

## Perceptions of Lifetime Risk and Actual Risk for Acquiring HIV Among Young Men Who Have Sex with Men

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**Abstract** Among young men who have sex with men (MSM) surveyed in six US cities, we evaluated the magnitude and correlates of perceived lifetime risk for acquiring HIV, and missed opportunities to increase risk perception by providers of health-care and HIV-testing services. Overall, approximately one quarter of young MSM perceived themselves at moderate/high risk for acquiring HIV. Adjusting for demographic, prior testing, and behavioral characteristics, moderate/high perceived risk had the strongest association with unrecognized HIV infection. However, half of the 267 young MSM with unrecognized infection perceived themselves at low lifetime risk for acquiring HIV, and many young MSM with low-risk perception reported considerable risk behaviors. Providers of health-care and HIV-testing services missed opportunities to assess risks and recommend testing for young MSM. To increase HIV testing, prevention providers should

intensify efforts to assess, and to increase when needed, perceptions of lifetime risks for acquiring HIV among young MSM.

**Keywords** Risk perception · HIV · Young MSM

### Introduction

To reduce transmission of HIV from persons who are unaware they are infected, the Centers for Disease Control and Prevention (CDC) announced in 2003 a new set of prevention strategies to increase the uptake of HIV testing in the United States (CDC, 2003). Since the early 1970s, perceived susceptibility (termed "risk" in this paper) to disease has been shown to be an important personal motivator for diagnostic testing, and has served as a key component in many

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health-behavior models and interventions designed to protect or improve health (Kowalewski, Henson, & Longshore, 1997; Poppen & Reisen, 1997). More recently, perceived risk for HIV infection has been shown to be an important motivator for HIV testing (Irwin, Valdiserri, & Holmberg, 1996; Stein & Nyamathi, 2000; Spielberg et al., 2003). Thus, one potential strategy to increase the uptake of HIV testing is to increase perceived risk for infection. To use resources effectively, efforts to increase risk perception should target high-risk groups with low perceived risk for HIV infection.

Recent reports suggest that of all risk groups, young men who have sex with men (MSM), especially those who are black, experience the highest known HIV incidence and prevalence of unrecognized infection in the United States (CDC, 2001a, 2005; MacKellar et al., 2005). Although one report suggests that the majority of young MSM with unrecognized HIV infection perceive themselves at low risk for being infected (MacKellar et al., 2005), the prevalence and correlates of perceived lifetime HIV risk among infected and non-infected young MSM is unknown. Moreover, the relative strengths of perceived lifetime HIV risk versus self-reported behavior as predictors of actual risk (i.e., unrecognized HIV infection) is also unknown.

Nearly all previous studies that have assessed the relationship between perceived and “actual” risk have used self-reported sexual or drug-use behaviors as surrogates for HIV infection risk (Kowalewski et al., 1997; Poppen & Reisen, 1997). Self-reported sexual behavior, however, often fails to predict the incidence of sexually transmitted diseases (STD) (Peterman et al., 2000) or the considerable variation in prevalence of HIV infection among racial/ethnic groups of young MSM (Harawa et al., 2004). Knowing the relative strengths of perceived risk versus self-reported behaviors in predicting unrecognized HIV infection is important for guiding how providers of HIV prevention services might assess risks and recommend testing for young MSM.

To help evaluate the need for assessing and increasing HIV risk perception among young MSM, we analyzed data from the second phase of the Young Men’s Survey (YMS). The second phase of YMS was a cross-sectional survey conducted during 1998–2000 of males aged 23–29 years who attended MSM-identified venues (e.g., shopping areas, dance clubs, bars, and organizations) in six US cities. The main objective of YMS was to assess the prevalence of HIV infection and associated risk behaviors among young MSM. In this manuscript, we report for young MSM, (a) the magnitude and correlates of perceived lifetime risk for acquiring HIV, (b) the relative strength of associations

of perceived lifetime risk and self-reported risk behaviors with unrecognized HIV infection, and (c) missed opportunities to increase risk perception by providers of health-care and HIV-testing services.

