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Differences in Risk Behavior and Demographic Factors between Men who have Sex with Men with Acute and Non-Acute Human Immunodeficiency Virus Infection in a Community-Based Testing Program in Los Angeles

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Abstract

Introduction—High viremia combined with HIV-infection status unawareness and increased sexual risk behavior contributes to a disproportionate amount of new HIV infections.

Methods—From August 2011-July 2015, the Los Angeles LGBT Center conducted 66,546 HIV tests. We compared factors including the presence of concomitant sexually transmitted infections, number of recent sex partners and reported condomless anal intercourse between men who have sex with men (MSM) diagnosed with an acute HIV infection and a non-acute HIV infection using multivariable logistic regression.

Results—Of 1,082 unique MSM who tested HIV-infected for the first time, 165 (15%) had an acute infection and 917 had a non-acute infection. HIV rapid antibody testing was 84.8% sensitive for detecting HIV infection (95% CI=82.9%-87.1%). Median HIV viral load among acutely infected MSM was 842,000 copies/ml (interquartile range=98,200-4,897,318). MSM with acute infection had twice the number of sex partners in the prior 30-days (median=2), and prior 3-months (median=4) before diagnosis compared to those diagnosed with non-acute infection ($p<0.0001$). The odds of acute HIV infection were increased with the numbers of recent sex partners after controlling for age and race/ethnicity (aOR >5 partners in past 30-days=2.74; 95%CI=1.46-5.14; aOR >10 partners in past 3-months=2.41; 95%CI=1.36-4.25). Non-African American MSM had almost double the odds of being diagnosed with an acute HIV infection compared with African-American MSM (aOR=1.97; 95% CI=1.10-3.52).

Conclusion—MSM with acute HIV infection had nearly twice as many sex partners in the past 30-days and 3-months compared with MSM with newly diagnosed non-acute HIV infection. Those diagnosed with acute HIV infection had decreased odds of being African American MSM.

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Introduction

Acute human immunodeficiency virus (HIV) infection is known to cause high levels of viremia, which is associated with higher levels of infectivity.¹ Transmission of pathogens, especially sexually, depends not only on infectivity, but also on sexual behavior over time, known as the contact rate.² Immediately prior to and during acute HIV infection, individuals may be more likely to participate in sexual behaviors associated with higher risk of transmission.³⁻⁵ Additionally, individuals with acute HIV infection will probably remain unaware of their infection during this time because most acute infections are asymptomatic, of short duration^{6,7} and rarely detected with currently used testing algorithms.¹ Untreated but chronically infected individuals usually have lower viral loads than those very recently infected. Further, knowledge of one's serostatus may make one more cautious with sex partners and reduce sexual risk behavior.⁸⁻¹¹

Phylogenetic studies to reconstruct transmission events estimate that forward transmission in the first six months after acute infection may account for 25-50% of all new transmissions.¹² In mathematical models, episodic risk (e.g., changes in high and low risk behavior over time) can cause dramatic increases in HIV incidence when the duration of high risk matches the duration of acute HIV infection.¹³ However, Steward et al. demonstrated that participants reported a decrease in some associated sexual risk behaviors following the diagnosis of acute HIV infection, including a reduction in sex partners and an attempt to limit sex to partners with the same serostatus (i.e. serosorting), which could play a pivotal role in decreasing forward sexual transmission.¹⁴

Several studies have attempted to characterize the demographics and risk behavior differences between acutely and chronically infected populations.^{3-5,15} In North Carolina, the only state where all publicly funded HIV tests are screened for acute HIV infection through pooled HIV RNA testing, Kuruc et al. found that MSM made up a majority of those with acute HIV infection (n=236 acute HIV infections).⁵ However, their study did not investigate the specific risk behaviors that distinguished those with acutely diagnosed and new, non-acute diagnosed infections.

The "Early Test" program in San Diego was one of the few studies with an adequate sample size to thoroughly analyze specific risk behaviors associated with acute HIV infection (n=200 acute HIV infections).⁴ That study found the combination of condomless receptive anal intercourse and five or more recent male sex partners were the strongest predictors of acute and early HIV infection among MSM.⁴ In multivariate analysis the "Early Test" program in San Diego found that drug use was not associated with acute HIV infection. However methamphetamine use was associated with HIV infection in univariate analyses.^{4,16} In addition, other studies found that drug use is an important risk factor for MSM's HIV acquisition and transmission.^{17, 18} Another study found that among individuals who reported stopping methamphetamines, their sexual risks behaviors partly declined.¹⁹ Gaps in the literature include understanding the behaviors, especially sexual behaviors, before testing with acute HIV infection, as well as the demographics of those more likely to receive a diagnosis with acute HIV infection.

