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High-Risk Sexual Behavior at Social Venues in Madagascar

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Background: **Persistent high levels of sexually transmitted infection (STI) in Madagascar indicate current prevention strategies are inadequate. STI/HIV prevention based in social venues may play an important role in reaching individuals at risk of infection. We identified venues where people meet sexual partners and measured the need and potential for venue-based prevention.**

Methods: **Interviews were conducted in 7 Madagascar towns with 1) community informants to identify social venues, 2) individuals socializing at a sample of venues to assess sexual behavior among venue patrons, and 3) venue representatives to assess the potential for venue-based intervention.**

Results: **Community informants identified numerous venues (range: 67–211 venues, depending on the town); streets, bars, and hotels were most commonly reported. Among 2982 individuals socializing at venues, 78% of men and 74% of women reported new sexual partnership or sex trade for money, goods, or services in the past 4 weeks and 19% of men and 18% of women reported symptoms suggestive of STI in the past 4 weeks. STI symptom levels were disproportionately high among respondents reporting either sex trade or new sexual partnership in the past 4 weeks. Twenty-eight percent of men and 41% of women reported condom use during the last sex act with a new partner. Although 24% to 45% of venues had hosted STI/HIV interventions, interventions were deemed possible at 73% to 90% venues according to 644 interviews with venue representatives.**

Conclusions: **Venue-based intervention is possible and would reach a spectrum of populations vulnerable to STI/HIV including sex workers, their clients, and other high-risk populations.**

SEXUALLY TRANSMITTED INFECTIONS (STIs) constitute a significant public health concern in Madagascar. Surveys conducted in the mid-1990s highlighted high syphilis and low but rising HIV prevalence levels.[1,2] More recently, high prevalence of gonorrhea, Chlamydial infection, trichomoniasis, or syphilis was measured among asymptomatic female sex workers (74%–78%)[3] and women seeking care for vaginal discharge (40%).[4] STI-related morbidity warrants a public health response. Given the role of STIs in HIV transmission, particularly in a nascent HIV epidemic,[5,6] STI control is also urgently needed to help prevent a widespread HIV epidemic in Madagascar.[5,7,8]

Persistent STI indicates current control strategies have been inadequate and novel approaches are needed. The Priorities for Local AIDS Control Efforts (PLACE) Study is an STI/HIV intervention-planning tool based on epidemiologic models indicating that new and multiple sexual partnerships are important STI/HIV transmission determinants.[9,10] PLACE identifies geographic areas and social venues within these areas where people meet new and multiple partners and measures the unmet need and potential for condom promotion and STI/HIV prevention education at social venues. A venue-based approach can offer programmatic advantages over approaches based on risk group status that can be stigmatizing and that may be inadequate in generalized epidemics, such as that observed in Madagascar.

A research team including representatives from the Madagascar National AIDS Control Program; the Madagascar National Institute for Public and Community Health; the United States Aid for International Development; the University of North Carolina, Madagascar; and the MEASURE Evaluation Project at the University of North Carolina, Chapel Hill implemented the Madagascar PLACE Study in 7 cities. We aimed to identify venues where people meet new sexual partners, assess the potential for STI/HIV intervention hosted at venues, and measure the prevalence of high-risk sexual behaviors and self-reported STIs among individuals socializing at venues.

Materials and Methods

Study Setting

The research team identified 7 priority towns where population mobility was high and the potential for sexual partnership and STI/HIV risk was thought to be likely: agricultural and industrial

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center Antsirabe (population: 162,000 inhabitants); urban port towns Mahajanga, Morondava, and Mananjary (population: 166,000, 70,000, and 70,000 inhabitants, respectively); coastal tourist town and mining area, Fort Dauphin (population: 50,000 inhabitants); semi-rural town, Tsiroanomandidy, which hosts a large *zebu* (cattle) market weekly (population: 50,000 inhabitants); and sapphire mining settlement Ilakaka, reputed for its sex work industry (population:15,000 inhabitants).

