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HIV and STD Status Among MSM and Attitudes About Internet Partner Notification for STD Exposure

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Objectives: **This study assessed the acceptability and perceived utility of Internet-based partner notification (PN) of sexually transmitted disease (STD) exposure for men who have sex with men (MSM) by human immunodeficiency virus (HIV) serostatus.**

Study Design: **We recruited 1848 US MSM via a banner advertisement posted on an MSM website for meeting sexual partners between October and November 2005.**

Results: **Even though there was broad acceptance of a PN e-mail across HIV serostatus groups, HIV-infected men rated the importance of each component (e.g., information about where to get tested/treated, additional education regarding the STD exposed to, a mechanism for verifying the authenticity of the PN e-mail) lower than HIV-uninfected or status-unknown participants (all *P*'s <0.01). Additionally, HIV-infected participants were less likely to use the services offered within a PN e-mail (if they were to receive an e-mail notifying them of possible STD exposure in the future), and were less likely to inform their partners of possible STD exposure via an Internet notification system in the future (all *P*'s <0.01). A similar trend emerged about men who reported not having a previous STD compared with those who did. Men who reported no previous STD found Internet PN more acceptable.**

Conclusions: **Overall, this study documents broad acceptance of Internet PN by at-risk MSM, regardless of HIV serostatus, including a willingness to receive or initiate PN-related e-mail. If public health officials consider using Internet notification services, they may need to anticipate and address concerns of HIV-infected MSM, and will need to use a culturally-sensitive, social marketing campaign to ensure that those who may benefit from these services are willing to use this modality for PN. Internet PN should be considered as a tool to decrease rising STD and HIV rates among MSM who use the Internet to meet sexual partners.**

THE STEADY INCREASES IN SEXUALLY transmitted diseases (STDs) among men who have sex with men (MSM)[1–4] and the augmented potential of human immunodeficiency virus (HIV) transmission[5] underscore the need to develop culturally-appropriate and innovative STD/HIV prevention strategies for MSM. This study sought to assess the acceptability and perceived utility of Internet-based partner notification (PN) of STD exposure for MSM by HIV serostatus; overall findings have been previously reported.[6]

PN is a core component of STD prevention and control programs in many jurisdictions and may help to prevent the spread of STDs/HIV among MSM who engage in risky sexual behavior. Traditional PN uses 3 different strategies for notifying the sexual partners of infected patients: provider referral (notification of sexual partners via a third party); partner referral (notification of sexual partners via the index patient); and contract referral (an agreement between the patient and provider where the patient is given the opportunity to notify their sexual partners on their own, with the understanding that their partners will be notified by a third party if they have not been notified by a predetermined date).[7,8] Such strategies may be appropriate for notification of partners under certain circumstances; however, much of the literature on PN strategies argues for cultural sensitivity and attention to special circumstances in assessing their appropriateness and potential for success as an intervention strategy.[7,9] In particular, there are numerous considerations when evaluating the success of such strategies for MSM, such as the feasibility of notifying anonymous partners.[10]

Previous studies have evaluated the high prevalence of risky sexual behaviors among MSM who use the Internet.[11–14] One study found that MSM were more likely than any other group surveyed to access the Internet to look for sexual partners.[13] In addition, when compared with individuals not seeking sexual partners on the Internet, those who did so were more likely to have had an STD previously, were more likely to become infected with an STD or HIV in the future, were more likely to have engaged in sexual behaviors with an HIV-infected partner, and had more sexual partners.[13] As MSM are the most frequent seekers of sexual partners on the Internet, it is reasonable to think of the Internet as a place where education and referral to clinical services may be most effective for at-risk MSM.

In addition to the greater frequency with which MSM engage in certain risky sexual behaviors,[15] it is also very common for MSM to report sexual contact with anonymous partners. In one study, anonymous sex was reported by 44.9% to 88.5% of MSM respondents in various cities.[10] Anonymous sex poses challenges in the context of PN programs, because individuals may not be able to identify their sexual partners and provide locator information.

