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Local Differences in HIV Prevalence: A Comparison of Social Venue Patrons, Antenatal Patients, and STI Patients in Eastern Kinshasa

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Abstract

Background—This study compares the sexual behavior and HIV prevalence of men and women at social venues where people meet new sexual partners in Eastern Kinshasa with the HIV prevalence and behavior of STI treatment and antenatal clinic patients in the same area.

Methods—ANC clinic patients, STI clinic patients and social venue patrons were interviewed, asked to provide a blood sample onsite, and provided information about obtaining test results. All social venue patrons at all identified social venues in the study area were invited to participate.

Results—1,116 pregnant women; 66 male and 229 female STI clinic patients; and 952 male and 247 female patrons of social venues were interviewed and tested. HIV prevalence ranged by group: ANC patients (4%); female venue patrons (12%); female STI patients (16%); male venue patrons (2%); and male STI patients (23%). HIV prevalence among sexworkers at social venues (29%) was higher than the prevalence among other female patrons with new or multiple partnerships (19%) or among female patrons denying sexwork (6%). However, the absolute number of infected women was higher among women reporting recent new or multiple partnerships than the smaller group of sexworkers (23 vs 18). Two-thirds of the infected female STI patients (24/36) reported no more than one sexual partner in the past year.

Conclusion—Improving prevention programs in Kinshasa is essential. Prevention efforts should not neglect women at social venues who do not self-identify as sexworkers but have high rates of new sexual partnerships.

Keywords

HIV Seroprevalence; HIV Prevention and Control; Democratic Republic of the Congo; Sexual Behavior; Venue-based Population

Introduction

HIV prevention programs in Kinshasa need to be based upon current dynamics of the HIV epidemic in the local setting. Estimates of HIV prevalence among pregnant women in Kinshasa have remained between 2 and 5% for the last two decades [1-8]. Estimated HIV prevalence among female sexworkers and STI patients, although much higher than among pregnant women, decreased from 29% to 23% among sexworkers and from 12% to 9% among STI patients between 1997 and 2002 [1, 2]. The apparent stabilization of HIV prevalence among ANC patients and decline among sexworkers and STI patients is somewhat unexpected given the political instability and conflict experienced in Kinshasa since 1991. One explanation is that stable prevalence reflects high mortality among those infected with HIV coupled with high HIV incidence [9]. Prevalence of other STIs has also been relatively stable over the past two decades [10]. In this resource constrained setting beset with conflict, only tentative conclusions can be drawn regarding trends reflected in sequential cross-sectional surveys. Ongoing cohort studies are not available, nor has sufficiently detailed data been collected to assess whether there have been important changes in the population participating in surveillance activities. Not only differential mortality, but differences in other underlying demographic factors and survey participation could provide misleading estimates of HIV prevalence trends.

In order to contribute to the investigation of HIV prevalence among different subpopulations in Kinshasa, we implemented a study using the Priorities for Local AIDS Control Efforts (PLACE) methodology in eastern Kinshasa aimed at finding undetected pockets of high infection. PLACE is a venue-based epidemiological approach that interviews community informants to identify locations where people meet new sexual partners. New partnerships provide contact between susceptible and infected persons. Such contacts are crucial to the spread of the HIV epidemic. Information on the characteristics and behaviors of persons with high rates of new sexual partnerships who socialize at these places can be used to inform prevention programs and identify groups at risk of acquiring and transmitting HIV [11, 12]. The PLACE method makes it possible to target prevention activities to persons with high rates of new partnership formation who are not identified as commercial sex workers.

This paper presents results from the 2003 Kinshasa PLACE study. In addition, in order to determine whether this venue-based methodology identifies high-risk populations not identified using more traditional methodologies, demographic and behavioral characteristics and levels of HIV in this group are compared to those in clients at a major antenatal care clinic (ANC) and several STI clinics in the same eastern Kinshasa neighborhood.

