

Evaluation of an Online Partner Notification Program

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Background: Internet-based programs for sexually transmitted infections (STI)/HIV partner notification have generated considerable interest as public health interventions; yet data are lacking to support widespread dissemination. We report on a clinic-based and web-based evaluation of the Colorado inSPOT online partner notification program.

Methods: Clinic-based surveys were conducted at a large urban STI clinic before and after the implementation of feasible clinic interventions as well as nonclinic campaigns to promote the use of inSPOT Colorado. Questions assessed recognition and use of the site. Website statistics were provided by the inSPOT service, including the number of site hits, e-cards sent, and specific STI exposures identified on the card.

Results: Recognition and use of the service among STI clinic patients remained low (<6%) despite the interventions. Site statistics demonstrated an immediate but quickly diminishing response after placement of a banner ad on a popular gay website. Newspaper advertisements and radio public service announcements showed small increases in website use. Analysis of STIs specified on the e-cards, showed scabies and pediculosis as the most-identified STIs, accounting for nearly 30% of all e-cards sent. Clinic survey data indicated that when respondents were faced with the hypothetical situation of being diagnosed with an STI, more than 90% would notify partners in person; only 5% would use e-mail or the Internet.

Conclusions: Our data did not support the effectiveness of the inSPOT intervention among a predominantly heterosexual population in a large urban STI clinic.

The notification, testing, and treatment of partners of patients with sexually transmitted infections (STI) comprise one of the cornerstones of STI prevention. Traditionally, this task has been performed by disease intervention specialists at public health departments who elicit partners from the index patient through an interview process. Due to staff/resource intensity

and chronic underfunding of disease intervention specialists services, this method of partner notification (PN) is usually reserved for patients with HIV infection or syphilis. Most other patients, including the majority of those diagnosed with gonorrhea or chlamydia infections, are simply encouraged by care providers to refer their partners for evaluation and treatment. They may also be given cards to distribute to their partners to identify the STI that they may have been exposed to and to provide information on where to go for testing and treatment. In addition, for reportable STI, the health department may follow-up with letters sent to the index patients to reiterate the importance of partner treatment. Research suggests that the latter method of “patient referral” or “self-referral” may result in the notification of at least 1 partner by up to 50% of infected persons.¹ Clearly, although this number may be higher than expected, there is much room for improvement. In the last decade, there has been considerable interest in innovative methods that may result in enhancing the likelihood that partners of STI-infected patients receive appropriate treatment. Specifically, 3 randomized trials have demonstrated the efficacy of “expedited partner therapy”, involving methods by which patients with diagnosed gonorrhea or chlamydia infections are given additional medication or a prescription to give to their partner(s).^{2–4} This approach has been actively endorsed by the Centers for Disease Control and Prevention.⁵ In addition, innovative approaches have been developed using the Internet. The concept of providing PN using the Internet arose initially from the finding that the Internet was increasingly used as a medium to find sex partners, specifically among men who have sex with men (MSM), and Internet sex seeking had been linked to the re-emergence of syphilis in this population.⁶ The Internet may be used in a variety of ways for PN, including the use of e-mail as an additional modality to in person PN, outreach into chat rooms of gay dating sites, and self-contained online PN programs.⁷ The prototype of the latter approach is the inSPOT program. This online program allows persons who have been diagnosed with an STI to select from a number of online “e-cards” to be sent electronically to up to 6 sex partners. Users can specify the STI to which their partners have been exposed, enter a custom message, and opt to send the card anonymously. The partner receiving the card via e-mail is referred back to the inSPOT site for STI-specific information as well as the addresses of nearby clinics where they can go for evaluation and treatment. The inSPOT program has proven popular among public health providers and is currently used in 21 US cities and states and 2 countries abroad. According to a recently published article, in 2007, a total of 6222 e-cards were sent, with an average of 1.6 recipients per card. Of 23,594 cards sent in 2006 and 2007, 15.4% were for gonorrhea, 14.9% for syphilis, 11.6% for chlamydia, and 9.3% for HIV.⁸ Although encouraging, more research is needed to determine the effect of this program on the health-seeking behaviors and testing trends of partners when notified through this system. In this article, we

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examine the use of the inSPOT program among visitors of a large urban STI clinic.

METHODS

The inSPOT online PN program can be purchased by and adapted for local/state jurisdictions. The Colorado Department of Public Health and Environment obtained a site license in January 2006 and the Colorado site is accessible via inSPOT's main website: www.inSPOT.org. In 2008, we assessed the use of the site through 2 separate evaluation mechanisms: (a) 2 clinic-based surveys before and after a clinic campaign to encourage site use at the Denver Metro Health Clinic (DMHC), and (b) an analysis of site statistics in relation to web-based and other media efforts to stimulate use of the site.

