

Routine Rapid HIV Screening in Six Community Health Centers Serving Populations at Risk

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BACKGROUND: In 2006, to increase opportunities for patients to become aware of their HIV status, the Centers for Disease Control and Prevention released updated guidelines for routine, opt-out HIV screening of adults, adolescents, and pregnant women in healthcare settings. To date, there are few documented applications of these recommendations.

OBJECTIVE: To measure the impact of application of the guidelines for routine screening in health centers serving communities disproportionately affected by HIV in the southeastern US.

DESIGN: A multi-site program implementation study, describing patients tested and not tested and assessing changes in testing frequency before and after new guidelines were implemented.

PARTICIPANTS: All patients aged 13 to 64 seen in participating health centers.

INTERVENTIONS: Routine rapid HIV screening in accord with CDC guidelines.

MEASUREMENTS: The frequency of testing before and after routine screening was in place and demographic differences in offering and receipt of testing.

MAIN RESULTS: Compared to approximately 3,000 patients in the year prior to implementation, 16,148 patients were offered testing with 10,769 tested. Of 39 rapid tests resulting in preliminary positives, 17 were newly detected infections. Among these patients, 12 of 14 receiving referrals were linked to HIV care. Nineteen were false positives. Younger patients, African Americans and Latinos were more likely to receive testing.

CONCLUSIONS: By integrating CDC-recommended guidelines and applying rapid test technology, health centers were able to provide new access to HIV testing. Variation across centers in offering and receiving tests may indicate that clinical training could enhance universal access.

KEY WORDS: HIV/AIDS; HIV; screening; community health centers.
J Gen Intern Med 24(12):1269–74
DOI: 10.1007/s11606-009-1070-1
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Received January 2, 2009

Revised July 2, 2009

Accepted July 7, 2009

Published online August 5, 2009

INTRODUCTION

In 2006, the Centers for Disease Control and Prevention (CDC) published updated recommendations for HIV testing of adults, adolescents, and pregnant women in health care settings¹. The recommendations aim to increase HIV screening of patients in health care settings, detect unrecognized HIV infection earlier, provide counseling and referrals to newly identified cases, and reduce perinatal HIV transmission. One notable change is the recommendation that HIV testing be offered on a routine basis—all patients aged 13 to 64 in healthcare settings should be informed that they will be screened for HIV infection unless they explicitly decline, regardless of signs, symptoms or risk factors. This paper describes the results of an effort to implement routine testing guidelines in six community health centers in the Southeastern United States.

The national network of federally qualified community health centers is a logical setting for implementation of the new guidelines. Health centers provide primary care and preventive services, including on-site dental, pharmaceutical, mental health and substance abuse services, to the nation's underserved. Ninety-one percent of 18.4 million patients at health centers seen in 2008 were low income; most (39%) were uninsured or depended on Medicaid (35%). Two-thirds of patients are racial and ethnic minorities; about half reside in rural areas and most of the rest live in inner-city communities.² Providing screening and care for HIV is a priority in these settings because health center patients are disproportionately affected by HIV.

The National Association of Community Health Centers, Inc. (NACHC) is the non-profit member organization providing a common source for research, information, training and advocacy for 6,300 federally qualified community health centers in the US and its territories. In 2004, NACHC launched the *Putting Patients First: Health Centers as Leaders in HIV Prevention and Testing* initiative in partnership with the CDC and the US Bureau of Primary Health Care. The initiative aims to increase the number of patients receiving HIV testing and prevention services during routine health care visits. Because NACHC was already working to enhance access to HIV testing when the new guidelines were released, NACHC was able to leverage existing momentum. NACHC trainers were able to design and implement a model in accord with guidelines which could help health centers integrate routine screening into their primary care programs.

This paper describes an evaluation of the effort to make HIV screening routine in selected health centers, which is particularly important because we are aware of only one published study reflecting the outcomes of implementation in this type of setting.³ We present the following: 1) the number of tests

delivered before and after implementing routine testing; 2) the frequency with which testing was offered to eligible patients seen during the study period; 3) the frequency with which tests were performed; 4) the frequency with which cases were identified, and; 5) demographic characteristics of patients offered and receiving tests.

