

Evaluation of a Rapid HIV Testing Initiative in an Urban, Hospital-Based Dental Clinic

Oni J. Blackstock, M.D.,¹ James R. King, D.D.S.,² Roger D. Mason,³
Cynthia C. Lee, M.A.,³ and Sharon B. Mannheimer, M.D.³

Abstract

Performing rapid HIV testing in nontraditional clinical settings such as dental clinics is a potential method for targeting high-risk individuals who may not otherwise access health care settings that offer HIV testing. In March 2008, Harlem Hospital Center, located in New York City, launched a counselor-based rapid HIV testing initiative in its on-site dental clinic. A full-time, trained counselor consented and tested patients as they waited for their appointments. HIV screening was performed using a whole-blood, finger-stick rapid HIV test. Through this initiative, 3864 HIV tests were performed from March 1, 2008 to December 31, 2009, representing 3565 unique individuals and 97.6% of dental patients approached for testing. Of those tested, the mean age was 38.5 years, with 47.1% female, 75.5% black, and 20.6% Hispanic. Self-reported HIV risk behaviors included 73.5% with recent unprotected heterosexual intercourse, 4.6% with recent or past injection drug use, and 2.6% who identified as men who have sex with men. Nineteen previously undiagnosed individuals (0.53%) were confirmed HIV positive. Of these individuals, mean age was 38.3 years with males representing 84.2%. Fifteen newly diagnosed patients (78.9%) were linked to care. Of those linked to care, median initial CD4 cell count was 317 cells/mm³; 6 of these individuals (40%) had CD4 cell counts below 200 cells/mm³. Our results demonstrate that a counselor-based rapid HIV testing program with linkage to specialized HIV care can be successfully integrated into the dental clinic setting.

Introduction

THE CENTERS FOR DISEASE CONTROL AND PREVENTION'S (CDC) revised HIV testing guidelines recommend voluntary HIV testing be considered part of routine care in all health care settings.¹ While dental clinics were not expressly mentioned in the CDC's recommendations, offering HIV screening in this setting represents a unique opportunity because high-risk individuals may seek care regularly from oral health providers while having minimal to no interaction with other health care settings.²

Although the feasibility and acceptance of rapid HIV testing in dental clinics has been established, to our knowledge, no published data exists regarding the implementation and evaluation of a rapid HIV testing program in this setting.^{3,4} In March 2008, Harlem Hospital Center, a large, city hospital in New York City, launched a rapid HIV testing initiative at its on-site, outpatient dental clinic. The hospital serves Central Harlem, a predominantly low-income, African American

community with an HIV/AIDS seroprevalence of 2.9%, the second highest in the city.⁵ This report describes the results of this dental clinic-based rapid HIV testing initiative.

Methods

In 2006, in response to the CDC's revised recommendations, Health and Hospitals Corporation, the municipal hospital system for New York City, began a system-wide program to increase opportunities for HIV testing throughout its inpatient and outpatient sites. The rapid HIV testing program in Harlem Hospital's dental clinic grew out of this initiative. The dental clinic offers comprehensive dental services and is staffed by 10 faculty dentists, 18 dental residents, and a dental hygienist. The clinic treats a high volume of patients annually and accepts new walk-in patients on a daily basis.

The hospital's rapid HIV testing program assigned a full-time, trained counselor to the dental clinic during weekdays. The counselor approached patients for testing as they waited

¹Department of Internal Medicine, Yale University School of Medicine, New Haven, Connecticut.

²Department of Dentistry and Oral and Maxillofacial Surgery, ³Department of Medicine, Division of Infectious Diseases, Harlem Hospital Center/Columbia University, New York, New York.

for their dental appointments. Eligibility for HIV testing included being 13 years of age or older (consistent with the CDC's recommended starting age for HIV screening) and able to provide informed consent.¹ In a separate private area of the clinic, patients underwent pretest counseling during which the counselor obtained information about demographics and HIV risk factors. After obtaining written informed consent, as required by New York State law, a whole-blood, finger-stick rapid HIV test was performed (OraQuick Advance Rapid HIV-1/2 Antibody Test, OraSure Technologies, Bethlehem, PA). Results were obtained within 20 min on the same day as testing. All tested patients received post-test counseling, including risk reduction information, upon receipt of their results prior to leaving the dental clinic.