The goal of the present study was (1) to describe the frequency of acute infection at a community-based HIV testing center that serves predominately MSM, (2) describe the risk behaviors associated with acute HIV infection among MSM, and (3) compare the risk behaviors between newly diagnosed acutely and previously undiagnosed non-acutely HIV-infected MSM.

Methods

We analyzed routine HIV testing data from the Los Angeles LGBT Center (The Center) in Los Angeles, California. Our analysis included data from August 1, 2011 to July 31, 2015 during which period the same risk assessment form was used, and acute HIV testing was available at the Center. From August 1, 2011 to July 31, 2015, The Center conducted 66,546 HIV tests. The inclusion criteria for the study were as follows: 1) birth sex was male, and 2) reported sexual orientation of gay, bisexual, or reported sex with another man in the last year and 3) newly diagnosed HIV-infected. We included testing data for men who reported sex with men (MSM), men who reported sex with men and women (MSMW) and men who reported having sex with men and transgender women in our analysis. The outcome of our study was acute HIV infection diagnosis (defined as receiving a HIV-1 RNA test reported as detectable HIV-1 RNA but a concurrent negative HIV antibody result). We compared characteristics among those with acute versus non-acute, previously undiagnosed infections (defined as receiving a positive HIV antibody test at the Center). All antibody negative samples were tested for acute HIV infection. OraQuick ADVANCE® Rapid HIV-1/2 Antibody Test (OraSure Technologies, Inc., Bethlehem, Pennsylvania) was used until June 23, 2014 at which point the clinic switched to the INSTI test (bioLytical Laboratories Inc., Richmond, BC, Canada). OraQuick takes about 15 minutes to read the result whereas the INSTI test can be read in about 60 seconds, with similar sensitivity and specificity. The sensitivity of the INSTI test is 99.8%, better than the OraQuick test (97.7%). The specificity of the INSTI test is 99.5%, slightly lower than the OraQuick test (99.98%). HIV-infected patients received a quantitative HIV viral load test when diagnosed (Abbott Real Time HIV-1 test, Des Plaines, Illinois, for quantitative tests and Hologic, Aptima HIV-1 RNA test, San Diego, CA for qualitative tests). We excluded testing data from individuals who tested HIV-antibody negative, were not MSM or MSMW, and/or reported an established or known HIV infection.

All clients receiving HIV testing services at the Los Angeles LGBT Center were administered an 82-item risk assessment prior to the HIV test. The Center's counselors administered behavioral risk assessments in face-to-face interviews with clients. The risk assessment contained questions on demographics, condom use behavior, drug use, and previous history of STIs. Those variables were investigated as potential factors to distinguish MSM with acute HIV infection vs. MSM with a non-acute, previously undiagnosed HIV infection. Clients who did not report sexual activity in the past 3-months were removed from the analysis of condomless sex. Clients who answered that they never/sometimes used a condom during anal sex in the past 3-months were considered as having condomless sex for the purpose of this study. In addition, we analyzed condomless sex at last sex act before diagnosis. We also analyzed concurrent sexually transmitted infections (STIs), e.g., urethral or rectal *Chlamydia trachomatis* or urethral, oral or rectal *Neisseria gonorrhea* infection, or

recent syphilis (defined as a four-fold change in titer) diagnosed at the HIV testing visit or urethral or anal discharge, comparing characteristics of MSM with acute HIV infection vs. MSM with a non-acute previously undiagnosed HIV infection.

Statistical analyses

We analyzed socio-demographic variables including age in years, educational attainment and race/ethnicity (dichotomized to non-African American vs. African American, based on previous analyses of this cohort), as well as behavioral data (e.g., number of prior lifetime HIV tests, presence of a main sex partner, condom use during sex, or illicit drug use in the past 12-months) by acute vs. non-acute previously undiagnosed HIV infection status using Chi-square tests for categorical variables, Wilcoxon rank sum tests for continuous variables (e.g. median partners), and Student t-tests for means (e.g. mean number of partners). We analyzed the association between self-reported number of sex partners in the last 30-days and 3-months, and condomless anal intercourse at last sex act before diagnosis between those with acute HIV infection and non-acute previously undiagnosed HIV infection using multivariable logistic regression. Select *a priori* confounders and variables were included in the final model based on the causal structure of confounding. We received approval for all analyses from the University of California, Los Angeles Institutional Review Board (IRB#15-001821). All analyses were conducted with SAS v9.4 (Cary, NC).

