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INTRODUCTION TO SPECIAL SUPPLEMENT

MONITORING AND EVALUATION OF HIV COUNSELING, TESTING AND REFERRAL (CTR) AND HIV TESTING SERVICES

Renee Stein, Tanisha S. Grimes, Robert Malow, Dale Stratford, Freya Spielberg, David R. Holtgrave

The Centers for Disease Control and Prevention (CDC) estimate that 1.1 million people are living with HIV in the United States and approximately 56,000 new infections occur each year (CDC, 2008; Hall et al., 2008). By the end of 2006, an estimated 21% of people with HIV did not know that they were infected (calculated using extended back-calculation methods) (Campsmith et al., 2010). Many of those who do learn their serostatus are diagnosed in the late stages of the disease—approximately 38% of those who are diagnosed with HIV progress to AIDS within a year of their first positive HIV test. HIV transmission rates from persons who are aware of their seropositivity is approximately 3.3 compared to a rate of approximately 11.4 of those unaware of their seropositivity (Holtgrave, 2010). Furthermore, with high-quality care, a 25-year-old HIV-positive person can live an additional 39 years (Lohse, 2007). This information confirms the importance of routine HIV testing and early linkage to care for persons who test positive (CDC, 2009).

Two of the primary goals of the 2010 White House National HIV/AIDS Strategy (NHAS) are to reduce new HIV infections and to increase the access to and quality of care of those who are infected (Millet et al., 2010). HIV testing is an important strategy to reach these goals since people who do not know their serotatus are more likely to engage in risk behaviors that transmit HIV to others (Hall et al., 2010) and may access care too late to receive the maximum benefit (Hall et al., 2010). One of the targets set forth by the NHAS is to increase the percentage of people who are living with HIV who know their serostatus from 79% to 90% by 2015. The NHAS also calls for the development of improved mechanisms to monitor and evaluate efforts to reduce HIV incidence and improve health outcomes. It is particularly important during this difficult economic time to conduct high-quality monitoring and evaluation of HIV testing so that resources may be properly allocated to HIV test-

Renee Stein, Tanisha S. Grimes, and Dale Stratford are with the Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), Centers for Disease Control and Prevention (CDC), Atlanta, GA. Robert Malow is with the College of Health and Urban Affairs, Florida International University, North Miami, FL. Freya Spielberg is with the Research Triangle Institute, Research Triangle Park, NC. David R. Holtgrave Department of Health, Behavior and Society and Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

Address correspondence to Renee Stein, PhD, MPH, Division of HIV/AIDS Prevention, National Center for HIV, STD, and TB Prevention, Centers for Disease Control and Prevention, 1600 Clifton Road NE, Mail Stop E-59, Atlanta GA 30333; E-mail: arf7@cdc.gov

ing programs that are effective and evidence-based. It is to this end that this special supplement in AIDS Education and Prevention is dedicated.

The publication of this supplement is timely as we approach National HIV Testing Day, an annual event led by the National Association of People with AIDS (NAPWA). Every year on June 27th, local organizations and individuals across the United States (e.g., community-based organizations, businesses, health departments, elected officials, media) mobilize the people in their communities to obtain an HIV test in order to learn their HIV status.

The articles in this supplement present a diversity of methods for monitoring and evaluating HIV counseling, testing, and referral (CTR) and HIV testing services, as well as for using data to improve the planning and implementation of these services. Some of the evaluation questions that inspired the articles in this supplement include: (1) Are the populations at highest risk for HIV infection being reached and tested? If not, what are the barriers and how can accessibility and acceptability of HIV testing in these populations be enhanced? (2) Are persons who receive an HIV-positive diagnosis accessing health care? If not, what are the barriers and how can linkage to care be improved? (3) What are the barriers and facilitators to introducing or expanding HIV testing into special settings (e.g., emergency departments, primary care settings, jails)? (4) What are the monetary costs associated with HIV testing and are programs effective in terms of cost per HIV case identified? (5) How can monitoring and evaluation data be used and triangulated with other data sources to guide planning and program improvement? (6) Under what conditions do new technologies and strategies improve HIV testing outcomes?

The studies in this supplement use a variety of analytic methods to address these questions, including mixed-model analysis (combining qualitative and quantitative data), cost effectiveness analysis, and the triangulation of disparate data sources. Furthermore, they draw upon a multitude of perspectives including those of stakeholders, staff members, and HIV infected persons. It is our hope that the responses to these important evaluation questions will help inform planning of CTR and HIV testing services in order to improve linkage to care and improve the quality of life for HIV infected persons and enhance HIV-related services. These services inform a person of their serostatus, and ultimately lead to a reduced incidence of HIV infections.

PART I: MONITORING AND EVALUATING LARGE SCALE HIV TESTING PROGRAMS

The first part of the supplement includes three articles that provide large-scale HIV testing program data at the state level (Wisconsin), national level (United States), and in Vietnam. Gasiorowicz et al. triangulate multiple data sources to help guide the delivery of targeted HIV prevention efforts in WI. Specifically, they calculated HIV prevalence estimates for specified demographic and race/ethnicity groups in WI and then compared them to the proportion of targeted tests these groups received in the state in 2009. After identifying disparities between HIV cases and services, the Wisconsin Division of Public Health set jurisdiction-level HIV testing targets for 2010. These targets were intended to realign the proportion of persons to be tested by racial/ethnic and demographic group and ensure that the people most impacted by HIV receive proportionate resources. For example, although black men who have sex with men (MSM) accounted for 58% of HIV diagnoses in WI, they only ac-

counted for 19% of targeted tests in 2009. In response to this disparity, the Wisconsin Division of Public Health increased their 2010 HIV testing target for black MSM by 67%. Given current resource constraints, this article provides a potential best practice to U.S. health departments for using evaluation data to assess and target HIV prevention dollars efficiently.

Because of the disproportionate impact that HIV has on MSM, the NHAS urges increased attention and resources be given to this population. Fisher et al. described characteristics of CDC-funded HIV tests provided to MSM in 2007 by 29 U.S. health departments. Their central analysis compared tests provided to MSM who were first-time testers (18%) to tests provided to MSM who had tested previously (82%). Although in 2006 MSM accounted for 53% of new HIV infections among adults and adolescents in the U.S (Hall et al., 2008), Fisher et al. report that only 10% of all CDC-funded tests conducted by 29 health departments in 2007 were conducted among MSM. Fisher et al. recommend that additional analyses at a jurisdiction-level are needed to determine local targets for testing MSM that are appropriate for the epidemic in their area (see Gasiorowicz et al. for a potentially valuable tool to assess jurisdiction-level HIV testing needs and set targets). Fisher et al. recommend triangulating national surveillance and incidence data with national HIV counseling and testing data to determine whether CDC's response is appropriate, given the extent and distribution of the HIV epidemic nationwide.

Hong et al. report findings from five years of a PEPFAR-supported national program to provide Voluntary Counseling and Testing (VCT) to high-risk populations in Vietnam. The program was successful in reaching populations that engaged in high-risk behaviors, in de-stigmatizing HIV testing attitudes and behaviors, and in identifying HIV-positive people. Their data show that high-risk exposures (e.g., injection drug use, commercial sex work) were reported in 81% of test records and the yield of new HIV-positive test results was very high at 19%. In addition, the failure to return for test results was reported in only 3.5% of records. In their article, Hong et al. evaluated the utilization of VCT and made recommendations for improving HIV prevention for sex partners of injection drug users and commercial sex workers. Finally, the authors describe a model HIV testing program that takes a comprehensive approach to promote VCT and includes peer outreach, social marketing, and clinical care referral.

PART II: ASSESSING COST EFFECTIVENESS OF HIV TESTING PROGRAMS

The second part of the supplement includes two articles that present cost-effectiveness analyses of HIV testing services. The NHAS calls for the rigorous evaluation of current HIV testing and prevention programs and a redirection of resources to the most effective programs. A cost-effectiveness analysis is one component of a rigorous evaluation because it allows for the documentation of costs and comparison of approaches to identify the most effective prevention strategies. Shrestha et al. present a cost-effectiveness evaluation of a targeted rapid HIV testing intervention provided to transgender communities in New York City and San Francisco. Evaluation of HIV testing in the transgender population is especially important, given that this population has a high prevalence of HIV (Herbst et al., 2008). The service providers in New York City and San Francisco used mobile van outreach and social networking to find very high rates of previously undiagnosed HIV infection (as high as 18.2%) for

a relatively low cost per person notified of a new HIV diagnosis (as low as $3,563 compared to rates of $3,835-$22,243 per person diagnosed).

In 2006, CDC published guidelines recommending routine HIV testing for all patients aged 13–64 in health care settings, including emergency departments (EDs) (Branson, et al., 2006). These guidelines assert that HIV screening should be treated as a routine part of healthcare services, similar to other treatable diseases. The EDs function as the primary point of care for many patients who do not have access to health care and may not otherwise access HIV testing services. Although the potential advantages of routine HIV testing in EDs are clear, EDs may need to adjust implementation to match the needs of their local environment, including institution-specific factors such as prevalence of HIV in the population served and availability of additional funds and staff (Torres, 2010). Hutchinson et al. used a decision analytic model to compare three different staffing models for HIV testing in emergency departments. They found that rather than using either existing ED staff (e.g., nurses) or supplementary staff (e.g., HIV test counselors who are not ED employees) to do HIV testing, a hybrid model that incorporated both existing ED staff and supplemental staff was favored in terms of cost per HIV-infected patient identified. This decision analytic model could be adapted to evaluate other ED-based HIV screening programs.

PART III: EXPANDING HIV TESTING IN PRIMARY CARE SETTINGS

The third part of the supplement includes two articles that explore the factors that serve as barriers and facilitators to implementing routine HIV testing in primary care settings. Since the publication of the 2006 revised CDC HIV testing guidelines (Branson et al., 2006), it is unclear to what extent the guidelines are being implemented among outpatient general internists. Korthuis et al. examined the adoption of routine HIV screening within this community by surveying general internists across the nation regarding their HIV screening behaviors and beliefs, and perceived barriers in light of the CDC guidelines. They found that although awareness of the CDC guidelines was high among general internists, and beliefs about the guidelines were generally favorable, the reported proportion of patients who were provided with HIV screening in the previous 30 days was low and only half reported having increased their screening practices since the CDC guidelines were published. Korthuis et al. discuss perceived barriers (e.g., competing priorities and lack of time) and facilitators (e.g., favorable attitudes to adopting routine HIV tesing) to HIV screening in outpatient internal medicine practices, and suggest strategies and interventions to increase adoption of routine HIV testing in this setting.

Myers et al. conducted a comprehensive evaluation that assessed barriers and facilitators to routine HIV testing and linkage to care in primary care settings funded by the San Francisco Department of Public Health. They found that although HIV testing increased in these publicly-funded primary care settings since 2007, it is still not uniformly accessible for all patients in these settings. Based on these findings, a group of experts and stakeholders recommended a staged approach to expanded HIV testing across networks of community health clinics. This approach would include incorporating HIV testing into different clinical settings over time, starting with clinics serving patients at high risk for HIV. These clinics could then become leaders in identifying best practices for expanding HIV testing and improving linkage to care that their sister health centers could later adopt.

PART IV: HIV TESTING IN JAILS AND OUTREACH SETTINGS

The NHAS states that "a commitment to innovation is needed to keep pace with an evolving epidemic, a scarcity of resources, and to support communities for which HIV is just one of the major challenges." Often innovation and creativity are particularly important when trying to improve HIV testing services in nontraditional HIV testing settings. The next two articles in the supplement address HIV testing in unique settings, namely in jails and outreach settings. Beckwith et al. report findings from a pilot HIV rapid testing program in a Rhode Island jail that included qualitative data collected from healthcare staff in the jail regarding their impressions and attitudes about the program. The article presents convincing evidence that a jail-based rapid HIV testing program has strong potential to help streamline this critical prevention effort among incarcerated individuals who may be transient and are not likely to access HIV testing while in the community.

Spielberg et al. identified optimal HIV counseling and testing strategies to reach populations of color at high-risk for HIV who may be unaware of their HIV status in the Seattle area. They found that a mobile testing van was more likely to reach these populations than a clinic-based health department. They also incorporated an innovative tool called Computer Assessment and Risk Reduction Education (CARE) into their HIV counseling and testing sessions. CARE is an interactive multimedia computer tool that allows clients to receive information about rapid HIV testing, an individualized HIV/STI risk assessment, and evidence-based HIV/STI risk reduction counseling. In addition to guiding and enhancing counseling, the CARE tool also generates tailored summaries and referrals for the clients to take with them. A qualitative analysis of staff interviews revealed favorable perceptions of the impact of the CARE tool on counseling quality, program productivity, and evaluation capability.

PART V: BARRIERS IN LINKING HIV-POSITIVE PERSONS TO CARE

In the final section of the supplement, Garland et al. view CTR as a gateway to medical care for those who test positive for HIV and assert that the post-test counseling component of the session may be a critical opportunity to link HIV-infected persons into care. The authors draw upon the unique perspective of HIV-positive persons not in care by exploring their CTR experiences, and how their testing encounter may be related to their current lack of care. Overall, HIV-positive respondents reported inadequate counseling and information at the time of diagnosis and passive rather than active referrals to care. In addition, they reported encountering system-level barriers to receiving care, such as lack of health insurance and lack of access to case-management services. Garland et al. suggest that more thorough counseling and provision of information at the time of diagnosis, clear standards for active referrals to care by CTR staff, and more frequent linkage to care activities (e.g., increased contact with a case manager) may lead to a more effective linkage to care for HIV-infected clients.

CONCLUSION

In this special issue on the Monitoring and Evaluation of HIV Testing and CTR Services, we present an array of articles focusing on the monitoring and evaluation

of large-scale HIV testing programs, assessing the cost-effectiveness of HIV testing programs, examining HIV testing in specialized settings and identifying barriers to linking newly identified HIV-positive persons to care. We give our gratitude to the authors for their outstanding efforts and contributions to this supplement. In view of the upcoming 2011 June 27th National HIV Testing Day we hope that this special issue will serve as a catalyst in developing and strengthening effective evidence-based HIV CTR services, increasing HIV testing services and programs to underserved communities, and improving the utilization of CTR in linking HIV-positive persons to care.

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HIV PREVALENCE ESTIMATES AND ALIGNMENT AMONG RECENT DIAGNOSES, TARGETED TESTS, AND PREVENTION SERVICES BY DEMOGRAPHIC AND RACIAL/ETHNIC GROUP IN WISCONSIN

Mari Gasiorowicz and Jim Stodola

The article provides HIV prevalence estimates by demographic group (men who have sex with men [MSM], non-MSM males, and females) and race/ethnicity for Wisconsin. Using the estimate that 4-8% of males aged 15-59 are MSM, we estimate that 14-28% of Black MSM in Wisconsin are HIV-positive. The proportions of HIV diagnoses by racial/ethnic and demographic group were compared with the proportions of targeted tests and HIV prevention clients in 2009. Among Blacks, MSM accounted for 58% of HIV diagnoses in Wisconsin but only 19% of targeted tests and 11% of HIV prevention clients. Disparities between cases and services also exist for Latinos and Whites. Jurisdiction-level testing targets were developed for 2010 using the estimated number of persons presumed to be living with HIV and unaware of their infection by racial/ethnic and demographic group. Targets for 2010 were compared with targeted tests conducted in 2009 to identify groups with the largest discrepancies.

State health departments, HIV community planning groups and services providers working in the field of HIV receive useful guidance from the Centers for Disease Control and Prevention (CDC) on monitoring the HIV epidemic, assuring data quality for HIV testing, and selecting effective HIV prevention interventions to maximize responsiveness to the epidemic in their jurisdictions (CDC, 2009 and 2010a). Although guidance on each component, such as conducting HIV surveillance and monitoring HIV testing is very specific, guidance for targeting resources often remains general, advising policy makers to use epidemiologic data to identify the populations most in need of services in their jurisdictions and to prioritize interventions for each population.

Triangulating multiple data sources at a high level of detail can reveal significant discrepancies between populations most affected by HIV and those receiving the

Mari Gasiorowicz is an epidemiologist with the AIDS/HIV Program, Wisconsin Division of Health, Madison. Jim Stodola is a coordinator of the HIV Counseling, Testing and Referral Program, AIDS/HIV Program, Wisconsin Division of Public Health, Madison.

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Address correspondence to Mari Gasiorowicz, AIDS/HIV Program, Wisconsin Division of Public Health, West Wilson St., Madison, WI 53703; e-mail: Mari.Gasiorowicz@Wisconsin.gov

greatest proportion of services. This article describes methods and analysis conducted in one jurisdiction, the state of Wisconsin, using HIV surveillance, targeted counseling and testing, and prevention services data. The burden of disease by racial/ethnic and demographic group (men who have sex with men [MSM], non-MSM males, and females) is compared with breakdowns of persons served through publicly funded targeted HIV testing efforts and individual- and group-level health education/risk reduction (HE/RR) interventions. As a result of identifying significant disparities, the state health department set targets to realign the proportion of persons to be tested by racial/ethnic and demographic group and shifted HIV prevention funds. The purpose for sharing these findings is to encourage other jurisdictions to conduct similarly detailed analyses with a goal of ensuring that populations most impacted by HIV receive proportionate resources.

METHODS

ESTIMATING HIV PREVALENCE

Cases of HIV and AIDS cases have been reported to the Wisconsin Division of Public Health AIDS/HIV Program (WDPH) state epidemiologist since 1985. Cases are reported with name, date of diagnoses, date of report, demographic characteristics, and risk exposure. In the analysis presented here, risk information was imputed for cases for which risk had not been reported. Imputed risk is derived using a method that stratifies cases by sex, race/ethnicity, metropolitan category, and year of report and assumes that cases with unknown risk exposure within each stratum have risk exposures similar to cases with known risk exposure. For planning for prevention services, only cases initially reported in Wisconsin are included; these are cases for which prevention efforts in the state could have helped avert the infection. For assessing burden of disease, estimated prevalence by population, and for HIV care needs, all reported cases living in the state are included.

HIV prevalence was estimated by demographic group to assess the impact of HIV on each subgroup. The estimated HIV prevalence was calculated by dividing the estimated number of persons living with HIV by the population of that demographic group using 2008 intercensal population estimates. Reported cases presumed to be living with HIV (cumulative cases minus deaths) were adjusted to account for CDC's estimate that across demographic groups, 21% of those infected are estimated to be unaware of their infection (CDC, 2008).

The CDC (2010b) has estimated that 4% of males aged 13 and older are MSM. Lieb et al. (2011) have estimated the percentage of males, aged 18 and older, who are MSM by race/ethnicity by state. For Wisconsin, the estimates are 5.4% overall, 4.3% for Blacks, 5.3% for Latinos, and 5.6% for Whites. Estimates by the CDC and Lieb include older men, whereas our analysis is limited to males aged 15-59. Local data suggest that for larger metropolitan areas and among young men, these figures may underestimate the MSM population. For example, data from 2009 Youth Risk Behavior Survey (YRBS) indicate that 10% of Wisconsin public high school students and 19% of Milwaukee students who had had any sexual contact had had at least one partner of the same sex (Karki, Gasiorowicz, & Hollander, 2010). Because findings from the YRBS suggest that the percentage of young males who are MSM may be higher than 4% and because we use a narrower age range than do the CDC and Lieb, Wisconsin uses a range, estimating that between 4% and 8% of the adolescent

and adult male population are MSM. Other jurisdictions have also used ranges, rather than point estimates, for the percentage of the male population that are MSM (e.g., Lieb et al., 2009).

COMPARING TARGETED HIV TESTING AND PREVENTION SERVICE DATA TO SURVEILLANCE DATA

Using HIV data for targeted testing and health education/risk reduction (HE/RR) interventions, the WDPH compared the percentage of individuals served by racial/ethnic and demographic group with recently reported cases of HIV to assess the degree to which populations served match those at greatest risk and most impacted by HIV.

The WDPH supports both HIV screening and targeted HIV testing. Screening efforts are aimed at the general population, whereas targeted testing efforts strive to reach those at greatest risk of becoming infected and those who may be infected and unaware of their HIV status.

HE/RR efforts are individual- and group-level interventions, including comprehensive risk counseling services, aimed at HIV-positive persons at risk of transmitting HIV and HIV-negative persons at risk of acquiring HIV. In 2009 the WDPH funded 14 group-level interventions (GLIs), the majority of which are in Milwaukee, where more than half of the state's cases are diagnosed. Seven of these were directed at MSM; these included two interventions of Many Men, Many Voices, one for Latino MSM and one for African American MSM; Healthy Relationships, for African American HIV-positive MSM; two GLIs for male-to-female transgender women of color; and two other GLIs, one for young MSM of any race or ethnicity, and one for adult Latino MSM. One GLI served HIV-positive persons with a variety of risk factors, one was directed at injection drug users and five were directed at heterosexuals at high or moderate risk. Three individual-level interventions were funded in 2009, one for HIV-positive individuals, one for Latino MSM and one for African American MSM.

The analysis does not include participants in HIV prevention interventions that do not collect individual-level data on both race/ethnicity and risk behaviors. These include non-federally funded needle exchange programs, capacity-building interventions, and Internet and venue-based outreach, including Mpowerment, which serves a large number of young MSM of all races/ethnicities.

Service providers funded by the WDPH to conduct HIV testing and HE/RR services enter their individual-level data into EvaluationWeb, a Web-based reporting system developed by Luther Consulting, LLC. Deidentified information regarding client risk behaviors, demographic characteristics and testing and prevention services are entered into the system. For all data sources included in this article, analyses are provided for Blacks, Latinos, and Whites. Analyses for other racial/ethnic groups could not be presented because of small numbers.

RESULTS

ESTIMATING HIV PREVALENCE

Calculations and estimates for HIV prevalence for MSM, non-MSM males and females for Blacks, Latinos, and Whites aged 15-59 in Wisconsin are provided in Table 1. The estimated HIV prevalence across all populations in Wisconsin is 5.2%; it is 0.5% in Latinos, and more than six times the statewide rate in Blacks (1.3%).

TABLE 1. Calculation for HIV-Prevalence by Demographic and Racial/Ethnic Group Using Population Data and Reported Number Presumed to be Living with HIV, Wisconsin, 2009

Demographic Group	Race/ Ethnicity	Population Estimates, ages 15-59, Using 2008 Intercensal Estimates (National Center for Health Statistics)[a]	Estimate of Persons Living with HIV, Both Reported and Those Unaware of Their Infection, 2009[b]	Estimated HIV Prevalence, 2009
MSM	Black	4,234 - 8,470	1,194	14.1% - 28.2%
	Latino	3,860 - 7,720	347	4.5% - 9.0%
	White	61,157 - 122,313	2,618	2.2% - 4.3%
	Total	69,251-138,503	4,158	3.0% - 6.0%
Non-MSM Males	Black	97,407 - 101,643	824	0.8%
	Latino	88,792 - 92,652	294	0.3%
	White	1,406,567 - 1,467,723	500	0.0%
	Total	1,592,766-1,662,018	1,618	0.1%
Females	Black	111,710	761	0.7%
	Latino	77,178	194	0.3%
	White	1,486,625	429	0.0%
	Total	1,675,513	1,384	0.1%
Total	Black	217,587	2,778	1.3%
	Latino	173,690	834	0.5%
	White	3,015,505	3,547	0.1%
	Total	3,406,782	7,159	0.2%

Note. [a]Population estimate ranges for MSM and non-MSM males by racial/ethnic group is based on an estimate that 4% to 8% of adolescent and adult males are men who have sex with men. [b]Estimated number presumed alive and unaware of HIV status is calculated using the number reported to be living in the state with HIV divided by 0.79, reflecting CDC's estimate that approximately 21% of people living with HIV are aware of their infection.

By demographic group, the prevalence is highest for MSM, 3-6%. Within MSM, by racial/ethnic group, the estimated prevalence is 14-28% for Black MSM, 5-9% for Latino MSM, and 2-4% for White MSM.

Within each racial/group, prevalence estimates are similar between non-MSM males and females—0.8% for Black non-MSM males and 0.7% for Black females, 0.3% for Latinos, and less than 0.1% for Whites.

COMPARING HIV TESTING AND PREVENTION SERVICE DATA TO SURVEILLANCE DATA

We compared the percentage of cases of HIV diagnosed in Wisconsin in 2009 to the percentage of clients reached through targeted testing and HE/RR interventions by race/ethnicity and within each racial/ethnic group, by demographic group. Blacks accounted for 38% of cases of HIV reported in Wisconsin in 2009; they comprised 40% of targeted tests and a somewhat lower percentage of individuals served through HE/RR (31%). Latinos, by contrast, accounted for 13% of new Wisconsin cases in 2009 but a much larger proportion of targeted HIV tests (36%) and of HE/RR clients (42%). Whites accounted for 48% of Wisconsin cases reported in 2009 but only 24% of tests and 28% of HE/RR clients (Figure 1).