Materials and Methods

In March 2002, a team of researchers from the Congolese National AIDS Program (PNLS) and the University of North Carolina (UNC) School of Public Health carried out a PLACE study in three contiguous, poor, densely populated sections of Kinshasa. The study team was interested in assessing whether this poor, congested area contained sexual networks with high rates of new sexual partnerships. A total of 1,350 community informants, asked to identify places where people go to meet new sexual partners, identified 916 unique sites that

the study team was able to visit and map. An owner, manager, or other knowledgeable person was interviewed about site characteristics, including the number of men and women who socialize at each site, behaviors such as drinking and finding new sex partners, and HIV prevention activities such as the sale or distribution of condoms.

Mapping revealed nine geographic clusters of sites. One of the largest clusters (133 sites) was selected for further investigation pending IRB approval. Men and women socializing at 59 sites in this cluster were interviewed from October, 2003 to January, 2004 about their characteristics and behavior and tested for HIV. These 59 sites included sites most frequently identified as places where people meet new sexual partners by community informants and 7 sites along a major road in the area. When sites identified in 2002 were no longer in business, a similar site nearby was chosen as a replacement.

HIV prevalence at PLACE sites was compared with prevalence among patients at the largest ANC clinic in the area and at seven STI clinics within the selected geographic cluster. Patient volume at the ANC at the time of the study was estimated to be 800 persons per month and at the seven STI clinics, patient volume varied from 30 to 200 patients per month. Clinic records are imprecise and therefore, estimates may be inexact [13]. Patients at the STI clinics were overwhelmingly female and poor. Typically, male STI patients have already tried to treat their STI symptoms through over the counter medications available at pharmacies, and come to the STI clinic as a last resort [13]. Treatment at STI clinics in the study is through Syndromic Management; data on STI prevalence is not available. HIV care was not provided at these clinics at the time of the study.

After PLACE site or ANC and STI clinic authorities voluntarily agreed to participate, private areas were identified for interviews and HIV testing. At each STI clinic, 1 or 2 nurses were trained as interviewers and conducted informed consent, pre-test counseling for HIV, interviews, and phlebotomies with each respondent individually. At both the ANC and at PLACE venues, patients and venue patrons were informed about the study and received counseling about voluntary HIV testing as a group. Subsequently, at the ANC, three study interviewers conducted the informed consent process with individual patients. If informed consent was obtained, participants were interviewed and directed to a study nurse who performed a phlebotomy. ANC and STI patients were encouraged to return to each clinic for their HIV test results. A total of 1,140 ANC women were informed about the study during the group HIV pre-test counseling session. Twenty-four women choose not to participate and the remaining 1,116 women were interviewed and tested for HIV, representing a consent rate of approximately 98%. A valid HIV test result was available for 1,106 of these women. At the STI clinic, 236 women and 68 men were invited to participate in the study. Of these, 66 men and 229 women consented to participate in both the interview and blood draw, representing a response rate of 96% for males and 97% for females.

At PLACE sites, after all patrons received pre-test counseling and study information, interviewers approached patrons individually to explain the informed consent process and ask each person if he or she would be willing to be interviewed and tested for HIV. When verbal consent was obtained, respondents proceeded to a private area and written informed consent was obtained. Interviewers administered the questionnaire and a study nurse performed a phlebotomy for HIV testing. Participants received money for transportation to obtain their HIV test results. PLACE site participants received test results at their choice of four health centers providing voluntary counseling and testing (VCT).

Of the 1,199 men and women introduced to the study at PLACE venues, approximately 30 persons declined to participate, representing a response rate of approximately 98%. At the first 6 sites, approximately 30 out of 67 persons in the HIV pre-test counseling sessions

declined to participate (a response rate of 45%). The exact number and gender of those who declined is not certain due to problems with record keeping which were subsequently resolved. After an improved explanation of the purpose of the study to participants and venue owners, participation rose to 100 percent.

