

Interrupting Transmission of HIV and Other Sexually Transmitted Infections in Rhode Island

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TRANSMISSION OF HUMAN IMMUNODEFICIENCY virus (HIV) and other sexually transmitted infections (STI) in Rhode Island, a central New England location for many gay sex club venues,¹ continues to be a public health challenge despite close collaboration between health care providers, community-based agencies, and the **RI Department of Health (HEALTH).**² In December 2010, HEALTH requested assistance from the **Centers for Disease Control and Prevention (CDC)** to further understand a recent increase in syphilis and HIV infections among **men who have sex with men (MSM)** in RI. MSM comprise the majority of persons diagnosed with both syphilis and HIV infection in RI; increasing from 79% (27/34) in 2009 to 89% (54/61) in 2010 among new syphilis cases, and increasing from 47% (59/125) in 2009 to 51% (54/106) in 2010 among newly diagnosed HIV infections.² The CDC evaluation highlighted HIV testing deficits among MSM and the need to increase HIV and STI testing, as well as early diagnosis. Many MSM in RI were not routinely tested for HIV and other STI, nor were they linked to appropriate care upon diagnosis, regardless of having a primary care provider.

A key to effectively reducing HIV and other STI transmission in RI is understanding the epidemiology of those infections and their transmission from index cases to their sexual partners, which depend on routine testing, timely case reporting, and appropriate treatment. In

this paper we highlight the epidemiology of HIV and other STI transmission in RI and the methods in place to interrupt it.

EPIDEMIOLOGY OF HIV AND OTHER STI

Current epidemiology of HIV and other STIs in RI is concerning and reflects the national epidemic, with ongoing and increasing transmissions throughout the state, particularly among MSM. Demographic characteristics for individuals with chlamydia, gonorrhea, HIV, and syphilis, all reported to HEALTH, reveal highest proportions in Providence County (81-91% of STIs and 77% of HIV) in 2010.¹ Comparison of infection rates between 2009 and 2010 demonstrate stable chlamydia (344 vs. 331 cases per 100,000 population; 3615 vs. 3480 total cases); gonorrhea (31 vs. 28 cases per 100,000; 322 vs. 291 total cases); and HIV infections (12 vs. 10 per 100,000; 125 vs. 106 total cases); but increased infectious syphilis infections (3 vs. 6 cases per 100,000; 34 vs. 61 total cases of primary, secondary, and early latent syphilis); a 79% increase.¹ (Table 1)

TRADITIONAL EPIDEMIOLOGICAL METHODS OF INTERRUPTING DISEASE TRANSMISSION – Partner Notification

To control HIV and other STI transmission, in addition to collecting demographic characteristics, HEALTH