## Method

### Participants and Procedures

YMS methods have been described previously (MacKellar, Valleroy, Karon, Lemp, & Janssen, 1996). Briefly, the second phase of YMS was conducted in Baltimore, Maryland; Dallas, Texas; Los Angeles, California; Miami, Florida; New York, New York; and Seattle, Washington. Formative research was conducted to construct monthly sampling frames of the days, times, and venues attended by young MSM. Each month,  $\geq 12$  venues and their associated day/time periods were selected randomly and scheduled for sampling. Sufficient sampling events were conducted to recruit a target of 500 men from each city. During sampling events, men were approached consecutively to assess their survey eligibility. Local male residents aged 23–29 years who had never previously participated were eligible for the survey. Participants were interviewed with a questionnaire, had blood drawn for testing, were given appointments to obtain test results, and were provided HIV/STD prevention counseling and referral for care when needed. Specimens were tested for HIV at local laboratories with FDA-approved assays. Analyses excluded records of duplicate participants who were identified using the Miragen antibody-profile assay (Unger & Strauss, 1995), and of participants who reported contradictory responses or who were impaired by alcohol or drugs.

### Measures

One standard questionnaire was used in all cities during the survey. The questionnaire included measures that assessed reasons for participation, demographics, use of health care, prior HIV testing, sexual behaviors with men, injecting drug use, prior STD infection, and perceived lifetime risk for becoming HIV infected. For previous testers, we asked the results of their most recent HIV test. Men who tested HIV-positive as part of YMS and who reported not ever previously testing positive were defined as having unrecognized HIV infection (infected-unaware). Unprotected anal intercourse (UAI) was defined as  $\geq 1$  occurrences of anal intercourse (insertive or receptive) without a condom. Perceived lifetime risk was measured on a 5-point scale with the following question: “Using this card, choose a

number that best describes how likely it is that you will become HIV positive in your lifetime.” Participants who responded (1) *Very unlikely* or (2) *Unlikely* were defined as perceiving themselves at low risk, and participants who responded (3) *Somewhat likely*, (4) *Likely*, or (5) *Very likely* were defined as perceiving themselves at moderate/high risk. Of participants who reported using a regular source of health care or testing for HIV in the past year, we also asked whether their provider assessed their risk behaviors and discussed whether they should test (health-care provider) or re-test (HIV-test provider) for HIV.

### Data Analyses

Analyses were restricted to men who reported ever having oral or anal sex with another man and who reported never testing positive for HIV. We analyzed perceived lifetime risk as both a continuous numeric and categorical variable. As a continuous variable, we used the *t*-test to evaluate differences in mean scores (standard deviation, SD) for the following variables: reason for participation, demographic characteristics (age group, race, education, use of health care), HIV testing and risk behaviors (ever prior test, receipt of a negative test result in the past year, lifetime male sex partners, UAI, and injecting-drug use), prior STD diagnosis, and being HIV-infected unaware. As a categorical variable, we used logistic regression to identify which of these variables were independently correlated with moderate/high perceived lifetime risk. In a second logistic regression model adjusting for the effects of other covariates, we evaluated the relative strength of associations of moderate/high perceived lifetime risk and self-reported behaviors (e.g., UAI) with unrecognized HIV infection. We included in each of these two models city, age group, race, and all variables that were moderately associated ( $P < 0.25$ ) in our univariate analyses. Full models were then reduced by the stepwise elimination of variables with  $P$ -values  $\geq 0.05$  with the exception of important confounders. We also calculated crude odds ratios (OR) and 95% confidence intervals (CI) for unrecognized infection among black and Hispanic MSM relative to white MSM, stratified by low and moderate/high perceived lifetime risk. Finally, to evaluate missed opportunities to increase HIV risk perception and testing, we conducted chi-square analyses to evaluate differences between men who perceived themselves having low and moderate/high lifetime risk who reported that their providers never assessed their risk behaviors or never discussed their need for testing (health-care provider) or re-testing (HIV-test provider).

