Published in final edited form as:

AIDS Care. 2016 November ; 28(11): 1455–1460. doi:10.1080/09540121.2016.1189500.

Demographic and behavioral correlates of HIV/STI among Vietnamese Female Sex Workers (FSWs) in Southwest China

Yeon Jung Yu, Ph.D.,

Arnold School of Public Health, University of South Carolina, Columbia, SC, USA,
yjj.anthropology@gmail.com

Xiaoming Li, Ph.D.,

Arnold School of Public Health, University of South Carolina, Columbia, SC, USA

Tam Cheuk Chi,

Department of Psychology, Virginia Commonwealth University, Richmond, VA, USA

Zhou Yuejiao,

Guangxi CDC, HIV&STD Prevention Center, Nanning, Guangxi, CN

Chen Yi, and

Guangxi CDC, HIV&STD Prevention Center, Nanning, Guangxi, CN

Shen Zhiyong

Guangxi CDC, HIV&STD Prevention Center, Nanning, Guangxi, CN

Abstract

Previous literature has suggested high rates of HIV/STIs among Chinese FSWs. However, limited data were available regarding HIV-related risks among Vietnamese FSWs—a rapidly increasing, vulnerable population in southwest China. The current study examined the demographic and behavioral factors associated with the infection rates of HIV, syphilis, and Hepatitis C (HCV) among Vietnamese FSWs in Guangxi, China.

We conducted a secondary data analysis of a cumulative sample of 1,026 Vietnamese FSWs (aged 14–66) recruited over five years (2010–2014) from 35 National Sentinel Surveillance (NSS) sites within the Guangxi province. Analyses included Fisher's exact chi-square test, t-test, and binary logistic regression (LR).

The overall prevalence of HIV, syphilis, and HCV infections among the cross-border women were 3.2%, 6.9%, and 2.6%, respectively. Multivariate analysis showed that greater lengths of sex work and lower-paying work venues were significant risk factors for HIV infection; for syphilis infection, older age, drug use experience, and forgoing condom use were significant risk factors; for HCV infection, drug use experience was the only significant risk factor.

Our findings suggest that elevated HIV-related risks among the Vietnamese FSWs are closely related to their financial disadvantages and that drug use is a prominent risk factor for cross-border women in the sex trade. Furthermore, culturally tailored and linguistically accessible HIV prevention and intervention initiatives that target cross-border FSWs, with a close international collaboration between China and Vietnam, is urgently needed.

China's HIV epidemic has expanded over the past two decades (Xu et al., 2014). In particular, heterosexual transmission has become the primary mode of HIV transmissions (UNAIDS & MoH, 2012). Thus, the major task of controlling the HIV epidemic in China has become preventing further spread of HIV through sexual transmission.

Many researchers have identified FSWs as one of the most at-risk groups for HIV/STIs in China (e.g., Chen et al., 2012a; Yu, 2013). However, researchers noticed a relatively stable and low reported seroprevalence among FSWs, contrasting the rapid rise in the overall rate of heterosexual transmission (UNAIDS, MoH, 2012). Therefore, it is important to identify subgroups of FSWs who are at particularly higher risk of HIV (Zhou et al., 2013). The current study examined a rapidly increasing, unique subgroup of Vietnamese FSWs in Guangxi, the province ranked second among China's 31 provinces in HIV seropositive cases (Guangxi CDC, 2011).

According to numerous media reports (e.g., Ghosh, 2014), many impoverished Vietnamese women cross the border into China to become paid brides or find work in the sex industry. Furthermore, 78.9% of all reported Vietnamese HIV cases were found in people between 20 and 39 years old; especially high infection rates were seen in border areas (UNAIDS, 2007). Vietnamese National HIV serosurveillance data indicate a steady increase in the prevalence of HIV, particularly among FSWs (0.6% in 1994 to 6.6% in 2002) (Thuong et al., 2005).

