Implementation of HIV Testing at 2 New York City Bathhouses: From Pilot to Clinical Service

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Background. Commercial sex venues (e.g., bathhouses) that cater to men who have sex with men (MSM) continue to function in most urban areas. These venues present a challenge to developing strategies to prevent the spread of the human immunodeficiency virus (HIV), but they also provide opportunities for interventions to reduce the risk and rate of disease transmission. Several cities in the United States have developed programs that offer HIV testing in these venues. Similar programs have not existed before in New York City.

Methods. A pilot HIV testing program was implemented at 2 New York City bathhouses. Testing included rapid HIV testing, the use of the serologic testing algorithm for recent HIV seroconversion, and pooled plasma HIV viral load to detect and date incident and acute HIV infections. In addition to HIV tests, behavioral and demographic data were collected from 493 presumed HIV-negative participants.

Results. The pilot program recruited MSM who were at high risk for HIV infection. Of the 493 men tested, 20 (4%) were found to be positive for HIV, and 8 (40%) of these 20 men demonstrated evidence of acute or recent HIV infection. The program tested men often not tested in more traditional medical settings. Significant disparities were demonstrated in the testing habits of MSM who reported having sex with women and had not disclosed same-sex activities to their caregivers.

Conclusions. Bathhouse-based testing for HIV infection can be implemented in New York City and would include a population of MSM who are at high risk for HIV infection. Because of the high rate of recent HIV infection, expanded testing in these venues may be a good strategy to reduce the forward transmission of HIV in this highly sexually active population.

Since the beginning of the AIDS epidemic in the United States, bathhouses and other commercial sex venues have been implicated in the transmission of the human immunodeficiency virus (HIV) among men who have sex with men (MSM) [1]. Bathhouses in several US cities have permitted various governmental and community organizations to conduct on-site HIV testing [2]. Despite concerns by some that such venue-based testing may be unacceptable, these programs have demonstrated the ability to reach high-risk men [3, 4]. In addition, Heubner et al. [5] demonstrated that participation in bathhouse-based testing was associated with a reduction in HIV-related risk behaviors.

Although MSM in the United States are amenable to HIV testing, the Centers for Disease Control and Prevention (CDC) estimate that nearly 50% of MSM with HIV infection are unaware of their status. The CDC National Behavioral Surveillance System, which employed "gay" venue–based recruitment, found 25% of the MSM tested to be infected with HIV, with nearly one-half of HIV-seropositive individuals unaware of their infection [6]. In New York City (NYC), the HIV incidence rate among MSM was 2.3%, with 52% of those who tested positive being unaware of their HIV seropositivity [6]. Among young MSM in NYC, the annual HIV incidence rate has been estimated to be 7.6% [7]. Young MSM of all races in NYC are increasingly being diagnosed with HIV infection, with the incidence rate for this group having increased by 33% during the period from 2001 through 2006 [8]. Young African-American MSM appear to be disproportion-

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ately affected by this trend, with the incidence rate having increased by 35% during that same period [8].

Behavioral trends among MSM indicate a need for more-intensive preventive programs contextualized to the venues MSM use for finding of sex partners. Of the 233 (45.0%) of 518 MSM surveyed in NYC in 2002 who reported engaging in intentional, unprotected anal intercourse, 67 (28.8%) of them reported finding sex partners at commercial sex venues [9]. Risk factors for unprotected anal intercourse at commercial sex venues included drug use and HIV-positive status, both of which could lead to significant HIV transmission in a sexually active population [10]. Other studies have demonstrated that bathhouse clients may participate in less high-risk sex in these venues than they would in private or other settings [1, 5, 11, 12]. These venues may provide important opportunities to introduce public health interventions and screenings for HIV infection [9, 13].

Biological factors may also play a role in increasing rates of HIV infection in a highly sexually active population. Recently acquired HIV infections continue to be especially implicated in the transmission of HIV infection [14–18]. Programs designed to identify acute infection using pooled plasma HIV viral load testing have been implemented in health care facilities that care for patients with sexually transmitted infection. However, this diagnostic method has not been used often in nontraditional settings. The risk reduction associated with a recent diagnosis of HIV infection implies a preventive role for viral load–enhanced serological testing in venues where individuals who are at high risk of HIV infection gather [19].

