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Men Who Have Met Sex Partners via the Internet: Prevalence, Predictors, and Implications for HIV Prevention

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This study examined the prevalence of Internet use for meeting sexual partners among men who have sex with men. The study also examined HIV risk behaviors among men who reported meeting a sexual partner via the Internet. A sample of 609 men was surveyed while attending a gay pride festival in Atlanta, GA. Participants completed a questionnaire assessing demographic information, Internet use, gay acculturation, AIDS knowledge, attitudes about condoms, global substance use, and sexual behavior. A substantial majority of men (75%) reported using the Internet to access gay-oriented web sites. One third of the sample (34%) reported having met a sexual partner via the Internet. Men meeting sex partners online reported higher rates of methamphetamine use. Men meeting sexual partners over the Internet reported having sex with more male partners in the previous 6 months ($M = 8.38$, $SD = 19.39$) compared with men not meeting partners in this manner ($M = 3.13$, $SD = 4.99$, $p < .001$). Men meeting partners via the Internet also reported higher rates of sexual risk behaviors including unprotected anal receptive intercourse ($p < .05$) and unprotected anal insertive intercourse ($p < .01$). The high prevalence of Internet use as a method of meeting sexual partners suggests that sexual networks may be forming over the Internet. The Internet therefore provides opportunities for new HIV primary prevention interventions.

KEY WORDS: HIV; sexual behavior; Internet; prevention; homosexuality.

The demography of AIDS in the United States has changed in recent years, but the majority of AIDS cases and new HIV infections continue to occur among men who have sex with men (MSM; Centers for Disease Control and Prevention, 1998). The social networks and risk behaviors of MSM therefore continue to be important areas of investigation for HIV primary prevention work. Many MSM meet in traditional venues, such as gay cultural events, via friends, gay organizations, gay bars, and gay pride festivals. In recent years, the Internet has become a popular venue for gay men, like their heterosexual counterparts, to exchange information, discuss political issues, converse in chat rooms, and to place and respond to personal ads (Shaw, 1997; Weinrich, 1997). The Internet may have unique appeal for gay men because like many other disenfranchised groups, gay men have relatively few places in which they can meet without fear of negative social consequences. It has been suggested that the Internet may provide a new outlet for gay men and women to discuss issues of interest in an anonymous fashion without fear of reprisal (Shaw, 1997; Weinrich, 1997).

At least some individuals initially "meeting" over the Internet (online) ultimately meet in person, and some MSM report sexual activity with partners originally met through the Internet (Shaw, 1997). The use of the Internet as a method of meeting sexual partners came to the attention of public health officials after a syphilis outbreak in San Francisco was traced back to an America Online discussion forum (chat room) used predominantly by MSM (Klausner, Wolf, Fischer-Ponce, & Zolt, 2000; San Francisco Department of Public Health, 1999). Few studies have investigated the prevalence of Internet use as a method of meeting sexual partners. Shaw (1997)

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provided a qualitative analysis of interviews conducted with 12 MSM reporting Internet use. All participants of that study reported a face-to-face meeting with a man they had initially contacted over the Internet and nine participants (75%) reported having met a sexual partner through the Internet. In a much larger study, McFarlane, Bull, and Rietmeijer (2000) reported that 16% of patients presenting to an STD clinic indicated that they had sought sex partners over the Internet. These individuals were more likely to be gay and male, more likely to have a past history of a sexually transmitted infection, and reported more sexual partners over the previous 12 months. This study presented preliminary data showing a relationship between seeking sexual partners via the Internet and some risk behaviors. However, the very specialized sample was not representative of the U.S. population as a whole or of MSM specifically. In addition, this study did not determine if seeking partners via the Internet was a significant independent predictor of high-risk behavior, after accounting for demographic factors and other correlates of high-risk behavior.

The present exploratory study surveyed a large sample of MSM attending a gay pride festival to assess the prevalence of meeting sex partners over the Internet and the behavioral characteristics of MSM who reported meeting a partner via the Internet. We anticipated that men meeting partners via the Internet would engage in higher risk sexual behaviors, and would also report additional risk behaviors such as substance use. We anticipated that this association between meeting sexual partners over the Internet and high-risk sexual behavior would remain significant after accounting for the influence of demographic factors and known correlates of high-risk behavior.