Discrepancies are much greater when both racial/ethnic group and demographic group are considered (Figure 2). Among Blacks, MSM accounted for more than half (58%) of 2009 Wisconsin cases, 19% of targeted testing clients, but only 11% of HE/RR clients. Among Blacks, females accounted for 30% of 2009 Wisconsin cases,

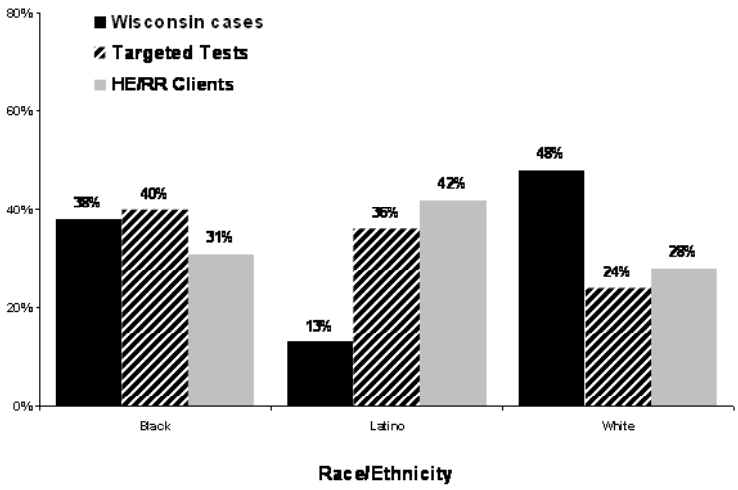

FIGURE 1. Distribution of HIV Dignoses, individuals served by AIDS/HIV Program-supported targeted HIV testing sites and health education/risk reduction (HE/RR) interventions by race/ethnicity in Wisconsin, 2009.

a proportionate share (32%) of tests, but more than two thirds (68%) of individuals reached through HE/RR. There was also a misalignment of cases and services vis-à-vis non-MSM males; this group accounted for 12% of cases, 49% of tests, and 21% of clients served. Data for Whites were similar to those for Blacks: White MSM accounted for 81% of cases, 52% of tests, and only 16% of persons reached through HE/RR services. Females, by contrast, accounted for 10% of cases, 19% of tests, and 63% of HE/RR clients. For Latinos, the percentages of MSM cases (59%) and HE/RR clients served (60%) were well-aligned, but the percentage of tests was lower (36%).

DEVELOPING TESTING TARGETS

Since the early 2000s, the WDPH, in collaboration with the statewide HIV prevention and care community planning group, has continually shifted resources to better align testing and HE/RR services to match the epidemic. For example, in 2005, MSM accounted for only 13% of Blacks receiving targeted tests, compared with 19% in 2009, indicating some progress in recent years. Social Networks Testing, a strategy in which individuals newly diagnosed with HIV refer members of their social networks for testing, began in 2008, focusing primarily on testing Black and Latino MSM. The positivity rate for the Social Networks Testing initiative was 70% higher than for the targeted testing program as a whole in 2009. Nevertheless, despite this initiative and other efforts to increase testing of those at highest risk, resources still remain misaligned.

To decrease the gaps between the proportion of targeted tests and recent HIV cases, the WDPH set jurisdiction-wide testing targets for 2010 (Table 2). The parameters for the 2010 target setting process were to strive to match the proportion of targeted tests to recent cases by demographic and racial/ethnic group while conducting approximately the same number (8,548) of targeted tests in 2010 as were

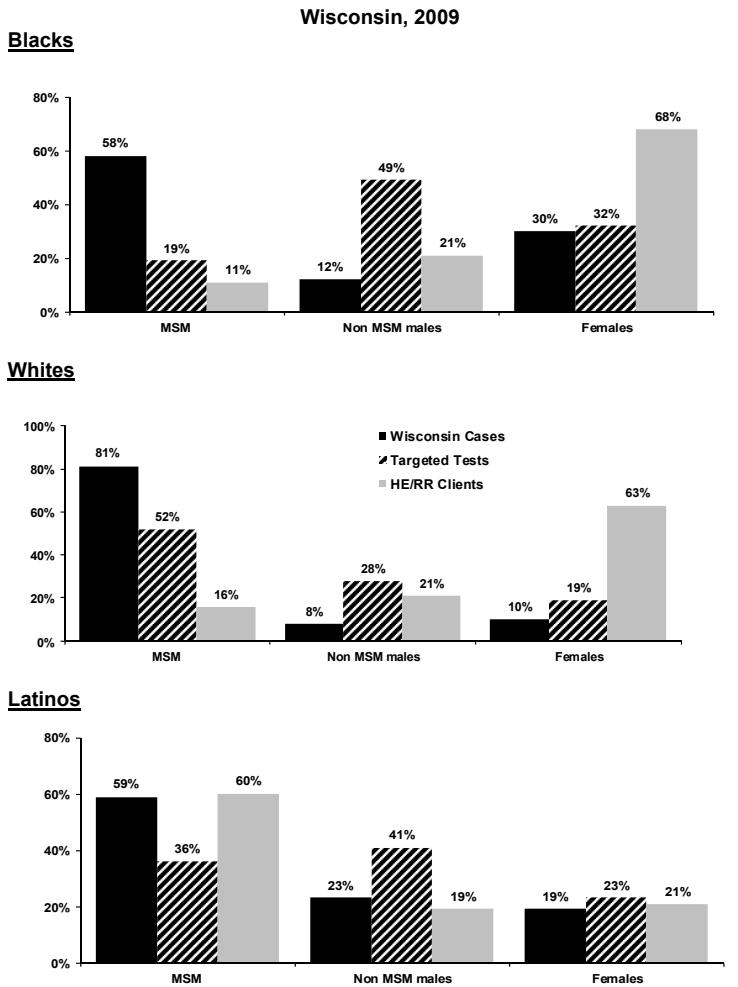

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FIGURE 2. Distribution of HIV diagnoses, individuals served by AIDS/HIV Program-supported targeted HIV testing sites and health education/risk reduction interventions by demographic group, within racial/ethnic groups, Wisconsin.

conducted in 2009. The percentage of persons presumed to be alive and unaware of their infection for each group was multiplied by the total number of tests in 2009.

The 2010 targets were then compared with the number of tests conducted in 2009 to identify groups experiencing the greatest discrepancies. Positive numbers and percentages in the final two columns of Table 2 indicate that the target for 2010 is greater than the number of actual tests conducted in 2009 for that group.

The largest gaps between 2010 targets and 2009 tests occurred for Black and White MSM (over 700 tests each). For Black MSM, this represents a need to increase testing in 2010 by 67%, and for White MSM by 24% over the number of tests actually conducted in 2009. Black women had a gap of 124 tests (14%). Conversely, in order to test approximately the same total number in 2010 as in 2009 but to reallocate tests, the largest declines would need to occur in tests of White non-MSM males

TABLE 2. Testing Targets for 2010 and Persons Tested in 2009 by Demographic and Racial/Ethnic Group Wisconsin

Demographic Group	Race/Ethnicity	Estimated Number Presumed Alive and Unaware of HIV Status[a]	Percent of Total Estimated Number Presumed Alive and Unaware of Status	Testing Target For 2010 Based on Percent of Total Presumed Alive and Unaware of Infection	Number Tested in 2009	Percent of Total Number Tested in 2009	Difference Between 2010 Target and 2009 Tests	Percent Difference Between 2010 Testing Target and Number Tested in 2009
MSM	Black	251	17%	1,425	465	5%	**960**	**67%**
	Latino	73	5%	414	566	7%	-152	-37%
	White	550	37%	3,125	2,383	28%	**742**	**24%**
Non-MSM Males	Black	173	12%	984	1,198	14%	-214	-22%
	Latino	62	4%	351	636	7%	-285	-81%
	White	105	7%	597	1,293	15%	-696	-117%
Females	Black	160	11%	908	784	9%	**124**	**14%**
	Latino	41	3%	231	352	4%	-121	-52%
	White	90	6%	512	871	10%	-359	-70%
Total		1,503	100%	8,548	8,548	100%	0	0%

Note. [a]Estimated number presumed alive and unaware of HIV status is calculated using the number reported to be living in the state with HIV divided by 0.79, reflecting CDC's estimate that approximately 21% of people living with HIV are aware of their infection. A positive number, bolded in the final two columns, indicates a need to increase testing in this group in 2010.

(by nearly 700 tests), in Black and Latino non-MSM males and in White females (over 200 tests each).

Using jurisdiction-wide targets, the WDPH counseling and testing staff worked collaboratively with grantees to establish and reach site-level testing targets. The WDPH focused on strategies to increase testing in underserved groups and encouraged sites to develop networks to refer lower risk populations to other HIV testing providers. Nevertheless, WDPH staff also communicated to test site staff that any individual presenting for testing with a history of risk behaviors or requesting a test should be granted one.

Funding for HE/RR services was also shifted to increase the number of Black MSM and young MSM of all racial/ethnic groups to be served. Conversely, allocations to several agencies serving lower risk populations were reduced or eliminated.

DISCUSSION

UNERSTANDING AND ADDRESSING THE MISALIGNMENT OF RESOUCRES

The analysis demonstrates a misalignment between populations represented in recently diagnosed cases of HIV and those reached through targeted testing and individual- and group-level HIV prevention services. The most notable finding is that across cases and services for Blacks in 2009, MSM accounted for 58% of reported cases but only 19% of targeted tests and 11% of persons reached through prevention services. One success worth noting is that more than half of the HIV-positive MSM served through comprehensive risk counseling services are Black. Black MSM is the population most disproportionately affected by HIV, both nationally (CDC, 2010c) and in Wisconsin (Wisconsin AIDS/HIV Program, 2010). Recent case and service data patterns for White MSM parallel those for Blacks. Latino MSM are also underserved by the targeted testing program but are proportionately served by HE/RR services. This is likely attributable to the success of two Latino community-based organizations in Milwaukee in providing HIV services to both MSM and male-to-female transgender women.

It is important to note that prevention services shown here only include those for which an individual's race/ethnicity and risk behaviors have been assessed—clients participating in individual- and group-level interventions. This did not count the approximately 25,000 men reached through MSM outreach. About half of these were White, 25% were Latino, and 20% were Black. In addition, capacity-building and community-level interventions, such as Mpowerment aimed at MSM communities were directed primarily at Black and young MSM.

Although significant realignment of services is needed, it is also important to try to understand the context in which these discrepancies have developed. One reason is that MSM, particularly MSM of color, have historically been less visible to service providers and therefore more difficult to reach with both testing and prevention services than have been females and non-MSM males. In addition, prevention interventions for heterosexual women were released earlier and training was more widespread than it has been for interventions targeting Black MSM (CDC, 2009).

In addition, there has been a belief in Wisconsin and elsewhere that in order to make HIV testing an acceptable practice in communities of color, it was necessary to cast a wide net and to offer testing in venues that would reach all sectors of the community. Thus, much of the testing occurred at health fairs, in community-based

organizations serving youth and families, and in faith-based settings that welcomed persons of diverse backgrounds. An MSM could get tested in these settings without feeling conspicuous. Wisconsin DPH HIV counseling and testing and prevention services staff began making the case several years ago that the goal of normalizing HIV testing in communities of color had largely been achieved and that it was necessary to shift the focus to those at greatest risk, primarily MSM of color. Two agencies in Milwaukee serving the Latino community made that shift several years ago and now concentrate their prevention and social networks testing efforts on MSM and transgender populations. This shift in perspective and focus is still in the process of occurring in Milwaukee agencies serving the Black community.

To more effectively reach and serve MSM, especially men of color, existing efforts need to be expanded. These include capacity building and leadership development among gay and bisexual men of color to better equip individuals to reach and serve their own communities. Broader racial/ethnic communities must acknowledge the magnitude of the MSM epidemic and address homophobia and other barriers to marshalling community resources. Greater efforts are also needed at the jurisdictional and national levels to roll out, provide training for, and extend the reach of effective behavioral interventions for MSM of color.

LIMITATIONS

Analyses provided here are subject to several limitations. First, estimating prevalence by population requires estimating the percentage of males that are MSM, an unknown denominator, but one for which ranges have been provided.

Second, the CDC estimates that 21% of persons who are infected with HIV are unaware of their infection. More detailed estimates are available for selected demographic groups, for example, the percentage estimated to be unaware of their infection is higher among Blacks (22.2%) and Latinos (21.6%) than among Whites (18.8%) and higher for heterosexual males (26.7%) and MSM (23.5%) than for females (21.2%) (Campsmith, Rhodes, & Hall, 2009). However, estimates by both race/ethnicity and demographic group are not available so this analysis applied the 21% to all groups, recognizing that the percentage actually unaware of their infection may actually be higher for some groups, especially African American and Latino males, both MSM and non-MSM. Data collected through the National HIV Behavioral Surveillance System in 21 U.S. cities in 2008 indicated that 59% of Black MSM, 46% of Latino MSM and 26% of White MSM were unaware of their HIV infection (CDC, 2010d).

Third, testing data presented here include only targeted tests, those for which HIV testing service providers have a relatively large degree of control over the populations that they test. Local public health departments and others that conduct HIV screening for the general population were not included. Among these providers is the major public STD (sexually transmitted disease) clinic in Milwaukee that conducted over 6,000 tests in 2009 (compared with 9,100 targeted tests in that year), including HIV tests for 1,722 Black females. When these tests are taken into account, the gap of 124 for Black females between 784 tests in 2009 and a target of 908 tests in 2010 was eliminated. The clinic also tested 113 Black MSM, which somewhat reduces the gap of nearly 1,000 between 2009 tests and 2010 targets.

Fourth, HE/RR data presented here include only individual- and group-level interventions. Thus, MSM outreach and capacity-building interventions for MSM of color, young MSM and transgender populations, which are important components of HIV prevention services in Wisconsin, were not included in this analysis.

Fifth, the analysis does not address quality of service or outcomes, such as whether people testing HIV-positive were referred to medical care or whether HE/RR clients completed multiple sessions or demonstrated changes in risk behaviors over time.

Finally, the analysis was conducted at the level of the demographic group—MSM, non-MSM males, and females, but within each of these, it is critical to reach those whose behaviors and circumstances put them at highest risk of acquiring or transmitting HIV.

The authors believe that the disparities described here are not unique to Wisconsin. We encourage other jurisdictions to conduct similar analyses to those described here and to share them with their community planning groups, HIV prevention and testing service providers, government policy makers, and other funders as a means of building support for shifting resources to better match trends in recent infections.

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CHARACTERISTICS OF FIRST-TIME AND REPEAT HIV TESTS AMONG MEN WHO HAVE SEX WITH MEN WHO TEST AT CDC-SUPPORTED SITES, 2007

Holly H. Fisher, Nancy Habarta, Felicia Hardnett, Carlos Toledo, Tamika Hoyte, Adanze Eke, and Linda Valleroy

This report describes characteristics of HIV test data for men who have sex with men (MSM) tested in 2007 through programs funded by the Centers for Disease Control and Prevention (CDC). HIV test-level data of MSM submitted by 29 health departments were analyzed to explore test characteristics among all tests, first-time tests, and repeat tests. Characteristics significantly associated with HIV-positive results among first-time tests were identified through logistic regression. Of the 129,893 tests conducted, 18% were first-time tests and 82% were repeat tests. HIV positivity among first-time tests was 4.1% and 3.7% among repeat tests. Among first-time tests, 46% of tests were among White MSM and 48% of HIV-positive test results were among African Americans. An HIV-positive test among first-time tests was strongly associated with being African American, being 40-49 years old, and testing in the southern United States. Race/ethnicity differences exist among MSM testing at CDC-funded sites. African American MSM accounted for the greatest proportion of HIV-positive results but White MSM represented the greatest proportion of tests conducted. HIV prevention strategies that include CDC-funded testing for MSM should increase targeting of African Americans.

Men who have sex with men (MSM) bear the greatest burden of HIV infection in the United States. In 2009, male-to-male sexual contact accounted for 23,846 (75%) of the 31,872 estimated new diagnoses among males in 40 states with confidential, name-based HIV reporting (CDC, 2009a). In a meta-analysis of data on same-sex behavior collected from nationally representative samples of men, the Centers for Disease Control and Prevention (CDC) estimated the rate of new HIV diagnoses among MSM to be more than 44 times that of other men and more than 40 times that of women (Purcell et al., 2010). These analyses were based on new estimates of the size of the U.S. population of MSM—according to CDC estimates, 4% of U.S. males had sex with other males in the last 5 years.

HIV incidence surveillance data have indicated new infections for all risk groups (MSM, heterosexuals, injection drug users [IDUs], and MSM/IDUs) peaked in the

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Address correspondence to Holly Fisher, 1600 Clifton Rd., NE, Mail Stop E59, Atlanta, GA 30333; e-mail: hkh3@cdc.gov.

1980s and then subsequently declined (Hall et al., 2008). However, there is some evidence that new HIV infections among MSM have been increasing gradually since the early 1990s. Large-scale studies have reported MSM with unrecognized infection may be twice as likely to engage in unprotected anal intercourse as HIV-positive MSM who are aware of their status (CDC, 2005). In addition, high rates of undiagnosed infection among young MSM, particularly among men of color, continue to be reported (MacKellar et al., 2005; Marks et al., 2009).

HIV testing is integral in preventing HIV transmission because the results provide knowledge of infection status; those aware of their status may avoid engaging in risky behavior (Marks, Crepaz, Senterfitt, & Janssen, 2005). The CDC has made increased HIV testing and increased awareness of HIV status a priority. State and city health departments used CDC prevention funding to allocate $76 million in fiscal year 2007 for HIV counseling and testing (CT) programs which represented 26% of the Division of HIV/AIDS Prevention budget for health departments (CDC, 2009b). The CDC began funding health departments in 1985 to provide HIV CT services, and since 1989, the national HIV CT System has monitored these services (CDC, 2006a). An estimated 16-22 million people in the United States are tested for HIV infection each year (CDC, 2010); and tests administered through CDC-funded programs account for roughly 2 million (10%) of these tests annually (CDC, 2006a).

MSM have high rates of HIV testing (CDC, 2006b; Lauby & Milnamow, 2009; MacKellar et al., 2005; Mackellar et al., 2006; Sifakis et al., 2007). HIV CT services are available to MSM through a wide variety of sites, such as community health centers, public health clinics, HIV prevention organizations, and private medical offices. Findings from large-scale research projects indicate that a large proportion of MSM (60%) had their most recent HIV test in a health care setting (e.g., doctor's office, public health clinic); a smaller proportion (less than 15%) were tested through HIV prevention organizations (CDC, 2006b; MacKellar et al., 2002). Other research indicates that MSM who test more than once tend to test at the same locations, and some test sites may be more likely to provide HIV prevention information than others (Lauby & Milnamow, 2009).

The CDC (2006c) recommends that high-risk groups test annually for HIV infection. There is evidence that most MSM are repeat or regular testers (Fernyak et al., 2002; Helms et al., 2009; Lauby & Milnamow, 2009), indicating frequent opportunities to engage in client-centered risk counseling and be exposed to HIV prevention messages. However, some studies have indicated that MSM who test repeatedly have higher levels of risky sexual and drug-use behavior and greater HIV prevalence than MSM who have tested only once (Fernyak et al, 2002; MacKellar et al., 2002; Sifakis et al., 2007). Other research indicates HIV-negative MSM who have tested more than once reduced their sexual risks because of their CT experiences (Dilley et al, 2007; MacKellar et al., 2006). Much is known about the risk factors and behavioral correlates of MSM who repeat test, but less is understood about the characteristics of the very first HIV test experience for this group. Identifying the similarities/differences in patterns for MSM who test for the first time versus those who have tested previously may help public health officials identify unique prevention strategies for each of these groups.

This article describes characteristics of CDC-funded HIV tests conducted in 2007 among MSM testing for the first time and MSM who had previously tested. Test data submitted to the CDC from 29 health departments for MSM who had tested more than once (repeat tests) and for MSM testing for the first time (first-time

tests) are reported. Client demographic and test characteristics associated with HIV-positive test results among first-time tests are also described.

METHODS

When an individual receives an HIV test at a CDC-supported site, demographic and behavioral risk information is documented by a service provider, sent to the health department, and then, without personally identifying information, reported to CDC. Data in this report are based on test-level data reported in 2007 by 29 health departments. The test data reported to the HIV CT system from the remaining 30 health departments funded by CDC in 2007 were excluded because they were submitted in aggregate (i.e., test-level data were unavailable) or in a different format (i.e., a different set of variables was used). At the time this article was written, these data were the most recent HIV CT data available for dissemination.

VARIABLES ANALYZED

In our analyses, we included tests that had a valid result for men aged 13 years or older who reported sex with another male since 1978 (regardless of any other risk behavior reported). Race/ethnicity, age group, U.S. geographic region from which the test was reported, test site type, test type (confidential or anonymous), current test result, and receipt of test result and posttest counseling are reported for all tests. This same information is reported for *first-time tests* (i.e., a test where the client did not indicate having previously taken an HIV test) and for *repeat tests* (i.e., a test where the client indicated having previously taken an HIV test). Race/ethnicity was measured by a single question whereby clients indicated if they were White (not Hispanic), Black (not Hispanic), Hispanic, Asian/Pacific Islander, American Indian/Alaskan Native, or other. Test site type was defined as clinical (sexually transmitted disease clinic; family planning clinic; prenatal/obstetrics/gynecology clinic; tuberculosis clinic; public health clinic/community health center; hospitals/private medical doctor offices; prisons/jails; drug treatment centers), nonclinical (HIV CT centers; field visits), or other (test venue cannot be classified as clinical or nonclinical) settings. A *newly identified HIV-positive test* was defined as a test with a current HIV-positive result but there was no self-reported history of a previous HIV-positive result. Because test data reported to CDC do not include unique identifiers, it was not possible to link multiple tests to the same client. Thus, only first-time tests could be assumed to represent unique clients.

This report is limited to data submitted to CDC by health departments using the 2007 HIV test form (CDC, 2006a).

ANALYSES

We first report test characteristics of all tests, first-time tests, and repeat tests and then examine test characteristics significantly associated with an HIV-positive result. We next examine characteristics associated with an HIV-positive test result among first-time tests. By restricting the analysis in this way, we potentially eliminated repeat tests and were able to analyze and interpret the data at the client level. For all data reported, current HIV-positive test results represent newly identified HIV-positive test results. We used logistic regression to identify factors indepen-

TABLE 1. Characteristics of HIV Tests Among Men Who Have Sex With Men Reported by 29 U.S. Health Departments, by All Tests, First-Time Tests, and Repeat Tests, 2007

	All tests	First-time tests	Repeat tests
	No. (%)[a]	No. (%)[a]	No. (%)[a]
Race/ethnicity [b]			
African American	27,202 (21)	5,317 (23)	21,885 (21)
American Indian/Alaska Native	546 (0.4)	89 (0.4)	457 (0.4)
Asian/Pacific Islander	5,555 (4)	920 (4)	4,635 (4)
Hispanic	26,753 (21)	5,384 (24)	21,369 (20)
White	66,473 (51)	10,585 (46)	55,888 (52)
Age group, years			
13-19	10,026 (8)	4,417 (19)	5,609 (5)
20-29	50,392 (39)	9,773 (43)	40,619 (38)
30-39	32,057 (25)	3,830 (17)	28,227 (26)
40-49	23,126 (18)	2,744 (12)	20,382 (19)
50+	12,854 (10)	1,904 (8)	10,950 (10)
Region[c]			
Northeast	24,381 (19)	6,602 (29)	17,779 (17)
Midwest	17,462 (13)	3,544 (15)	13,918 (13)
South	42,542 (33)	6,255 (27)	36,287 (34)
West	45,508 (35)	6,551 (29)	38,957 (36)
Test site type			
Non-clinical	70,140 (54)	10,237 (45)	59,903 (53)
Clinical	46,473 (36)	9,719 (42)	36,754 (34)
Other	12,717 (10)	2,994 (13)	9,723 (9)
Test type			
Anonymous	35,178 (27)	4,671 (20)	30,507 (29)
Confidential	91,097 (70)	18,173 (80)	72,924 (68)
Receipt of test result and posttest counseling			
No	13,232 (10.2)	2,491 (11)	10,741 (10)
Yes	110,737 (85)	19,230 (84)	91,507 (86)
Current test result [d]			
Negative	125,010 (96)	22,009 (96)	103,001 (96)
Positive	4,883 (4)	943 (4)	3,940 (4)
Total	129,893 (100)	22,952 (100)	106,941 (100)

Note. [a]Because of rounding and missing data, the values in each column may not sum to the column total. [b]Groups are mutually exclusive. [c]Northeast region: Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; Midwest region: Chicago, Michigan, Minnesota, Missouri, and Ohio; South region: Delaware, District of Columbia, Florida, Georgia, Houston, Louisiana, South Carolina, Texas, and Virginia; West region: California, Colorado, Idaho, Los Angeles, New Mexico, North Dakota, Oregon, San Francisco, and Utah.| [d]Excludes HIV-positive tests with a history of a previous HIV-positive test result.

dently associated with an HIV-positive test among MSM who test for the first time. Variables that were significantly associated with an HIV-positive test in the bivariate regression analyses ($p < .05$) were entered into a multivariate regression model. The final model included only those variables that remained significantly associated ($p < .05$) with an HIV-positive result after controlling for other significant factors. We assessed the fit of the multivariate model using the Hosmer and Lemeshow (1989)

goodness-of-fit test. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) are reported. All analyses were performed using SAS Version 9.2 (SAS Institute, Inc., Cary, NC).