Each respondent's sexual partnership level was defined based on responses to the questionnaire. Partnership level was defined as "high" if the person reported a new partner or more than one partner in the past four weeks; "moderate" if the person did not have new or multiple partners in the past 4 weeks but did in the past 12 months; and "low" if the person had one long term partner in the past 12 months or no partners at all. Women were identified as commercial sexworkers by self-report. Transactional sex was identified as having received or given money or a gift in exchange for sexual intercourse. We were interested in the extent to which there were persons with high partnership rates who did not report engaging in commercial or transactional sex[1, 2].

HIV Testing

Blood specimens were tested for HIV antibodies using the Vironostika HIV1/2-O Elisa. Enzygnost EIA HIV1-2 and the Determine HIV1/2 rapid test were used to confirm positive results. Specimens with a negative confirmatory test were retested for HIV RNA and HIV p24 core antigen to identify newly infected samples not yet antibody positive.

Pools of 100 HIV antibody-negative blood specimens were tested for HIV RNA at the Congolese National AIDS Program (PNLS) laboratory, using reverse transcriptase-polymerase chain reaction (RT-PCR)[14]. Blood was collected in EDTA tubes and the Amplicor 1.5 test from Roche was used to extract RNA and amplify it for quantification. The lower level of detection for this sensitive method was 400 copies/ml. Pools of 100 specimens that tested positive were to be retested in smaller and smaller pools until the positive specimen was identified. Control tests confirmed that the PCR technique at the PNLS lab was well performed. The INNOTEST™ HIV Antigen was the enzyme immunoassay (EIA) used for the detection and quantification of p24 core antigen of the HIV-1, group O and HIV-2. This test was used for early detection of HIV infection before seroconversion[15, 16].

Analysis

Data were entered in Epi Info Version 6 and analyzed using STATA 9.0. The sociodemographic and behavioral characteristics of men and women interviewed and tested at PLACE sites, men and women interviewed and tested at STI clinics, and women interviewed and tested at the ANC clinic are described and compared using Pearson's chi square test. Whenever any group had 5% or more data missing for a particular variable, the percentage of data missing is indicated for every group. Prevalence of HIV by sociodemographic and behavioral characteristics was examined for each group. The ability of the PLACE methodology to identify HIV positive individuals relative to STI and ANC clinics was evaluated by comparing the odds of HIV infection among PLACE women with the odds of HIV infection among women at the ANC and STI clinics. We used multiple logistic regression analysis with interaction terms for site type and characteristic to calculate odds ratios of the HIV infection outcome within each strata of selected sociodemographic and behavioral characteristics.

Results

Characteristics of Women at Social Sites, ANC Clinic, and STI Clinic

A total of 247 women socializing at social sites, 1,116 pregnant women from the ANC clinic, and 229 women from the STI clinics were interviewed and tested for HIV infection (Table 1). The three populations were significantly different in age, education, condom use with last sex partner, partnership level, and lifetime condom use ($p < 0.05$ for each). About half of all women surveyed in each setting were aged 20-29, though the STD clinics had the highest proportion of women 35 and older.

Women at PLACE sites had the lowest educational attainment (only 71.5% had received a level of education higher than primary school) and the highest rates of sexual partnership. Approximately one fourth of women at PLACE sites self-identified as sexworkers. One third of all women at PLACE sites reported engaging in transactional sex and half reported having had new or multiple sexual partnerships within the past four weeks. However, of those who reported having new or multiple partners in the past four weeks, 30% reported no commercial or transactional sex and only 8% reported engaging in both commercial and transactional sex. Sexual partnership rates among STI and ANC clinic patients were much lower than among women at social venues: only 20% of female STI clinic patients and 5% of ANC clinic patients reported new or multiple partnerships within the past year. In spite of their high rate of sexual partnering, 44% of PLACE women had never used a condom.

