''No One's at Home and They Won't Pick up the Phone'': Using the Internet and Text Messaging to Enhance Partner Services in North Carolina

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Background: The Internet and mobile devices are increasingly used by men who have sex with men to find potential partners. Lack of partner information, besides e-mail addresses or user profiles, limits the ability to adequately perform partner notification by traditional means and test those at high risk. To streamline North Carolina Internet Partner Notification (IPN) services, University of North Carolina at Chapel Hill collaborated with the North Carolina Division of Public Health beginning in July 2011 to formalize state IPN and text messaging for partner notification (txtPN) policies and centralize notification practices by designating a single IPN/txtPN field coordinator within the University of North Carolina at Chapel Hill.

Methods: We compared the number of IPN and txtPN contacts initiated and their outcomes in July 1, 2011, to June 30, 2012, and compared with outcomes in January 1, 2010, to December 31, 2010, the year before the collaboration.

Results: Overall, 362 IPN contacts were initiated compared with 133 initiated in 2010. More than half (59.1%) were black; mean age was 28.8 years. Almost all were men who have sex with men (83.7%). Approximately two-thirds (n = 230; 63.5%) of contacts were successfully notified using centralized IPN. Seven new cases of HIV infection, 11 new cases of syphilis, and 19 known previous HIV-positive persons were identified. Text messaging for partner notification was used for 29 contacts who did not initially respond to traditional notification or IPN; 14 (48%) responded to txtPN in a median time of 57.5 minutes (interquartile range, 9–2708).

Conclusions: Centralization of IPN services augmented partner detection of new HIV and syphilis diagnoses. Text messaging for partner notification represents a potentially effective method for augmenting traditional partner services. In addition, IPN and txtPN allow identification of HIV-infected persons in need of linkage to care.

The Internet and mobile devices are increasingly used by men who have sex with men (MSM) to find potential partners.[1–4] A recent online study of more than 3000 MSM found that MSM spend a significant amount of time online looking for sex partners, nearly half reporting spending 6 or more hours per week.[5] As of May 2013, 91% of United States adults own a cell phone and more than half (56%) have a smartphone. Increasingly, Internet screen names, e-mail addresses, or smart phone apps may be the preferred or only means for reaching sex partners. Pseudonymous sexual encounters with partners met online may lead to a lack of partner information, besides e-mail addresses or user profiles. This can limit the ability for public health officials to adequately perform partner notification by standard means (e.g., telephone calls and home visits).[6] This further restricts their ability to find, test, and treat (as needed) new cases of sexually transmitted infections among those at high risk. A recent network investigation in North Carolina (NC) found that a nearly one quarter (23.9%) of HIV-infected men reported online sex partners, with a trend toward such partners being more difficult to trace.[7]

A key component of ending the HIV epidemic requires that all persons with HIV are tested and informed of their diagnosis. Partner notification services play a critical role because both HIV and/or syphilis-infected persons are interviewed to elicit information about their partners, who can then be confidentially notified of their possible exposure or potential risk and encouraged to undergo HIV testing themselves.[8] The goal of Internet Partner Notification (IPN) is to notify partners, suspects, and associates of potential infectious disease exposures to HIV and/or syphilis. These notifications are conducted on social networking Web sites and within sexually explicit adult Internet Web sites. The Centers for Disease Control and Prevention issued general recommendations for IPN and many local jurisdictions are using these modalities.[9]

North Carolina began IPN in 2009, but comprehensive notifications in all regions had not been fully implemented before collaboration with the University of NC at Chapel Hill (UNC), which occurred in July 2011. To streamline NC IPN services, UNC collaborated with the NC Division of Public Health (NC DPH) to formalize state IPN policies and enhance the program. We present an evaluation of the first 12 months of IPN activities after the collaboration and compare outcomes with 2010, the year prior. In addition, results of pilot testing the use of text messaging for partner notification (txtPN) are presented.

METHODS

In NC, a mandatory, confidential, name-based system is used to report diagnoses of syphilis and HIV to NC DPH. Each client who is diagnosed as having HIV or syphilis is assigned to an NC DPH disease intervention specialist (DIS) who conducts voluntary interviews with each client and collects standardized information. Both traditional (e.g., injection drug use) and nontraditional (e.g., Internet sex seeking) risks are recorded, along

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with all identifying information available for partners. The DIS then contacts the client's sex partner(s), provides risk-reduction counseling, and offers either voluntary testing in the field or transport partners to a clinic for testing.