## Results

### Recruitment

At 181 venues in the 6 cities, staff enrolled 3137 (57.6%) men of 5443 who were identified as eligible. Proportionally more men aged 23–26 years enrolled compared with men 27–29 years, 58.9% vs. 54.7%,  $\chi^2(1, N = 5386) = 9.13, P < 0.01$ . No statistically significant differences were observed in the proportion of men enrolled by race/ethnicity. Of the 3137 participants, the following were removed from analyses: 53 (1.7%) duplicates; 13 (0.4%) who gave contradictory responses or who were impaired by alcohol or drugs; 11 (0.4%) who reported never having sex; 121 (3.9%) who reported never having sex with men; 41 (1.3%) whose blood specimens were not tested for HIV; and 4 (0.1%) who either refused to answer ( $n = 3$ ) or who reported not knowing ( $n = 1$ ) their perceived lifetime risk for acquiring HIV. Of the remaining 2894 MSM, analyses were restricted to 2788 (96.3%) who reported that they had never tested HIV-positive (range by city: 432–517).

### Distribution of Scores on Perceived Lifetime Risk

Of the 2788 MSM, the mean score (SD) on perceived lifetime risk for acquiring HIV was 2.03 (0.92); range by city: 1.92–2.17. Mean scores on perceived lifetime risk were significantly ( $P < 0.05$ ) higher among young MSM who reported participating in YMS to obtain a free HIV test; were Hispanic (relative to white); who reported obtaining no higher than a high school education; not using a particular source of health care; not receiving a negative HIV test result in the last year; having  $\geq 20$  male sexual partners, unprotected anal sex with men, injected drugs, and a previous STD; and who were HIV-infected unaware (Table 1).

### Correlates of Moderate/High Perceived Lifetime Risk

Of the 2788 young MSM, 716 (25.7%) perceived themselves at moderate/high lifetime risk for acquiring HIV (range by city: 19.7–31.0%). In a multivariate logistic regression model, young MSM who perceived themselves at moderate/high lifetime risk were significantly more likely to be Asian and Hispanic (relative to white); to report having only a high school education,  $\geq 20$  lifetime male partners, UAI with men of unknown HIV status, injected drugs, and a previous STD; and to be HIV-infected unaware (Table 1). Young MSM who perceived themselves at moderate/high lifetime risk were significantly less likely to have

**Table 1** Magnitude and distribution of perceived lifetime risk for acquiring HIV, and correlates of perceived moderate/high lifetime risk and being HIV-infected unaware, men aged 23–29 years who have sex with men—six cities, United States, 1998–2000

