

## Primary HIV Infection Education

### *Knowledge and Attitudes of HIV-Negative Men Who Have Sex With Men Attending a Public Health Sexually Transmitted Disease Clinic*

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**Background:** Although many individuals who acquire HIV are symptomatic, primary HIV infection (PHI) is infrequently diagnosed, even after the integration of RNA testing into HIV screening programs. Until more individuals with PHI seek evaluation, the public health impact of RNA testing is likely to be small.

**Objective:** To describe knowledge of PHI and attitudes toward health care-seeking behavior for symptoms consistent with PHI in men who have sex with men (MSM).

**Methods:** Between April 2004 and March 2005, HIV-negative MSM attending the Public Health–Seattle and King County sexually transmitted disease (STD) clinic completed an anonymous, self-administered, written questionnaire.

**Results:** Ninety-six (64%) of 150 subjects named  $\geq 1$  symptom associated with PHI. Only 18 (39%) of 46 men who knew PHI could resemble influenza would seek care for flu-like symptoms. Fifteen (65%) of 23 men reporting a week-long febrile illness with rash in the preceding year sought health care, but only 7 (30%) were tested for HIV.

**Conclusions:** Although most subjects identified some symptoms of PHI, relatively few would seek care for such symptoms. MSM seeking attention for febrile illnesses were infrequently tested for HIV. Increased symptom recognition, health care-seeking behavior, and routine HIV RNA testing are needed if PHI screening programs are to have meaningful impact.

**Key Words:** primary HIV infection, acute HIV infection

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Primary HIV infection (PHI) refers to events after HIV acquisition and seroconversion. Within 2 to 4 weeks after HIV acquisition, HIV viremia rises rapidly and is accompanied by symptoms in 50% to 90% of individuals.<sup>1–4</sup> However, because symptoms are nonspecific and often precede antibody formation individuals may not seek evaluation, and those who do seek evaluation for symptoms may not be diagnosed if HIV RNA testing is not performed.<sup>1–7</sup>

Individuals with PHI are highly infectious,<sup>8</sup> and a small cohort study and mathematic modeling suggest that a significant proportion of individuals acquire HIV from recently infected partners.<sup>9,10</sup> Identifying newly infected individuals may reduce HIV incidence by prompting individuals diagnosed with HIV to alter their behavior to reduce secondary transmission to partners.<sup>11–13</sup> To date, the impact of public health efforts to diagnose PHI in Washington, North Carolina, and California has been important but small; the addition of pooled RNA testing to HIV screening has identified acute infection in 7 (0.2%) of 3439,<sup>14</sup> 23 (0.02%) of 109,250,<sup>15</sup> and 11 (0.3%) of 3789 individuals tested,<sup>16</sup> respectively. In contrast, research programs that focus testing on high-risk symptomatic individuals have identified PHI in 8% to 12% of evaluated individuals (J. Maenza, MD, 2005 personal communication),<sup>5,6</sup> yielding a small total number of PHI cases but with greater case finding per 100 persons tested.

Unless large numbers of individuals with PHI seek health care during acute infection, primary HIV screening programs will have a limited impact on HIV prevention. We evaluated knowledge about PHI and attitudes related to health care-seeking behavior in men who have sex with men (MSM) as a preliminary effort in the development of a symptom-focused public health screening program for early detection of PHI.

## METHODS

Between April 2004 and March 2005, a convenience sample of 154 HIV-negative MSM at the Public Health–Seattle and King County sexually transmitted disease (STD) clinic was surveyed. We approached all men awaiting STD and/or HIV testing during hours when research staff members were available, and eligibility was confidentially reported. Men were included if they were HIV-negative or did not know their serostatus, had had oral or anal sex with at least 1 male partner in the previous year, and could read and write in English. A waiver of written informed consent was obtained from the University of Washington Institutional Review Board; all individuals gave verbal consent and received a written information statement describing risks and benefits of study participation.