Although the number of Vietnamese FSWs in China is increasing over time, there is limited information available regarding these women as well as the demographic and behavioral factors that are associated with their HIV-related risks. Zhang et al. (2015) examined the longitudinal epidemiological trends of HIV, syphilis, and HCV among Vietnamese FSWs who participated in the National Sentinel Surveillance Survey in Guangxi, China from 2010 through 2014. However, the limitations with the longitudinal data included both the variation of sample sizes over time and relatively small samples in earlier years. The current report reanalyzed the data using a cumulative sample (n=1,026) over five years, with an increased statistical power, to examine the demographic and behavioral correlates of HIV, syphilis, and HCV.

METHODS

National Sentinel Surveillance (NSS) sites

In response to the HIV epidemic, the Chinese government launched the HIV National Sentinel Surveillance (NSS) program in 2004 (L.Zhang, et al. 2012), including designated sites for FSWs across the nation. For Vietnamese women who were recruited from various NSS sites in Guangxi, local CDC workers conducted surveys (in either Vietnamese or via interpreter) and HIV/syphilis/HCV tests. The number of Vietnamese FSWs in Guangxi NSS data was 49 in 2010, 110 in 2011, 166 in 2012, 343 in 2013, and 358 in 2014. The detailed descriptions of samples and recruitment methods are available elsewhere (Zhang et al., 2015).

Measurements

Demographic background.—Participants provided a range of demographic information including age, marital status, education, length of work in the current and previous locations, and work venue. Furthermore, the survey inquired about recent histories of both condom use and drug use.

HIV knowledge.—HIV knowledge was assessed with eight questions regarding transmission routes, non-transmission routes, and preventive measures. The response for each question was coded as 1 if correct and 0 if incorrect. The composite score for the participant's HIV knowledge was calculated by summing correct answers to all eight questions (Cronbach $\alpha=.656$).

HIV prevention services.—Participants reported if they participated in any HIV prevention services, including free condom distribution, voluntary counseling/testing (VCT), methadone maintenance treatment (MMT), the needle exchange program (NEP), and peer education.

HIV, syphilis, and HCV infection and testing.—Participants reported if they had a history of STIs in the past year, and if so, what kind of STI. They also provided HIV testing history. Further, participants were tested for HIV, syphilis, and HCV antibodies.

Data analysis

We first employed the chi-square test (for categorical variables) and t-test (for continuous variables) to assess the Vietnamese FSWs' demographic profile, HIV knowledge, access to HIV prevention services, and drug-using and sexual behaviors by the testing results of HIV, syphilis, and HCV antibodies. Second, we used logistic regression models to examine the association of demographic and behavioral factors with HIV, syphilis, and HCV infections. Odd ratios (OR) and the 95% confidence intervals (95% CI) were used to depict the independent relationship between predictors and dependent variables.

RESULTS

Sample characteristics

Table 1 summarizes rates of HIV, syphilis, and HCV infections by the demographic and behavioral profile among the sample. A total of 1,026 participants were recruited over a five-year period (2010–2014); the mean age was 29 years (ranging from 14 to 66, SD=9.3). Almost one half of the group (45.8%) was never married and 48.1% were currently married; a small portion was divorced, widowed (4.3%) or cohabited with their partners (1.9%). The majority completed either elementary school (37.2%) or middle school (41.4%). A total of 87.7% of the participants were involved in at least one of the HIV prevention services. Respondents scored 6.1 out of a maximum score of 8.0 for HIV knowledge. Reported condom use rates were high: 91.2% in the latest sex act and 74.4% reported every time use. Among drug-using FSWs (n=32), 90.3% were injection drug users (IDUs).

HIV infection

Thirty-three (3.2%) of the participants tested positive for HIV. The factors associated with HIV infection were: age, marital status, work venue, work duration in current location, and drug use experience (Table 1). HIV-infected women were significantly older ($M=33.39$, $SD=9.09$) than those without HIV ($M=28.88$, $SD=9.23$), $t(1024)=-2.76$, $p=.006$.