| Characteristics                                       | Perceived lifetime risk for HIV |                        | Perceived moderate/high lifetime HIV risk |                           | HIV-infected unaware |                           |
|---|---------------------------------|------------------------|---|---------------------------|----------------------|---------------------------|
|   | N                               | Mean <sup>a</sup> (SD) | %   | AOR <sup>b</sup> (95% CI) | %                    | AOR <sup>b</sup> (95% CI) |
| Total   | 2788                            | 2.03 (0.92)            | 25.7                                      | —                         | 9.6                  | —                         |
| <i>Reason for participation</i>                       |                                 |                        |   |                           |                      |                           |
| Obtain free HIV test                                  | 893                             | 2.10 (0.96)            | 28.7                                      | —                         | 9.9                  | —                         |
| Other   | 1895                            | 2.00 (0.91)**          | 24.3                                      | —                         | 9.5                  | —                         |
| <i>Age group</i>                                      |                                 |                        |   |                           |                      |                           |
| 23–25   | 1373                            | 2.01 (0.91)            | 24.7                                      | —                         | 8.1                  | Reference                 |
| 26–29   | 1415                            | 2.05 (0.94)            | 26.6                                      | —                         | 11.0                 | 1.62 (1.22, 2.16)**       |
| <i>Race/ethnicity<sup>c</sup></i>                     |                                 |                        |   |                           |                      |                           |
| Asian   | 163                             | 2.10 (0.83)            | 27.0                                      | 1.75 (1.19, 2.59)**       | 1.8                  | 0.53 (0.16, 1.74)         |
| Black   | 517                             | 2.03 (1.03)            | 27.7                                      | 0.96 (0.72, 1.26)         | 27.9                 | 7.67 (5.33, 11.0)**       |
| Hispanic  | 669                             | 2.11 (0.98)**          | 30.2                                      | 1.40 (1.10, 1.78)**       | 8.4                  | 1.63 (1.08, 2.47)*        |
| Mixed race/other                                      | 53                              | 2.19 (1.09)            | 34.0                                      | 1.35 (0.71, 2.55)         | 13.2                 | 2.91 (1.20, 7.05)*        |
| White   | 1382                            | 1.98 (0.85)            | 22.4                                      | Reference                 | 4.1                  | Reference                 |
| <i>Education</i>                                      |                                 |                        |   |                           |                      |                           |
| High school   | 618                             | 2.25 (1.05)            | 38.0                                      | 1.82 (1.47, 2.25)**       | 18.6                 | 1.81 (1.35, 2.42)**       |
| At least some technical school or college             | 2168                            | 1.97 (0.88)**          | 22.2                                      | Reference                 | 7.0                  | Reference                 |
| <i>Use a particular source of health care</i>         |                                 |                        |   |                           |                      |                           |
| No  | 1032                            | 2.10 (0.96)            | 29.2                                      | —                         | 10.5                 | —                         |
| Yes   | 1756                            | 1.99 (0.90)**          | 23.6                                      | —                         | 9.1                  | —                         |
| <i>Ever prior HIV test</i>                            |                                 |                        |   |                           |                      |                           |
| No  | 321                             | 2.02 (0.99)            | 28.4                                      | —                         | 10.6                 | —                         |
| Yes   | 2467                            | 2.03 (0.92)            | 25.3                                      | —                         | 9.4                  | —                         |
| <i>Received HIV negative test result in past year</i> |                                 |                        |   |                           |                      |                           |
| No  | 1336                            | 2.08 (0.95)            | 28.4                                      | Reference                 | 12.1                 | Reference                 |
| Yes   | 1452                            | 1.99 (0.90)*           | 23.2                                      | 0.76 (0.63, 0.92)**       | 7.3                  | 0.62 (0.47, 0.83)**       |
| <i>≥20 lifetime male sex partners</i>                 |                                 |                        |   |                           |                      |                           |
| No  | 1366                            | 1.87 (0.88)            | 19.2                                      | Reference                 | 9.2                  | —                         |
| Yes   | 1422                            | 2.19 (0.94)**          | 31.9                                      | 1.60 (1.32, 1.95)**       | 9.9                  | —                         |
| <i>Ever UAI with men</i>                              |                                 |                        |   |                           |                      |                           |
| No  | 674                             | 1.82 (0.86)            | 18.0                                      | —                         | 8.2                  | —                         |
| Yes   | 2113                            | 2.10 (0.94)**          | 28.1                                      | —                         | 10.0                 | —                         |
| <i>UAI with men of unknown HIV status<sup>d</sup></i> |                                 |                        |   |                           |                      |                           |
| No  | 2154                            | 1.92 (0.87)            | 20.7                                      | Reference                 | 8.3                  | Reference                 |
| Yes   | 634                             | 2.40 (1.02)**          | 42.6                                      | 2.25 (1.84, 2.76)**       | 13.9                 | 1.49 (1.09, 2.03)*        |
| <i>Inject drugs<sup>d</sup></i>                       |                                 |                        |   |                           |                      |                           |
| No  | 2719                            | 2.02 (0.92)            | 25.2                                      | Reference                 | 9.5                  | —                         |
| Yes   | 69                              | 2.52 (1.11)**          | 43.5                                      | 1.73 (1.02, 2.93)*        | 14.5                 | —                         |
| <i>Previous STD (self-report)</i>                     |                                 |                        |   |                           |                      |                           |
| No  | 2084                            | 1.95 (0.89)            | 21.8                                      | Reference                 | 8.1                  | Reference                 |
| Yes   | 704                             | 2.26 (0.99)**          | 37.2                                      | 1.77 (1.44, 2.16)**       | 14.1                 | 1.30 (0.96, 1.76)         |
| <i>HIV-infected unaware</i>                           |                                 |                        |   |                           |                      |                           |
| No  | 2521                            | 1.97 (0.87)            | 23.1                                      | Reference                 | —                    | —                         |
| Yes   | 267                             | 2.61 (1.19)**          | 50.2                                      | 2.70 (2.01, 3.63)**       | —                    | —                         |
| <i>Perceived lifetime HIV risk</i>                    |                                 |                        |   |                           |                      |                           |
| Low   | 2072                            | —                      | —   | —                         | 6.4                  | Reference                 |
| Moderate/High   | 716                             | —                      | —   | —                         | 18.7                 | 2.75 (2.05, 3.68)**       |