The anonymous, written, self-administered survey (Appendix 1) included a combination of true-false, multiple choice, and open-ended questions. The first half of the survey collected information on demographics, HIV risk behaviors, and access to HIV testing and general health care services. The second half involved questions about primary HIV infection,

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**TABLE 1.** Demographic Characteristics of MSM Completing Survey\*

	n (%)
Mean years of age (range)	31.8 (19–66)
Race/ethnicity	
White	105 (70.0)
African American	9 (6.0)
Native American	7 (4.7)
Asian	5 (3.3)
Other or mixed	20 (13.3)
Hispanic	11 (7.3)
Education	
Less than high school	12 (8.0)
High school degree	33 (22.0)
Some college coursework	50 (33.3)
College degree	34 (22.7)
Postgraduate coursework or graduate degree	20 (13.3)
Gender preference for sex partners	
Men only	119 (79.3)
Men and women	31 (20.7)
UAI with partner who was HIV <sup>+</sup> or unknown status (past year)	41 (27.5)
Regular HIV <sup>+</sup> partner	13 (8.7)

\*Denominators for proportions reflect individuals responding to each question. UAI indicates unprotected anal intercourse.

health care-seeking behavior for symptoms compatible with PHI or other sexually transmitted infections (STIs), and attitudes about diagnosis and treatment during PHI. Because it was anonymous, the study could not be linked to subjects' HIV testing results or medical records.

Objectives of the study were to collect preliminary data about PHI knowledge; generate hypotheses about knowledge, attitudes, and practices; and plan for a future educational intervention. Results are primarily descriptive analyses using STATA software (StataCorp LP, College Station, TX). Where applicable, statistical tests (including  $\chi^2$  tests, Student

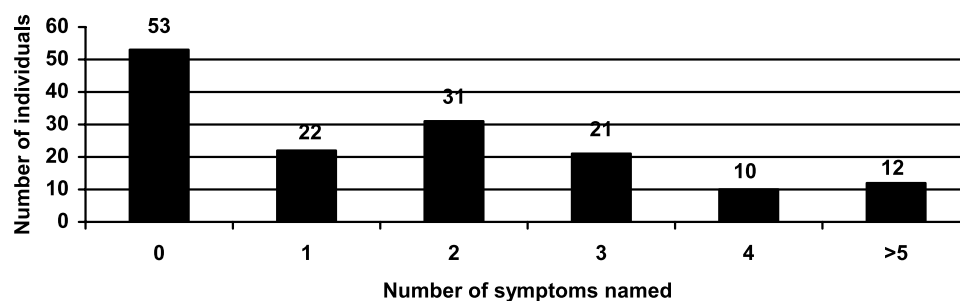
*t* tests, Mann-Whitney *U* tests, and univariate regression analyses) were performed.

## RESULTS

Four men were excluded from the analysis because they reported sex only with women ( $n = 2$ ), had no sex partners in the prior year ( $n = 1$ ), or provided erratic written responses ( $n = 1$ ). Demographic characteristics and behaviors associated with risk for HIV acquisition for the remaining 150 individuals are shown (Table 1). Subjects reported a median of 7 (range: 1–202) male partners, 3 (range: 0–75) male partners with whom they had anal sex, and 1 (range: 0–40) partner with whom they had unprotected anal intercourse in the last year. Most subjects had previously accessed HIV testing services; 105 (70%) and 27 (18%) MSM were last tested for HIV within the past year and 1 to 2 years previously, respectively. Only 7 (5%) subjects had never previously received HIV counseling and testing services.

Twenty-three (15%) subjects reported an illness within the last year characterized by fever and rash that lasted at least 1 week. Fifteen (65%) of these subjects sought attention; 5 subjects reported syphilis testing, and 7 reported HIV testing (subjects were not asked to describe the method of HIV testing.). Six (40%) of the 15 MSM were not tested for HIV or syphilis.

When asked in an open-ended question to name specific symptoms that could be associated with PHI, 149 subjects named a median of 1 (range: 0–9) symptom (Fig. 1). “Flu-like illness” was named by 47 individuals but was not included in the tabulation in Figure 1 because there was no way to know if those subjects knew specific characteristics of influenza. When flu-like illness was considered among the list of correct symptoms associated with PHI, 44 (30%) subjects did not identify a single correct symptom. In univariate linear logistic regression analyses, there was no association between symptom identification (as a continuous variable) and any other characteristic (age, race and/or ethnicity, education,