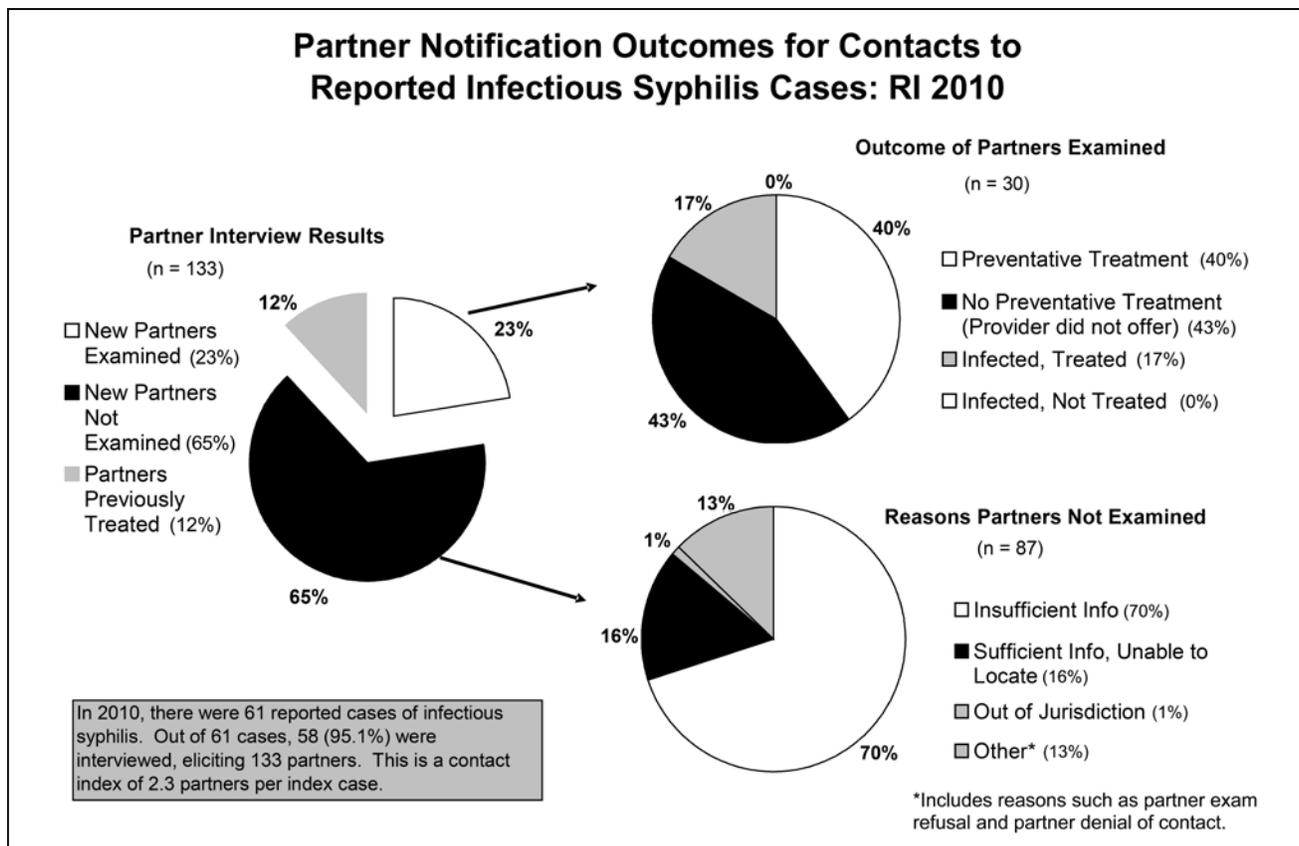
identifies potential sexual partners of index cases and notifies these partners of their potential exposure to gonorrhea, syphilis, and HIV (i.e. contact tracing or partner notification). Sexual partners of chlamydia cases are not notified due to the high case volume, except with prioritized cases or upon provider request.

Five methods of partner notification are employed with varying levels of effectiveness. (1) *Provider referral*: a specifically-trained health department employee, often referred to as a **partner notification specialist or disease intervention specialist (PNS/DIS)**, interviews the index case, obtains their possible sexual partners and notifies them; (2) *Third party referral*: professionals other than HEALTH staff members carry out partner notification (e.g., HIV counselors or clinicians); (3) *Self-referral*: index cases choose to notify their sexual partners on their own; (4) *Contract referral*: the index case agrees to notify partners and if not successful or completed, the provider then intervenes and follows-up; and (5) *Dual referral*: both the index case and the provider notify partners of potential sexual exposures. Provider referral has been shown to be the most effective single method for partner notification, while self-referral is the least effective.³ Given that more partners are treated through partner notification services rather than through other strategies, treatment of sexual partners is valuable for control of infection and cost-effective for averting

Table 1. Sexually transmitted infection rates and total cases in Rhode Island, 2009 – 2010¹

Rate of infection	2009	2010
Chlamydia cases per 100,000 population (total cases)	344 (3615)	331 (3480)
Gonorrhea cases per 100,000 population (total cases)	31 (322)	28 (291)
HIV cases per 100,000 population (total cases)	12 (125)	10 (106)
Syphilis cases per 100,000 population (total cases)	3 (34)	6 (61)

Figure 1. Partner Notification Outcomes



sequelae of disease. HEALTH utilizes any of the partner notification methods that a provider or patient prefers, with *provider referral* being the most common.