Patients testing preliminary positive were provided with extensive post-test counseling, asked to provide blood samples for confirmatory testing by Western blot, and given a scheduled appointment to return to the dental clinic within 1 week to receive confirmatory results from the counselor. Individuals with preliminary positive results continued to be seen by their oral health provider while they awaited confirmatory results. The counselor reported the names of persons testing preliminary positive to the New York City Department of Health and Mental Hygiene (DOHMH) public health advisor assigned to Harlem Hospital. For individuals who self-reported a previously known HIV diagnosis, counseling and testing was offered for verification and their names given to the DOHMH public health advisor for confirmation of prior known HIV infection. If the known HIV-infected individual was not currently linked to care and desired to establish care, the counselor accompanied the patient to the hospital's outpatient HIV clinic to schedule an appointment.

Patients with positive confirmatory results received further counseling at their return visit with the counselor, were escorted from the dental clinic to the hospital's outpatient HIV clinic, and given an appointment with an HIV care provider. The counselor completed the required paperwork for partner notification, which was then submitted to the DOHMH as per protocol.

Outreach for persons with confirmed positive HIV test results who did not follow up for receipt of their results was conducted via mail and phone calls by the Harlem Hospital HIV counseling and testing staff. If no response was obtained after three repeated attempts via outreach letters and phone calls, a case worker was assigned to locate the individual lost to follow-up. In parallel with the HIV counseling and testing staff's efforts, the DOHMH public health advisor assigned to our hospital also attempted to contact individuals who failed to return for confirmatory results in order to inform them of their results and to link them to care.

Data for each patient was stored in QuadraMed Computerized Patient Record (Himss Analytics, Version 5.0.08.63; Reston, VA) and Oracle Business Intelligence Discoverer 11g (Oracle Corporation, Version 10.1.2; Redwood Shores, CA).

Results

From March 1, 2008, to December 31, 2009, the dental clinic treated 8006 patients who were eligible for HIV testing, totaling 17,351 clinic visits. Through this dental clinic-based rapid HIV testing initiative, a total of 3864 HIV tests were performed during the study period representing 3565 unique

TABLE 1. CHARACTERISTICS OF DENTAL PATIENTS TESTED (N=3565)

Mean age, years (range)	38.5 ± 14.3 (range, 14 to 91)
Gender, N (%)	
Male	1884 (52.9%)
Female	1681 (47.1%)
Race/ethnicity, N (%)	
Black/African American	2692 (75.5%)
Hispanic	734 (20.6%)
White	31 (0.9%)
Asian	29 (0.8%)
Other	47 (1.3%)
Unknown	32 (0.9%)
Insurance status, n (%)	
Public insurance (i.e., Medicaid, Medicare)	1630 (45.7%)
Private insurance	184 (5.2%)
Uninsured	1557 (43.7%)
Other/Unknown	194 (5.4%)
Self-reported HIV risk categories, n (%)	
Unprotected heterosexual intercourse	2620 (73.5%)
IDU (past or recent)	164 (4.6%)
MSM	93 (2.6%)

IDU, injection drug use; MSM, men who have sex with men.

dental patients and 97.6% of eligible dental patients approached for testing. Given the time required to counsel and test patients, the counselor tested approximately 10 dental patients per day.

Mean age of those tested was 38.5 ± 14.3 years (range, 14 to 91). Of those tested, 47.1% were female, 75.5% black, and 20.6% Hispanic (Table 1). Regarding marital status, more than two thirds (68.9%) of persons tested described themselves as single. Tested individuals were predominantly publicly insured (45.7%) or uninsured (43.7%). Self-reported risk behaviors among those tested included 73.5% with recent unprotected heterosexual intercourse, 4.6% with recent or previous injection drug use (IDU), and 2.6% who identified themselves as men who have sex with men (MSM).

Of the 3565 individuals tested, 19 patients (0.53%) were newly diagnosed as HIV positive. Mean age for these 19 patients was 38.3 ± 14.7 years (range, 20 to 61) (Table 2). Males comprised 84.2% (16) of the newly identified cases. Prior to testing HIV-positive, 9 of the 19 newly diagnosed individuals (47.3%) had at least one or more prior visits to our institution within the past year and had not received an HIV test including 5 individuals with emergency department visits, 3 with medicine clinic visits, and 2 with dental visits.

Fifteen patients (78.9%) confirmed positive were linked to HIV primary care at our facility. The remaining 4 individuals (21.1%) did not return for their confirmatory results despite attempts to contact them for follow-up. Median initial CD4 cell count for the 15 patients linked to care was 317 cells/mm³ (interquartile range, 81 to 480) and median HIV viral load, 39,000 copies per milliliter (interquartile range, 5890 to 63,600). Of the 15 patients who were linked to care, 6 (40%) had CD4 cell counts below 200 cells/mm³, therefore meeting criteria for AIDS.