We report on a bathhouse-based pilot program that offered rapid HIV testing supplemented by assays to detect acute and recent infection. The pilot program took place at 2 NYC bathhouses; HIV testing had not been previously offered at these or similar establishments in NYC. The goals of this pilot program were to assess the feasibility of bathhouse-based HIV testing in NYC, to describe the men who wanted to be tested, and to identify differences between the men who had never been tested for HIV and the men who reported having been tested previously. The data presented in our study have directly resulted in the implementation of HIV testing at these bathhouses as a clinical service provided by the Bellevue Hospital Center and the NYC Health and Hospital Corporation.

METHODS

Venue selection. Bathhouse 1 (BH1) and bathhouse 2 (BH2) were selected for participation in our study on the basis of their longevity as commercial sex venues and their centralized management. In 2005, BH2 was linked to a highly publicized case of drug-resistant HIV infection with rapid clinical progression [20, 21]. HIV testing occurred 4–5 h/week in the evening and late night in spaces provided by the venues. HIV counselors from diverse educational backgrounds staffed the project.

Participant recruitment. We advertised in BH1 and BH2 using public announcements and posted signage. The pilot program was advertised as an "HIV testing program," so recruitment efforts attempted to exclude men with known HIV infection. No financial or material incentives were provided for participation.

Testing algorithm. Informed written consent for HIV testing was obtained using an institutional review board–approved research consent form, and New York State–mandated HIV pretest counseling was provided. Men who were deemed unable to provide consent by the study team because of intoxication were excluded and asked to return at a later date. Rapid HIV testing was performed using an oral transudate (OraQuick Advance Rapid HIV-1/2 antibody test; Orasure Technologies). Preliminary positive test results were confirmed by Western blot analysis and were evaluated using the serologic testing algorithm for recent HIV seroconversion, to estimate the approximate date of infection [22]. Recent infections were assumed to have occurred during a seroconversion period of 170 days (95% confidence interval [CI], 145–200 days), according to the serologic testing algorithm for recent HIV seroconversion [23]. The plasma from participants with negative test results was tested weekly using pooled HIV viral load testing to detect acute infection [24]. All HIV-positive participants were referred to clinical services. All participants, regardless of HIV status, were given access to resources and referrals on the basis of need. The results of rapid HIV testing were reported at point of care. Negative test results were reported to patients by telephone, in person, or by e-mail, according to patient preference, whereas positive test results were communicated in person. Data were not collected on men who elected not to participate in testing during the program's pilot phase.

Risk assessment and demographic survey. Participants completed a staff-administered survey covering demographic characteristics, HIV testing habits, health care use, and risk behaviors.

Statistical analysis. SPSS for Windows, version 15.0 (SPSS), was used for data entry and management. Data recoding and statistical analysis was performed using SAS, version 9.1 (SAS Institute), and Egret for Windows, version 2.0.31 (Cytel Software). Categorical data were analyzed using Mantel-Haenszel point estimates and 95% CIs, as implemented in Egret [25]. Multivariate analysis was performed using unconditional logistic regression, as implemented in Egret. In building multiple logistic regression models, we considered all variables with P values of $<.2$ on bivariable analysis. In analyses of risk factors for HIV infection, we reported exact 95% CIs and P values from Egret.

Role of funding sources. The funding sources were not

involved in the study design, data collection, data management, data interpretation, manuscript preparation, or decision to publish.