IPN Procedures

In July 2011, a memorandum of understanding formalized all procedures for centralization of IPN at UNC. Before July 2011, IPN referrals were not considered a high priority activity, and there was no designated person responsible for ensuring that all leads were pursued and referrals made. In 2011, a UNC IPN field coordinator (FC) was trained in all aspects of IPN and regional trainings were conducted with all NC DIS to highlight and reinforce the importance of eliciting IPN referrals as well as procedures. The key changes made included designating a single IPN/txtPN FC employed and stationed at UNC who was responsible for managing all IPN activities, including receiving the referrals, setting up and maintaining online profiles, sending and answering messages, and providing updates and outcomes to regional DIS.

The DIS was responsible for eliciting any Internet-based locating information and then faxing a copy of the contact's field record to the FC using a secure fax within 24 hours of the client interview. The secure fax was checked at least twice daily. E-mails were sent to sex partners and social contacts using both closed and open e-mail systems. "Closed" e-mail refers to social networking and dating-themed Web sites, some of which are sexually explicit in nature. "Open" refers to e-mail systems such as Yahoo, Gmail, and so on. The FC maintained all usernames and passwords for closed e-mail systems. The FC sent up to 3 e-mails per client during a 10-day period. A standard e-mail message was used and modeled after the Centers for Disease Control and Prevention guidelines, which differed slightly between open and closed e-mail systems.[9] When the DIS received a telephone call from the client, the DIS notified the FC within 24 hours so that a second or third e-mail was not sent. If the client did not respond to any of the e-mails, the FC contacted the DIS 2 business days after the final e-mail was sent so the DIS could record the outcome of the investigation on the field record. In closed e-mail systems, when the contact did not engage in a dialog with the FC, we classified the IPN outcome based on the results of Web sites' internal e-mail status tracking systems, which allow determination if the e-mail has been received and opened. Once the DIS dispositioned the field record, the DIS notified the FC within 24 hours by telephone or e-mail to share the outcome of the investigation. All activities between the DIS and FC are documented on the back of the original field record maintained in the regional DIS office (see Fig. 1).

TxtPN Procedures

A pilot program using TxtPN to notify clients began on November 21, 2011, and we present findings through June 30, 2012. Text messaging for partner notification was conducted only by the UNC FC and was used for those persons who did not initially respond to traditional PS (e.g., only a telephone number was available and the client did not answer after ≥2 attempts) or IPN (e.g., did not respond to an initial IPN e-mail or message). A standard text message was used and sent. If the client did not respond within 24 hours, a second text was sent urging the client to call the DIS. A third and final text was sent 24 hours after the second text acknowledging that that would be the last text they received from the DIS. Text messaging for partner notification describes both informing a client about their specific infection exposure and providing clients with a means to respond to notifications made using traditional partner services.

Analysis Procedures

The number of IPN contacts initiated and their outcomes from July 1, 2011, to June 30, 2012, were compared with outcomes between January 1, 2010, and December 31, 2010, the

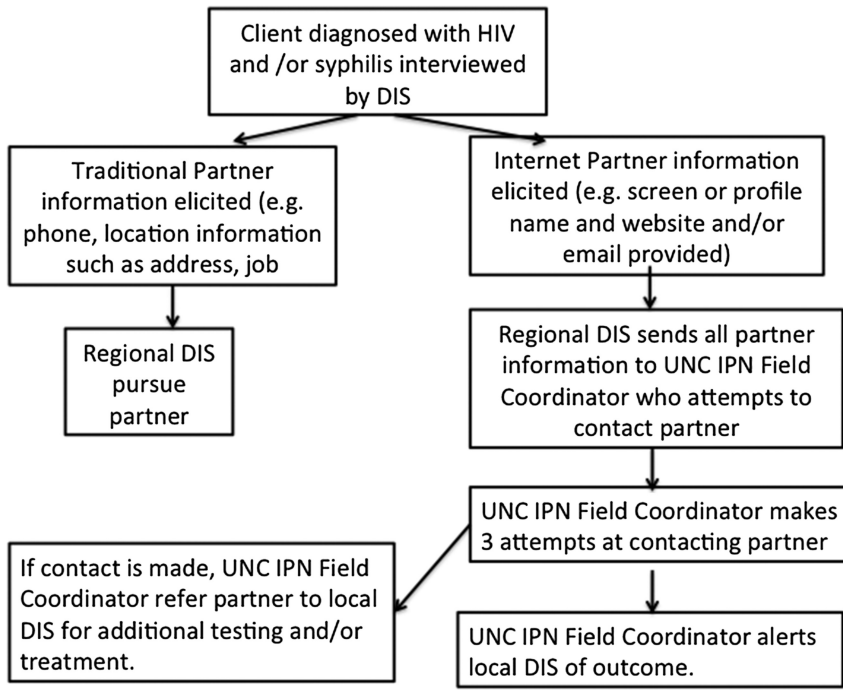

Figure 1. Partner notification procedures, NC, July 1, 2011–June 30, 2012.

year before the collaboration. An IPN log was used to record contacts and dispositions using standardized DIS disposition codes and IPN/txtPN outcomes.

