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Results of a Social Network Testing Intervention for HIV in Infectious Disease Clinics

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Abstract
Social networks can be leveraged to identify undiagnosed HIV-infected individuals. The NC-LINK clinic-based testing initiative utilized these networks to achieve a 5% (95% CI 1.1–8.9%) positivity rate by providing free HIV testing to anyone who accompanied an HIV-infected patient to their clinic appointment. During 2013–2015, 120 individuals were tested at two clinics (N > 1000 patients each) in North Carolina, with 5 new and 6 total positive results. Of these, three linked to care within 30 days and all within 365 days. If expanded further, this initiative could significantly increase the number of HIV-infected individuals aware of their status.

Keywords HIV · Clinic-based testing · Social networks · Newly diagnosed

Introduction

Approximately 168,000 people (14%) living with HIV in the US are undiagnosed [1]. Similar to national estimates, in North Carolina an estimated 4000 HIV-infected individuals (11%) are unaware of their status [2]. Despite highly effective treatment and free testing, reaching those who are undiagnosed remains a significant obstacle. Increasing the number of diagnosed HIV-infected individuals is an important step in controlling the epidemic as undiagnosed individuals cannot benefit from treatment and disproportionately contribute to HIV transmission. Modeling of HIV transmission indicates that 30% of HIV transmissions events in the US occur from HIV-infected individuals who were unaware of their status [3]. Additionally, undiagnosed HIV-infected individuals had transmission rates 3–7 times that of those who were aware of their HIV status [3].

When HIV-infected individuals are aware of their diagnosis, they can link to care, which is a necessary first step toward ART initiation. Delays in accessing care after diagnosis are associated with a higher viral loads and lower CD4 counts [4], while earlier linkage to care is associated with decreased time to viral suppression [5], which can lead to decreased transmission to others [6]. Interventions which test high risk individuals and provide rapid or immediate linkage to care should have high priority because they provide both individual and public health benefits of decreased transmission.

Individuals in the social network of HIV-infected individuals are considered to be at increased risk for HIV infection, even in the absence of a sexual relationship [7]. As such, the use of social networks can widen the detection of HIV beyond solely sexual partners and increase the number of HIV-infected individuals who are aware of their status. Following this theory, a pilot HIV testing intervention that offered free, rapid HIV testing to anyone accompanying an HIV-infected individual to their HIV care appointment within an infectious diseases (ID) clinic yielded a high positivity rate of 3.6% [8], indicating that the social network of a HIV-infected individual can be a highly effective means of

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identifying others with HIV [8]. To increase the percentage of HIV-infected individuals aware of their status, this pilot clinic-based testing intervention was adapted and expanded to two additional HIV clinics. This paper details the process of the testing intervention and provides data to support more widespread expansion of this HIV testing strategy.

Methods

The clinic-based HIV testing initiative was initially developed and piloted at a public academic medical center infectious diseases clinic (Site 0) which provides care to approximately 1900 total HIV patients. The initiative provided free, rapid HIV testing to anyone who accompanied an HIV-infected patient to their appointment in the clinic, without requiring the individual to register as a patient of the clinic. The clinic-based HIV testing program was expanded to two additional academic medical centers, Sites 1 and 2 with approximately 1950 and 1400 HIV patients, respectively.

The program was implemented under an existing Clinical Laboratory Improvement Amendments (CLIA) at each site. Before implementing the program, the testing protocol was approved by each clinic's institutional standards, point of care testing committee, and the local department of public health (DPH). A Memorandum of Understanding (MOU) was developed between each clinic and the respective county department of public health to allow the clinic to serve as an alternative testing site for the health department. This allowed the DPH to provide free OraQuick© rapid tests to the clinics, enabling clinics to offer testing free of charge and waive patient registration in the clinic's healthcare system.

The intervention was publicized through flyers in the waiting room and discussions with medical providers. Any individual requesting an HIV test was directed to one of the counseling staff for a confidential pre-test interview. Counseling staff were patient navigators, social workers, study coordinators, or other trained staff. The OraQuick© rapid test was administered by a trained tester, who could be the same as the counselor or a different staff member. After the test was administered, individuals were asked to wait for their results in the waiting room. Results were available after approximately 20 min.

Positive tests were confirmed by a second trained tester and the results and post-test counseling were given in a confidential location by an HIV clinician in the clinic. The client could choose to register as a patient of the clinic for a confirmatory test or have blood sent to the DPH state lab for confirmatory testing. The client was also offered a new patient appointment at the clinic, to take place within 1 week after confirmatory test results were available.

All clinic staff performing rapid testing as part of the testing program received proficiency training in test procedures from the DPH, passed a written and observational exam and completed annual competency testing. Oversight of the testing initiative was provided by either the clinic's HIV Coordinator or a Clinical Quality Administrator.

Demographic and testing data were collected from the standard DPH Interim Rapid Testing form that is entered into the state HIV surveillance database. The data collected includes tests performed at Site 1 from April 25, 2013 through December 14, 2014 and at Site 2 from March 24, 2014 through December 13, 2015. Frequencies were calculated for demographics, self-reported risk factors, test results, and care outcomes for those who tested positive. The risk factors assessed behaviors that individuals engaged in over the 12 months prior to testing. The presence of a viral load (VL) test result was identified using state surveillance data and was used as a proxy to indicate linkage to care following HIV diagnosis. The proportion achieving viral suppression (VLS) < 200 copies/mL was measured, as was the proportion that met the HIV AIDS Bureau (HAB) HIV Care retention measure in effect at that time of two lab markers at least 90 days apart within the year following the HIV diagnostic test.

