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Presence of an HIV Testing Program Lowers the Prevalence of Unprotected Insertive Anal Intercourse inside a Gay Bathhouse among HIV-negative and HIV-unknown Patrons

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Abstract

This study sought to determine whether the presence of HIV testing inside a gay bathhouse reduced sexual risk behavior among patrons. A two-stage, time probability, cluster sample design recruited men exiting a northern California bathhouse in the last 5 weeks of 2001 (N=440), when no HIV testing was offered inside the bathhouse, and again in the last 5 weeks of 2002 (N=412) when HIV testing was offered 5 days a week. Separate logistic regression analyses compared a 2002 HIV testing exposure subgroup to both a 2001 non-exposure subgroup and a 2002 non-exposure subgroup for differences in sexual risk behavior during the bathhouse visit. Prevalence of unprotected insertive anal intercourse was significantly lower in the 2002 exposure subgroup than in the 2002 non-exposure subgroup. Similar results obtained when HIV-positive respondents were excluded. These results indicate on-site HIV testing has a preventive effect on some sexual risk behavior inside the bathhouse.

Keywords

HIV testing; structural intervention; risk reduction; bathhouse; MSM

Introduction

Men who have sex with men (MSM) have been, and continue to be, disproportionately affected by HIV (CDC, 2008; El-Sadr, Mayer, & Hodder, 2010). Since the beginning of the AIDS epidemic in the United States, gay bathhouses and sex clubs have been thought to contribute significantly to the spread of the disease among MSM (Bayer, 1989; Shilts, 1987; Turner, Miller, & Moses, 1989).

Screening for sexually transmitted diseases in bathhouses has a long tradition in public health going back to the first decade of gay liberation (Darrow, Barrett, Jay, & Young, 1981;

Merino, Judson, Bennett, & Schaffnit, 1979; Merino & Richards, 1977; Ritchey & Leff, 1975), so it is not surprising that when HIV became a major health issue for MSM, HIV screening, once available, was implemented in bathhouses (Binson, Blea, Cotten, Kant, & Woods, 2005). On-site testing has shown demonstrable value by revealing unidentified infections and reaching populations of men who might not otherwise test (Bingham et al., 2008; Daskalakis et al., 2009; Huebner et al., 2010; Huebner et al., 2006; Mayer et al., 2011; Spielberg et al., 2005; Woods et al., 2010a). In addition, such programs coincide with the “National HIV/AIDS Strategy for the United States” (2010) because they bring HIV screening and surveillance to a subgroup of MSM who are at even higher risk for HIV transmission and target unidentified infections (Collins & Diallo, 2010; Millett et al., 2010). Data from the Urban Men’s Health Study show that MSM who visit bathhouses are significantly more likely to engage in sexual risk behavior than MSM who do not visit bathhouses (Osmond, Pollack, Paul, & Catania, 2007). Moreover, among bathhouse patrons, men who visit other types of public sex environments (e.g., cruising areas) are significantly more likely than men who do not to report having risky sex (Binson et al., 2001). Thus, the bathhouse venue definitely serves a subset of MSM at elevated risk for transmission of HIV.

Several studies have assessed the impact of voluntary counseling and testing (VCT) in a bathhouse as an individual-level intervention, primarily in terms of the number and background of men who access the services offered (Bingham et al., 2008; Daskalakis et al., 2009; Huebner et al., 2010; Huebner et al., 2006; Mayer et al., 2011; Spielberg et al., 2005). However, with their focus only on the men who test, these studies were unable to address how the intervention influenced the clearly delimited social network of patrons interacting within the bounded physical environment of the bathhouse, and so ignored how changes in these important structural factors (Collins & Diallo, 2010; Sumartojo, 2000; Tawil, Verster, & O’Reilly, 1995) may have impacted the sexual risk behavior of all bathhouse patrons (Binson & Woods, 2003). One can posit that the presence of on-site testing (usually manifested in the form of an area set aside for it plus associated signage, announcements, and, in some cases, limited outreach) may increase awareness among patrons that HIV is a pervasive and immediate concern, and as a consequence patrons curb their sexual risk behavior while inside the bathhouse, even if they do not seek testing themselves, and despite the fact that the testing program directly addresses not the cause (risk behavior) but rather the effect (serostatus). Thus, in addition to being an individually-focused intervention for MSM who test, an on-site VCT program may also serve as a *structural intervention* to reduce risk behavior among all patrons, albeit one limited to the social environment of the bathhouse.

