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Why do men who have sex with men test for HIV infection? Results from a community-based testing program in Seattle

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Abstract

Background—The Centers for Disease Control and Prevention recommends at least annual HIV testing for men who have sex with men (MSM), but motivations for testing are not well understood.

Methods—We evaluated data from MSM testing for HIV at a community-based program in King County, Washington. Correlates of regular testing were examined using GEE regression models.

Results—Between February 2004 and June 2011, 7176 MSM attended 12,109 HIV testing visits. When asked reasons for testing, 49% reported it was time for their regular test, 27% reported unprotected sex, 24% were starting relationships, 21% reported sex with someone new, 21% sought STI/hepatitis screening, 12% reported sex with an HIV-infected partner, 2% suspected primary HIV infection, and 16% reported other reasons. In multivariable analysis, factors associated with regular testing included having a regular healthcare provider and the following in the previous year: having only male partners, having 10 male partners, inhaled nitrite use, not injecting drugs, and not having unprotected anal intercourse with a partner of unknown/discordant status ($p < 0.001$ for all). Men reporting regular testing reported shorter intertest intervals than men who did not (median of 233 vs. 322 days, respectively; $p < 0.001$).

Conclusions—Regular testing, sexual risk, and new partnerships were important drivers of HIV testing among MSM, and regular testing was associated with increased testing frequency. Promoting regular testing may reduce the time that HIV-infected MSM are unaware of their status, particularly among those who have sex with men and women or inject drugs.

Keywords

HIV screening; men who have sex with men; testing frequency; reasons for testing

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Introduction

An estimated 34% percent of HIV-infected men who have sex with men (MSM) in the U.S. are unaware of their infection and therefore unable to enter care and reduce their likelihood of transmitting HIV to others¹. In an effort to increase awareness of HIV infection, Public Health - Seattle & King County (PHSKC), like many other public health organizations, recommends annual testing for all sexually-active MSM and more frequent testing for MSM at greater risk of acquiring HIV infection²⁻⁸. Gay City Health Project (GCHP), a Seattle community-based organization whose HIV and sexually transmitted infection (STI) testing program is funded primarily by PHSKC, recommends that most MSM test every three months and that only very low risk MSM wait six months between tests.

MSM seek testing for a variety of reasons, including potential exposures, symptoms, learning that a partner or friend was diagnosed with HIV infection, encouragement from healthcare providers or peers, wanting to know one's status, health maintenance, and regular testing⁹⁻¹⁶. Regular testing has the potential to increase HIV testing by creating habits around testing and normalizing testing. In addition, it does not rely on self-recognition of risk, potential exposures, or symptoms of acute infection to prompt testing. Most previous studies of motivations for testing have relied on data regarding participants' most recent test, which may be sensitive to recall bias, or qualitative data regarding testing in general, which may not represent the reasons men seek specific tests. A recent study of MSM seeking testing at a community-based testing facility in Switzerland found that sexual risk and regular testing were the main motivators for the current test in the majority of men¹⁵. In that study, age, relationship status, sexual risk behaviors, history of an STI, and "depressed feelings" were associated with reasons for testing. Although several studies have examined characteristics associated with recent testing, the correlates of seeking regular HIV testing are not well understood.

Monitoring reasons for seeking HIV testing can be useful for identifying novel methods for increasing testing and for evaluating interventions to promote desired testing behaviors, such as regular testing or testing in response to symptoms of acute infection. We examined reasons for seeking HIV testing and correlates of seeking a regular test among MSM attending GCHP's HIV/STI testing program in order to understand their motivations for testing and identify potential targets for increasing regular, frequent testing.

Materials and Methods

Study population

GCHP offers peer-based HIV/STI counseling and testing for MSM in English and Spanish in Seattle's Capitol Hill neighborhood, the center of the city's lesbian, gay, bisexual, transgender, and queer community. Trained staff deliver client-centered risk-reduction counseling based in motivational interviewing techniques. HIV and syphilis testing has been available since the initiation of GCHP's testing program in February 2004. Screening for other STIs was available as follows: chlamydial infection and gonorrhea from November 2006 until December 2007 and from March 2011 on, hepatitis A and B from May 2004 until December 2006, and herpes simplex virus from July 2004 until March 2006. Since July

2007, GCHP has also offered testing in outreach settings throughout King County. GCHP recommends quarterly HIV/STI testing for all MSM unless the counselor, based on his or her own judgment, considers the client to be at very low risk of acquiring HIV.