**FIGURE 1.** Number of individuals able to name symptoms associated with PHI. Signs and symptoms counted include: fever, chills, night sweats, fatigue, malaise, rash, swollen “glands” or lymph nodes, nausea, vomiting, diarrhea, weight loss, decreased appetite, muscle aches, headache, genital or oral “sores” or ulcers, confusion (encephalitis), and thrush. Dizziness was included as a potential side effect of diarrhea and/or anorexia. “Flu-like illness” was not included in this tabulation. Other symptoms named but not considered correct included: cold symptoms, cough, “runny nose”, sinus pain, sleep disorders and depression, jaundice, dry mouth, cancer, “blood in urine”, “blood in sputum”, “bloody stools”, susceptibility to infections, and STDs. The most frequently named symptoms were fever ( $n = 47$ ), fatigue ( $n = 36$ ), night sweats ( $n = 33$ ), rash ( $n = 23$ ), swollen “glands” or lymph nodes ( $n = 22$ ), diarrhea ( $n = 19$ ), and weight loss ( $n = 17$ ). The most frequently named symptoms that individuals incorrectly attributed to PHI included cough ( $n = 11$ ) and “cold symptoms” ( $n = 9$ ).

level of worry about HIV acquisition [scale: 1–10]; perceived chance of HIV infection [0%–100%]; number, gender, or serostatus of sex partners; substance abuse; or having a primary care provider, recent HIV counseling and testing, or an illness in the last year characterized by fever and rash).

Subjects were asked whether they would be likely to seek attention for a variety of symptoms lasting for 5 days that occurred after unprotected intercourse with an anonymous sex partner. The symptom with highest percentage of individuals reporting that they would be very or somewhat likely to seek attention was a painful genital ulcer (93%), followed by a painless genital ulcer (90%), oral ulcer (81%), rash in their partner (78%), rash (68%), lymphadenopathy (65%), flu-like illness (48%), fever and sore throat (48%), and cough and rhinorrhea (22%). There was no association between the identification of PHI as a flu-like illness and likelihood of seeking attention if an individual thought that he had influenza ( $\chi^2(3) = 4.66$ ;  $P = 0.2$ ), identifying swollen “glands” or lymph nodes and likelihood of seeking attention for “swollen lymph nodes in [the] neck” ( $\chi^2(3) = 1.78$ ;  $P = 0.6$ ), or identifying rash and likelihood of seeking attention for a nonpruritic rash on the chest and back ( $\chi^2(3) = 1.64$ ;  $P = 0.6$ ) (data not shown).

Most (81%) MSM appropriately disagreed with the statement that HIV could be cured during PHI, and nearly all (92%) agreed that if they knew they had HIV, they would have safe(r) sex to prevent transmission. Eighty-five percent and 87% also agreed with statements that treatment during PHI could protect the immune system and could help individuals to live longer.

## DISCUSSION

For pooled RNA and other PHI detection methods to have a significant impact on public health, new strategies must be developed to identify greater number of individuals with acute infection. One potential solution is to scale up the PHI research program model, which has produced greater case finding per 100 individuals tested by targeting screening to high-risk symptomatic individuals (J. Maenza, MD, 2005 personal communication).<sup>5,6</sup> In a high-risk population of MSM, we found that 15% had experienced an illness that may have represented HIV seroconversion in the preceding year and that 65% of these persons had sought medical attention for the illness but less than one third believed they had been tested for HIV. Inconsistent symptom recognition and health care-seeking behavior by patients, coupled with lack of provider recognition and routine testing for HIV RNA, are barriers to the goal of diagnosing HIV during acute infection and suggest potential targets for public health interventions.

Most MSM in our study could identify at least 1 symptom associated with PHI. Knowledge of PHI symptoms was not associated with anticipated health care-seeking behavior, however. The relatively low likelihood of seeking attention for symptoms consistent with PHI was not attributable to lack of belief in the benefits of diagnosing and treating PHI, even though the benefit of early antiretroviral treatment has not been definitively established. Our findings suggest that future efforts to increase diagnosis of

PHI should focus on increasing knowledge of symptoms and increasing health care-seeking behavior.

There are several limitations to our study. The convenience sampling we used may not be representative of MSM in King County or nationally. Responses to questions may reflect cues from preceding questions. In addition, we cannot determine the validity of subjects' reports of intent to seek evaluation, and subjects may not have reported STI/HIV interventions performed by their providers if they were unaware or did not recall accurately that testing was performed.

The establishment of primary infection education programs coupled with public health efforts to diagnose PHI could result in earlier HIV diagnosis and prevention of transmission. Although a focus on symptom recognition cannot identify individuals before symptom onset or those with asymptomatic infection, reliance solely on routine HIV RNA screening of individuals seeking HIV testing is likely to fail to identify even greater numbers of individuals with PHI unless large numbers of individuals are tested with high frequency. Future efforts should evaluate public health programs designed to educate at-risk individuals about signs of PHI, increase health care-seeking behavior, and direct them toward clinics where HIV RNA testing is routinely performed.

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