Study Procedures

Field work was conducted from May through December 2003. The PLACE Study methodology has been described in detail elsewhere.[11] Briefly, in the first phase, community informants in each study town were interviewed to attempt to identify all social venues in the town where people meet new sexual partners. In the second phase, each identified venue was visited to verify the venue address and administer a 10 minute structured face-to-face questionnaire to a venue representative, such as a venue manager or owner, to assess the history of and the potential for STI/HIV intervention based in the social venues. In the final phase, in each town, 20 venues were chosen randomly with a probability of selection that was proportional to the size of the on-site socializing population, measured during interviews with venue representatives. An additional 5 priority venues per town were purposefully selected by the field coordinator. Fifteen minute structured face-to-face sexual behavior surveys were administered to a sample of venue patrons recruited from the 25 venues. Sixteen men and 8 women were recruited at each venue, as interviews with venue representatives indicated a venue sex ratio of 2 men to 1 woman. A protocol was followed that distributed interviewers systematically throughout the venue to minimize interviewer discretion in selecting respondents by convenience. Respondents were led to a private area to ensure confidentiality during the interview.

Before each interview, interviewers explained the purpose and scope of the study and obtained a verbal informed consent to conduct a confidential and anonymous interview. The interviewer provided a small snack bag to each respondent to eat during the interview. All interviews were conducted in Malagasy.

Interviewers were selected based on skill, experience, and fluency in Malagasy. Each interviewer received a 1-week training on the PLACE Study protocol. Study instruments were translated from English into Malagasy and French.

The ethical review boards of Madagascar Medical Research and the University of North Carolina at Chapel Hill approved the research.

Measures

Venue STI/HIV Intervention. During the interviews with venue representatives, STI/HIV intervention indicators were measured, including prior on-site STI/HIV prevention intervention, prior on-site condom availability, and venue representative willingness to host STI/HIV prevention education and sell condoms.

Venue Patron Characteristics. Measured characteristics of venue patrons included age, employment, education, and exposure to STI/HIV education. Sexual behavior indicators included how often the patron visited the venue, new sexual partnerships, transactional sex, and condom use. Transactional sex was defined as having given or received money, goods, or services for sex in the past 4 weeks. Typically in Madagascar, women sell and men buy sex, hence this variable indicated whether a woman was a sex worker or a man was the client of a sex worker. Patrons also self-reported STI symptoms in the past 4 weeks.

Data Analysis

Analyses were performed in Stata, version 8.0 (Stata Corp., College Station, TX). The number of venues was enumerated and the distributions of major venue types and on-site STI/HIV intervention variables were calculated separately by study town.

Patron socio-demographic characteristics, sexual behaviors, and self-reported STIs were calculated separately by gender and compared using Pearson chi-square test statistics.

To compare STI risk among individuals involved in sex trade versus other high-risk partnerships (without sex trade), we measured levels of symptoms suggestive of STI among those reporting that, in the past 4 weeks, they engaged in: transactional sex *and* at least 1 new partnership; transactional sex, but no new partnerships; at least 1 new partnership, but no transactional sex; and no new partnerships and no transactional sex. We calculated gender-specific unadjusted and adjusted prevalence ratios (PRs) and 95% confidence intervals (CIs) for the associations between risk behavior and STI symptoms using a generalized linear model specifying a log link, a Poisson distribution,[12,13] and a robust variance estimator.[14] Multivariable models included study town, age, and employment.

We calculated unadjusted and adjusted PRs and 95% CIs for the associations between exposure to STI/HIV prevention and 2 indicators of STI risk: condom use with a recent new sexual partner and self-reported STI symptoms in the past 4 weeks. Results were not gender-stratified as preliminary analyses indicated few differences by gender. Multivariable models adjusted for study town, gender, age, employment, and transactional sex.

