

# Let Them Know: Evaluation of an Online Partner Notification Service for Chlamydia That Offers E-mail and SMS Messaging

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**Abstract:** This study evaluated *Let Them Know* ([www.letthemknow.org.au](http://www.letthemknow.org.au)), an online partner notification website offering e-mail and text message notification services to individuals diagnosed with chlamydia. A substantial and increasing number of text messages were sent, pointing to the potential for improved partner notification rates.

Partner notification, the process whereby an individual infected with a sexually transmitted infection (STI) informs their partner so they may be tested and/or treated, is one of the cornerstones in chlamydia control.<sup>1</sup> However, studies have shown that a substantial proportion of index patients' partners are not contacted when traditional methods of partner notification are used.<sup>2-5</sup> New strategies aimed at increasing the proportion of partners contacted are required.

In recent years, innovative methods aimed at enhancing partner notification have been developed, using new communication technologies such as the internet, e-mail, and text messaging (SMS [short message service]).<sup>6-8</sup> Initial observations suggest these may be effective notification tools,<sup>6,9</sup> with studies showing broad acceptance of e-mail partner notification among men who have sex with men (MSM),<sup>10</sup> and a preference for new technologies among a significant minority of genitourinary clinic patients.<sup>11</sup>

In a recent Australian study, one-third of index patients recently diagnosed with chlamydia, who had not informed all recent sexual partners, reported that if web-based tools that facilitated the sending of e-mail and SMS messages to partners were available they would have contacted more partners.<sup>12</sup> In another study, 90% of Australian general practitioners (GPs) indicated they would also find such a service useful.<sup>13</sup>

A recent evaluation of the first reported online partner notification system, *inSPOT* ([www.inSPOT.org](http://www.inSPOT.org)) which targets

MSM, found that over 750 people had visited the site daily with 30,000 visitors sending nearly 50,000 e-cards since the site was first launched.<sup>7</sup> The site has been replicated elsewhere.<sup>7</sup> Similar Australian based services, *The Drama Down Under* ([www.thedramadownunder.info](http://www.thedramadownunder.info)), and *whytest* ([www.whytest.org](http://www.whytest.org)), both aimed at MSM, offer SMS and e-mail notification services.

In December 2008, *Let Them Know* ([www.letthemknow.org.au](http://www.letthemknow.org.au)), a website targeting heterosexual men and women diagnosed with chlamydia, and which offered e-mail and SMS notification services, was launched. Development of the website contents was informed by initial research and focus groups. Surveys of chlamydia infected individuals and GPs showed strong support for a website.<sup>12,13</sup> To date, there are few published evaluations of partner notification services that use newer technologies. We undertook an evaluation of *Let Them Know*. In the 11-month evaluation period (December 2008 to October 2009) 57,145 chlamydia notifications were reported in Australia.<sup>14</sup>

*Let Them Know* was designed to target heterosexuals as there were existing Australian websites geared towards improving partner notification among MSM. The home page outlines the purpose of the site and provides links to: a fact sheet on chlamydia, frequently asked questions on partner notification, tips for talking with partners and sample animated conversations; personal or anonymous e-mails, SMS messages and letters used to notify partners; advice on talking to a GP; information for partners; and a feedback section, allowing users to provide comments in a free text box. Before sending a personal or anonymous SMS, e-mail or letter, users were asked to consider if the method chosen was the best way to make contact with a partner and if they were likely to be read by someone other than the intended recipient. Partners were provided with the *Let Them Know* web address and a phone number linked to a short recorded message about chlamydia transmission, testing and treatment via the e-mail, SMS or letter they received through the service.

To ensure the privacy of users, e-mail addresses and mobile numbers were not kept on the server after messages were sent. To guard against the distribution of hoax e-mails and SMS messages, the website employed a program Completely Automated Public Turing Test to Tell Computers and Humans Apart, to protect against spam and computer generated responses. The program generated a challenge-response type test where users were required to retype obscured text to verify they were authentic users. The Completely Automated Public Turing Test to Tell Computers and Humans Apart program grades the test and because current computer programs are unable to recognize the obscured text, all correct responses are presumed to be human.<sup>15</sup>

To further limit misuse, the site also has a daily limit on the number of e-mail and SMS messages that can be sent by an individual user. Feedback on the site is monitored on a weekly