RESULTS

Of 1,389,733 HIV tests reported to the CDC by 29 U.S. health departments in 2007, 132,218 tests (10%) were conducted among MSM. Of the 132,218 tests conducted, 623 tests (0.5%) were excluded from our analyses because the test result was inconclusive or no result was specified. An additional 1,702 tests (1%) were excluded because they indicated both a current HIV-positive result and a previous history of an HIV-positive result. After these exclusions, 129,893 tests were included in the analyses.

OVERALL TEST PATTERNS

Of all tests, 51% were among Whites, 21% were among Hispanics, and 21% were among African Americans (Table 1). Thirty-nine percent were among men aged 20-29, with the next highest percentage of tests (25%) conducted among men aged 30-39. The highest percentages of tests were conducted in the West (35%) and in the South (33%); the majority of tests (54%) took place in nonclinical settings. Seventy percent of all tests were given confidentially (i.e., the client provided his name). Most HIV tests (85%) indicated that the client received both the result and posttest counseling. Of all tests, 22,952 (18%) were reported as first-time tests and 106,941 (82%) represented repeat tests. Of first-time tests, most tests were among Whites (46%), 23% were among African Americans, and 24% were among Hispanics. The highest percentage of first-time tests was among men aged 20-29 (43%), followed by those aged 13-19 (19%). The highest percentage of first-time tests were conducted in the Northeast (29%) and West (29%). Almost half of the tests (45%) were conducted at nonclinical sites. Eighty percent of first-time tests were confidential. The majority (84%) of tests were reported as including results and posttest counseling being given to clients.

Among repeat tests, 52% were among Whites, 21% were among African Americans, and 20% were among Hispanics (see Table 1). As with first-time tests, the majority of repeat tests were conducted among men aged 20-29 (38%); however, many tests (26%) were conducted among 30-to 39-year-olds. Many repeat tests took place in the West (36%) and the South (34%), were conducted at nonclinical sites (53%), and were confidential (68%). Eighty-six percent of repeat tests were reported as including receipt of results and posttest counseling by the client.

HIV positivity differed slightly for all tests (3.8%), first-time tests (4.1%), and repeat tests (3.7%).

CHARACTERISTICS OF HIV-POSITIVE TESTS

Of all 129,893 HIV tests, 4,883 (3.8%) were HIV-positive tests, of which 41% were among African Americans, 34% were among Whites, and 21% were among Hispanics (Table 2). The highest HIV positivity was among African Americans (7.4%), followed by Hispanics (3.8%); the lowest HIV positivity was among Asians and Pacific Islanders (2.0%), followed by Whites (2.5%). The highest percentage of HIV-positive tests (43%) occurred among men aged 20-29 years, followed by men

TABLE 2. Characteristics of HIV-positive Tests[a] Among Men Who Have Sex With Men Reported by 29 U.S. Health Departments, by All Tests, First-Time Tests, and Repeat Tests, 2007

	All tests			First-time test			Repeat tests		
	No.	(%)[b]	Positivity (%)[c]	No.	(%)[b]	Positivity (%)[c]	No.	(%)[b]	Positivity (%)[c]
Race/ethnicity [d]									
African American	2,014	(41)	(7.4)	449	(48)	(8.4)	1,565	(40)	(7.2)
American Indian/Alaska Native	19	(0.4)	(3.5)	3	(0.3)	(3.4)	16	(0.4)	(3.5)
Asian/Pacific Islander	111	(2)	(2.0)	18	(2)	(2.0)	93	(2)	(2.0)
Hispanic	1,008	(21)	(3.8)	201	(21)	(3.7)	807	(21)	(3.8)
White	1,654	(34)	(2.5)	261	(28)	(2.5)	1,393	(35)	(2.5)
Age group, years									
13-19	251	(5)	(2.5)	85	(9)	(1.9)	166	(4)	(3.0)
20-29	2,117	(43)	(4.2)	392	(42)	(4.0)	1,725	(44)	(4.2)
30-39	1,369	(28)	(4.3)	211	(22)	(5.5)	1,158	(29)	(4.1)
40-49	829	(17)	(3.6)	174	(18)	(6.3)	655	(17)	(3.2)
50+	282	(6)	(2.2)	72	(8)	(3.8)	210	(5)	(1.9)
Region [e]									
Northeast	887	(18)	(3.6)	280	(30)	(4.2)	607	(15)	(3.4)
Midwest	712	(15)	(4.1)	164	(17)	(4.6)	548	(14)	(3.9)
South	2,174	(44)	(5.1)	355	(38)	(5.7)	1,819	(46)	(5.0)
West	1,110	(23)	(2.4)	144	(15)	(2.2)	966	(25)	(2.5)
Test site type									

Non-clinical	2,244	(46)	(3.2)	350	(37)	(3.4)	1,894	(48)	(3.2)
Clinical	2,177	(45)	(4.7)	477	(51)	(4.9)	1,700	(43)	(4.6)
Other	446	(9)	(3.5)	115	(12)	(3.8)	331	(8)	(3.4)
Test type									
Anonymous	901	(18)	(2.6)	153	(16)	(3.3)	748	(19)	(2.5)
Confidential	3,888	(80)	(4.3)	789	(84)	(4.3)	3,099	(79)	(4.2)
Receipt of test result and posttest counseling									
No	546	(11)	(4.1)	77	(8)	(3.1)	469	(12)	(4.4)
Yes	4,066	(83)	(3.7)	830	(88)	(4.3)	3,236	(82)	(3.5)
Total	4,883	(100)	(3.8)	943	(100)	(4.1)	3,940	(100)	(3.7)

Note. [a]Excludes HIV-positive tests with a history of a previous HIV-positive test result. [b] Because of rounding and missing data, the values in each column may not sum to the column total. [c] Denominators for calculating positivity % come from Table 1. [d] Groups are mutually exclusive. [e] Northeast region: Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; Midwest region: Chicago, Michigan, Minnesota, Missouri, and Ohio; South region: Delaware, District of Columbia, Florida, Georgia, Houston, Louisiana, South Carolina, Texas, and Virginia; West region: California, Colorado, Idaho, Los Angeles, New Mexico, North Dakota, Oregon, San Francisco, and Utah.

aged 30-39 (28%). The highest percentage of HIV-positive tests came from tests conducted in the South (44%)—a percentage at least twice that of the proportion of HIV-positive tests from any other region. The highest HIV positivity was among men aged 30-39 (4.3%), followed by men aged 20-29 (4.2%); the lowest HIV positivity was among men aged 50 or more (2.2%), followed by men aged 13-19 (2.5%). Almost equal percentages of HIV-positive tests were administered at clinical (45%) and nonclinical (46%) sites; however, HIV positivity at clinical sites (4.7%) was higher than at nonclinical sites (3.2%). Most (80%) of the HIV-positive tests were confidential and most test reports (83%) indicated receipt of the result and posttest counseling. HIV positivity among confidential tests (4.3%) was higher than among anonymous tests (2.6%). In addition, HIV positivity was higher among tests that were not followed up with receipt of HIV test results and posttest counseling (4.1%) versus those that were followed up with receipt of HIV test results and post test counseling (3.7%).

Of 22,952 first time tests, 943 (4.1%) were HIV-positive, of which almost half (48%) were among African Americans, 28% were among Whites, and 21% were among Hispanics. The highest HIV positivity for first time tests was among African Americans (8.4%), followed by Hispanics (3.7%); the lowest HIV positivity was among Asians and Pacific Islanders (2.0%), followed by Whites (2.5%). Many of these tests were among men aged 20-29 years (42%) and approximately two thirds of these tests were conducted in the South (38%) and Northeast (30%). The highest HIV positivity for first time tests was among men aged 40-49 (6.3%), followed by men aged 30-39 (5.5%); the lowest HIV positivity was among men aged 13-19 (1.9%), followed by men aged 50 or more (3.8%). The highest HIV positivity among first time tests was in the South (5.7%), followed by the Midwest (4.6%); the lowest HIV positivity was in the West (2.2%). About half (51%) of HIV-positive first-time tests were conducted in clinical settings, 84% were confidential, and 88% of test reports indicated that the result and posttest counseling were received. HIV positivity among first time tests was highest among tests conducted in clinical sites (4.9%) than in nonclinical sites (3.4%) and among confidential tests (4.3%) than among anonymous tests (3.3%). In addition, HIV positivity among first-time tests was higher among tests that were followed up with receipt of HIV test results and posttest counseling (4.3%) versus those that were not followed up with receipt of HIV test results and posttest counseling (3.1%).

The pattern of HIV-positive test results and positivity for repeat tests was very similar to the pattern among first-time tests (see Table 2). Of 106,941 repeat tests, 3,940 (3.7%) were HIV-positive, the highest percentage of tests was among African Americans (40%), followed by Whites (35%) and Hispanics (21%). High percentages of these tests were among men aged 20-29 years (44%) and tests conducted in the South (46%). Forty-eight percent of repeat tests were conducted at nonclinical sites and 43% were conducted at clinical sites. The majority of the HIV-positive repeat tests were confidential (79%) and test reports indicated that the client received the tests results and posttest counseling (82%).

TEST CHARACTERISTICS ASSOCIATED WITH HIV-POSITIVE RESULTS FOR FIRST-TIME TESTS

Table 3 provides the results of the logistic regression analyses conducted to identify test characteristics significantly associated with first-time tests that were HIV-positive. In the bivariate analysis, first-time test characteristics associated with an HIV-positive result included race/ethnicity (African American or Hispanic); age

TABLE 3. Test Characteristics Associated With HIV-Positive Results Among First-time Tests for Men Who Have Sex With Men Reported by 29 Health Departments, 2007

	HIV-Positive Tests	Bivariate Analysis	Multivariate Analysis
	No. (%)[a]	OR (95% CI)	OR (95% CI)
Race/ethnicity [b]			
African American	449 (48)	3.47 (2.96, 4.07)	3.76 (3.18, 4.43)
American Indian/Alaska Native	3 (0.3)	-	-
Asian/Pacific Islander	18 (2)	0.78 (0.48, 1.27)	0.96 (0.59, 1.57)
Hispanic	201 (21)	1.50 (1.24, 1.81)	1.84 (1.51, 2.24)
White	261 (28)	Referent	Referent
Age group, years			
13-19	85 (9)	Referent	Referent
20-29	392 (42)	2.22 (1.73, 2.84)	2.77 (2.15, 3.56)
30-39	211 (22)	3.08 (2.36, 4.01)	4.27 (3.24, 5.61)
40-49	174 (18)	3.53 (2.68, 4.64)	4.79 (3.61, 6.34)
50+	72 (8)	2.15 (1.56, 2.99)	2.99 (2.14, 4.17)
Region [c]			
Northeast	280 (30)	1.91 (1.55, 2.35)	1.72 (1.36, 2.18)
Midwest	164 (17)	2.09 (1.66, 2.63)	2.28 (1.78, 2.93)
South	355 (38)	2.84 (2.32, 3.47)	2.25 (1.79, 2.83)
West	144 (15)	Referent	Referent
Test site type			
Non-clinical	350 (37)	Referent	Referent
Clinical	477 (51)	1.54 (1.33, 1.78)	1.27 (1.08, 1.49)
Other	115 (12)	1.15 (0.92, 1.43)	0.95 (0.75, 1.21)
Test type			
Anonymous	153 (16)	Referent	-
Confidential	789 (84)	1.37 (1.14, 1.64)	-
Receipt of test results and post-test counseling			
No	77 (8)	Referent	Referent
Yes	830 (88)	1.44 (1.13, 1.84)	1.51 (1.17, 1.95)
Total	943 (100)		

Note. OR = odds ratio; CI = confidence interval. [a] Because of rounding and missing data, the values in each column may not sum to the column total. [b] Groups are mutually exclusive. [c] Northeast region: Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; Midwest region: Chicago, Michigan, Minnesota, Missouri, and Ohio; South region: Delaware, District of Columbia, Florida, Georgia, Houston, Louisiana, South Carolina, Texas, and Virginia; West region: California, Colorado, Idaho, Los Angeles, New Mexico, North Dakota, Oregon, San Francisco, and Utah.

(20 and older); geographic region (Northeast, Midwest, or South); test site type (clinical); test type; and receipt of test results/posttest counseling. African American MSM and Hispanic MSM had 3.5 and 1.5 times the odds, respectively, of receiving an HIV-positive test result during their first test event compared to Whites. MSM aged 30-39 testing for the first-time had three times the odds, and MSM aged 40-49 3.5 times the odds of receiving an HIV-positive test result during their first test event, relative to MSM aged 13-19.

Race/ethnicity, age group, geographic region, test site type, and receipt of test results all remained significant in the multivariate model (see Table 3), which suggests that each of these factors contributes an independent source of variation to the likelihood of receiving an HIV-positive test when testing for the first time. The pattern of first-time test characteristics and their associations with an HIV-positive result in the multivariate model was similar to the pattern in the bivariate findings. Test type was no longer significantly associated with a positive test result when entered into the multivariate analysis. The Hosmer-Lemeshow goodness-of-fit test was used to assess overall fit (chi-square = 6.86, $df = 8$, $p = .55$).

DISCUSSION

Our data show that differences associated with race/ethnicity exist among MSM who take their first HIV test at CDC-funded sites. African Americans comprised less than one quarter of first-time tests conducted but almost half the HIV-positive test results for first-time tests. Hispanics accounted for 24% of first-time tests and 21% of first-time HIV-positive tests. Whites accounted for almost half of first-time tests but less than one third of first-time HIV-positive tests. African Americans and Hispanics were significantly more likely to receive an HIV-positive test result during their first test experience, relative to Whites.

In this analysis of test data from 29 CDC-funded jurisdictions, there were similarities in the patterns of first-time tests and repeat tests. For example, the positivity rate (number of HIV-positive tests divided by number of tests conducted) for first-time tests (4.1%) was similar to repeat tests (3.7%). These rates are consistent with positivity rates (3.8%) reported among MSM testing through STD clinics (Helms et al., 2009). Additionally, testing and positivity levels were most prevalent among 20- to 29-year-olds and less prevalent in older age groups, for both first-time and repeat test groups.

There were some differences in test patterns of first-time and repeat tests. A smaller proportion of first-time tests were attributable to White MSM (46%) than the proportion of repeat tests attributable to White MSM (52%). The opposite pattern was true for African American MSM: 23% of first-time tests and 21% of repeat tests were conducted among African Americans. Similarly, for HIV-positive test results, the percentage of HIV-positive tests for African Americans was higher for first-time tests (48%) than for repeat tests (40%) (Whites: first-time tests = 28%, repeat tests = 35%). Although it is not possible to make inferences about individuals who test multiple times, the trends suggest African American MSM who test through CDC-funded sites in these jurisdictions may be less likely than White MSM to have previously tested at such sites. It is also possible that recent CDC HIV testing initiatives (CDC, 2006c) have resulted in more rigorous targeting of African American MSM, and therefore more African American MSM are tested for the first-time at CDC sites compared with White MSM. First-time test data may be compared to CDC HIV surveillance and estimated HIV incidence data reported for MSM in the same time period. In 2009 HIV surveillance data received from 40 states indicated, among MSM, HIV diagnoses were highest among African Americans (42%), followed by Whites (36%) and Hispanics (19%) (CDC, 2009a). In 2008, CDC (based on data from 22 states and extrapolated to the entire United States) estimated HIV incidence was highest among White MSM (46%), followed by African American (35%) and Hispanic (19%) MSM (CDC, 2006d). The current data collected through

CDC's HIV CT System indicate, among all MSM who tested for the first time in 2007 and received an HIV-positive test result, 48% were African American, 28% were White, and 21% were Hispanic. The observed difference between White and African American MSM positivity rates could be due to differences in test setting (private vs. public service provider), as the CT data set only represents 10% of tests conducted nationwide.

MSM account for the majority of HIV/AIDS diagnoses in the United States (CDC, 2009a); however, only 10% of all tests conducted at CDC-funded sites in 2007 were conducted among MSM. Several possible explanations are offered to explain the low percentage of tests conducted among the MSM population. It is possible that MSM seek testing through non-CDC-funded sources, such as through private doctor or medical offices, and there is some evidence to support this notion (CDC, 2002, 2006b). Data sources indicate that many HIV-negative MSM (36%) are getting tested at private physicians' offices, followed by public health and community health centers (26%) and CT sites (12%) (CDC, 2006b). Among 712 MSM surveyed through the HIV Testing Survey project in 2002, 28% reported their most recent HIV test was at a private doctor's office, 19% were tested at a CT site, and 14% were tested at a community health center/public health clinic (CDC, 2002). It could also be that CDC testing programs funded in 2007 may not have targeted MSM populations at a level proportionate to their representation in the epidemic (under-targeting). Programs may have targeted only a subset of the MSM population, for example, by focusing predominantly on individuals who were already receiving other HIV prevention services, as opposed to reaching not previously reached MSM groups. Furthermore, data in the current analysis only include 29 of 59 total CDC-funded jurisdictions. There may be greater numbers/proportions of MSM served in the 29 jurisdictions that are not reported here.

LIMITATIONS

These findings are subject to several limitations. First, the population of persons accessing CDC-funded sites for HIV testing is self-selected and is not representative of the overall population of people tested (public or private) in the United States Furthermore, MSM tested through CDC-funded sites may not be representative of MSM who access test services at nonfederal and privately funded sites. Second, these data are reported as test level, so it is not possible to link the results of repeat tests to a single person. Third, these findings may not be representative of MSM tested through federally funded health departments for which only aggregate-level data are available. Aggregate-level data reported from publicly funded health departments represented 29% of HIV tests and 24% of HIV-positive tests in 2007. Furthermore, these test data were collected through HIV prevention programs using nonstandardized methods that varied across test sites. The information collected was not validated via research or epidemiological investigations. Fourth, the regression results suggest there may be other unmeasured test characteristics that are related to HIV positivity among first-time tests. However, only a small number of HIV test variables were available for reporting. Finally, global inferences regarding HIV transmission in the MSM community at large should be made with caution. Although the definition of MSM varies in the literature (e.g., men who have any type of sex with another man, men who self-identify as gay regardless of sexually activity), HIV risk in this population is associated with a specific behavior (unprotected anal intercourse with an HIV-positive partner). The current findings should be interpreted within the context of behavior and not sexual orientation.

CONCLUSIONS

These data represent the first report of the CDC's national HIV CT data for MSM in a peer-reviewed publication. This report describes important patterns of HIV testing among MSM who access test services at select CDC-funded sites, including characteristics of those testing for the very first time. Certain tested MSM subpopulations were more likely than others to receive an HIV-positive test result at their first HIV test at a CDC-funded site. The current analyses indicate that a large volume of tests are being conducted among White MSM at these sites, but disproportionately large percentages of HIV-positive individuals are being identified among African American and Hispanic MSM. Additional analyses at the jurisdiction level are needed to aid CDC-funded sites in setting appropriate local targets for MSM testing that are representative of the epidemic in their respective communities.

The national HIV CT data system is a unique source of information that is valuable to both community- and federal-level public health officials. Along with prevention programs and behavioral interventions, CDC-funded testing activities represent an important component of CDC's overall response to the epidemic. The test data describe key programmatic outcomes that inform providers and public health officials of services being provided at the community level (e.g., Do most clients receive test results? which populations are served?). Despite some differences when comparing the HIV CT system to CDC's HIV surveillance and incidence reporting systems (e.g., data sources, specific jurisdictions represented), the current findings suggest that test data could be used in concert with surveillance and incidence data to inform local and national HIV prevention planning. For example, the surveillance system reports HIV/AIDS infection and morbidity data that are based on positive diagnoses (and deaths). Population estimates from other sources (e.g., census data) must be used to calculate the proportion of HIV-positive individuals within a particular group at the national level. Both HIV-positive and HIV-negative test results, however, are reported through the HIV CT system, allowing a measurement of the overall positivity rate at CDC-funded sites. Additionally, surveillance and incidence data describe the extent and distribution of the HIV epidemic nationwide while HIV CT data describe the extent and distribution of CDC's response to the epidemic. In the future, HIV CT data will also be disseminated more frequently (biannually) than surveillance data (annually); more timely reporting of the test data may provide an early indication of HIV transmission trends nationally. Taken together, data from all three reporting systems allow better decision making for testing strategies and prevention program planning.

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UTILIZATION OF HIV VOLUNTARY COUNSELING AND TESTING IN VIETNAM: AN EVALUATION OF 5 YEARS OF ROUTINE PROGRAM DATA FOR NATIONAL RESPONSE

Nguyen Thi Thu Hong, Mitchell I. Wolfe, Tran Tien Dat, Deborah A. McFarland, Mary L. Lamb, Nguyen Trong Thang, Hoang Nam Thai, and Carlos Del Rio

This study evaluated the utilization of HIV voluntary counseling-and-testing (VCT) services targeting high-risk populations in Vietnam in order to inform decisions on program improvement and expansion. A total of 158,888 records collected from 55 VCT sites supported by the U.S. Centers for Disease Control and Prevention's Global AIDS Program in the period of 2002 to 2007 were used to analyze sociodemographic characteristics, risk exposures, seropositivity, test refusal, and failure to return for test results among VCT clients. High-risk exposures, such as injection drug use, commercial sex work, homosexual contacts or heterosexual contacts with high-risk sex partners, were reported in 126,815 (81%) records. Among high-risk clients, any condom use in the past month ranged from 34% to 71%. During the study period, 19% of the VCT encounters resulted in a positive HIV test; of those persons tested, 23% of men and 13% of women were HIV-positive. High HIV positivity rates were associated with injection drug use, being ill/recommended by health care provider, and having an HIV-infected sex partner. Of all records, 6.1% documented refusal of HIV testing. Failure to return for results was reported in 3.5% of records for clients who were tested. Previously testing positive was the strongest predictor of test refusal, and being referred by peer educators was associated with failure to return for results. The VCT program in Vietnam successfully targeted high-risk populations, and clients had high return rates using a

Nguyen Thi Thu Hong, Tran Tien Dat, and Hoang Nam Thai are with the U.S. Centers for Disease Control and Prevention (CDC), Global AIDS Program, Hanoi, Vietnam. Mitchell I. Wolfe is with the U.S. CDC, Global AIDS Program/Asia Regional Office, Bangkok, Thailand. Deborah A. McFarland and Carlos Del Rio are with Emory University, Atlanta, GA. Mary L. Kamb is with the U.S. CDC, Division of STD Prevention, Atlanta, GA. Nguyen Trong Thang is with LIFE-GAP Project, Ministry of Health, Vietnam.

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Address correspondence to Nguyen Thi Thu Hong, US Embassy--Hanoi, DHHS/CDC, 7 Lang Ha St., Dong Da, Hanoi 1000, Vietnam; e-mail: nguyenht@vn.cdc.gov

standard testing strategy. Interventions to increase consistent condom use and promote access to prevention services among sex partners of high-risk individuals should be implemented and evaluated.

Voluntary counseling and testing (VCT) for HIV is a major component of all comprehensive HIV/AIDS programs around the world (Campbell et al., 1997; Valdiserri, Holtgrave, & West, 1999). Typically, VCT consists of a pretest counseling session, an HIV antibody test, and a posttest counseling session. VCT provides an opportunity for individuals to understand their personal risk for HIV infection, make informed choices based on knowledge of their serostatus, change behaviors that may put themselves or others at risk for HIV infection, and seek entry into medical care if they are HIV-positive. Successful implementation of VCT is associated with a reduction in risk behaviors in persons who test positive for HIV (Müller et al., 1995; Sharr et al., 2007; Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000), lower rates of HIV seroconversion among HIV serodiscordant couples (Allen et al., 1992), and reduction of new sexually transmitted infections (STIs) (Kamb et al., 1998). Providing VCT at antenatal clinics has proven to be essential in efforts to prevent mother-to-child HIV transmission (Bassett, 2002). VCT is a cost-effective HIV intervention in terms of new infections averted and years of life saved (Sweat et al., 2000). HIV prevention programs may have greater impact when services target and capture those who are at highest risk of HIV acquisition and/or transmission. Integrating new diagnostic testing technologies (e.g., HIV reverse transcriptase-polymerase chain reaction [RT-PCR], into health care systems, particularly VCT, has proved to be feasible in detecting persons with acute HIV infection or most at risk of transmission persons (Novitsky et al., 2008; Pilcher et al., 2002; West, Corneli, Best, Kurljian, & Cates, 2007). VCT continues to play a critical role in elucidating HIV prevention approaches. A recent study by Granich, Gilles, Dye, De Cock, and Williams (2009) suggested that the "test and treat" strategy, including massive scale-up of universal voluntary HIV testing and immediate antiretroviral therapy (ART), could substantially reduce HIV transmission rates, especially in generalized epidemics.

Although VCT can provide substantial benefits to individuals, this intervention can be resource intensive. Questions about management, cost, and effectiveness are of interest to decision makers even in developed countries like the United States (Campbell et al., 2007). Governmental and donor agencies have an increased interest in understanding the value of the VCT programs they support. Program implementers also want to learn more about how they can maximize the performance of their programs and improve their organizational capacity. The extent of participation in VCT by persons at high risk for HIV infection, as well as their acceptance of VCT services, are key measures to determine whether a VCT program is successfully and effectively implemented. Measures of utilization of VCT services, and factors influencing VCT access and utilization in different settings, have been a research focus in the United States and several African countries. Findings from multiple studies have resulted in evidence-based development of technologies, policies, and strategies to enhance VCT accessibility and acceptability (Technical Expert Panel Review of CDC HIV Counseling, Testing, and Referral Guidelines, 2001).

