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## Social injecting and other correlates of high-risk sexual activity among injecting drug users in northern Vietnam

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### Abstract

**Background**—Sexual risk and STDs are relatively high among injecting drug users (IDUs) in Vietnam. We sought to determine characteristics of sexually active IDUs and correlates of high-risk sexual practices among IDUs in Bac Ninh province in northern Vietnam.

**Methods**—We used data collected for a community-based cross sectional pilot study to identify correlates of recent high-risk sex (> 1 sex partner and inconsistent/no condom use in the past year). Factors associated with high-risk sex were identified using logistic regression.

**Results**—Among 216 sexually active male IDUs, one third (n=72) had engaged in high-risk sex within the last year. IDUs who reported injecting with others more frequently, having someone else inject their drugs at last injection, sharing needles or sharing any injection equipment were more likely to have reported recent high-risk sex. Factors independently associated with high-risk sexual activity were not injecting oneself [aOR: 2.22; 95% CI (1.09 – 4.51)], and sharing needles in the past 12 months [(aOR: 2.57; 95% CI: (1.10 – 5.99)].

**Conclusions**—IDUs who inject socially and IDUs who share needles are likely to engage in high-risk sexual behaviors and may serve as an important bridge group for epidemic HIV transmission in Vietnam. In addition to messages regarding the dangers of sharing needles and other injection equipment, preventive interventions among newly initiated IDUs should also focus on reducing sexual risk.

### Keywords

Injecting Drug Users; HIV; Sexual Risk; Vietnam

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## Introduction

The majority of HIV infections among injecting drug users (IDUs) initially was attributed to parenteral exposures; however, research has increasingly highlighted the importance of sexual behaviors for HIV infection among IDUs, especially among women.(Kral et al., 2001; Strathdee et al., 2001) Additionally, in areas where HIV infections are primarily in IDUs, high-risk sexual behaviors among IDUs may serve as a catalyst for progression from a concentrated epidemic to a generalized one.(Grassly et al., 2003; Saidel et al., 2003; Wiessing & Kretzschmar, 2003)

In Vietnam, IDUs account for over 65% of all reported HIV infections.(UNAIDS, 2004) National HIV prevalence among IDUs increased from 9.4% in 1996 to 29.3% in 2002 and from 0.6% in 1994 to 6.6% among female sex workers (FSWs). Among STD patients and army conscripts, HIV prevalence increased from 0.5% and 0% in 1994 to 2.0% and 0.7% in 2002, respectively and from 0.03% in 1995 to 0.4% in pregnant women.(Subcommittee on HIV/AIDS Surveillance, 2003; United Nation General Assembly Special Session on HIV/AIDS: UNGASS, 2003) Between 2000 and 2005, the total number of persons living with HIV/AIDS more than doubled to an estimated 260,000.(UNAIDS, 2006)

Injecting drug use has increased substantially in recent years. The Vietnamese government reported 170,400 recorded drug users in Vietnam, an increase of 6% from the previous year. Approximately 93% of all drug users in Vietnam are men, 70% use heroin, and injecting heroin has become the primary route of drug administration.(United Nations Office on Drugs and Crime Country Office Vietnam, 2005) Additionally, studies among Vietnamese IDUs have reported high frequencies of multiple sex partners, sex with sex workers and low rates of condom use with all sex partners. (Tran et al., 2006; Thao le et al., 2006; Tung et al., 2001) Among male IDUs in 5 Vietnamese provinces, only 28-56% reported consistent condom use with commercial sex workers in the past year, and even fewer (15-28%) used condoms consistently with regular partners.(Tung et al., 2001) With the rising prevalence of HIV, a large pool of IDUs, and high rates of risky sexual behaviors, there is potential for the epidemic to spread from IDUs to the general population via sexual transmission.(Go et al., 2006a; Tran et al., 2005b; Hammett et al., 2005)

Understanding sexual activity and the characteristics of sexual activity among IDUs is paramount to designing effective prevention strategies to avert a large-scale HIV epidemic in Vietnam. Investigating predictors of high-risk sex among IDUs may allow public health officials to identify pockets of IDUs who engage in high-risk sexual behaviors for targeted interventions. We have previously found that sexual risk and STDs are relatively high among IDUs. In Bac Ninh province, 88% of IDUs had ever had sex, 1/3 reported having had sex with a sex worker during their last sexual encounter, and 30% were diagnosed with at least 1 sexually transmitted infection other than HIV. Our previous qualitative findings indicated that some IDUs injected in groups and then visited sex workers together.(Go et al., 2006a; Go et al., 2006b)

We sought to determine the characteristics of sexually active IDUs, as well as the correlates of high-risk sexual practices among IDUs. Based on our previous findings, we hypothesized that injecting behaviors indicative of injecting in groups, or social injecting, were associated with high-risk sexual practices.