Results

Number and Types of Venues: Community Informant Interviews

The number of community informants interviewed ranged from 147 in Morondava to 201 in Antsirabe (response rates: 98%–100%, depending on the town). Informants were diverse and included merchants, taxi drivers, restaurant/hotel workers, and people in the street. Numerous venues where people meet new sexual partners were identified (range: 67–211 venues) (Table 1). Informants identified the greatest number of venues in the largest port cities, Mahajanga, Morondava, and Mananjary (211, 171, and 106 venues, respectively). The most common venues were open-aired public spaces such as streets, parks, beaches, or fields (range: 30% of venues in Fort Dauphin and Ilakaka to 49% of venues in Antsirabe) followed by hotel/bar establishments (range: 13% of venues in Tsiroanomandidy to 49% of venues in Fort Dauphin). Additional venues included private homes, many of which functioned as informal brothels; informal shacks serving meals, called *gargottes*; schools; video clubs; transport centers, such as taxi stands and bus stations; shops and markets; and churches. Setting-specific venues included mines in Ilakaka and Fort Dauphin, the *zebu* market in Tsiroanomandidy, and casinos in Antsirabe.

STI/HIV Prevention Activities at Venues: Venue Representative Interviews

Interviewers identified a venue representative to approach for an interview at the majority of venues in each study town (range: 91%–100%, depending on the town). Interviews with 644 representatives (response rates: 92%–100%) indicated that on-site STI/HIV prevention activities had previously been hosted in approximately one quarter of venues in Mahajanga (24%) and Antsirabe (25%), 33% of venues in Mananjary, 39% of venues in Morondava, and between 43% and 45% of venues in Tsiroanomandidy, Ilakaka, and Fort Dauphin (Table 2). Condoms were available on

TABLE 1. Percent Distribution of the Types of Venues Where People Meet New Sexual Partners That Were Identified by Community Informants, by Study Town (Madagascar PLACE Study, 2003, N = 784 Venues With Verified Addresses)

Venue Types	Antsirabe, Agricultural and Industrial Center (N = 67 Venues)	Urban Port Towns			Fort Dauphin, Coastal Town and Mining Area (N = 81 Venues)	Tsiroanomandidy, Semi-Rural Town; Hosts *zebu* Market (N = 69 Venues)	Ilakaka, Sapphire Mining Settlement (N = 79 Venues)
		Mahajanga (N = 211 Venues)	Morondava (N = 171 Venues)	Mananjary (N = 106 Venues)			
Open-aired public venue	48.7	43.7	45.8	38.2	30.4	32.7	30.3
Bar, club, restaurant, hotel	19.3	34.4	29.0	29.2	49.3	12.7	35.5
Private home*	3.4	1.6	1.7	2.3	0.0	3.6	10.5
Gargotte†	10.1	0.0	2.3	1.1	2.9	5.5	0.0
School	0.8	8.3	0.6	2.3	0.0	9.1	0.0
Video club	3.4	1.0	5.2	3.4	2.9	7.3	7.9
Transport center	5.9	3.6	2.3	6.7	2.9	7.3	0.0
Shop	2.5	3.1	2.3	4.5	2.9	7.3	2.6
Open-aired market	0.8	0.0	1.2	4.5	4.4	1.8	2.6
Church	0.0	0.0	1.7	1.1	0.0	3.6	1.3
Other‡	5.1	4.3	7.9	6.7	4.3	9.1	9.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Values are given in percentage.
*Many private homes identified as places where people meet partners functioned as informal brothels.
†A *gargotte* was an informal eating establishment, often in the open-air.
‡The list of "other" venues was diverse and included recreational venues such as youth centers, cultural centers, sports fields, and arenas, and venues such as the town factory or slaughterhouse.

TABLE 2. History of and the Potential for STI/HIV Intervention Based in PLACE Venues, According to Interviews With Venue Representatives, by Study Town (Madagascar PLACE Study, 2003, N = 744 Venue Representatives)