We reviewed viral load (VL) data contained within the NC state surveillance databases, the NC Electronic Disease Surveillance System,[10] and the Enhanced HIV/AIDS Reporting System[11] for all IPN contacts identified as previous positives (e.g., diagnosed as having HIV before being contacted using IPN). For each client, we reviewed both databases to identify the most recent VL measurement using a 24-month window before the date of the current investigation and 12-month window after the current investigation. Those without a VL in that window were considered to be currently unengaged in care. All data were entered into an Access database, and descriptive statistics were calculated using SAS (version 8.0) and Excel (version 14.3.7).

This analysis was deemed to be part of a statewide evaluation of the partner services program and not research and, thus, was exempt from institutional review board approval but was reviewed and approved by the NC DPH.

RESULTS

IPN Outcomes

Clients interviewed by the DIS named 362 IPN contacts. For some contacts, more than 1 e-mail or Web site screen/profile name was provided, thus generating a total of 455 IPN referrals, compared with 133 contacts initiated during the 12-month comparison period in 2010. More than half (59.1%) were black, 23.1% were white, and 11.0% were Hispanic. The mean age of IPN contacts was 28.8 years. Almost all contacts (93.1%) were men, of whom most (93.8%) were MSM.

Of the 455 referrals, 332 (73%) were identified through closed social and sexual networking sites with the remainder contacted through "open-system" e-mails. There were 142 (39.2%) HIV exposures and 142 (39%) syphilis exposures, and 78 (21.6%) persons had dual exposures to both HIV and syphilis. The total number of unique closed Web sites used was 35, compared with only 3 in all of 2010.

Approximately two-thirds (63.5%; 230/362) of IPN contacts were successfully notified by IPN during the period of program evaluation, compared with 26% (34/133) of IPN contacts successfully notified in 2010. Internet Partner Notification contacts accounted for approximately 12.8% (230/1787) of all the successful notifications for HIV or syphilis conducted during the study period of July 1, 2011, to June 30, 2012. Of those notified, 130 (56.5%) of 230 received and opened at least 1 of the e-mail messages notifying them of a potential exposure, but did not respond or request additional information about testing. Among IPN contacts initiated,[7] seven new HIV-positive patients (mean age, 25.3 years) and 11 new patients with syphilis (mean age, 28.5 years) were identified (see Fig. 2). Four of the 7 new HIV-positive persons were confirmed to have entered HIV care in NC, whereas the 3 remaining new positives reported either leaving or having plans to leave NC. All persons infected with syphilis had documented appropriate treated.

Nineteen men were identified as previous positives as a result of IPN investigations; 94.7% were black, and their mean age was 30.2 years, with the date of their original diagnosis ranging from 1987 to 2012 (see Table 1). Among these, 18 seemed to be out of care or off treatment; 14 men had no recorded VL in the 24 months preinvestigation, 4 had VLs more than 50 copies/mL (mean, 92,027 copies/mL; range, 4771–324,272 copies/mL), and only 1 had a VL less than 50 copies/mL within the 24-month window. Viral load measurements after IPN investigation were found for 9 of the men, with 4 having less than 50 copies/mL and 5 having at least 50 copies/mL (mean, 33,036 copies/mL; range, 1890–81,720 copies/mL).

TxtPN Outcomes

Text messaging for partner notification was used for 29 contacts who did not initially respond to traditional PS or IPN, as described above. Fourteen (48%) of these 29 persons responded to txtPN in a median time of 57.5 minutes (interquartile range, 9–2708). Most were MSM (92.9%) and black (71.4%), and the mean age was 29.6 years. Of those who responded (n = 14), 9 were contacts to patients with HIV, 1 to a patient with syphilis, and 4 to dually infected persons. Two new patients with syphilis (2/29; 6.9%) and 1 new patient with HIV infection (1/29; 3.5%) were identified as a result of contact investigations that used txtPN.