As online health information on STD and HIV has become more pervasive, there have been several initiatives to develop Internet

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PN systems that permit notification of sexual partners who may not be otherwise identified by the index patient. One such initiative found Internet PN via an online "chat room" to be moderately successful for MSM.[16] Based in San Francisco, one of the major challenges confronted by the study was the inability to identify online users of the chat room by anything other than a screen name because of privacy restrictions. To counteract this challenge, the researchers designed a notification system in which the partners of index patients were notified of their possible exposure by an electronic mail (e-mail) message sent via their online profile. The study found that an average of 5.9 partners per index patient sought testing; in previous studies of PN in similar populations the average had been only 2.2.[17] Additional investigations of e-mail-based PN for syphilis in MSM in San Francisco and Los Angeles have demonstrated high rates of testing among notified partners.[18,19]

The current study was designed to assess the acceptability of Internet PN systems for MSM via one of the largest MSM-specific sexual partner meeting sites. To our knowledge, this is the first study of its kind to examine the acceptability and appropriateness of such strategies for this population by HIV serostatus. Because of stigma associated with diagnoses of STDs and HIV, and because of concerns that patients may have about perceived homophobia of medical providers and confidentiality of medical record information, we hypothesized that MSM with prior diagnoses might be more likely to find third party notification less acceptable than those with fewer negative experiences with the health care system and fewer fears of disclosure of their prior medical information. We hypothesized that there would be overall broad support for Internet PN among HIV serostatus groups whether or not an individual had a previous STD. However, we think acceptability will differ by HIV serostatus, with HIV-uninfected MSM having a higher rate (on average) of acceptability versus HIV-infected or HIV status-unknown MSM. Similarly, we think that MSM with no prior STD diagnosis will have a higher rate (on average) of acceptability versus those with a prior diagnosis.

Methods

This study was conducted online via one of the largest MSM Internet sexual meeting sites with the full cooperation and participation from the site's administrators. All study measures and procedures were approved by the Institutional Review Board at The Fenway Institute, Fenway Community Health.[20,21] The survey was developed and administered with the support of the Massachusetts Department of Public Health Communicable Disease Bureau, Sexually Transmitted Disease Prevention Division.

Participants

Participants were recruited via a banner advertisement that invited users of the website to take part in the current study, and all users of the website within the contiguous United States could gain access to and complete the questionnaire. Users of the website could access the banner advertisement for a 1-month period beginning in October 2005. Clicking on the banner directed participants to a page explaining the content and purpose of the study. Because the questionnaire was anonymous and no identifying information was collected, informed consent was not obtained.

Measures and Data Analysis

The questionnaire was administered to participants using the online survey service provided by Survey Monkey (http://www.surveymonkey.com). Study participation took approximately 10 to 15 minutes. The questionnaire asked about demographic information (age, education level, race, residential zip code, sexual preference, and STD/HIV history) and reactions to and preferences regarding e-mail notification of exposure to an STD. The questionnaire asked respondents to rate their likelihood of utilizing a variety of services included in a sample PN e-mail. There were also questions related to participants' intent to use different strategies for PN if they were infected with an STD in the future.

For the current article, SPSS statistical software was used to perform each analysis, where statistical significance was determined at the $P < 0.05$ level. All analyses were conducted using a complete case analysis; descriptive statistics for missing observations were similar to those used in all analyses.

Descriptive statistics were calculated for both demographic variables and content-related questions. χ^2 tests were calculated to evaluate the likelihood of having a previous STD based on HIV serostatus, as well as demographic comparisons between HIV serostatus groups and reporting a prior STD or not. Mean group comparisons for age were made using one-way analyses of variance and *t* tests to compare differences between HIV serostatus groups, and participants who reported having/not having a previous STD.

Acceptability of Utilizing an Internet PN System. Participants were given 5 options and asked to select 1 for how they would most likely behave if infected with a curable STD (i.e., Chlamydia, gonorrhea, or syphilis) in the future. Chi square tests were performed to compare categories across the 3 serostatus groups and between those reporting/not reporting a previous STD. Overall acceptability of utilizing Internet PN to inform partners of possible STD exposure (if infected with an STD in the future) was determined by aggregating responses1, 2, and 3 (i.e., use the department of public health to notify sexual partners via a PN e-mail; notify sexual partners themselves via a PN e-mail; or do both). A separate chi square analysis examining Internet PN acceptability by STD history was performed yielding 6 categories.

