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HIV vaccine trial willingness among injection and non-injection drug users in two urban centres, Barcelona and San Francisco

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Abstract

Being able to recruit high-risk volunteers who are also willing to consider future participation in vaccine trials are critical features of vaccine preparedness studies. We described data from two cohorts of injection- and non-injection drug users in Barcelona, Spain [Red Cross centre] and in San Francisco, USA, [UFO-VAX study] at high risk of HIV/HCV infection to assess behaviour risk exposure and willingness to participate in future preventive HIV vaccine trials. We successfully identified drug-using populations that would be eligible for future HIV vaccine efficacy trials, based on reported levels of risk during screening and high levels of willingness to participate. In both groups, Red Cross and UFO-VAX respectively, HCV infection was highly prevalent at baseline (41% and 34%), HIV baseline seroprevalence was 4.2% and 1.5%, and high levels of willingness were seen (83% and 78%).

Keywords

HIV; HIV vaccines; IDUs; Injection and non-injection drug users; Willingness to participate in future trials

1. Introduction

About 1 out of 10 European Union citizens living with HIV resides in Spain, and the prevalence of this infection at a population level is surpassed only by Estonia [1]. This situation is primarily a result of the serious epidemic of heroin injection that took place in the 1980s and 1990s. Although, during the last 20 years, smoked marijuana and snorted cocaine has become increasingly popular among new generations of drug users, in Barcelona heroin injection still predominates [2,3]. Cocaine use, which is especially associated with high HIV risk due to injection frequency [4], is also problematic. One out of 5 European cocaine users are estimated to live in Spain [5]. While sexual transmission has

replaced injection drug use as the most common HIV transmission route in Spain, the prevalence of risk behaviours related to drug use remains high and contributes to the substantial rates of both HIV and hepatitis C virus (HCV) infections in these populations [6]. Although studies of HIV seroprevalence in Spain among injection drug users (IDUs) show a decline in recent years, HIV prevalence remains high compared with others European countries [7]. In Spain, HCV seroprevalence among IDUs is high and did not decrease in recent years. Two recent studies have reported HCV prevalence rates of 70% [8] and 86% [9] among IDUs in Catalonia, Spain. Moreover, a review article of twenty-eight eligible studies were identified and the prevalence of HCV in these non-injection drug user (NIDU) populations ranged from 2.3 to 35.3% [10]. Also, one study in Spain presented elevated prevalence of HCV, HBV and HIV infection, even if drug use is only inhaled [11].

In the U.S., HIV among IDUs has been widespread and has also shown signs of decline, including in New York [12] and San Francisco both early epicentres of HIV among IDUs. More recently, San Francisco has shown stable HIV rates among IDUs in general, and among younger IDU, annualized HIV incidence is currently estimated at about 0.5% [13]. Both heroin and cocaine use were associated with the early dissemination of HIV in San Francisco [14]. Currently among younger IDUs in San Francisco, heroin remains the predominant injection drug of choice [15], although methamphetamine is also common [16,17]. Prospective studies of IDUs allow for monitoring trends in patterns of consumption, risk behaviours, infection rates, and other health outcomes, as well as assess the need and potential for prevention interventions for HIV and other blood borne viruses, such as viral hepatitis infections, B and C (HBV and HCV).

The best hope for halting the expansion of the global HIV epidemic is an effective, safe and affordable preventive vaccine [18,19]. Being able to recruit high-risk volunteers who are also willing to consider future participation in vaccine trials is a critical feature of vaccine preparedness studies designed to assess the feasibility of conducting HIV vaccine efficacy trials. Studies assessing prevention interventions, including prophylactic vaccines, require recruitment of high-risk volunteers who are willing to participate in vaccine trials. Critical requirements for the development of HIV vaccine cohorts and vaccine preparedness studies include: (1) moderate to high annual HIV incidence rate; (2) continued HIV exposure risk even in the presence of directed counselling; (3) willingness to participate in future preventive HIV vaccine and efficacy trials and (4) long term follow-up and high retention rates during the study. Studies conducted in countries with concentrated rather than generalized epidemics have traditionally engaged populations, which are historically among the most vulnerable with regard to health care access, stigmatization, and discrimination, often as a result of illegal activity, including drug use and sex work [20]. Long-term follow-up of participants, necessary for successful prevention efficacy trials, may be especially challenging when subjects are homeless or live in temporary housing, with no regular addresses, no telephone, and have limited resources for travel to health centres or trial sites.