METHODS

Setting. Participation was open to all community health centers not receiving categorical HIV-funding (from the federal Ryan White Program) in North Carolina, South Carolina and Mississippi. NACHC worked with primary care associations in each state to identify health centers that were highly motivated to implement routine HIV screening. Community health centers are often comprised of more than one clinical site, which was the case with all but one of the six centers participating in this effort. Participating centers did not receive any additional funding to support their transition to routine HIV testing, although rapid test kits were donated, and later in the project year, a small stipend from NACHC was provided to support confirmatory testing. Health centers began rolling out testing between December 2006 and April 2007 and submitted test documentation data for this study through March 31, 2008. For this analysis, we restricted data to the 13-month period between March 1, 2007 and March 31, 2008 when full implementation was underway. Institutional Review Board approval for the analysis was obtained from the University of California, San Francisco.

HIV Testing Algorithm. The HIV testing algorithm was developed by the NACHC trainer after consulting with participating health centers and was included in the overall written protocol used in each clinic. Trained clinical staff members drew blood samples using a finger stick method. Samples were tested using the Uni-Gold Recombigen HIV screening test (Trinity Biotech USA, St. Louis, MO). Clinical staff reported negative results to patients as HIV-uninfected; positive results were reported as preliminary positive and staff gave patients written information about the nature of the result. At that time, patients were offered confirmatory testing, which was done with a western blot. If the western blot was negative, clinic staff asked patients to return after three months for a repeat western blot. Late in the year of implementation, NACHC was able to find some funding for two centers to conduct RNA testing in lieu of western blots.

Clinic Procedures. After participating health centers were identified, the NACHC trainer worked with staff in each clinic to redesign patient flow procedures to integrate routine HIV screening with the primary care visit. Although the point in the visit when testing was offered differed across centers, in general, non primary care providers conducted the testing and delivered results when the test came back negative. In cases of preliminary positive results, a primary care provider delivered the result. Clinic-specific procedures were documented in written protocols, which were used during clinic-wide in-service and role-specific training for primary

care providers, social workers, and nurses. Training topics included how to offer HIV screening, discuss rapid test results, document testing and link HIV-infected patients to follow-up care. Training was integrated into centers' pre-existing meeting schedules where possible. The NACHC trainer provided intensive on-site technical assistance during start-up, with ongoing support provided via email, telephone and periodic follow-up visits. Patient education materials were also developed in English and Spanish using health literacy principles.⁴ A more detailed description of the model including the barriers and facilitators experienced during implementation of this project is available elsewhere.⁵

Data used to determine HIV Tests Offered and Inclusion and Exclusion Criteria for the Study.

To help understand the results of the project, we used two data sets reflecting application of new procedures. First, we used administrative data reported by all centers through a uniform data system. From this dataset, we obtained the aggregate number of patients seen during the study period. We compared these figures to the number of patients to whom tests were offered, determined from the second data set: de-identified patient-level documentation of tests provided by clinics, which used a standard form developed for this project. We stratified by health center to measure variation across them. We included patients in this analysis if their age was inside the range for which testing guidelines are established.

HIV Tests Performed. Patient-level data was used to determine the number of tests offered and performed by each health center during the study period. To measure changes in the percent of patients tested before and after procedures were implemented, health centers provided the total number of patients seen and tests performed in the year prior to the study (2006). We compared this to tests offered during the study period, calculated from the patient-level data set.

Identification of New HIV Cases and Linkage to Care. We also used patient-level data to determine test outcomes (negative or preliminary positive) and whether reactive tests were confirmed with western blots. In cases of confirmed infection, we asked health centers to indicate if patients were successfully linked to HIV care.

Characteristics of Patients Offered HIV Screening. To determine if there were differences in characteristics of all patients seen and those offered HIV screening, we combined the patient-level testing documentation into categories matching the pre-aggregated administrative dataset and compared the two. Categories of comparison include patient data by age and gender, race/ethnicity and insurance status. We used unadjusted odds ratios and 95% confidence intervals to measure significant differences across categories.