HIV in Women

We estimated the prevalence of HIV in each study population by gender, stratified by age, education, hospitalization, and sexual behavior (Table 2). There were no incident cases of HIV infection. HIV prevalence was highest among STI patients (16.5%) and PLACE patrons (12.3%) and lower among pregnant women (4.1%). The pattern of HIV prevalence by age varied by study population. Among ANC clients, prevalence did not vary greatly by age (Table 2). Among STI clinic patients and women at PLACE sites, prevalence was lowest among women 15-24. HIV prevalence peaked at ages 25-34 among PLACE women (21.4%) and among women 35 and older at STI clinics (35.0%). The odds of HIV infection among PLACE patrons ages 25-34 relative to STI patients was 2.6 and relative to ANC patients was 5.6 (95% CI: 2.8, 11.1) (Table 3).

Strong association between new or multiple sex partnerships and HIV infection was found among women at PLACE sites. Women reporting new or multiple partnerships in the past 4 weeks had the highest prevalence (19.3%) followed by women who had new or multiple partners in the past year but not in the past month (10%). HIV prevalence among those with the highest partnership rates at STI clinics was similar to that of high partnership PLACE women (18.6%).

Characteristics of Men at PLACE sites and at the STI Clinics

A total of 952 men socializing at PLACE sites and 66 men from the STI clinics participated (Table 1). Men at PLACE sites were younger than male STI clinic patrons and were more likely to report new and multiple partnerships than men at STI clinics ($p < 0.0001$). Over one-half of men interviewed at PLACE sites reported new or multiple partnerships within the past four weeks, and 20% more reported new or multiple partnerships within the past year. Most men at STI clinics denied having either new or multiple partnerships.

Although the age distribution of men and women at PLACE sites was similar, men were more likely to have completed high school and to be employed professionally. Almost three-fourths of men reported new or multiple partnerships in the past year compared with 56% of

women. Transactional sex was reported almost as frequently among men at PLACE sites as among women at PLACE sites (29% vs 34%). Reported condom use with the most recent new partner was lower among PLACE site males than females ($p < 0.05$).

HIV in Men

There were no incident cases of HIV infection identified among men. Prevalence was an order of magnitude higher among the STI clinic population than among PLACE patrons (23% vs 2%). For male PLACE patrons, HIV prevalence increased with age, professional employment, a recent visit to an STD clinic, and having a new sexual partner in the past year but not using a condom. Among men interviewed at the STI clinic, HIV prevalence increased with age, having less than a high school education, and a recent hospitalization. In neither population was partnership level associated with HIV infection.

Discussion

Study Limitations

The primary objective of this study was to compare HIV incidence in a poor area of Kinshasa among persons recruited from ANC and STI clinics and venues where people meet new sexual partners. Unfortunately, funds were insufficient to recruit the extremely large samples required to assess differences in incidence among three low incidence populations. This failure to obtain adequate power to estimate incidence in an urban African setting even though over 2,400 samples were tested for incident or acute HIV raises questions about whether cross-sectional testing for incident infection could ever be routine.

Our study was designed to compare HIV prevalence and incidence of PLACE patrons and ANC and STI clinic patients by age, and not as a comparison of the behavioral characteristics of respondents at these three site types. The PLACE survey included questions about employment, exchange of money for sex, and additional details about condom use, in order to assess whether the characteristics and sexual behavior of people socializing at each site were associated with the site's geographic location, size, or site type. Because PLACE surveys are focused on new sexual partnership formation, questions about marital status are often not asked because of doubtful response validity.

The study had sufficient power to compare differences in the HIV prevalence and social and behavioral characteristics of female ANC, PLACE and STI populations. The study had 92% power to detect a difference in the HIV prevalence of ANC patients and that of PLACE venue patrons, based on an expected HIV prevalence of 3% among ANC patients and 6% among venue patrons. Power to detect a difference in the HIV prevalence of STI patients and that of PLACE venue patrons, based on an expected HIV prevalence of 12% among STI patients and 6% among venue patrons, was 89%. Power to detect a difference in the HIV prevalence of STI patients and that of ANC patients, based on an expected HIV prevalence of 12% among STI patients and 3% among ANC patients, was over 99%.