Data source

We examined de-identified, electronic records from MSM testing for HIV infection at GCHP's testing program from February 2, 2004 until June 30, 2011. Reasons for seeking testing, sociodemographic characteristics, and risk behaviors were obtained as part of a self-administered written intake survey. All men who reported having sex with men in the prior year were included as MSM.

Reasons for seeking testing

The GCHP intake survey includes the following question: "Why did you decide to be tested today?" Clients could select more than one reason and had the option of writing in other reasons. When calculating the proportion of MSM reporting each reason, clients with multiple visits contributed only one randomly selected visit to avoid oversampling reasons associated with frequent testing.

Correlates of seeking a regular test

We considered regular testing to be the reason for the visit if the client selected "It is time for my regular test" as a reason for testing, regardless of the interval since his last reported test. We examined associations between seeking a regular test and both sociodemographic characteristics and HIV risk behaviors using generalized estimating equations (GEE) Poisson regression with exchangeable working correlation and robust standard errors to adjust for multiple visits per client. A multivariable model was selected using backwards stepwise procedures starting with all sociodemographic and risk behaviors associated with seeking a regular test in bivariable analyses ($p < 0.05$), adjusting for age and year of visit based on a priori decisions. Two characteristics associated with seeking a regular test in bivariable analyses (reporting a history of a bacterial STI and usually or always disclosing HIV status to male anal sex partners) were not included in the multivariable analysis because these data were only available starting in 2008. The association between testing HIV-positive and seeking a regular test was assessed in a separate model, adjusting for age and year of visit. The HIV intertest interval (ITI), the time between the last reported test and the current test, was used as an estimate of testing frequency and calculated as previously described^{17, 18}. ITIs were compared between men who tested HIV-positive versus those who tested negative, stratified by whether they were seeking a regular test, using a linear GEE model with exchangeable working correlation and robust standard errors to account for multiple visits per client. ITIs were log₁₀-transformed for this analysis as described previously^{17, 18}. The three visits with inconclusive test results (i.e. two with reactive enzyme immunoassays and indeterminate Western blots, one reactive rapid antibody test without confirmatory testing) were not included in analyses describing HIV test results.

Data were analyzed using Stata statistical software version 11.0 (College Station, Texas, U.S.). The study received ethical approval from the University of Washington Human Subjects Division.

Results

Between February 2, 2004, and June 30, 2011, there were 12,109 visits to GCHP by 7176 unique MSM seeking HIV testing who reported a prior negative test or did not know their status. Sociodemographic and HIV risk characteristics of these men are described in Table 1. Men were predominantly white (79%), had at least some post-secondary education (86%), had a regular healthcare provider (62%), and had sex with men only (90%).

Reasons for seeking testing

Figure 1 describes the reasons MSM reported for seeking HIV testing at GCHP. At randomly selected visits by 7176 unique MSM, 3481 (49%) reported it was time for their regular test. Of these men, 1455 (42%) reported seeking a regular test as their only reason for testing. When all visits were included in the analysis, reasons reported for seeking testing were similar except that a greater proportion of men (56%) reported that it was time for their regular test.

Reasons for testing and HIV test results

At 12,106 visits with conclusive test results, 190 (1.6%) MSM had positive HIV tests (Table 1). The likelihood of testing positive at the current visit differed by the reason MSM reported for seeking testing. Including all visits, the proportions of men who tested HIV-positive by reason were as follows: 10% (20/200) of men who suspected primary infection, 9.4% (3/32) of men testing because they shared needles or works, 3.5% (50/1427) of men testing because they had sex with an HIV-infected person, 2.4% (23/958) of men who had been asked to test by a sex partner, 2.3% (75/3229) of men testing because they had unprotected anal or vaginal sex, 1.4% (37/2591) of men testing at the start of a new relationship, 1.4% (2/145) of men seeking hepatitis screening, 1.2% (79/6800) of men reporting it was time for their regular test, 1.1% (28/2491) of men seeking STI screening, and 0.9% (27/3009) of men testing because they had sex with someone new.