## Methods

We conducted a community based cross-sectional survey among active IDUs in Bac Ninh, Vietnam. Active IDUs were recruited from Bac Ninh Province, a small semi-urban province 45 kilometres north of Hanoi, between August-September 2003, through snowball sampling

using peer recruiters who were current or former IDUs. Two districts, Bac Ninh town centre and Tu Son, a rural district 10 km from the town centre, were purposively selected based on the highest reported number of out-of-treatment IDUs. IDUs eligible for the study were between 18-45 years of age, reported having injected drugs in the six months prior to the survey, and provided voluntary informed consent. Participants who completed the survey were compensated VND 45,000 (US \$3) for their time. Ethical oversight was through the National AIDS Standing Bureau's institutional review board and the Johns Hopkins Bloomberg School of Public Health's Committee on Human Research.

Consenting participants were administered a face-to-face interview by a trained interviewer in a private room at the project site. The 30-minute questionnaire contained questions on demographic information, drug use history, injection drug use practices in the past six months including sharing of injection equipment (cookers, cotton, rinse water, squirting drugs from someone else's syringe into one's own syringe), sharing needles/syringes, initiation of injection drug use, drug treatment, sexual behaviors, medical history and HIV counseling and testing.

We excluded the 10 women who completed our survey from this analysis both because they represent only 3% of our total sample and because these women were likely to be sex workers and have different sexual risk than the majority of IDUs in Vietnam, who are men. (United Nations Office on Drugs and Crime Country Office Vietnam, 2005) We also excluded men who reported they did not have sex and those who refused to divulge how many sex partners they had had in the past 12 months.

We defined high-risk sex as reporting more than one sex partner (a person with whom the participant had vaginal, anal or oral sex) and inconsistent condom use with any sex partner over the past 12 months. Participants were asked how often they or their sex partners used condoms over the past year: never, less than half the time, about half the time, more than half the time, or always. Inconsistent condom use was defined as less frequent than always. We hypothesized that high-risk sex was associated with demographics, history of drug use and of injection drug use, injection practices, and knowledge of HIV risk. Variables such as age, duration of injection drug use, and age at first injection that were recorded as continuous variables were categorized according to their distributions and dichotomized as above/below the median. Years of education was categorized according to the Vietnamese school structure: primary (0-5 years), some secondary (6-11 years) and completed secondary education ( $\geq 12$  years).

We used logistic regression to investigate associations of the variables of interest and high-risk sex. To identify variables independently associated with high-risk sex, we then modeled all variables that were marginally statistically significant ( $p < 0.10$ ) using forward stepwise regression. At each step, the order of a variable being included in the model is determined by the relative improvement in the model fit if that variable versus other variables is included. All analyses were performed using Stata Version 9.0. (StataCorp, 2005)

## Results

Of the 393 IDUs approached by outreach workers, 309 (79%) eligible participants completed interviews. Of these, we excluded 10 women (3%), 80 men who were not sexually active in the past year (20%) and 3 men who declined to divulge the number of sex partners they had in the past 12 months (1%). One third (33%) of the remaining 216 participants had engaged in high-risk sex within the past year.

Overall, the average age of sexually active IDUs was 28.5 (median: 27.5), and just over half reported never being married ( $n = 118$ , 55%); only about one-fifth had completed secondary education ( $\geq 12$  years), and approximately one-third reported part-time or no employment.

One-half reported first injecting before the age of 24 ( $n = 109$ ), and have been injecting for less than 4 years ( $n = 108$ ). In terms of social injecting behaviors, 23% ( $n = 50$ ) of all sexually active IDUs reported injecting with others more than half the times they injected over the past 6 months, and while only 27 (13%) reported ever sharing needles, the majority ( $n = 142$ , 66%) reported ever sharing any equipment in the past 6 months. The average number of reported sexual partners was 3.23 (median: 2). Most participants (80%) reported at least one regular sex partner (a sexual relationship lasting for at least three months); 110 (51%) reported having had sex with FSW in the past year. Consistent condom use was more prevalent with FSW (70% of men visiting sex workers) than with regular sex partners (24% of men reporting at least one regular partner). Among IDUs who reported engaging in high-risk sex (Table 1) over the past year, just over half (57%) were younger than 28, and the majority (63%) were single. In bivariate analyses, younger and single IDUs were more likely to engage in high-risk sex, but neither association reached statistical significance. IDUs engaging in low and high-risk sex were equally likely to have completed  $\geq 12$  years of education than those completing  $< 12$  years; however, those who reported part-time employment or being unemployed were about half as likely to engage in high-risk sex as those who reported full time employment or were self-employed, although this association was marginally significant [Odds Ratio 0.56, 95% Confidence Interval (0.30 – 1.06)].