Likelihood of Utilizing Specific Components Within a PN E-mail. Participants were asked to imagine that they received a PN e-mail from a public health specialist who had an established profile on a given sex site for MSM. Participants were asked to rate their likelihood of utilizing specific components of a PN e-mail on a Likert scale from 1 to 4 (very unlikely to very likely). Responses to these questions were grouped as "likely" (categories 3 and 4) or "not likely" (categories 1 and 2). Chi square tests were performed to compare behavioral intentions of using an Internet PN system between HIV serostatus groups and between those reporting/not reporting a previous STD. The theory of planned behavior guided our logic behind assessing behavioral intentions, as intentions are considered a proximal predictor of behavior.[22]

Important Elements of a PN E-mail of Possible STD Exposure. Participants were asked to consider the type of information they would or would not like to receive in a PN e-mail from a public health specialist notifying them of an STD exposure. Reponses to each of the questions in this section allowed participants to gauge their level of importance on a Likert scale ranging from 1 to 5 (least to most important). Responses to these questions were grouped as "important" (categories 3, 4, and 5) or "not important" (categories 1 and 2). Chi square tests were performed to compare the acceptability of using an Internet PN system between HIV serostatus groups and between those reporting/not reporting a previous STD.

Analyses Performed by US Regions. One-way analyses of variance and chi square tests were used to examine differences between regions of the United States on: (a) demographics; (b)

TABLE 1. Descriptive Statistics (N = 1848)

	HIV Uninfected (N = 1287)	HIV Status Unknown (N = 198)	HIV Infected (N = 363)
Age range, mean (SD)	18–70, 35.2 (10.5)	18–61, 34.4 (10.1)	18–65, 39.81 (8.9)*
	N (%)	N (%)	N (%)
Race/ethnicity			
White/Caucasian	1048 (81.4)	138 (69.7)*	296 (81.4)
Black/African American	45 (3.5)	14 (7.1)†	18 (5.0)
Hispanic/Latino	99 (7.7)	22 (11.1)	29 (8.0)
Multiracial	22 (1.7)	5 (2.5)	2 (0.6)
Asian/Pacific Islander/other	73 (5.7)	19 (9.6)†	18 (5.0)
Education			
HS/GED or less	137 (10.7)	31 (15.7)†	32 (8.8)
Some college/associates Degree/technical school	377 (29.3)	68 (34.3)	135 (37.2)*
College degree	477 (37.0)	62 (31.3)	124 (34.2)
Graduate/Prof. degree	296 (23.0)	37 (18.7)	72 (19.8)
Sexual orientation			
Homosexual/Gay	1094 (85.0)	163 (82.4)	347 (95.6)*
Bisexual	170 (13.2)	31 (15.6)	14 (3.9)*
Heterosexual/straight/other	23 (1.8)	4 (2.0)	2 (0.5)
Self-reported STD history			
Prior STD diagnosis (syphilis, gonorrhea, Chlamydia, or any combination)	360 (28.0)	58 (29.3)	237 (65.3)*
Syphilis	77 (6.0)	14 (7.1)	121 (33.3)*
Gonorrhea	256 (19.9)	47 (23.7)	166 (45.7)*
Chlamydia	162 (12.6)	15 (7.6)†	95 (26.2)*
United States regions			
Pacific	144 (59.5)	23 (9.5)	75 (31.0)
Mountain	101 (75.3)	10 (7.5)	23 (17.2)
West North Central	24 (68.6)	5 (14.3)	6 (17.1)
West South Central	55 (65.5)	9 (10.7)	20 (23.8)
East North Central	167 (73.9)	23 (10.2)	36 (15.9)
East South Central	33 (71.7)	7 (15.2)	6 (13.1)
Mid Atlantic	175 (68.4)	35 (13.6)	46 (18.0)
South Atlantic	289 (65.7)	46 (10.5)	105 (23.8)
New England	299 (77.7)	40 (10.4)	46 (11.9)