In our study, the small sample size among male STI patients limits the usefulness of the STI data for men and limits comparison between STI and PLACE data. As discussed above, male patients form the minority of STI clients in Kinshasa. The opposite gender imbalance occurs at PLACE venues, where the majority of patrons socializing are male. In addition, the one year delay between identification of sites and on-site interviewing of patrons may have introduced some bias in interpretation of the findings as sites still in operation in 2003 may have been different from the sites in operation in 2002.

Finally, the percentage of missing data was high for survey questions concerning recent hospitalization, new sexual partnerships within the past year, and condom use at last sex

with last new partner. Approximately one fourth of STI patients did not give information about recent hospitalization and over 10% of STI patients did not indicate whether or not they had a new sexual partner in the past year. Over 40% of female STI patients and 27.1% of ANC patients who had a new sex partner in the past year did not indicate whether or not they used a condom the last time they had sex with their most recent new partner.

Study Findings

A total of 2,610 men and women were screened for HIV. Thirty-six test results were not available. Out of the 2,574 available test results, there were 145 cases of HIV infection and the overall HIV prevalence was 5.6%. HIV prevalence among the 1,116 ANC clinic attendees tested in our study (4%) was similar to that found in a 2002 study where 17 of 582 pregnant women in Kinshasa were infected (3%)[1]. HIV prevalence among women attending Kingasani ANC, where our study took place, has subsequently decreased to 1.9% in 2004 [8]. HIV prevalence among male and female STI clients was higher in this study (23.1% and 16.2%) than 2002 estimates of 8.8% (18 of 203 persons) [1] and 12.4% HIV prevalence among sex workers attending Matonge STI clinic [10]. This may reflect an actual increase in prevalence, however, the STI clinic populations used in these three studies are different. Matonge clinic has had ongoing HIV prevention programming since 1985 [10] and lower HIV prevalence at Matonge may reflect successful HIV prevention efforts there. HIV prevalence among sex workers interviewed at PLACE venues in our study was 28.6%, substantially higher than the 12.4% prevalence reported at Matonge. In the 2002 Matonge study, HIV prevalence among sex workers varied by type of sex work, ranging from 24% among home-based workers to 6.6% among occasional or clandestine sex workers. Unfortunately, we do not have data describing the type of sex work carried out by women at PLACE venues.

In spite of its limitations, the data reveal several important insights into the value added by HIV outreach testing among patrons of sites known to be places where people meet new sexual partners. Many more sites where people meet new partners were identified than expected based on ongoing surveillance of sexworkers in Kinshasa. The number and diversity of sites suggested a more extensive system of sexual networks than previously understood. Patrons of sites where people meet new sex partners were more likely than STI clinic attendees and much more likely than ANC clinic attendees to report new and multiple sexual partnerships. HIV prevalence among women at PLACE sites (12.3%) was much higher than expected and among women age 25-34 was twice the prevalence of women at the STI clinic (21.3% vs 9.9%). Among women interviewed at PLACE sites, HIV prevalence was strongly associated with partnership formation levels. Self-identified commercial sexworkers at PLACE sites had a very high HIV prevalence (28.6%) relative to those who did not identify as sexworkers (6.3%), but there was also a high prevalence of infection (16%) among women interviewed at PLACE sites who reported transactional sex but denied being sexworkers. The number of HIV infected women detected by outreach testing among all female patrons of social venues was double the number that would have been found if testing had been limited to women who self-identified as commercial sexworkers. By including all women in the outreach testing, the stigma associated with outreach testing targeting specific groups such as commercial sexworkers was also avoided. Extraordinarily low refusal rates after the first 6 PLACE venues were visited attest to the universality of testing at each site.