Regular testing

Figure 2 depicts the distribution of HIV ITIs based on whether MSM reported that it was time for their regular test. Men seeking a regular test reported shorter intervals since their last HIV test than men who did not (median of 233 vs. 322 days, respectively; $p < 0.001$).

Table 2 presents sociodemographic characteristics and HIV risk behaviors associated with reporting regular testing in bivariable and multivariable analyses. In a multivariable analysis adjusting for age and year of visit, factors associated with reporting regular testing included having a regular healthcare provider and the following behaviors in the previous year: having only male sex partners, having 10 male sex partners, inhaled nitrite use, not injecting drugs, and not having UAI with a partner of unknown or discordant HIV status ($p = 0.001$ for all). Adjusting for the intertest interval in this analysis did not affect the estimates of association (data not shown).

Regular testing and diagnosis of HIV infection

On average, MSM who reported seeking a regular test were 44% [95% confidence interval (CI): 26-58%] less likely to be newly diagnosed with HIV infection than men who did not report regular testing, adjusting for age and visit year (1.2% vs. 2.1%, respectively; $p < 0.001$). Adjusting for the ITI as an estimate of the duration of risk did not affect this estimate (data not shown). Adjusting for risk behaviors, however, did attenuate this association; MSM who reported seeking a regular test were 36% (95% CI: 14-53%) less likely to be newly diagnosed than men who did not when adjusting for number of partners, UAI with a partner of unknown or discordant status, and methamphetamine, nitrite, and injection drug use.

Among those seeking a regular test, MSM who tested positive for HIV infection had similar ITIs to those testing negative (median of 253.5 and 232 days, respectively; $p = 0.16$). On the other hand, among those who did not report regular testing, MSM testing positive had longer ITIs than those testing negative (402 and 321 days, respectively; $p = 0.004$).

Discussion

Regular testing, sexual risk, and new partnerships were important drivers of HIV testing among MSM attending GCHP. From 2004 to 2011, about half of MSM attending GCHP reported seeking a regular test, and this proportion increased over time. Regular testing was associated with shorter ITIs, particularly among men newly diagnosed with HIV infection. However, even among those seeking a regular test, one-third had not tested in the prior year despite GCHP recommendations to test every three to six months.

The likelihood of being diagnosed with HIV infection in our study varied substantially by the reason men reported for seeking testing. MSM who reported testing in response to potential exposures, including unprotected sex, sex with an HIV-infected partner, and sharing needles or works, had a higher than average likelihood of testing positive (2.3%, 3.5%, and 9.4%, respectively). In addition, although only a small number of men reported testing because of concerns about primary HIV infection, one in 10 of these men tested positive. Motivating MSM to seek testing in response to the symptoms of primary infection may increase case-finding, as has been suggested previously^{19,20}.

However, persons at risk for acquiring HIV may not recognize when they are exposed to HIV^{1, 21-23}, may engage in risky behavior too frequently to test after each exposure, or may not recognize the symptoms of acute infection^{19,20}. Seeking testing on a regular schedule has the potential to result in timely identification of new HIV infections simply by ensuring that testing occurs within a set time of any exposure. Regular testing is independent of exposure to HIV and therefore must occur frequently to reduce the time newly-infected persons are unaware of their infection. Such frequent testing independent of exposures can result in repeated negative tests. Correspondingly, a relatively lower proportion of men seeking a regular test had positive tests (1.2%). However, these men contributed more than 40% of newly identified cases of HIV infection among MSM at GCHP during the study period, and newly diagnosed men who reported seeking a regular test had shorter ITIs than other newly diagnosed men, suggesting that they may have spent less time unaware of their

infection. As a more practicable alternative to exposure- and symptom-based testing, frequent regular testing has the potential to play an important role in increasing serostatus awareness.