Results

From August 2011 to July 2015, The Center conducted 66,546 HIV screening tests. Among those, 1,082 unique men tested HIV-positive for the first time, 165 (15%) were an acute HIV infection and 917 were non-acute infections (85%). HIV rapid antibody testing was 84.8% sensitive for likely HIV infection among MSM seeking testing (using HIV antibody tests alone, 917 infections would have been detected out of 1082 possible infections, 95% CI= 82.9%, 87.1%). Among MSM with acute HIV infection, the median viral load was 842,000 copies/ ml (IQR=98,200-4,897,318). Three-quarters of viral loads were >100,000 copies/ml (122/164 [n=1 missing]; 74%) and about half were >1,000,000 copies/ml (81/165, 49%).

The mean age was 31.9 years (standard deviation [SD]=9.0) for the HIV-infected non-acute previously undiagnosed group, compared with 31.8 years (SD=8.9) for men with acute HIV infection. Acute HIV infection was diagnosed almost twice as frequently among non-African American MSM compared with African American MSM (OR=1.97, 95% CI=1.10, 3.52). In addition, there were significant differences between prior HIV testing and race. White men had a median of 10 previous HIV tests (IQR=5-19), whereas Hispanic men had a median of 6 previous HIV tests (IQR=3-11) and black men had a median of 5 previous HIV tests (IQR=3-10) ($p<.0001$). A greater proportion of individuals with acute infection reported testing for HIV within the last year compared to those with non-acute HIV infection or those who tested HIV-negative ($p<0.001$); however, the difference between men with a non-acute HIV infection and HIV negatives was not significant ($p=0.14$).

Almost 14% of those with a new HIV diagnosis also reported having sex with a woman in the past 3-months. Educational attainment was not different by diagnosis group. Overall,

both groups of men had some college (35%) or a college degree (34% of those with acute HIV infection and 32% of those with a non-acute infection) (Table 1).

Any recent reported drug use (e.g., methamphetamine, amyl nitrate, cocaine use in the past 12-months) was not different between groups (13% vs. 12.7% for methamphetamine use, 1.3% vs. 1.8% for amyl nitrate use, and 6.6% vs. 6.7% for cocaine use for acutely infected vs. non-acute new infections, respectively). Men with a non-acute previously undiagnosed HIV infection were more likely than those with an acute HIV infection to have a concomitant *Chlamydia trachomatis* infection (30% vs. 19%, $p=0.002$). Duration of infection was not associated with a recent syphilis infection (RPR 1:16, 17% vs. 11% $p=0.08$). However, men with acute HIV infection were more likely to have a concomitant *Neisseria gonorrhoeae* infection (37% vs. 25%, $p<0.001$), and were more likely to have anal or urethral discharge during their diagnosis visit (7% vs. 2%, $p=0.009$).

MSM with acute HIV infection had almost double the number of sex partners in the 30-days (mean=4 [SD=5.9], median=2 [range=0-50]), and 3-months (mean=9.5, [SD=16.6], median=4 [SD=1-150]) prior to the diagnostic visit compared to those with a non-acute previously undiagnosed HIV infection (30-day mean=2.4, [SD=5.2], median=1 [SD=0-99]; 3-month mean=5.2, [SD=10.0], median=2 [range=0-100], $p<0.0001$) (Figure). Further, condomless receptive anal sex in the past 3-months was significantly more frequent among men with acute HIV infection (64%) compared to men with non-acute previously undiagnosed infections (55%; OR= 2.09, 95% CI= 1.05, 4.18). The frequency of recent condomless insertive sex was not different between the groups (Table 1).

In multivariable analysis, MSM with acute HIV infection had increased odds of reporting condomless receptive anal sex in the past 3-months before testing (adjusted odds ratio [aOR]=1.95; 95% CI=0.99, 3.83) when compared with MSM with non-acute previously undiagnosed HIV infection after adjusting for age, race/ethnicity, number of prior HIV tests and number of sex partners in the past 3-months.