Syphilis infection

Seventy-one (6.9%) of tested samples were positive for syphilis. The factors associated with syphilis infection were: age, marital status, education level, work venues, duration of work in current location, condom use, drug use history, and HIV testing (Table 1). Syphilis-infected women were significantly older ($M=37.34$, $SD=9.72$) than those without syphilis ($M=28.41$, $SD=8.93$), $t(1023)=-8.08$, $p<.001$.

HCV infection

Overall, 2.6% ($n=27$) of respondents tested positive for HCV. The factors associated with HCV infection were: age, marital status, drug use history, and HIV knowledge (Table 1). HCV-infected women were significantly older ($M=33.74$, $SD=7.85$) than those without HCV ($M=28.90$, $SD=9.27$), $t(1024)=-2.69$, $p=.007$.

Multivariate Analysis

The multivariate analysis confirmed the results of bivariate results regarding the higher risk for HIV, syphilis, and HCV infections among FSWs who were older, holding longer work durations, working in lower-paying venues, forgoing condom use, or using drugs (Table 2). Length of sex work and work venue were significant predictors for HIV infection; FSWs in higher-paying venues were less likely to get an HIV infection ($OR=.35$; 95%CI=.13, .96); FSWs with shorter work durations were less likely to be HIV positive ($OR=.63$; 95%CI=.42, .94). Older age, drug use history, and forgoing condoms were significant risk factors for syphilis infection; older FSWs were more likely to be syphilis positive ($OR=1.10$; 95%CI=1.06, 1.12); drug-using FSWs were much more likely to have a syphilis infection over non-users ($OR=7.51$; 95%CI=3.32, 16.95); frequent condom-using FSWs were less likely to be syphilis positive ($OR=.42$; 95%CI=.26, .67). The only significant predictor for HCV infection was drug use history; drug-using FSWs were far more likely to be HCV positive than non-users ($OR=58.51$; 95%CI=24.10, 142.10).

DISCUSSION

This study confirmed high rates of HIV, syphilis, and HCV infections among Vietnamese FSWs. The infection rate of HIV (3.2%) among these cross-border women was much higher than the prevalence among Chinese FSWs (1.0%) (UNAIDS, 2013). The high rates of HIV and other STIs indicate the need for HIV intervention programs to control the spread of infection among these underserved cross-border populations.

The result that age, length of sex work, and work venue were significant predictors of HIV infection and other STIs may point to the importance of the economic situation of FSWs. In our sample, of the 33 HIV-positive women, the majority (81.8%) was from lower-paying

venues. It is also likely that older FSWs are at greater risk due to less negotiating power in practicing safer sex.

Our findings support the existing argument that the most significant risk behavior for HCV is drug use (Trustees of Dartmouth College, 2015). Although not found to be a significant predictor for HIV infection, drug use and condom use frequency were significant risk factors for syphilis infection, suggesting a close connection between drug use and unprotected sex. Thus, researchers and health professionals must pay more attention to drug use among these women in curtailing the region's HIV infections.

Further, several critical individual, social, or environmental factors may place the Vietnamese FSWs at especially high-risk for HIV/STIs. These women are typically impoverished, with a very limited education, facing a language barrier, and lacking protection under Chinese law—all of which may prevent them from effectively engaging in local HIV prevention programs (e.g., Lau, Wong, 2000). Furthermore, these women are highly mobile, which may facilitate the spread of HIV/STIs between regions (Zhou et al., 2013).

Three potential limitations should be noted in considering the findings of the current study. First, we used a cumulative sample over 5 years. While it was unlikely that the NSS survey had recruited the same women at the same sites (due to the known high mobility of this population), it was still possible that some women participated in NSS more than once, which would result in an overlap among the participants across years. Second, the analysis of cumulative data limited our ability to establish a causal relationship between HIV/STIs and risk/preventive factors. Third, current results regarding behavioral patterns are subject to self-report bias.