Note. SD = standard deviation; AOR = adjusted odds ratio; CI = confidence interval; UAI = unprotected anal intercourse

<sup>a</sup>Independent-samples *t*-test was used to evaluate difference in mean scores. All *t*-test statistics and degrees of freedom are available from the primary author upon request

<sup>b</sup>Reported for variables that remained in the final reduced logistic regression model that also adjusted for city (data not shown)

<sup>c</sup>All *t*-test comparisons are with white race

<sup>d</sup>In the 6 months preceding the survey interview

\**P* < 0.05

\*\**P* < 0.01

received a negative HIV test result in the past year (Table 1).

#### Associations of Perceived Risk and Behaviors with Unrecognized HIV Infection

Of the 2788 young MSM, 267 (9.6%) were HIV-infected unaware. In a multivariate logistic regression model, young HIV-infected unaware MSM were significantly more likely to be older; black, Hispanic, or of mixed/other race (relative to white); to report having only a high-school education and UAI with male partners of unknown HIV status; and to perceive themselves at moderate/high lifetime risk for acquiring HIV. Of these variables, perceived moderate/high lifetime risk had the strongest association with being HIV-infected unaware (Table 1). Young HIV-infected unaware MSM were significantly less likely to have received a negative HIV test result in the past year (Table 1). Among young MSM who perceived themselves at moderate/high lifetime risk, proportionally more black ( $n = 143$ ) versus white men ( $n = 309$ ) were HIV-infected unaware, 46.2% vs. 10.4%, OR = 7.4, 95% CI = 4.5–12.1, and similar proportions of Hispanic ( $n = 202$ ) versus white men were HIV-infected unaware, 14.4% vs. 10.4%; OR = 1.5, 95% CI = 0.8–2.5.

#### Low Perceived Lifetime Risk for HIV, Risk Behaviors, and Unrecognized HIV Infection

Many of the 2072 (74.3%) young MSM who perceived themselves at low lifetime risk for acquiring HIV were at substantial risk for infection: 46.7% reported having  $\geq 20$  lifetime male sex partners; in the prior 6 months, 32.1% reported  $\geq 4$  male sex partners and 17.6% engaged in UAI with male partners of unknown HIV status; 21.3% had been diagnosed with an STD; and 6.4% were HIV-infected unaware. Among young MSM who perceived themselves at low lifetime risk, relative to white MSM ( $n = 1073$ ), proportionally more black, ( $n = 374$ ) 20.9% vs. 2.3%, OR = 11.0, 95% CI = 6.9–17.6, and Hispanic men, ( $n = 467$ ) 5.8% vs. 2.3%, OR = 2.6, 95% CI = 1.5–4.5, were HIV-infected unaware. Of the 267 MSM who were HIV-infected unaware, 133 (49.8%) perceived themselves at low risk for acquiring HIV in their lifetime.

#### Missed Opportunities to Increase Risk Perception and Recommend Testing

Among 1693 young MSM who reported using a particular source of health care, proportionally more men who

perceived themselves at low ( $n = 1300$ ) versus moderate/high lifetime risk ( $n = 393$ ) reported that their health-care provider never assessed their sexual behavior with men, 44.5% vs. 37.2%,  $\chi^2(1, N = 1693) = 6.59$ ,  $P < 0.05$ , or never discussed their need for HIV testing, 43.4% vs. 35.6%,  $\chi^2(1, N = 1693) = 7.48$ ,  $P < 0.01$ . Of 527 MSM who reported that their health-care provider never assessed their sexual behavior or discussed their need for HIV testing, 30 (5.7%) were HIV-infected unaware (by risk-perception group: 14 [3.3%] of 426 MSM with low lifetime risk perception, and 16 [15.8%] of 101 MSM with moderate/high lifetime risk perception, were HIV-infected unaware).

Among 1512 (54.2%) MSM who had tested in the past year, statistically similar high proportions of men who perceived themselves at low ( $n = 1158$ ) versus moderate/high lifetime risk ( $n = 354$ ) reported that their HIV test provider did not assess their risky sexual practices (45.9% vs. 51.7%) and did not discuss whether they should re-test for HIV (51.6% vs. 52.8%). Of the 676 MSM who had tested in the past year and who reported that their test provider did not assess their risks or discuss whether they should re-test for HIV, 66 (9.8%) were HIV-infected unaware (by risk-perception group: 31 [6.2%] of 504 MSM with low lifetime risk perception, and 35 [20.3%] of 172 MSM with moderate/high lifetime risk perception, were HIV-infected unaware).