METHOD

Participants, Setting, and Procedures

To investigate the prevalence of Internet use as a means of meeting sexual partners, 609 men attending a gay pride festival in Atlanta, GA, were recruited to complete self-administered surveys. This festival was chosen as the site for the survey because of the over 300,000 men who attend this annual event and because previous research has shown that men who attend gay pride festivals report significant rates of high-risk sexual behaviors (Hickson, Reid, Davies, Weatherburn, Beardsell, & Keogh, 1996). Georgia ranks eighth among U.S. states in cumulative number of AIDS cases, and over 70% of all AIDS cases in Georgia have been reported in metropolitan Atlanta. More than half of Atlanta's AIDS cases have occurred among men who have sex with men (Georgia Division of Public Health, 1998).

Participants were asked to complete an 11 page survey concerning HIV and AIDS as they walked through the area of the festival grounds where retail venders and community organizations occupied display booths, two of which were rented for the purposes of this study. Participants were told that the survey was about sexual relationships, contained personal questions about their sexual history and substance use, was anonymous, and required approximately 15 min to complete. Research assistants attempted to recruit all men walking through the vending area. Over 70% of men approached agreed to complete the survey. Participants' names were not collected with the survey at any time. Participants were offered $4 for completing the survey, of which half could be donated to a local AIDS service organization; 45% of the sample chose to donate their entire incentive payment.

Measures

Participants completed self-administered anonymous surveys that consisted of measures of demographic information, Internet use, gay acculturation, AIDS knowledge, condom attitudes, substance use, and sexual practices.

Demographics

Participants were asked their age, years of education, income, ethnicity, home zip code, whether they self-identified as gay, bisexual, or heterosexual, whether they had been tested for HIV antibodies, and if so the results of their most recent HIV test.

Internet Use

Participants were asked to indicate how often they used gay-oriented computer services/Internet bulletin boards. Response choices ranged from 1 (*Never*) to 4 (*often*). Participants were also asked the question: "Have you ever had sex with someone you met over the Internet?" with a yes/no response choice format.

Gay Acculturation

Participants were asked to indicate how often in the past year they engaged in gay cultural activities (e.g., "Read gay newspapers or magazines," "Gone out to gay bars"). Responses were anchored on a 4-point scale from 1 (*never*) to 4 (*often*). This measure showed acceptable internal consistency within this sample ($\alpha = .73$).

AIDS Knowledge

Participants answered six questions designed to assess knowledge about HIV, AIDS, and the risk associated with various sexual activities (sample item, "By reducing the number of sexual partners you reduce your risk for getting HIV/AIDS."). Participants were asked to respond "True," "False," or "Don't Know." AIDS knowledge items were selected from a longer AIDS-Knowledge questionnaire used in previous research (Benotsch, Kalichman, & Kelly, 1999). Correct answers were keyed and summed across the 6-item scale.

Condom Attitudes

We used a shortened 4-item version of the Condom Attitudes Scale (Hewling-Larsen & Collins, 1991) as adapted for previous research (Kalichman, Kelly, & Rompa, 1997). Items included "Condoms ruin the mood," and "Using condoms is an interruption of foreplay," $1 =$ *Strongly Agree*, $4 =$ *Strongly Disagree*. Internal consistency for this measure was acceptable ($\alpha = .77$).

Substance Use

Participants were asked if they had used alcohol, marijuana, nitrite inhalants (poppers), cocaine, and methamphetamine in the previous 6 months. Participants were also asked if they had ever used Viagra to "boost [their] sexuality."

Sexual Practices

Sexual behavior was measured by asking participants to report the number of times they had engaged in anal intercourse, as the insertive and receptive partner, as well as the number of times they used or did not use condoms during anal intercourse in the past 6 months. We were particularly interested in unprotected anal intercourse because of the high risk that this behavior poses for HIV transmission. Participants were also asked to report the number of times they had engaged in unprotected oral sex, as both the insertive and receptive partner in the past 6 months. Participants also recorded the number of sexual partners with whom they had engaged in each behavior in the previous 6 months. Open response formats were used for the sexual behavior measures to reduce response bias and to minimize measurement error. Participants were also asked to respond "Yes" or "No" to items asking whether they had exchanged sex for money or drugs, or exchanged tangible goods for sex. Measures similar to these have been found to be reliable in self-reported sexual behavior assessments (Kauth, St. Lawrence, & Kelly, 1991).