Despite these limitations, the current findings have some important implications for HIV prevention among Vietnamese FSWs in China. First, we call for culturally tailored and linguistically accessible intervention initiatives, which engage and empower these women to reduce their risk of HIV infection and other STIs. The high rates of HIV/STIs, despite the reported high rate of engagement in HIV prevention services (87.7%), indicate either the low efficacy of the services, or the complicated process of transferring knowledge toward behavioral change. Second, a close international collaboration between China and Vietnam is needed in the effort to design and implement effective HIV prevention programs targeting cross-border FSWs. Lastly, additional research is needed to understand the high prevalence of HIV/STIs and unique cultural and structural barriers for effective HIV/STIs control among this rapidly growing population in China.

REFERENCES

- Agresti A (2013). *Categorical Data Analysis*. John Wiley & Sons.
- Baral S, Beyrer C, Muessig K, Poteat T, Wirtz AL, Decker MR, . . . Kerrigan D (2012). Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infect Dis*, 12(7), 538–549. [PubMed: 22424777]
- Chen XS, Liang GJ, Wang QQ, Yin YP, Jiang N, Zhou YJ, . . . Wang B (2012a). HIV prevalence varies between female sex workers from different types of venues in southern China. *Sex Transm Dis*, 39(11), 868–870. [PubMed: 23064536]