	Antsirabe, Agricultural and Industrial Center (N = 61 Venues)	Urban Port Towns			Fort Dauphin, Coastal Town and Mining Area (N = 80 Venues)	Tsiroanomandidy, Semi-Rural Town; Hosts *zebu* Market (N = 60 Venues)	Ilakaka, Sapphire Mining Settlement (N = 76 Venues)
		Mahajanga (N = 200 Venues)	Morondava (N = 171 Venues)	Mananjary (N = 96 Venues)			
Prior STI/HIV intervention							
Ever hosted STI/HIV prevention education	24.6	23.5	39.2	33.3	45.0	43.3	43.4
Condoms were available on the day of interview	41.0	31.5	30.4	27.1	53.8	26.7	43.4
Condoms were available more than half the year	34.4	27.5	21.6	27.1	47.5	26.7	40.8
Potential for STI/HIV intervention							
Willing to host STI/HIV prevention							
Yes	85.3	67.5	77.8	70.8	85.0	80.0	84.2
Maybe, but currently undecided	3.3	14.5	3.5	2.1	5.0	3.3	1.3
No	9.8	6.0	4.7	1.0	1.3	5.0	1.3
Not applicable*	0.0	1.0	5.9	1.0	2.5	1.7	1.3
Willing to sell condoms							
Yes	68.9	51.0	47.4	44.8	72.5	40.0	80.3
Maybe, but currently undecided	8.2	16.5	7.6	5.2	6.3	8.3	2.6
No	18.0	15.0	25.7	11.5	8.8	23.3	2.6
Not applicable*	0.0	5.0	8.8	1.0	1.3	18.3	2.6

Values are given in percentage.
*For sites where condom distribution would be inappropriate, such as due to lack of infrastructure.

TABLE 3. Socio-Demographic Characteristics, Exposure to STI/HIV Education, Sexual Behavior, and Symptoms Suggestive of Sexually Transmitted Infections (STIs) Among Individuals Socializing at Social Venues (Madagascar PLACE Study, 2003, N = 2982)

	Men (N = 2013)		Women (N = 969)		
Characteristics of Individuals Socializing at Venues	n*	%	n*	%	Pearson χ^2 *P*
Socio-demographic characteristics					
Age (yr)					<0.0001
18–24	821	40.8	553	57.1	
25–34	748	37.2	296	30.6	
35–44	301	15.0	97	10.0	
45+	121	6.0	14	1.4	
Currently a student	411	20.4	199	20.5	0.897
Currently employed (full or part-time)	1478	73.4	479	49.4	0.0001
STI/HIV education in the past 3 mo					
Participated in STI/HIV prevention session	568	28.2	271	28.0	—
Listened to STI/HIV radio program	1804	89.6	850	87.7	0.18
Saw STI/HIV public health campaign advertisement	1720	85.4	807	83.3	0.118
Watched STI/HIV TV program	1372	68.2	608	62.8	0.945
Venue visitation					
Visits venue daily	1008	50.1	496	51.2	0.45
Sexual behavior					
≥1 new partnership in the past 12 mo	1530	76.0	653	67.4	<0.001
High-risk sexual partnerships in the past 4 wk†					
Both transactional sex and ≥1 new partner	912	45.3	456	47.1	0.003
Transactional sex only (no new partners)	321	16.0	135	13.9	
≥1 new partner only (no transactional sex)	271	13.5	90	9.3	
Neither transactional sex nor new partnership	444	22.1	251	25.9	
≥20 new partners in the past 4 wk	15	0.8	67	6.9	<0.0001
Ever used a condom	981	48.7	505	52.1	0.081
Used a condom with last recent new partner‡	428	28.0	266	40.7	<0.0001
STIs					
Had a symptom suggestive of an STI in the past 4 wk§	380	18.9	171	17.7	0.56
Consulted a doctor about STI symptoms in the past 4 wk‖	270	71.1	114	66.7	0.21

*Totals may not sum to 2013 among men and 969 among women because of missing values.
†Transactional sex is defined as having given or received money, goods, or services for sex in the past 4 weeks.
‡Among those who reported having ≥1 new partner in the past 12 months.
§Defined as pain on urination (men), discharge from the penis (men), unusual vaginal discharge (women), lower abdominal pain (women), and/or genital ulcers (men and women).
‖Among those who reported having symptoms suggestive of an STI in the past 4 weeks.

the day of the interview at less than one third of venues in Tsiroanomandidy (27%), Mananjary (27%), Morondava (30%), and Mahajanga (32%), 41% of venues in Antsirabe, and 54% of venues in Fort Dauphin.

The majority of venue representatives were willing to host prevention activities at their venues, or would consider the option (range: 73%–90%). Smaller proportions indicated they would be willing to or would consider selling condoms, with commitment lower in Tsiroanomandidy (48%), Mananjary (50%), and Morondava (55%) than in Mahajanga (68%), Antsirabe (77%), Fort Dauphin (79%), and Ilakaka (83%).