The objective of this study is to describe two cohorts of volunteers at high risk of HIV/HCV infection: injection (IDUs) and non-injection drug users (NIDUs) and their willingness to participate in future HIV vaccine trials. We describe data from two cohorts in Barcelona, Spain, and in San Francisco, USA, to assess behavioural patterns and risk exposures. In both cities, researchers working with IDUs have examined the preparedness and willingness to participate in prophylactic HIV vaccine trials. Both of these countries have concentrated HIV epidemics and drug users would be important target populations for future HIV vaccine preventive trials.

2. Methods

2.1. Participants

The target populations, IDUs and NIDUs were accessed through collaborations with the following organizations: (1) Hospital Clínic Barcelona, Barcelona, Spain; (2) the Red Cross Centre in Barcelona city, Spain and (3) the University of California, San Francisco (UCSF), USA. HIV/AIDS Division at San Francisco General Hospital.

The Red Cross (RC) Centre is based in Ciutat Vella district, Barcelona's inner city, with a population of approximately 90,000 and high rates of social marginalization and poverty. This centre provides a wide range of services for IDUs and NIDUs including drug detoxification, methadone maintenance, and social, psychological and health assistance programs. In 2005, we embarked on a pilot study to identify, estimate risk behaviour and willingness to participate in future preventive HIV vaccine trials of both women and men from three high risk target populations: IDUs and NIDUs from RC centre, female commercial sex workers and men who have sex with men. The study was coordinated by the AIDS Research Unit at the Hospital Clínic Barcelona, a reference health centre for infectious diseases. Inclusion criteria were the following: (1) age 18 years or above; (2) self reported use of injection or non-injection drugs in past 12 months; (3) residence in Spain; (4) ability to provide informed consent in the participant's preferred language; (4) self reported HIV negative or unknown serostatus. Subjects were approached by trained staff (social workers) in waiting rooms, nursing rooms, and HIV care workshops at each site of recruitment and through outreach activities.

In San Francisco, CA, young (under age 30) IDUs were recruited between September 2004 and May 2007 into a cross-sectional screening study to determine eligibility for a randomized trial testing methods to improve adherence to multiple dose vaccine schedules, using the combined hepatitis A virus (HAV)/HBV vaccine as a model for future HIV and HCV vaccines. This study, named UFO-VAX, is one of a constellation of studies of young urban IDUs conducted in San Francisco since 1997, known collectively as the UFO-VAX Study. Participants were recruited by street-based outreach workers in neighborhoods of San Francisco where young drug users are known to congregate. Potential study participants were approached by outreach workers familiar with the young street IDUs in afternoon, evening, and weekend hours and were invited to visit one of three community-based storefront field sites to complete a screening form to determine study eligibility. Eligible persons were: (1) under age 30; (2) injected drugs in the prior 30 days; and (3) reported neither a prior positive HIV antibody test nor prior HBV immunization. Injection status was verified by field staff through visual inspection of injecting scars and questions about injection practices.

2.2. Study design and measures

This is a descriptive study of two cohorts at high risk of HIV/HCV infection among IDUs and non-IDUs from RC and UFO-VAX in Barcelona inner city and San Francisco, respectively.

At the RC centre, we determined baseline seroprevalence of HIV-1, serological markers for HBV, HCV, and syphilis infections, as well as baseline self-reported risk behaviours and willingness to participate in future preventive HIV-1 vaccine trials and efficacy trials in a cross-sectional sample of participants as detailed [21]. Informed consent was obtained by Research Assistants at the site of recruitment and included written materials and verbal dialogue in Spanish and English language to ensure comprehension. After signed informed consent was obtained and eligibility confirmed, volunteers were interviewed regarding socio-demographic characteristics and behavioural risk factors. The structured questionnaire

