Patterns of Exchange Sex and HIV Infection in High-Risk Heterosexual Men and Women

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ABSTRACT *Heterosexual partnerships involving the trade of money or goods for sex are a well-described HIV risk factor in Africa and Southeast Asia, but less research has been conducted on exchange partnerships and their impact on HIV infection in the United States. In our study, men and women were recruited from high-risk risk neighborhoods in New York City through respondent-driven sampling in 2006–2007. We examined the factors associated with having an exchange partner in the past year, the relationship between exchange partnerships and HIV infection, and the risk characteristics of those with exchange partners by the directionality of payment. Overall, 28% of men and 41% of women had a past-year exchange partner. For men, factors independently associated with exchange partnerships were older age, more total sexual partners, male partners, and frequent non-injection drug use. For women, factors were homelessness, more total sexual partners, more unprotected sex partners, and frequent non-injection drug use. Exchange partnerships were associated with HIV infection for both men and women, although the relationships were substantially confounded by other behavioral risks. Those who both bought and sold sex exhibited the highest levels of risk with their exchange and non-exchange partners. Exchange partnerships may be an HIV risk both directly and indirectly, given the overlap of this phenomenon with other risk factors that occur with both exchange and non-exchange partners.*

KEYWORDS *HIV, Heterosexual, Behavioral risk, Exchange sex, Prostitution*

INTRODUCTION

The commercial trade of sex between men and women is a well-documented risk factor for HIV transmission in Africa and Southeast Asia,[1–3] where sex workers commonly report inconsistent condom use with multiple partners.[4] More broadly, commercial sex work is a subset of exchange or transactional sex, defined as the trading of sex for material goods like money, drugs, or shelter.[5] This includes informal bartering by men and women whose primary income is not derived from this activity. Few studies have investigated this broader phenomenon, particularly in the United States where research has largely focused on male-to-male[6,7] or male-to-transgender exchange.[8]

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Prevalence estimates of heterosexual exchange sex in the United States vary with differing measures and populations under investigation. Among adolescents and young adults, lifetime exchange sex appears to be relatively uncommon: 4% in a mixed-gender study of adolescents nationally[9] and 9% among impoverished young women in northern California.[10] Neither study, however, defined the gender of exchange partners, and both found associations between exchange sex and bisexual identity, suggesting that some were same-sex. Among adults, a recent study of adult African-American and white women found that 13% engaged in any exchange sex and 33% had maintained a sexual relationship for economic reasons.[11]

Of the studies on the association between exchange sex and HIV infection in the United States, most have investigated drug users only. In 1994, Edlin et al.[12] found nearly a 14-fold likelihood of sex exchange among women who had smoked crack, and Astemborski et al.[13] observed a high prevalence of exchange sex among female injection drug users (IDUs). Both studies revealed a strong association between sex exchange and HIV infection. Of studies on exchange sex among men, many are also limited to current drug users[14] or those in treatment.[15] One exception, a recent clinic-based study of young men, found that 9% had recently exchanged sex, which was associated with self-reported STD/HIV infection;[16] the association with HIV alone was not reported and drug use overall was not described. Data are therefore needed to estimate the prevalence of exchange sex and its association with HIV infection among a broader population of high-risk heterosexuals that includes men and non-drug users.

Payment direction in exchange partnerships (who pays whom) also requires further study. A mixed-population study of drug users, men who have sex with men (MSM), and their sex partners in rural North Carolina found that 27% had sold and 28% had purchased sex from a recent partner,[17] but again, it was unclear how much of this was heterosexual exchange. Heterosexuals who only sell sex may have less leverage to consistently use condoms and reduce their sexual risk in other ways,[18,19] but there is little information on persons who both buy and sell sex.