The first case of HIV infection in Vietnam was reported in Ho Chi Minh City in 1990. Currently, an estimated 243,000 people are living with HIV/AIDS nationwide and the HIV prevalence among the adult population (aged 15-49) is estimated at 0.44% in 2010 (Vietnam Ministry of Health, 2009). The epidemic is still a concen-

trated epidemic that affects primarily high-risk groups such as injection drug users (IDUs), female commercial sex workers (CSWs) and their clients and those who have unsafe sex with them. The HIV prevalence varies from province to province and is substantially greater in urban areas and along drug trafficking corridors (Vietnam Ministry of Health, 2006; UNAIDS Vietnam, 2010). Sentinel surveillance data have shown an estimated 20% of IDUs and 3.1% of CSWs are HIV infected. The HIV prevalence among STI patients greater than 10% in some sentinel provinces (Vietnam Ministry of Health, 2009). A recent survey in six provinces in Vietnam also revealed an 8.2% HIV prevalence in smear-positive tuberculosis (TB) patients, which was strongly associated with young male IDUs, and CSWs with a history of STIs (Thanh et al., 2010).

HIV testing in Vietnam began in the early 1990s. Besides mandatory HIV testing for incarcerated persons and blood donors, HIV testing was recommended for patients admitted to hospitals or clinics and who were suspected of having AIDS owing to symptoms or diagnoses. Voluntary confidential counseling and testing was initially offered only at government-funded testing sites for a fee of 50,000 Vietnamese dong (approximately U.S. $3). In Vietnam, IDUs and CSWs are highly stigmatized and targeted by government anti-"social evil" campaigns, especially when most of the HIV infections are occurring among them. These populations are often discouraged from seeking HIV testing services owing to their concern about cost of HIV testing, fear of being identified as a "social evil" and/or denied access to treatment. At the end of 2002, the Vietnam Ministry of Health initiated a free VCT program to expand the national HIV testing capacity with support from the U.S. Centers for Disease Control and Prevention's Global AIDS Program (CDC/GAP) and, starting in 2004, under the auspices of the U.S. President's Emergency Plan for AIDS Relief. Program services were provided through a provincial network of free standing testing sites specifically targeting IDUs, CSWs, and their sex partners. High-quality anonymous VCT services were promoted through peer outreach programs, health care providers, mass media and social marketing activities. Besides CDC/GAP, other organizations such as Family Health International, the World Bank, and the Global Fund for AIDS, Tuberculosis and Malaria also supported similar VCT services. In addition, HIV testing and counseling has recently been integrated into TB and STI services or offered on an outreach basis as part of efforts to increase uptake of HIV testing among high-risk populations.

We analyzed data collected at the CDC/GAP-supported freestanding VCT service sites during 5 years of implementation in order to evaluate the utilization of VCT in Vietnam. In particular, we assessed whether this program was reaching its targeted populations and examined factors that influenced their service utilization. This analysis provided critical information for improving access and utilization of VCT services in Vietnam. In addition, data about at-risk populations and their health-care-seeking behavior were analyzed to inform the development of more effective HIV care and prevention interventions.

METHODS

This evaluation of VCT utilization involved a retrospective analysis of client data records collected from November 2002 through December 2007, from 55 CDC/GAP-supported VCT sites in 40 provinces of Vietnam. These provinces make up

77% of the Vietnam population of approximately 87 million (Vietnam General Statistics Office, 2009).

VCT PROCEDURES

Standardized VCT procedures were applied in all sites. The counseling approach, adapted from the U.S. CDC client-centered counseling model, focused on sex and drug-use-related risk reduction. Counselors obtained verbal consent from clients prior to pretest counseling and administration of an HIV test. Clients who chose to test for HIV were instructed to return after 1 week to receive their test results and posttest counseling. A successful VCT episode occurred when the client accepted an HIV test, returned and received their test result. A VCT episode was considered unsuccessful if the client refused the test after pretest counseling or did not return for their test result within 1 month. If the client came back after 1 month, this was regarded as a new episode and another test was offered. No names or any other personal identification data were collected; there was one data record for each anonymous VCT episode rather than for an individual who might participate in more than one episode; each episode had one unique identifying number that was used to link the person who had been tested with his test result.

DATA COLLECTION AND ANALYSIS

Information was collected using a standardized client intake form across all VCT sites and included sociodemographic data, primary reason for visit, source of referral, prior HIV testing, personal risk behavior and sex partner risk. Counselors received training in proper data collection procedures. All completed forms were reviewed for accuracy and completeness by VCT site supervisors before an administrative staff entered the data into Epi Info Version 2005 for Windows.

SAS Version 9.1.3 for Windows was used for data analysis. A number of data reporting issues were addressed prior to analysis as follows.

Hierarchy of Risk Categories. A VCT record might report more than one risk factor for the related client. For ease of statistical analysis, each record was assigned one primary risk category, and was counted only once. Therefore, a hierarchy of risk categories was developed based on a classification of risk factors that are more or less likely to be responsible for HIV acquisition or transmission (Table 1).

Risk Exposures. In another analysis, a dichotomy of reported risk exposures (i.e., high risk and low risk) was used to recategorize the variable of "primary reason for seeking VCT." A record was assigned high-risk exposure if the primary reason for seeking VCT was associated with the client's personal engagement in a high-risk behavior (i.e., IDU, unprotected homosexual contact with other men [MSM], sex work or having multiple sex partners) or with the client's sexual contact with an HIV-infected or high-risk individual. Records indicating that the primary reason was "ill" and/or "recommended by health care provider or referred by their sex partner" were also assigned to the high-risk exposure category on the assumption that VCT was recommended because of an AIDS-suspected symptom or an HIV-infected sex partner. Records that reported the primary reason for VCT was associated with casual contacts with HIV-infected individuals, needle sticks, or providing care to AIDS patients were assigned the low-risk exposure category.

TABLE 1. Risk Categories and Source of Referral

Risk categories	
Person risk exposure categories (1= highest risk, 9= lowest risk)	Sex partner's risk categories (1= highest risk; 10 = lowest risk)
1. = IDU/MSM	1. = sex partner is HIV infected
2. = IDU/CSW	2. = sex partner is IDU/MSM, IDU/CSW, IDU/MSP or other risk (unknown HIV status)
3. = IDU/M-SP	3. = sex partner is IDU only (unknown HIV status)
4. = IDU (and other)	4. = sex partner is MSM (non-IDU and unknown HIV status)
5. = MSM (non-IDU, CSW or other)	5. = sex partner is CSW (non-IDU, non-MSM and unknown HIV status)
6. = CSW(non-IDU, non-MSM, and other)	6. = sex partner is client of CSW (non-IDU/MSM/CSW and unknown HIV status)
7. = M-SP (non-IDU, non-MSM, non-CSW, and other)	7. = sex partner is M-SP only
8. = other (non-IDU, non MSM, non-CSW, non M-SP)	8. = sex partner has other risk
9. = none (not any above)	9. = sex partner's risk is unknown
	10. = no sex partner

Note. IDU = injecting drug use. MSM = men who have sex with men. CSW = commercial sex work. M-SP = having multiple sex partners. Other = other risk (accident, needle stick, casual contact with HIV-infected or suspected-AIDS person). Primary Sources of Referral (1=most desirable referral, 7=least desirable referral) 1. = Referred by peer educator (PE) [and may include another source]. 2. = Referred by health provider (HCP) [and may include another source but not PE] 3. = Referred by sex partner (SP) [and may include another source but not PE or HCP]. 4. = Referred by needle sharing partner (NSP) [and may include another source but not PE, HCP or SP]. 5. = Referred by other client [and may include another source but not PE, HCP, SP or NSP]. 6. = self-referred when learning about VCT from mass media. 7. = Referred by someone other than any above.

TABLE 2. Sociodemographic Characteristics of 158,888 Clients Attending CDC/GAP-Supported VCT Sites in 40 Provinces of Vietnam During November 2002-December 2007.

Variable	All clients		Men		Women	
Residence	n=158,129	(%)	n=100,549	(%)	n=57,427	(%)
Urban	105,752	67.0	69,007	68.6	36,636	63.8
Rural	37,834	24.0	23,314	23.2	14,496	25.2
Other province	14,543	9.0	8,228	8.2	6,295	11.0
Missing	759		912			
Region	n=158,888	(%)	n=101,032	(%)	n=57,694	(%)
Northeast	19,223	12,1	12,218	12.1	6,985	12.1
Red River Delta	41,640	26.2	27,990	27.7	13,615	23.6
Northwest	3,551	2.2	2,795	2.8	756	1.3
North Central	10,979	6.9	6,921	6.9	4,054	7.0
Central coastal	19,051	12.0	10,735	10.6	8,303	14.4
Central highland	3,257	2.0	2,031	2	1,217	2.1
Northeast South	38,946	24.5	24,365	24.1	14,512	25.2
Mekong River Delta	22,241	14.0	13,977	13.8	8,247	14.3
Missing	0		162			
Gender	n=158,726	(%)				
Male	101,032	63.6				
Female	57,694	36.4				
Missing	162					
Age Group	n=158,888	(%)	n=101,032	(%)	n=57,694	(%)
15-19	9,062	5.7	5,620	5.6	3,431	6.0
20-29	82,451	52.0	50970	50.4	31,391	54.4
30-39	46,511	29.3	30,544	30.2	15,923	27.6
40-49	15,683	9.9	10,250	10.1	5,418	9.4
50 and over	5,181	3.3	3,648	3.6	1,531	2.6
Missing	0		162			
Education	n=157,063	(%)	n=99,822	(%)	n=57,081	(%)
No schooling	2,693	1.7	1,258	1.3	1,433	2.5
Grades 1-5	18,788	12.0	9,449	9.5	9,324	16.3
Grades 6-9	56,830	36.2	34,255	34.3	22,520	39.5
Grades 10-12	62,343	39.7	43,013	43.1	19,263	33.8
Over grade 12	16,409	10.4	11,847	11.9	4,541	27.7
Missing	1,825		1,985			
Marital status	n=158,117	(%)	n=100,550	(%)	n=57,411	(%)
Single/unmarried	68,146	43.0	52,483	52.2	15,586	27.2
Married/living with partner	78,043	49.4	43,958	43.7	34,012	59.2
Divorced/separate	8,196	5.2	3,641	3.6	4,551	7.9
Widowed	3,732	2.4	468	0.5	3,262	5.7
Missing	771		927			

Hierarchy of Referral Sources. A record might report that the VCT client was referred by more than one source. For ease of statistical analysis, each record was assigned to one referral source category and was counted only once. A hierarchy of referral source was developed based on the assumption that high-risk persons would be more likely to be reached and referred to VCT through a certain number of current interventions such as peer outreach, provider or partner referral, or VCT social marketing (see Table 1). Intended effects of these referral approaches could therefore be assessed using the VCT program data.

We analyzed reported primary reasons for seeking VCT and HIV risk behavior/exposure to determine the overall proportion of clients at high-risk exposures. Multivariable logistic regression analyses, corrected for sociodemographic characteristics, prior HIV testing, source of referral, reason for seeking VCT, and risk exposures,

REPORTED Prior HIV Testing, Primary Sources of Referral for VCT, Reasons for Seeking VCT, Primary HIV Risk Behaviors/Exposures, Test Acceptance, Return for Test Results, and HIV Seropositivity, among Clients at CDC/GAP-Supported VCT Sites During November 2002-December 2007

Variable	All clients		Men		Women	
Prior HIV testing	n=157,040	(%)	n=100,145	(%)	n=57,185	(%)
No previous test	116,899	74.2	74,607	74.5	42,173	73.8
Previously negative	27,480	17.5	15,850	15.9	11,605	20.3
Previously positive	7,776	5	5,706	5.7	2,057	3.6
Previously inconclusive	2,332	1.5	1,688	1.7	641	1.1
Previously, not received result	3,003	1.9	2,294	2.3	709	1.2
Unidentified	1,398		2,008			
Primary source of referral (mutually exclusive)	n=157,754	(%)	n=100,322	(%)	n=57,276	(%)
Peer educator	40,015	25.4	25,418	25.3	14,566	25.4
Healthcare provider	26,422	16.8	15,553	15.5	10,843	6.9
Sex partner	3,006	1.9	1,061	1.1	1,943	3.4
Needle-sharing partner	2,550	1.6	2,426	2.4	122	0.2
Other client	23,518	14.9	14,477	14.4	9,021	15.8
Mass media	55,535	35.2	37,348	37.2	18,115	31.6
Other	6,708	4.6	4,039	4	2,666	4.7
Unidentified	1,134		1,290			
Primary reason for seeking VCT	n=156,889	%	n=100,001	%	n=56,730	%
High-risk behavior	81,153	51.7	66,453	66.5	14,621	25.8
Sex-partner is HIV-infected	9,494	6.1	1,482	1.5	8,002	14.1
Sex partner is high-risk	30,324	19.3	12,478	12.5	17,817	31.4
Ill/recommended by HCP	4,802	3.1	2,871	2.9	1,927	3.4
Recommended by sex-partner	1,042	0.7	486	0.5	554	1
Accident	5,952	3.8	3,745	3.7	2,200	3.9
Casual contact with PLHIV	11,054	7	5,830	5.8	5,214	9.2
Other	13,068	8.3	6,656	6.7	6,395	11.3
Unidentified	1,999		2,157			
Personal risk (See Table 1 for definitions and classification)	n=152,857	(%)	n=97,467	(%)	n=55,240	(%)
IDU/MSM	117	0.1	117	0.1	0	0
IDU /CSW	734	0.5	528	0.5	206	0.4
IDU/M-SP	2,781	1.8	2,672	2.7	105	0.2
IDU only	37,616	24.6	36,023	37	1,563	2.8
MSM	513	0.3	508	0.5	4	0
CSW	10,422	6.8	1,800	1.9	8,615	15.6
M-SP	28,539	18.7	23,312	23.9	5,200	9.4

Other	26,675	17.4	16,250	16.7	10,394	18.8
No personal risk behaviors	45,460	29.7	16,257	16.7	29,153	52.8
Unidentified	6,031		6,181			
Sex partner's risk (See Table 1 for definitions and classification)	n=146,798	(%)	n=92,910	(%)	n=53,739	(%)
Sex partner is HIV-infected	10,947	7.5	2,114	2.3	8,825	16.4
Sex partner is IDU (multi-risks)	1,167	0.8	434	0.5	733	1.4
Sex partner is IDU only	12,977	8.8	2,886	3.1	10,076	18.8
Sex partner is MSM	484	0.3	423	0.5	60	0.1
Sex partner is CSW	27,853	19	27,333	29.4	481	0.9
Sex partner is client of CSW	7,462	5.1	933	1	6,524	12.1
Sex partner is M-SP	24,113	16.4	11,347	12.2	12,746	23.7
Sex partner has other risk	4,880	3.3	2,273	2.5	2,602	4.8
Sex partner's risk is unknown	30,341	20.7	23,510	25.3	6,807	12.7
No sex partner	26,574	18.1	21,657	23.3	4,885	9.1
Unidentified	12,090		12,239			
HIV test acceptance	n=158,888	(%)	n=101,032	(%)	n=57,694	(%)
No	9,762	6.1	6,635	6.6	3,115	5.4
Yes	149.126	93.9	94,397	93.4	54,579	94.6
Unidentified	0		162			
Return for test results	n=149,126	(%)	n=92,197	(%)	n=53,339	(%)
No	5,149	3.5	3,757	4.1	1,390	2.6
Yes	140,532	96.5	88,840	95.9	51,949	97.4
Unidentified	3,445		3,590			
HIV seropositivity	n=149,126	(%)	n=94,397	(%)	n=54,579	(%)
HIV negative	119,058	79.8	71,971	76.2	46,975	86.1
HIV positive	28,036	18.8	21,077	22.3	6,928	12.7
Indeterminate	286	0.2	172	0.2	114	0.2
Other (lost, missing)	1,746	1.2	1,177	1.3	562	1
Unidentified	0		150			

Note. IDU = injecting drug user. MSM = men who have sex with men. CSW = commercial sex worker. M-SP = having multiple sex partners. Other = other risk (accident, needle stick, casual contact with HIV-infected or suspected-AIDS person). PLHIV = people living with HIV.

were performed. The outcome measures were test refusal, failure to return for test results, and HIV seropositivity. Statistical tests were performed at 5% significance level. Independent variables significantly associated with the dependent variables in univariate analyses were entered into multivariable logistic regression models. Variables found to be responsible for multicollinearity (variance inflation factor [VIF] of greater than 10) were removed from the full models. The backward selection method (significance level for entry and staying in the model = .10) was then used to select the best possible sets of predictors for outcome measures. Records were deleted from the logistical regressions if they had missing values for response or explanatory variables.

RESULTS

During the period from November 2002 to December 2007, the CDC/GAP-supported VCT services collected 161,824 records. Of these, 158,888 (98%) records were for clients aged 15 years and older and were utilized for analysis. Table 2 summarizes the socio-demographic characteristics of these clients. The median age was 28 years, and the median number of years of schooling was 10. Male clients were slightly older and spent significantly more time (over 1 year) in school than female clients. Male clients reported being single/unmarried more frequently than female clients (52% vs. 27%). Of 156,889 (99%) records with information on primary reasons for seeking VCT, 126,815 (81%) reported reasons indicating that clients were at high risk of exposure to HIV either through engaging in personal risky behaviors or through sexual contact with an HIV-infected person or a person engaging in risky behaviors (Table 3). The proportion with high-risk exposure was significantly higher in males (84%) than females (76%) (t test, $p < .001$). Most male clients (67%) sought VCT because of concerns about their personal risk behaviors, whereas the largest proportion of female clients (47%) sought VCT because of concerns related to high-risk behaviors or HIV status of their sex partner.

Personal risk behaviors were reported in 152,857 (96%) records, and 146,798 (92%) records provided information on HIV risk among sex partners. Injection drug use was the primary personal risk behavior for 40% of male clients and 3.4% of female clients (see Table 3). Injection drug use was also a risk among sex partners of clients who reported using injection drugs; of 35,720 records for male IDUs who reported their sex partners' risk, 1,130 (3.2%) reported an injection-drug-using sex partner, and 530 (30%) of 1,739 records for female IDUs reported an injection-drug-using sex partner (data not shown). Among all these 2,869 records for clients reporting an injection drug-using sex partner, 1,581 (55%) indicated the clients were themselves IDUs; 683 (43%) of these IDUs were HIV-positive. In a subset analysis of 9,254 records for clients who reported an HIV-infected sex partner, 8,466 (91%) were for female and 788 (9%) were for male; 33% of females and 40% of males, respectively, were found to be HIV-positive. Among those reporting injection drug use ($n = 546$), 71% were HIV-positive (data not shown).

Among 72,547 records for clients reporting vaginal sex during the 30 days prior to VCT, reported "any condom use" rates during the previous month were: 71% in CSWs, 34% in IDUs, 53% in those with an HIV-infected sex partner, 34% in those with an IDU sex partner, and 42% in those who had sex with a CSW (data not shown).

Of 157,040 (99%) records with information on HIV testing history, 116,899 (74%) documented no previous HIV test (see Table 3); of these, 18,704 (16%) were newly positive. In a subset analysis of 27,480 records reporting a prior HIV negative test result, 9,145 (33%) reported that the negative test was done within the prior 3 months. Of these, 8,278 (91%) documented a new test result, of which 640 (7.7%) were newly positive (data not shown). In another subset analysis of 7,776 records reporting a prior HIV positive test result (3,810 [49%] of which were from Ho Chi Minh City), 6,803 (77%) records documented a new HIV test, and of these, 342 (5%) were HIV-negative (data not shown).

Overall, 6.1% of the total 158,888 records indicated refusal of an HIV test. Of the 145,681 (92%) records that had information on return for test results and posttest counseling, 5,099 (3.5%) indicated failure to return for test results. Of the 149,126 HIV-tests performed, 28,036 (19%) indicated an HIV positive test result (see Table 3). Results of multivariable logistic regression assessing the association between dependent variables (i.e., testing refusal, return for test results and HIV positivity) and independent variables are shown in Table 4. Because of missing values for the response and explanatory variables, 149,903 (94%) records were included in the regression analysis for test refusal. In addition, 128,099 records were included in the regression for return for test results and 128,744 for HIV positivity. The refusal rates were higher among clients IDU/MSM (adjusted odds ratio (AOR) = 2.0, 95% CI: 1.1-3.4), or those reporting positive results with a prior HIV test (AOR = 3.0, 95% CI: 2.7-3.3]. Higher rate of failure to return for test results was significantly associated with clients from the Central Highland provinces (AOR = 2.8, 95% CI: 2.4-3.2), those who were referred by peer educators (AOR = 2.4, 95% CI: 2.1-2.5) and those reporting no receipt of prior test results (AOR = 1.4, 95% CI: 1.1-1.7). The strongest predictors of HIV positivity were being an IDU (AOR = 4.1-11.6), being ill/recommended by a health care provider (AOR = 8.6, 95% CI: 6.7-10.9), and being a sex partner of an HIV-infected person (AOR = 6.7, 95% CI: 5.1-8.6).

DISCUSSION

Our analysis of 5 years of data from the CDC/GAP-supported VCT program demonstrated that services have been primarily reaching those who are engaging in high-risk behaviors or exposed to HIV through sexual contacts with high-risk individuals. The HIV prevalence among VCT clients, especially most at risk populations (MARPs) such as IDUs and CSWs, was considerably higher than the national prevalence, suggesting that individuals at higher risk of HIV infection have been successfully targeted at VCT sites. These successes are due to a comprehensive approach to promote VCT including peer outreach, social marketing, and clinical care referral to MARP-friendly, anonymous VCT services.