Defining what constitutes a structural intervention to prevent HIV is an evolving discussion among social science and public health researchers. Some tend to reserve the term “structural” for large scale population-wide phenomena encompassing demographic trends and economic forces, particularly in international research (Parker, Easton, & Klein, 2000), while other researchers include any factors outside the individual (Abdul-Quader & Collins, 2011; Adimora & Auerbach, 2010; Evans, Jana, & Lambert, 2010; Latkin & Knowlton, 2006). Within the public health field on-site VCT might be variously characterized as a policy intervention implemented by private businesses (Sumartojo, 2000), a community mobilization intervention (Blankenship, Friedman, Dworkin, & Mantell, 2006), or an

organization-level intervention addressing accessibility to HIV testing (Charania et al., 2011). Categorization will depend on which of six areas of action that may constitute a structural intervention (Auerbach, Parkhurst, & Cáceres, 2011) is a given researcher's focus: policy change (testing must/should be offered on-site), environmental enablement (access to testing in a high risk, anonymous environment), changing norms (toward proactive monitoring of HIV serostatus), social change (advocacy for testing), empowerment (acquiring knowledge of serostatus), or economic intervention (free testing). This paper is the first evaluation of whether or not the presence of an on-site HIV testing program alters the bathhouse environment to the extent that sexual risk behavior is reduced among all bathhouse patrons, regardless of whether they test during their visit.

To determine whether exposure to VCT services alters the level of HIV risk activity in a bathhouse environment, we used two probability samples recruited via exit surveys one year apart from the same bathhouse as part of a study designed to elicit a better understanding of who goes to bathhouses and what kinds of sexual behavior patrons engage in both inside and outside the bathhouse. The first survey was conducted when no testing program was operating and the second when a program operated on 5 out of 7 days each week. Secondary analysis of the two surveys afforded us a unique opportunity. By comparing the proportion of patrons reporting sexual risk behavior (i.e., unprotected anal intercourse) at the bathhouse when testing was available to when it was not available, we assessed whether testing influences risk behavior inside the bathhouse. That approach (a post hoc analysis of available "before and after" data) was similar to the one used in the initial study of needle exchange, which was eventually validated as a successful harm reduction intervention for prevention of HIV transmission among intravenous drug users (Gyudish et al., 1993).

Methods

Sample

A two-stage, time probability cluster sample design was used to recruit men exiting a northern California bathhouse in the last 5 weeks of 2001 (N=440), a period when no HIV testing was offered inside the bathhouse (Woods et al., 2007). The same sampling methodology was used again in the same bathhouse in the last 5 weeks of 2002 (N=412) when HIV testing was offered on-site 3–6 hours a day, 5 days a week (Binson, Pollack, Blair, & Woods, 2010).

Recruitment and Data Collection

The bathhouse operates 24 hours a day, seven days a week. Data collection in both 2001 and 2002 occurred over the 36 consecutive days beginning with the Monday after the Thanksgiving holiday (U.S.). Each 24-hour day was divided into 8 three-hour segments (i.e., midnight–3AM, 3AM–6AM, etc.). Using patron counts provided by club management, the 56 three-hour segments in each week (8 segments per day, 7 days per week) were stratified by the number of men expected to exit the bathhouse during the segment. A stratified random sample of segments was selected for data collection (Binson, Blair, Huebner, & Woods, 2007). Sample allocation was proportional to the size of the stratum. Within each

stratum, segments were selected with probabilities proportional to the number of men expected to exit.