This study also provides useful data on the feasibility of bringing voluntary HIV counseling and testing to men and women socializing at sites where people meet new sex partners. It is the first Kinshasa study to collect blood for HIV testing and behavioral data regarding HIV/AIDS in the general population at social venues during their busiest night-time periods. Sixty-one percent of participants returned for their HIV test results. The highest rate of

return was in the ANC clinic (88%), followed by the STI clinics (67%). Forty-three percent of persons interviewed at PLACE sites collected their result at the designated voluntary counseling center.

Use of PLACE data for HIV prevention in Kinshasa

The public health system in DRC has progressively deteriorated and at the time of this study, the reliable health services in Kinshasa were provided by private religious organizations or other non-governmental organizations such as the Salvation Army or Medicines Sans Frontiers (MSF). The ANC where this study was conducted is run by Catholic sisters and the STD centers where the study was conducted were under MSF/Belgium responsibility.

The PNLS and non-governmental organizations used results from the 2002 and 2003 PLACE studies to target local HIV prevention programs. UNICEF and the Kinshasa School of Public Health requested mapped data from this study to assist them in targeting HIV prevention efforts in Kinshasa. This study revealed more venues where sexworkers solicit than had been previously known and revealed the high sexual partnership rates of those who did not self-identify as sexworkers.

Screening at PLACE sites is likely to be as effective or more effective in identifying infected women as screening at STI clinics. A similar number of women 25-34 were tested at STI clinics and PLACE sites (81 and 89 respectively), yet onsite testing at PLACE sites identified 19 infected women age 25-34 compared to 8 at STI clinics. Two-thirds of the infected women at STI clinics were older than 35 and did not report new or multiple partners in the past year. The infected women at PLACE venues had a higher partnership rate than the women at the STI clinics, suggesting that prevention at PLACE sites might be a more effective strategy for limiting onward transmission to additional sexual partners.

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Short Summary

In Kinshasa, women with multiple sexual partners who deny sexwork but socialize at places where people meet sexual partners have a higher HIV prevalence (20%) than ANC clinic attendees (4%).

Table 1

Sociodemographic and Behavioral Characteristics of Men and Women Interviewed at 59 PLACE Sites, 7 STI Clinics, and an Antenatal Care Clinic (ANC)

Sociodemographic Characteristics	PLACE		STI Clinics		ANC Clinic
	Women (n=247) %	Men (n=952) %	Women (n=229) %	Men (n=66) %	Women (n=1116) %
Age					
15-19	17.6	10.2	10.3	4.7	16.3
20-24	28.7	33.9	24.2	17.2	29.6
25-29	23.8	22.7	25.6	17.2	28.6
30-34	13.1	15.8	11.7	25.0	17.5
35-39	9.0	6.8	13.0	15.6	6.3
40+	7.8	10.7	15.3	20.3	1.7
Level of education					
None	6.5	0.9	7.1	0.0	2.6
Primary	22.0	6.1	15.6	7.7	15.0
Orientation Cycle	23.7	11.0	27.7	16.9	28.9
High School	45.3	69.2	43.8	67.7	51.7
University/Grad School	2.5	12.9	5.8	7.7	1.9
Employment					
Employed Professional (except sex workers) *	4.2	20.2	--	--	--
Employed Non-Professional (except sex workers) **	46.3	54.3	--	--	--
Sex Worker	26.3	0.0	--	--	--
Unemployed	13.3	9.1	--	--	--
Student	10.0	16.4	--	--	--
Marital Status					
Single	--	--	3.5	9.2	0.0
Unmarried but living together	--	--	21.0	28.8	24.1
Married (monogamous)	--	--	48.9	45.5	64.1
Married (polygamous)	--	--	7.9	4.6	8.1
Divorced	--	--	3.9	0.0	1.1
Widowed	--	--	5.7	0.0	0.0
Other	--	--	9.2	10.8	2.6
Hospitalized during past 3 months					
Yes	11.7	10.2	10.0	19.7	5.4
No	86.6	84.0	67.7	54.6	89.0
Missing	1.6	5.8	22.3	25.8	5.7
Visited Medicines Sans Frontiers STI Clinic in past 3 months					
Yes	8.9	5.6	100.0	100.0	1.1
No	91.1	94.4	0.0	0.0	98.9
Sexual Behaviors					
Had a new partner in the past year					