RESULTS

Demographic characteristics of participants in the pilot program. During the 20-month period of the pilot program, 504 participants visited either BH1 or BH2. Eleven individuals who were previously diagnosed with HIV infection were excluded from statistical analysis. The analysis was limited to the remaining 493 first-time participants who were presumed to be HIV negative (table 1). The ages of the participants ranged from 18 to 79 years (median age, 39 years). Of these 493 participants, 269 (54.6%) were either nonwhite or white Hispanic, 161 (32.7%) had completed at least 4 years of college, and 397 (80.5%) reported that they were employed. The median annual income reported was $50,000–99,999. Of 491 participants who reported sexual orientation, most (397 [76.6%]) identified themselves as "gay," 98 (20.0%) identified themselves as bisexual, and 11 (2.2%) identified themselves as "straight." Forty-seven participants (9.5%) reported being married to a woman at the time the survey was taken. A minority of participants (187 [37.9%]) reported having been offered HIV testing in traditional venues (i.e., hospitals, clinics, or private offices). Most of the participants (281 [57.0%]) were under the care of a primary care provider, and 194 (69.0%) of these participants had not disclosed same-sex activities to their caregiver. Regardless of the low number of participants who were offered HIV testing by a health care provider, 434 participants (88.0%) had been tested for HIV infection at least once prior to enrolling in our study.

Comparison of participants at BH1 with those at BH2. The participants who were tested at BH1 were older, more likely to be white non-Hispanic, and more often residents of the New York Tri-State Region than were the participants who were tested at BH2. The participants at the 2 bathhouses did not differ significantly statistically with regard to self-reported circumcision status, disclosure of same-sex behavior to their primary care provider, reporting a regular sex partner, recalling an incident of sexually transmitted infection during the past 90 days, drug use, unprotected anal intercourse, or sex with women (data not shown). The number of participants who were married to a woman at the time of our study was significantly greater at BH1 than at BH2 (24 [16.6%] of 145 participants vs. 23 [6.6%] of 346 participants; $P < .001$).

Sexual risk behaviors. Participants reported significant sexual risk behaviors. They reported a median number of 6 sex partners (interquartile range [IQR], 3–15 sex partners) during the 90 days before the start of our study (hereafter referred to as the recall period). Of the 493 study participants, 430 (87.2%) reported having engaged in anal intercourse, and 463 (93.9%) reported having had sex with anonymous partners. Of the 430 participants who engaged in anal intercourse, 193 (44.9%) reported having had at least 1 episode of unprotected anal intercourse during the recall period. Of the 193 participants who reported having had unprotected anal intercourse during the recall period, 93 (48.2%) engaged in unprotected insertive anal intercourse exclusively, 39 (20.2%) engaged in unprotected receptive anal intercourse, and 81 (41.9%) engaged in both unprotected receptive anal intercourse and unprotected insertive anal intercourse. There was no statistically significant difference between the percentage of participants who reported having engaged in exclusive unprotected insertive anal intercourse and the percentage of participants who reported having engaged in exclusive unprotected receptive anal intercourse or both unprotected insertive anal intercourse and unprotected receptive anal intercourse. Thirteen percent of participants reported having had intercourse with a female partner during the recall period. Of the 493 men tested at the 2 bathhouses, 409 (83.0%) used non-bathhouse strategies and other commercial sex venues to find sex partners; 143 (35.0%) of these 409 participants utilized Internet chat rooms or Web sites.

Drug use. More than one-half (260 [52.8%] of 429) of the participants reported having used drugs during the 3 months before enrolling in our pilot program. The most common drugs reported were nitrate inhalants (102 [39.2%] of 260 participants), erectile dysfunction drugs (53 [20.3%] of 260), marijuana (40 [15.4%] of 260), cocaine (17 [6.5%] of 260), crystal methamphetamine (10 [3.8%] of 260), and 3,4-methylenedioxymethamphetamine (MDMA; 8 [3.1%] of 260). The majority of participants (31 [58.4%] of 53) obtained their erectile dysfunction drugs from a physician. Neither the self-reported use of drugs nor use of any specific drug was associated with a new diagnosis of HIV infection or previous HIV testing habits.