Clinic-Based Survey

The DMHC is the largest STI clinic in the Rocky Mountain Region, logging over 18,000 patient visits per year. In 2008, the clinic diagnosed 2089 cases of chlamydia and 744 cases of gonorrhea, representing approximately 30% and 40% of reported chlamydia and gonorrhea cases in the City and County of Denver, respectively (unpublished observations; DMHC). Thus, a significant proportion of referred partners of chlamydia and gonorrhea index cases are likely to be observed at DMHC also, and therefore this clinic should be suited well for the evaluation of any interventions aiming to enhance the PN process. Moreover, DMHC is mentioned prominently as a clinical resource on the Colorado inSPOT website, and as detailed below, DMHC index patients were encouraged to use the inSPOT system to notify their partners during the evaluation period. We postulated that members of the sexual networks of cases identified at DMHC would also use DMHC for evaluation and treatment, and that any effect of the inSPOT program on partners effectively notified of their contact status should thus be measurable in the clinic by users who identified inSPOT as a referral source.

The inSPOT evaluation was one of a number of studies undertaken at the Denver Public Health Department under the auspices of the CDC-funded Internet and STD Center of Excellence project. For purposes of these studies, this project conducted a series of time-limited, computer-based waiting room surveys at DMHC, which complemented data collected in the clinic's electronic medical record.

Surveys comprised approximately 50 questions that varied across the 3 surveys but generally queried clinic patients about the use of the Internet and other technologies related to the project's studies, including the assessment of providing clinic test results online, the use of text messaging to encourage patients to obtain test results and retesting, the uptake of an online STI testing service, and the evaluation of the inSPOT program.

Surveys were programmed for computer self-administration using QDS software (Questionnaire Development Systems, Nova Research Company, Bethesda, MD). Through a systematic sampling scheme, 400 to 500 patients were recruited, consented, and enrolled in each survey administration. Every third patient visiting for a new STI who declared English as a primary language was asked to participate. The survey took approximately 10 minutes to complete and patients completing the survey were offered an \$8.00 restaurant coupon. All surveys were completed before patients were examined by the clinician.

Survey data were linked to patients' medical records using a unique identifier; however, the resulting database did not contain any private health information. To date, 3 surveys have been completed. The data used in the present analysis are from the second (October 15, 2007–May 1, 2008) and third survey (August 21, 2008–February 4, 2009), hereafter referred to as Survey A and Survey B, respectively. Between Survey A and Survey B, a clinical campaign, described later, was initiated to enhance the use of the inSPOT program.

Surveys A and B both included questions on recognition and use of the inSPOT website. In addition, during Survey B, a question was asked to ascertain correct identification of inSPOT among those who said they recognized the program, and patients were also asked how they intended to notify their partner should they be diagnosed with an STI.

The study was reviewed by the Colorado Multiple Institutions Review Board and was deemed exempt from review since it was determined to constitute program evaluation and not research.

Clinic-Based Intervention to Encourage inSPOT Use

This evaluation was not an intervention study. Rather it was designed to be an observational assessment of the recognition of the inSPOT service by DMHC clients after the service was offered through the Colorado Department of Health. Nonetheless, it could be argued that the service would not be used if not adequately advertised and marketed. Therefore, rather than combining the data of Survey A and Survey B to assess recognition of the inSPOT site, a number of activities were deployed at DMHC following the administration of Survey A, in May 2008, to encourage the use of the inSPOT program that, if effective, could have been measured in Survey B that was conducted after the activities were deployed. In designing these activities, we considered what would be feasible in the "real-world" setting and the resource constraints of a typical STI clinic. First, all patients with diagnosed STI who routinely receive contact cards to encourage partners to come to the clinic for evaluation and treatment, were also given an inSPOT "palm card" that explains the use of the website and how to access it. Clinicians reinforced these messages when giving out cards. Between August 1, 2008 and November 1, 2008, over 500 palm cards were distributed, roughly paralleling the number of gonorrhea, chlamydia, syphilis, and HIV diagnoses made during this time frame. Second, clinic flyers and posters alerted patients to the existence of the site. Third, the inSPOT service was advertised on the DMHC website, www.denverstdclinic.org.