#### Discussion

Corroborating previous reports that have evaluated perceived risk for HIV infection as an outcome variable (Kowalewski et al., 1997), we found that young MSM who perceived themselves at moderate/high risk for acquiring HIV in their lifetime were more likely to report sexual and drug-use behaviors that might have led to HIV exposure. Moreover, we found that young MSM who perceived themselves at moderate/high lifetime risk were significantly more likely to have already acquired HIV. Our findings suggest that nearly one in five young MSM who perceive themselves at moderate/high lifetime risk may be unaware that they acquired HIV, and among those who are black, nearly half may be unaware that they are infected. Adjusting for other covariates, we found that perceived lifetime risk for acquiring HIV had the strongest association with unrecognized HIV infection, and the magnitude of this association was nearly twice that of the only risk behavior (UAI with male partners of unknown status) that remained significantly associated with unrecognized infection in our logistic regression model. After

adjusting for other covariates, other reported risk behaviors (e.g.,  $\geq 20$  lifetime male partners, ever UAI, injecting-drug use) were not found to be significantly associated with unrecognized HIV infection among young MSM.

Since HIV acquisition risk is dependent, in part, on the prevalence of unrecognized and recognized HIV infection within sexual networks, HIV-status assessment and disclosure practices, accuracy of perceived infection status, and partner-specific sexual and drug-use behaviors, we were not surprised to find that relatively simple measures of behavior were less predictive of unrecognized infection than a more global perception of HIV susceptibility. Given the rather poor predictive strength of self-reported behaviors found here and elsewhere (Peterman et al., 2000; Harawa et al., 2004), our data suggest that perceived lifetime risk, measured as susceptibility to HIV infection, may be a more valid and reliable predictor of actual risk (i.e., unrecognized infection) than surrogate behavioral measures. Thus, to help increase testing and reduce the high prevalence of unrecognized HIV infection among young MSM, providers of HIV prevention services should consider incorporating clients' perception of HIV susceptibility within risk-assessment practices. For those men who report perceiving themselves at moderate/high risk for acquiring HIV, providers should underscore the urgency for HIV testing, and assess and resolve personal testing barriers.

Testing barriers for MSM who perceive themselves at moderate/high lifetime risk may be based on fears about testing positive (Irwin et al., 1996; Spielberg et al., 2003; Stokes & Peterson, 1998). These fears might be addressed, in part, by increasing awareness of the benefits of early diagnosis and advancements in HIV care, that access to treatment and social services is available to many without insurance, and that laws and organizations exist to help protect against discrimination for those with HIV. Fears about discrimination and social stigmatization might be particularly acute for black and Hispanic MSM (Stokes & Peterson, 1998). Encouragingly, many black and Hispanic MSM who perceived themselves at moderate/high lifetime risk participated in YMS to test for HIV, underscoring the importance of new initiatives to make testing more widely available in community settings to reach MSM at exceptionally high risk for unrecognized HIV infection (CDC, 2003). The use of rapid HIV tests in these settings may be a particularly effective strategy to increase testing and provision of test results to high-risk MSM (Spielberg et al., 2003).

Although our findings suggest that perceived lifetime risk was the strongest predictor for unrecognized

HIV infection, the findings in this report also suggest that many young MSM underestimate their lifetime risks for acquiring HIV. Among young black MSM who perceived themselves at low risk for acquiring HIV, approximately one in five were unaware that they had acquired HIV; among young Hispanic MSM who perceived themselves at low risk, approximately one in fifteen were unaware they were infected. Moreover, half of all unrecognized HIV infections were found among young MSM who perceived themselves at low risk for acquiring HIV in their lifetime.