Data Quality Assurances and Statistical Analyses

All surveys were examined for inconsistencies and invalid responses. Missing data were omitted from analyses, resulting in slightly different *ns* for various statistical tests. The resulting groups, men who had met a sexual partner over the Internet and men who had not, were compared on demographic, gay acculturation, substance use, and sexual behavior risks using *t* tests, Mann–Whitney nonparametric tests, chi-square analyses, and sequential logistic regression analysis. Because distributions of sexual behavior were highly skewed, nonparametric analyses were used as recommended by Hays (1988). Two-tailed significance levels were used for all tests.

RESULTS

Among the 609 participants, the mean age was 32.6 years ($SD = 9.0$), and the average years of education was 14.7 ($SD = 2.0$). The majority of the sample was white (75%), with the remainder being African American (17%), Latino (3%), Asian American (3%), or other/mixed ethnic heritage (2%). The sample represented diverse regions of the United States: participants reported 272 separate home zip codes, representing 27 U.S. states and the District of Columbia. Twenty-five percent of participants had annual incomes below $20,000, 26% had incomes between $21,000 and $30,000, and 49% had annual incomes over $30,000. The majority (85%) reported having been tested for HIV antibodies; of those, 81% tested HIV negative, 17% HIV positive, and 2% did not know their test results. Eighty-eight percent of participants self-identified as gay, 8% bisexual, and 4% heterosexual. Because we specifically wanted to focus on men who have sex with men, participants who self-identified as heterosexual and reported no sexual contact with a man in the 6 months prior to the study were eliminated from further analyses.

Meeting Sexual Partners Over the Internet

Four hundred and thirty men (73%) reported visiting a gay-oriented web site on the Internet at least once. Two hundred and one (34%) reported having had sex with someone they initially met over the Internet. Individuals meeting sexual partners online reported more frequent use of gay-oriented Internet sites/chat rooms ($M = 3.12$, $SD = 1.02$), relative to men not meeting partners in this manner ($M = 2.31$, $SD = 1.13$), $t(570) = 8.67$, $p < .001$. Individuals who reported meeting partners via the

Internet were more likely to be white (84%), relative to individuals who reported not meeting partners via the Internet (72%), $\chi^2(1, N = 581) = 11.79$, $p < .001$. Participants with a history of meeting sex partners over the Internet were also younger ($M = 31.2$, $SD = 8.7$), relative to others ($M = 33.4$, $SD = 9.0$), $t(581) = 2.91$, $p < .01$. The two groups did not differ in years of education, income level, gay acculturation, or HIV status.

AIDS Knowledge and Condom Attitudes

Both groups demonstrated good knowledge of AIDS and HIV transmission risk, scoring above 4 out of a possible 5 correct on the AIDS knowledge test. Individuals who met sexual partners over the Internet did not differ in AIDS knowledge ($M = 4.24$, $SD = 0.84$) from those not meeting partners over the Internet ($M = 4.21$, $SD = 0.85$), $t < 1.0$, *ns*. The two groups also did not differ in their attitudes toward condoms; men who met a partner via the Internet ($M = 15.45$, $SD = 2.93$) reported comparable attitudes toward condoms as those men never meeting a partner via the Internet ($M = 15.56$, $SD = 2.90$), $t < 1.0$, *ns.*

Substance Use and Meeting Partners Over the Internet

To further characterize the behavior patterns of individuals utilizing the Internet to meet sexual partners, we compared the substance use patterns of men who reported meeting a sexual partner via the Internet with men who had not. As shown in Table I, a greater percentage of men who had met sexual partners over the Internet reported methamphetamine use in the previous 6 months, relative to men not finding sexual partners in this manner. No significant differences were seen between the groups for use of alcohol, cocaine, nitrite inhalants, or marijuana. Individuals reporting meeting sexual partners via the Internet were also significantly more likely to report using Viagra to boost their sexuality, relative to individuals whom reported not meeting a sexual partner via the Internet.