Variables that may serve as markers of long-term and/or more serious addiction – having injected for  $\geq 4$  years, injecting everyday, injecting more than once a day on days in which the participant injected drugs, ever injecting drugs other than heroin and ever smoking opium were negatively associated with high-risk sex, although none of these associations reached statistical significance. In contrast, markers of social injecting behaviors were positively associated with high-risk sex. IDUs who reported injecting with others greater than half the times they injected were more than twice as likely to have engaged in high-risk sex [OR 2.27, (1.19 – 4.34)], and having someone else inject their drugs at last injection was also positively associated with high-risk sex, [OR 2.28, (1.16 – 4.51)]. Additionally, sharing needles [OR 2.43, (1.08 – 5.50)] and sharing any injection equipment [OR 1.88 (1.01 – 3.50)] in the past six months were associated with having engaged in high-risk sex over the past year. Perception of HIV risk and having ever been tested for HIV were not associated with self reported high-risk sex.

The results of the multivariate model are shown in Table 2. After adjustment, sexually active IDUs who were injected by someone else at last injection were about twice as likely to engage in high-risk sex [AOR 2.22, (1.09 – 4.51)] than IDUs who injected themselves. Sharing needles in the past six months was independently associated with high-risk sex in the past year [AOR 2.57, (1.10 – 5.99)].

## Discussion

IDUs who inject socially may be a key bridge group for HIV transmission in Vietnam. Having drugs injected by someone else, and sharing needles in the past six months were independently associated with recent risky sexual behavior – having sex with more than one partner and inconsistently using condoms in the past year. Our results highlight the importance of sexual behavior as a risk factor for HIV infection among IDUs in Vietnam, as well as the potential for the HIV epidemic to spread via heterosexual sex as nearly half of our participants are HIV positive. (Quan et al., 2004)

Risky sexual behaviors, including multiple sexual partners, commercial sex work and inconsistent condom use are highly prevalent among IDUs in a number of settings outside Asia. (Tun et al., 2003; Kuyper et al., 2004; Absalon et al., 2006; Tyndall et al., 2002) However, in these studies, either no association between sharing equipment was found, or the investigators did not assess the association between high-risk sexual and injecting behaviors.

In contrast, a significant proportion of studies on IDUs throughout Asia report high-risk sexual and injecting behaviors. In southwestern China, for example, drug users who engaged in unprotected casual sex were more likely to be younger, married, visit FSW and to have used drugs and/or alcohol during sex. Additionally, among those who reported needle sharing while injecting, 30.6% reported ever selling or buying sex, while only 12.9 percent of those who didn't share needles reported engagement with commercial sex work. However, this difference did not meet statistical significance. (Yang et al., 2006) Lau, et al., recently found a similar clustering of high-risk sexual behaviors among IDUs who exhibit high-risk injecting behaviors in the Sichuan province in southwestern China; IDUs who used shared syringes were nearly twice as likely to have visited a FSW in the past month. (Lau et al., 2007)

Risky sex is also prevalent among IDUs in Vietnam. A significant proportion of IDUs in Hanoi and Ho Chi Minh City report inconsistent condom use with FSW, casual and regular non-FSW sex partners. (Tung et al., 2001; Hien et al., 2000) In a sample of IDUs from three southern and one northern border provinces, HIV infection was 3.4 times higher among IDUs who reported sexual contacts with FSW and other non-regular partners (Tuan et al., 2007) than among IDUs with no non-regular sex partners, highlighting the increasing importance of sexual behaviors with regard to HIV transmission in this group. In general, the overlap between high-risk sex and IDUs has been reported in South Vietnam, Hanoi and Hai Phong; however, one study conducted in the northern border of Lang Son province found that few IDUs reported unprotected sex with casual partners. (Hammett et al., 2005) However, in these reports, the relationship between injecting and sexual behaviors among IDUs in Vietnam was not explored.