- Chen XS, Wang QQ, Yin YP, Liang GJ, Jiang N, Yang LG, et al. (2012b). Prevalence of syphilis infection in different tiers of female sex workers in China: implications for surveillance and interventions. *BMC infectious diseases*, 12(1), 84. [PubMed: 22475187]
- Chen Y, Shen Z, Morano JP, Khoshnood K, Wu Z, Lan G, ... & Tang Z (2015). Bridging the Epidemic: A Comprehensive Analysis of Prevalence and Correlates of HIV, Hepatitis C, and Syphilis, and Infection among Female Sex Workers in Guangxi Province, China. *PloS one*, 10(2).
- China AIDS. 2012. Response progress Report: Ministry of Health of the People's Republic of China, 2012.
- Damacena GN, Szwarcwald CL, & Souza Júnior PRBD (2014). HIV risk practices by female sex workers according to workplace. *Revista de saude publica*, 48(3), 428–437. [PubMed: 25119937]
- Feng L 2011 An Epidemiological Study on the Prevalence and Risk Factors of HIV and Sexually Transmitted Diseases among Cross-border and Local Female Sex Workers in One County of Yunnan. M.Sc. Thesis. Chinese CDC. [in Chinese]
- Ford K, & Chamrathirong A (2012). Cross border migrants: duration of residence, mobility and susceptibility to HIV infection. *International Journal of Migration, Health and Social Care*, 8(3), 127–133.
- Galvin SR, & Cohen MS (2004). The role of sexually transmitted diseases in HIV transmission. *Nat Rev Microbiol*, 2(1), 33–42. doi: 10.1038/nrmicro794 [PubMed: 15035007]
- Ghosh N (2014, 12 7). Bride or brothel - the choice for duped Vietnamese women trafficked to China in thriving industry. *The Stratis Times* Retrieved from <http://www.stasiareport.com/the-big-story/asia-report/china/story/bride-or-brothel-the-choice-duped-vietnamese-women-trafficked->
- Guangxi CDC. 2011 Update an HIV/AIDS epidemic in Guangxi. Guangxi: Guangxi CDC.
- Hayaki J, Anderson B, & Stein M (2006). Sexual risk behaviors among substance users: relationship to impulsivity. *Psychol Addict Behav*, 20(3), 328–332. [PubMed: 16938071]
- Hien NT, Long NT, Huan TQ. HIV/AIDS epidemics in Vietnam: evolution and responses. *AIDS Education and Prevention* 2004;16(Suppl A):137–54.
- Hong H, Xu GZ, & Zhang DD (2013). HIV Risk, Drug Use, and Sexual transmission among Female Sex Workers in Ningbo, China. *Int J Gynaecol Obstet*, 121(1), 91–92. [PubMed: 23419996]
- Jia Y, Lu F, Sun X, & Vermund SH (2007). Sources of data for improved surveillance of HIV/AIDS in China. *Southeast Asian J Trop Med Public Health*, 38(6), 1041–1052. [PubMed: 18613545]
- King G, & Zeng L (2001). Logistic regression in rare events data. *Political Analysis*, 9, 137–163.
- Lau JT, & Tsui HY (2003). HIV/AIDS behavioral surveillance surveys of the cross-border sex-networker population in Hong Kong from 1997 to 2001. *Sex Transm Dis*, 30(11), 827–834. [PubMed: 14603090]
- Lau JT, & Wong WS (2000). Behavioural surveillance of sexually-related risk behaviours for the cross-border traveller population in Hong Kong: the evaluation of the overall effectiveness of relevant prevention programmes by comparing the results of two surveillance surveys. *Int J STD AIDS*, 11(11), 719–727. [PubMed: 11089785]
- Li J, Chen XS, Merli MG, Weir SS, & Henderson GE (2012). Systematic differences in risk behaviors and syphilis prevalence across types of female sex workers: a preliminary study in Liuzhou, China. *Sex Transm Dis*, 39(3), 195–200. [PubMed: 22337106]
- Li Q, Li X, & Stanton B (2010). Alcohol use among female sex workers and male clients: an integrative review of global literature. *Alcohol and Alcoholism*, 45(2), 188–199. [PubMed: 20089544]
- Lin FENG, Ning WANG, & Lin LU (2010). Cross-border migrants and HIV/STD related risk behaviors. *Chinese Journal of AIDS & STD*, 5, 515–518.
- Lomba L, Apostolo J, & Mendes F (2009). Drugs and alcohol consumption and sexual behaviours in night recreational settings in Portugal. *Adicciones*, 21(4), 309–325. [PubMed: 20011989]
- Lu L, Jia M, Ma Y, Yang L, Chen Z, Ho DD, . . . Zhang L (2008). The changing face of HIV in China. *Nature*, 455(7213), 609–611. [PubMed: 18833270]
- Luksamijarulkul P, & Deangbubpha A (1997). Hepatitis C antibody prevalence and risk factors of some female sex workers in Thailand. *The Southeast Asian journal of tropical medicine and public health*, 28(3), 507–512. [PubMed: 9561600]