was administered through trained interviewers. Willingness to participate was measured on a 4-point scale, ranging from 1 (definitely not willing), 2 (probably not willing), 3 (probably willing) to 4 (definitely willing) in response to the question: “How willing would you be to join a study of a vaccine to prevent HIV infection?” Following the survey, participants underwent HIV counselling and testing. Trained HIV counsellors at the respective recruitment centres provided client-centered pre- and post-test counselling, including information on HIV, hepatitis virus and sexual transmitted infections (STI) risk reduction, guidance on reducing sexual and parenteral exposure risk, and HIV testing information including an explanation of testing procedures and interpretation of results. HBV and HCV testing were added to the testing algorithm 4 months after the start of the study. Sera were tested for HIV-1 antibodies by enzyme-linked immunosorbent assay (ELISA, Sanofi Diagnostic Pasteur). Positive or indeterminate samples were confirmed by Western Blot (New LAB- Blot 1, Sanofi Diagnostic Pasteur). Hepatitis B virus surface antigen (HBsAg) and core antibodies (anti-HBc) as well as antibodies to hepatitis C virus (anti-HCV) were tested by ELISA. Syphilis screening tests were performed by ELISA and confirmed by Treponema pallidum hemagglutination assay (TPHA). Participants with HIV-1 positive results were referred to Hospital Clínic in Barcelona for HIV care and treatment.

In San Francisco, participants completed a 60-min interviewer-administered survey, received client-centered risk reduction counselling, and underwent phlebotomy for viral testing. Participants were invited to return one week later for viral testing results, counselling, referrals and subsequent enrolment in the vaccine adherence trial if eligible. The survey included questions about participant sociodemographics, drug use and sexual practices, health care utilization, knowledge about vaccine trials, and willingness to participate in preventive HIV vaccine trials. Willingness to participate was measured on a 4-point scale, ranging from 1 (definitely not willing), 2 (probably not willing), 3 (probably willing) to 4 (definitely willing) in response to the question: “How willing would you be to join a study of a vaccine to prevent HIV infection, if the study were to start tomorrow?” Participants were paid US \$10 for their first study visit and US \$20 for the results visit. HIV testing was conducted using an enzyme immunoassay (Abbott Laboratories) and confirmed by Western blot. Antibody to HCV (anti-HCV) was detected using a second-generation enzyme immunoassay (EIA-2.0; Ortho Diagnostics Systems, Raritan, New Jersey). Hepatitis B surface antigen (HBsAg), antibody to hepatitis B core antigen (anti-HBc), and antibody to hepatitis B surface antigen (anti-HBs) were detected by standard commercial enzyme immunoassays (Abbott Laboratories, Abbott Park, Illinois). Individuals were defined as HBV infected by the presence of either anti-HBc or HBsAg. An anti-HBs titer ≥ 10 mIU/mL in the absence of other HBV serologic markers was considered evidence of prior successful HBV immunization. Participants were considered HBV uninfected and non-immune if they tested negative for all HBV markers.

The protocols for both studies were reviewed and approved by Institutional Review Boards at their respective institutions.

2.3. Data analysis

All variables were assessed as categorical, and frequencies and 95% confidence intervals (CI) were calculated. Comparisons were made between the two study populations using the binomial confidence intervals. Bivariate analyses of willingness to participate by study characteristics were performed using the chi-square test. Multiple logistic regression was conducted to assess independent predictors of willingness to participate (the primary outcome variable), defined as probably or definitely willing to join a study of a vaccine to prevent HIV infection. Variables significant at $p \leq 0.15$ in bivariate analyses and additional potential confounders (age, sex) were considered in multivariate analysis. Using a

backwards stepwise elimination process, variables were removed one by one, and models were finalized based on variables significant at $p = 0.05$.

3. Results

Table 1 shows socio-demographic data, risk behaviour and HIV/HCV testing histories among the 326 participants from RC centre and the 409 individuals from UFO-VAX study. About sociodemographic characteristics, the most salient findings from combined cohorts are that participants from the RC centre were more than a half (79%) European natives and 36 years of median age. In contrast, the sample from UFO-VAX study were younger (23 years of median age), and all were born in the United States. Importantly, we should remark the difference in educational level between the two centres; nearly two-thirds of RC participants have less than secondary (no studies or primary) studies versus 63% of UFO-VAX participants completed secondary or higher educational level. Regarding risk behaviours, in RC 77% ever borrowed used syringes; 74% reported having unprotected sex with a casual or steady partner and 22% reported having sex with an IDU partner in past 12 months. In the UFO-VAX cohort, all participants were IDUs per enrolment criteria; more than half (61%) reported sex with an IDU partner in past 3 months and 83% reported unprotected anal or vaginal sex with a steady or casual partner. Moreover, a high proportion of IDUs (75%) ever borrowed used syringes.