A growing number of HIV infections in the United States are attributable to heterosexual contact,[20,21] and exchange sex has been shown to drive transmission in certain heterosexual subgroups. In this analysis, we investigated exchange sex among a broadly defined group of heterosexually active men and women from New York City (NYC) who were at high risk for HIV infection. Our objectives were to estimate the prevalence of exchange sex that was specifically heterosexual; explore the relationship between exchange sex and other behavioral risks; analyze the association of exchange sex and HIV infection, controlling for other risks; and examine the variations in exchange sex risks by payment direction.

METHODS

Sampling and Eligibility

This analysis was based on data collected in the National HIV Behavioral Surveillance (NHBS) study of high-risk heterosexuals in NYC in 2006–2007. NHBS is a cross-sectional study with the objective of characterizing HIV prevalence and risk among MSM, IDUs, and high-risk heterosexuals.[22] The NHBS methods for defining high-risk heterosexuals have been explained in detail elsewhere.[23] Briefly, we used NYC HIV surveillance data and Census data on household poverty to identify NYC zip codes where residents and members of their social networks were

at highest risk for heterosexual HIV infection. Zip codes were ranked by combined standardized rates of heterosexual HIV and poverty. The top 30 were considered "high-risk areas" (HRAs); they clustered in three NYC neighborhoods (Central Brooklyn, Harlem, and the South Bronx) whose residents persistently suffer high morbidity and mortality from many infectious and chronic diseases.[24]

Residing in or having a social connection to an HRA was a main eligibility criterion. Participants were considered to have a social connection if they were recruited into the study by a previous participant who resided in an HRA. We used respondent-driven sampling (RDS) for this peer recruitment.[25] Study ethnographers selected initial recruits ($n=8$), called seeds, through community outreach. Once seeds completed the study, we asked them to recruit up to three peers, then asked the next wave of participants to recruit, and so on until we met our target sample size. Participants who lived outside an HRA were not allowed to recruit others in order to maintain the connection to HRAs.

Other eligibility criteria were heterosexual vaginal or anal sex in the past year, age between 18 and 50 years, NYC residence, and English or Spanish comprehension. Eligible participants were paid $20 for completing the questionnaire, $10 for taking the HIV test, and $10 for each eligible participant (up to three) whom they recruited. All study procedures were approved by the Institutional Review Boards of the participating organizations.

Measures

In a structured survey administered in private by a trained interviewer, participants were asked to enumerate their past-year and last sex partners, and then categorize them as main, casual, or exchange partners. Exchange partners were defined as "a partner you have sex with in exchange for things like money or drugs." Participants were also asked how many of these partners they bought sex from and how many they sold sex to. In this analysis, we examined sociodemographics (race/ethnicity, age, poverty, homelessness, and arrest in the past year), past-year HIV risk factors (five or more sex partners, unprotected vaginal or anal sex with three or more partners, male-to-male partnerships, and any sexually transmitted disease diagnoses), and past-year drug and alcohol use (drug injection, non-injection crack use, and at least weekly non-injection drug use or binge alcohol use). Homelessness was defined as living on the street, in a shelter, or a single-room occupancy hotel in the past year.

Participants were asked their HIV status and were tested for HIV infection. Blood collected through venipuncture was tested on HIV1/2 enzyme-linked immunosorbent assay and HIV1 Western blot platforms (Bio-Rad Laboratories, Hercules, CA).

Statistical Analysis

We conducted a weighted analysis using the RDS Analysis Tool (RDSAT) 5.6 (Cornell University, Ithaca, NY). RDSAT generates weights that control for biases common in peer-referral sampling: Participants with large networks and those who recruit others like themselves tend to be overrepresented in the sample.[25] Weighted data were analyzed in SAS 9.2 (SAS Institutes, Cary, NC).