- Parry C, Petersen P, Carney T, Dewing S, & Needle R (2009). Rapid assessment of drug use and sexual HIV risk patterns among vulnerable drug-using populations in Cape Town, Durban and Pretoria, South Africa. *Sahara j*, 5(3), 113–119.
- Pregibon D (1981) Logistic Regression Diagnostics, *Annals of Statistics*, Vol. 9, 705–724. We can talk more about this on Monday.
- Tao XH, Jiang T, Shao D, Xue W, Ye FS, Wang M, & He MH (2014). High prevalence of syphilis among street-based female sex workers in Nanchang, China. *Indian dermatology online journal*, 5(4), 449. [PubMed: 25396127]
- Ghosh N (2014, 9 15). China to crack down on ‘foreign bride’ websites on human trafficking, prostitution fears. *The Straits Times* Retrieved from <http://www.straitstimes.com/asia/east-asia/china-to-crack-down-on-foreign-bride-websites-on-human-trafficking-prostitution-fears>
- Thuong NV, Nhung VT, Nghia KV, Tram LT, & O’Farrell N (2005). HIV in female sex workers in five border provinces of Vietnam. *Sexually transmitted infections*, 81(6), 477–479. [PubMed: 16326850]
- Trustees of Dartmouth College. (2015). Hepatitis C: An Epidemic for Anyone. Retrieved from <http://www.epidemic.org/thefacts/hepatitisc/transmission/>
- Tucker JD, Yin YP, Wang B, Chen XS, & Cohen MS (2011). An expanding syphilis epidemic in China: epidemiology, behavioural risk and control strategies with a focus on low-tier female sex workers and men who have sex with men. *Sex Transm Infect*, 87 Suppl 2, ii16–18. [PubMed: 22110145]
- Uddin SM, Hossain MG, Islam MA, Islam MN, Aik S, & Kamarul T (2014). High-Risk Behavior of HIV/AIDS among Females Sex Workers in Bangladesh: Survey in Rajshahi City. *Japanese journal of infectious diseases*, 67(3), 191–196. [PubMed: 24858608]
- UNAIDS & MoH 2012. 2012 China AIDS response progress report.
- UNAIDS. 2013 Global report: UNAIDS report on the global AIDS epidemic 2013. UNAIDS Geneva.
- Wang H, Chen RY, Ding G, Ma Y, Ma J, Jiao JH, ... & Wang N (2009). Prevalence and predictors of HIV infection among female sex workers in Kaiyuan City, Yunnan Province, China. *International journal of infectious diseases*, 13(2), 162–169. [PubMed: 18718801]
- Xu Y, Fu LR, Jia M, Dai G, Wang Q, Huang P, . . . Wang N (2014). HIV prevalence and associated factors among foreign brides from Burma in Yunnan Province, China. *PLoS One*, 9(12), e115599. [PubMed: 25536087]
- Yu YJ (2013). Subjectivity, hygiene, and STI prevention: a normalization paradox in the cleanliness practices of female sex workers in post-socialist China. *Med Anthropol Q*, 27(3), 348–367. [PubMed: 24123232]
- Zetola NM, & Klausner JD (2007). Syphilis and HIV infection: an update. *Clin Infect Dis*, 44(9), 1222–1228. [PubMed: 17407043]
- Zhou Y, Li X, Zhang C, Tan G, Stanton B, Zhang X, & Cui Y (2013). Rates of HIV, syphilis, and HCV infections among different demographic groups of female sex workers in Guangxi China: evidence from 2010 national sentinel surveillance data. *AIDS Care*, 25(11), 1433–1441. [PubMed: 23438031]

Table 1.

Infection rates of HIV, syphilis, and HCV infections by demographic and behavioral profile among Vietnamese FSWs (n=1,026)