In each selected segment exiting men were selected with equal probabilities using systematic random sampling. The “sampling fraction” (i.e., every k^{th} person) was based on the anticipated number of men exiting the bathhouse during the data collection segment as well as expected eligibility and response rates so that each segment would yield the same number of interviews. A randomly generated number between 1 and k determined the initial selection within a segment.

Exiting patrons selected for approach were asked by a recruiter to participate in a 15-minute survey. A selected man was considered ineligible to be interviewed if he had already participated or if he was unable to complete the consent process due to insufficient knowledge of English or cognitive impairment (e.g., could not reiterate the study activity in his own words). Patrons who gave verbal consent were interviewed face-to-face using a paper-and-pencil instrument in a private room inside the bathhouse.

Data collection was performed by three-man teams, two recruiter-interviewers plus a monitor to enumerate patrons exiting the bathhouse. Prior to implementation, all protocols, procedures, and instruments were subjected to full committee review and approved by the Institutional Review Board of the University of California, San Francisco.

Measures

Since it was an exit survey, the recorded interview start time was synonymous with bathhouse exit time. Arrival time was self-reported. The respondent was first asked about his sexual behavior during the just completed bathhouse visit. He was told to consider “any time a man puts his penis in your anus” or “any time you put your penis in a man’s anus” as anal sex, regardless of how brief or long it lasted, or whether or not he or his partner achieved orgasm. Respondents were asked, “How many different men did you have receptive anal sex with while you were here?” The next item stated, “Sometimes men use condoms when they have anal sex and other times they don’t. Of those (number from preceding answer) men you had receptive anal sex with, how many used a condom all the time they were inside you.” The number of men with whom a condom was not used all the time was calculated by the interviewer and then confirmed with the respondent. The same series of questions was used to ask about insertive anal intercourse. Participants were also asked to report on their anal sexual behavior during the prior 3 months. We derived two separate dichotomous variables denoting sexual risk behavior during the bathhouse visit and during the prior 3 months, with risk operationally defined as engaging in unprotected anal intercourse (i.e., anal sex without a condom), or UAI. Additional background questions were also asked including age, race/ethnicity, education, income, place of residence (represented by the first 3 digits of their residential zip code), self-defined sexual orientation, current HIV serostatus, and whether or not they have a male partner they consider their domestic partner or spouse.

Bathhouse Environment and Testing Program

The bathhouse is located in a city of approximately 100,000 people, but two neighboring cities are 4 and 8 times that size, respectively, and the metropolitan area numbers over 7

million in population. The venue encompasses 7500 square feet of enclosed space and can accommodate over 100 patrons at any given time. At the time of the study, amenities included a weight room, television room, steam room, showers, whirlpool, an open area for sex designed as a maze, and private rooms to rent. Patrons paid a fee to enter for up to 6 hours, at the end of which an additional payment could be made for another 6 hours. Once inside, patrons generally wore only a towel provided by the bathhouse.

The bathhouse had a health education director, a full-time manager-level employee who was in charge of all health education activities at the venue. Free condoms and personal lubricant were available at the front desk. Free condoms were also available in the public sex areas and the private rooms. Brochures and pamphlets about HIV/AIDS risk, prevention, testing, and services were available in the entry area. Posters up front and in the public areas promoted safer sex behaviors and HIV testing.

The voluntary HIV counseling and testing program offered inside the bathhouse was run by the local municipality's department of public health. Typical staffing was a lead field supervisor/phlebotomist, an "outreach" worker, and 2 or 3 counselors. Counselors were trained and certified to deliver counseling and testing according to protocols promulgated by the State of California. All testing was done anonymously in a private room using oral testing technologies. A banner, posted fliers, and periodic announcements over the public address system advertised the availability of testing when it was offered inside the bathhouse. The outreach worker posted the signage, managed the flow of patrons wishing to test, and, when time permitted, recruited patrons to test as they passed through the area of the club where the program was set up. The outreach worker was not permitted to enter other areas of the club beyond the immediate testing area. Aural announcements and outreach ceased one hour prior to the end of testing.