Table I. Substance Use Percentage for Men Meeting Sexual Partners via the Internet Versus Men Not Meeting Sexual Partners via the Internet

	Men meeting sexual partners via the Internet ($n = 201$)		Men not meeting sexual partners via the Internet ($n = 382$)		
	n	%	*n*	%	χ^2
Alcohol	180	90	324	87	1.85
Cocaine	25	13	35	9	1.39
Marijuana	58	29	110	30	0.12
Methamphetamine	20	10	20	5	3.98*
Nitrites	53	27	72	20	3.62
Using Viagra to boost sexuality	32	16	20	5	17.40**

Note. Numbers reflect the participants reporting use of the relevant substance.
*$p < .05$. **$p < .01$.

Sexual Risk Practices and Meeting Partners Over the Internet

Men meeting sexual partners over the Internet reported having sex with more male partners in the previous 6 months ($M = 8.38$, $SD = 19.39$) compared with men not meeting sexual partners via the Internet ($M = 3.13$, $SD = 4.99$), $Z = 6.65$ (Mann–Whitney test), $p < .001$. Participants who had met a sexual partner over the Internet were more likely to have engaged in unprotected anal intercourse in the previous 6 months (66%), relative to men not meeting partners in this manner (52%), $\chi^2(1, N = 557) = 10.23$, $p = .001$. Men who reported having sex with someone they met over the Internet also reported additional high-risk sexual behaviors (see Table II). Participants who had met a sex partner online reported engaging in more frequent unprotected insertive and receptive anal intercourse, and more unprotected insertive and receptive oral sex, relative to participants not meeting sexual partners in this manner. Men who used the Internet to meet sex partners also reported having significantly more sex partners in the previous 6 months with whom they had engaged in unprotected insertive and receptive anal intercourse, and unprotected insertive and receptive oral sex.

As a more conservative test of the relationship between high-risk sexual behavior and the use of the Internet to meet sexual partners, men in both groups were categorized as to whether they had engaged in unprotected anal intercourse—the highest risk sexual activity—with two or more partners in the previous 6 months. We believe this analysis to be more conservative because it categorizes individuals who may have had unprotected anal sex exclusively within the context of a mutually monogamous relationship into the lower risk group. Men with a history of meeting sexual partners via the Internet were significantly more likely to have engaged in unprotected anal intercourse with two or more partners in the previous 6 months (44%), relative to men with no such history (31%), $\chi^2(1, N = 564) = 9.62$, $p = .002$. The two groups did not differ in percentages of participants who reported trading sex for money, drugs, or a place to stay. The two groups also did not differ in percentages of participants who reported trading money, drugs, or a place to stay in exchange for sex.

Table II. Sexual Behavior of Men Meeting Sexual Partners via the Internet Versus Those not Meeting Sexual Partners via the Internet

Behavior	Men meeting sexual partners via the Internet ($n = 201$) Mean frequency	*SD*	Men not meeting sexual partners via the Internet ($n = 382$) Mean frequency	*SD*	Z^a
Unprotected insertive anal intercourse	7.53	21.90	4.77	14.27	3.06**
Unprotected receptive anal intercourse	5.04	12.79	4.71	14.17	2.14*
Unprotected insertive oral sex	4.96	12.06	3.40	11.47	3.01**
Unprotected receptive oral sex	5.92	19.08	3.46	11.24	2.05*
Unprotected insertive anal partners	2.05	8.68	0.87	2.56	2.46*
Unprotected receptive anal partners	1.34	4.41	0.76	2.01	2.18*
Unprotected insertive oral partners	2.31	8.29	1.25	6.44	3.06**
Unprotected receptive oral partners	4.58	36.49	1.09	5.58	2.65**
	n	%	*n*	%	χ^2
Providing sex for money, drugs, or a place to stay	30	15	43	11	1.49
Providing money, drugs or a place to stay for sex	18	9	48	13	1.83

[a]Mann–Whitney test.
*$p < .05$.**$p < .01$.