DISCUSSION

Although prior studies have reported success in using the Internet to notify contacts in sexually transmitted infection

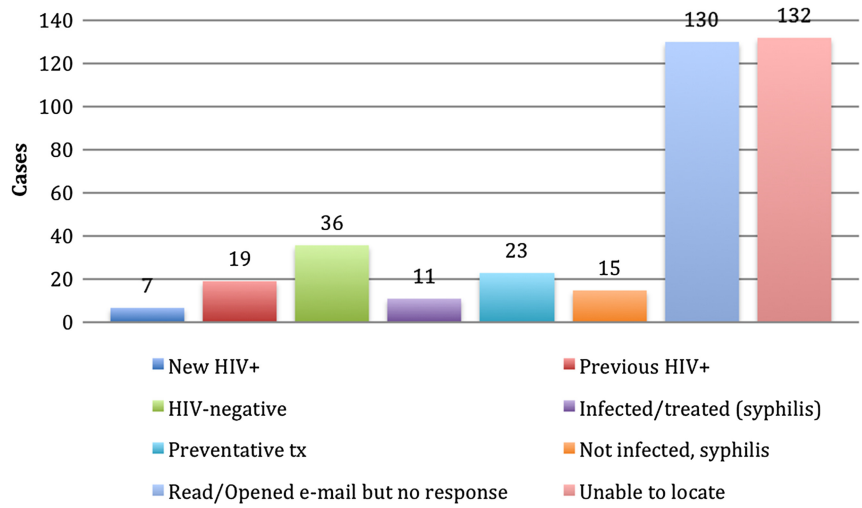

Figure 2. Internet partner notification outcomes, NC, July 1, 2011–June 30, 2012.

TABLE 1. Description of 19 Previous Positives Identified Via IPN

ID	Age at Time of Investigation, y	Race	Year of First HIV Diagnosis	Month/Year IPN	VL in 24 mo Before IPN	VL in 12 mo After IPN
1	27	Black	2007	8/2011	None	None
2	35	Black	2004	8/2011	None	None
3	26	Black	2004	8/2011	16,500	None
4	27	Black	2009	8/2011	None	6140
5	32	Black	2008	8/2011	None	None
6	20	Black	2011	10/2011	None	81,720
7	49	Black	1987	10/2011	None	None
8	25	Black	2004	12/2011	None	14,032
9	32	Black	2007	3/2012	None	None
10	42	Black	2007	11/2011	<50	1890
11	27	Black	2009	2/2012	None	<50
12	21	Black	2010	1/2012	22,564	None
13	45	White	2004	2/2012	None	<50
14	28	Black	2010	4/2012	None	<20
15	32	Black	1999	5/2012	None	None
16	22	Black	2012	5/2012	324,272	<20
17	21	Black	2010	6/2012	None	None
18	27	Black	2008	6/2012	None	61,400
19	36	Black	2009	5/2012	4771	None

outbreaks among MSM, this analysis evaluated statewide combined IPN and txtPN activities.[12–15] Centralization of services resulted in an increased and high yield of new HIV and syphilis diagnoses. Our findings mirror the results of a recent report from Washington, DC, that found that IPN led to an 8% increase in the overall number of syphilis clients, with at least 1 treated sex partner, 26% more sex partners being medically examined and treated (if necessary), and 83% more sex partners being notified of their sexually transmitted disease exposure.[16] In our study, we increased successful notifications nearly 600% (from 34 in 2010 to 230 during the period under review). During the study period, an increased number of Web sites were used in tracing sex partners compared with that in 2010. We hypothesize that the increased number of sites used for IPN reflects both a growing trend toward meeting sexual partners online including the rise in geospatial mobile hookup sites and focused support and manpower being devoted specifically to expanding the program.

We identified 19 men who had been previously diagnosed as having HIV infection before being named as a contact during the IPN investigation. It is concerning that most of these men (18/19; 94.7%) were either not engaged in care (no VL in NC in the 24 months before IPN) or had elevated VLs potentially facilitating onward transmission of HIV. This is alarming given national estimates that only 28% of all HIV-infected persons in the United States are virally suppressed and that even among those with diagnosed infection, only approximately 51% are receiving regular HIV care.[17–19] In NC, approximately 30% of persons with HIV are virally suppressed.[20] Even after being contacted during the IPN investigation, only 9 (47.4%) of the 19 men had VL measurements, suggesting that greater linkage-to-care interventions are needed for this population.

Realization of the full potential of treatment as prevention[21] requires that HIV-infected persons be successfully diagnosed, linked and retained in care, initiated on antiretroviral therapy, and supported to achieve and maintain long-term viral suppression. In addition to finding new infections, IPN and txtPN may allow for identification of HIV-infected persons in need of secondary prevention messages and linkage-to-care interventions. Of note, 7 clients who had no VL in the 24 months before being notified of their exposure by IPN had recorded VL levels in the 12 months after IPN. Although we cannot prove causality, it may be that the IPN triggered reentry into care for these clients.