Beginning in March 2001, HIV testing was offered inside the bathhouse once a week for 4 hours (Saturdays 5PM–9PM). However, no testing occurred during 2001 data collection. In July 2002 testing was expanded to twice a week for a total of 7 hours (Saturdays 5PM–9PM and Wednesdays 4PM–7PM). During the 2002 data collection period, which was promoted as a holiday "test-a-thon," on-site testing was offered 5 days per week for 3–6 hours per day (Tuesdays 4PM–8PM, Wednesdays 4PM–7PM, Thursdays 6PM–9PM, Fridays 12PM–3PM, and Saturdays 3:30PM–9:30PM), a total of 19 hours a week.

Statistical Analysis

We performed two sets of analyses to compare men who were exposed to on-site HIV testing during their visit (the testing exposure subgroup) to men who were not (the non-exposure subgroup) on prevalence of UAI during the bathhouse visit. A single testing exposure subgroup was extracted from the 2002 sample and used in both analyses. The first set of analyses compared the testing exposure subgroup to a parallel subgroup of men drawn from the 2001 sample (when no testing was offered inside the bathhouse). In the second set of analyses the comparison was made with a subgroup of men from the 2002 sample that did not visit the bathhouse during the times when testing was offered.

We operationally defined respondents as part of the *2002 testing exposure subgroup* if they arrived at the bathhouse no more than 30 minutes before HIV testing began that day and were inside the bathhouse for at least 30 minutes while testing was ongoing, or arrived and departed while testing was ongoing, or arrived while testing was ongoing and departed after the testing session was over but were inside the bathhouse for at least 60 minutes during testing. This definition of exposure to testing was narrowly circumscribed to insure that any risk behavior engaged in by an exposed patron is likely to have occurred while on-site HIV testing was in progress. The testing exposure subgroup accounted for approximately 17% of the 2002 sample.

By applying the same operational definition to the 2001 sample, we defined a comparable *2001 non-exposure subgroup* that matched the 2002 testing exposure subgroup in terms of time of day and day of week patrons were inside the bathhouse. Patrons who would have been exposed to on-site HIV testing inside the bathhouse, if the program had been in operation at the time, accounted for 13% of the 2001 sample.

The *2002 non-exposure subgroup* included only men who entered and departed the bathhouse less than 12 hours before HIV testing began that day, and men who entered the bathhouse more than 2 hours but less than 12 hours after the testing session was over. The 2 hour minimum precluded exposure to even a “halo effect” of on-site testing. Approximately 27% of the 2002 sample fell into the non-exposure subgroup. Participants who did not enter or depart the bathhouse within 12 hours of the beginning or end of any on-site HIV testing session (about 29% of the 2002 sample) were not included because the times when they visited the bathhouse were so dissimilar to the testing exposure subgroup. We also excluded patrons who had partial exposure to HIV testing at the bathhouse, i.e., men whose exposure was insufficient to meet the criteria for inclusion in the testing exposure subgroup (about 27% of the 2002 sample).

All data in this report are weighted, unless otherwise specified, to accommodate differing probabilities of individual selection (due to different numbers of visits during the data collection period) and within-segment selection (caused by differences between expected and actual numbers of exiting men) plus differential coverage and response rates. Each case weight is the multiplicative product of three weighting components: (1) the probability of a visit (the probability of a three-hour segment being chosen for data collection multiplied by a respondent’s probability of selection within the three-hour segment), (2) the number of visits to the bathhouse during the data collection period (based on responses to survey questions on number of previous and subsequent planned visits to the venue during the 5-week data collection period), and (3) non-response/non-coverage (based on actual numbers of exits and completed interviews failing to meet or exceeding the expected numbers for a selected three-hour segment). All statistical analyses employed computational algorithms that adjusted standard errors for weighted data.