Men with an acute HIV infection reported a greater number of sex partners in the past 30-days and 3-months after controlling for age, race/ethnicity and education (aOR for >5 partners in past 30-days =2.74, 95% CI=1.46, 5.14; aOR for >10 partners in the past 3-months=2.41, 95% CI=1.36, 4.25) when compared with men with non-acute previously undiagnosed HIV infection. In addition, we found that 5 men with an acute HIV infection (3.4%), and 23 men with a non-acute previously undiagnosed infection (3.0%) had condomless vaginal sex in the past 3-months with a woman or transgender woman.

The frequency and type of STI diagnoses were different between groups. Men with an acute HIV infection had increased odds of being diagnosed with a concomitant gonococcal infection compared to men with a non-acute previously undiagnosed HIV infection after adjusting for age, race/ethnicity and number of sex partners in the past 30-days (aOR=1.72, 95% CI=1.11, 2.64). Men who reported urethral or anal discharge were almost 3-times the odds of being diagnosed with an acute HIV infection (aOR=2.73, 95% CI=1.04, 7.18). There was no association between acute HIV infection and a concomitant *Chlamydia trachomatis* infection diagnosis (aOR=0.58, 95% CI=0.22, 1.50), or concurrent recent

syphilis (aOR=0.82, 95% CI=0.42, 1.63) after adjusting for age, race/ethnicity, and number of sex partners in the past 30-days (Table 2).

Discussion

Among MSM testing for HIV infection at a large community-based testing program in Los Angeles, we found those with acute HIV infection had nearly twice as many sex partners in the past 30-days and 3-months compared with those newly diagnosed with chronic HIV infection. Further, those men with acute HIV infection were more likely to have condomless receptive anal intercourse in the 3-months prior to their diagnosis. Having a concomitant *Neisseria gonorrhoeae* infection and reporting anal and/or urethral discharge were associated with increased odds of being diagnosed with an acute HIV infection. Being African American was associated with decreased levels of recent HIV testing (and number of recent tests), and consequently African American MSM had decreased odds of being diagnosed with an acute HIV infection, though HIV incidence is higher among black MSM in Los Angeles. Substance use was not different between those with acute HIV infection and non-acute previously undiagnosed group.

In addition, we found a large range in viral load among those with acute HIV infection, though the majority had a viral load greater than 100,000 copies/ml, and about half had viral load of greater than 1,000,000 copies/ml. Previous studies have demonstrated that mean levels of HIV viral load increases the rates of sexual and perinatal transmission.^{1,8} However, there are few reports that include such a large number of cases among acutely infected men.²⁰⁻²² A recent study from East Africa and Thailand found that the viral-load set point occurred at a median 31 days after the first detection of plasma viremia, which correlated with peak viremia.⁷ In that cohort, few signs and symptoms of acute HIV were identified by study participants. Those viral load data are important for scientists modelling the contribution of acute HIV infection in HIV transmission dynamics and reinforce the importance and urgency of expanding screening for acute HIV infection to accelerate HIV control among high-risk populations in the United States.^{4-9,13,23-27} A recent study found that testing for acute HIV infection was cost-effective in preventing new HIV infections among at risk MSM in San Diego as well as other MSM populations with similar HIV prevalence but lower proportions of diagnosis of acute HIV infection.²⁸

Sexual transmission of HIV depends on multiple factors. HIV transmission through a population depends not only on infectiousness (e.g. viremia), but also on transmission risk behavior over time. The basic reproductive number (R_0) of HIV is proportional to the probability of transmission per contact with the infectious person (e.g. HIV viral load, condom use and type of sex act) * contact rate (e.g. number of sex acts) (and variability of contact rate in the population) * duration of infection.^{1,2} Our findings emphasize the importance of the contact rate in HIV transmission, as MSM with acute infection had double the number of partners as those with a non-acute previously undiagnosed infection. Furthermore, those with an acute infection reported more recent condomless receptive anal sex in the past three-months, which increases the probability of transmission. The number of sexual contacts and sexual activities which carry higher per-act probabilities for transmission act synergistically to increase the spread of HIV infection.

Sexual risk behavior is likely to be episodic; therefore, sexual behaviors reported over a year may not adequately reflect risk factors most pertinent for acute HIV transmission. Our study appears to confirm the findings from the “Early Test” San Diego study that found that an increased number of sex partners and condomless receptive anal intercourse were important predictors of acute HIV infection.⁴ Our findings show that sexual risk behavior is significantly different within the 30-days prior to an acute HIV diagnosis, as previously predicted.¹³ Future research on acute HIV infection should also examine shorter windows of sexual risk behavior because it is more specific to the events that resulted in HIV transmission. If such findings are replicated across a wider population, recent sexual behavior data may prove to be an important tool to identify those at greater risk for acute HIV infection. Patients will likely report more reliably the number of sex partners they have had in the previous 30-days or 3-months in comparison to one year, especially for patients with numerous partners.

