Existing prevention programmes in Tijuana and Ciudad Juarez have incorporated important components to reach the IDU population, including mobile health clinics, needle exchange and targeting places frequented by IDUs. However, HIV testing is also a fundamental component of prevention programmes, and thus it is of great concern that only about one-third of IDUs in our study had ever been tested for HIV, and few HIV-positive participants were aware of their serostatus. In both cities, efforts to make HIV VCT available at drug treatment centres, medical visits and jails should be encouraged. Although IDUs who had been diagnosed with an STI in Tijuana were more likely to have had an HIV test, nearly two-thirds of IDUs who had never been tested reported at least one missed testing opportunity, suggesting that improvements are needed.

Our findings underscore the immediate need to increase and fund HIV testing on the Mexico – US border, specifically targeting the IDU population. Existing prevention programmes and available HIV testing sites need to be evaluated and adjusted to address barriers and improve the uptake of regular HIV testing among IDUs.

Acknowledgements

The authors would like to express their sincere thanks to the study participants for making this study possible. The authors also gratefully acknowledge support from the National Institute on Drug Abuse (NIDA) through grants DA09225-S11 and DA019829, donor support for the Harold Simon Chair in International Health and Cross-Cultural Medicine, the UCSD Center for AIDS Research (P30 AI36214-06) and a career award supporting K. B. (NIDA grant K01DA020364). We are extremely thankful for the staff of Proyecto El Cuete, CIRAD, Patronato ProCOMUSIDA and Programa Compañeros, and to Dr Peter Hartsock of NIDA.

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Table 1

Univariate analysis of factors associated with never having had an HIV test in Tijuana and Ciudad Juarez, Mexico, 2005

Overall	Tijuana (n = 222)		Ciudad Juarez (n = 205)	
	n* (%)	OR (95% CI)	n* (%)	OR (95% CI)
Gender				
Female	5 (26.3)	1.00	9 (56.3)	1.00
Male	133 (65.5)	5.32 (1.84 – 15.38)	134 (70.9)	1.90 (0.67 – 5.34)
Marital status				
Married	29 (59.2)	1.00	35 (55.6)	1.00
Single	107 (63.3)	1.19 (0.62 – 2.28)	107 (75.9)	2.52 (1.34 – 4.72)
Highest level of schooling completed				
Completed secondary	36 (50.7)	1.00	37 (67.3)	1.00
Less than secondary	101 (67.3)	1.95 (1.10 – 3.46)	106 (71.1)	1.20 (0.62 – 2.33)
Sexuality				
Homosexual or bisexual	57 (62.0)	1.00	17 (65.4)	1.00
Heterosexual	71 (61.2)	0.97 (0.55 – 1.70)	117 (73.1)	1.44 (0.60 – 3.47)
Received medical attention in last 6 months				
Yes	27 (49.1)	1.00	26 (63.4)	1.00
No [†]	93 (69.4)	2.35 (1.24 – 4.48)	111 (71.2)	1.42 (0.69 – 2.94)
Health-care provider ever told you have an STI				
Yes	8 (38.1)	1.00	3 (60.0)	1.00
No	128 (64.3)	2.93 (1.16 – 7.40)	133 (68.9)	1.48 (0.24 – 9.08)
Ever received drug treatment [‡]				
Yes	62 (55.4)	1.00	51 (57.3)	1.00
No	76 (69.7)	1.86 (1.07 – 3.23)	90 (79.6)	2.92 (1.57 – 5.43)
Born in state of interview				
Yes	38 (58.5)	1.00	123 (72.8)	1.00
No	100 (63.7)	1.24 (0.69 – 2.25)	20 (55.6)	0.47 (0.22 – 0.98)
Lived or worked outside Mexico in past 10 years				
Yes	55 (63.2)	1.00	34 (56.7)	1.00
No	83 (62.4)	0.97 (0.55 – 1.69)	109 (76.2)	2.45 (1.29 – 4.65)
Knowledge of HIV transmission (self-reported)				
Yes	116 (59.2)	1.00	121 (66.5)	1.00
No	22 (88.0)	5.06 (1.46 – 17.47)	21 (95.5)	10.58 (1.39 – 80.46)
Self-perceived risk of HIV				
More likely than other injection drug users	95 (61.0)		81 (69.8)	
Same or less likely	38 (66.1)	1.26 (0.67 – 2.39)	52 (70.3)	1.02 (0.54 – 1.93)
Know HIV + person				
Yes	78 (56.5)		38 (57.6)	
No	58 (70.7)	1.86 (1.04 – 3.33)	105 (75.5)	2.28 (1.22 – 4.24)
Hours on street per day				
<12 hours	37 (52.1)		89 (67.9)	
>12 hours	101 (68.2)	1.98 (1.11 – 3.53)	54 (74.0)	1.34 (0.71 – 2.54)

* Sample sizes may vary due to missing data;

[†] participant selected 'have not received medical care in the past 6 months' in response to the question 'During the past 6 months, where have you gone most often to get health care?';

[‡] as reported from the interview question, 'Have you ever received treatment for a drug-related problem?'

Table 2

Multivariate logistic regression models for never having had an HIV test among injection drug users in Tijuana and Ciudad Juarez, Mexico, 2005

Variable	Tijuana		Ciudad Juarez	
	AOR*	95% CI	AOR*	95% CI
Male gender	4.20	1.34, 13.12	—	—
Not married	—	—	2.82	1.42, 5.63
Never diagnosed with STI by health-care provider	3.98	1.46, 10.83	—	—
Never received drug treatment [†]	—	—	2.69	1.37, 5.26
Did not live/work outside of Mexico in past 10 years	—	—	2.08	1.03, 4.17
Do not know how HIV is transmitted (self-reported)	5.02	1.35, 18.70	7.97	1.01, 62.99
>12 hours spent on street per day	2.15	1.16, 3.97	—	—

* AOR: adjusted odds ratio;

[†] as reported from the interview question, 'Have you ever received treatment for a drug-related problem?'

Table 3

Missed opportunities for HIV testing among IDUs who never received an HIV test, stratified by city

Opportunity	Tijuana (n = 138) %	Ciudad Juarez (n = 143) %	Total (n = 281) %
Diagnosed with STI by health-care provider	5.8	2.21	4.0
Ever received drug treatment*	44.9	36.2	40.5
Received medical attention in last 6 months	22.5	19.0	20.6
Ever been in jail	26.1	34.1	30.0
At least one missed testing opportunity	68.1	61.5	64.8

* As reported from the interview question, 'Have you ever received treatment for a drug-related problem?'