Sexual Behavior Survey Among Venue Patrons

Socio-Demographic Characteristics, STI/HIV Education, and PLACE Venue Visitation. Of 2021 men and 977 women aged 18 years or older who were approached for an interview while socializing at the venue, 2013 (99.6%) men and 969 (99.2%) women agreed to the interview.

Women interviewed at venues were younger than their male counterparts (median of 23 versus 26 years, respectively) (Table 3). Women were less likely to report any employment, whether full- or part-time (49%), than men (73%) ($P < 0.001$). One fifth of men and women were currently students.

Recent exposure to STI/HIV prevention intervention was comparable among men and women (Table 3). Only 28% of men and women had participated in an STI/HIV education in the past 3 months. However, the majority had heard a radio program (men: 90%, women: 88%), seen a public health advertisement (men: 85%, women: 83%), or watched a TV program (men: 68%, women: 63%) about STI/HIV in the past 3 months.

Approximately half of respondents reported daily visits to the PLACE social venues (50% men, 51% women).

Sexual Behavior and STI Symptoms. In the past 4 weeks, 78% of men and 74% of women reported having either at least 1 new sexual partner or engaging in transactional sex (Table 3). The greatest percentage of respondents reported both transactional sex and multiple new sexual partnerships (men: 45%, women: 47%). Small percentages of respondents reported transactional sex but no new sexual partnerships (men: 16%, women: 14%) or new sexual partnerships but no transactional sex (men: 14%, women: 9%). The distributions of high-risk partnerships differed somewhat by gender ($P = 0.003$). More striking, however, was that women were more likely than men to report very high numbers of recent new sexual partners; nearly 7% of women reported 20 or more new

TABLE 4. Prevalence Ratios (PRs) and 95% Confidence Intervals (CIs) for the Associations Between Type of High-Risk Sexual Partnership in the Past 4 Weeks and Self-Reported Symptoms of Sexually Transmitted Infection (STIs) in the Past 4 Weeks, Among Men and Women Socializing at Social Venues (Madagascar PLACE Study, 2003, N = 2982)

			Self-Reported STI Symptoms in Past 3 Mo			
			Unadjusted		Adjusted‡	
High-Risk Sexual Partnerships in the Past 4 Wk*	n†	% Reporting STI Symptom	PR	95% CI	PR	95% CI
Men						
Both transactional sex and ≥1 new partner	912	28.7	4.02	2.84–5.70	3.45	2.42–4.93
Transactional sex only (no new partners)	321	11.8	1.67	1.07–2.61	1.46	0.92–2.33
≥1 new partner only (no transactional sex)	271	16.2	2.26	1.47–3.46	2.10	1.38–3.20
Neither transactional sex nor new partnership	444	7.2	1.0	—	1.0	—
Women						
Both transactional sex and ≥1 new partner	456	24.8	3.77	2.32–6.12	3.45	2.11–5.64
Transactional sex only (no new partners)	135	18.5	2.77	1.55–4.94	2.04	1.11–3.74
≥1 new partner only (no transactional sex)	90	15.6	2.33	1.20–4.52	2.21	1.15–4.26
Neither transactional sex nor new partnership	251	6.8	1.0	—	1.0	—

*Transactional sex is defined as having given or received money, goods, or services for sex in the past 4 weeks.
†Totals may not sum to 2013 among men and 969 among women because of missing values.
‡Adjusted for study town, age, employment.

partners in the past 4 weeks compared with less than 1% of men ($P < 0.001$).

Approximately half of respondents reported ever having used a condom (men: 49%, women: 52%). Among persons with a new partner in the past 12 months, 28% of men and 41% of women used a condom the last time they had sex with a new partner ($P < 0.001$).

Approximately 19% of men and 18% of women reported symptoms suggestive of an STI in the past 4 weeks, including pain on urination (men), discharge from the penis (men), unusual vaginal discharge (women), lower abdominal pain (women), and/or genital ulcers (men and women). Of those reporting STI symptoms, the majority reported having consulted a doctor in response to the symptoms (men: 71%, women: 67%). Whether the doctor was a traditional healer or a medical doctor was not asked in the interview.