Characteristics of Patients Tested. To determine if there were differences in characteristics of patients offered and receiving tests, we used the patient-level data to perform univariable and multivariable logistic regression. We observed different relationships between an overall model to assess differences in

testing and separate models for women and men. Therefore, we assessed differences in testing by categories of age, race/ethnicity and insurance status variables, controlling for the health center in which a patient was seen, among women and among men.

RESULTS

Frequency of Offering Routine HIV Screening. During the study period, 16,148, or 28%, of patients between 13 and 64 were offered HIV tests (Table 1); the percentage varied across health centers from 7% to 50%.

Frequency of HIV Tests Performed. Of the tests offered, 10,769 (67%) were performed (with a range from 56% to 83% across health centers; Table 1). Compared to the year prior to the study, when 3,078 tests (approximately 3% of patients) were performed, this represented an almost three-fold increase in the number of tests performed.

Identification of New HIV Cases and Linkage to Care. The number of newly confirmed HIV-infections is presented in Table 1. Of tests performed, 39 (0.36%) yielded preliminary positive results; of these, 17 (0.16%) were confirmed HIV infections. Health centers reported that 14 of the 17 were offered referral to HIV specialty care with 12 accepting that referral. Five (29% of preliminary positive results) were determined to be false positives with either two western blot tests or RNA testing. Eleven additional patients received only one confirmatory western blot test and all tested negative. One individual did not receive confirmatory testing.

Characteristics of Patients Offered HIV Screening. Table 2 compares all patients seen during the study period to patients offered testing. Patients under 55, and particularly men under 18 (OR=0.34; 95% CI=0.30, 0.38, $p<0.0001$) were less likely to be offered testing. Compared to whites, Latinos (OR=0.38; 95% CI=0.36, 0.40, $p<0.0001$) and patients of races/ethnicities other than white, Latino and African American were less likely to be offered testing (OR=0.17; 95% CI=0.15, 0.19, $p<0.0001$). African Americans were more likely

than whites to be offered testing (OR=1.06; 95% CI=1.01, 1.11, $p<0.0001$). Although testing was offered free of charge, compared to uninsured patients, patients with Medicaid and Medicare were less likely to be offered testing and patients with private insurance were more likely to be offered it (all $p<0.0001$). Women were no more or less likely to be offered testing than were men.

Characteristics of Patients Tested. Tables 3 and 4 present the predictors of receipt of an HIV test across demographic characteristics and gender, controlling for health center. Among men and women, patients offered testing aged 54 and younger—and especially those aged 18 to 34—were significantly more likely to test compared to those aged 55 and over. Among both men and women, patients who were not white – and particularly Latinos – were more likely to receive testing when it was offered. Regardless of the health center where they were seen, age and insurance status, compared to white men (Table 3), Latino men were more than twice as likely to receive testing when it was offered (OR=2.72; 95% CI=2.27, 3.25; $p<0.0001$). Latinas (Table 4) were over twice as likely to receive testing as their white counterparts (OR=2.18; 95% CI=1.92, 2.47; $p<0.0001$). With regard to health insurance, after controlling for demographics and health center, only privately insured men were slightly less likely to receive testing compared to uninsured men (OR=0.82; 95% CI=0.70, 0.97; $p<0.0001$).

DISCUSSION

In community health centers prepared for and motivated to implement routine HIV testing, implementation of expanded HIV screening is providing important new access for health center patients. Among patient offered screening in participating health centers, as many as 83% were tested. While not all patients were tested, this project demonstrated that with a well developed protocol, access to test kits, training and support, primary care clinics in community settings could implement and sustain expanded access to HIV testing. This approach is receiving renewed attention as a key strategy in the fight against HIV.⁶

The proportion of patients tested as a result of this effort was comparable or greater than what has been found in other studies.^{7–11} Nevertheless, variation in the rates of offering and

Table 1. Number and Percentage of Persons Tested for Human Immunodeficiency Virus (HIV) in Community Health Centers by Site and Selected HIV Testing Characteristics – March 1, 2007 to March 31, 2008