History of HIV testing among participants who presumed an HIV-negative or unknown status. Of the 493 participants in our study, 59 (12.0%) had never been tested for HIV infection before enrolling in our pilot program (table 2). Participants were significantly more likely to have been tested for HIV infection if they were recruited at BH2, were $\geqslant$30 years of age, earned >$50,000 per year, identified themselves as "gay," and disclosed to their primary care provider that they were MSM. Men who were married to women were less likely to have been tested for HIV infection before participating in our pilot program ($P < .001$). Drug use was associated with having been tested in the unadjusted analysis, but this association became statistically nonsignificant after adjustment for age and income. Unprotected insertive anal intercourse was associated with having been previously tested for HIV infection, whereas unprotected receptive anal intercourse was not. The unadjusted analysis for trend indicated that greater educational achievement was directly associated with prior HIV testing, but this

Table 1. Data on the characteristics of men who were tested for human immunodeficiency virus infection at 2 bathhouses in New York City in 2007.

Characteristic	Participants in the pilot program			*P*
	Bathhouse 1	Bathhouse 2	Total	
Age				
18–29 years	17/146 (11.6)	71/347 (20.5)	88/493 (17.8)	<.001
30–39 years	32/146 (21.9)	141/347 (40.6)	173/493 (35.1)	
40–49 years	40/146 (27.4)	90/347 (25.9)	130/493 (26.4)	
⩾50 years	57/146 (39.0)	45/347 (13.0)	102/493 (20.7)	
Median age (range), years	45 (19–76)	37 (18–75)	39 (18–45)	<.001
Race				
Black non-Hispanic	5/146 (3.4)	38/347 (11.0)	43/493 (8.7)	.02
Black Hispanic	3/146 (2.1)	13/347 (3.7)	16/493 (3.3)	
White non-Hispanic	81/146 (55.5)	143/347 (41.2)	224/493 (45.4)	
White Hispanic	34/146 (23.3)	102/347 (29.4)	136/493 (27.6)	
Asian/Pacific Islander	17/146 (11.6)	38/347 (11.0)	55/493 (11.2)	
Native American/other	6/146 (4.1)	13/347 (3.7)	19/493 (3.9)	
Education				
High school, GED, or less	22/146 (15.1)	50/347 (14.4)	72/493 (14.6)	.9
Some college	26/146 (17.8)	69/347 (19.9)	95/493 (19.3)	
College degree	47/146 (32.2)	114/347 (32.9)	161/493 (32.7)	
Graduate school	51/146 (34.9)	114/347 (32.9)	165/493 (33.5)	
Annual income, $				
<25,000	25/146 (17.1)	64/347 (18.4)	89/493 (18.1)	.18
25,000–49,999	26/146 (17.8)	85/347 (24.5)	111/493 (22.5)	
50,000–99,999	50/146 (34.2)	112/347 (32.3)	162/493 (32.9)	
⩾100,000	23/146 (15.8)	56/347 (16.1)	79/493 (16.0)	
No response	22/146 (15.1)	30/347 (8.6)	52/493 (10.5)	
Employment status				
Employed	108/132 (81.8)	289/319 (90.6)	397/451 (88.0)	<.001
Unemployed, seeking work	1/132 (0.8)	12/319 (3.8)	13/451 (2.9)	
Student/disability/other	23/132 (17.4)	18/319 (5.6)	41/451 (9.1)	
Sexual orientation				
Gay	102/146 (69.9)	274/345 (79.4)	376/491 (76.6)	.1
Straight	3/146 (2.1)	8/345 (2.3)	11/491 (2.2)	
Bisexual	38/146 (26.0)	60/345 (17.4)	98/491 (20.0)	
Other	3/146 (2.1)	3/345 (0.9)	6/491 (1.2)	
Sex of sex partners				
Male	100/139 (71.9)	272/340 (80.0)	372/479 (77.7)	.12
Female	2/139 (1.4)	6/340 (1.8)	8/479 (1.7)	
Both	37/139 (26.6)	62/340 (18.2)	99/479 (20.7)	
Marital status				
Married/living with man	16/145 (11.0)	24/346 (6.9)	40/491 (8.1)	.002
Single	92/145 (63.4)	269/346 (77.7)	361/491 (73.5)	
Previous relationship with a woman	13/145 (9.0)	30/346 (8.7)	43/491 (8.8)	
Married to a woman	24/145 (16.6)	23/346 (6.6)	47/491 (9.6)	

NOTE. Data are proportion (%) of participants, unless otherwise indicated. GED, General Educational Development (tests).

association became statistically nonsignificant ($P = .06$) after adjustment for age and income. Of 485 participants, 410 (84.5%) stated they would use an over-the-counter rapid HIV test at home if it were readily available.