Cohort differences (2001 vs. 2002) were evaluated using the SVY: TABULATE procedure for two-way tabulations in Stata Release 11 (Stata Corporation, 2009), which calculates an F-test based on the Rao and Scott second-order correction of the Pearson chi-square statistic. Logistic regression (SVY: LOGIT procedure) was used to assess the relationship between

testing exposure and UAI during the bathhouse visit adjusted for factors that could influence UAI prevalence including length of bathhouse visit, age, HIV serostatus, the day of the week the respondent arrived at the bathhouse, and the week of data collection (first through fifth). Hispanic ethnicity was also included in the regression models because the two cohorts significantly differed on this characteristic.

Results

During the two data collection periods a combined 1,547 patrons exiting the bathhouse were selected for participation. Of those selected, 98 were ineligible (65 previously interviewed, 21 cognitively impaired, 12 non-English speaking) and 21 could not be interviewed due to technical problems. Of the remaining 1,428 eligible patrons, 852 (59.7%) participated in the survey (62.1% in 2001, 57.2% in 2002). Comparisons between 2001 (N=440) and 2002 (N=412) study participants found no significant differences ($p > 0.05$) on age, education, income, place of residence, self-defined sexual orientation, HIV serostatus, having a male domestic partner/spouse, or prevalence of UAI during the 3 months prior to the visit (see Table 1). However, a higher proportion of 2002 participants than 2001 participants were Hispanic (16.5% vs. 8.0%). Consequently, this factor was included in all subsequent multivariate analyses.

The prevalence of any UAI during the bathhouse visit was 11.1% in 2001 and 13.6% in 2002. The pattern was similar for both receptive UAI (5.5% vs. 6.0%) and insertive UAI (7.0% vs. 10.4%). Although not statistically significant, the prevalence of UAI is higher in 2002 (when on-site HIV testing was being offered in the bathhouse) than in 2001 (when no such testing was available).

Comparing the exposure subgroup to the 2001 and 2002 non-exposure subgroups reveals that the exposure subgroup has a lower prevalence of any UAI and insertive UAI, but a higher prevalence of receptive UAI during the bathhouse visit (see Table 2). However, only the within-2002 comparison for insertive UAI was found to be statistically significant. Since exposure to VCT may have a greater impact on men who are not HIV-positive, the analyses were repeated for non-positive (HIV-negative and HIV-unknown) respondents only. When limited to non-positive MSM, the prevalences of UAI during the bathhouse visit are uniformly lower. The pattern of results for any UAI and insertive UAI are essentially unchanged, but prevalence of receptive UAI in the exposure subgroup is the same or slightly lower than for the non-exposure subgroups among non-positive patrons. The small number of HIV-positive participants precludes statistical analysis within that group, but generally, HIV-positive patrons had higher prevalences of UAI, and exposure to testing appears to be associated with an increase in prevalence of receptive UAI during their bathhouse visit.

Discussion

The study results indicate that an on-site HIV testing program inside a bathhouse may alter the social environment among patrons in a way that has a preventive effect on some sexual risk behavior in the bathhouse. The data suggest that exposure to testing is associated with a lower likelihood of men engaging in insertive UAI during their bathhouse visits, although

only the within-2002 comparison achieved statistical significance. The fact that the prevalence of UAI among all patrons increased from 2001, when no testing was offered inside the bathhouse, to 2002, when on-site testing was offered frequently, confirms that exposure to on-site HIV testing did not have a robust effect on sexual risk behavior inside the bathhouse. It should be noted that this finding conforms to other data indicating a temporal trend towards increasing risk behavior among MSM at that time (Crepaz, Hart, & Marks, 2004; Osmond et al., 2007).