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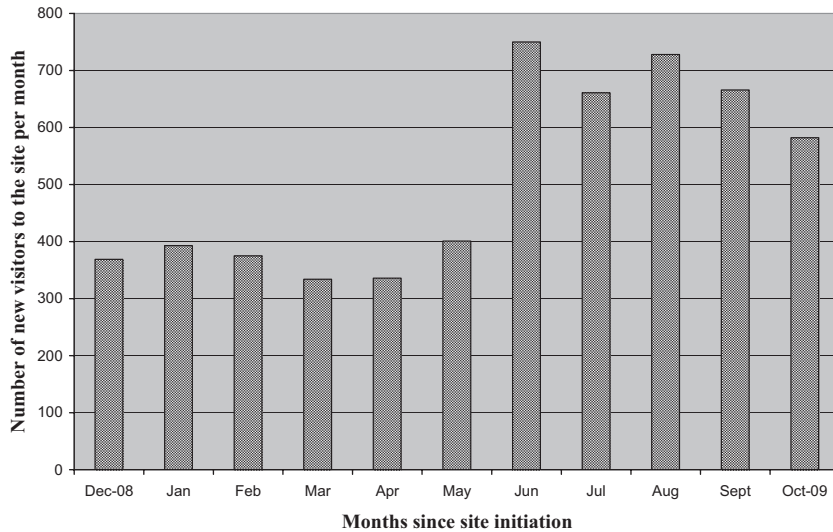
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**Figure 1.** Number of new visitors to *Let Them Know* by month since initiation.

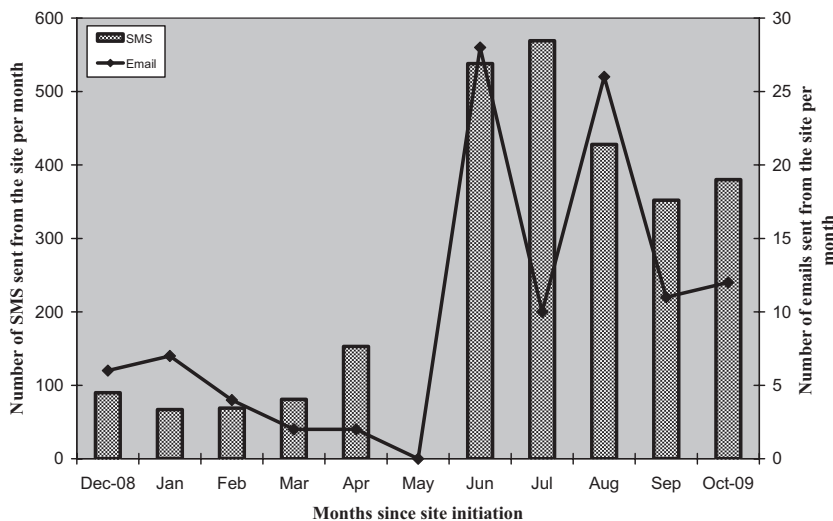
basis and responded to. In instances where individuals in receipt of hoax e-mails contacted us through the feedback page and provided their mobile phone number, numbers were blocked on the server to guard against future hoax use. Currently, the site can only be used to notify partners with Australian based mobile numbers or with any valid e-mail address. The website can be located either directly, through links on the Melbourne Sexual Health Centre and some Australian health department websites or via an internet search using search engines such as Google or Mozilla. The website was initially promoted to index patients at the Melbourne Sexual Health Centre via the diagnosing clinician or nurse or through printed advertising material available in the centre. Sexual health doctors and nurses were also notified of the website via member organizations and as a result a number of sexual health services across Australia received promotional material. The site was subsequently promoted through a number of health department websites in other Australian states.

Site data were collected through Google Analytics<sup>16</sup> and e-mail and SMS usage logged by the application server each

time a message is sent. Changes in the monthly number of new visitors, e-mail and SMS messages sent were explored over time using simple linear regression analysis. Analyses were undertaken using Stata 10.

*Let Them Know* was visited 6481 times between December 2008 and October 2009. Ninety-four percent of visits (n = 6067) were by individuals within Australia. Three percent of visitors accessed the website from internet enabled mobile phones. In total, 89% (5785) of visits were by new visitors. Figure 1 shows the number of new visitors to the site over the evaluation period. There was a significant increase in the number of new visitors to the website over the 11-month evaluation period from 350 to 552 (P < 0.01).

The Australian states with the highest number of visitors were Victoria (n = 3301, 54%), New South Wales (n = 1245, 21%), and Queensland (n = 810, 13%). Forty-six percent of users accessed the site directly, 40% through referral from other sites and 14% through search engines. The main referral sites were Melbourne Sexual Health Centre and Australian health



**Figure 2.** Number of e-mail and SMS generated from *Let Them Know* by month since initiation.

departments and the major search engine Google. The average time spent on the website was 40 seconds.

A total of 2727 SMS and 108 e-mail messages were sent from the site during the evaluation period, with a mean of 57 SMS and 2 e-mails per week. Figure 2 shows the number of e-mail and SMS notifications during the evaluation period. An increase in the number of e-mail and SMS notifications was evident from June 2009 in line with the further promotion of the site on health department websites. There was a significant increase in the number of SMS messages sent over the 11-month period from 85 to 369 ( $P < 0.01$ ). Data on e-mail and SMS use was unavailable for a 6-week period due to a server malfunction. Given this, the actual number of e-mail and SMS messages would have been higher. A breakdown of named versus anonymous e-mail and SMS messages was not available.