Among participants who were previously tested for HIV infection, the median time since their last HIV test was 10.7 months (IQR, 5.5–22.2 months). The median time since the last HIV test for participants at BH2 was shorter than that reported for participants at BH1 (9.4 months [IQR, 5.3–20.0 months] vs. 12.9 months [IQR, 5.3–20.0 months]; $P < .001$, by

Table 2. Data on characteristics of men who presumed themselves to be uninfected with the human immunodeficiency virus (HIV) and who reported previous HIV testing, expressed as odds ratios (ORs).

Characteristic	No. of participants	No. (%) of participants previously tested	Crude OR (95% CI)	*P*	Adjusted OR (95% CI)[a]	*P*
Venue attended						
Bathhouse 1	146	122 (83.6)	1.00		1.00	
Bathhouse 2	347	312 (89.9)	1.75 (0.96–3.2)	.05	2.00 (1.1–3.9)	.01
Age						
<30 years	88	69 (78.4)	1.00		1.00	
⩾30 years	405	364 (89.9)	2.50 (1.3–4.8)	.002	2.30 (1.2–4.3)	.009
Race						
Black non-Hispanic	43	37 (86.0)	1.00		1.00	
White non-Hispanic	224	203 (90.6)	1.57 (0.53–4.5)	.4	1.15 (0.35–3.6)	.8
Hispanic	152	134 (88.2)	1.21 (0.39–3.5)	.7	0.96 (0.29–3.0)	.9
Asian or other	74	60 (81.1)	0.69 (0.21–2.2)	.5	0.37 (0.10–1.3)	.09
Education						
High school, GED, or less	72	58 (80.6)	1.00	.003[b]	1.00	.06[b]
Some college	95	80 (84.2)	1.29 (0.54–3.09)	.5	1.19 (0.49–2.9)	.7
College degree	161	143 (88.8)	1.92 (0.84–4.38)	.09	1.40 (0.58–3.5)	.4
Graduate school	165	153 (92.7)	3.08 (1.25–7.61)	.006	1.82 (0.73–6.0)	.12
Annual income, $						
<50,000	200	166 (83.0)	1.00		1.00	
⩾50,000 or no response	293	268 (91.5)	2.20 (1.2–4.0)	.005[c]	2.01 (1.1–3.6)	.01[c]
Identify themselves as gay						
No	117	90 (76.9)	0.31 (0.17–0.56)	<.001	0.35 (0.18–0.65)	<.001
Yes	376	344 (91.5)	1.00		1.00	
Primary care provider knows participant has sex with men						
No	129	105 (81.4)	1.00		1.00	
Yes	103	99 (96.1)	5.65 (1.8–5.6)	<.001	6.30 (1.9–26)	<.001
Reported drug use						
No	218	185 (84.9)	1.00		1.00	
Yes	275	249 (90.5)	1.71 (0.96–3.1)	.05	1.41 (0.76–2.6)	.2
Married to a woman at time of participation in program						
No	444	397 (89.4)	1.00		1.00	
Yes	47	35 (74.5)	0.35 (0.16–0.76)	.003	0.27 (0.11–0.61)	<.001
Reported having sex with women in past 3 months						
No	429	384 (89.5)	1.00		1.00	
Yes	64	35 (54.7)	0.42 (0.21–0.9)	.009	0.53 (0.23–1.03)	.03
Reported unprotected receptive anal intercourse						
No	390	344 (88.2)	1.00		1.00	
Yes	94	83 (88.3)	1.01 (0.48–2.2)	.98	0.99 (0.47–2.2)	.99
Reported unprotected insertive anal intercourse						
No	335	288 (67.1)	1.00		1.00	
Yes	151	141 (93.4)	2.30 (1.1–5.0)	.02	2.10 (1.0–4.9)	.05

NOTE. CI, confidence interval; GED, General Educational Development (tests).