It should be emphasized that the purpose of the clinic-based evaluation was not the recognition or use of the site by the index patients who were given the inSPOT palm cards. Rather, we postulated that use of the inSPOT site by these index cases would result in referrals to the clinic and that referred patients and the source of the referral, that is, inSPOT would be assessed by the survey of clinic patients described earlier.

Site Analysis

inSPOT website statistics specific to Colorado were obtained on the basis of the site's utilities, including the number of site users, the number of e-cards sent, the number of recipients (each card may be sent to any number of recipients), and

TABLE 1. Representativeness of Surveyed Populations

	Survey A Surveyed		Survey B Surveyed	
	Yes N (%)	No N (%)	Yes N (%)	No N (%)
Gender	453 (6.7)	5812 (93.2)	481 (11.9)	3558 (88.1)
Male	227 (50.1)	3476 (58.8)	277 (57.6)	2253 (63.3)
Female	226 (49.9)	2336 (40.2)	204 (42.4)	1305 (36.7)
Race/ethnicity				
White	175 (38.6)	2411 (41.5)	179 (37.2)	1550 (43.6)
Black	113 (25.0)	1520 (26.1)	143 (29.7)	903 (25.4)
Hispanic	141 (31.1)	1539 (26.5)	134 (27.9)	917 (25.8)
Asian	5 (1.1)	90 (1.6)	8 (1.7)	62 (1.7)
Other	19 (4.2)	252 (4.3)	17 (3.5)	126 (3.5)
Orientation				
MSM	40 (9.1)	614 (10.6)	57 (11.8)	404 (11.4)
Diagnosis				
Gonorrhea	22 (4.9)	354 (6.1)	30 (6.2)	188 (5.3)
Chlamydia	66 (14.6)	800 (13.8)	76 (15.8)	519 (14.6)
Age				
Mean	26.9	28.7	27.5	29.3
Median	25	26	25	26
Sex partners in previous 3 mo				
Mean	1.8	1.9	2.3	2
Median	1	1	1	1

MSM indicates men who have sex with men.

the STIs specified on the cards. All site statistics since the inception of the program in January 2008 were included in this analysis.

Web-Based Interventions to Encourage inSPOT Use

The Colorado Department of Public Health and Environment employed 3 web-based activities to enhance use of the Colorado inSPOT site: (1) a banner advertisement ran on the gay dating site ManHunt between October 2008 and January 2009, aimed at Colorado users of the site, alerting them to the inSPOT service; (2) an advertisement highlighting the site appeared in a Denver newspaper, *Westword*, on a biweekly basis between March and May 2009; and (3) a radio public service announcement that highlighted the Colorado inSPOT program ran through the month of April 2009 on a station catering to populations at highest risk for STI in the Denver area. Again, since most of these activities targeted at-risk populations in the Denver Metro area, and since the DMHC was featured as a clinical resource on the site (and probably well-known by the majority of the target population), a significant number of referrals from the site to clinical resources, were deemed to be measurable at DMHC.

RESULTS

Clinic Surveys

A total of 453 valid responses from Survey A and 481 responses from Survey B were available for analysis. The overall response rates were >95% in both the surveys. Women were slightly more likely to respond to the survey than men (especially during Survey A), but otherwise there were no significant differences between the 2 survey populations or between the survey population and the clinic population along

demographic factors, MSM status, or testing positive for chlamydia or gonorrhea on the day of visit (Table 1).

Results of the 2 clinic surveys are summarized in Table 2. Recognition and use of the inSPOT site was low (<6%) in both the surveys and there was no significant upward trend after the clinic-based and web-based interventions were implemented. Thus, we were unable to measure any effect that the in-clinic distribution of inSPOT palm cards or web-based interventions may have had on clinic referrals through inSPOT. Due to low numbers, subanalyses were not conducted. Compared to Survey A, significantly more respondents on Survey B indicated that they had ever sent an e-card. However, the absolute increase was small (from 0.2% to 2.0%) and of the 10 respondents who reported sending an e-card on the second survey, only 3 identified the correct purpose of the card. When asked how respondents would prefer to notify their partners in the event they were diagnosed with an STI, the large majority replied that they would tell their partners in person (89%) or via the telephone (37%). Only 4.8% said that they would use e-mail, whereas 11% said that they would send a text message (Table 2).

inSPOT Colorado Site Analysis

The number of "hits" on the Colorado inSPOT home web page totaled 156 per month during the first quarter of 2008 and increased to 1285 per month during the second quarter of 2009. The number of users sending e-cards paralleled this trend, increasing from 26 per month to 36.3 per month, as did the number of cards sent, increasing from 41.3 per month to 42.7 per month, respectively. Month-by-month site statistics are shown in Figure 1. A sharp increase in site utilization occurred in October 2008, coinciding with the start of the Colorado banner campaign on ManHunt and also with the