We did not find any statistically significant associations between high-risk sex and indicators of long-term, severe, heroin addiction such as longer duration of and more frequent injections; however, both indicators showed a negative association with recent risky sexual activity. Since our previous research indicated that men with a longer history of addiction were less likely to be interested in sex and were less likely to have evidence of chlamydia infection – a marker of recent risky sexual behavior (Go et al., 2006a) – we believe that the IDUs who exhibit social injecting behaviors and high-risk sex have a less severe addiction. This may explain the association we found between injecting in groups and reporting high-risk sex. Alternatively, sensation-seeking may be mediating the relationship between social injecting behaviors and high-risk sex.

Nonetheless, our results suggest that IDUs who inject socially are likely to be the same IDUs who engage in high-risk sexual behaviors. As the majority (83%) who engaged in high-risk sex had also had sex with a sex worker in the past 12 months, the association between social injecting and high-risk sex may be an extension of cultural norms surrounding commercial sex work in Vietnam. Qualitative research has suggested that it is not unusual for men to visit sex workers in groups. In fact, married and unmarried men who purchase sex often go to purchase sex with good friends, and occasionally with co-workers, bosses and business associates. Often, it is understood that if group of male friends or associates (*bancho'i*), invites you out for a night of drinking and fun that the night will end with the group soliciting sex. (Hoa et al., 2006) If soliciting sex is a social activity among Vietnamese men, especially among those who drink together, it follows that men who inject with others would also go together to purchase sex.

There are several limitations that need to be taken into account when interpreting these results. First, our survey was cross sectional, and therefore, we cannot assess the temporality of the association between social injecting behavior and sexual behavior. In addition, our analysis tested an ad-hoc hypothesis that was not a part of the original survey design, and injecting behaviors were assessed over the past six months, and sexual behaviors were assessed over the past year. Therefore, we cannot draw any conclusions as to whether social injecting preceded sexual risk behaviors or vice-versa.

Second, all the data in this analysis relied on self reported marginalized behaviors, and participants may have responded with what they perceived to be the most socially desirable answer. Since both our outcome and exposure variables are dependent on the participant's willingness to disclose information on sensitive behaviors, we believe that participants who underestimated their sexual behaviors would also underestimate their injecting behaviors, thus leading to an overestimation of the true association.

Sampling was done purposively rather than randomly. However, other studies have shown that snowball sampling by outreach workers can obtain broad samples of hidden population such as IDUs.(Griffiths et al., 1993) Government records show that 98.6% of IDUs in Bac Ninh are male, and we estimate that approximately 70% of active IDUs living in the two districts we sampled participated in this study. However, our results may not be generalizable to IDUs living in other districts of Bac Ninh province or to all IDUs in Vietnam, as recent reports suggest increasing IDU among FSW in Hanoi and Ho Chi Minh City(Nguyen et al., 2004; Tran et al., 2005a)

While the risk of a generalized heterosexual epidemic in Vietnam is unknown, there is great potential for further escalation of HIV transmission among high-risk groups through high-risk sex.(Brown, 2004; Commission on AIDS in Asia, 2008) IDUs who exhibit social injecting behavior may serve as an important bridge group for sexual transmission of HIV, which underscores the need for prevention messages about sexual risk reduction among IDUs in Vietnam. To properly address HIV prevention in Vietnam, more data are needed to understand the context in which IDUs solicit sex as well as the link between social drug using behaviors and soliciting sex.

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**Table 1**

Selected Characteristics of High vs. Low-Risk Sex among Injecting Drug Users in past 12 months