HIV baseline seroprevalence in RC was 4.2% and in UFO-VAX study 1.5%. Only 38% of RC participants reported having ever been tested for HIV compared to 69% of UFO-VAX participants. In contrast, most RC participants (63%) reported having been tested for HCV, compared to 39% in UFO study. With regard to HBV vaccination histories, in RC centre 29% of the participants have ever been vaccinated, compared to 12% of UFO-VAX identified individuals (this question was asked at baseline prior to UFO-VAX enrolment).

Table 2 summarizes the correlates of willingness to participate in HIV vaccine trials from both cohorts. Among the 326 RC participants interviewed regarding HIV vaccine trial willingness, a large majority (83%) reported that they would probably (32%) or definitely participate (51%). Willingness to participate was associated with reporting sex with an IDU partner in past 12 months in bivariate analysis ($OR = 2.6$; $p = 0.036$), although it was not significant in multivariate analysis ($AOR = 2.3$; $p = 0.073$). Participants who reported significant higher unwillingness in bivariate and multivariate analysis were primarily those who were ever vaccinated against HBV ($OR = 0.5$; $p = 0.021$; $AOR = 0.5$; $p = 0.047$).

In the UFO-VAX study, among the 404 participants interviewed, 77.5% subjects reported they were probably (41.6%) or definitely (35.9%) willing to participate. On bivariate analysis, willingness to participate was associated with methamphetamine injection in the prior 3 months ($OR = 1.5$; $p = 0.097$), non-injection crack cocaine use in the prior 3 months ($OR = 1.6$; $p = 0.064$), and sex work in the prior 3 months ($OR = 6.9$; $p = 0.009$). Only sex work was independently associated with willingness to participate in the multivariate analysis ($AOR = 6.7$; $p = 0.01$).

4. Discussion

In both cohorts, we detected higher levels of willingness to join a study of a vaccine to prevent HIV infection, than those reported male IDUs (77%) [22] or female IDUs (60%) in hypothetical HIV vaccine trials. High levels of willingness were seen despite the substantial daily challenges that both the RC and San Francisco populations face, including poverty, violence, stigma, and the risk of incarceration.

Willingness to participate was associated with different independent predictors in the two study populations. In multivariate analyses, prior HBV immunization was inversely associated in the RC group; whereas in the UFO-VAX group, participants that engaged in sex work were 6 times more likely to be willing to participate in a preventive HIV vaccine trial. HBV-vaccinated IDUs may have misconceptions about vaccine trials based on their experience with receiving HBV immunizations in clinical settings. Conversely, as a result of their prior experience, they may have a better understanding of the time and commitment required to obtain a multiple dose vaccine schedule over a six-month period of time. Sex working IDUs, as in the UFO-VAX sample, may be more willing to participate in a vaccine trial because of their higher risk of HIV transmission by both sexual and parenteral routes.

About sociodemographic characteristics, it is important to note the difference in educational level between the two centres. Furthermore, the educational level and the variety of nationalities, languages and cultures in RC centre, is an important feature to be taken into account to implement intervention strategies to prevent HIV/HCV infection, workshops and educational strategies in HIV vaccine concepts.

Although each group reported substantial levels of substance use, as well as sexual and injecting behavioural risk, the overall proportion of participants with behavioural risk is higher among UFO-VAX participants (including borrowing used syringes, sex with an IDU partner, injected heroin/heroin mix, used marijuana and non-injection crack use). Taking into account the different time-frame (12 months in RC versus 3 months in UFO-VAX), we may be underestimating some risk behaviours and exposure risk in RC centre. The proportion of participants in RC who had previously tested for HIV (38%) was lower than in UFO-VAX study (69%). Higher HIV testing reported by UFO-VAX participants likely reflects the public health surveillance and research practices conducted in San Francisco since the late 1980s which paid IDU to get tested [23,24]. Moreover, the fact that HIV testing was not implemented in RC centre as a regular test when we started the project, could explain the low HIV testing frequency in Spanish cohort. The fact that many participants reported joining previous vaccine trials [25], at least in part, for personal benefits reinforces the need to provide HIV prevention services outside research trials and for monitoring to ensure that participants are not motivated to join trials for financial gain.