Effectiveness of partner notification is dependent on a close collaboration between health department PNS/DIS personnel and community health care providers. The first essential step in the control of disease transmission is the reporting of a syphilis, gonorrhea, or HIV case to HEALTH. This reporting can be done using the case report forms available on the HEALTH website (www.health.ri.gov) → 'Information for Healthcare Providers' → 'Report certain diseases and conditions to the department' → 'HIV/AIDS (Adult Confidential)' and 'Sexually Transmitted Diseases'. Given the important nature of timely intervention, as soon as the partner notification services team is aware of a new index case, the PNS/DIS attempts to contact this individual for counseling and interviewing. During that process, a list of sexual partners is elicited from the individual, including contact information that the index case is able to provide such as telephone numbers, email addresses, and/or social media

information. The partners contacted are offered risk reduction counseling, rapid HIV testing, referral for other STI testing, and linkage to medical care. An index case's name, gender, and the time period of potential sexual exposure are not revealed to the notified partners. The process of identifying and reaching sexual partners of index cases can be substantially enhanced when it is encouraged and facilitated by the provider involved. Providers can make patients aware that HEALTH personnel will be contacting them to initiate the partner notification service. Effective communication between PNS/DIS and health care providers is essential and can lead to successful interruption of transmission in the chain of HIV and other STIs.

Implementation of Partner Notification Services for Syphilis Exposure

The number of new infectious syphilis cases reported to HEALTH in 2010 was 61 (58 males; 3 females). PNS/DIS attempted to interview 100% of those cases, and was able to successfully interview 58/61 (95%) of them;

documented reasons for the remaining three not interviewed were refusal (1) and unknown reasons (2). From the 58 index cases, 133 partners were elicited through the partner notification process. (Figure 1) Thirty of these 133 partners (23%) were examined by a provider upon referral from HEALTH, resulting in preventative treatment in 12/30 (40%) and treatment of confirmed syphilis infection in 5/30 (17%). The remaining 13/30 (43%) referred to care did not have preventative treatment, according to clinical judgment, and patient preference. Of the 103/133 partners that were not examined by a health care provider, 16/133 (12%) reported previous appropriate treatment, and 87/133 (65%) were not evaluated by a provider for a variety of reasons, including refusal (11/87, 13%), inability to locate despite having sufficient information (14/87, 16%), or insufficient contact information (61/87, 70%). Anonymous sexual activity among infectious syphilis cases was reported by 33% (1/3) of females; 25% (1/4) of heterosexual males; and 61% (33/54) of MSM with infectious syphilis in 2010.

Implementation of Partner Notification Services for HIV Exposure

One hundred and six new HIV cases were reported to HEALTH in 2010, and 100% were sought after for interview by HEALTH's PNS/DIS. Of the 106 cases, 93% (99/106) were successfully reached. There were three reasons seven index cases were not reached for an interview: (1) they were noted to be previously HIV positive and already interviewed as a new case, (2) they were not able to be reached based on insufficient or inaccurate information, or (3) they refused to communicate. Among the 99/106 index cases reached, 94/99 (95%) were willing to accept partner notification services with behavior risk reduction counseling, an interview, and referral to care. Ranging from one reported partner per index case to 500 partners per index case, 942 total partners were elicited from these 94 new HIV index cases through the partner notification process. A major proportion of these partners were unable to be identified by HEALTH's PNS/DIS because of anonymous sexual activity; a smaller proportion of partners were unable to be located because the index case refused to name the partners and did not want the PNS/DIS to contact the exposed partners; or because partners resided out-of-country. PNS/DIS submitted information about out-of-state partners to other state health departments for notification. Among 71 sexual partners with locatable contact information, 66 (93%) were reached and notified of their exposure to HIV and other potential STIs. HIV testing was performed on 56/66 (85%), including rapid HIV testing at the time of notification. The remaining 10/66 (15%) were not tested for HIV due to declined testing (2/10), a known positive HIV status (4/10), or a prior HIV negative test within the last one to three months, depending on the last unprotected sexual exposure (4/10).

Nine percent (5/56) of HIV-tested sexual partners of index cases were newly identified and confirmed as HIV positive in this partner notification process. Two of the five newly diagnosed cases self-identified as MSM, one self-identified as transgender (male to female), and two were heterosexual females.