Results

From April 25, 2013 through December 13, 2015, a total of 120 HIV tests were performed on individuals accompanying patients to an HIV clinic appointment. Among all tests performed, individuals were primarily 18–29 years (39%), black/African-American (53%), with slightly more women (58%) tested than men (42%). (Table 1).

Overall, the positivity rate was 5% (n = 6) (95% CI 1.1–8.9%) with a new HIV case positivity of 4% (n = 5) (95% CI 0.6–7.7%). Of all six who tested positive, the primary risk factor was sex with a known HIV-infected partner. Three were linked to care within 30 days, five within 180 days and all within 365 days, defined as the presence of an additional viral load test within that time. Additionally, five of the six positives attended at least two medical visits separated by 90 days within 1 year after the rapid test. Three of five achieved viral suppression within 90 days, four within 180 days and five within 365 days (Table 1).

Discussion

The most important finding from the program evaluation is the high rate of new HIV positives (4%) (95% CI 0.6–7.7%). among persons accompanying HIV patients to clinic appointments, indicating that this intervention likely targets high risk individuals. Testing and detection of persons previously diagnosed with HIV also provides

Table 1 Characteristics and results of persons who received clinic-based testing

	n (%)
Total	120
Age	
< 18	4 (3%)
18–29	47 (39%)
30–39	25 (21%)
40–49	27 (23%)
≥ 50	13 (11%)
Unknown	4 (3%)
Gender	
Male	50 (42%)
Female	70 (58%)
Race/ethnicity	
Black or African-American	64 (53%)
White (non-hispanic)	30 (25%)
Hispanic/latino	11 (9%)
Asian	10 (8%)
Other/multiple reported	5 (4%)
Risk factor[a]	
MSM	16 (13%)
MSW	27 (23%)
WSM	56 (47%)
Sex with known HIV positive partner	64 (53%)
Other[b]	5 (4%)
Test results	
New positive	5 (4%) [95% CI 0.6–7.7%]
Previous positive	1 (1%)
Total positive	6 (5%) [95% CI 1.1–8.9%]
Engaged in care	
Within 30 days	3 (50%)
Within 90 days	4 (67%)
Within 180 days	5 (83%)
Within 1 year	6 (100%)
Retention in care @ 1 year [2 visits, > 90 days apart]	5 (83%)
Viral suppression	
Within 90 days	3 (50%)
Within 180 days	4 (67%)
Within 1 year	5 (83%)

[a]Not mutually exclusive

[b]Cannot report categories less than 5, per state requirements. Includes IDU, WSW, perinatal transmission, healthcare exposure

an opportunity to reconnect those patients with HIV care. While this new positive rate compares to Disease Intervention Specialists (DIS) in NC who found 3.7% new HIV positives when testing partners and associates of known HIV cases in 2011 [9], the testing program required significantly less resources. Notably, this testing strategy has a far higher new HIV positive rate than other alternative testing interventions [10, 11] and significantly higher prevalence than current testing interventions in North Carolina, where prevalence of 1.0% occurs in nontraditional testing sites, 0.3% in sexually transmitted disease clinics, and 0.3% in outreach settings [9].

Despite the small number of HIV-infected individuals identified, by offering direct and immediate access to care for those who tested positive, providing HIV testing in an ID clinic may improve movement through the stages of the care continuum as well. This intervention demonstrated a high rate of linkage to care, with half of those who tested positive engaged in care within 30 days and two-thirds engaged within 90 days. This is consistent with other study findings in which patients diagnosed in a medical clinic had increased rates of linkage to care compared to patients tested in other settings [12]. Additionally, 5 of 6 individuals testing positive were retained in care and all 5 achieved viral suppression after 1 year. Offering HIV testing in a medical clinic not only expedites linkage to care, it also provides access to additional support services offered by the clinic, which may help retain patients in care by immediately addressing barriers to treatment [8].

One of the primary strengths of this intervention was the use of existing infrastructure. The HIV testing intervention was implemented under existing CLIA waivers and utilized staff already employed at the clinics. MOUs with the county health departments allowed clinics to receive free rapid tests, enabling the testing to be offered free of charge. This contributed to the low-cost, as well as increased feasibility of implementation and sustainability of this intervention.

Our findings are subject to several limitations. This intervention was implemented at two ID clinics and may not be representative or generalizable to other clinic populations. Additionally, due to the partnership with the county DPH, the feasibility of this intervention is only applicable where clinics can establish similar partnerships with local health departments. The total number of tests performed overall was low and the expansion sites 1 and 2 did not test as intensely as site 0 despite many similarities in the clinics. Many possible explanations exist such as, different patient volumes per provider, changing epidemiology of HIV transmission or changing access to alternative testing options. The intervention also did not implement a standardized protocol for providers to follow in recommending the intervention to patients, the addition of which could be an improvement for future iterations of the intervention. We are also unable to determine whether the low number of tests were due to low uptake because data was unavailable on the number of individuals who accompanied patients to their appointments but declined testing. However, providing free, rapid testing in an infectious disease medical clinic has been previously found to be widely acceptable among the clinic patients [8]. Additionally, the high positivity rate suggests

that even with low numbers, the intervention was still able to reach the target population.

Despite the limitations of our study, this was a low-resource intervention that yielded a high rate of identifying new HIV positives. If expanded to other ID clinics across the US, this strategy could aid in identifying undiagnosed people living with HIV.

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Compliance with Ethical Standards

Conflict of interest None of the authors have conflicts of interest to report.

Research Involving Animal Rights This article does not contain any studies with animals performed by any of the authors.

Research Involving Human Rights All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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