[a] Adjusted via unconditional logistic regression analysis for venue, age (dichotomized as <30 vs. ⩾30 years of age), and income (dichotomized as <$50,000 vs. ⩾$50,000 per year).

[b] For trend.

[c] For trend, after removing participants who declined to answer.

Wilcoxon rank-sum test). The median time since the last HIV test for 405 participants ⩾30 years of age was longer than that for 88 participants who were younger (11.9 months [IQR, 5.7–24.0 months] vs. 6.6 months [IQR, 3.6–10.1]; $P < .001$, by Wilcoxon rank-sum test). The median time since the last HIV test for participants who were married to a women was longer than that for participants who were not (median, 13.4 months [IQR, 8.4–33.5 months] vs. 9.9 months [IQR, 5.4–21.2 months]; $P = .01$, by Wilcoxon rank-sum test). Multiple logistic regression analysis indicated that a testing interval of >6 months was associated with an age of ⩾30 years (odds ratio [OR], 2.2; 95% CI, 1.3–3.8) and being married to a woman (OR, 4.4; 95% CI, 1.3–14.6); bathhouse venue was not a part of the analysis after these variables were considered.

A time since last HIV test of >12 months was associated with older age, with only 17 (19.3%) of 88 participants 18–30 years of age not having been tested during the past 12 months, compared with 67 (38.7%) of 173 participants 30–39 years of age, 67 (51.2%) of 130 participants 40–49 years of age, and 64 (62.7%) of 102 participants ⩾50 years of age ($P < .001$ for trend). Not having been tested within the past 3 months was also more common among older participants, with 85% of participants 18–30 year of age and 30–39 years of age not having been tested during the past 3 months, compared with 91% of participants 40–49 years of age and 94% of participants ⩾50 years of age ($P = .02$ for trend). The participants at BH1 were more likely to have a time interval since last HIV test of >12 months, compared with the participants at BH2 (57% vs. 40%; $P = .001$), but venue was not statistically significant ($P = .99$) in the multiple logistic regression model that included both age ($P < .001$) and bathhouse venue.

HIV test results. Of the 493 presumed HIV-negative participants in our pilot program, 20 (4.1%) received a diagnosis of HIV infection. Of these 20 participants, 19 received their test result at the bathhouse testing site, with no immediate adverse events noted during that visit. One participant who had a negative rapid test result received a diagnosis of acute HIV infection by use of pooled HIV viral load testing. By including this participant, we determined that 8 (40%) of the 20 participants who received a diagnosis of HIV infection demonstrated evidence of recent HIV infection, by use of either pooled HIV viral load testing or the serologic testing algorithm for recent HIV seroconversion. There was 1 false-positive rapid HIV test. Using these data, we estimated the HIV incidence among the participants in our pilot program to be 3.9 infections per 100 participants/year (95% CI, 0.9–7.2 infections per 100 participants/year) [23]. The participants with newly diagnosed HIV infection were demographically indistinguishable from the participants who tested negative.

Connecting HIV-positive participants to care. All 493 participants received their rapid HIV test results. Of the 20 participants who were newly diagnosed with HIV infection, 15 (75.0%) were successfully connected to an HIV primary care provider. Of those 15 participants, 9 (60.0%) were followed up at our institution, and the remaining 6 (40.0%) were connected to other physicians because of insurance issues, subject preference, or geographic constraints.