Three analytic approaches were used. First, we used Pearson chi-square tests to investigate the sociodemographics and risk factors associated with having a past-year exchange partner. These analyses were stratified by gender. Two multiple logistic regression models (one for each gender) were constructed to

determine variables independently associated with exchange partnerships. We entered any variable significantly associated with exchange partnerships in bivariate analysis at $p \leq 0.10$ into the multivariate model and proceeded with a backwards elimination of variables. The adjusted odds ratios (AOR) and 95% confidence intervals (CIs) for the remaining variables significant at $p \leq 0.05$ are shown.

Second, we investigated whether past-year exchange partnerships were independently associated with HIV infection through multiple logistic regression with controls for 6 key potential confounders (age, number of sexual partners, MSM or IDU history, crack use, or STD diagnoses in the past year). In all regression analyses, we weighted the models by the RDS weight for the dependent variable, as others have.[26,27] Since RDS regression modeling techniques are still developing, we conducted a sensitivity analysis of regression outcomes by comparing weighted and unweighted models.

Finally, we compared with Pearson chi-square tests the risk characteristics of participants with exchange partners by the payment directionality of all past-year partners (only bought sex, only sold sex, or both). Here we did not stratify by gender because the effects of payment direction largely followed those of gender. For continuous variable comparisons (e.g., number of sex partners), we used Wilcoxon rank sum tests for skewed distributions.

RESULTS

Of the 850 study participants, there were similar numbers of men ($n=412$) and women ($n=438$) in the sample. As Table 1 shows, respondents were largely black or Hispanic and most were between the ages of 40 and 50. Most earned less than $10,000 and were homeless, and recent arrest was common among both men (40%) and women (26%). In the past year, 29% of men and women reported 5 or more sex partners, 43% of men and 47% of women had unprotected vaginal/anal sex with 3 or more sex partners, and 22% of men and 32% of women were diagnosed with an STD. Nine percent of men reported any past-year male sex partners. For substance use in the past year, 17% of men and 15% of women injected illicit drugs, 39% of men and women used crack cocaine, 51% of men and 59% of women used any non-injection drugs at least weekly, and 37% of men and 31% of women binged on alcohol at least weekly. Overall, 827 of the 850 participants were tested for HIV in the study. HIV prevalence was 7.3% for men and 9.1% for women overall, and was 6.1% for men and 7.1% for women with no IDU or MSM history. Nearly all (95%) of participants who tested positive were unaware of their HIV status.

Among men, 28% had an exchange partner in the past year (Table 2). In bivariate analysis, exchange partnerships were significantly associated with older age ($p=0.03$) and the following past-year risk factors: 5 or more sex partners ($p<0.01$), unprotected sex with at least 3 partners ($p<0.01$), male sex partners ($p<0.01$), drug injection ($p=0.01$), and non-injection crack use ($p=0.02$). In multiple logistic regression, age 40–50 (AOR=3.26; 95% CI=1.56–6.82), 5 or more sex partners (AOR=4.49; 95% CI=2.74–7.34), male partners (AOR=2.65; 95% CI=1.24–5.69), and at least weekly non-injection drug use (AOR=1.68; 95% CI=1.03–2.73) were all independently associated with exchange partnerships.

Among women, 40% had an exchange partner in the past year (Table 3). In bivariate analysis, exchange partnerships were significantly associated with age

TABLE 1 Demographics, disease outcomes, and behavioral risks among New York City high-risk heterosexuals, by gender (2006–2007, $n=850$)

	Men, $n=412$ (%)[a]	Women, $n=438$ (%)[a]
Race/ethnicity		
Black	68.9	69.3
Hispanic	24.1	19.7
White	4.3	9.3
Other	2.7	1.7
Age		
18–29	19.9	35.0
30–39	19.0	19.4
40–50	61.1	45.7
Sociodemographics[b]		
Income<10,000	66.0	77.3
Homeless	51.9	56.4
Arrested	40.3	25.6
Sexual risk factors[b]		
≥5 sex partners	29.1	29.2
Unprotected sex with ≥3 partners	42.9	47.1
Male partners	9.3	–
STD diagnosis	22.2	32.0
Drug and alcohol use[b]		
Drug injection	17.4	15.3
NI crack use	38.5	39.3
NI drug use ≥1×/week	50.9	58.8
Binge alcohol use ≥1×/week	37.3	30.5
HIV status		
HIV infected	7.3	9.1
Excluding IDU and MSM	6.1	7.1