Multivariate Tests of Association Between Meeting Partners via the Internet, Drug Use, Condom Attitudes, AIDS Knowledge and Sexual Risk Behavior

Given past findings that suggest multiple factors influence high-risk sexual behavior, we performed a sequential logistic regression analysis in order to determine the independent influence of meeting partners via the Internet on sexual risk behavior, after controlling for factors previously identified as associated with risky sexual practices. Using sequential logistic regression analysis to identify predictors of high-risk sexual behavior, participants were classified into two groups: those reporting unprotected anal intercourse with 2 or more partners in the previous 6 months ($n = 203$) and those reporting not having had unprotected anal intercourse with two or more partners in the previous 6 months ($n = 363$). As seen in Table III, demographic factors were entered on the first step as control variables. Condom attitudes and AIDS knowledge were added on the second step, and significantly added to the prediction of sexual behavior, $\chi^2(2, N = 519) = 10.96$, $p < .01$. Having positive attitudes about condoms and having more knowledge concerning AIDS and HIV transmission were protective factors associated with less risky sexual behavior. Cocaine use, marijuana use, methamphetamine use, and nitrite inhalant use were entered as a block on the third step and significantly added to the prediction of sexual behavior, $\chi^2(4, N = 519) = 13.67$, $p < .01$. In particular, nitrite inhalant (poppers) use emerged as a significant risk factor for engaging in unprotected anal intercourse with multiple partners over the previous 6 months. Whether or not a participant had met a sexual partner over the Internet was added on the final step and significantly added to the prediction of high-risk sexual behavior, $\chi^2(1, N = 519) = 6.95$, $p < .01$. As shown in Table III, meeting a sexual partner over the Internet was a significant predictor of having multiple unprotected anal intercourse partners in the previous 6 months, even after controlling for demographic factors and several commonly identified predictors of high-risk sexual practices.

Table III. Sequential Logistic Regression Analysis Predicting Unprotected Anal Intercourse With 2 or More Partners Versus Unprotected Anal Intercourse With Fewer Than 2 Partners

Variable and step	OR	CI	*B*	*SE*	*p*
1. Age	0.99	(0.97, 1.02)	−.004	.011	.74
Education	1.04	(0.95, 1.04)	.041	.047	.38
Ethnic status	0.92	(0.74, 1.15)	−.081	.113	.48
2. AIDS knowledge	0.77	(0.62, 0.96)	−.261	.112	.02
Condom attitudes	0.93	(0.87, 0.99)	−.075	.032	.02
3. Cocaine use	1.25	(0.83, 1.89)	.221	.211	.29
Marijuana use	1.15	(0.92, 1.43)	.138	.110	.21
Methamphetamine use	1.04	(0.67, 1.61)	.035	.224	.88
Nitrite use	1.37	(1.06, 1.78)	.318	.132	.02
4. Meeting sexual partners via the internet	1.68	(1.14, 2.47)	.518	.196	<.01

Note. $N = 519$.

Validity Checks

As an additional check on the validity of the present findings, the sequential logistic regression presented in Table III was repeated four times with subgroups of the present sample: men who reported sexual activity in the previous 6 months, men who reported ever accessing a gay-oriented web site, HIV seronegative men, and HIV seropositive men. For each analysis, age, education, and

ethnic status were entered on the first step; knowledge about AIDS and condom attitudes were entered on the second step; cocaine, marijuana, methamphetamine, and nitrite use were entered on the third step; and using the Internet to meet sexual partners was entered on the fourth step. For the subset of men reporting sexual activity in the previous 6 months ($N = 528$), Internet use to meet partners predicted having two or more sexual partners with whom the individual had engaged in unprotected anal intercourse in the previous 6 months, after controlling for previously identified risk factors, OR = 1.58 (CI = 1.07, 2.35), $p < .05$. Logistic regression showed similar results for the subset of men who reported having accessed a gay-oriented web site at least once ($N = 430$): using the Internet to meet sexual partners predicted having multiple partners for unprotected anal intercourse, after controlling for other factors, OR = 1.79 (CI = 1.16, 2.74), $p < .05$. For HIV seronegative men ($N = 409$), results also showed that using the Internet to meet sexual partners was a risk factor for having multiple partners for unprotected anal intercourse, OR = 1.68, (CI = 1.07, 2.62), $p < .05$. Results with HIV seropositive men ($N = 84$) were not significant; after controlling for other risk factors, using the Internet to meet sexual partners among this subset did not significantly predict having multiple partners for unprotected anal intercourse, OR = 2.05 (CI = 0.60, 6.94), $p > .20$.