Although PHSKC has promoted regular, quarterly HIV testing among high risk MSM since 2005⁷, the relationship between regular testing and HIV risk was complicated in our study. Men who inhaled nitrites or had 10 or more male sex partners in the last year were more likely to report seeking a regular test, whereas men who injected drugs or had UAI with a partner of unknown or discordant HIV status were less likely to report seeking a regular test. A recent study also found that non-concordant UAI in the last year was associated with a decreased likelihood of “routine” testing among MSM attending a small community-based HIV/STI testing facility in Switzerland¹⁵. Other studies among MSM have also reported associations between some risk behaviors and recent testing^{12, 17, 24}. Further research is necessary to understand the complex relationship between risk and HIV testing behavior and to evaluate the impact of quarterly testing recommendations for high risk MSM.

Men who reported sex with both men and women were less likely to be seeking a regular test at GCHP and have been found to have tested less recently than men who have sex with men only^{17, 25, 26}. Messages geared towards gay-identified MSM may not resonate with or reach other MSM²⁷. In addition, men who have sex with men and women may be less open about their sexuality^{27, 28} and therefore less comfortable accessing services that may identify them as having sex with men. Messaging and services targeted specifically for these men may be necessary to increase testing in this bridge population.

Our study has several limitations. First, much of our data rely on self-report and may therefore be sensitive to social desirability bias or recall bias. In addition, some clients' understandings of the reason “It is time for my regular test” are likely to have differed from our interpretation that this test was part of a regular testing schedule. Third, we made multiple comparisons and therefore may have observed associations by chance, although the strength of these associations suggests otherwise. Finally, we used records from GCHP for this analysis because of the richness of data regarding reasons for testing, but these MSM may not be representative of all MSM. Most GCHP clients were white, had at least some post-secondary education, and had health insurance; therefore, our results may not be applicable to settings with greater racial/ethnic diversity or lower socioeconomic status. In addition, screening for STIs other than HIV and syphilis were only available at GCHP for parts of the study period, and clinical evaluation and treatment are not available at GCHP. MSM with HIV/STI symptoms and other higher risk MSM may therefore be more likely to seek testing at the PHSKC STD Clinic or a healthcare provider.

Repeat testing at regular intervals is recommended in order to reduce the time that HIV-infected persons are unaware of their status and therefore unable to seek care for their infection or change their behavior to prevent ongoing transmission²⁻⁸. Our study suggests that MSM continue to test for a variety of reasons and that promoting both regular testing and testing in response to exposures and symptoms of acute HIV infection has the potential to increase awareness of HIV status. Further efforts are needed to identify effective interventions to increase HIV testing among MSM. Particular attention may need to be paid

to promoting regular testing among men who have sex with both men and women or inject drugs.

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Summary

A study of men who have sex with men at a Seattle community-based program found that regular testing, sexual risk, and new partnerships were important motivations for seeking HIV testing.

Figure 1. Reasons men who have sex with men reported for seeking HIV testing at Gay City Health Project, 2004 to 2011

N = 7176 unique MSM. Clients could mark more than one reason. Less than 1% of MSM reported the following reasons for seeking testing: “I shared a needle, cooker, cotton, or rinse water”, “Someone from the health department advised me to test”, “An outreach worker offered me a test”, and “I have to test for a court order”. Starting in 2008, “I suspect I may have primary HIV infection” was added to the list of options, and “I am getting tested for hepatitis” and “Someone from the health department advised me to test” were no longer included.

Figure 2. HIV intertest intervals among men who have sex with men seeking HIV testing at Gay City Health Project, by reporting seeking a regular test

N = 12106 HIV testing visits. Men seeking a regular test at GCHP reported shorter intervals since their last HIV test than men who did not (median of 233 vs. 322 days, respectively; $p < 0.001$). Among those seeking a regular test, MSM who tested positive for HIV infection had similar ITIs to those testing negative ($p = 0.16$). Among those who did not report regular testing, however, MSM testing positive had longer ITIs than those testing negative ($p = 0.004$).