The demographic characteristics of the population attending the CDC/GAP-supported VCT differed from the general population. Compared with the general population (**Vietnam** Population and Housing Census, 2009), the VCT population was mainly male (63.6% vs. 49.5% for general population) and from urban areas (67% vs. 30% for general population). The proportion of single/unmarried persons in the VCT population was higher than that in the general population (43% vs. 27%). Persons aged 20-39 were disproportionally represented in the VCT population (81% vs. 44% for general population). These differences could be expected in

TABLE 4. HIV test refusal, seropositivity, and failure to return adjusted for demographics, risk exposures and other characteristics among clients who were tested at CDC/ GAP-supported VCTsites, November 2002 – December 2007

	HIV test refusal			HIV seropositivity			Failure to return		
	(%)	ORadj(1)	95% CI(2)	(%)	ORadj(1)	95% CI(2)	(%)	ORadj(1)	95% CI(2)
Residence (n=158,129)	(*)			(*)			(*)		
Urban	6.4	Excluded from regression model using backward selection method		20.0	Excluded from regression model using backward selection method		3.4	1.0	0.8-1.1
Rural	5.2			17.7			4.1	1.2	1.0-1.3
Other province/country	6.2			16.8			2.7	Ref.	-
Region (n=158,888)	(*)			(*)			(*)		
Northeast	6.4	1.8	1.4-2.1	24.5	1.2	1.1-1.3	4	1.1	0.9-1.2
Red River Delta	8.4	2.2	1.8-2.6	18.2	0.9	0.8-0.9	4.5	1.3	1.9-1.4
Northwest	1.1	0.4	0.2-0.5	20.7	0.7	0.6-0.8	1.5	0.3	0.2-0.3
North Central	6	1.5	1.2-1.8	18.4	1.0	0.9-1.1	6	1.8	1.6-2.0
Central coastal	3.2	0.6	0.5-0.8	5.4	0.4	0.3-0.4	2	0.4	0.3-0.4
Central highland	4.2	1.1	0.9-1.3	7.3	0.5	0.3-0.5	11.5	2.8	2.4-3.2
Northeast South	5.7	0.8	0.7-0.8	27.3	1.5	1.4-1.5	1.9	0.4	0.4-0.5
Mekong River Delta	6.2	Ref.	-	15.1	Ref.	-	3.5	Ref.	-
Gender (n=158,726)	(*)	Excluded from regression model using backward selection method		(*)			(*)		
Male	6.6			22.7	1.1	1.0-1.1	4	1.3	1.2-1.4
Female	5.4			12.9	Ref.		2.6	Ref.	-
Age group (n=158,888)	(*)			(*)			(*)		
15-19	5	0.6	0.5-0.7	6.6	0.6	0.5-0.7	4.3	Excluded from regression model using backward selection method	
20-29	5.8	0.7	0.6-0.7	20.6	2.3	1.9-2.6	3.5		
30-39	6.1	0.7	0.6-0.8	22.6	2.6	2.2-3.0	3.4		
40-49	7.5	0.9	0.7-0.9	11.2	1.4	1.2-1.6	4.1		
50 and over	9.4	Ref.	-	7.0	Ref.	-	2.4		
Education (n=157,063)	(*)			(*)					
No schooling	3.5	Excluded from regression model using backward selection method		27.5	3.2	2.7-3.6	3.3	Excluded from regression model using backward selection method	
Grades 1-5	4.5		26.0	2.9	2.6-3.1	3.2			
Grades 6-9	5.6		22.7	2.1	2.0-2.3	3.7			
Grades 10-12	6.9		16.1	1.5	1.3-1.6	3.6			
Over grade 12	6.8		7.5	Ref.	-	3.2			
Marital status (n=158,117)				(*)			(*)		

Single/unmarried	6.3	Excluded from regression model due to multicollinearity		19.6	Ref.	-	4.1	Ref.	-
Married/living with partner	6		17.3	1.1	1.0-1.1	3.1	0.8	0.7-0.8	
Divorced/separate	5.7		23.8	1.4	1.3-1.5	3.6	1.0	0.8-1.1	
Widowed	5.2		35.1	2.6	2.3-2.9	2.2	0.8	0.6-1.0	
Prior HIV testing(n=157,490)	(*)			(*)			(*)		
No previous test	5.7	Ref.	-	15.6	Ref.	-	3.6	Ref.	-
Previously negative	6.3	0.9	0.8-0.9	6.6	3.3	3.11-3.5	3.3	1.0	0.9-1.1
Previously positive	12.8	3.0	2.7-3.3	95.1	252.0	218.-290	2	0.7	0.5-0.9
Previously inconclusive	3.7	0.6	0.4-0.7	62.7	19.7	17.5-22.3	4.2	1.2	0.9-1.5
Previously, not received result	3.8	0.7	0.6-0.9	50.2	9.8	8.7-10.9	6	1.4	1.1-1.7
Source of referral (n=157,754)	(*)		(*)			(*)			
Peer educator	4.8			20.1	0.9	0.8-0.9	5.8	2.4	2.1-2.5
Healthcare provider	5.9	Excluded from regression model using backward selection method		28.0	1.7	1.6-1.8	2.7	1.0	0.8-1.0
Sex partner	5.3		19.4	1.1	1.0-1.3	2	1.0	0.7-1.3	
Needle-sharing partner	3.6		39.4	0.9	0.7-0.9	2	0.6	0.4-0.7	
Other client	4.1		18.0	1.0	0.9-1.0	2.6	1.0	0.9-1.1	
Mass media	8.1		13.6	Ref.	-	3	Ref.	-	
Other	7.1		17.3	1.0	0.9-1.2	2.3	0.8	0.6-0.9	
Reason for seeking VCT (n=156,889)	(*)			(*)			(*)		
High-risk behavior	4.9	1.0	0.9-1.1	25.4	4.6	3.6-5.8	3.9	0.7	0.5-0.8
Sex partner is HIV-infected	4.5	0.4	0.3-0.4	32.7	6.7	5.1-8.6	1.7	0.8	0.5-1.1
Sex partner is high-risk	5.7	0.6	0.5-0.6	9.3	4.6	5.6-5.8	3.2	0.8	0.6-0.9
Ill/recommended by HCP	9	1.3	1.1-1.5	26.6	8.6	6.7-10.9	2.7	1.0	0.7-1.3
Recommended by SP	5.2	0.7	0.4-0.9	13.1	4.3	3.1-6.0	2.2	0.7	0.3-1.1
Accident	9	Ref.	-	2.1	Ref.	-	3.3	Ref.	-
Casual contact with PLHIV	9.2	1.0	0.8-1.1	3.7	1.8	1.4-2.3	3.4	1.1	0.9-1.3
Other	9.6	1.1	1.0-1.2	9.8	3.2	2.5-4.1	3.9	1.2	0.9-1.4
Personal risk (n=152,857)	(*)			(*)			(*)		
IDU/MSM	14.5	2.0	1.1-3.4	20.2	4.1	1.9-8.7	3.4	0.8	0.1-6.3
IDU /CSW	8.3	0.7	0.5-0.9	47.2	11.6	9.2-14.6	5.8	1.2	0.7-1.8
IDU/M-SP	3.2	0.4	0.3-0.4	40.7	7.8	6.9-8.8	5	1.3	1.0-1.6
IDU only	4.5	0.4	0.3-0.4	43.2	7.3	6.6-7.9	4.5	1.3	1.1-1.4
MSM	7.8	0.7	0.4-1.0	15.8	2.1	1.4-3.0	2.8	1.3	0.6-2.6
CSW	4.1	0.7	0.6-0.7	7.9	1.3	1.1-1.4	3.2	1.2	1.0-1.4

TABLE 4. (continued)

M-SPs	3.7	0.5	0.4-0.5	10.9	1.3	1.1-1.3	3.8	1.2	1.0-1.3
Other risk (none of the above risks)	10	1.3	1.2-1.4	8.4	1.1	1.0-1.2	2.8	0.7	0.6-0.8
No personal risk behaviors	5.5	Ref.	-	11.5	Ref.	-	2.9	Ref.	-
Sexual partner's risk (n=146,798)	(*)		(*)			(*)			
Sex partner is HIV-infected	5.1			34.4	2.1	1.8-2.4	1.6	0.7	0.5-1.0
Sex partner is IDU (multi-risks)	4.5			20.7	1.4	1.1-1.7	2.4	0.7	0.4-1.1
Sex partner is IDU only	6.5			16.4	1.2	1.1-1.3	2.8	1.1	0.9-1.3
Sex partnerisMSM	6	Excluded from regression		14.7	0.8	0.5-1.2	2.4	0.6	0.2-1.3
Sex partner isCSW	6.1	model using backward selection		14.0	0.8	0.7-0.9	4.3	1.2	1.1-1.4
Sex partner is client of CSW	3.6	method		7.2	0.6	0.5-0.6	2.3	0.8	0.6-1.0
Sex partneris M-SP	4.4			8.4	0.6	0.5-0.6	3.1	1.0	0.8-1.1
Sex partner has other risk	6			12.7	1.0	0.8-1.0	2.2	0.6	0.4-0.7
Sex partner's risk is unknown	5.7			22.6	0.8	0.7-0.8	3.9	1.2	1.0-1.3
No sex partner	5.2			29.7	Ref.	-	3.9	Ref.	-
HIV test result (n=147,094)							(*)		
HIV negative							3.5	Ref.	-
HIV positive							3	0.8	0.7-0.9

Note. (1) Adjusted Odds Ratio. (2) 95% Confidence Interval. (*) Significant with Chi-square test. IDU = injecting drug use. MSM = men who have sex with men. CSW = commercial sex work. M-SP = having multiple sex partners. Other = other risk (accident, needle stick, casual contact with HIV-infected or suspected-AIDS person). PLHIV = people living with HIV

an HIV epidemic driven by young male IDUs, CSWs, and their sex partners, with services targeted to MARPs and mostly located in urban areas.

In addition, the high seroconversion rate among those who reported testing HIV-negative within the previous 3 months indicates that the VCT program also effectively identifies recently HIV-infected individuals and thus offers the opportunity to prevent further transmission owing to high infectivity during early HIV infection. As West et al. (2007) have suggested, the development and use of low-cost diagnostic tests for recent infection (e.g., PCR) could enhance the program's ability to detect a larger number of those most at risk of transmission and target them with prevention interventions. As immediate ART is not within programmatic guidelines, intensive risk reduction counseling for those most at risk of transmission who have been identified through VCT should continue as an intervention to reduce HIV transmission.

Our analysis showed that injection drug use was the strongest predictor of testing HIV-positive, consistent with epidemiologic data demonstrating IDU as the dominant mode of HIV transmission in Vietnam. The high HIV positivity rate among those who were ill and referred from health care providers suggests that clinical care is critical in the identification of individuals who need referral to VCT. Similar to the findings from the evaluation of a VCT program in Thailand (Kawichai et al., 2002), our analysis of this VCT data found that male clients were more likely to seek VCT because they had high-risk behaviors, whereas female clients were more likely to seek VCT because their sex partner was infected or had high-risk behaviors. The data indicate that having an HIV-infected or injection-drug-use sex partner was a strong predictor of HIV seropositivity and this was probably associated with the testers' personal IDUs behavior. However, the data also demonstrated high HIV positivity rates among those (mainly females) who were not IDUs or CSWs and reported an HIV-infected or IDU sex partner, suggesting that sexual transmission needs to be addressed in Vietnam, even though the HIV epidemic is largely driven by injection drug use. Existing HIV prevention programs in Vietnam tend to appropriately emphasize interventions for IDUs and CSWs, but insufficient attention is given to their non-IDU sex partners.

Furthermore, the high proportion of VCT population testing positive for HIV highlights the importance of effective linkages between VCT and HIV care and treatment programs. Although free standing and anonymous VCT is recognized to be attractive to stigmatized populations, these features also represent challenges in tracking referrals to care and treatment services. In Vietnam, confidential VCT testing services have recently been introduced to allow for better linkages of clients testing positive with clinical care and to help eliminate the requirement for duplicate HIV testing at the clinic.

Outside Vietnam, partner notification and referral programs that protect confidentiality have been found to be effective in identifying, testing, counseling, and educating individuals at risk (Hogben, McNally, McPheeters, & Hutchinson, 2007; West & Stark, 1997), particularly sex partners of HIV-infected persons. Integration of couples counseling into HIV care and treatment and VCT services is important to address the need for couples-based HIV risk reduction in this population (Desgrées-du-Loû & Orne-Gliemann, 2008), especially given that many HIV-infected clients may have been recently infected. Couples counseling that clearly explains discordance, emphasizes transmission risks, and supports risk reduction through condom use has proven to be effective in reducing seroconversion rates among discordant couples (Allen et al., 1992). In Vietnam couples' counseling has rarely been provided

in both VCT and HIV care and treatment settings. Initial results of a pilot couples voluntary counseling and testing (CVCT) component recently added to VCT services in Ho Chi Minh City showed a low proportion (4.2%) of CVCT among all VCT contacts (unpublished data). A study conducted in Addis Ababa, Ethiopia, suggested that low utilization of CVCT was likely due to the lack of knowledge about CVCT services, unavailability, or unwillingness of sex partners (Dillnessa & Enquselassie, 2010). The VCT program should examine the behaviors of VCT seeking and utilization among Vietnamese couples prior to scaling up this HIV prevention strategy. Furthermore, Were et al. (2006) suggested that outreach VCT targeted to sex partners of HIV-infected individuals may be effectively provided through home-based care and treatment programs. However, the "mother-to-child-transmission-plus" program in Abidjan, Côte d'Ivoire, documented numerous changes (e.g., disclosure of HIV status) in engaging partners and family members of newly enrolled HIV-infected pregnant women into care (Tonwe-Gold et al., 2009). Efforts to understand barriers to partner notification and referral to HIV counseling and testing are needed to consider this model for implementation in Vietnam.

The relatively low condom use among high-risk clients suggests that Vietnam program managers should strengthen interventions targeted to increasing condom use among MARPs. The 100% condom use programs that have reduced the rates of STDs and HIV infections in Thailand, Cambodia, and other neighboring countries should be considered for adaptation for CSWs and their clients in Vietnam. Strategies for ensuring condom access should be evaluated and appropriately strengthened. This may be done through condom social marketing and distribution in nontraditional outlets, coupled with interventions targeted to change relevant social norms and promote safer sexual practices.

Test refusal and failure to return for test results represent missed opportunities to learn HIV status, refer to clinical services, and prevent further transmission. Given that confirmatory rapid testing is not available in Vietnam and test results are provided after several days, the high HIV test acceptance and return rates among clients demonstrate important successes for this VCT program. A review of United States data on rates and determinants of VCT acceptance (Irwin, Valdiserri, & Holmberg, 1996) suggested that high acceptance rates were associated with risk perception, acknowledgment of risk behaviors, and confidentiality protection. Other studies of VCT utilization in the United States (Molitor, Bell, Truax, Ruiz, & Sun, 1999; Valdiserri et al., 1993; Weber, Frey, Horsley, & Gwinn, 1997) indicated that clients of freestanding VCT sites, presenting primarily for HIV testing, were more likely to return for test results and posttest counseling than clients of other site types, such as clinics treating sexually transmitted diseases. The successes of the VCT program in Vietnam may be due to a high level of HIV risk perception among VCT clients, and other attributes, including freestanding sites with a solid track record of anonymity protection.

Previous studies from other countries (Kawichai et al., 2002; Matovu et al., 2005) suggest that higher VCT refusal rates are associated with previous positive test results or reported no personal high-risk behavior. In our analysis, higher failure-to-return rates were found among those referred by peer educators and those reporting failure to receive prior test results. Although those who failed to return represent a small proportion of VCT clients, further efforts to understand barriers to learning and coping with HIV test results among this subset may be useful to develop counseling strategies tailored to their needs to maximize program effective-

ness. Strengthened referral and linkage with MARP-focused outreach programs can also increase VCT utilization among high-risk individuals.

A number of studies have documented the relationship between repeat testing and risk behavior and HIV incidence. Fernyak et al. (2002) pointed out that highest repeating testing rates were associated with persons who practice hight risk behaviors and have high HIV incidence. Others have noted that repeat testers have significantly higher sexual risk compared with first-time testers (Leaity et al., 2000; MacKellar et al., 2002). Bradley, Tsui, Kidanu, and Gillespie (2010) found that Ethiopian women with high sexual risk were four times more likely than those with no sexual risk to be repeat testers; perceived vulnerability, or feelings of powerlessness to prevent HIV risk behaviors increased their likelihood of repeat testing. Our analysis revealed a substantial proportion of VCT clients who had tested HIV-negative prior to their current VCT episode and subsequently tested positive for HIV infection. At present, VCT services in Vietnam recommend a repeat VCT visit every 3 months for clients who continue to engage in risky behaviors, including counseling focused on supporting clients to reduce risk. Repeat visits could provide the opportunity to address continued high-risk behaviors and reinforce personal risk reduction strategies, especially for negative testers. However, further efforts are required to gain new insights into behavioral risks and motivations among Vietnamese repeat testers to develop counseling strategies that better address their risk reduction need.

We found most clients who reported prior positive test results resided in Ho Chi Minh City. This is most likely due to a surge of recovering drug users who were released from 18 government mandatory drug treatment centers between 2005 and 2008. These returnees, about half (48%, HIV Sentinel Surveillance, 2007) of whom are HIV-infected, were encouraged to seek HIV care and treatment services in the community upon release. This suggests the need for an evaluation of service coverage for returnees and efforts to provide HIV counseling and testing as well as referral to clinical services for this group. In addition, existing reintegration programs for recovering drug users should develop methods to link data for those diagnosed HIV positive inside the centers with community-based services, thus minimizing the need for repeat testing and the associated resource drain. Our analysis also documented that some persons reporting previous positive HIV tests had negative tests during VCT. Although there may be recall bias related to reporting prior test results and prior testing services, this suggests the need for further examination of laboratory practices in provinces where these cases occur.

Our analysis had some potential limitations. Because the data used for analysis were client records (line-listed data) derived from a single donor-funded program, the results only reflected the experience of a single program and might not be generalizable to all HIV counseling-and-testing services in Vietnam. We were not able to compare the results with those of other VCT systems in Vietnam owing to the lack of similar reports or analyses. In addition, it is important to acknowledge that individual records represent VCT episodes rather than individuals; thus, it is not possible to interpret the data in terms of individual clients. The current data system limits our ability to detect the magnitude of repeat episodes and the results may be weighted towards these repeat events. This is an unavoidable limitation of interpreting anonymous VCT data. Misclassification and missing values for some key variables of interest, such as reported risk exposures, might also have affected the reliability of results and interpretation of findings. We were unable to evaluate population coverage of the VCT services because of a to lack of reliable estimates

of high-risk population size and distribution in service areas. Results from the HIV/STI Integrated Biological and Behavioral Surveillance (IBBS) study, conducted in 10 provinces of Vietnam in 2009, indicate that the proportion of those knowing their HIV status is 21-64% among IDUs, 21-79% among street-based female sex workers, 17-85% among venue-based female sex workers, and less than 20% among MSM. We were able to assess neither the quality of pretest counseling (which might have influenced the rates of HIV test acceptance and return for test results) nor the ability of VCT to reduce new HIV infections owing to the lack of incidence data. Finally, the data did not permit a national assessment of the trends in characteristics of clients who attend VCT services because the program changed in scale over time. The number of sites increased gradually during November 2002 and March 2007, but VCT services were phased out in 10 provinces in April 2007 because of a strategic decision to focus on improving quality and coverage in a more limited number of provinces.

This analysis demonstrates that this single donor-funded VCT program successfully reaches its targeted population, had excellent test acceptance and receipt of test results, and provided important data for program improvement. As the HIV epidemic in Vietnam remains concentrated in MARPs, the VCT program should maintain its focus on serving high-risk individuals through its freestanding services. However, the following recommendations can be included in a revised national strategy on HIV counseling and testing for the country: (a) VCT services should continue to be integrated into existing government health care settings, such as STI or TB programs, to effectively reach high-risk individuals who have poor access to freestanding VCT services, and (b) Interventions should be developed to effectively reach non-IDU sex partners of IDUs and HIV-infected persons to prevent both primary and secondary infections. Counseling should be provided to HIV-infected persons that focuses on partner referral, especially for those who recently seroconverted. A couples-focused approach should be integrated into VCT and HIV care and treatment services to address the needs of HIV prevention among discordant couples. This will require advanced training for health care staff /counselors to effectively assist clients with partner referrals and facilitate couples counseling sessions.

Additionally, data on risk behavior in this analysis indicate that HIV programs in Vietnam need to strengthen approaches to increase consistent and correct condom use and promote access to prevention services among sex partners of high-risk individuals. Future research should focus on evaluating the effectiveness of the counseling component of VCT, specifically targeting behavioral assessments and examining MARP-targeted behavioral interventions and change of behaviors related to condom use, partner referral, repeat testing, and other relevant risk behaviors.

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COSTS AND EFFECTIVENESS OF FINDING NEW HIV DIAGNOSES BY USING RAPID TESTING IN TRANSGENDER COMMUNITIES

Ram K. Shrestha, Stephanie L. Sansom, Jeffrey D. Schulden, Binwei Song, Linney C. Smith, Ramon Ramirez, Azul Mares-DelGrasso, and James D. Heffelfinger

We assessed the costs and effectiveness of rapid HIV testing services provided to transgender communities in New York City and San Francisco from April 2005 to December 2006. Program costs were estimated based on service provider's perspective and included the costs attributable to staff time, incentives, transportation, test kits, office space, equipment, supplies, and utilities. The average annual numbers of persons tested were 195 and 106 persons and numbers notified of new HIV diagnoses were 35 (18.2%) in New York City and 8 (7.3%) in San Francisco, respectively. The estimated annual program costs were $125,879 and $64,323 and average costs per person notified of new diagnosis were $3,563 and $8,284 in New York City and San Francisco, respectively. The primary reason for differences in program costs by site was differences in the proportion of undiagnosed HIV infection among persons tested. Our findings can inform decisions about program planning and allocation of limited HIV testing resources.

In the United States, HIV/AIDS continues to be a major health concern among racial and ethnic minorities, men who have sex with men (MSM), and transgender persons (Bartlett et al., 2008; Centers for Disease Control and Prevention [CDC], 2007; Hall et al., 2008; Herbst et al., 2008). *Transgender* is an umbrella term that refers to persons whose gender identity, expression, or behavior does not conform to societal gender norms associated with their sex at birth (Bockting, Robinson, & Rosser, 1998; Herbst et al., 2008). Transgender persons are identified as male-to-female (MTF) or female-to-male (FTM). A recent meta-analysis reported that the overall HIV prevalence among MTF transgender persons was 27.7% (confidence interval [CI]: 24.8–30.6%), and the prevalence was higher among African American (56.3%, CI: 50.1%–62.4%) than among White (16.7%, CI: 11.8–21.5%) or His-

Ram K. Shrestha, Stephanie L. Sansom, Jeffrey D. Schulden, Binwei Song, and James D. Heffelfinger are with the Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA. Linney C. Smith is with Housing Works, Inc., New York. Ramon Ramirez and Azul Mares-DelGrasso are with AIDS Healthcare Foundation, San Francisco.

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Address correspondence to Ram Shrestha, PhD, Centers for Disease Control and Prevention, Mail Stop E48, 1600 Clifton Rd., Atlanta, GA 30333; e-mail: rshrestha@cdc.gov

panic/Latino (16.1%, CI: 12.1–20.1%) MTF transgender persons (Clements-Nolle, Marx, Guzman, & Katz, 2001; Herbst et al., 2008). In the U.S. population, the overall HIV prevalence is estimated to be 0.45%, and the prevalence is higher for African Americans (1.72%) than for Hispanics/Latino persons (0.59%) or white persons (0.22%) (CDC, 2008). The reported HIV prevalence among FTM transgender persons is substantially lower than that reported for MTF transgender persons, and ranges from 0% (in three studies) to 3% (in one study) (Herbst et al., 2008).

HIV testing has been an important means of early diagnosis, initiation of antiretroviral treatment, and prevention of HIV transmission in the transgender community (Bartlett et al., 2008). The availability of point-of-care rapid HIV testing technologies has made HIV testing more accessible, with test results available in as few as 20 minutes. Several studies have shown that persons who are aware of their HIV infection reduce risky sexual behaviors and are more likely to prevent HIV transmission (Marks, Crepaz, Senterfitt, & Janssen, 2005; Marks et al., 2009; Weinhardt, Carey, Johnson, & Bickham, 1999).

In 2003 the CDC launched the Advancing HIV Prevention initiative to increase access to HIV testing and diagnosis of HIV infection, particularly in minority populations and underserved communities with high HIV prevalence. In one demonstration project under this initiative, the CDC funded 3 community-based organizations (CBOs), one each in New York City, San Francisco, and Miami Beach, to provide rapid HIV counseling and testing services to transgender persons. HIV testing outcomes, risk behavior, and demographic characteristics of transgender persons served by this demonstration project have been reported elsewhere (Schulden et al., 2008). In this analysis we assessed the project's costs and cost-effectiveness in New York City and San Francisco. Because the cost data were collected during the last phase of project implementation and there was high staff turnover during this phase at the Miami Beach CBO, we did not complete the cost data collection at this site.

METHODS

HIV TESTING PROGRAM

Housing Works and the AIDS Healthcare Foundation offered rapid HIV testing and counseling to transgender persons in New York City and San Francisco between April 2005 and December 2006. Housing Works used two distinct strategies to recruit transgender people to participate: a venue-based outreach approach and a social network approach. Under the venue-based outreach approach, HIV testing was conducted by using a mobile testing van driven to areas of the city, including bars and night clubs, frequented by transgender persons. The mobile van provided testing at various times of the day and night and locations convenient for the transgender community. Under the social network approach, transgender persons who received HIV testing services from Housing Works were asked to identify and refer their transgender associates, sex partners, and drug-using partners for HIV counseling and testing. The transgender associates, in turn, were asked to recruit their associates and sex partners.

The AIDS Healthcare Foundation in San Francisco primarily used a venue-based approach to recruit transgender participants at various venues, including bars and night clubs, but also encouraged participants to refer their transgender acquaintances for testing. Ark of Refuge, a community organization based in San Francisco that provided a variety of social services to the local transgender community, col-

laborated with the AIDS Healthcare Foundation in the design of the project and provision of HIV counseling and testing services.

Participating project sites conducted rapid HIV testing using the OraQuick Advance Rapid HIV-1/2 Antibody Test (sensitivity: 99.3-99.6%, specificity: 99.8-100%; OraSure Technologies, Bethlehem, PA) with oral mucosal transudate specimens or finger-stick whole-blood specimens (Greenwald, Burstein, Pincus, & Branson, 2006). Staff at participating sites provided pretest counseling and posttest risk reduction counseling to all participants who were tested. Oral fluid or whole-blood specimens were collected for confirmatory testing by Western blot from persons who had reactive rapid test results (Greenwald et al., 2006; Schulden et al., 2008). In addition, staff at participating sites administered a brief survey to participants to collect information on demographic characteristics, risk behaviors, and HIV testing history. Because only 7% of total number of transgender persons served by the programs were FTM transgender persons, we combined MTF and FTM data in our analysis (Schulden et al., 2008). The details on recruitment methods and HIV testing protocols are described elsewhere (Schulden et al., 2008).

COSTS AND EFFECTIVENESS

We used testing outcome data for the entire project period and calculated average annual outcomes, including the number of transgender persons tested and the number identified with new HIV diagnoses at each site. We considered our primary outcome to be the number of persons notified of new HIV diagnoses (i.e., the number of persons notified of a new preliminary HIV diagnosis based on rapid testing). Because of the high sensitivity and specificity of the rapid HIV screening tests, we considered a preliminary HIV diagnosis using rapid testing as equivalent to a confirmed HIV diagnosis using conventional testing in our analyses (Farnham, Hutchinson, Sansom, & Branson, 2008).