HCV infection was highly prevalent in both cohorts (41% and 34%). Despite the presence of syringe exchange programs, other studies in Spain and worldwide have shown prevalence frequencies of HCV infection among IDUs ranging from 25% to 80% [12,15,26–31]. In addition, even though HCV is not efficiently sexual transmitted, the prevalence is higher in sex workers and other persons that report multiple sexual partners [32–34]. Recently, we observed that 5% of non-drug using sex-workers were positive for anti-HCV [21]. It is important to note that the rates of HCV testing in RC are much higher than in UFO-VAX, in fact opposite of HIV testing, suggesting that combined HIV and HCV testing might be included and implemented by community-based organizations in prevention programs.

Limitations of this study include that self reported data of drug use, injection practices and sexual behaviour could overestimate or under-report current risk behaviours. Moreover, with the cross sectional data presented in this article, we cannot determine the influence of retention strategies on these participants and the willingness to participate for future HIV vaccine trials nor elucidate if vaccine education may affect changes in willingness and/or risk behaviour. In addition, willingness to participate may have been higher in the RC group compared to the UFO-VAX group because of the way participants were queried. In the RC group, willingness to participate was assessed generally; in the UFO-VAX group, willingness to participate was assessed for a vaccine trial starting the next day.

In conclusion, our findings highlight the continued need for targeting prevention programs, with harm reduction interventions as well as preventive health services, including HIV, HCV testing, counselling pre and post testing and awareness campaigns among high risk groups. We successfully identified drug-using populations that would be eligible for future HIV vaccine efficacy trials, based on reported levels of risk during screening, and high levels of willingness to participate. Currently, we are actively working on awareness campaigns addressed to community-based organizations and high risk target population to strengthen and promote participation in future HIV vaccine trials and HIV prevention programs. Continued engagement with these high-risk drug-using populations is required not only to further develop successful vaccine study cohorts and ensure their informed representation in vaccine preparedness studies, but also to implement culturally appropriate and evidence-based prevention interventions until an effective vaccine is identified.

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Table 1

Baseline demographic, risk behaviour, and serologic testing and vaccination among Red Cross and UFO-VAX volunteers.

	Red Cross		UFO-VAX	
	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)
Demographics				
Overall	326	100	409	100
Gender				
Female	64	20 (16–24)	109	27 (22–31)
Male	262	80 (76–85)	297	73 (68–77)
Age Median (IQR)		36 (30–44)		23 (21–25)
Origin				
Europe	257	79 (74–83)	0	
United States	0	0	409	100
Latin America	17	5 (3–8)	0	
Africa	33	11 (7–14)	0	
Asia	19	6 (4–9)	0	
Education				
No studies	18	6 (3–9)	0	0
Primary	183	56 (51–62)	151	37 (32–42)
Secondary	105	32 (27–38)	249	61 (56–66)
University	20	6 (4–9)	9	2 (1–4)
Sexual behaviour (ever)				
Heterosexual	317	97 (95–99)	320	78 (74–82)
Homosexual	5	2 (0.5–4)	89	22 (18–26)
Risk behaviours				
Injection drug use (ever)	131	40 (35–46)	409	100
Non-injection drug use (ever)	303	93 (90–96)	409	100
Injected every day in past month ^a	54	41 (33–50)	124	30 (26–35)
Sex with an IDU partner in past 3 months			249	61 (56–66)
Sex with an IDU partner in past 12 months ^a	72	22 (18–27)		
Performed sex work in past 3 months			44	11 (8–13)
Performed sex work in past 12 months	11	3 (2–6)		
Unprotected anal/vaginal sex with steady or casual partner	147	74 (67–80)	286	83 (79–87)
Ever borrowed used syringe ^a	101	77 (68–86)	282	75 (71–80)
Borrowed used syringe in past 3 months			181	46 (41–51)
Borrowed used syringe in past 12 months ^a	26	20 (13–28)		
Injected heroin/heroin mix in past 3 months			345	84 (81–88)
Injected heroin/heroin mix in past 12 months ^a	77	59 (50–67)		
Injected speed/methamphetamine in past 3 months			231	57 (52–61)
Non-injection heroin use in past 3 months			84	20 (17–25)