NI non-injection

[a]Respondent-driven sampling weighted proportions

[b]Time frame is in the past year

30–39 ($p=0.02$), homelessness ($p<0.01$), arrest ($p<0.01$), and the following past-year risk factors: 5 or more sex partners ($p<0.01$), unprotected sex with at least 3 partners ($p<0.01$), STD diagnoses ($p<0.01$), drug injection ($p<0.01$), non-injection crack use ($p<0.01$), and at least weekly non-injection drug use ($p<0.01$) or binge alcohol use ($p<0.01$). In multiple logistic regression, homelessness (AOR=3.99; 95% CI=2.05–7.79), 5 or more sex partners (AOR=13.21; 95% CI=5.83–29.94), unprotected sex with 3 or more partners (AOR=5.45; 95% CI=2.90–10.23), and at least weekly non-injection drug use (AOR=6.58; 95% CI=3.37–12.83) were all independently associated with exchange partnerships.

In bivariate analysis (data not shown), exchange partnerships were significantly associated with HIV infection as the outcome for both men (OR=3.37; 95% CI=1.59–7.12) and women (OR=2.27; 95% CI=1.21–4.64). After controlling for potential confounders (age, partner number, MSM and IDU history, crack use, and STD diagnoses), however, the adjusted coefficients declined by >20% for men (AOR=2.69; 95% CI=1.02–7.16) and for women (AOR=1.40; 95% CI=0.52–3.75). The relationship lost significance among women. In the sensitivity tests of the effects of RDS weighting in all regression models, the

TABLE 2 Factors associated with having a past-year exchange partner among New York City high-risk heterosexual men (2006–2007, $n=41$)

	Exchange partner[a] (%)[b]	Crude OR	95% CI	p	Adjusted OR	95% CI
Overall	27.5					
Race/ethnicity				0.29		
Black	29.7	1.66	0.65–4.24			
Hispanic	22.7	1.16	0.41–3.22			
White/Other	20.3	1.00				
Age				0.03		
18–29	15.2	1.00			1.00	
30–39	28.7	2.25	1.02–4.98		2.12	0.91–4.96
40–50	30.7	2.48	1.26–4.89		3.26	1.56–6.82
Sociodemographics[a]						
Income <10,000	30.5	1.56	0.97–2.50	0.07		
Homeless	30.6	1.40	0.91–2.16	0.13		
Arrested	29.1	1.14	0.74–1.76	0.55		
Sexual risk factors[a]						
≥5 sex partners	47.2	3.76	2.38–5.93	<0.01	4.49	2.74–7.34
Unprotected sex with ≥3 partners	38.3	2.56	1.65–3.97	<0.01		
Male partners	55.2	3.70	1.82–7.53	<0.01	2.65	1.24–5.69
STD diagnosis	33.3	1.43	0.87–2.36	0.15		
Drug and alcohol use[a]						
Drug injection	41.1	2.07	1.18–3.64	0.01		
NI crack use	33.7	1.67	1.09–2.58	0.02		
NI drug use≥1×/week	31.2	1.48	0.96–2.28	0.08	1.68	1.03–2.73
Binge alcohol use≥1×/week	30.0	1.22	0.79–1.89	0.37		

NI non-injection

[a]Time frame is in the past year

[b]Respondent-driven sampling weighted proportions

coefficients and significance levels for the main associations did not differ substantially (>5%) from the primary models.