	PLACE		STI Clinics		ANC Clinic
	Women (n=247) %	Men (n=952) %	Women (n=229) %	Men (n=66) %	Women (n=1116) %
Sociodemographic Characteristics					
Yes	52.6	64.5	18.3	33.3	4.3
No	42.1	28.7	71.2	54.6	88.0
Missing	5.3	6.8	10.5	12.1	7.7
Used a condom at last sex with last new partner (among those who had a new partner in the past year)					
Yes	48.5	36.5	14.3	13.6	0.0
No	45.4	57.7	45.2	72.7	72.9
Missing	6.2	5.9	40.5	13.6	27.1
Partnership level					
Low (No sex or 1 non-new partner within past 12 months)	42.4	26.3	79.7	62.7	94.8
Moderate (New or multiple partners within past 12 months)	8.2	20.0	0.5	1.7	5.3
High (New or multiple partners within past 4 weeks)	49.4	53.7	19.8	35.6	0.0
Ever used a condom					
Yes	56.0	76.5	--	--	--
No	44.0	23.5	--	--	--
Gave or received money or gifts in exchange for sex in the past 4 weeks					
Yes	34.0	29.0	--	--	--
No	66.0	71.0	--	--	--

* Professional includes government or private sector professionals

** Non-Professional includes skilled and unskilled non-professionals and house wives

Table 2
HIV Prevalence of Men and Women Interviewed at 59 PLACE Sites, 7 STI Clinics, and an Antenatal Care Clinic

	PLACE						STI Clinic			ANC Clinic	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	
Sociodemographic Characteristics	# tested	HIV+ N(%)	# tested	HIV+ N(%)	# tested	HIV+ N(%)	# tested	HIV+ N(%)	# tested	HIV+ N(%)	
Age group											
15-24 *	112	6 (5.4%)	413	0 (0.0%)	75	5 (6.7%)	14	2 (14.3%)	502	17 (3.4%)	
25-34	89	19 (21.3%)	362	7 (1.9%)	81	8 (9.9%)	27	6 (22.2%)	502	24 (4.8%)	
35+	40	3 (7.5%)	163	11 (6.7%)	60	21 (35.0%)	22	6 (27.3%)	88	4 (4.5%)	
Marital Status											
Married or living together			170	20 (11.8%)	51	11 (21.6%)	1003	41 (4.1%)			
Divorced			9	2 (22.2%)	0	***	12	1 (8.3%)			
Widowed			13	9 (69.2%)	0	***		***			
Single			8	1 (12.5%)	6	1 (16.7%)		***			
Employment											
Employed Professional (except sex workers) *	10	1 (10.0%)	185	8 (4.3%)							
Employed Non-Professional (except sex workers) **	109	9 (8.3%)	501	10 (2.0%)							
Sex Worker	63	18 (28.6%)	0	***							
Unemployed	31	1 (3.2%)	84	1 (1.2%)							
Student	24	0 (0.0%)	152	0 (0.0%)							
Education Level											
High School or More	115	10 (8.7%)	761	15 (2.0%)	108	8 (7.4%)	48	10 (20.8%)	559	17 (3.0%)	
Less than High School	127	20 (15.7%)	166	3 (1.8%)	109	27 (24.8%)	16	5 (31.3%)	481	23 (4.8%)	
Hospitalized during past 3 months											
Yes	29	8 (27.6%)	96	2 (2.1%)	21	8 (38.1%)	13	6 (46.2%)	60	2 (3.3%)	
No	211	22 (10.4%)	791	16 (2.0%)	151	21 (13.9%)	36	8 (22.2%)	983	39 (4.0%)	
Visited Medicines Sans Frontiers STI Clinic in past 3 months											
Yes	22	2 (9.1%)	53	2 (3.8%)	216	34 (15.7%)	63	14 (22.2%)	12	1 (8.3%)	
No	222	28 (12.6%)	889	17 (1.9%)					1,094	44 (4.0%)	
Sexual Behaviors											