	Overall		HIV		χ^2		Syphilis		χ^2		HCV		χ^2	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
N (%)	1026 (100%)	(3.2%)												
Age M(SD)	29.0 (9.3)	33.4	28.9		37.3 (9.7)	28.4 (8.9)	29.0 (9.3)	33.7 (7.9)	28.9 (9.3)					
					7.63**		65.3***						7.2**	
Marriage status N (%)														
Single	470 (45.8%)	10 (30.3%)	460 (46.3%)		15 (21.1%)	455 (47.7%)	470 (45.8%)	4 (14.8%)	466 (46.6%)					
Married	493 (48.1%)	17 (51.5%)	476 (47.9%)		48 (67.6%)	444 (46.5%)	493 (48.1%)	18 (66.7%)	475 (47.5%)					
Co-habitated	19 (1.9%)	2 (6.1%)	17 (1.7%)		4 (5.6%)	15 (1.6%)	19 (1.9%)	1 (3.7%)	18 (1.8%)					
Divorced/Widowed	44 (4.3%)	4 (12.1%)	40 (4.0%)		4 (5.6%)	40 (4.2%)	44 (4.3%)	4 (14.8%)	40 (4.0%)					
					10.01*		22.48***						15.49**	
Education N (%)														
None	136 (13.3%)	7 (21.2%)	129 (13.0%)		20 (28.2%)	116 (12.2%)	136 (13.3%)	6 (22.2%)	130 (13.0%)					
Elementary school	382 (37.3%)	17 (51.5%)	365 (36.8%)		30 (42.3%)	352 (37.0%)	382 (37.3%)	13 (48.1%)	369 (37.0%)					
Middle school	425 (41.5%)	7 (21.2%)	418 (42.2%)		17 (23.9%)	407 (42.8%)	425 (41.5%)	6 (22.2%)	419 (42.0%)					
High school or more	81 (7.9%)	2 (6.1%)	79 (8.0%)		4 (5.6%)	77 (8.1%)	81 (7.9%)	2 (7.4%)	79 (7.9%)					
					6.99		19.33***						5.04	
Work Venue (Tiers) N (%)														
Lower-paying	572 (55.8%)	27 (81.8%)	545 (54.9%)		56 (78.9%)	515 (54.0%)	572 (55.8%)	19 (70.4%)	553 (55.4%)					
Higher-paying	454 (44.2%)	6 (18.2%)	448 (45.1%)		15 (21.1%)	439 (46.0%)	454 (44.2%)	8 (29.6%)	446 (44.6%)					
					9.39*		16.59***						2.40	
Length of Sex Work N (%)														
1 yr.	347 (33.9%)	22 (66.7%)	325 (32.8%)		45 (64.3%)	301 (31.6%)	347 (33.9%)	15 (55.6%)	332 (33.3%)					
6–12 mos.	163 (15.9%)	3 (9.1%)	160 (16.1%)		10 (14.3%)	153 (16.1%)	163 (15.9%)	4 (14.8%)	159 (15.9%)					
1–6 mos.	369 (36.0%)	6 (18.2%)	363 (36.6%)		11 (15.7%)	358 (37.6%)	369 (36.0%)	7 (25.9%)	362 (36.3%)					
< 1 mo.	145 (14.2%)	2 (6.1%)	143 (14.4%)		4 (5.7%)	141 (14.8%)	145 (14.2%)	1 (3.7%)	144 (14.4%)					
					16.41**		33.17***						6.79	
Previous work location N (%)														
Different province	183 (18.0%)	4 (12.5%)	179 (18.2%)		15 (21.4%)	168 (17.8%)		6 (23.1%)	177 (17.9%)					