Fourteen comments were received from site visitors through the feedback page, including: one comment on a technical issue with the site, 4 comments reporting hoax e-mail or SMS notifications, 4 commending the site, and 5 comments or enquiries about accessing further STI and partner notification information.

Since its implementation, *Let Them Know* has been accessed by an increasing number of individuals from across Australia. It is likely that if the site were promoted nationally, use of the notification services would increase substantially. SMS notifications were a far more popular notification method than e-mail. To our knowledge, this is the first evaluation to be published that has demonstrated the potentially large capacity for SMS messaging in enhancing partner notification using an online service.

There are some limitations to this evaluation. While site usage data can be reported, it is not possible to provide a breakdown on the site pages viewed, the number of letters sent from the site or demographic data on site users. Furthermore, we cannot be certain of how many legitimate messages were sent by people with chlamydia as opposed to those sent inappropriately as hoaxes. However, very few complaints about hoax messages were reported, in line with the experience of the inSPOT evaluation.<sup>7</sup> Finally, we do not know ultimately how effective the service was in terms of the proportion of contacts tested and treated for chlamydia as a result of receiving an e-mail or SMS message. However, if most of the messages sent were authentic then the beneficial effect was potentially large.

Future evaluations should aim to capture user demographics, their experience in using the site, and determine if the services have been effective at increasing the proportion of partners notified and tested, and therefore reducing chlamydia transmission. However, the potentially complex ethical issues of an evaluation examining the proportion of partners tested and treated as a result of the *Let Them Know* service would need to be considered.

The development cost of the site was approximately AUD\$17,000 with ongoing annual maintenance costs of about AUD\$2000. Currently, the site is being further developed to

provide a breakdown of personal versus anonymous notifications and provide information and partner notification resources for all STIs.

## REFERENCES

1. Trelle S, Shang A, Nartey L, et al. Improved effectiveness of partner notification for patients with sexually transmitted infections: Systematic review. *BMJ* 2007; 334:354.
2. Fortenberry JD, Brizendine EJ, Katz BP, et al. The role of self-efficacy and relationship quality in partner notification by adolescents with sexually transmitted infections. *Arch Pediatr Adolesc Med* 2002; 156:1133–1137.
3. Golden M, Whittington WL, Gorbach P, et al. Partner notification for chlamydial infections among private sector clinicians in Seattle-King county: A clinician and patient survey. *Sex Transm Dis* 1999; 26:543–547.
4. Hogben M, Kissinger P. A review of partner notification for sex partners of men infected with chlamydia. *Sex Transm Dis* 2008; 35:S34–S39.
5. Oh MK, Boker JR, Genuardi FJ, et al. Sexual contact tracing outcome in adolescent chlamydial and gonococcal cervicitis cases. *J Adolesc Health* 1996; 18:4–9.
6. Klausner J, Wolf W, Fischer-Ponce L, et al. Tracing a syphilis outbreak through cyberspace. *JAMA* 2000; 284:447–449.
7. Levine D, Woodruff A, Rain M, et al. inSPOT: The first online STD partner notification system using electronic postcards. *PLoS Med* 2008; 5:e213:1428–1431.
8. Murray C, Gray B, Bourne B, et al. Using new technologies to increase STI testing behavior among gay men in inner Sydney. Paper presented at: The Australasian Sexual Health Conference; 2006; Melbourne, Victoria.
9. Centers for Disease Control and Prevention (CDC). Using the internet for partner notification of sexually transmitted diseases. *MMWR Morb Mort Wkly Rep* 2003; 53:129–131.
10. Mimiaga MJ, Fair AD, Tetu AM, et al. Acceptability of an internet-based partner notification system for sexually transmitted infection exposure among men who have sex with men. *Am J Public Health* 2008; 98:1009–1011.
11. Apoola A, Radcliffe KW, Das S, et al. Patient preferences for partner notification. *Sex Transm Infect* 2006; 82:327–329.
12. Bilardi J, Fairley C, Hopkins C, et al. Experiences and outcomes of partner notification among men and women recently diagnosed with chlamydia and their views on innovative resources aimed at improving notification rates. *Sex Transm Dis*. 2010; Published Ahead of Print: DOI: 10.1097/OLQ.0b013e3181d012e0.
13. Bilardi JE, Hopkins CA, Fairley CK, et al. Innovative resources could help improve partner notification for chlamydia in primary care. *Sex Transm Dis* 2009; 36:779–783.
14. National notifiable diseases surveillance system. Number of notifications of chlamydial infection, Australia, 2008 and 2009, by month and year. Available at: <http://www9.health.gov.au/cda/Source/CDA-index.cfm>. Accessed January 18, 2010.
15. Completely Automated Public Turing Test to Tell Computers and Humans Apart (CAPTCHA). CAPTCHA: Telling Humans and Computers Apart Automatically. 2009. Available at: <http://www.captcha.net/>. Accessed October 28, 2009.
16. Google. Google Analytics. 2009. Available at: <http://www.google.com/analytics/>. Accessed November 5, 2009.