	Clinic 1 N/%	Clinic 2 N/%	Clinic 3 N/%	Clinic 4 N/%	Clinic 5 N/%	Clinic 6 N/%	Total N/%
Unduplicated patients aged 13 to 64 seen at health centers	6,716	2,632	6,345	9,906	28,396	4,624	58,619
Documented offer of HIV testing (% of total patients)	2,850 (42%)	179 (7%)	3,150 (50%)	2,364 (24%)	5,470 (19%)	2,135 (46%)	16,148 (28%)
Received HIV testing (% of those offered)	2,379 (83%)	124 (69%)	1,764 (56%)	1,464 (62%)	3,808 (70%)	1,230 (58%)	10,769 (67%)
Preliminarily Positive Rapid Test Result (% of tests)	16 (0.67%)	1 (0.81%)	2 (0.11%)	6 (0.41%)	13 (0.34%)	1 (0.08%)	39 (0.36%)
Confirmed as newly diagnosed HIV-infected (% of tests)	8 (0.34%)	0	0	2 (0.14%)	6 (0.16%)	1 (0.08%)	17 (0.16%)
Linked to care (% of newly confirmed HIV-infected)	7	N/A	N/A	1	6	0	14

Table 2. Number and Percentage of Patients Eligible for Screening and Offered Screening – March 1, 2007 to March 31, 2008

	All patients	Patients offered screening ^a		Unadjusted odds ratio	95% confidence intervals
	N	N	% of all patients		
Gender					
All males	19,898	5,496	28%	1.01	0.97, 1.05
All females	38,721	10,636	27%	Reference	
Gender and age					
Males					
13 to 17	2,774	414	15%	0.34	0.30, 0.38
18 to 34	6,813	1,733	25%	0.65	0.59, 0.72
35 to 54	7,290	2,312	32%	0.89	0.81, 0.97
55 to 64	3,021	1,037	34%	Reference	
Females					
13 to 17	3,426	706	21%	0.49	0.44, 0.54
18 to 34	16,839	3,870	23%	0.56	0.82, 0.60
35 to 54	13,886	4,468	32%	0.89	0.83, 0.95
55 to 64	4,570	1,592	35%	Reference	
Race					
African American	17,733	6,546	37%	1.06	1.01, 1.11
Latino	21,966	3,812	17%	0.38	0.36, 0.40
White	14,995	5,334	36%	Reference	
Other	4,838	414	9%	0.17	0.15, 0.19
Insurance					
Uninsured	26,582	9,423	35%	Reference	
Medicaid	6,900	2,107	31%	0.80	0.76, 0.85
Medicare	4,064	876	22%	0.50	0.46, 0.54
Private Insurance	7,202	2,714	38%	1.10	1.04, 1.16

^aTotals within categories may not sum to 100% due to missing data; in the case of insurance, we omitted 'other insurance'.

Note: Odds ratios in **bold** are $p < 0.0001$

delivering tests across health centers participating in this project may mean that the degree to which all patients receive screening depends on the setting in which testing is offered. We did not directly assess reasons why patients were or were not offered testing. It may be that some patients and providers in the mostly rural health centers participating in this effort do not perceive HIV as a problem in their communities. In a 2003 survey (unpublished; Executive Summary available from NACHC), health centers reported this perception to be a barrier to testing. The rate of offering tests that we found may also reflect competing priorities in health centers. As a main

site of primary care in many communities, other health conditions such as diabetes and heart disease, which are more prevalent than HIV infection, may be the priority.