NOVEL EXPLORATORY METHODS OF INTERRUPTING DISEASE TRANSMISSION – MOLECULAR EPIDEMIOLOGY

The high number of anonymous partners reported among HIV index cases highlights the challenges of partner notification as a means of HIV and other STI transmission prevention. Technological advances have enabled people to easily meet anonymous partners through venues such as internet social networks and chat rooms, as well as through smartphones and other mobile devices. A survey of middle and high school students in several Northeastern states found that 35% of high school boys and 37% of high school girls reported meeting a stranger on-line, and 23% of boys and 13% of girls reported that some sort of sexual encounter occurred at the ensuing face-to-face meeting.⁴ Technology has given rise to new social norms and mechanisms that people can use to find sex partners, thus creating novel ways in which sexual networks form and influence the transmission and incidence of HIV and other STIs.⁵ Incorporation of molecular epidemiology in HIV prevention is a novel approach to further assist the traditional partner notification services at interrupting the transmission of HIV and other STIs.

In the context of HIV, molecular epidemiology involves the use of phylogenetics and statistics to reconstruct and examine the evolutionary patterns of genetic sequences on the virus, looking for closely related sequences. These tools, unless used for forensic investigations involving more complex methods,⁶ cannot and do not intend to infer direct transmission between individuals who harbor closely related sequences, and it is impossible to determine direct transmission between them, whether other individuals are involved, or whether they are completely unrelated. However, molecular epidemiology can describe patterns of HIV transmission in a population, and this approach has been used to study HIV outbreak investigations,⁷⁻⁹ transmission and epidemiology,¹⁰⁻¹⁷ and trends and dynamics of HIV in different populations,¹⁷⁻¹⁹ including in RI.²⁰

While molecular epidemiology has the ability to improve our knowledge of HIV transmission patterns by identifying specific transmission networks at a mo-

lecular resolution, the HIV and other STI partner notification programs at HEALTH will continue to benefit from collaboration with health care providers to facilitate communication with infected patients, identification of partners, and promotion of testing and linkage to care. The effectiveness of combining these traditional and novel methods needs to be explored, a process that is ongoing in RI.²⁰

CONCLUSION AND CHALLENGES TO OVERCOME

Interruption of HIV and other STI transmission in RI is an essential goal that requires state-wide involvement at all levels of health care, community service organizations, and public health officials. Testing for these infections should be routine for all individuals engaged in sexual activity, regardless of sexuality. Once such testing practices are in place to better identify new cases, steps can be taken to improve this process further. Some common challenges in the partner notification process for HEALTH are the delay in receiving timely and complete case report forms with sufficient demographic information. This results in (1) numerous attempts by HEALTH to communicate with the provider for the necessary information, and (2) a delay in the opportunity to effectively initiate the partner notification services. Licensed health care providers and facilities are asked to report HIV and other STIs within four days of diagnosis, to help identify additional infected cases and their sexual partners earlier in the disease transmission process.

High numbers of anonymous sexual partners of index cases present significant challenges to partner notification, and to the interruption of further transmitting infections. Anonymous sexual partners do not usually exchange demographic information, making the process of locating exposed partners extremely difficult. Although anonymous sexual activity may take place at venues such as bath houses or other sex club venues, an increasing proportion of sexual contacts occur through social media such as internet sites or anonymous sex smartphone applications. HEALTH PNS/DIS personnel currently work with these social media tools to improve partner notification. Integration of molecular epidemiology with partner notification programs to further address

this challenge may allow improved risk reduction counseling with better understanding about sexual behavior patterns and targeted prevention interventions.

Health care providers are essential facets in enhancing the goal to reduce transmission of HIV and other STIs in RI, by being aware of the opportunities to interrupt further spread of disease and working with HEALTH to facilitate these efforts. In addition to routine testing and quick reporting of new cases, providers can perform or encourage partner notification by educating patients about the process and the potential for communication by PNS/DIS staff from HEALTH. Partner notification services can also be requested from HEALTH by health care providers to help locate or counsel patients who do not return to be informed of their new HIV and other STI positive results. A strong collaboration across agencies, particularly between health care providers and HEALTH will be crucial to effectively interrupt further transmission of HIV and other STIs in RI.

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