Among men and women who had past-year exchange partners ($n=310$), 26% only bought sex, 62% only sold sex, and 12% both bought and sold sex (Table 4). Men were significantly more likely than women ($p<0.01$) to report only buying sex or both buying/selling sex. Exchangers had a median of 8 total sex partners and 4 exchange partners in the past year, and those who both bought/sold sex had significantly more total partners ($p<0.01$). Overall, 72% had unprotected vaginal/anal sex with exchange partners, 82% had unprotected sex with non-exchange partners, and 57% had unprotected sex with both exchange and non-exchange partners. For all 3 variables, exchangers who only sold sex or both bought/sold sex had significantly higher levels of unprotected sex. Almost one third (32%) of exchangers had an exchange partner at their last sexual encounter. Most of those who did reported unprotected sex with that exchange partner, with higher likelihood of unprotected sex among those who only bought or both bought/sold sex ($p<0.01$). Those who only sold sex were more likely to have an exchange partner 5 or more years older than the participant ($p=0.03$). Most of those with an

TABLE 3 Factors associated with having a past-year exchange partner among New York City high-risk heterosexual women (2006–2007, $n=438$)

	Exchange partner[a] (%)[b]	Crude OR	95% CI	p	Adjusted OR	95% CI
Overall	40.8					
Race/ethnicity				0.76		
Black	41.7	1.02	0.54–1.90			
Hispanic	37.1	0.84	0.40–1.76			
White/Other	41.3	1.00				
Age				0.02		
18–29	32.6	1.00				
30–39	51.6	2.21	1.27–3.84			
40–50	42.1	1.50	0.96–2.35			
Sociodemographics[a]						
Income <10,000	44.3	1.50	0.93–2.41	0.10		
Homeless	53.6	3.80	2.49–5.81	<0.01	3.99	2.05–7.79
Arrested	61.3	3.11	1.99–4.86	<0.01		
Sexual risk factors[a]						
≥5 sex partners	89.9	32.96	17.26–62.92	<0.01	13.21	5.83–29.94
Unprotected sex with ≥3 partners	68.7	10.86	6.89–17.11	<0.01	5.45	2.90–10.23
STD diagnosis	60.0	3.20	2.10–4.86	<0.01		
Drug and alcohol use[a]						
Drug injection	57.1	2.13	1.20–3.78	<0.01		
NI crack use	65.6	6.10	4.00–9.31	<0.01		
NI drug use≥1×/week	60.4	10.69	6.41–17.82	<0.01	6.58	3.37–12.83
Binge alcohol use≥1×/week	59.3	3.00	1.97–4.58	<0.01		

NI non-injection
[a]Time frame is in the past year
[b]Respondent-driven sampling weighted proportions

exchange partner at last sex reported concurrent substance abuse, with no variations by payment direction. Finally, HIV prevalence (data not shown) was lower among those who only bought sex (6.6%) compared to those who only sold sex (12.0%) or bought/sold sex (13.1%), although the difference was not statistically significant ($p=0.61$).

DISCUSSION

Exchange sex is a known risk factor for HIV infection in the developing world and among female drug users in the United States, but few studies have explored its impact on heterosexual men and women more broadly. In our study of high-risk heterosexuals from New York City, we found a high prevalence of exchange sex, which was linked with several sexual and substance use risk factors. Exchange sex was associated with HIV infection in both men and women, but the relationship was confounded by other behavioral risks like male-to-male sex and injection drug use. Most of those with exchange partners engaged in unprotected sex with both exchange and non-exchange partners, with important variations by payment direction.