TABLE 2. CHARACTERISTICS OF NEWLY DIAGNOSED HIV-POSITIVE INDIVIDUALS (N=19)

Mean age, years (range)	38.3 ± 14.7 (20 to 61)
Gender, n (%)	
Male	16 (84.2%)
Female	3 (15.8%)
Race/ethnicity, n (%)	
Black/African American	18 (94.7%)
Hispanic	1 (5.3%)
No. of newly diagnosed HIV-positive persons with at least one prior visit to facility in the previous year (%)	9 (47.3%)
No. of newly diagnosed HIV-persons linked to care (%)	15 (78.3%)
Median initial CD4 cell count of newly diagnosed HIV-positive persons linked to care (IQR)	317 cells/mm ³ (81 to 480)
Median initial HIV viral load of newly diagnosed HIV-positive persons linked to care (IQR)	39,900 copies/mL (5390 to 63,600)

IQR, interquartile range.

Discussion

Individuals at risk for HIV may be more likely to seek regular care from an oral health provider than from health care providers in settings that offer HIV testing.² Consequently, HIV screening in dental clinics provides an opportunity to reach a high risk population.² In our rapid HIV testing initiative, dental patients demonstrated high acceptance rates to counselor-based HIV counseling and testing. The program identified 19 previously undiagnosed individuals as HIV-infected during the 22-month study period. The majority of these newly diagnosed individuals were linked to HIV care and treatment. A greater proportion of these newly identified HIV-infected persons (40%) received a concurrent diagnosis of AIDS compared to the city-wide rate (25%).⁵ Moreover, despite having one or more visits to the hospital in the past year, almost half of newly diagnosed persons had not received an HIV test during that time period.

Central Harlem's HIV epidemic mirrors the national landscape, in that, increasingly, HIV in the United States disproportionately affects low-income, minority populations in urban areas.^{6,7} Based on the patients' self-reported risk factors, Harlem Hospital's dental clinic-based rapid HIV testing initiative reached an at-risk population. More than two thirds of dental patients who received an HIV test described themselves as single and nearly three quarters reported recent unprotected heterosexual intercourse. The confluence of Central Harlem's high HIV seroprevalence with its high rates of poverty, incarceration, substance use, and sexually transmitted infections, may place even individuals engaging in normative sexual behaviors, such as unprotected sex in the context of a stable relationship, at risk for HIV.⁸⁻¹¹ With respect to IDU, in the general U.S. population, the fraction of individuals who report ever injecting drugs is approximately 1.5%.¹² Among the dental patients tested in this initiative, the rate of self-reported recent or past IDU (4.6%) exceeded this rate considerably. The proportion of dental patients tested who self-identified as MSM parallels national data.¹³ HIV incidence among MSM continues to increase, particularly among MSM of color.⁶ MSM represent half of all new infections annually and account for the highest burden of undiagnosed HIV infection.^{6,14}

Given that at-risk individuals may be missed by risk-based HIV testing, routine HIV testing in conventional and non-traditional health-care settings, such as dental clinics, has been promoted as an approach to increase opportunities for early HIV detection.¹⁵⁻¹⁷ Approximately one fifth of individuals who are HIV-infected in the United States are unaware of their status.¹⁸ In particular, the burden of undiagnosed HIV infections disproportionately impacts African Americans, among whom nearly half of HIV-infected persons are unaware of their status.¹⁴ Individuals with undiagnosed HIV infection may be unknowingly responsible for over 50% of newly transmitted HIV infections.¹⁹ Early HIV detection and linkage to care and treatment are associated with improved health outcomes for individuals infected with HIV and is cost effective.²⁰⁻²² Furthermore, knowledge of one's current HIV status may prevent further HIV infections since HIV-infected individuals aware of their status have been shown to decrease risky behaviors.²³

Various models for rapid HIV testing in the dental setting have been suggested, including counseling and testing performed by the oral health provider, by a member of the dental staff such as a dental assistant, or by a counselor, such as in our initiative.^{3,4} The specific model will likely depend, in part, on the type of dental practice (i.e., private practice versus hospital-based), financial resources and staff support available, and oral health providers' degree of comfort with HIV counseling and testing. If HIV testing is to be offered in dental clinics, access to HIV primary care is essential to ensure linkage to care and treatment. Issues of training, handling of confirmatory results, and reimbursement for HIV counseling and testing will need to be addressed as well.