Variable	Low-Risk Sex <sup>1</sup>	High-Risk Sex <sup>2</sup>	High-risk vs. Low-risk sex	
	N <sub>e</sub> (%) n = 144	N <sub>e</sub> (%) n = 72	Odds Ratio	95% Confidence Interval
<i>Demographics</i>				
Age				
≥ 28 years	77 (53.5)	31 (43.1)	1.00	
< 28 years	67 (46.5)	41 (56.9)	1.52	(0.86 – 2.69)
Marital status				
Never Married	73 (50.7)	45 (62.5)	1.00	
Ever Married	71 (49.3)	27 (37.5)	0.62	(0.35 – 1.10)
Education				
0 – 5 Years	27 (18.8)	13 (18.1)	1.00	
6 – 11 Years	84 (58.3)	43 (59.7)	1.06	(0.50 – 2.27)
≥ 12 Years	33 (22.9)	15 (20.8)	0.94	(0.38 – 2.32)
Occupation status				
Fulltime/Self-employed	88 (61.1)	51 (70.8)	1.00	
Parttime/Unemployed	55 (38.2)	18 (25.0)	0.56	(0.30 – 1.06)
<i>Injecting Behaviors</i>				
Duration of Injection Drug Use				
< 4 years	67 (46.5)	41 (56.9)	1.00	
≥ 4 years	77 (53.5)	31 (43.1)	0.66	(0.37 – 1.16)
Age first injected				
< 24 years	70 (48.6)	39 (54.2)	1.00	
≥ 24 years	74 (51.4)	33 (45.8)	0.80	(0.45 – 1.41)
Frequency of Injecting in past 6 month				
< Everyday	64 (44.4)	41 (56.9)	1.00	
Everyday	80 (55.6)	31 (43.1)	0.60	(0.34 – 1.07)
Frequency of Daily Injection				
Once/Day	78 (54.2)	42 (58.3)	1.00	
> Once/Day	66 (45.8)	30 (41.7)	0.84	(0.48 – 1.50)
Frequency of Injecting with others				
≤ 1/2 times injected	118 (81.9)	48 (66.7)	1.00	
> 1/2 times injected	26 (18.1)	24 (33.3)	2.27	(1.19 – 4.34)
Inject with anyone, last injection				
No	93 (64.6)	39 (54.2)	1.00	
Yes	51 (35.4)	33 (45.8)	1.54	(0.87 – 2.74)
Injected self at Last Injection				
Yes	122 (84.7)	51 (70.8)	1.00	
No	22 (15.3)	21 (29.2)	2.28	(1.16 – 4.51)

Variable	Low-Risk Sex <sup>1</sup>	High-Risk Sex <sup>2</sup>	High-risk vs. Low-risk sex	
	N° (%) n = 144	N° (%) n = 72	Odds Ratio	95% Confidence Interval
Shared injection equipment <sup>3</sup> in last 6 months				
No	58 (40.3)	19 (26.4)	1.00	
Yes	86 (59.7)	53 (73.6)	1.88	(1.01 – 3.50)
Shared needles in last 6 months				
No	131 (91.0)	58 (80.6)	1.00	
Yes	13 (9.0)	14 (19.4)	2.43	(1.08 – 5.50)
Ever injected any drug other than heroin				
No	92 (63.9)	54 (75.0)	1.00	
Yes	52 (36.1)	18 (25.0)	0.59	(0.31 – 1.11)
Ever smoked Opium				
No	88 (61.1)	47 (65.3)	1.00	
Yes	56 (38.9)	25 (35.7)	0.84	(0.46 – 1.51)
Ever overdosed				
No	80 (55.6)	38 (52.8)	1.00	
Yes	64 (44.4)	34 (47.2)	1.12	(0.63 – 1.97)
Ever in Drug Treatment				
No	67 (46.5)	33 (45.8)	1.00	
Yes	77 (53.5)	39 (54.2)	1.03	(0.58 – 1.81)
<i>Knowledge of HIV risk</i>				
Perceived Risk for HIV				
Yes	50 (34.7)	29 (40.3)	1.00	
No	66 (45.8)	29 (40.3)	0.76	(0.40 – 1.43)
Don't Know	26 (18.1)	13 (18.1)	0.86	(0.38 – 1.93)
Ever Tested for HIV				
Yes	61 (42.4)	22 (30.6)	1.00	
No	83 (57.6)	50 (69.4)	1.67	(0.92 – 3.04)

<sup>1</sup> Low-risk sex was defined as reporting 1 sex partner or > 1 sex partner and always using condoms with all sex partners in the past 12 months

<sup>2</sup> High-risk sex was defined as reporting > 1 partner and inconsistent or no condom use in the past 12 months

<sup>3</sup> Injection equipment includes cookers, cotton, rinse water, or directly squirting drugs from someone else's syringe into one's own syringe

**Table 2**

Multivariate Model of High Risk Sex vs. Low Risk or No Sex among IDUs

Variable	Adjusted OR	95% CI	P value
Injected Self at Last Injection			
Yes	1.00		
No	2.22	1.09 – 4.51	0.027
Sharing Needles in past 6 months			
No	1.00		
Yes	2.57	1.10 – 5.99	0.029

Variables included in stepwise regression: occupational status, frequency of injecting in past 6 months, frequency of injecting with others in past 6 months, injecting with others at last injection, sharing injection equipment in past 6 months, ever tested for HIV