Our estimates of exchange sex prevalence were higher than some previous studies of high-risk heterosexuals in the United States, which found around 9% of

TABLE 4   Risk characteristics of New York City high-risk heterosexuals with past year exchange partnerships, by payment direction (2006–2007, *n*=310)

		Payment direction			
	Total	Only bought (*n*=99)	Only sold (*n*=170)	Both (*n*=41)	
	%[a]	%[a]	%[a]	%[a]	*p*
Gender					<0.01
Male	41.2	93.2	8.8	68.2	
Female	58.8	6.9	91.3	31.9	
Sexual partnerships[b]					
Total sex partners, mean (median)	22.0 (8)	18.0 (7)	23.5 (9)	25.3 (12)	<0.01
Exchange partners, mean (median)	16.9 (4)	13.7 (3)	18.5 (4)	17.4 (5)	0.08
Unprotected sex with exchange partners	72.1	60.4	77.5	75.4	0.01
Unprotected sex with non-exchange partners	81.8	72.7	85.3	89.1	0.02
Unprotected sex with both exchange and non-exchange partners	56.8	42.7	62.8	64.9	<0.01
Last sex partner[b]					
Exchange partner	32.4	41.7	28.0	30.6	0.23
Exchange partner ≥5 years older	10.8	6.2	14.5	2.1	0.03
Unprotected sex with exchange partner	19.9	28.4	14.0	29.9	<0.01
Drug/alcohol use during sex with exchange partner	23.3	24.6	21.8	28.8	0.68

[a]Respondent-driven sampling weighted proportions
[b]Time frame is in the past year

men[16] and women[10] exchanged sex, but similar to studies of non-injection drug users[12,14] and IDUs.[13] At least 2 factors may influence our high estimates. First, several prostitution strolls (public areas where sex workers solicit clients) were located in our targeted high-risk areas. Second, we defined exchange sex partners broadly, as the trading of sex for goods like money or drugs,[15] which may highlight the potentially blurry distinction between exchange and casual partnerships. One illustration of this is found by comparing the mean and median number of exchange partners among sex exchangers in the past year (17.4 versus 5): While there is small group (probably commercial sex workers) with a very high number of partners influencing the average, most exchangers have relatively few exchange partners, which may be evidence of non-commercial bartering. Participants in ethnographic interviews, conducted as part of our study's formative research phase, often said less formal "sex-for-presents" relationships (which fall under our study definition of exchange sex) between older men and younger women were common in their communities. Research in Africa has explored the complexities of exchanging goods in main and long-term casual partnerships.[5]

An important age differential emerged from our analysis. In men, exchange sex was most likely in men aged 40–50 years old, while in women it was most likely those aged 30–39. This is also reflected in our finding that those who only sold sex were

significantly more likely to be female and also have an exchange partner at last sex who was 5 or more years older. This reflects the traditional dynamic of older men paying younger women for sex, which presents an HIV risk to women since age gaps signify partnerships with older men who have accumulated more lifetime partners.[28]

Our findings on payment directionality by gender were consistent with studies in the United States, Africa, and elsewhere: most who only bought sex were men (93%) and most who only sold sex were women (91%).[29] Previous research has largely focused on these traditional gender dynamics in sex exchange,[16,30] and few studies have examined the overlap between buying and selling sex across gender. We found that exchangers who both bought and sold sex were a small group (12% of exchangers), but had the most sexual partners and the highest rates of unprotected sex. There were smaller gender differentials in this group (68% male versus 32% female). This again may reflect our expansive definition of exchange sex that includes informal trading outside the realm of commercial sex work. The dual directionality of payment in informal exchange partnerships has important implications. Sex ratio imbalances in urban African-American communities, due to disproportionately high rates of incarceration and mortality among young African-American men, may have led to the emergence of a market for male sexual services sold to female consumers.[31–33] This is an area that deserves further research attention.

Among both men and women, exchange sex was strongly associated with high rates of multiple partnerships and unprotected sex. Similarly, a study of US men found that those with exchange partners were more likely to have multiple partners and be generally unwilling to use condoms.[16] In formative ethnographic research, we found that sex workers initially said they always used condoms, but on further questioning admitted to condomless sex with long-term "steadies" who were willing to pay a premium.