We estimated annual total program costs for each intervention from a provider's perspective (i.e., excluding participants' costs or productivity losses) and expressed costs in 2007 dollars. We used microcosting methods to estimate the total program cost, including all fixed and variable costs of the intervention; we identified the unit cost and quantity of each program element, such as personnel, facilities, equipment, and materials (Drummond, O'Brien, Stoddart, & Torrance, 1996; Frick, 2009; Gold, Siegel, & Russell, 1996; Haddix, Teutsch, & Corso, 2003; Shrestha, Begley et al., 2009; Shrestha et al., 2008). We used standardized forms to collect cost data, and costs were enumerated based on the staff time spent and materials used during the program start-up phase, durable items used during the project period, and other costs attributable to staff time, supplies, facility space, and utilities incurred in a typical month, during the data collection period. We collected all program costs retrospectively. The program manager or the staff person assigned by the manager completed the standardized cost forms and submitted the completed cost forms to CDC; CDC researchers reviewed the data and then followed up with the programs through conference calls to complete or clarify the data, if needed. The researchers reviewing the costs visited New York City to observe program operations related to the cost data collection, but they did not visit San Francisco because of limited time and budget available for the data collection.

The cost of rapid test kits ($8.69 for each test kit) was based on the bulk purchase price that the CDC pays for test kits (CDC, 2006). The cost of confirmatory Western blot testing ($41.17 for the test kit and processing time) was based on data from a national commercial reference testing laboratory (Farnham et al., 2008). We

TABLE 1. Average Annual Rapid HIV Testing Outcomes and Program Costs in New York City and San Francisco, April 2005–December 2006

	New York City	San Francisco
Persons tested, number	195	106
Persons with HIV-positive rapid test results, number	39	8
Persons notified of new HIV-positive rapid test results, number[a]	35	8
Persons with confirmed new HIV diagnosis, number[b]	34	6
HIV seropositivity, %[c]	18.2	7.3
Costs (in 2007 dollars)		
Total program	125,879	64,323
Per person tested	647	607
Per person notified of new HIV diagnosis	3,563	8,284
Per person with confirmed new HIV diagnosis	3,702	10,125

Note. [a]All persons with a new HIV diagnosis were notified of their rapid test results. In New York City, four transgender persons were previously diagnosed as HIV-positive persons, thus they were excluded in the cost-effectiveness calculation. [b]The programs were able to confirm all but three (New York City: 1, San Francisco: 2) preliminary HIV diagnoses by Western blot, and no false-positive cases were identified. [c]HIV seropositivity (percent) is the proportion of new HIV-positive rapid test results among transgender persons tested.

used a 3% discount rate to amortize the costs (over the useful life) of the mobile van (self-contained testing unit) used to provide venue-based HIV testing in New York City and of computers and other office equipment that were used at both sites (Gold et al., 1996). We included the cost of renting facility space but excluded costs related to research and program evaluation.

The programs provided cash, gift cards and coupons, donated items, or in-kind incentives to participants who completed surveys and HIV testing. In New York City, in-kind incentives (e.g., bags, magazines, or cosmetics) and cash incentives ($20 per person) were provided to transgender persons for each associate they recruited for testing; associates who received an HIV test received only an in-kind incentive. For the venue-based approach used in New York City, persons who completed surveys received food and beverages as in-kind incentives and those who completed the test received $20 per person as a cash incentive. In San Francisco, persons who completed surveys and testing received a $25 gift card and an additional $10 gift card for each transgender person they referred for testing. Although San Francisco did not formally use a network approach for recruitment, 67% of participants referred at least one transgender person for HIV testing.

This project was determined to be a public health program activity provided by the CDC and therefore review by the CDC's institutional review board was not required. All participants provided the programs with written informed consent for HIV testing, as required by state and local laws and regulations.

RESULTS

The annual average number of persons tested and the number (and percentage) of persons notified of new preliminary HIV diagnoses from rapid test results among those tested were 195 and 35 (18.2%) at the New York City site, and 106 and 8 (7.3%) at the San Francisco site (Table 1). During the 2-year project period, the programs were able to confirm all but three (New York City: one, San Francisco:

TABLE 2. Variable and Fixed Cost per Person of Rapid Human Immunodeficiency Virus (HIV) Testing Services in New York City and San Francisco, April 2005–December 2006

	New York City	San Francisco
Variable costs (in 2007 dollars)		
Client recruitment and outreach[a]	33.07	9.18
Setup and breakdown of counseling and testing session	10.90	13.97
Counseling and testing time for a person with:		
HIV-negative result	16.84	18.48
Preliminary positive HIV test result[b]	19.64	28.61
Rapid test kits	8.69	8.69
Specimen collection and delivery for confirmatory test[b]	5.61	13.20
Confirmatory Western blot testing[b]	41.17	41.17
Provision of confirmatory results[b,c]	8.42	11.00
Referral interviewing and linking of an HIV-positive person to care[b]	30.87	21.78
Control kits and running controls	3.72	12.31
Incentives: cash, gift card	21.72	34.40
Incentives: in-kind[d]	38.29	na
Disposable items and supplies	42.93	29.07
Variable cost as a proportion of total cost (percent)	25	22
Fixed cost (in 2007 dollars)		
Program start-up[e]	147.02	65.61
Program planning, administration, and supervision	134.00	207.58
Staff training	3.82	31.81
Data management and quality assurance	41.69	104.74
Transportation to and from mobile testing site	25.09	na
Utilities	24.19	24.37
Facility space	54.77	31.02
Equipment and durable goods	16.87	8.91
Mobile van[f]	101.21	na
Mobile van operation[f]	39.23	na
Fixed as a proportion of total cost (percent)	75	78

Note. [a]Includes determining eligibility and waiting for the client to initiate the test. [b]Expressed as the cost per person with HIV-positive result; all other costs are expressed as the cost per person tested. Preliminary HIV-positive result was confirmed by Western blot. [c]Includes time spent for prevention counseling. [d]In-kind incentives include bags, magazines, cosmetics, food and beverages, and the costs are expressed as the cost per person tested. [e]Includes the staff time spent on recruiter identification and training ($140.76/person tested) for the social network intervention in New York City. [f]Mobile van cost ($101.21/person tested) was annuitized at 3% discount rate, and costs attributable to routine maintenance, insurance, fuel, and parking fees for the mobile van that was used for venue-based testing in New York City. na = not applicable.

two) preliminary HIV diagnoses by Western blot, and no false-positive cases were identified.

The annual cost of the rapid HIV testing program in New York City was $125,879, and the average cost per person notified of a new HIV diagnosis was $3,563. The annual cost of the program in San Francisco was $64,323, and the average cost per person notified of a new HIV diagnosis was $8,284. The average cost per person tested was $647 in New York City and $607 in San Francisco.

Fixed costs made up a large portion of the total program cost at both sites: 75% in New York City and 78% in San Francisco (Table 2). The key components of the fixed costs were program management (planning, administration, and supervision), data management and quality assurance of rapid test kits, program start-up, facility space, and the purchase and operation of testing vans. The costs related to staff time spent on program start-up activities ($147.02 per person tested) and the mobile testing van ($165.53 per person tested for costs attributed to purchase and operation of the van, and transportation to and from mobile testing sites) contributed most to the fixed cost in New York City. The program start-up cost was particularly high (more than twice that in San Francisco) because it included the additional amount of staff time spent identifying and training recruiters. In San Francisco, the costs of program

start-up ($65.61/person tested), program management ($207.58/person tested), and data management ($104.74/person tested) contributed most to the fixed cost.

The costs of kits for testing participants and conducting quality assurance, of incentives, and personnel time spent recruiting clients, counseling, and testing made up most of the variable costs for both sites (see Table 2). The New York City program spent $33.07/person tested and the San Francisco program spent $9.18/person tested to recruit and determine the eligibility of clients. The higher cost to recruit and determine the eligibility of clients in New York City was because of costs for the compensation of four part-time educators ($150.00/week for 39 weeks) who assisted with recruitment and outreach for venue-based testing. The costs of staff time spent on counseling and testing of persons whose test results were negative were $16.84 in New York City and $18.48 in San Francisco; for persons who had preliminary positive test results, they were $19.64 and $28.61, respectively. Variations in these costs were because of differences in the amount of time spent on counseling and testing and staff wages in the two cities (Table 2 and 3). Program staff spent relatively less time counseling and testing clients in San Francisco, but they received hourly wages that were approximately 50% higher than staff in New York City.

The New York City program also incurred higher variable costs by providing both cash and in-kind incentives to the program participants, although most of the in-kind incentives were donated items. In the New York City program, the average cash and in-kind incentive was $60.01/person tested; the additional in-kind incentive in New York City was because of the cost of food and beverages provided to the participants at outreach events. The San Francisco program used gift cards for incentives, and the average amount was $34.40/person tested.

DISCUSSION

The programs in New York City and San Francisco provided rapid HIV testing and counseling services to transgender communities and found a high rate of previously undiagnosed HIV infection by using rapid tests. The proportion of persons tested who had preliminary positive test results were 18.2% and 7.3%, respectively. These rates are within the range reported for transgender populations in the literature, particularly for MTF transgender persons (Herbst et al., 2008), higher than the HIV prevalence rate in the general population of the United States (0.45%), and comparable to other groups at high risk for HIV infection (MSM): 7.2%, African American MSM: 14.1%) (CDC, 2008; Valleroy et al., 2000). Knowledge of HIV serostatus provides HIV-infected persons the opportunity to receive treatment and prevention services and can help prevent further HIV transmission. We assessed the cost of identifying and notifying transgender persons with unrecognized HIV infection that they are HIV infected. The cost per transgender person identified with and notified about a new HIV diagnosis was $3,563 in New York City and $8,284 in San Francisco; and the variation was in part because of differences in the proportion of persons tested who had preliminary positive test results and program start-up and management costs.

Previous studies reported the costs and cost-effectiveness of several HIV counseling and testing strategies, including testing in heath care clinics, correctional facilities, outreach venues, and testing through partner referral and social network referral approaches (Golden et al., 2006; Shrestha et al., 2008; Shrestha, Begley et al., 2009; Shrestha, Sansom et al., 2009; Toomey et al., 1998). In these studies, the

TABLE 3. Counseling and Testing Time in Hours per Transgender Person for Rapid Human Immunodeficiency Virus (HIV) Testing Services in New York City and San Francisco, April 2005–December 2006

	New York City	San Francisco
Counseling and testing a person with:		
Negative HIV test result[a]	1.00	0.78
Preliminary positive HIV test result	1.17	1.08
Specimen collection and delivery for confirmatory testing	0.33	0.50
Provision of confirmatory HIV test result[b]	0.50	0.42
Referral session and linkage to care	0.83	0.92

Note. [a]Includes eligibility determination, specimen collection, paperwork, test processing, and provision of results.
[b]Includes time spent on prevention counseling.

cost of a new HIV diagnosis and notification in different population groups through social networks, partner services, and venue-based testing ranged from $3,835 to $22,243 (the proportion of persons tested who had preliminary positive test results ranged from 0.7% to 21.8%; costs adjusted to 2007 U.S. dollars). Our results are at the lower end of the range reported in these studies.

The program in New York City was cost effective compared with the cost and effectiveness of HIV counseling and testing in a variety of settings, despite the added cost of the mobile testing van. The van provided rapid testing services at different times and locations convenient for transgender persons, a strategy that might have contributed in part to higher case finding.

Both testing programs incurred relatively high fixed costs. New programs often require substantial investment, as fixed costs prior to implementation, to hire and train staff members, build partnerships, develop testing strategies, and identify necessary resources, target populations, and testing venues. The AIDS Healthcare Foundation in San Francisco had a high fixed cost (78% of the total), with the cost of program start-up and management accounting for a substantial share of the fixed cost. Similarly, Housing Works incurred high fixed costs (75% of the total) in part because of the cost of program start-up and management, and to own and operate the mobile van. Total costs could diminish over time because many of the start-up costs are only incurred once.

We evaluated HIV testing services provided to a specific community (transgender persons). By targeting a very specific risk group, such as the transgender community, programs may be more likely to detect undiagnosed HIV. However, the prevalence of undiagnosed HIV among transgender persons in particular locations may decline quickly over time, reducing the number of new HIV diagnoses and increasing the cost per new HIV diagnosis. We used microcosting methods in our analysis and included costs associated with HIV testing services provided to transgender persons only—although both testing programs included outreach to nontransgender sex and drug-using partners. This implies that the staff time and resources not used in testing transgender persons would have been used in other projects. To the extent that the resources were not used in other projects and remained idle, our cost analysis understate the true program cost.

Our analysis has several limitations. We collected program costs retrospectively, over a 1-month period during the 2nd year of project implementation, and projected the monthly costs to estimate the annual total program cost. Although our method provided the average cost, we might have missed some variation in costs over the

project period. We analyzed data from two sites only, thus the results cannot be generalized to other programs. They might, however, provide insight into costs associated with similar programs focused on the transgender population. The primary outcome of our analysis was the cost per person notified of a new HIV diagnosis, which does not take into account the likelihood of linkage to HIV care and cannot be compared with cost per life year or quality-adjusted life year saved.

CONCLUSIONS

The programs in New York City and San Francisco were successful in providing rapid HIV testing and counseling services to transgender communities and identifying a high proportion of new HIV diagnoses among transgender persons tested. We found that the program costs per person notified of a new HIV diagnosis varied by project site, and the variation was largely because of differences in previously undiagnosed HIV infection among persons tested. Our findings should help program managers and health care providers better understand the costs and potential benefits of HIV testing programs directed towards transgender persons. Additionally, our findings provide useful information for program planning and allocation of HIV testing resources to reach transgender persons.

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EMERGENCY DEPARTMENT HIV SCREENING WITH RAPID TESTS: A COST COMPARISON OF ALTERNATIVE MODELS

Angela B. Hutchinson, Paul G. Farnham, Sheryl B. Lyss, Douglas A.E. White, Stephanie L. Sansom, and Bernard M. Branson

Although previous studies have shown that HIV screening in emergency departments (EDs) is feasible, the costs and outcomes of alternative methods of implementing ED screening have not been examined. We compared the costs and outcomes of a model that used the hospital's ED staff to conduct screening, a supplemental staff model that used non-ED staff hired to conduct screening and a hypothetical hybrid model that combined aspects of both approaches. We developed a decision analytic model to estimate the cost per HIV-infected patient identified using alternative ED testing models. The cost per new HIV infection identified was $3,319, $2,084 and $1,850 under the supplemental, existing staff and hybrid models, respectively. Assuming an annual ED census of 50,000 patients, the existing staff model identified 29 more HIV infections than the supplemental model and the hybrid model identified 76 more infections than the existing staff model. Our findings suggest that a hybrid model should be favored over either a supplemental staff or existing staff model in terms of cost per outcome achieved.

More than 1 million persons are infected with HIV in the United States, and 21% of infected persons are unaware they are infected (Centers for Disease Control and Prevention [CDC], 2010). Additionally, approximately 50-70% of new infections are estimated to be from persons who are infected but unaware of their status (Marks, Crepaz, Senterfitt, & Janssen, 2005). Late diagnosis of HIV is also common; approximately 38% of HIV-infected persons receive an AIDS diagnosis within a year of their first positive HIV test (CDC, 2010). The CDC's (2006b) HIV testing recommendations call for routine screening of all patients aged 13-64 in health care settings. The goals of these recommendations are to increase the number of persons

Angela B. Hutchinson, Paul G. Farnham, Sheryl B. Lyss, Stephanie L. Sansom, and Bernard M. Branson are with the Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA, Douglas A.E. White is with the Department of Emergency Medicine, Alameda County Medical Center, Highland Hospital, Oakland, CA.

Address correspondence to Angela B. Hutchinson, PhD, MPH, Division of HIV/AIDS Prevention, National Center for HIV, STD, and TB Prevention, Centers for Disease Control and Prevention, 1600 Clifton Rd. NE, Mail Stop E-46, Atlanta GA 30333; e-mail: ahutchinson@cdc.gov

with HIV who are aware of their status and link infected persons to effective medical care and prevention services. To reduce barriers to testing, the guidelines call for an opt-out approach (i.e., notifying patients that an HIV test will be performed unless they specifically decline) and eliminating the requirement for prevention counseling as a prerequisite for testing.

Emergency departments (EDs) are uniquely positioned to detect undiagnosed HIV infection as recommended by the CDC in (i.e., opt-out testing; CDC, 2006b). EDs often serve as the only source of medical care for disadvantaged populations and have been identified as a key site where missed opportunities to diagnose HIV infection occur (CDC, 2006a). ED patients are also accepting of routine HIV testing in EDs (Hutchinson, Corbie-Smith, Thomas, Mohanan, & del Rio, 2004). Yet HIV screening (i.e., offering testing to all patients, regardless of risks or symptoms of HIV) is infrequently conducted in EDs outside of demonstration projects and research programs (CDC, 2007; Fincher-Mergi et al., 2002). Although routine HIV screening in health care settings, including EDs, has been shown to be cost-effective even in low-prevalence settings (Sanders et al., 2005), the costs and outcomes of alternative methods of ED HIV screening have yet to be analyzed.

EDs have used two primary models for HIV screening. The most common approach uses supplemental staff (i.e., non-ED staff hired specifically to conduct rapid HIV screening in the ED) (CDC, 2007; Lyss et al., 2007; Silva, Glick, Lyss et al., 2007). An alternate approach is to incorporate HIV screening into routine clinical practice utilizing existing staff, typically nurses (del Rio, 2001; White, Scribner, Schulden, Branson, & Heffelfinger, 2009). The purpose of this study is to compare the costs and outcomes of ED staffing models for identifying new HIV infections under an opt-out rapid HIV testing scenario that reflects the CDC's 2006 recommendations and to better understand the sources of efficiency of each model.

METHODS

STUDY DESIGN AND SETTING

We conducted a decision analysis from the provider perspective of the costs and outcomes using existing versus supplemental staff for HIV screening in the ED. For the base case, we used cost and outcome data from two CDC-funded point-of-care rapid HIV screening projects conducted in large urban EDs that collected primary cost data. As a sensitivity analysis, we also evaluated a hybrid model that included features of both the existing and supplemental staffing models. As described below, we modified some of the original data to make clear comparisons between the two base case models and to illustrate the effect of opt-out testing in the 2006 recommendations.

Supplemental staff (health educators) were used in a study that screened for HIV and sexually transmitted diseases in an urban nonprofit hospital ED with an annual census of 44,000 visits in Chicago from April 2003 to August 2004 (Silva et al., 2007). Existing staff (nurses) were employed in an urban nonprofit hospital ED with an annual census of 75,000 visits in Oakland, California, from April 2005 to March 2006 (CDC, 2007; White et al., 2009). Both EDs served populations comprising of predominately minority, low-income, uninsured patients. The cost data collection procedures for the supplemental staff model and institutional review board approvals for both studies are described elsewhere (Silva et al., 2007; White et al., 2009). Although these studies were conducted before the 2006 CDC guidelines were issued

and thus employ an opt-in approach to testing, they provided useful data on HIV screening models. Additionally, we incorporated time-motion estimates on initiating opt-out testing from the hospital that employed the existing staff model of testing (White et al., 2009).

For the supplemental model, two health educators trained in the prevention and testing staffed each testing of HIV and other sexually transmitted diseases (STDs) session from 11 a.m. until 8 p.m. weekdays. They screened ED patients aged 15–54 years for age eligibility using the hospital's electronic data sources and approached potentially eligible patients in their examination rooms (Silva et al., 2007). The health educators could approach patients for testing at any time during their visit. Though opt-in testing with limited prevention counseling was provided in the original study, we assumed an opt-out approach to initiating testing in which the health educators initiated opt-out testing and provided written pretest information that includes a description of the rapid test and concise HIV risk information. The health educators then verified other eligibility criteria in the medical record, ordered the HIV test, and obtained written consent for HIV testing using a streamlined consent form. They collected specimens from each patient in the patient's examination room, tested the specimens in a designated rapid HIV testing area in the ED, and disclosed test results to patients in examination rooms.

For the existing staff model, during the intake process, we assumed the ED triage staff who accessed the patients' electronic medical records as part of triage initiated opt-out testing (though opt-in testing was originally conducted), to all age-eligible patients (≥12 years old) who were not known to be HIV infected. If the patient did not opt out of testing, triage staff checked a box in the electronic medical record to order the HIV test. Testing was available 24 hours a day, 7 days a week. ED staff nurses gathered rapid HIV test supplies and then obtained written consent using a streamlined HIV consent form, provided an informational handout as pretest information, tested specimens in a designated testing area, and disclosed results. These tasks were undertaken in addition to the nurses' usual responsibilities (White et al., 2009).

No pretest prevention counseling or risk assessment was performed in either model. Additionally, both models had similar procedures for reading and recording HIV test results and for confirmatory testing with Western blot after a repeatedly reactive oral fluid rapid test. In both models, the health educator or nurse disclosed reactive test results, provided posttest counseling and handouts on HIV/STD risk reduction, and arranged an appointment with the hospital's infectious disease clinic. In addition, both studies had similar exclusion criteria, including the ability for patients to give informed consent, and the restriction that patients were not being treated for an unstable medical illness or were not known to be HIV infected.

SENSITIVITY ANALYSIS

We created a hypothetical hybrid model that included the most effective method of initiating testing based on the existing staff model's use of an ED triage nurse to initiate testing and the most effective method of completing testing based on the supplemental staff model's use of health educators to conduct testing and disclose results. We also reduced the proportion of persons tested in sensitivity analysis to account for possible differences in hours of testing availability for supplemental staff aspects of the hybrid model.

We conducted sensitivity and threshold analyses on key parameters in the model to test the robustness of the results. For the supplemental staffing model, we used

outcome data from other CDC ED testing programs that used this approach in Chicago; New York; and Los Angeles (CDC, 2007; Lyss et al., 2007). For the existing staff model, we used outcome data from an urgent care center testing program in Atlanta, Georgia (del Rio et al., 2001). We used ED testing program data for sensitivity analysis so that our analyses reflected real world practice. For the hybrid model, we included a sensitivity analysis in which we decreased the probability of being tested by 25% of the base case value.

DATA COLLECTION AND COST PARAMETERS

All cost data were reported in 2009 US dollars. Rapid test kit costs were based on a survey of 45 U.S. hospitals, and Western blot costs were based on a CDC cost analysis (Pinkerton, Bogart, Howerton, Snyder, Becker, et al., 2010; Farnham, Hutchinson, Sansom, & Branson, 2008). We assumed that everyone who tested positive with a rapid test received their results. We excluded facility and other fixed costs from the analysis.

Labor costs were estimated using time-motion data collected for both staffing approaches. Wage rates were based on national wage data. We used hourly rates plus 15% fringe for a medical assistant ($16.28 total) for offering the test at triage, for a registered nurse ($36.79 total) for all other activities for the existing staff model, and for a health educator ($24.52 total) for the supplemental staff model (Bureau of Labor Statistics, 2009). The hybrid model applied labor costs for a medical assistant for describing the test at intake and those for a health educator for all other testing activities. For the existing and supplemental staffing models in the base case analysis, an independent observer measured the time involved in specific tasks related to testing, including approaching patients and offering testing, verifying consent, performing the rapid test, and delivering results. For the supplemental staff model, time and motion cost data were collected on 107 patients of whom 49 consented to screening (Silva et al., 2007). For the purpose of this study, time data were adjusted to include only HIV aspects of the HIV/STD screening program. Therefore these data differ from the cost data in a previously published report (Silva et al., 2007). Cost data for the existing staff model have not been previously reported, although outcomes of the existing staff study can be found elsewhere (CDC, 2007; White et al., 2009). For the existing staff model, time and motion analyses were conducted on 87 patients, 35 of whom consented to HIV testing. Additionally, we used labor cost data for initiating opt-out testing and verifying consent and providing written pretest information from a subsequent evaluation of opt-out testing in this setting. We applied these data to all staffing models to incorporate opt-out testing into the analysis (White et al., 2009). For both models, we made the simplifying assumption that an oral fluid rapid test was conducted and nurses (for the existing staff model) or health educators (for the supplemental staff model) disclosed both negative and preliminary positive test results so that we could better assess differences attributable to the staffing models. For the hybrid model, we applied the costs associated with the aspects of the existing and supplemental staff models that comprise the hybrid model.

DECISION ANALYTIC MODEL

We constructed a simple decision model using TreeAge Pro 2009 (TreeAge Software, Inc., Williamstown, MA) to compare the cost per new HIV diagnosis for the testing approaches. The model included the probabilities of being offered, accepting and receiving an HIV test, and testing positive for HIV infection as well as HIV testing costs (Figure 1, Table 1) and estimates the proportion of persons tested and

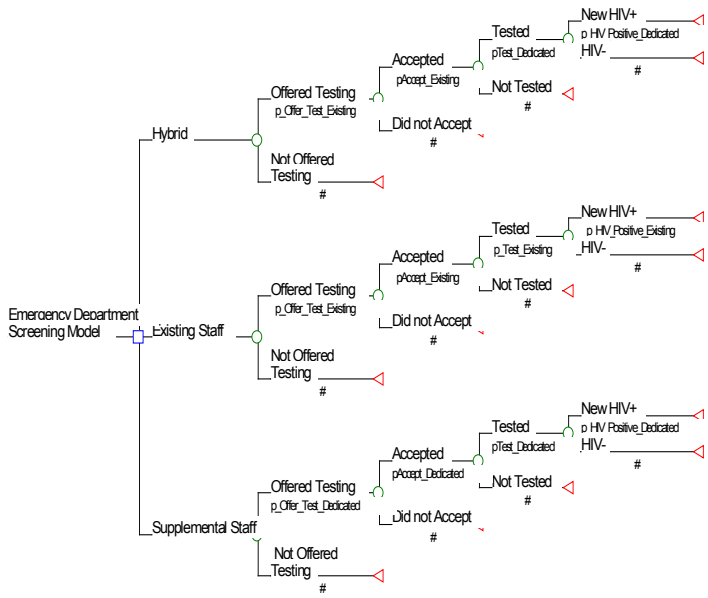

FIGURE1. Emergency Department HIV Screening Decision Model

diagnosed and testing costs for each approach. These estimates were applied to a cohort of 50,000 patients representing an annual ED census of 50,000, which allowed us to estimate total program costs, HIV infections diagnosed, and cost per diagnosed infection. We did not include linkage to care in the model because there was no consistent measure among studies and ascertainment was unreliable because patients might be linked to care outside of the institution in which they were tested. We also did not place a value on persons being informed of a negative HIV test result owing to uncertainty about the effect of HIV counseling and testing on rates of HIV acquisition. Although theory-based, client-centered counseling has been shown to reduce risk behaviors and STD infections among HIV-uninfected persons in an STD clinic setting, that type of time-intensive counseling is not feasible in EDs and could substantially reduce the number of patients tested (Kamb et al., 1998).