Risk Behavior and HIV Serostatus

It is useful to consider the pattern of results in the context of previously published data about sexual risk behavior inside this bathhouse (Binson et al., 2010; Woods et al., 2007). Fewer than 14% of patrons reported any UAI during their visit, and the rate of UAI was more than 3 times higher among HIV-positive men (28%) than among non-positive men (8%) (Woods et al., 2007). This disparity suggests seroadaptive behaviors like serosorting and seropositioning (Snowden, Raymond, & McFarland, 2009) are being employed, although in the largely anonymous bathhouse context a partner's serostatus is less likely to be known and more likely to be attributed based on the kind of sexual behavior he is willing to engage in (Binson et al., 2010). Among non-positive men who engage in anal intercourse during their bathhouse visit, the insertive UAI rate (18%) was more than double the rate for receptive UAI (8%) (Binson et al., 2010). Given that over 80% of the patrons are non-positive, and non-positive patrons rarely engage in receptive UAI inside the bathhouse, insertive UAI was the more likely behavior to be impacted (i.e., since the prevalence of receptive UAI was already low, it was unlikely the intervention could lower it further).

It would seem logical to assume that HIV-positive men would not have been influenced by exposure to HIV testing because they already knew they were infected with the virus. Our data lend no definitive support for or against that supposition because of small subsample sizes. The higher rate of receptive UAI in the exposure subgroup relative to the non-exposure subgroup is in truth a difference of only 2 or 3 cases. With such limited power, none of the differences observed among HIV-positive patrons would have achieved statistical significance.

Study Limitations

There are limitations to keep in mind concerning these results. First and foremost, neither of the two non-exposure subgroups was entirely comparable to the testing exposure subgroup. The 2001 non-exposure subgroup did match the 2002 testing exposure subgroup in terms of day of week and time of day they visited the bathhouse, but by definition they lacked temporal comparability because they were surveyed a year earlier. The 2002 non-exposure subgroup was surveyed the same year as the testing exposure subgroup, but by definition lacked time-of-day comparability because testing times were the same each week. The additional covariates in the logistic regression models were included to adjust results for the influences of variables that differed between groups. More importantly, the 2001 and 2002 non-exposure subgroups yielded similar results. Since the two subgroups are derived from two independent cross-sections of the patron population, it is reasonable to interpret the results from one as validating the other. Thus, despite the weaknesses inherent in each

individual comparison with the 2002 testing exposure subgroup, the combined results favor our interpretation.

Although the datasets were large at the start of the analysis, the need to narrowly define analytic subgroups in combination with a lack of prior knowledge of when patrons entered the bathhouse (i.e., those who entered long before testing commenced did not meet the operational definition of exposure) yielded small subgroup sizes, which resulted in limited power to detect statistically significant differences. Had data collection times better matched the times when testing was offered, then we might have obtained larger subgroups with which to make comparisons, but the desire to obtain representative samples of patrons inhibited our ability to accomplish this. The obtained participation rates (around 60%) were in line with expectations when using time-space sampling to survey MSM (MacKellar et al., 2007; MacKellar, Valleroy, Karon, Lemp, & Janssen, 1996).

It is also possible that the generally high level of prevention efforts at this bathhouse during times when HIV testing was not present may have made the prevention environment too “rich” to allow for a more pronounced effect from on-site testing. A larger reduction in UAI might obtain in bathhouses with poorer prevention environments. On the other hand, it could be that any effect was the result of the novelty of the “test-a-thon” approach. However, testing was being offered inside the bathhouse twice a week in the 4 months prior to the 2002 data collection period, so exposure to testing was not a unique experience to regular visitors. Yet, 85% of patrons visited the club once a month or less during the past year (Woods et al., 2007), so for most patrons testing exposure would be a fairly novel event.

Another consideration is the age of these data and whether they have relevance 10 years hence. Bathhouse regulatory policies are relatively unchanged in the past 20 years. For example, in a study of 12 city and county health jurisdictions across the U.S., only two made any changes in their policy towards bathhouses in the decade ending 2007 (Woods, Binson, Pollack, and Sheon, 2010). Los Angeles County in 2004 decided to require licensing and mandate programs (e.g., condom and information distribution, patron agreement to refrain from unsafe sex, on-site HIV testing) that larger bathhouses were already instituting voluntarily, although not necessarily at the levels required by the new regulations (Bathhouse and Sex Venue Regulation, 2004). Specifically, clubs are now required to pay for a minimum of 20 hours of on-site testing per week. The results of the present study create the expectation that this mandate could result in lower rates of risk behavior inside Los Angeles County bathhouses, but no research has been conducted to test the possibility.