Acute HIV infection was associated with more frequent repeat HIV testing in our cohort. Our data confirm what other studies have demonstrated that frequent testing will result in earlier detection and decreases in HIV incidence.⁴⁻⁸ More frequent testing habits were found among acutely infected patients because they would be more likely to present during the short acute infection period; otherwise, less frequent testing habits would be more likely to result in a non-acute HIV diagnosis.

Further, MSM with urethral and/or urethral discharge were more likely to get diagnosed with an acute infection in our cohort. Given the moderate sensitivity (about 85%) of commonly used rapid HIV tests, additional resources are needed to ensure that persons at high-risk for HIV infection with a concomitant STI receive an HIV RNA test or at least a 4th generation HIV test that detected antigens as well as antibodies. Our study also found that black and Latino MSM get tested less frequently for HIV infection when compared with white MSM. We know that there are important racial/ethnic disparities in HIV infection among MSM as well as the resultant awareness of and access to HIV testing, prevention and care services. There is an urgent need to understand barriers to testing, expand access and to increase campaigns that increase the frequency of testing among populations disproportionately impacted by HIV.

The targeted use of RNA testing HIV testing algorithms to diagnose and initiate treatment for those with acute infection can help prevent onward HIV transmission. Our findings support efforts to increase the frequency of HIV testing among high-risk groups and the integration of acute HIV screening within STI clinical services.²⁹

Our data found that HIV rapid antibody testing was only 85% sensitive for HIV infection among MSM seeking testing at a Los Angeles community-based testing program. Our study replicated the findings of Peters et al., which determined that rapid third generation HIV tests (i.e., antibody only) detected only 87% of new HIV diagnoses in MSM in New York, California and North Carolina.¹⁵ Additional research is needed to further reduce the window period of rapid HIV tests to identify those with an acute infection. Until then, established testing protocols and implementation of routine HIV RNA testing should be expanded.^{9,10,30,31} Our data also demonstrate that increased behavioral risk among MSM is

associated with acute HIV infection. If pooled HIV RNA testing is not performed on those with negative HIV rapid tests, over 10-15% of testers in high-risk groups may be missed and sent home unaware of their actual infection status at the height of their infectivity and sexually risky behaviors.

We argue that there is an urgent need to scale up targeted interventions (e.g., HIV RNA testing in high risk groups) to diagnose acute infections, even at a greater cost, in order to reach them early with behavioral interventions and treatment to curb onward HIV transmission. The costs of HIV RNA screening may be greater in the short term, but will ultimately be cost-effective through the prevention of disease progression and new HIV infections²⁸.

Previous prevention efforts have emphasized condom use negotiation skills and other psychological techniques for minimizing sexual risk behavior. Our study suggests that future interventions should incorporate efforts to reduce contact rates and convey how the frequency of contacts can also influence the transmission of HIV infection. In the new era of biomedical HIV prevention, reducing contact rates should be promoted alongside pre-exposure prophylaxis, post-exposure prophylaxis, and condom use in order to maximize sexual health outcomes of HIV-uninfected MSM.

Limitations of our analysis include the lack of data on the frequency of sexual intercourse prior to diagnosis. We have data on the number of sex partners, but not the number of sex acts. There may be recall bias with reporting behaviors up to one year before data collection. Because our analysis was cross-sectional, it measured reported behavior prior to receiving HIV test results, which limited recall bias based on HIV infection status. Our study relied on self-reported sexual behaviors which may be subject to social desirability bias, and as a result, participants may have underreported sexual risk behaviors. Further, we only analyzed data from a community-based testing center in Los Angeles, which has distinct characteristics, thereby limiting the generalizability to other areas.

Conclusion

Our study demonstrated that MSM with acute HIV infection and high levels of viremia had nearly twice as many sex partners in the past 30-days and 3-months. Importantly, men with acute HIV infection were more likely to have had urethral and/or anal discharge and gonorrheal infection as well. Although the diagnosis of acute HIV infection via HIV RNA testing comes at a higher cost, scaling up of routine detection of acute HIV infection is warranted, especially among African American MSM and MSM with STIs.

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Figure.