EFFECTIVENESS DATA

For the probability of being offered the test, we used the ED census, or the annual number of ED visits, as the denominator. The proportion of visits at which HIV testing was offered was .08 and .48, and the proportion of persons approached that accepted testing was .48 and .53 for the supplemental and existing staff models, respectively. For the supplemental and existing staff models, the proportion of persons who accepted testing who were tested was .99 and .39 (see Table 1) (CDC, 2007; Silva et al., 2007). In the hypothetical hybrid model, the proportions of those that were offered testing, accepted and were tested were estimated as .48, .53, and .99, the parameters for the corresponding parts of the supplemental and existing staff model that constituted the hybrid model. We assumed a 1% HIV seropositivity among those tested that was derived from CDC ED rapid HIV testing demonstration

TABLE 1. Decision Model Input Probabilities for the Cost Comparison of Alternative Models of Emergency Department HIV Screening

	Base Case Analysis			Sensitivity Analysis	
Parameter	Supplemental Staff Model: Chicago[a]	Existing Staff Model: Oakland[b]	Hybrid Model	Supplemental Staff Model: Los Angeles[c] and New York[c]	Existing Staff Model: Atlanta[d]
Probability patient offered testing	0.08	0.48	0.48	.02-0.04	0.49
Probability patient accepts testing	0.48	0.53	0.53	0.84-0.98	0.40
Probability patient tested	0.99	0.39	0.99	0.99-1.00	0.72
HIV prevalence[a,b,c,d]	0.01	0.01		0.006 – 0.03	

Note. [a]Silva et al., 2007. [b]CDC, 2007. [c]del Rio, 2001. [d]CDC, 2007.

projects, which is consistent with CDC recommendations on when to conduct HIV screening in medical settings (CDC, 2006b, 2007).

RESULTS

The overall proportion of the ED census that was tested, assuming an ED census of 50,000, was 3.9% (1,934) in the supplemental model, 9.7% (4,848) in the existing staff model and 24.9% (12,429) in the hypothetical hybrid model (Table 2).

COST OF TESTING

The cost parameters, reported in 2009 U.S. dollars, from the time-motion analyses are listed in Table 3. The per-person total cost of testing was similar among the three staffing models, but labor costs differed. The costs of testing an HIV-uninfected person (approximating the cost per person tested at the ED because 99% of those tested were negative) were $19.62, $18.85, and $17.85, respectively, for the supplemental, existing staff and hybrid models, and the costs per HIV-infected person tested was $70.49, $75.81, and $68.72. Labor costs associated with screening ($.49), verifying eligibility ($.38), and approaching patients in their exam room ($.18) were incurred in the supplemental model but not in the existing staff or hybrid models where HIV testing was integrated into ED triage processes. This made the total per-person costs for uninfected patients lower than in the supplemental model. The costs of the screening and confirmatory tests comprised approximately two thirds of the total costs for uninfected patients and 75% of total costs for infected patients in all three models.

PROGRAM COSTS

Assuming an annual ED census of 50,000 patients for each ED testing model, the total program costs were estimated to be: $101,028 for the existing staff model, $64,200 for the supplemental staff model, and $229,939 for the hybrid model (Table 4). These costs, derived from the decision analysis, were the total costs for an ED testing program with an annual census of 50,000 adjusted for the probabilities of offering, accepting, being tested, and testing positive. The existing staff model identified 29 more cases of HIV infection than the supplemental staff model at an

TABLE 2. Emergency Department (ED) Testing Outcomes Assuming 50,000 Annual ED Visits

Model	Number Offered Testing	Number Accepted	Number Tested
Supplemental staff	4,100	1,960	1,934
Existing staff	23,850	12,593	4,848
Hybrid	23,850	12,593	12,429

annual additional cost of $36,828 or $1,264 per additional case identified. The hybrid model identified 76 more HIV infections than the existing staff model at an additional annual program cost of $128,911, or $1,700 per additional case identified (see Table 4). The average cost per case (total program cost divided by the number of newly identified cases of HIV infection) under the supplemental, existing and hybrid models, respectively, was $3,319, $2,084, and $1,850.

SENSITIVITY ANALYSIS.

Existing and Supplemental Staff Models. The cost per newly identified case of HIV infection was lower for the existing staff model compared with the supplemental staff model over the entire range of effectiveness parameter values (i.e., the probability of offering, accepting, and testing) used in the sensitivity analysis. Additionally, our findings were not sensitive to seropositivity when it was varied simultaneously for both staffing models.

Threshold values, relative to the cost of testing that would make the cost per case of HIV infection identified equal under the existing and supplemental staff models, are unlikely to be observed. For example, the cost per case of HIV identified for these two ED testing models would be equal if, under the existing staff model, the cost of testing an HIV-infected person increased from $75.81 to $1,325 and the cost of testing an HIV-uninfected person increased from $18.85 to $32. Likewise, the cost per case identified would be equal if, under the supplemental staff model, the cost of testing an HIV-uninfected person decreased from $19.62 to $7.00. There was no threshold value, however, for reducing the costs of testing an HIV-infected person. Even if effectiveness parameters for the supplemental staff were increased to their highest values and those for the existing staff model were held constant (for example, supplemental staff offered HIV testing to all patients who then accepted and were tested while costs stayed the same), the existing staff model would have a lower cost per case than the supplemental staffing model.

Hybrid Model. If the probability of getting tested was 74% (25% lower than the base case value) under the hypothetical hybrid model, total costs and effectiveness decreased. Yet the hybrid model still identified 44.7 and 29.2 more HIV infections at an increase of $65,000 and $86,500 in total program costs than the existing and supplemental staff models.

DISCUSSION

Our findings suggest that costs per outcome achieved are more favorable for ED testing programs that use existing staff rather than those that hire supplemental staff. These findings were robust over a range of values observed in other ED HIV-testing

TABLE 3. Time-Motion Cost Detail of Alternate Models of Emergency Department HIV Testing

Supplemental Staff Model†			Existing Staff Model‡			Hybrid Model±		
	Mean Time (h)	$, per patient		Mean Time (h)	$, per patient		Mean Time (h)	$, per patient
Screening eligibility	0.02	0.49	N/A	---	---	N/A	---	---
Chart verify eligibility	0.02	0.38	N/A	---	---	N/A	---	---
Approach	0.01	0.18	N/A	---	---	N/A	---	---
Initiate opt-out testing ^	0.009	0.22	Initiate opt-out testing (triage)*,^	0.009	0.15	Initiate opt-out testing (triage)*,^	0.009	0.15
Verify consent, written test info^	0.01	0.28	Gather supplies	0.01	0.53	Verify consent, written test info^	0.01	0.28
order HIV test	0.03	0.65	Verify consent written test info^	0.03	0.41	Obtain oral swab**	0.006	0.16
Obtain oral swab	0.006	0.16	Obtain oral swab	---	0.23	Transport specimen	0.01	0.34
Transport specimen	0.01	0.34	Transport specimen	0.006	0.49	Oraquick Set-up	0.03	0.74
Oraquick Set-up	0.03	0.74	Oraquick Set up	0.01	0.75	Cost of Rapid test kit		14.94
Cost of Rapid test kit		14.94	Cost of Rapid test kit		14.94	Read & Enter results	0.03	0.80
Read & Enter results	0.03	0.80	Read & enter results	0.03	0.91	Reactive Disclose HIV-	0.02	0.46
Reactive Disclose HIV-	0.02	0.46	Reactive Disclose HIV-	0.02	0.45	Reactive Disclose HIV+	0.24	5.88
Reactive Disclose HIV+	0.24	5.88	Reactive Disclose HIV+	0.01	10.86	Phlebotomy (WB)	0.09	2.24
Phlebotomy (WB)	0.09	2.24	Phlebotomy (WB)	0.30	3.35	Cost of WB kit and labor	43.21	
Cost of WB kit and labor		43.21	Cost of WB kit and labor		43.21			
Total HIV Uninfected		$19.62	Total HIV Uninfected		$18.86	Total HIV Uninfected		$17.85
Total HIV Infected		$70.49	Total HIV Infected		$75.83	Total HIV Infected		$68.72

Note. †For all categories wage rate+ 15% fringe, health educator (hr.) =$24.52. ‡For all categories except describe opt-out testing, wage rate+ 15% fringe, RN (hr.) =$36.79. *Wage rate+ 15% fringe, medical asst. (hr.) = $16.28; includes ordering HIV test electronically. ± For all categories except for describe opt-out testing, wage rate+ 15% fringe, health educator (hr.) =$24.52. ^Labor time estimates derived from opt-out testing in hospital that used existing staff. Wages rates from Bureau of Labor Statistics (2009) National Occupational Employment and Wage Estimates.

TABLE 4. Cost and Outcomes of Alternative ED HIV Screening Models

Staffing Model	Program Cost	Outcomes: HIV Infections Diagnosed*	Cost / Outcomes	Incremental Cost	Incremental Outcomes	Incremental Cost/Outcomes
Supplemental	$ 64,200	19.4	$3,319	--	--	--
Existing	$ 101,028	48.5	$2,084	$36,828	29.1	$1264
Hybrid	$229,939	124.3	$1,850	$128,911	75.8	$1700

Note. Based on an annual ER census of 50,000 and a 1% HIV seropositivity among patients tested

programs. Using all studies included in the base case and sensitivity analyses, the probability that a patient was offered testing was 11 times as high in the studies that used existing staff (48% compared with 4%) and the overall probability that an ED patient would be tested was over four times as high for the studies that used existing staff (12.4%) (CDC, 2007; del Rio et al., 2001) compared with those that used supplemental staff (3.1%) (CDC, 2007; Lyss et al., 2007; Silva et al., 2007). Despite the fact that twice as many patients who accepted testing were actually tested under the supplemental model (98%), compared with the existing model (39%, base case values), we found that increasing the probabilities of offering, accepting, and testing to 100% for the supplemental staff would still not change the results to favor the supplemental model. Hiring additional supplemental staff, increasing the hours of testing availability, or both will not achieve the cost-effectiveness of the existing staff model because existing staff seem better able to integrate HIV testing into ED care.

In addition to differences in overall testing rates between models, our results were also driven by differences in screening costs. In particular, the costs associated with screening and verifying eligibility and approaching the patient for testing were incurred in the supplemental staff model but not in the existing staff or hybrid models. Further, all patients who walk into the emergency department must be separately screened for eligibility under the supplemental model, whereas eligibility is quickly determined during routine ED care under the existing and hybrid models. Thus, initiating testing is considerably more expensive under the supplemental model.

Large numbers of ineligible patients decrease the probability that the test will be offered in both models. In the supplemental staff model, however, ineligible patients incurred costs for the HIV screening program because supplemental staff needed to seek out patients and their records to make an eligibility determination, whereas existing staff could make such determinations during routine ED care.

ED HIV testing programs that use existing staff are likely to be more favorable in terms of cost per outcome achieved than those that use supplemental staff, but there are questions about the feasibility of using existing staff to conduct point-of-care HIV testing (White et al., 2009). Accordingly, we created a hypothetical hybrid model that took advantage of the efficiencies in each staffing strategy by using existing staff for assessing eligibility and offering testing to ED patients at triage and supplemental staff to perform point-of-care rapid testing. This model substantially increased the number of infections diagnosed by approximately 75 to 100 with a relatively small increase in total program costs of $130,000 to $165,000, assuming 50,000 annual ED visits. Total program costs were greater in the hybrid model because of the costs of confirmatory testing and disclosing results for the much larger number of HIV infected persons identified than in the other models. Although the increase in HIV infections identified relative to additional program costs was very favorable when compared to lifetime HIV treatment costs, which are upward of

$350,000, the decision about which program to fund ultimately depends on the ED's budget for HIV testing (Schackman et al., 2006).

In the existing staff model, triage nursing staff demonstrated the ability to offer HIV screening to a large number of eligible patients. Many patients who were offered and agreed to testing, however, were not tested, likely because of the ED staff's competing clinical responsibilities (Freeman, Sattin, Miller, Dias, Wilde, 2009; White et al., 2009). The supplemental staff model was able to offer testing to fewer patients but tested a higher proportion of patients who accepted. The hypothetical hybrid model maximized the likelihood that ED patients were offered and received testing. Even when we reduced the proportion of patients tested under the hybrid model by 25% to account for the possibility that the supplemental staff might not be able to test all the patients who accepted testing, there were large benefits over the existing and supplemental models in terms of additional HIV infections identified and average cost per case identified. Additionally, the hybrid model might be more sustainable because there are fewer staff to train and monitor for quality control.

Although we adapted our time motion data to incorporate an opt-out approach, we did not make changes to our data on test acceptance as it is unclear how much opt-out testing may increase test acceptance. Opt-out testing resulted in higher test acceptance rates in one study (91%) (Freeman et al., 2009) but not another (53%) (Brown et al., 2007) than the routine testing studies that used an opt-in approach in this analysis for which about 50% of persons accept testing (CDC, 2007; Lyss et al., 2007, Silva et al., 2007, White et al., 2009).

This analysis is subject to several important limitations. We did not assess the opportunity cost of using existing staff to conduct testing instead of activities related to the ED's mission of providing acute care. These costs are difficult to value and are not often included in cost-effectiveness analyses. However, because a lower proportion of persons who accepted testing were, in fact, tested under the existing staff model, it is likely that existing staff only provided HIV testing when it did not divert time from other patient care activities. The issue of opportunity costs remains central to the decision about whether to conduct HIV testing and other public health interventions in ED settings (Kelen, 2008). The Institute of Medicine has recommended that EDs not initiate non-core initiatives unless ED care is adequately resourced (Committee on the Future of Emergency Care in the United States Health System, 2006).

Also, we did not attempt to value downstream costs (such as medical care) and benefits (such as HIV transmissions averted) because our goal was primarily to inform decision makers about the potential costs and outcomes of different staffing models. However, considering that 29 more HIV infections would have been identified using the existing staff model and 105 more using the hybrid model in our hypothetical cohort (compared to the supplemental staffing model), it is likely that either the existing staff or hybrid models would be favored over the supplemental model in an analysis that included these distal health outcomes.

We focused on variable costs and did not include fixed or other administrative costs. These costs have been estimated to be 33% of a program's total costs (Silva et al., 2008). Furthermore, we excluded labor costs incurred when supplemental staff might be idle (i.e., not performing HIV testing activities) even though EDs would incur these costs because EDs would employ supplemental staff for the sole purpose of testing. Including these costs would make the supplemental staff model even more costly than the existing staff or hybrid models. Finally, the EDs included in the

analysis were predominantly located in urban public hospitals, which may differ in patient population and staff composition from other hospital EDs.

The hypothetical hybrid model anticipates alternatives to point-of-care rapid testing that are now available because of "rapid result" automated HIV assays. These assays allow ED patients to receive same-day results without incurring the costs associated with point-of-care rapid testing of individual patients (Hoxhaj, Davila, Modi, Kachalia, Malone et al., in press). If existing staff determined eligibility and obtained a specimen for HIV screening during specimen collection for other tests, and laboratory staff (instead of supplemental staff) performed testing with automated systems, cost savings might be achieved without an additional burden on ED staff. This model is likely to be more cost effective than point-of-care rapid testing with either existing or supplemental staff and would identify many more HIV infections because of the higher proportion of ED patients tested. Such an approach would also lower HIV testing costs, compared with point-of-care rapid tests. Evaluations of ED testing programs that have begun to employ this approach are needed.

In summary, we find the supplemental staff model to be least favorable in terms of costs and outcomes. Use of existing staff is more favorable in terms of cost and outcomes but potentially less feasible. A hypothetical hybrid model in which existing staff offer testing and supplemental staff conduct testing would offer advantages over both.

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GENERAL INTERNISTS' BELIEFS, BEHAVIORS, AND PERCEIVED BARRIERS TO ROUTINE HIV SCREENING IN PRIMARY CARE

P. Todd Korthuis, Gail V. Berkenblit, Lynn E. Sullivan, Joseph Cofrancesco Jr., Robert L. Cook, Michael Bass, Philip G. Bashook, Marcia Edison, Steve M. Asch, and James M. Sosman

The Centers for Disease Control and Prevention (CDC) recommends routine HIV screening in primary care but little is known about general internists' views of this practice. We conducted a national, cross-sectional, Internet-based survey of 446 general internists in 2009 regarding their HIV screening behaviors, beliefs, and perceived barriers to routine HIV screening in outpatient internal medicine practices. Internists' awareness of revised CDC guidelines was high (88%), but only 52% had increased HIV testing, 61% offered HIV screening regardless of risk, and a median 2% (range 0-67%) of their patients were tested in the past month. Internists practicing in perceived higher risk communities reported greater HIV screening. Consent requirements were a barrier to screening, particularly for VA providers and those practicing in states with HIV consent statutes inconsistent with CDC guidelines. Interventions that promote HIV screening regardless of risk and streamlined consent requirements will likely increase adoption of routine HIV screening in general medicine practices.

P. Todd Korthuis is with the Departments of Medicine and Public Health and Preventive Medicine, Oregon Health and Science University, Portland, OR. Gail V. Berkenblit and Joseph Cofranciso are with the Department of Medicine. Johns Hopkins University School of Medicine. Baltimore, MD. Lynn E. Sullivan is with the Department of Internal Medicine, Yale University School of Medicine, New Haven, CT. Robert L. Cook is with the Departments of Epidemiology and Medicine, University of Florida, Gainesville. Michael Bass, Philip G. Bashook, and Marcia Edison are with the Department of Medical Education, University of Illinois College of Medicine, Chicago. Steve M. Asch is with the VA Greater Los Angeles Healthcare System, David Geffen School of Medicine at UCLA, Los Angeles. James M. Sosman is with the Department of Medicine, University of Wisconsin School of Medicine and Public Health, Madison.

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Address correspondence to Dr. P. Todd Korthuis, Oregon Health and Science University, 3181 SW Sam Jackson Park Rd., Mail Code L-475, Portland, OR 97239-3098; e-mail: korthuis@ohsu.edu

In September 2006 the Centers for Disease Control and Prevention (CDC) revised guidelines for HIV screening (Branson et al., 2006) recommending routine "opt-out" HIV testing in healthcare settings for all patients aged 13-64 years, rather than testing only those with perceived risk factors. The CDC further recommended streamlined counseling and testing procedures without separate written consent. The revised recommendations recognize that targeted HIV testing and existing prevention programs in the U.S. have failed to change HIV incidence over the past 10 years. In addition, HIV has become in many situations a manageable disease, with better outcomes when diagnosed and treated early (Kitahata et al., 2009). Finally, persons who know they are HIV infected are likely to reduce risky behaviors and decrease transmission of HIV (Marks, Crepaz, Senterfitt, & Janssen, 2005). More than 20% of HIV-infected Americans, however, are unaware that they are HIV-infected (Campsmith, Rhodes, Hall, & Green, 2009; Glynn & Rhodes, 2005). It is therefore imperative to expand and modify testing strategies to identify undiagnosed HIV infection.

Reports of expanded HIV testing in high risk populations in a number of settings suggest that routine HIV screening is feasible and increases HIV testing compared with risk-based screening, including relatively high prevalence inpatient units, emergency departments (Brown et al., 2007; Walensky et al., 2008), sexually transmitted disease (STD) clinics (Stanley, Fraser, & Cox, 2003), and correctional settings (Macgowan et al., 2009). Systemic interventions to promote routine HIV screening in community health centers (Cunningham et al., 2009; Myers, Modica, Dufour, Bernstein, & McNamara, 2009; Weis et al., 2009) and Veteran's Administration (VA) primary care clinics (Anaya et al., 2008; Goetz et al., 2008) may increase routine HIV testing among primary care patients. Only a minority of primary care patients in these studies were tested, however. Many questions remain regarding optimal strategies for implementing CDC-recommended HIV screening guidelines in primary care settings. In addition, little is known about primary care providers' attitudes and behaviors regarding routine HIV testing.

Both provider and health care system characteristics could influence uptake of routine HIV testing. For example, many states have statutes proscribing written and detailed HIV consent and counseling requirements that are inconsistent with revised CDC guidelines (Mahajan, Stemple, Shapiro, King, & Cunningham, 2009). Likewise, primary care providers' adoption of routine HIV screening may be influenced by their perceptions of local HIV prevalence, personal, and practice characteristics. In a systematic review, physicians identified insufficient time, burdensome consent processes, and lack of patient acceptance as key barriers to implementing HIV testing (Burke et al., 2007). In 2006, the Society of General Internal Medicine (SGIM) received a grant from the CDC to assess the implementation of routine HIV screening among outpatient general internists. As teachers of general internal medicine, SGIM members are influential in dissemination of evidence-based practices in primary care.

The purpose of this study was to assess general internists' HIV testing behaviors since publication of revised CDC screening guidelines, beliefs about CDC screening guidelines, and perceived barriers and facilitators for the adoption of CDC screening guidelines in outpatient internal medicine practices. We hypothesized that routine HIV screening has not yet been widely adopted by general internists and that, key provider characteristics (e.g. internists' perception of high community HIV prevalence) and practice characteristics (e.g. state statutes consistent with CDC HIV

screening guidelines) would be associated with increased HIV screening behaviors and favorable beliefs about routine HIV screening.

METHODS

STUDY DESIGN AND PARTICIPANTS

We conducted a cross-sectional internet-based survey from March through May 2009 of general internists who were active and full members of the Society of General Internal Medicine (SGIM) in 2008. SGIM is the largest U.S. professional organization exclusively devoted to general internal medicine practice and education. The SGIM membership list was used to identify all members with MD or DO degrees who had completed internal medicine residency training. SGIM administrative personnel compiled a confidential list of e-mail addresses for these members for survey distribution. Investigators were blinded to member personal identifying information. This study was reviewed and approved by the institutional review board at Oregon Health and Science University. Subject consent was implied by survey participation. Respondents were eligible to be randomly selected to receive one of three $500 gift certificates to an online bookstore upon study completion. Survey respondents were eligible for inclusion in this analysis if they reported currently practicing or supervising trainees in an outpatient primary care setting at least one half day per week. Following data collection, respondent race/ethnicity; gender; full-time vs. part-time status, academic rank; VA affiliation; region, and teaching, administrative, or research roles were compared with those of nonrespondents using the SGIM membership administrative database. Our target population of interest was general internists practicing or supervising trainees in an outpatient general internal medicine clinic.

SURVEY DEVELOPMENT AND MEASURES

Survey domains included provider HIV testing behaviors, beliefs regarding the 2006 revised CDC HIV testing recommendations, barriers and facilitators to implementing routine HIV testing, and provider demographic and practice characteristics. Specific measures are described in the following paragraphs. Survey items were adapted from previous literature about provider barriers to HIV testing (Burke et al., 2007) and SGIM member focus group findings of general internists' attitudes, beliefs, and perceived barriers to HIV testing in general medical practices (Bashook, Edison, Sullivan, Bass, & Sosman, 2008). Survey items were pilot-tested among potentially eligible participants and modified accordingly.

Four measures of HIV testing behaviors included self-report of (a) increased HIV testing since CDC HIV testing recommendations were revised, September 2006 (increased/not increased), (b) HIV testing regardless of risk behaviors (yes/no), (c) reporting that at least 25% of their practice had ever had an HIV test (yes/no), and (d) percentage of patients seen in the last 30 days for whom HIV testing was performed (number of HIV tests performed/number of unique patients seen in last 30 days x 100).

Four measures of HIV testing beliefs included self report that offering HIV testing to all persons aged 13-64 regardless of risk will (a) improve public health in their community (yes/no), (b) benefit their patients (yes/no), and (c) decrease their ability to meet their patients' other medical needs (yes/no). Subjects were also asked to rate how important it is to perform routine HIV screening during a typical patient visit in

their practice on a 5-point scale (1 = not important to 5=essential). Responses were dichotomized as very important or essential versus less than very important.

Measures of potential barriers and facilitators for implementing HIV screening included 9 patient-level barriers (e.g., patient reluctance/refusal), 17 structural/clinic barriers (e.g., lack of reimbursement; informed consent requirements), and 6 facilitators (e.g., better reimbursement for counseling time) adapted from the medical literature and formative focus group data (Bashook et al., 2008; Burke et al., 2007).