Denver, on the other hand, dropped bathhouse regulations they found to be unenforceable (e.g., enforcing safer sex rules in private rooms) in favor of developing approaches that better addressed the safety and protection of staff and patrons (e.g., condom and information distribution, requiring management to “make efforts” to prevent unsafe sex), but did not require on-site HIV testing be paid for by the owners (City and County of Denver, 2006). In both Denver and Los Angeles the new policies focused on promoting safer sex behavior inside the bathhouses rather than sanctioning against sexual risk behavior.

Telephone surveys of managers of bathhouses in 1995 (Woods, Binson, Mayne, Gore, & Rebhook, 2001) and again in 2005 (Woods, Euren, Pollack, & Binson, 2010b) indicate that the overall number of venues remained fairly stable during that decade with the majority of businesses operating without change in location or ownership. More recent data do indicate a modest decrease in the number of bathhouses operating in the largest urban areas (Woods, Binson, Pollack, Cotten, and Neilands, 2008). Surveys at bathhouses in Portland, OR in 1996 (Van Beneden et al., 2002), Los Angeles in 2001–2002 (Bingham et al., 2008), and Seattle in 2004 and 2006 (Reidy et al., 2009) all yielded a prevalence of UAI inside the bathhouse comparable to the data reported here. Given the apparent stability in policy and facilities and risk behavior, we feel it is reasonable to conclude that current bathhouse environments have not changed substantively since the data for this study were collected. Nevertheless, the absence of more recent data on risk behavior, risk avoidance behavior, and HIV testing inside bathhouses should instill a healthy skepticism that can only be alleviated by new research and replication of these results.

Implications for On-site Testing

The primary purpose of HIV testing programs in bathhouses is to reach a high risk population of MSM in an environment where they are likely to feel more comfortable and accepted, and therefore will access the offered services. These results are not intended to assess that primary purpose, and the lack of a robust effect on sexual risk behavior inside the bathhouse should not be considered a reason to drop or reduce the presence of these programs at bathhouses. Even if the effect on UAI is minimal, it is still likely that these programs meet their primary aims, as a number of other studies have shown (Bingham et al., 2008; Daskalakis et al., 2009; Huebner et al., 2010; Huebner et al., 2006; Spielberg et al., 2005; Woods et al., 2010a). Moreover, it should be noted that in a bathhouse serving a large metropolitan area (particularly one that never closes), the yearly clientele can number in the tens of thousands, so even the modest reduction in sexual risk behavior suggested by this analysis may prevent thousands of potential risk events annually.

Recently compiled data indicate that on-site HIV testing is commonplace in gay bathhouses in the U.S. (approximately 75% have it), but the amount of testing is low (three quarters of the clubs that offered testing reported 4 hours a week or less) (Woods et al., 2010b). Since our results suggest that exposure to ongoing testing may lower the prevalence of some sexual risk behavior inside the bathhouse, it might be concluded that more on-site testing should be recommended. Alternatively, one might consider better advertising and/or more widespread outreach inside the bathhouse while testing is ongoing in order to amplify the impact of the extant program. Another possibility would be to modify post-test counseling regarding sexual risk reduction by referencing changes in club behavior during testing and suggesting ways in which clients' reaction to testing could be carried over to their behavior outside the venue. However, the limited statistical power of our analyses, the lack of a robust effect for VCT on UAI inside the bathhouse, and the absence of replicating studies preclude complete confidence in these results. Consequently, it is premature to suggest any changes in policy based solely on these data.

The high cost of HIV testing and the possibility that a rich prevention environment may itself keep risk behavior low also will also affect policy determinations. That is, it may be more cost effective to pursue systemic interventions in the bathhouse environment other than HIV testing (e.g., hiring a director of prevention, offering varying forms of outreach including small group and peer-led discussions, expanded outreach to frequently attending patrons, etc.). Clearly, further qualitative and quantitative research is needed to fully evaluate the effect of on-site HIV testing on sexual behavior inside bathhouses. Data from a larger number of venues beyond the west coast of the United States are necessary to assess the generalizability of the phenomenon. Other issues for future research include the magnitude of the effect in bathhouses with poorer prevention environments than the venue in the present study, and whether there is a ceiling effect for the number of hours of exposure to testing.