CONCLUSIONS

Bathhouse-based HIV testing can be implemented in NYC and may supplement health care–based testing programs to access MSM who are at risk of HIV infection. No immediate adverse events were associated with communication of test results, and a significant majority of newly diagnosed men were connected to care. Although most participants had been previously tested for HIV infection, our pilot program demonstrates that barriers to HIV testing continue to exist among MSM. Our finding that men who revealed same-sex behaviors to their primary care provider were ~6-fold more likely than those who had not to have been tested for HIV infection supports similar findings reported by others in NYC [26]. Targeted HIV-testing programs, like this one, may extend the reach of diagnostic services to less accessible populations and may address a health care disparity. Of the 493 men tested at the 2 bathhouses, 409 (83.0%) used non-bathhouse strategies and other commercial sex venues to find sex partners; 143 (35.0%) of these 409 participants utilized Internet chat rooms or Web sites. Many of these milieus, specifically Web sites and chat rooms, challenge more traditional approaches used to deliver health care–related services. The bathhouse visits, therefore, may be an opportunity for these men who use the Internet to find sex partners who would otherwise be less accessible.

The observation that participants <30 years of age were less likely to report having been previously tested for HIV infection is of concern given the increasing rates of HIV infection among younger MSM in NYC [27]. In addition, given data from the Young Men's Survey regarding inadvertent HIV exposures by young MSM unaware of their HIV-positive status, it is critical that strategies be developed to increase testing accessibility and acceptability among these men [28].

Although CDC HIV testing guidelines indicate that annual testing may be adequate for a high-risk population, specific recommendations for individuals (such as those participating in our pilot program) are only made in the CDC treatment guidelines for sexually transmitted diseases. The mean interval between HIV tests among previously tested participants was longer than the 3–6 month interval recommended for this highly sexually active segment of the MSM population. Many men were also outside of the more traditionally cited HIV testing interval of 12 months [29].

Nearly one-fourth (115 [23.4%] of 491) of the participants did not identify themselves as "gay," and 9.6% (47 of 491 participants) reported being married to women. Notably, there were 2 men diagnosed with HIV infection who were married to women at the time that they participated in our pilot program. The importance of providing bathhouse-based testing is further supported by the finding that the participants in our study who were married to women had been tested less often for HIV infection than those who were not married and that being married to a woman, along with older age, was a statistically significant predictor of a prior HIV-testing interval greater than that recommended by the CDC. Access to this population may help reduce the transmission of HIV infection to both the male and female partners of these MSM [19].

A high percentage of the participants diagnosed with HIV infection in our pilot program demonstrated evidence of recent

infection, including 1 acutely infected individual. Identification of early infections may be specifically important given the large number of sex partners reported by some bathhouse participants and the increased likelihood of transmission of HIV infection during the early stages of the disease [14, 17].

There were several limitations to our study that merit mention. Data were not available regarding the number of bathhouse patrons present during testing hours or regarding the number of these patrons who knew they had HIV infection and would be unlikely to be a part of our HIV-testing program. Therefore, an estimate of the proportion of bathhouse patrons who used the testing services cannot be calculated. Anecdotally, only a small number of the men who visited the 2 bathhouses could be tested on a per-night basis given the limits of space and staffing. With the continuation of this HIV testing program, over time, we may be able test a significant proportion of men at risk for HIV who consistently frequent these bathhouses. However, with current logistical and consent restraints, high-throughput testing on a single testing night would be difficult or impossible. Further refinement of strategies for increasing the number of individuals tested in these venues should be explored.

Bathhouse patrons who have already developed a pattern of routine testing with other agencies or physicians may not have elected to be tested during this pilot program. As a result, the data regarding time since last HIV test may underestimate the testing practices of MSM who attended the bathhouse. Furthermore, because the outcome of never having been tested for HIV infection was not rare, caution must be taken in interpreting the ORs presented.

The participants in the pilot program may not be representative of the general bathhouse population. Given the convenient sample format of this pilot program, we cannot generalize our findings to the greater population of patrons who use the bathhouses or to other populations of MSM.

The data presented in our study have resulted in increased testing hours at BH1 and BH2, as a result of the establishment of venue-based diagnostic satellites of Bellevue Hospital Virology Clinic. Our findings should encourage other cities to initiate similar collaborative efforts between public health, academia, and commercial sex venues, to better reach MSM who are at risk of HIV infection.

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