	Red Cross		UFO-VAX	
	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)
Non-injection heroin use in past 12 months ^b	76	25 (20–30)		
Non-injection speed/methamphetamine use in past 3 months			205	50 (45–55)
Non-injection speed/methamphetamine use in past 12 months ^b	30	10 (7–14)		
Non-injection cocaine use in past 3 months			118	29 (24–33)
Non-injection cocaine use in past 12 months ^b	114	38 (32–43)		
Used marijuana in past 3 months			340	83 (80–87)
Used marijuana in past 12 months ^b	74	24 (20–30)		
Used benzodiazepines in past 3 months			212	52 (47–57)
Used benzodiazepines in past 12 months ^b	24	8 (5–12)		
HIV testing				
Ever tested for HIV	124	38 (33–44)	281	69 (64–73)
Tested for HIV in past 3 months	4	1.2 (0.3–3.1)	232	57 (52–62)
Tested negative last HIV test (self report)	326	100	409	100
HCV testing				
Ever tested for HCV	204	63 (57–68)	158	39 (35–44)
Tested for HCV in past 3 months	177	54 (49–60)	130	32 (27–36)
Positive anti-HCV result	130	41 (35–46)	135	34 (29–38)
HBV vaccination				
Ever vaccinated for HBV	94	29 (24–34)	47	12 (8–15)
Vaccinated for HBV in past 3 months	89	27 (23–32)		

^aRed Cross: percentages calculated over the 131 injection drug use volunteers.

^bRed Cross: percentages calculated over the 303 non-injection drug use volunteers.

Table 2

Correlates of willingness to participate in HIV vaccine trials among eligible volunteers ($N = 326$ Red Cross, $N = 409$ UFO-VAX Study): adjusted odds ratios and 95% confidence intervals.

	Red Cross		UFO-VAX	
	Willing to participate n (%)	Adjusted OR (95% CI)	Willing to participate n (%)	Adjusted OR (95% CI)
Demographics				
Overall	271(83)		317(78)	
Gender				
Female	55(86)		89(82)	
Male	216(82)		225(76)	
Age median (IQR)	37(30–44)		23(21–25)	
Origin				
Europe	215(84)		0	
United States	0(0)		317(78)	
Latin America	16(94)		0	
Africa	27(82)		0	
Asia	13(68)		0	
Education				
No studies	14(78)		0(0)	
Primary	156(85)		118(78)	
Secondary	86(82)		138(78)	
University	15(75)		61(76)	
Sexual behaviour (ever)				
Heterosexual	262(80)		246(78)	
Homosexual	5(100)		71(22)	
Risk behaviours				
Injection drug use (ever)	113(86)		317(78)	
Non-injection drug use (ever)	254(84)		317(78)	
Injected every day in past month	46(85)		95(77)	
Sex with an IDU partner in past 3 months			195(78)	
Sex with an IDU partner in past 12 months	66(92)			
Performed sex work in past 3 months			42(96)	6.7 (1.6–28.3) *
Performed sex work in past 12 months	10(91)			
Unprotected anal/vaginal sex with steady or casual partner	120(82)		222(78)	
Ever borrowed used syringe	46(88)		225(80)	
Borrowed used syringe in past 3 months			143(79)	
Borrowed used syringe in past 12 months	23(88)			
Injected heroin/heroin mix in past 3 months			264(78)	
Injected heroin/heroin mix in past 12 months	66(86)			
Injected speed/methamphetamine in past 3 months			186(81)	
Non-injection heroin use in past 3 months			67(80)	

	Red Cross		UFO-VAX	
	Willing to participate <i>n</i> (%)	Adjusted OR (95% CI)	Willing to participate <i>n</i> (%)	Adjusted OR (95% CI)
Non-injection heroin use in past 12 months	65(86)			
Non-injection speed/methamphetamine use in past 3 months			163(80)	
Non-injection speed/methamphetamine use in past 12 months	28(93)			
Non-injection cocaine use in past 3 months			92(78)	
Non-injection cocaine use in past 12 months	91(80)			
Used marijuana in past 3 months			267(79)	
Used marijuana in past 12 months	58(78)			
Used benzodiazepines in past 3 months			163(77)	
Used benzodiazepines in past 12 months	19(79)			
HIV testing				
Ever tested for HIV	101(81)		215(77)	
Tested for HIV in past 3 months	4(100)		181(78)	
Tested negative last HIV test (self report)	271(100)		317(78)	
HCV testing				
Ever tested for HCV	167(82)		123(78)	
Tested for HCV in past 3 months	147(83)		102(79)	
Positive anti-HCV result	111(85)		100(74)	
HBV vaccination				
Ever vaccinated for HBV	71(76)	0.5 (0.3–0.9)*	34(72)	
Vaccinated for HBV in past 3 months	69(78)			

* *p*-Value <0.05.