Referent is the HIV-uninfected participants.
*$P < 0.01$.
†$P < 0.05$.

reported level of importance of components of a PN e-mail; (c) reported level of behavioral intentions to use components included in a PN e-mail; and (d) reported intentions of using differing methods of PN in the future. Regions were divided using a previously established regional map of the United States obtained from the Centers for Disease Control and Prevention.[23]

Results

Demographics

Descriptive statistics by HIV serostatus are presented in Table 1. Three thousand two hundred ninety-nine US users of the website clicked on the advertisement, linking them to the online questionnaire. Of these, 1848 men completed the questionnaire. Participants ranged in age from 18 to 70 years (M = 36.0, SD = 10.3). Eighty-three percent identified as white, 4.5% black/black, 8% Hispanic/Latino, 2% multiracial, and 2.5% Asian/Pacific Islander/Other. Fifty-eight percent had a college degree or higher, with only 1.5% of the sample reporting less than a high-school education. Most identified as homosexual/gay (87%), whereas 12% identified as bisexual and 1% heterosexual/straight or other. At least one participant reported a zip code from each of the 50 states, with the exception of South Dakota and Idaho. The mean number of participants in each region of the United States was 203 (SD = 133); there were no statistically significant regional variation differences about demographics or survey responses. In addition, there were no statistically significant differences in demographics for individuals who completed specific sections of this study, versus those who opted out of answering.

HIV Status and History of STDs

Twenty percent of the sample reported being HIV-infected, 70% HIV-uninfected, and 10% did not know their HIV status. The self-reported rate of HIV infection found in the current study is similar to other studies of MSM who use the Internet to meet sexual partners (e.g., 16.7%[24]; 22.5%[25]; 16.2%[26]). HIV-infected participants were older ($P < 0.01$), and more often identified as homosexual/gay ($P < 0.01$) compared with HIV-uninfected men. HIV status-unknown participants were less likely to identify as white ($P < 0.01$), more likely to identify as black/black ($P < 0.05$), or Asian/Pacific Islander ($P < 0.05$), and more often had less than a high school education ($P < 0.05$) compared with HIV-uninfected men.

Eleven percent of the men reported being previously diagnosed with syphilis, whereas 25% reported prior gonorrhea and 15% reported prior chlamydial infection; these frequencies are similar

TABLE 2. Acceptability of Utilizing an Internet Partner Notification System for STD Exposure (N = 1636)

	HIV Uninfected (N = 1145), N (%)	HIV Status Unknown (N = 176), N (%)	HIV Infected (N = 315), N (%)
Participants were asked to choose one of the following responses, indicating what they would most likely do if infected with a STD in the future:			
Would only use the Department of Public Health to notify their sexual partners via a PN e-mail	377 (32.9)	64 (36.4)	85 (27.0)*
Would notify their primary/regular partners themselves via a PN e-mail, and use the Department of Public Health to notify their "other" sexual partners via a PN e-mail	459 (40.1)	54 (30.7)*	107 (34.0)*
Would notify all of their partners on their own via a PN e-mail	238 (20.8)	35 (19.9)	92 (29.2)†
Would do nothing at all (not notify any sexual partners)	41 (3.6)	14 (7.9)†	18 (5.7)
Would do something other than what is listed above	30 (2.6)	9 (5.1)	13 (4.1)

Referent is the HIV-uninfected participants.
*P <0.05.
†P <0.01; P <0.001.

to other studies of MSM who use the Internet to find sexual partners.[24,27] HIV-infected participants were more likely to report ever being diagnosed with syphilis, gonorrhea, or chlamydia compared with the status-unknown participants (all P's <0.01). In total, 35% of the sample reported a previous STD (syphilis, chlamydia, gonorrhea, or any combination of the 3). Those who reported having a previous STD were demographically similar to those who did not. However, those who reported having a previous STD were more likely to self-report being gay/homosexual compared with those who did not (P <0.001).