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Table 1

Comparisons between 2001 and 2002 Cohorts

Variable	Category	2001 Sample (n=440) %	2002 Sample (n=412) %	P-value
Age				0.430
	18–29	14.4	10.2	
	30–39	34.2	34.0	
	40–49	28.8	34.0	
	50+	22.6	21.8	
Race/ethnicity				0.043
	White	59.5	56.6	
	African American	11.8	7.8	
	Asian/Pac. Islander	12.8	10.3	
	Hispanic	8.0	16.5	
	Other	7.9	8.9	
Education				0.152
	< college degree	26.8	31.8	
	4-year college degree	50.8	41.9	
	Advanced degree	22.4	26.3	
Income				0.063
	\$40,000 or less	30.3	31.7	
	\$40,001 – \$80,000	43.5	51.3	
	Over \$80,000	26.2	16.9	
Residence				0.807
	Local urban area	34.2	37.0	
	Nearby central city	28.8	28.0	
	Other areas	37.0	35.0	
Orientation				0.433
	Gay identified	74.5	70.9	
	Non-gay identified	25.5	29.1	
HIV serostatus				0.586
	HIV-positive	15.2	17.0	
	Non-positive	84.8	83.0	
Male domestic partner/spouse				0.438
	Yes	31.3	28.0	
	No	68.7	72.0	
Any UAI prior 3 months				0.146
	Yes	30.3	36.5	
	No	69.7	63.5	

Table 2

Comparisons of the 2002 Testing Exposure Subgroup to the 2001 and 2002 Non-exposure Subgroups on Prevalence of UAI During the Bathhouse Visit

	2001 Non-exposure	2002 Testing Exposure	2002 Non-exposure
Unweighted n	65	84	99
Any UAI (%)	13.9	10.7	13.6
Multivariate <i>p</i> -value	0.801		0.245
Adjusted odds ratio ¹	0.86		0.55
95% confidence interval	0.25 – 2.88		0.20 – 1.52
Receptive UAI (%)	5.9	7.3	5.0
Multivariate <i>p</i> -value	0.668		0.248
Adjusted odds ratio ¹	1.42		2.39
95% confidence interval	0.28 – 7.23		0.54 – 10.53
Insertive UAI (%)	10.3	5.8	11.8
Multivariate <i>p</i> -value	0.397		0.043
Adjusted odds ratio ¹	0.51		0.30
95% confidence interval	0.11 – 2.42		0.09 – 0.96
Non-positive only	49	70	82
Any UAI (%)	11.6	7.9	12.4
Multivariate <i>p</i> -value	0.227		0.120
Adjusted odds ratio ²	0.40		0.36
95% confidence interval	0.09 – 1.79		0.10 – 1.30
Receptive UAI (%)	4.7	4.4	4.4
Multivariate <i>p</i> -value	0.644		0.774
Adjusted odds ratio ²	0.61		1.34
95% confidence interval	0.07 – 5.05		0.18 – 10.13
Insertive UAI (%)	9.8	4.5	11.1
Multivariate <i>p</i> -value	0.094		0.034
Adjusted odds ratio ²	0.17		0.20
95% confidence interval	0.02 – 1.36		0.05 – 0.88
HIV-positive only	15	13	15
Any UAI (%)	24.9	33.4	22.0
Receptive UAI (%)	11.4	30.3	9.7
Insertive UAI (%)	13.5	16.6	17.1

¹ Adjusted for length of bathhouse visit, age, Hispanic ethnicity, HIV serostatus, day of week respondent arrived at bathhouse, and week of data collection

² Adjusted for length of bathhouse visit, age, Hispanic ethnicity, day of week respondent arrived at bathhouse, and week of data collection