DISCUSSION

One third of the present sample of MSM reported having sex with someone they initially met on the Internet. The high prevalence of Internet use as a method of meeting sexual partners suggests that the Internet is becoming an important venue for forming sexual networks. MSM using the Internet to meet sexual partners in the present study reported substantially higher rates of high-risk sexual behavior, and greater use of methamphetamine and Viagra, two drugs used to facilitate sexual activity. The high rates of Internet use among MSM may afford an efficient method for men who are motivated to do so to meet large numbers of sexual partners. Using the Internet to meet sexual partners, for HIV seronegative men, was a significant predictor of having multiple partners for high-risk sexual activities, after controlling for demographic factors and well-known HIV risk correlates of AIDS knowledge, condom attitudes, and substance use.

Previous research has suggested that targeting individuals at high risk for contracting HIV through outreach to gay bars is a productive method of promoting safer sexual behavior and reducing disease transmission (Kelly et al., 1997; Kelly, St. Lawrence, Stevenson, & Hauth, 1992). Such methods are likely successful, in part, because they selectively target men at relatively high risk for HIV and because they intervene in the natural setting where men meet their partners. Serving much the same role as gay bars have in the past, the Internet is becoming a popular venue for persons to meet sex partners. These findings suggest that the Internet may also be a productive avenue for primary prevention interventions that can be targeted towards individuals at increased risk for HIV. Interventions might include web-based skills training, motivational enhancement, outreach, education, and peer-based safer sex messages.

Existing primary prevention interventions in cyberspace have used educational approaches—for example, by posting safer-sex guidelines in chat rooms frequented by gay men—and have also used e-mail and other messaging systems for partner notification (Klausner et al., 2000). These are meaningful first steps; however, more sophisticated approaches are needed. Information about HIV transmission is typically thought of as a necessary, but not sufficient, prerequisite to the adoption of HIV risk-reduction behavior (Fisher & Fisher, 1992; Kalichman, 1998; Ross & Rosser, 1989). Interventions in cyberspace will benefit from components designed to increase motivation for behavior change and to improve the sometimes complex behavioral skills needed to make meaningful, sustained changes in risk behavior (Fisher & Fisher, 1992). For example, one way to increase motivation for behavior change is through the use of feedback to individuals regarding their current level of risk behavior. Some studies have adapted these techniques drawn from the substance abuse literature for use with individuals at high risk for contracting HIV (Carey, Maisto, Kalichman, Forsyth, Wright, & Johnson, 1997; Kalichman, Cherry, & Brown-Sperling, 1999). In this technique, individuals first answer questions about sexual behavior, substance use, and other risk factors. A personalized, individual feedback report is then generated that describes which aspects of their behavior are considered high-risk and why, and provides information about their behavior in reference to a normative sample. Individuals are then encouraged to identify factors that might merit change, and to brainstorm alternative behaviors. This and other techniques appear readily modifiable for the Internet. Health-related web sites are already replete with questionnaires concerning various health-related behaviors. Normative feedback could be automatically generated and supplied to participants. More sophisticated approaches could utilize a trained counselor in, for example, a chat room, as a proxy for a small group intervention. Additional approaches could intervene at the network level. This may be particularly promising because

men who use the Internet to meet sex partners may constitute sexual networks.

This study sampled from men attending a gay pride festival; men participating may be more likely to be open about their sexual orientation. This study does not provide information on how men who are less open about their sexual activity with other men may be using the Internet. Men in the present study were also not specifically asked about their sexual activities with partners met online. Men using the Internet to meet sexual partners may also engage in other activities designed to attract sexual partners such as answering personal ads, using dating services, etc. This study did not ask participants about their use of these other methods of meeting sexual partners. Thus, future work needs to examine whether using the Internet is a unique risk factor for high-risk sexual activity, or merely one of a number of strategies used by individuals desiring many sexual partners. Despite these limitations, the present findings provide new evidence that the Internet is becoming an important means of meeting sex partners within the gay community, and that men meeting partners through the Internet have higher rates of high-risk sexual behaviors. In addition, results of this study suggest opportunities for online primary prevention interventions.

Computer and Internet access has increased in recent years, and younger individuals are more likely to use these technologies. Young gay men are at increased risk for HIV, and the present findings suggest that younger gay men are more likely to meet partners online. The trend towards increased use of the Internet will likely continue and the role that the Internet plays in meeting sex partners may increase over time. As the Internet plays a more important role in the formation of sexual networks, interventions targeted at this population will be increasingly needed. The findings of the present study therefore suggest opportunities for new and innovative online interventions to limit the spread of HIV.

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