Limitations of this study include that it is based on the performance of a single site located in a high HIV prevalence community. Consideration of the background rate of undiagnosed HIV infection should be carefully weighed in decision-making with regards to offering routine HIV testing in low HIV prevalence areas given concerns about cost and test performance. Yet, even in low-prevalence areas, studies demonstrate that routine HIV testing is cost effective.^{21,22} Paltiel et al.²³ concluded that routine HIV testing is cost-effective when the prevalence of undiagnosed HIV infection in the population is at least 0.2%. Another potential limitation

of the study relates to the cost of testing for patients. As most individuals served by the hospital's dental clinic are publicly insured or lack insurance, the clinic provided testing at no additional cost to patients. It is unclear whether a copayment or fee would have dissuaded patients, in particular, those at high risk, from being tested. Studies suggest that even small fees can discourage use of preventive health services.²⁴

Dental professional societies should consider encouraging oral health providers with sufficient resources to consider rapid HIV testing in their clinics. Opportunities may exist for oral health providers in private practice or those unaffiliated with a hospital or clinic offering HIV care to collaborate with HIV/AIDS-focused community-based organizations (CBOs). Dental professional organizations and CBOs can facilitate partnering oral health providers with CBOs that may be able to provide staff for HIV counseling and testing or assist in linking newly diagnosed individuals to HIV care.

Challenges remain in expanding HIV counseling and testing to sites such as dental clinics including ensuring that patients with preliminary positive results follow up for receipt of confirmatory test results and that newly diagnosed individuals are linked to HIV care in a timely manner.^{25–27} We continue to evaluate new approaches to facilitate engagement and maintenance in care for persons newly identified as HIV-positive. The high proportion of individuals tested who self-reported recent unprotected heterosexual intercourse and a history of IDU underscores the continued importance of developing targeted risk reduction interventions. Missed opportunities for early HIV diagnosis persist, despite repeated health-care encounters.²⁸ Continued emphasis on expanding HIV testing to nontraditional clinical settings and nonclinical sites, such as CBOs, which can support testing and linkage to care is needed.

Routine HIV testing in dental clinics holds promise as a key component of early HIV detection and prevention efforts. Our results demonstrate that a counselor-based rapid HIV testing program with linkage to specialized HIV care can be successfully integrated into a dental clinic setting.

Acknowledgments

The Harlem Hospital Center Rapid HIV Testing program is supported by a grant number H89HA00015 from United States Health Resources and Services Administration. This grant is funded through the Ryan White HIV/AIDS Treatment Extension Act of 2009—Part A funding, through the New York City Department of Health to Public Health Solutions. The authors would like to thank Martha Milan for her continued commitment to HIV counseling and testing in Harlem Hospital's dental clinic.

Author Disclosure Statement

No competing financial interests exist.