Some differences in levels of sexual risk behavior by study town were observed (not presented in table). Although 46% of men and women overall reported both new sexual partnerships and engaging in transactional sex in the past 4 weeks, these high-risk sexual partnerships were disproportionately high in Mananjary (61%), Ilakaka (56%), and Fort Dauphin (49%). Condom use with a recent new partner was low for men and women overall (32%), though levels were particularly low in Ilakaka (16%), Tsiroanomandidy (25%), and Fort Dauphin (27%).

Associations Between Risk Behaviors and STI Symptoms. Compared with those who reported neither transactional sex nor a new sexual partnership in the past 4 weeks, the prevalence of self-reported STI symptoms in the past 4 weeks was greater among those reporting both transactional sex and at least 1 new partnership (men: unadjusted PR: 4.02, 95% CI: 2.84–5.70; women: 3.77, 95% CI: 2.32–6.12), transactional sex but no new sexual partnerships (men: unadjusted PR: 1.67, 95% CI: 1.07–2.61; women: 2.77, 95% CI: 1.55–4.94), and at least 1 new sexual partnership but no transactional sex (men: unadjusted PR: 2.26, 95% CI: 1.47–3.46; women: 2.33, 95% CI: 1.20–4.52) (Table 4). After adjusting for study town, age, and employment status, these estimates weakened but the associations generally persisted.

Associations Between Prior Exposure to STI/HIV Interventions and Current Risk of STI. Individuals who had been exposed to STI/HIV prevention education materials in the past 3 months were more likely to report recent condom use with a new sexual partner and less likely to report STI symptoms in the past 3 months (Table 5). For example, those who had heard a radio program about STI/HIV in the past 3 months, compared with those who were not exposed to radio messages, were twice as likely to report recent condom use (unadjusted PR: 1.98, 95% CI: 1.47–2.66) and less likely to report recent STI symptoms (unadjusted PR: 0.70, 95% CI: 0.57–0.87). After adjusting for study town, gender, age, and employment status, and involvement in transactional sex, the associations weakened somewhat but remained.

Discussion

Approximately three-quarters of this venue-based sample reported having at least 1 new sexual partnership or engaging in transactional sex in the past 4 weeks. An important condom use gap was observed given these high partnership levels; approximately one half of the respondents reported ever having used a condom and a minority used a condom the last time they had sex with a new sexual partner. Self-reported symptoms suggestive of STIs were common. These results suggest that venue patrons represent a population at increased STI risk in Madagascar.

PLACE venues could play an important role in STI/HIV prevention in Madagascar. A minority of identified venues had previously hosted STI/HIV prevention or had on-site condom availability in the year before the interview. However, between 70% and 90% were open to hosting prevention activities and the majority were open to selling condoms. Appropriate interventions should be developed for these venues where otherwise difficult-to-reach populations vulnerable to infection can be accessed.

Individuals who socialized at venues included female sex workers and their male clients. Some women reported very high numbers of recent new partnerships, highlighting the particular vulnerability to STI among this population. Men and women involved in transactional sex indeed reported disproportionate levels of STI symptoms. However, respondents who reported

TABLE 5. Prevalence Ratios (PRs) and 95% Confidence Intervals (CIs) for the Associations Between Exposure to HIV/AIDS Prevention and Indicators of STI Risk Among Men and Women Socializing at Social Venues (Madagascar PLACE Study, 2003, N = 2982)