Table 1
Characteristics of men who have sex with men seeking HIV testing at Gay City Health Project, 2004 to 2011

Characteristic	n or Median	% or IQR
By Unique MSM (N = 7176)		
Age at first visit (years)	30	24 to 39
Race		
White	4990	79%
Black	295	5%
Asian	550	9%
Native Hawaiian / Pacific Islander	80	1%
Native American / Native Alaskan	49	1%
Multiracial	370	6%
Hispanic / Latino	1027	16%
Education		
Less than high school diploma or equivalent	169	2%
High school diploma or equivalent	853	12%
Some college, Associate's degree, or technical school	2263	32%
College graduate or post-graduate degree	3862	54%
By Visit (N = 12,109)		
<i>Socioeconomic status</i>		
Homeless	132	1%
Has regular healthcare provider or doctor	7497	62%
Has health insurance	8200	68%
<i>HIV risk</i>		
Sex with men and women (versus men only), last year	1261	10%
10 male sex partners, last year	2928	25%
UAI with HIV-infected partner or partner of unknown status, last year	2510	21%
Usually or always tells male anal sex partners HIV status (versus never or sometimes) ^a	5320	84%
History of STI ^a	1756	26%
Inhaled nitrite use, last year	2314	19%
Methamphetamine use, last year	639	5%
Injection drug use, last year	109	1%
New HIV diagnosis	190	1.6%

Between February 2, 2004 and June 30, 2011, 7176 unique MSM attended 12,109 HIV testing visits at Gay City Health Project. IQR = interquartile range. STI = sexually transmitted infection (syphilis, gonorrhea, or chlamydial infection). UAI = unprotected anal intercourse.

^aHistory of STI and frequency of disclosing HIV status to sex partners were only collected from 2008 to 2011.

Table 2
Correlates of seeking a regular test among men who have sex with men attending Gay City Health Project: Sociodemographics and HIV risk behaviors

Correlates	Univariable		Multivariable	
	RR	95% CI	RR	95% CI
Age (y)	1.003 ^b	1.001 to 1.005		
Education				
Less than high school diploma or equivalent	ref ^c			
High school diploma or equivalent	0.95	0.79 to 1.13		
Some college, Associate's degree, or technical school	1.18	1.00 to 1.39		
College graduate or post-graduate degree	1.29	1.10 to 1.53		
Homeless	0.77 ^a	0.62 to 0.96		
Has regular healthcare provider or doctor	1.11 ^c	1.07 to 1.16	1.07 ^b	1.03 to 1.12
Has health insurance	1.05 ^a	1.01 to 1.09		
Sex with men & women (versus men only)	0.67 ^c	0.62 to 0.73	0.70 ^c	0.64 to 0.76
10 male sex partners, last year	1.19 ^c	1.15 to 1.24	1.20 ^c	1.16 to 1.25
UAI with HIV-infected partner or partner of unknown status, last year	0.83 ^c	0.79 to 0.87	0.81 ^c	0.77 to 0.85
Usually or always tells male anal sex partners HIV status (versus never or sometimes)	1.30 ^c	1.20 to 1.40		
History of STI	1.13 ^c	1.07 to 1.19		
Inhaled nitrite use, last year	1.11 ^c	1.06 to 1.16	1.08 ^c	1.04 to 1.13
Methamphetamine use, last year	0.88 ^b	0.81 to 0.97		
Injection drug use, last year	0.49 ^c	0.35 to 0.69	0.54 ^c	0.39 to 0.74
Year of visit	1.02 ^c	1.01 to 1.03	1.02 ^c	1.01 to 1.03

The final multivariable model was selected using backwards stepwise procedures starting with all characteristics associated with regular testing in univariable analysis ($p < 0.05$) (except "History of STI" and "Usually or always tells male anal sex partners HIV status", which were only available from 2008-2011), adjusting for age and year of visit. Race and Hispanic ethnicity were not associated with regular testing in univariable analysis. RR = relative risk, estimated using Poisson regression. CI = confidence interval. UAI = unprotected anal intercourse. STI = sexually transmitted infection (syphilis, gonorrhea, or chlamydial infection).

^a $p < 0.05$.

^b $p < 0.01$.

^c $p < 0.001$.