Demographic differences among patients offered and not offered tests may reflect the role of provider-related factors—such as comfort with different patients or perceptions of patient risk or need—in expanding HIV screening. Latinos in particular were less likely to be offered testing; this may have been a language issue. Older patients were more likely to be offered testing, perhaps because they had established relationships with the centers and providers working in them. In any case, these

Table 3. Predictors of Patient Receipt of HIV Test—Results of Univariable and Multivariable Analysis for Men Aged 13 to 64

	MEN			
	HIV testing		Unadjusted odds ratio (95% confidence intervals)	Adjusted odds ratio ^b (95% confidence intervals)
	Offered test (n=5,496)	Received test (n=3,603; 66%) ^a		
Age				
13 to 17	414	287 (69%)	1.90 (1.49, 2.41)	1.38 (1.03, 1.84)
18 to 34	1,733	1,253 (72%)	2.19 (1.86, 2.57)	1.60 (1.32, 1.94)
35 to 54	2,312	1,449 (63%)	1.41 (1.21, 1.63)	1.23 (1.03, 1.46)
55 to 64	1,037	564 (54%)	Reference	Reference
Race				
African American	2,016	1,384 (69%)	2.21 (1.94, 2.53)	1.55 (1.31, 1.84)
Latino	1,482	1,134 (77%)	3.29 (2.83, 3.83)	2.72 (2.27, 3.25)
White	1,825	908 (50%)	Reference	Reference
Other	164	122 (74%)	2.91 (2.03, 4.18)	2.31 (1.57, 3.38)
Insurance				
Uninsured	3,182	2,140 (67%)	Reference	Reference
Medicaid	509	327 (64%)	0.87 (0.72, 1.05)	0.86 (0.70, 1.06)
Medicare	401	233 (58%)	0.65 (0.53, 0.81)	0.96 (0.77, 1.21)
Private insurance	967	627 (65%)	0.85 (0.73, 0.99)	0.82 (0.70, 0.97)

^aTotals within categories may not sum to 100% due to missing data; in the case of insurance, we omitted 'other insurance'.

^bOdds ratios are adjusted for demographic characteristics, insurance status and health center in which patients were seen.

Note: Odds ratios in **bold** are $p < 0.0001$

Table 4. Predictors of Patient Receipt of HIV Test—Results of Univariable and Multivariable Analysis for Women Aged 13 to 64

	WOMEN			
	HIV testing		Unadjusted odds ratio (95% confidence intervals)	Adjusted odds ratio ^b (95% confidence intervals)
	Offered test (n=10,636)	Received test (n=7,292, 69%) ^a		
Age				
13 to 17	706	499 (71%)	1.79 (1.48, 2.16)	1.54 (1.25, 1.90)
18 to 34	3,870	2,846 (74%)	2.06 (1.82, 2.33)	1.81 (1.57, 2.09)
35 to 54	4,468	2,955 (66%)	1.45 (1.29, 1.63)	1.32 (1.16, 1.50)
55 to 64	1,592	914 (57%)	Reference	Reference
Race				
African American	4,528	3,222 (71%)	1.83 (1.66, 2.00)	1.84 (1.66, 2.04)
Latino	2,329	1,796 (77%)	2.49 (2.22, 2.80)	2.18 (1.92, 2.47)
White	3,509	2,018 (58%)	Reference	Reference
Other	250	162 (65%)	1.35 (1.03, 1.77)	1.34 (1.01, 1.78)
Insurance				
Uninsured	6,239	4,252 (68%)	Reference	Reference
Medicaid	1,597	1,108 (69%)	1.03 (0.92, 1.16)	1.07 (0.94, 1.21)
Medicare	475	290 (61%)	0.70 (0.58, 0.84)	0.92 (0.76, 1.13)
Private insurance	1,750	1,226 (70%)	1.05 (0.93, 1.18)	1.09 (0.96, 1.23)

^aTotals within categories may not sum to 100% due to missing data; in the case of insurance, we omitted 'other insurance'.

^bOdds ratios are adjusted for demographic characteristics, insurance status and health center in which patients were seen.

Note: Odds ratios in **bold** are $p < 0.0001$

differences indicate a role for additional provider training or capacity-building including support for developing models which are tailored to specific clinic settings. It also may be that as healthcare providers become more comfortable with routine screening procedures, some of the differences will disappear in the demographics of patients offered and not offered testing. Next steps for providers working in community health centers – and others – who want to make HIV screening more accessible will be to refine tools and training strategies to facilitate more consistent testing.