TABLE 2. Clinic-Based Evaluation of an Online Partner Notification Program—Survey Responses

	Survey A		Survey B	
	N	% (95% CI)*	N	% (95% CI)
Total respondents	453		481	
Ever heard of inSPOT	22	4.9 (3.0–7.4)	28	5.8 (3.8–8.4)
Ever sent an e-card	1	0.2 (0–0.7)	10	2.0 (0.9–3.7) [†]
Ever received an e-card	2	0.4 (0.05–1.4)	5	1.0 (0.3–2.3)
Ever sent an e-card to:	Not asked			
Find sex partners online			3	0.6 (0.1–1.8)
Let sex partners know they have been exposed to an STI			3	0.6 (0.1–1.8)
Find STI information			4	0.8 (0.2–2.0)
Buy condoms online			0	0 (0–3.7)
If you were diagnosed with an STI, how would you tell your partners? (all that apply)				
In person/face-to-face			430	89.4 (86.7–91.1)
In person/telephone			176	36.6 (32.3–40.9)
Written note or letter			18	3.7 (2–5.4)
Text message			53	11.0 (8.2–13.8)
E-mail/Internet			23	4.8 (2.9–5.7)
Would not tell			12	2.5 (1.1–3.9)
Ask someone else to tell them			8	1.7 (0.6–2.8)

*95% confidence interval.

[†]*P* > 0.05.

media attention surrounding the publication of an earlier in-SPOT paper.⁸ However, site utilization dropped to near pre-campaign levels in the ensuing month while the campaign itself was still ongoing. A less dramatic increase in site utilization was also seen in April 2009 coinciding with the placement of the newspaper advertisement and the radio public service announcement. No noticeable change in site utilization was observed after the start of the clinic-based intervention in August 2008.

Individual STIs specified on e-cards are summarized in Table 3. Of 1885 e-cards sent between January 2008 and July 2009, 537 (28.5%) identified exposure to scabies/crabs, followed by 307 (16.3%) identifying exposure to gonorrhea, and 297 (15.8%) identifying exposure to chlamydia (on the Colorado inSPOT website, only the following STI can be specified: chlamydia, crabs and scabies, gonorrhea, hepatitis A, mollus-

cum contagiosum, nongonococcal urethritis, shigella, and syphilis).

DISCUSSION

Our evaluation of the Colorado inSPOT program did not yield evidence for its effectiveness in a large urban STI clinic. The clinic-based evaluation demonstrated low baseline use and no apparent effect of a reasonable intervention to enhance the use of the site that could be implemented in real-world settings. Also, web-based efforts, while increasing site use, did not result in higher recognition or use rates by clinic patients. Moreover, the predominantly heterosexual visitors of the Denver STI clinic indicated their overwhelming preference of personal (i.e., face-to-face or telephone) interactions to communicate with their partners should they

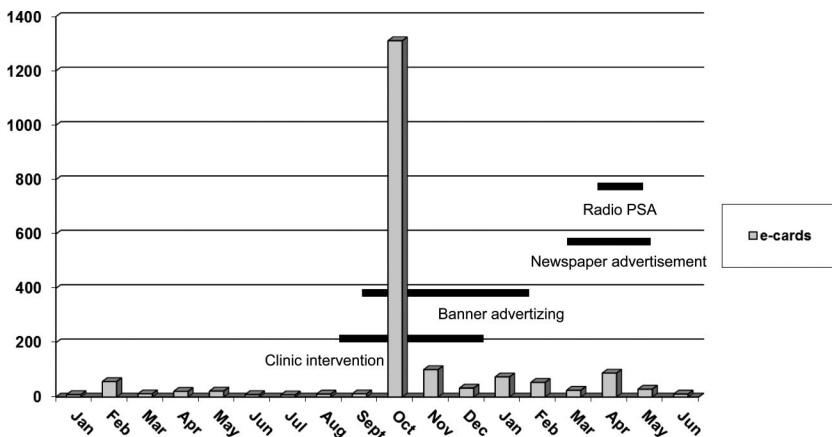


Figure 1. inSPOT Colorado: Number of users sending e-cards by month, 2008–2009.