		Used a Condom the Last Time Had Sex With a Recent New Sexual Partner*					Self-Reported STI Symptoms in Past 4 Weeks			
		Unadjusted		Adjusted†			Unadjusted		Adjusted†	
STI/HIV Prevention	% Used a Condom	PR	95% CI	PR	95% CI	% Reporting STI Symptom	PR	95% CI	PR	95% CI
Participated in prevention session										
No	28.5	1.0	—	1.0	—	20.4	1.0	—	1.0	—
Yes	40.3	1.42	1.25–1.60	1.39	1.23–1.57	13.8	0.67	0.56–0.81	0.71	0.58–0.86
Watched TV program										
No	23.7	1.0	—	1.0	—	21.3	1.0	—	1.0	—
Yes	35.8	1.51	1.30–1.75	1.54	1.33–1.78	17.1	0.80	0.68–0.93	0.83	0.71–0.97
Listened to radio program										
No	16.9	1.0	—	1.0	—	25.2	1.0	—	1.0	—
Yes	33.5	1.98	1.47–2.66	1.88	1.40–2.53	17.7	0.70	0.57–0.87	0.79	0.64–0.97
Saw public health campaign										
No	20.6	1.0	—	1.0	—	21.5	1.0	—	1.0	—
Yes	33.6	1.63	1.29–2.05	1.48	1.18–1.85	18.0	0.83	0.68–1.02	0.78	0.64–0.95

*Among those who reported having ≥1 new partner in the past 12 months.
†Adjusted for study town, gender, age, employment, and involvement in transactional sex defined as having given or received money, goods, or services for sex in the past 4 weeks.

recent new partnerships but no transactional sex were also more likely to report STI symptoms than those reporting no new partnerships and no transactional sex. This finding indicates that STI/HIV prevention efforts focused on sex worker populations may fail to reach some individuals at risk of STI/HIV. Interventions implemented in PLACE venues, however, would reach a spectrum of high-risk populations.

Our results indicate that, among venue patrons, prior exposure to STI/HIV prevention was associated with increased condom use and lower STI symptom levels. The causal effect of prevention interventions on venue patron behavior could not be evaluated based on these cross-sectional data. Nonetheless, the findings pointed to the potential positive effects of prior STI/HIV prevention interventions. We believe expansion of STI/HIV prevention interventions, including into the venue environment, is warranted and feasible. Radio programs that play music and include messages about STI/HIV prevention could be broadcast at bars and clubs, whereas educational posters could be hung in nearly any venue.

Low levels of condom use among the sample point to the need for condom promotion. Venue-based condom promotion has obvious potential, given experiences in Thailand,[15] Nicaragua,[16] and the southern United States.[17] A condom promotion trial among sex workers in Madagascar indicated that an intervention of intensive clinic-based counseling plus peer education was associated with slightly lower STI incidence at 6 months versus peer education alone. However, 6 months after receiving presumptive treatment, the combined prevalence of Chlamydial infection, gonorrhea, or trichomoniasis in the intervention group was 32%, indicating that this condom promotion strategy alone was an inadequate STI prevention intervention.[18] Clinic-based efforts coupled with condom promotion implemented in venues where people meet partners—at a time when condoms will soon be needed—may improve efforts to reduce STIs among sex workers, their clients, and other high-risk populations.

This PLACE Study attempted to identify the universe of venues where people meet sexual partners in each town, hence yielding a comprehensive list of places where high-risk groups can be reached. Further, participation levels were excellent, as has been observed in previous studies conducted in Madagascar by members of our team,[3,19] suggesting nonresponse bias was minimized.

However, a number of study limitations should be noted. Venue information may be incomplete if community informants failed to name important venues or venue representatives were not fully knowledgeable about their venues and provided inaccurate information. In addition, the sexual behavior findings measured among venue patrons may not be fully representative of the entire population socializing at venues, because of a data entry error that resulted in the inability to separate the 20 randomly chosen venues from the 5 purposefully chosen venues. Finally, social desirability and recall biases may have influenced self-reported sexual behaviors,[20,21] whereas self-reported STI served only as a crude indicator of the true burden of infection among venue patrons.

Although high-risk behaviors and symptoms suggestive of STIs were common among the venue population, venue managers were willing to host interventions. The study findings were discussed in workshops involving stakeholders and policy makers with the goal of outlining effective local strategies for STI/HIV prevention. Population Services International, an organization that has worked to increase condom access in Madagascar, has implemented condom promotion in some PLACE venues. STI/HIV interventions in venues identified during the PLACE study, locations where high-risk populations socialize, should be expanded to reach Malagasy men and women who are clearly in need of prevention interventions.

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