	Overall		HIV		Syphilis		HCV		χ^2
	Yes	No	Yes	No	Yes	No	Yes	No	χ^2
Condom Use, last episode <u>N (%)</u>	214 (21.1%)	209 (21.2%)	5 (15.6%)	10 (1.0%)	16 (22.9%)	198 (21.0%)	6 (23.1%)	208 (21.0%)	
	443 (43.6%)	422 (42.9%)	21 (65.6%)	236 (23.9%)	34 (48.6%)	408 (43.2%)	11 (42.3%)	432 (43.6%)	
	176 (17.3%)	174 (17.7%)	2 (6.2%)	740 (75.1%)	5 (7.1%)	171 (18.1%)	3 (11.5%)	173 (17.5%)	
	936 (91.7%)	908 (91.8%)	28 (87.5%)	81 (8.2%)	57 (80.3%)	879 (92.6%)	25 (92.6%)	911 (91.6%)	
Condom Use Frequency <u>N (%)</u>	85 (8.3%)	4 (12.5%)	4 (12.5%)	10 (1.0%)	14 (19.7%)	70 (7.4%)	2 (7.4%)	83 (8.4%)	0.03
	11 (1.1%)	1 (3.0%)	1 (3.0%)	236 (23.9%)	1 (1.4%)	10 (1.1%)	0 (0.0%)	11 (1.1%)	13.32***
	245 (24.0%)	9 (27.3%)	9 (27.3%)	740 (75.1%)	35 (50.0%)	209 (22.0%)	9 (34.6%)	236 (23.8%)	
	763 (74.9%)	23 (69.7%)	23 (69.7%)	1.47	34 (48.6%)	729 (76.9%)	17 (65.4%)	764 (75.1%)	28.32***
Drug Use	32 (3.1%)	3 (9.1%)	3 (9.1%)	29 (2.9%)	11 (15.5%)	21 (2.2%)	14 (51.9%)	18 (1.8%)	1.85
	993 (96.9%)	30 (90.9%)	30 (90.9%)	963 (97.1%)	60 (84.5%)	932 (97.8%)	13 (48.1%)	980 (98.2%)	
									217.72***
									38.55***
Injection Drug Use <u>N (%)</u>	29 (90.6%)	3 (100%)	3 (100%)	26 (89.7%)	10 (90.9%)	19 (90.5%)	13 (92.9%)	16 (88.9%)	
	3 (9.4%)	0 (0.0%)	0 (0.0%)	3 (10.3%)	1 (9.1%)	2 (9.5%)	1 (7.1%)	2 (11.1%)	
									0.00
									0.15
Injection Drug Use Frequency/mo. <u>M (SD)</u>	2.1 (0.9)	1.7 (0.6)	1.7 (0.6)	2.1 (0.9)	1.7 (0.8)	2.3 (0.9)	2.2 (1.0)	2.1 (0.9)	0.07
									3.32
Needle Sharing (ever)	12 (41.4%)	1 (33.3%)	1 (33.3%)	11 (42.3%)	2 (20.0%)	10 (52.6%)	4 (30.8%)	8 (50.0%)	
	17 (58.6%)	2 (66.7%)	2 (66.7%)	15 (57.7%)	8 (80.0%)	9 (47.4%)	9 (69.2%)	8 (50.0%)	
									2.88
									1.09
Needle Sharing Frequency	8 (66.7%)	1 (100.0%)	1 (100.0%)	7 (63.6%)	2 (100.0%)	6 (60.0%)	4 (100.0%)	4 (50.0%)	
	4 (33.3%)	0 (0.0%)	0 (0.0%)	4 (36.4%)	0 (0.0%)	4 (40.0%)	0 (0.0%)	4 (50.0%)	
									1.2
									3.00

	HIV		Syphilis		HCV		χ^2	
	Yes	No	Yes	No	Yes	No	χ^2	
HIV/AIDS Knowledge <u>M (SD)</u>	6.1 (1.5)	6.1 (1.5)	6.0 (1.6)	6.1 (1.5)	6.7 (0.7)	6.0 (1.5)	8.02	
HIV Prevention Service <u>N (%)</u>	Yes	900 (87.7%)	30 (90.9%)	870 (87.6%)	64 (90.1%)	835 (87.5%)	0.01	
	No	126 (12.3%)	3 (9.1%)	123 (12.4%)	7 (9.9%)	119 (12.5%)	0.42	
HIV Testing							0.32	0.04
Yes	314 (41.3%)	15 (46.9%)	299 (41.0%)	277 (39.7%)	11 (55.0%)	303 (40.9%)		
No	447 (58.7%)	17 (53.1%)	430 (59.0%)	420 (60.3%)	9 (45.0%)	438 (59.1%)	7.22**	1.60

*
p < .05;

**
p < .01;

p < .001

Table 2.

Results of binary logistic regression (n=1,026)

	HIV (OR; 95% CI)	Syphilis (OR; 95% CI)	HCV (OR; 95% CI)
Age			
		1.10 (1.06, 1.12) ***	
Length of sex work			
	.63 (.42, .94) *		
Work venue			
	.35 (.13, .96) *		
Condom use frequency			
		.42 (.26, .67) ***	
Drug use			
		7.51 (3.32, 16.95) ***	58.51 (24.10, 142.10) ***

*
 $p < .05$ **
 $p < .01$ ***
 $p < .001$