	PLACE				STI Clinic		ANC Clinic	
	Women	Men	Women	Men	Women	Men	Women	Men
Partnership level								
Low (No sex or 1 non-new partner, past 12 months)	102 5 (4.9%)	239 8 (3.3%)	167 24 (14.4%)	36 7 (19.4%)	986 40 (4.1%)			
Moderate (New or multiple partners, past 12 months)	20 2 (10.0%)	185 3 (1.6%)	1 0 (0.0%)	1 0 (0.0%)	53 1 (1.9%)			
High (New or multiple partners, past 4 weeks)	119 23 (19.3%)	491 8 (1.6%)	43 8 (18.6%)	21 3 (14.3%)	0 0			
Used a condom at last sex with last new partner (among those who had a new partner in the past year only)								
Yes	63 19 (30.2%)	222 3 (1.4%)	6 2 (33.3%)	3 0 (0.0%)	0 0			
No	58 5 (8.6%)	350 8 (2.3%)	19 2 (10.5%)	16 1 (6.3%)	35 0 (0.0%)			
Ever used a condom?								
Yes	129 26 (20.2%)	694 9 (1.3%)						
No	100 4 (4.0%)	212 9 (4.2%)						
Gave or received money or a gift in exchange for sex in past 4 weeks?								
Yes	83 19 (22.9%)	264 6 (2.3%)						
No	158 10 (6.3%)	647 13 (2.0%)						
Total	244 30 (12.4%)	937 19 (2.0%)	222 36 (16.2%)	65 1.5 (23.1%)	1,106 45 (4.1%)			

* Professional includes government or private sector professionals
 ** Non-Professional includes skilled and unskilled non-professionals and house wives
 *** No population in this category

Table 3

Association between site type and HIV prevalence for women ^{*}, within strata of sociodemographic and behavioral characteristics

	Odds of HIV infection among PLACE women relative to odds among STI Clinic women of same category, (95% CI)		Odds of HIV infection among PLACE women relative to odds among ANC Clinic women of same category, (95% CI)	
Sociodemographic Characteristics				
Age (Model 1)				
15-24	0.79	(0.26, 2.41)	1.61	(0.63, 4.16)
25-34	2.57	(0.68, 9.78)	5.61	(2.83, 11.12)
35+	0.20	(0.06, 0.70)	2.27	(0.72, 7.13)
Level of education (Model 2)				
Less than High School	0.57	(0.28, 1.17)	3.72	(2.03, 6.83)
High School or more	1.19	(0.43, 3.28)	3.04	(1.35, 6.84)
Hospitalized during past 3 months (Model 3)				
Yes	0.62	(0.23, 1.69)	11.05	(4.29, 28.46)
No	0.72	(0.31, 1.68)	2.82	(1.48, 5.35)
Sexual Behaviors				
Had a new partner in the past year (Model 4)				
Yes	0.98	(0.40, 2.40)	10.62	(5.74, 19.63)
No	0.26	(0.08, 0.82)	0.96	(0.32, 2.87)
Partnership level (Model 5)				
Moderate or High	1.01	(0.42, 2.43)	11.71	(6.34, 21.64)
Low	0.30	(0.11, 0.84)	1.18	(0.45, 3.10)

* 244 women at PLACE sites, 222 women at STI Clinics, and 1,106 women at the ANC Clinic