Differences in receipt of testing when it is offered may be due to patient-related factors. African Americans and Latinos may be more likely to accept provider's suggestions in general, or it may be that non-whites are more likely to accept testing because they are aware of higher HIV infection rates among people of color. Younger people were also more likely to accept testing, which may reflect self-perceived risk. These results suggest that tailored information should be provided to patients to assure accurate perceptions of risk and the value of HIV testing.

This project was successful in finding new infections and in linking patients to care that they would not otherwise have received. Although the number of newly detected infections was smaller than anticipated, it may not be reflective of the prevalence among all patients since there may be more undetected infections among the patients who were not tested. Nevertheless, health centers did find a prevalence of infections exceeding the threshold that the CDC recommends for continued testing¹ and health center staffs hope to test the more reluctant patients as the program proceeds.

Another unanticipated finding was that most preliminarily positive rapid tests resulted in unconfirmed infections. While the proportion of false positives in this sample mirrors that of other studies in similar settings¹² and the rate was in accord with the manufacturer's findings for specificity in low prevalence populations,¹³ providers found this disconcerting. At the beginning stages of implementation, clinic staff did not always have well-developed contingency plans for reactive tests. However, as the number of unconfirmed reactive tests grew,

providers and staff understood more clearly the importance of communicating the uncertainty around preliminary positive results and of confirmatory testing. Health centers carefully considered the issue of false positives and designed procedures to protect patients; they developed patient information on what a preliminary positive result meant and provided careful and comprehensive counseling to all patients whose screening test resulted in a preliminary positive. Health centers learned that false positive results are not benign and patient satisfaction and protection should be considered alongside accuracy. In this case and in future efforts, clarifying procedures and understanding how to cope with the possible outcomes of a reactive test will be important to sustaining efforts. Patients and providers may also benefit from new testing technologies and algorithms such as those using multiple rapid tests at one time to improve performance.^{14–15}

New algorithms also may mitigate the challenges introduced with longer wait times for confirmatory test results. In this project, many patients did not return for the results of their second test. In one case, the patient chose to forego confirmatory testing altogether. With wait times for confirmed infection, linkages to care were suboptimal. Even when health centers had active, well-established referral systems in place, patients were less likely to be linked to care when they did not return for confirmatory testing. Centers without well-defined referral networks had even more difficulty ensuring follow-up care. Keeping the referral systems timely, patient-centered and comprehensive has been critical. Health centers learned that referral networks are important, and that HIV testing programs require effort and resources devoted specifically to ensuring patients are linked to care.

Our evaluation of this effort has some limitations. We were only able to obtain aggregate data for the reference populations, which may have precluded us from discovering additional variables influencing the offering of tests. Because of time and staff resource constraints, we do not have reliable information about why patients did not test nor do we understand why the variation across health centers was so great. It may be that factors related to the specific clinic or

community influenced rates of offering and accepting tests; these factors warrant further study.

Community health centers were able to expand the access that their patients have to HIV testing. Over time, we anticipate that HIV screening will become seamlessly integrated into primary care in these settings and that access will become more consistent for all patients. This project demonstrates what routine screening looks like in real world settings; with commitment and effort, health centers successfully integrated routine screening into primary care settings.

Acknowledgements: The authors would like to thank the Centers for Disease Control and Prevention (CDC) for their financial support of the NACHC testing initiative. Jeff Bosshart at the CDC provided invaluable input on all aspects of the design and implementation of the testing initiative and its evaluation. Health Providers Direct made available the test kits free of charge. Gilead Sciences, Inc. helped support evaluation-related expenses. Participating health centers shared their data and their perspectives on the evaluation results during several meetings held during the initiative. A general description of this project was presented at NACHC's annual meeting in 2007, at the Centers for Disease Control and Prevention meeting in 2007, at the 2008 National Summit on HIV Diagnosis, Prevention and Access to Care. We are grateful to Starley Shade and Jennifer Bie at UCSF and to three anonymous reviewers for extensive suggestions that improved the quality of this paper.

Conflicts of Interest: Cheryl Modica received an honorarium from Gilead Sciences, Inc., Foster City, CA for attending a conference and describing this effort. None of the other authors have conflicts to report.

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