Most MSM identified through our enhanced partner services were men of color. The HIV epidemic in the Southeastern United States is concentrated among racial/ethnic minority MSM.[22–24] The highest rate of new HIV diagnoses in 2011 in NC was among adult/adolescent (those 13 years and older), black men (99.3 per 100,000 population). This rate was more than 8 times greater than the rate for adult/adolescent white men (11.3 per 100,000 population).[25]

Our findings of newly diagnosed and previous positive cases may actually underestimate the true number of cases. Approximately one-third of all clients (130/362; 35.9%) opened their IPN e-mail but did not contact the DIS to provide or request any additional information about the nature of their exposure. If any of these clients were known to be infected or pursued testing and treatment on their own, those results would not have been known or included in this evaluation. Although this number is high, it should be put in context that the number of partners who were located using standard partner services but refused to be tested for HIV in 2011 was approximately 12% (NC communicable disease surveillance data, 2011).[25] Future studies should evaluate if the nature of the message sent using IPN (e.g., general urgent health matter vs. disease specific) influences the likelihood of eliciting a client response.

The use of text messaging seems to represent an acceptable and potentially more effective method for reaching previously untraceable partners and augmenting traditional partner services. To our knowledge, there have only been isolated experiences of DIS using text messaging to notify clients of an sexually transmitted disease diagnosis and to notify partners of exposure.[26] Although the overall goal of text messaging is to enable the DIS to expedite contact so an appointment can be made with the client, we found this medium to be particularly applicable in situations where a client or partner is not responding to traditional means of follow-up. Importantly, texting is not considered a secure method of communication.[27] Telecom providers are not required to protect the content of text messages and may make these

records available to external parties such as law enforcement when requested even without a court order.

We set forth the following list of suggested considerations when developing a txtPN program: a) confirm that the number is a number connected to a mobile phone (e.g., by using an application such as reversemobile.com); b) inform clients not to send protected health information using text (if the client does send a message containing protected health information, ensure that the text is immediately transcribed and deleted); c) send messages only from a password-protected work device; d) send all text messages from a private space; e) be professional at all times and avoid abbreviations, acronyms, or icons; and f) be aware that it is extremely difficult to discern tone in text messages.

Although less intensive than traditional door-to-door outreach, successfully implementing an IPN program does require an investment of time and a commitment to continued evaluation. It is of the utmost importance that the IPN coordinator is fully technically savvy and aware of the nuances and ever-changing privacy rules within social networking sites. For instance, some "notifications" need to be on, while others off (e.g., we ensured that the viewer tracker or recently visited option was off to ensure that members and their friends would not be able to see that the DIS had visited them or that they had viewed our NC health profile). Close attention must be paid when setting up new accounts on new sites with regard to all the settings available, and one must be vigilant to ensure that profiles are updated as new paradigms and social media platforms emerge.[28] The development of site-specific guidelines that could be used by all jurisdictions wanting to implement IPN programs would be useful.

Our analysis is not without limitations. In financially constrained times, it may make sense to focus on methods of partner notification that are not overly labor intensive but still reap benefits. Unfortunately, we did not collect sufficient data to be able to perform a formal cost-effectiveness evaluation, but future studies should evaluate any cost-savings afforded by using "enhanced" partner services such as IPN and txtPN.[6] We cannot be sure that those men without VL data in the 24 months before their being named in a partner investigation were not receiving care outside NC or receiving care from a provider that did not report their VL results to the state. In 2006, NC updated their laboratory reporting regulations to include both AIDS defining CD4 results less than 200 cells/mm^3 and nucleic acid amplification tests to confirm HIV diagnosis.[29] Many providers have been reporting both detectable and undetectable VL results since 2006.[29] Moreover, we intentionally allowed for a very generous period (24 months) to ensure that we did not overestimate those not currently in care.

As both IPN and txtPN become more integrated into our public health systems, it is critical that these methods augment and enhance standard methods of partner services to maximize limited time and personnel resources and to avoid unintended negative consequences. In addition, IPN and txtPN may represent an innovative way to identify high-risk negatives in need of biomedical/behavioral interventions including preexposure prophylaxis for HIV infection. Furthermore, use of the Internet to notify partners can also be used in cases of other communicable diseases (e.g., agents of bioterrorism, food-borne outbreaks) that require urgent evaluation and treatment.[30] In conclusion, these findings highlight how IPN and txtPN can expand partner notification, complement, and enhance traditional partner services by not only finding new positives but also in engaging in conversations with persons previously diagnosed as having HIV and thus potentially impacting reengagement in care.

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