Acceptability of Utilizing an Internet PN System

Overall, more than 92% of study participants would use Internet PN in some capacity (i.e., use the department of public health to notify sexual partners via a PN e-mail; notify sexual partners themselves via a PN e-mail; or do both) to inform their sexual partners if infected with an STD in the future. HIV-uninfected and HIV unknown status participants reported that they would be more likely to use Internet PN in some capacity to notify their sexual partners of exposure to an STD compared with HIV-infected participants (Table 2). Men who reported no previous STD were more likely to tell or e-mail their regular partner(s) themselves and have the public health specialist notify their other sexual partners via a notification e-mail (P <0.05) and more likely to tell or e-mail everyone themselves (P <0.05) compared with those who reported previously having had an STD. No significant geographic variations were noted.

Comparisons stratifying Internet PN acceptability by serostatus by STD history revealed that HIV-uninfected MSM with no STD history were more willing to avail themselves of this modality for PN compared with HIV-infected MSM with no STD history (P <0.01), and HIV unknown-serostatus MSM with (P <0.001) and without (P <0.05) a STD history.

Likelihood of Utilizing Specific Components Within a PN E-mail

HIV-uninfected and HIV unknown status participants reported greater intentions of utilizing the 4 services offered within a PN e-mail if they were to receive an e-mail notifying them of possible STD exposure, compared with HIV-infected participants (Table 3). Similarly, about men who reported previously not having had an STD compared with those who did, men who reported no previous STD were more likely to use all of these options (all P's <0.001). No significant geographic variations were noted.

Important Elements of a PN E-mail of Possible STD Exposure

About including specific components (i.e., links to information, testing, treatment) in a PN e-mail, HIV-uninfected and HIV unknown status participants reported a higher level of importance for each than HIV-infected participants (Table 4). A similar trend emerged about men who reported not having a previous STD compared with those who did—men who reported no previous STD found it more important to have each of these components

TABLE 3. Likelihood of Utilizing Specific Components Within an Internet Partner Notification E-Mail (N = 1647)

	HIV Uninfected (N = 1153), N (%)	HIV Status Unknown (N = 177), N (%)	HIV Infected (N = 317), N (%)
Call a public health specialist whose information was supplied in the PN e-mail	747 (64.8)	98 (55.4)*	159 (50.3)†
Access a website listed in the PN e-mail to find information about where to get tested and treated if necessary	993 (86.1)	152 (85.9)	216 (68.1)†
Access a website listed in the PN e-mail to find information about the STD exposed to	1026 (90.0)	149 (84.2)	245 (77.3)†
Call or e-mail a customer service representative of a given sex site to confirm the e-mail's authenticity	830 (72.0)	124 (70.1)	207 (65.3)*

Referent is the HIV-uninfected participants.
*P <0.05.
†P <0.001; P <0.01.

TABLE 4. Self-Rated Important Elements of an Internet Partner Notification E-Mail of Possible STD Exposure (N = 1719)

	HIV Uninfected (N = 1203), N (%)	HIV Status Unknown (N = 183), N (%)	HIV Infected (N = 333), N (%)
The PN e-mail specifies that an exposure from sexual contact with someone met on the site be included	1032 (85.8)	138 (75.5)*	220 (66.2)*
The PN e-mail links you to additional education regarding the STD exposed to	979 (81.5)	141 (77.0)	217 (65.2)*
The PN e-mail provides information about where to get tested/ treated for the STD exposed to (for example: STD clinics, health centers, hospitals)	1020 (84.8)	153 (83.6)	238 (71.5)*
The PN e-mail contains a phone number to contact a public health specialist familiar with your possible infection	959 (79.7)	133 (72.7)†	206 (62.0)*
The PN e-mail has a phone number or link to contact a customer service person from the sex site regarding the e-mail's authenticity	968 (80.5)	149 (81.4)	237 (71.2)*

Referent is the HIV-uninfected participants.
*P <0.001.
†P <0.05.
‡P <0.01.

(all P's <0.0001). There was no geographical variation in the responses to these questions.