This clustering of exchange sex with other behavioral risks indicates not only high levels of risk to persons with exchange partners but also community-level risks. This is illustrated in 2 findings. First, half of past-year exchangers (57%) had unprotected sex with both an exchange partner and a non-exchange partner, with significantly higher rates of this among exchangers who were paid for sex. Past research has examined how sexual activity between core risk groups (e.g., sex workers) and "bridging" groups (e.g., their non-exchange partners) has driven HIV and STD infections in the general heterosexual population in Africa and Asia.[34,35] Our study points to the same phenomenon domestically. Second, men with male partners in the past year were over twice as likely to have (heterosexual) exchange partners in the same time frame. Previous research on a mixed MSM/heterosexual population has found links between bisexual identity and sex exchange among men.[17] This dual heterosexual/same-sex and exchange/non-exchange overlap may be a central community-level transmission risk to otherwise low-risk members of these sexual networks.[36]

Men and women who used drugs or alcohol in our sample were more likely to have exchange partners, consistent with previous research studying heterosexual subgroups of substance users.[13–15] Drugs are often used as a direct currency for sex, or indirectly when money exchanged for sex is used to buy drugs.[37] Over half of men and women in our sample reported weekly non-injection drug use, and this was independently associated with exchange partnerships for both men and women. Nearly three quarters of participants who had an exchange partner at last sex reported drug or alcohol use during sex; concurrent substance use is generally linked to lower rates of condom use and increased risk of HIV infection.[38,39]

Finally, HIV prevalence was high in our study, even after removing participants with an MSM or IDU history, and nearly all of those testing positive were unaware of their status. In bivariate analyses, exchange partnerships were associated with HIV infection in both men and women, and HIV prevalence among those with exchange partners was 14.1% in men and 10.8% in women. These were similar to the prevalence levels observed among sex workers in Africa and Southeast Asia.[1,40] In multiple logistic regression, the adjusted coefficients were lower when other key HIV behavioral risks were controlled for. This suggests (especially for women since the association lost statistical significance) that sex exchange may not always be an independent risk for HIV infection among heterosexual populations with high partner numbers and frequent unprotected sex. It may be impossible to disentangle exchange sex from these other risk factors in this group. Future studies should continue to investigate the confounding effects of these related behavioral risks, but our study suggests that exchange partnerships may be an HIV risk both directly and indirectly, given the overlap of this phenomenon with related behaviors.

Limitations

Our study has several limitations. First, participants were asked to categorize their past year sex partners into 3 mutually exclusive groups (main, casual, and exchange), which may underestimate exchange partnerships. Second, the study design is cross-sectional and we cannot determine the time and cause of HIV infection. Third, all data except HIV infection were self-reported and are subject to the common issues with survey research, including recall error and social desirability biases. The latter may have contributed to the low prevalence of self-reported HIV infection among those who tested positive. Finally, RDS techniques for sampling and analysis are still developing, and these results are not necessarily representative of the larger target population of heterosexuals residentially or socially connected to high-risk areas in NYC.

CONCLUSIONS

Exchange sex, whether in the commercial sex market or informal trading partnerships, is an important but understudied topic for heterosexual behavioral research in the United States. Our findings have several public health implications. Screening for exchange partnerships, using an expansive definition that would identify informal exchange partners, is needed to target individuals for prevention counseling, condom use, and more frequent HIV and STD testing. Given the data on the clustering of exchange partnerships with frequent unprotected sex with multiple partners and drug use, intensive interventions that target high-risk heterosexuals and encourage multiple aspects of risk reduction are indicated. The overlap between exchange sex and several drug use measures suggests that screening and interventions should occur in drug treatment and related settings. While no "best-evidence" interventions have been designed to engage heterosexuals with exchange partnerships per se,[41–43] existing interventions for heterosexuals may possibly be used with this population. However, the continued development of empirical research and interventions specifically targeting men and women who trade sex for money or drugs may play an important role in preventing heterosexual HIV transmission.

ACKNOWLEDGMENTS

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