References

- Centers for Disease Control and Prevention. Revised recommendations for HIV testing of adults, adolescents, and pregnancy women in health-care settings. *MMWR Recomm Rep* 2006;55:1–17.
- Pollack HA, Metsch LR, Abel S. Dental examinations as untapped opportunity to provide HIV testing for high-risk individuals. *Am J Public Health* 2010;100:88–89.
- Patton LL, Strauss RP, Santos VA, et al. Feasibility of HIV Testing in Dental Offices with Rapid Oral-Based Tests [Abstract M2-F0704]. Presented at National HIV Prevention Conference. Atlanta, GA: June 12–15, 2005. www.aegis.com/conferences/NHIVPC/2005/M2-F0704.html (Last accessed June 15, 2010).
- Dietz CA, Ablah E, Reznik D, et al. Patients' attitudes about rapid oral screening in an urban, free dental clinic. *AIDS Patient Care STDs* 2008;22:205–212.
- New York City Department of Health and Mental Hygiene. HIV Epidemiology and Field Services Semiannual Report. October 2009;4(2). www.nyc.gov/html/doh/downloads/pdf/dires/dires-2009-report-semi2.pdf (Last accessed June 15, 2010).
- Center for Disease Control and Prevention. HIV in the United States: An Overview. www.cdc.gov/hiv/topics/surveillance/resources/factsheets/us_overview.htm (Last accessed June 15, 2010).
- El-Sadr WM, Mayer KH, Hodder SL. AIDS in America—Forgotten but not gone. *N Engl J Med* 2010;362:967–970.
- Olson EC, Van Wye G, Kerker B, Thorpe L, Frieden TR. Take Care Central Harlem. NYC Community Health Profiles, Second Edition. 2006;20:1–16. www.nyc.gov/html/doh/downloads/pdf/data/2006chp-302.pdf (Last accessed June 15, 2010).
- Adimora AA, Schoenbach VJ, Floris-Moore MA. Ending the epidemic of heterosexual HIV transmission among African Americans. *Am J Prev Med* 2009;39:468–471.
- Magnus M, Kuo I, Shelley K, et al. Risk factors driving the emergence of a generalized heterosexual HIV epidemic in Washington, District of Columbia networks at risk. *AIDS* 2009;23:1277–1284.
- Drucker EM. Incarcerated People. In: Levy BS, Sidel VW, eds. *Social Injustice and Public Health*. New York: Oxford University Press, 206:163.
- Armstrong GL. Injection drug users in the United States, 1979–2002: An aging population. *Arch Intern Med* 2007;167:166–173.
- Purcell DW, Johnson C, Lansky A, et al. Calculating HIV and syphilis rates for risk groups: Estimating the national population size of men who have sex with men [Abstract 22896]. Presented at 2010 National STD Prevention Conference. Atlanta, GA: www.cdc.gov/hiv/topics/msm/resources/research/msm.htm (Last accessed June 15, 2010).
- Campsmith ML, Rhodes P, Hall HI. Estimated prevalence of undiagnosed HIV infection: US, end of 2006 [Abstract 1036]. Presented at 16th Conference on Retroviruses and Opportunistic Infections. Montreal, Canada: February 8–11, 2009. www.retroconference.org/2009/Abstracts/33682.htm (Last accessed June 15, 2010).
- Klein D, Hurley LB, Merrill D, Queensberry CP Jr. Review of medical encounters in the 5 years before a diagnosis of HIV-1 infection: Implications for early detection. *J Acquir Immune Defic Syndr* 2003;32:143–152.
- Alpert PL, Shuter J, DeShaw MG, Webber MP, Klein RS. Factors associated with unrecognized HIV-1 infection in an inner-city emergency department. *Ann Emerg Med* 1996;28:159–164.
- Jenkins TC, Gardner EM, Thrun MW, Cohn DL, Burnam W. Risk-based human immunodeficiency virus (HIV) testing fails to detect the majority of HIV-infected persons in medical care settings. *Sex Transm Dis* 2006;33:329–333.
- Centers for Disease Control and Prevention. HIV prevalence estimates—United States, 2006. *MMWR Morb Mortal Wkly Rep* 2008;57:1073–1076.

19. Marks G, Crepaz N, Janssen R. Estimating sexual transmission of HIV from persons aware and unaware that they are infected in the USA. *AIDS* 2006;20:1447–1450.
20. Palella FJ, Deloria-Knoll M, Chmiel JS, et al. Survival benefit of initiating antiretroviral therapy in HIV infected persons in different CD4+ cell strata. *Ann Intern Med* 2003;138:620–626.
21. Walensky RP, Freedberg KA, Weinstein MC, et al. Cost-effectiveness of HIV testing and treatment in the United States. *Clin Infect Dis* 2007;45:S248–S254.
22. Paltiel DA, Walensky RP, Shackman BR, et al. Expanded HIV screening in the United States: Effect in clinical outcomes, HIV transmission, and costs. *Ann Intern Med* 2008;145:797–806.
23. Marks G, Crepaz N, Senterfitt JW, Janssen RS. Meta-analysis of high-risk behavior in persons aware and unaware they are infected with HIV in the United States: Implications for HIV prevention programs. *J Acquir Immune Defic Syndr* 2005;39:446–453.
24. Solanki J, Schaffner HH. Cost-sharing and the utilization of clinical preventive services. *Am J Prev Med* 1999;17:127–133.
25. Reed JB, Hanson D, McNaghten AD, et al. HIV testing factors associated with delayed entry into HIV medical care among HIV-infected persons from eighteen states, United States, 2000–2004. *AIDS Patients Care STDs* 2009;23:765–777.
26. Bamford LP, Ehrenkranz PD, Eberhart MG, Shapner M, Bardy KA. Factors associated with delayed entry into primary HIV medical care after HIV diagnosis. *AIDS* 2010;24:928–930.
27. Mugavero MJ, Lin HY, Willig JH, et al. Missed visits and mortality among patients establishing initial outpatient HIV treatment. *Clin Infect Dis* 2009;48:248–256.
28. Center for Disease Control and Prevention. Missed opportunities for earlier diagnosis of HIV infection—South Carolina, 1997–2005. *MMWR Morb Mortal Wkly Rep* 2006;55:1269–1272.

Address correspondence to:

Oni J. Blackstock, M.D.

Robert Wood Johnson Clinical Scholar

Department of Internal Medicine

Yale University School of Medicine

333 Cedar Street

SHM IE-66

New Haven, CT 06510

E-mail: oni.blackstock@yale.edu

Copyright of AIDS Patient Care & STDs is the property of Mary Ann Liebert, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.