Discussion

Multiple recent reports have suggested that a substantial number of new HIV cases and STDs are acquired by MSM via meeting new sexual partners on the Internet.[11–13] The current study demonstrated broad support for Internet PN services among MSM of any HIV serostatus who seek partners on the Internet. Participants attached a high level of importance to receiving a variety of information in notification e-mails from public health specialists, including notification e-mails informing them that they had sex with someone infected with an STD, linking them to education about the STD, linking them to information on where to get tested for the STD, triage to public health specialists familiar with the STD, as well as access to phone numbers or link to a customer service representative to confirm the e-mail's authenticity. Furthermore, a majority of participants, regardless of HIV serostatus, responded that they would be likely to use the services included in such an e-mail if they were to receive an Internet notification of possible exposure to an STD. Finally, more than 92% of study participants would use Internet PN in some capacity (i.e., use the department of public health to notify sexual partners via a PN e-mail; notify sexual partners themselves via a PN e-mail; or do both) to inform their sexual partners if infected with an STD in the future.

Although these results suggest that Internet STD PN programs would be highly acceptable to MSM who use the Internet to meet sexual partners, HIV-infected participants rated the importance of each component of a PN e-mail lower than HIV-uninfected or status-unknown participants. Additionally, HIV-infected participants were less likely to report utilizing the services offered within a PN e-mail, if they were to receive an e-mail notifying them of possible STD exposure in the future. Finally, HIV-infected participants were less likely to report informing their partners of possible STD exposure via an Internet notification system. Thus, Internet PN may not be as acceptable and effective among HIV-infected MSM (even when stratifying by a prior STD history), perhaps because of (a) concerns about the confidentiality of their HIV status (e.g., as shown in Ref. 28) when being contacted by public health officials via the Internet; (b) state-level ordinance criminalizing nondisclosure of HIV serostatus to sexual partners; or (c) the fact that HIV-infected MSM are more willing to take personal responsibility for notification by notifying sexual partners on their own. It might also be that HIV-uninfected MSM or MSM without an STD history may surmise a more cautious approach to sexual interactions and a greater propensity to adhere to public health recommendations and guidance and a more amenable attitude toward public health interventions. Furthermore, it is possible that HIV-infected MSM or MSM with an STD history may have had (repeated) exposures to public health interventions (including visits to STD and HIV clinics), so they do not need additional information about specific STDs or where to go to get tested. Thus, the differences in attitudes toward online PN may be more a reflection of the personality and risk-taking behavior of the person and less a result of being HIV-infected. Even so, the majority of HIV-infected respondents were enthusiastic about Internet PN.

Men who were previously diagnosed with an STD were less supportive of Internet PN services than those who reported no prior STD. This could reflect prior concerns that some of the men had about the confidentiality of their medical records or residual shame or guilt about having acquired an STD.[29] If public health officials consider using Internet notification services, they may need to anticipate and address these concerns and will need to use a culturally sensitive social marketing campaign[30] to ensure that those who may benefit from these services are willing to use this modality for PN.

Although prior Internet surveys have had problems with redundant responses,[31] the Survey Monkey service used in the current study included protection against repeat survey submissions, to prevent this potential drawback. Several groups[32,33] reported a high degree of reliability for Internet-based questionnaires, compared with mailed questionnaires, with questions answered similarly in these 2 medias.

Generalizability, however, may be a concern because the population sampled in this study cannot be assumed to be representative of MSM in general. This study was restricted to MSM who visited the partner-seeking website on which we advertised, who decided to visit and complete the survey linked to the banner advertisement. It is reasonable to believe that the Internet-savvy MSM who comprised the study sample would be more amenable to an Internet PN system than other MSM who use the Internet less or not at all. It is worth noting, however, that this website has more

than one-half of a million subscribers worldwide, so the responses may be reflective of an important and large subset of MSM.

Based on the broad support for a PN system in the current study, it would be reasonable to develop these approaches using online partner-seeking websites. The feasibility of Internet PN was supported by Klausner and colleagues[16] who found that sending e-mails to members of an MSM chat room tied to a syphilis outbreak in San Francisco led to an average of 5.9 partners per index patient being motivated to undergo testing for syphilis. Although Internet PN may only directly benefit MSM who use the Internet to find sexual partners, the elevated STD risk in this population [11–13] presents the potential for this strategy to significantly curb recent increases in STD and HIV incidence among MSM.

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