In light of these and other findings (Irwin et al., 1996; Stein & Nyamathi, 2000; Spielberg et al., 2003), to increase testing and reduce the prevalence of unrecognized HIV infection, prevention providers should intensify efforts to assess and clarify HIV infection risks and perceptions of young MSM, particularly those who are black and Hispanic. For optimal effect, these efforts may need to be tailored for specific racial/ethnic groups. For example, our findings suggest that compared with young white MSM, (a) young black MSM are more likely to acquire HIV yet perceive themselves at similar lifetime HIV risk; (b) young Hispanic MSM are more likely to both acquire HIV and to perceive themselves at moderate/high lifetime risk; and (c) young Asian MSM are at similar risk for acquiring HIV yet are more likely to perceive themselves at moderate/high lifetime risk. Additional research is needed to identify the racial/ethnic-specific factors that might help to explain these findings and to guide the development of appropriately tailored messages to increase risk perception of all young MSM who underestimate their HIV risks. Our findings also affirm reports that some providers of HIV testing and health-care services miss opportunities to clarify infection risks and encourage testing for those in need (CDC, 2001b; Klein, Hurley, Merrill, & Quesenberry, 2003). Health-care providers should routinely recommend HIV testing for clients at increased risk for infection; HIV-test providers should routinely assess and clarify personal infection risks and encourage follow-up testing for clients with ongoing risk behaviors (CDC, 2001b).

In providing HIV test results to clients, providers should be aware of the potential influence a negative result might have on perceived susceptibility, and subsequent behavioral and HIV-infection risks. Our findings corroborate reports suggesting that some persons may underestimate current or future HIV infection risks because of tendencies to anchor perceptions on prior negative test results (Kowalewski et al., 1997; Poppen & Reisen, 1997). While we found that MSM who received a negative test result in the

past year were less likely to perceive themselves at moderate/high lifetime risk and to acquire HIV (not a surprising finding given the shorter exposure period in this group), seven percent of these men were HIV-infected unaware. Additional research is needed to evaluate the influence of receiving a negative HIV test result, in the presence and absence of counseling, on subsequent risk perception and behavior. For MSM who test HIV-negative, test providers should consider assessing what effect a negative test result might have on their client's perceived future infection risks, and if needed, counsel young MSM that a negative test result offers no assurance that they will remain free from HIV infection.

Findings in this report are subject to several limitations. First, our findings may not generalize to MSM who do not attend MSM-identified venues within the six cities or who are younger or older than 23–29 years of age. Second, although low risk perception has been correlated with low uptake of HIV testing, we did not specifically measure whether low perceived risk served as a barrier for testing among young MSM. Also, the influence of risk perception on HIV testing as part of YMS could not be assessed because all participants had to agree to be tested. Third, we relied upon self-reported data which is subject to disclosure and recall biases. It may be true, for example, that some participants knew they were HIV-infected but reported that they last tested HIV-negative. If true, our reported association between perceived lifetime risk for infection and unrecognized HIV infection might be biased upwards. Finally, it could be true that other self-reported behaviors that we did not measure might be more predictive of unrecognized HIV infection, and thus potentially reduce the predictive strength of perceived lifetime risk. However, the behavioral measures we used were typical of those of other surveys (Kowalewski et al., 1997; Poppen & Reisen, 1997) and of recommendations to assess behavioral risks in the context of counseling and testing (CDC, 2001b).

CDC's guidance on advancing HIV prevention identifies several strategies to increase the availability of testing to reduce unrecognized infection and HIV transmission in the United States (CDC, 2003). Although increasing the availability of testing services is prerequisite to increased testing, commensurate efforts at reducing personal barriers for testing are also needed. The findings in this report suggest that low perceived lifetime risk for infection may serve as an important personal barrier for HIV testing for MSM in their twenties. As an integral part of the new prevention strategies for young MSM, and in partic-

ular young black and Hispanic MSM, state and local prevention programs should consider coupling programs that make testing more available with efforts to assess, and to increase when needed, perceptions of lifetime risks for acquiring HIV.

**Acknowledgments** We are grateful to the young men who volunteered for this research project and to the dedicated staff who contributed to its success. We are especially grateful to the YMS Phase II coordinators: John Hylton and Karen Yen (Baltimore); Santiago Pedraza (Dallas); Denise Fearman-Johnson and Bobby Gatson (Los Angeles); David Forest and Henry Artiguez (Miami); Vincent Guilin (New York City); and Tom Perdue (Seattle); and to the laboratory and data management staff in all cities.

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