TABLE 3. Sexually Transmitted Infections (STIs) Identified on e-cards

STI Identified on Card	N	% (95% CI)*
Chlamydia	297	15.8 (14.2–17.4)
Gonorrhea	307	16.3 (14.7–17.9)
Syphilis	225	11.9 (10.4–13.4)
Crabs/scabies	537	28.5 (26.5–30.5)
Hepatitis A	73	3.9 (3.1–4.7)
Molluscum contagiosum	85	4.5 (3.6–5.4)
Nongonococcal urethritis	41	2.2 (1.5–2.9)
Shigella	23	1.2 (0.7–1.7)
Other STD	297	15.7 (14.1–16.3)
Total cards	1885	100.0%

*95% confidence interval.

be diagnosed with an STI, thus raising doubt whether an online intervention for PN would be a useful addition to in-person notification in this population.

Although the in-clinic intervention did not result in increased inSPOT site visits, the banner campaign on Man-Hunt and the publicity surrounding an earlier inSPOT publication was associated with a substantial increase in site use. The effect of mass media attention to the inSPOT intervention on subsequent site use has been reported previously.⁸ However, this increase was not sustained even though the banner campaign was ongoing, suggesting a “curiosity” or “novelty” factor and perhaps inappropriate use of the site. The latter suggestion appeared to be corroborated by the fact that a disproportionate number of e-cards were sent regarding exposure to scabies or pubic lice, conditions that are rarely encountered in the STI clinic setting and are nonreportable infections in the state of Colorado (or elsewhere in the United States). Although site abuse for the purpose of playing practical jokes or harassment may be relatively innocuous for conditions like scabies and pediculosis that do not result in severe medical complications, “false alarms” regarding exposure to HIV, syphilis, or even gonorrhea, and chlamydia infections may be considerably more harmful. However, there was no evidence from our clinic-based data or anecdotal reports in our clinic that site abuse, if it occurred, may have led the recipients of inappropriately sent e-cards to seek clinical evaluation.

There are a number of limitations to our study. First, this was a one-site evaluation and our findings are thus not generalizable to other jurisdictions where the inSPOT program has been deployed. Second, inSPOT was originally developed in response to the syphilis epidemic among MSM in San Francisco. It is possible that this service is more appealing and has greater utility among MSM compared to the predominantly heterosexual populations encountered in the Denver STI clinic. MSM are known to recruit more sex partners on the Internet^{9,10} and website “handles” or e-mail addresses may be the only way for them to contact their otherwise anonymous sex partners. By contrast, the mostly heterosexual patients in our clinic tend to have fewer partners and are more likely to have identifying information for them. Given the low proportion of respondents in our survey who reported recognition or use of the inSPOT website, subanalyses could not be performed and thus we were not able to ascertain the use of the site by MSM relative to heterosexual men and women. Third, this was an observa-

tional and not an intervention study with inherent biases. A prospective, randomized controlled trial could theoretically be envisioned to more formally and definitively study the efficacy of an online PN intervention. However, the preference of the majority of DMHC patients to notify their partners in person and the small proportion of respondents in our study who would want to use Internet or e-mail services for this purpose, raises concerns as to whether such a study is feasible. Indeed a recent report on a randomized controlled trial that compared inSPOT to partner-delivered therapy (expedited partner therapy), to a combination of both among MSM in the Seattle STD clinic showed that (1) it was very difficult to recruit MSM into this study, and (2) almost none of the MSM randomized to one of the inSPOT arms actually used the inSPOT service. As a result, the trial was stopped, calling into question whether an efficacy trial of the inSPOT intervention will ever be possible or even relevant.¹¹ Fourth, it could be argued that use of the inSPOT site is limited to those who have access to the Internet and that such access may be low in socially disadvantaged populations typically encountered in STI clinics. However, in our surveys, we have consistently found that the large majority (>90%) of DMHC patients have access to the Internet (unpublished observation) and a recent evaluation of a web-based test results system shows that currently over 70% of DMHC patients use this system.¹² Fifth, it is possible, albeit unlikely that partners notified through the inSPOT Colorado site, preferentially sought care at health care facilities other than DMHC, or that they under-reported awareness of the inSPOT website. Finally, our clinic-based and web-based interventions may have been insufficient to raise awareness of the inSPOT site and additional activities could have been deployed to enhance use of the site. However, we intentionally limited our efforts to those that would be feasible in real-world settings.

In summary, our evaluations did not provide evidence for the effectiveness of the inSPOT partner services program among a predominantly heterosexual population in an urban STI clinic. More research is needed into the development of innovative programs that can effectively make use of the potential advantages of new media like the Internet and mobile phone technology for the purpose of partner notification, evaluation, and treatment.

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