Men who have sex with men (MSM) diagnosed with acute HIV infection have higher number or recent partners in the past 30-days and 3-months compared to those with non-acute previously undiagnosed HIV infection at the Los Angeles LGBT Center August 2011-Jul

Table 1

Socio-demographics and behavioral risk factors among men who have sex with men diagnosed at the Los Angeles Lesbian, Gay, Bisexual Center stratified by diagnosis type, August 2011- July 2015

	Non-acute previously undiagnosed HIV infection (n=917, 85%)	Acute HIV infection (n=165, 15%)	p-value
Means and standard deviations			
Age in years	31.9 (9.0)	31.8 (8.9)	0.76
# of lifetime prior HIV tests	13.3 (10.2)	17.4 (83.3)	<0.0001
# of sex partners in past 30-days *	2.4 (5.2)	4.0 (5.9)	<0.0001
# of sex partners in past 3-months *	5.2 (10.0)	9.5 (16.6)	<0.0001
Frequencies and percentages			
Men who have sex with men and women	127 (14%)	19 (12%)	0.38
Race/ethnicity			0.02
Non-black (e.g. Caucasian, Asian, Hispanic), n=800	666 (73%)	134 (81%)	
African-American/Black, n=157	142 (27%)	15 (19%)	
Education			0.55
8 th grade or less	20 (2%)	2 (2%)	
Some high school	26 (3%)	3 (2%)	
High school diploma/GED	195 (23%)	24 (19%)	
Some college	294 (35%)	51 (41%)	
College degree	274 (32%)	42 (34%)	
Post graduate study/degree	44 (5%)	3 (5%)	
Behaviors			
# with main partner	276 (32%)	28 (22%)	0.04
Any methamphetamine use in the past year	119 (13.0%)	21 (12.7%)	0.95
Any amyl nitrates used in the past year	12 (1.3%)	3 (1.8%)	0.59
Any cocaine used in the past year	60 (6.6%)	11 (6.7%)	0.93
Sexually transmitted infection diagnosed same visit			
<i>Chlamydia trachomatis</i> (any site), n=934	236 (30%)	29 (19%)	0.002
<i>Neisseria gonorrhoeae</i> (any site), n=934	191 (25%)	58 (37%)	<0.0001
Anal and/or urethral discharge, n=901	17 (2.1%)	7 (6.5%)	0.009
Recent Syphilis (RPR 1:16 any site), n=684	98 (17%)	12 (11%)	0.08
Recent sex behaviors			
% who had condomless receptive anal sex in past 3-months **	466 (55%)	80 (64%)	0.02
% who had condomless insertive anal sex in past 3-months **	424 (50%)	65(52%)	0.38

* n=125, 40 missing data, don't know, or did not have a recent partner

** n=978, missing data for 104 men

Table 2

Unadjusted and adjusted odds ratios of various factors and acute versus non-acute HIV infection from the Los Angeles Lesbian, Bisexual, Gay and Transgender Center, 2011-2015

	OR of having an acute vs. non-acute HIV infection (95% CI)	Adjusted OR of having an acute vs. non-acute HIV infection (95% CI)	p-value
Receptive condomless sex in past 3-months	2.09 (1.05, 4.18)	1.95 (0.99, 3.83) *	0.05
Insertive condomless sex in past 3-months	1.21 (0.62, 2.34)	1.38 (0.70, 2.73) *	0.42
> 10 sex partners in past 3-months	1.78 (1.05, 2.94)	2.41 (1.36, 4.25) **	<0.001
> 5 sex partners in past 30-days	2.29 (0.87, 6.02)	2.74 (1.46, 5.14) **	<0.001
Diagnosed with <i>Neisseria gonorrhea</i> infection (any site)	1.80 (1.25, 2.58)	1.72 (1.11, 2.64) **	0.03
Diagnosed with syphilis (RPR 1:16)	0.80 (0.42, 1.53)	0.82 (0.42, 1.63) ***	0.58
Diagnosed with <i>Chlamydia Trachomatis</i> (any site)	0.52 (0.34, 0.80)	0.58 (0.22, 1.50) ***	0.68
Anal and/or urethral discharge	3.16 (1.28, 7.82)	2.73 (1.04, 7.18) ***	0.04

* adjusted for age, race/ethnicity, prior HIV tests, and # of partners in the past 3-months

** adjusted for age and race/ethnicity

*** adjusted for age, race/ethnicity, and # of partners in the past 30-days