We considered participant characteristics as potential independent variables and covariates including respondent gender (male/female), race/ethnicity (White, Asian, other), region (Northeast, Midwest, South, West), years since completion of training (< 10, 10-19, ≥ 20 years), whether or not they supervised trainees—medical students, physician residents, or physician fellows—in an outpatient setting (yes/no), estimated percentage of minority patients in practice (divided into tertiles of 0% to 30%, 31% to 60%, and ≥ 61%), estimated percentage of uninsured in practice (divided into tertiles of ≤ 5%, 6% to 20%, and ≥ 21%), estimated HIV prevalence (<0.1 to correspond with prevalence below which CDC does not recommend routine HIV testing, and 0.1-0.9, 1.0-4.9, and ≥ 5% to correspond with low-, medium-, and high-prevalence populations, respectively [Chou, Huffman, Fu, Smits, & Korthuis, 2005]), and practice setting (university, community, or VA based). Respondents were asked the state in which they practice and classified as practicing in states with HIV counseling and consent statutes consistent, neutral, or inconsistent with revised CDC guidelines based on a previous review of state HIV testing statutes (Mahajan et al., 2009).

DATA COLLECTION

Surveys were collected March through May 2009. An introductory e-mail with a Web link to SurveyMonkey was sent to targeted SGIM members. For those who did not respond within 1 week, a reminder e-mail was sent 1, 2, and 3 weeks after the initial introductory e-mail. Participants were allowed to log on to complete the survey for up to 1 month after the final e-mail was sent. Anonymous survey responses were then downloaded from the SurveyMonkey Web site for analysis following survey closure.

DATA ANALYSIS

The analytic sample for this study consisted of general internists who reported practicing or supervising trainees in an outpatient general internal medicine clinic setting. We report descriptive frequencies of HIV testing behaviors, beliefs, and barriers or facilitators of HIV screening using descriptive statistics appropriate to the distribution of the variable. Associations between hypothesized internists' demographic and practice characteristics and HIV screening behaviors and beliefs were estimated using bivariate and multivariate logistic regression, with the exception of percentage of patients receiving HIV screening in the past 30 days, which was estimated as a continuous variable using multivariate linear regression. We also developed separate multivariate logistic regression models in order to assess potential associations between state HIV consent and counseling statutes and provider identification of consent or counseling issues as barriers to adoption of HIV screening. Covariates were included in multivariate models if they were associated with dependent variables in bivariate analysis ($p < 0.2$) or of *a priori* importance. Using this approach, most covariates were associated with nearly all dependent variables, so we used the same

TABLE 1. General Internist Characteristics (n=446)*

	n (%)
Gender	
Male	193 (47.3)
Female	215 (52.7)
Race/Ethnicity	
White	317 (77.7)
Asian	48 (11.8)
Other	43 (10.5)
Years Since Completion of Training	
< 10 years	151 (37.0)
10-19 years	153 (37.5)
>= 20 years	104 (25.5)
Supervise Trainees	
No	67 (16.0)
Yes	352 (84.0)
Percent Minority Patients	
0-30%	155 (38.0)
31-60%	132 (32.4)
≥ 61%	121 (30.6)
Percent Uninsured Patients	
≤ 5%	188 (46.1)
6-20%	91 (22.3)
≥ 21%	129 (31.6)
Estimated HIV prevalence	
< 0.1%	104 (24.8)
0.1- 0.9%	181 (43.2)
1.0-4.9%	115 (27.6)
>=5%	19 (4.5)
Practice Setting	
University-based	237 (58.1)
Community-based	118 (28.9)
VA-based	53 (13.0)
State Consent Statutes	
Consistent with CDC	120 (29.4)
Neutral with CDC	144 (35.3)
Inconsistent with CDC	144 (35.3)
State Counseling Statutes	
Consistent with CDC	63 (15.4)
Neutral with CDC	238 (58.3)
Inconsistent with CDC	107 (26.2)

Note. *Total n for some characteristics do not sum to 446 due to missing data.

covariates in all models for clarity of presentation. Stata/IC version 11.0 (StataCorp, College Station, Texas) was used to complete all statistical analyses.

RESULTS

PARTICIPANTS

Introductory survey e-mails were initially sent to 1,615 active full members, of which 12 e-mail addresses were inactive and 11 had opted out of receiving any SurveyMonkey surveys. Of 1,592 SGIM members we attempted to contact, 515 (32.4%) responded. Respondents were comparable to nonrespondents in race/ethnicity, full-time status, VA affiliation, region, and teaching and administrative roles, but more likely to be female (48.8% vs. 42.9%, p = .026), assistant professors (50.7% vs. 40.8%, p = .001) and clinician researchers (37.1% vs. 30.8%, p = .013) than nonre-

TABLE 2. Internists' HIV Testing Behaviors and Multivariate Characteristics Associated with Behaviors.

	Increased Testing aOR (95% CI)* (n=430)¶	Test regardless of risk aOR (95% CI)* (n=417)	≥ 25% Patient ever HIV tested aOR (95% CI)* (n=420)	% Patients HIV tested in last 30d β coef (95% CI)† (n=417)
Overall	52.3%	61.1%	37.4%	2% (range 0-66.6%)
Gender				
Male	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
Female	1.61 (1.02, 2.53)	1.22 (0.77, 1.94)	1.80 (1.11, 2.92)	0.97 (-0.94, 2.88)
Yrs since completion of training				
< 10	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
10-19	0.53 (0.32, 0.87)	0.73 (0.45, 1.21)	0.66 (0.40, 1.09)	-0.63 (-2.70, 1.43)
≥ 20	0.95 (0.53, 1.69)	0.98 (0.54, 1.76)	0.40 (0.21, 0.77)	-2.18 (-4.61, 0.24)
Percent minority patients				
0-30%	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
31-60%	1.56 (0.92, 2.65)	0.86 (0.50, 1.47)	2.45 (1.37, 4.36)	0.23 (-1.99, 2.45)
≥ 61%	1.21 (0.65, 2.26)	1.18 (0.62, 2.25)	1.99 (1.03, 3.83)	3.12 (0.51, 5.73)
Percent uninsured patients				
≤ 5%	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
6-20%	0.88 (0.52, 1.51)	0.70 (0.40, 1.22)	0.88 (0.48, 1.60)	-0.60 (-2.33, 2.21)
≥ 21%	1.75 (1.00, 2.68)	1.09 (0.62, 1.92)	1.00 (0.57, 1.77)	1.53 (-0.80, 3.86)
Estimated HIV prevalence				
< 0.1%	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
0.1- 0.9%	1.57 (0.92, 2.69)	1.34 (0.78, 2.31)	1.52 (0.83, 2.80)	1.69 (-0.56, 3.94)
1.0-4.9%	2.55 (1.36, 4.78)	1.91 (1.01, 3.58)	2.43 (1.25, 4.73)	3.09 (0.51, 5.68)
>=5%	0.43 (0.14, 1.29)	2.86 (0.73, 11.2)	11.6 (2.83, 47.3)	9.94 (4.73, 15.2)
Practice Setting				
University-based	1.0 (ref)	1.0 (ref)	1.0 (ref)	0.0 (ref)
Community-based	0.97 (0.59, 1.60)	0.76 (0.46, 1.27)	1.84 (1.09, 3.12)	2.19 (0.09, 4.29)
VA-based	0.40 (0.20, 0.79)	0.45 (0.23, 0.87)	0.83 (0.40, 1.74)	0.89 (-1.91, 3.68)

Note. *aOR=adjusted odds ratio from multivariate logistic regression, adjusted for gender, years since completion of training, percent minority and uninsured patients in practice, estimated community HIV prevalence, and practice setting. † β coef = beta coefficient from multivariate linear regression models, adjusted for gender, years since completion of training, percent minority and uninsured patients in practice, estimated community HIV prevalence, and practice setting. ¶ Differing "n" at top of column for dependent variables is due to missing data.

spondents. Four hundred forty-six respondents (87% of respondents; 28% of SGIM members we attempted to contact) indicated they practiced or supervised trainees in an outpatient general internal medicine clinic (our analytic sample).

General internist characteristics are reported in Table 1. The majority were female (52.7%), of White race/ethnicity (77.7%) and supervised trainees in an outpatient primary care setting (84.0%). They were highly experienced as a group, reporting a median of 12 (range 1-41) years since completion of training. They cared for a median 40% (range 0-100%) minority race/ethnicity patients, and a median 10% uninsured (range 0-100%) patients and had seen a median of 60 (range 0-800) unique patients in the preceding 30 days. Seventy-five percent estimated their local community HIV prevalence to be ≥ 0.1% (the CDC threshold above which routine screening is recommended [Branson et al., 2006]). Thirty-five percent practiced in states with HIV consent statutes that were inconsistent with CDC consent guidelines (see Table 1).

TABLE 3. Internists' HIV Testing Beliefs and Multivariate Characteristics Associated with Beliefs.

I believe routine HIV testing…	Will improve public health aOR (95% CI)*(n = 426)¶	Will benefit my patients aOR (95% CI)* (n = 425)	Will decrease ability to meet other medical needs aOR (95% CI)* (n = 425)	Is very important or essential during a typical visit aOR (95% CI)* (n = 420)
Overall	333 (78.2%)	307 (72.2%)	104 (24.5%)	173 (41.2%)
Gender				
Male	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
Female	1.53 (0.90, 2.62)	1.41 (0.85, 2.33)	0.79 (0.47, 1.31)	1.73 (1.08, 2.75)
Yrs since completion of training				
< 10	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
10-19	0.97 (0.53, 1.78)	0.84 (0.48, 1.46)	1.45 (0.83, 2.52)	0.83 (0.51, 1.37)
≥ 20	0.83 (0.41, 1.57)	0.84 (0.44, 1.59)	0.99 (0.50, 1.93)	1.21 (0.67, 2.19)
Percent minority patients				
0-30%	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
31-60%	0.83 (0.46, 1.51)	0.78 (0.44, 1.40)	1.08 (0.59, 1.97)	1.31 (0.76, 2.26)
≥ 61%	1.26 (0.58, 2.77)	1.28 (0.62, 2.64)	1.27 (0.63, 2.57)	1.61 (0.86, 3.02)
Percent uninsured patients				
≤ 5%	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
6-20%	0.91 (0.49, 1.70)	0.78 (0.44, 1.40)	1.21 (0.65, 2.24)	1.11 (0.63, 1.95)
≥ 21%	1.55 (0.77, 3.11)	1.40 (0.74, 2.65)	0.95 (0.51, 1.77)	1.25 (0.73, 2.15)
Estimated HIV prevalence				
< 0.1%	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
0.1- 0.9%	1.96 (1.10, 3.48)	1.97 (1.14, 3.40)	1.09 (0.59, 2.02)	1.60 (0.90, 2.85)
1.0-4.9%	4.38 (2.01, 9.52)	4.64 (2.25, 9.57)	0.96 (0.47, 1.96)	3.50 (1.83, 6.69)
>=5%	7.72 (0.94, 63.1)	4.91 (1.02, 23.7)	1.13 (0.32 4.01)	3.74 (1.24, 11.3)
Practice Setting				
University-based	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
Community-based	0.67 (0.37, 1.20)	0.80 (0.46, 1.39)	1.00 (0.56, 1.77)	1.02 (0.61, 1.70)
VA-based	0.82 (0.39, 1.75)	0.98 (0.48, 2.00)	2.39 (1.21, 4.75)	2.48 (1.27, 4.84)

Note. *aOR=adjusted odds ratio from multivariate logistic regression, adjusted for gender, years since completion of training, percent minority and uninsured patients in practice, estimated community HIV prevalence, and practice setting. ¶ Differing "n" at top of column for dependent variables is due to missing data.

HIV TESTING BEHAVIORS

Though 375 of 424 respondents with complete awareness item data (88%) reported they were aware of the revised CDC testing guidelines, respondents reported testing only a median 2% (range 0-67%) of the patients they had seen in the previous 30 days (Table 2). Fifty-two percent reported they had increased routine HIV testing since revised CDC guidelines were published; 61% reported that they offered routine HIV screening regardless of HIV risk behaviors, and 37% reported at least 25% of patients in their practice had ever had an HIV test. These data confirm our hypothesis that routine HIV screening has not yet been widely adopted by general internists. In multivariate analysis, estimating one's community HIV prevalence as ≥ 5% was associated with two out of four HIV testing behaviors, including reporting that at least 25% of patients had ever been HIV tested, and that a greater percent of patients had received HIV testing in the last 30 days (see Table 2). Practicing in community-based settings and caring for ≥ 61% minority race/ethnicity patients was

TABLE 4. Barriers and facilitators to adopting routine HIV screening (n = 446).

Barriers to routine HIV screening	***n*** **(%)**
Other priorities at time of visit	330 (79.0)
Lack of time	267 (63.9)
Patient reluctance/refusal	268 (63.9)
Informed consent requirements	204 (48.9)
Pre-test counseling requirements	158 (37.9)
Rapid HIV testing not available in clinic	153 (36.7)
Testing low-risk established patients	146 (35.0)
Language barrier	132 (31.4)
Lack of high risk behaviors	126 (30.0)
Patient discomfort discussing HIV testing	118 (28.1)
Lack of reimbursement	69 (16.5)
Facilitators of routine HIV screening	
Better reimbursement for counseling time	206 (56.1)
Literature about HIV testing to give to patients	193 (52.6)
Information about state & local consent requirements	158 (43.1)
Staff training in counseling services	107 (29.2)
Training in Risk Reduction counseling	68 (18.5)
Information on where to refer patients with high risk behaviors	46 (12.5)

associated with reporting that ≥ 25% of patients had ever been HIV tested and that a greater percentage of patients had received HIV testing in the last 30 days. Female internists were more likely to report having increased HIV screening since publication of revised CDC HIV screening guidelines and that at least 25% of their patients had ever been HIV tested. Compared with university-based providers, VA providers had decreased odds of having increased HIV testing since publication of CDC guidelines and offering testing regardless of risk (see Table 2).

HIV TESTING BELIEFS

Table 3 reports general internists' beliefs regarding routine HIV screening in outpatient internal medicine practices. Seventy-eight percent of respondents believed that routine HIV screening would improve public health in their communities, 72.2% believed it would benefit their patients, 24.5% believed HIV screening would decrease their ability to meet their patients' other medical needs, and 41.2% believed it was very important or essential to perform routine HIV screening during a typical patient visit in their practice. In multivariate analysis, estimating one's community HIV prevalence as ≥ 5% was associated with endorsing two out of four favorable HIV testing beliefs, including the belief that adopting routine HIV screening will benefit patients, and that it is very important or essential to offer HIV screening during a typical patient visit. VA providers were more likely than university providers to believe that HIV screening would decrease their ability to meet their patients' other medical needs but more likely to believe it was very important or essential to

perform routine HIV screening during a typical patient visit in their practice (see Table 3).

BARRIERS AND FACILITATORS OF ADOPTING ROUTINE HIV SCREENING

Table 4 presents internists' perceived barriers to adopting routine HIV screening in their outpatient practices and factors that might facilitate adoption of routine HIV screening. The leading barriers to adopting routine HIV screening were competing priorities at the time of visit (79%), lack of time (63.9%), perceived patient reluctance/refusal (63.9%), and informed consent requirements (48.9%); few internists identified HIV testing reimbursement as a barrier (16.5%). The top potential facilitators for adopting routine HIV screening included receiving better reimbursement for counseling time (56.1%), having literature about HIV screening to give to patients (52.6%), and having information about state and local consent requirements (43.1%).

General internists varied in identifying informed consent requirements as a barrier to adopting routine HIV screening depending on whether they practiced in a state with statutes that were consistent (39.0%), neutral (45.1%) or inconsistent (62.2%) with CDC guidelines ($p < .001$ for variable). In multivariate logistic regression, internists practicing in states with consent statutes that were inconsistent with revised CDC HIV screening guidelines versus consistent (adjustment odds ration [AOR] 2.82, 95% confidence interval [CI]; 1.66, 4.80) and practicing in VA- vs. university-based settings (AOR: 5.61, 95% CI: 2.56, 12.3) were more likely to report HIV consent requirements as a barrier to adopting HIV screening after adjusting for estimated HIV prevalence.

General internists identified HIV pretest counseling as a barrier to adoption of routine HIV screening similarly whether they practiced in states with statutes that were consistent (31.8%), neutral (38.7%), or inconsistent (40.0%) with CDC guidelines ($p = .528$ for variable). In multivariate logistic regression analysis, internists practicing in VA- versus university-based settings (AOR: 3.22, 95% CI: 1.71, 6.06) were more likely to report HIV pretest counseling requirements as a barrier, but not those practicing in states with HIV counseling statutes that were inconsistent vs. consistent with revised CDC HIV screening guidelines (AOR: 1.14, 95% CI: 0.58, 2.26), after adjusting for estimated HIV prevalence.

State consent or counseling statutes were not associated with self-reported HIV screening behaviors or beliefs.

DISCUSSION

The revised CDC HIV screening guidelines strive to routinize HIVscreening to improve care for those with HIV and reduce transmission (Branson et al., 2006). Although awareness of CDC recommendations was high in the current study, the reported proportion of patients ever receiving HIV screening, or screened by general internists in the previous 30 days was low. Nearly 3 years after revised CDC HIV screening guidelines were published, only half of general internists report having increased their HIV screening practices despite recent endorsement of routine HIV screening by the American College of Physicians (Qaseem, Snow, Shekelle, Hopkins, & Owens, 2009).

Our findings of low HIV screening rates among outpatient general internal medicine practices confirm our hypothesis that adoption of routine screening remains low and are consistent with other studies. In a study of community health centers, only 3% of patients were tested in the year prior to the intervention, but that number rose to 19% after implementing a rapid screening protocol (Myers et al., 2009). Similarly, less than 5% of outpatients receive HIV screening in VA facilities (Valdiserri, Nazi, McInnes, Ross, & Kinsinger, 2010; Valdiserri et al., 2008). A multifaceted systems intervention to promote HIV screening in select VA facilities, however, resulted in a sustainable increase in HIV screening rates from 5% to greater than 10% (Goetz et al., 2008; Goetz et al., 2009). Taken together, these findings suggest the need for interventions to increase the uptake of routine HIV screening among general internists.

General internists' HIV screening behaviors and beliefs in the current study remain largely based on perceived risk of HIV in their practices, with 39% of internists reporting they target HIV testing based on HIV risk factors. Perception of increased local HIV prevalence in their communities was associated with greater HIV screening and more favorable beliefs regarding routine HIV screening, confirming our hypothesis that perception of high local prevalence would be associated with testing behaviors and beliefs. Likewise, internists caring for a greater proportion of minority race/ethnicity patients were more likely to report that more than a quarter of their patients had ever been HIV tested but did not differ from internists caring for a low proportion of minority race/ethnicity patients in other testing behaviors or beliefs. Prior to the change in CDC guidelines, one survey of primary care providers reported only 8% of internists offered routine HIV screening "regardless of apparent risk" and those caring for a greater percentage of non-White patients were more likely to report universal screening (Montano et al., 2008). Blacks/African Americans, Latinos/Hispanics, Native Americans/Alaska Natives, and Asian/Pacific Islanders all have a higher proportion of undiagnosed HIV infection compared with Whites, as well as younger age groups (vs. older) and men contracting HIV through heterosexual sex (vs. men who have sex with men) (Campsmith et al., 2009), meriting additional culturally appropriate HIV screening campaigns in these populations. While screening for HIV in higher risk populations may increase yield and cost effectiveness (Chou et al., 2005; Paltiel et al., 2005), though, provider reliance on previous risk based screening strategies misses at least 20% of HIV infections (Campsmith et al., 2009). Expansion of routine HIV screening regardless of perceived HIV risk has increased engagement in HIV treatment and has been associated with decreases in community viral load and HIV transmission (Castel et al., 2010; Das-Douglas et al., 2010). Initiatives that encourage general internists to offer HIV screening regardless of perceived risk would likely contribute to declines in community viral load and HIV transmission.

Female general internists were more likely to report having increased HIV screening since publication of revised CDC HIV screening guidelines and to having ever tested at least 25% of their patients. This is consistent with increased performance of other clinical preventive services by female compared with male providers (Flocke & Gilchrist, 2005). Internists' experience and the percentage of their patients who were uninsured were not associated with any HIV testing behaviors or beliefs.

The majority of general internists in the current study endorse the benefits of HIV screening both on the level of the individual patient and as a public health measure. Gaps were observed, however, between the percentage expressing favorable beliefs about routine HIV screening and increased screening behaviors. Likewise,

the majority of internists reported that they offered HIV testing regardless of risk yet reported the proportion of their patients being HIV tested in the past 30 days was low. Potential explanations for this apparent disconnect might be high rates of patient refusal related to suboptimal discussion of HIV testing or that providers may be performing screening only during certain low frequency office encounters (e.g. new patient evaluations). The current study suggests important barriers to adopting routine HIV screening that likely contribute to this belief-behavior gap and raises new hypotheses for future research.

Leading perceived barriers to adopting routine HIV screening included competing priorities at the time of visit, lack of time, and perceived patient reluctance or refusal of HIV screening. Utilizing support staff for routine HIV screening may free internists to use limited encounter times to address other issues. For example, Anaya et al. demonstrated that nurse-initiated HIV screening doubled HIV screening rates compared with screening offered by the provider during VA primary care clinic visits (Anaya et al., 2008). Although internists in the current study cited perceived patient reluctance or refusal as a barrier to screening, recent studies demonstrate high rates of acceptance by patients. In community health care settings, 67% of patients accepted routine screening (Myers et al., 2009). Likewise, focus group data from a VA setting found patients to be supportive of routine HIV screening (Bokhour, Solomon, Knapp, Asch, & Gifford, 2009), and in a recent survey 73% of veterans accessing their electronic medical records indicated they would be "very likely" to accept an HIV test, if offered (Valdiserri et al., 2010). General internists may be lagging behind the general population in their perception of the acceptability of routine HIV screening.

Informed consent requirements were identified as an important barrier to adopting routine HIV screening, as in previous studies (Burke et al., 2007). One third of surveyed general internists practiced in states with HIV consent statutes that are inconsistent with CDC recommendations for "opt-out" voluntary screening. These internists were more likely to identify consent requirements as a barrier to HIV screening compared with those practicing in states with HIV screening statutes consistent with CDC guidelines. Thirty-four states have changed their laws regarding HIV screening to be consistent with CDC guidelines. Several states with high HIV prevalence, however, still retain written consent requirements. The elimination of written consent has been shown to increase both screening rates and the number of positive tests (Das-Douglas, Zetola, Klausner, & Colfax, 2008). In addition, physician knowledge of their state and local laws may be deficient. Internists in the current study identified the need for information about state and local consent requirements as a potential facilitator for adopting routine HIV screening. The perception of counseling requirements as a barrier did not vary by state and may reflect uncertainty about CDC guidelines and state statutes on counseling. Internists identified having literature about HIV screening as a key facilitator. Availability of standardized patient materials may enhance testing rates.

Although few internists identified lack of reimbursement as a barrier to implementation, improving reimbursement for counseling time was identified as the leading facilitator for increasing adoption of routine HIV testing. This is consistent with prior studies that suggest improving reimbursement could increase adoption of routine HIV testing in primary care (Burke et al., 2007), but further suggests potential uncertainty about CDC guidelines and state counseling statutes.

VA general internists in the current study were less likely than their university-based counterparts to report increased HIV screening and screening regardless of

risk. They were also more likely to identify informed consent requirements as a barrier to adopting routine HIV screening. This suggests that VA policies requiring written informed consent may adversely impact VA internists' views regarding the feasibility of routine HIV screening in that setting. Recent systems-based initiatives have increased HIV screening rates in select VAs (Goetz et al., 2008), but only 9% of veterans accessing their electronic medical records reported they had been offered HIV screening during the past month compared with 83% who had been offered cholesterol screening (Valdiserri et al., 2010). In August 2009, the VA changed its policies to eliminate written HIV consent and scripted pretest and posttest counseling. Our findings suggest this will likely favorably impact screening uptake. Other evidence-based systems interventions demonstrated to improve uptake of HIV screening (Anaya et al., 2008; Goetz et al., 2008) should be broadly adopted throughout the VA health care system.

Our study findings should be interpreted in light of several potential limitations. First, our response rate was relatively low but comparable to other physician surveys (Asch, Connor, Hamilton, & Fox, 2000). Respondent characteristics were generally similar to nonrespondents. Respondents were more likely to be female and have fewer years since completing training; however, both of these variables were associated with a greater percentage of patients ever having been HIV tested. Thus, our study may overestimate SGIM physician member screening behaviors. Second, the general internists surveyed were all members of the SGIM who practiced or supervised trainees in outpatient primary care clinics and thus may not represent the beliefs and behaviors of all general internists; however, they do represent a broad spectrum of university-based, community, and VA practice nationwide. SGIM is a national organization of academic general internists, whose members are likely to be more aware of new evidence-based practices such as routine HIV screening, and influence broader community practices by training internal medicine residents who practice throughout the United States. Finally, HIV screening behaviors were self-reported and may underestimate or overestimate actual HIV screening practices. We consequently included four indicators of HIV screening behaviors in the survey, which were congruent and thus provide some validation of study findings.

In conclusion, the current study finds that general internists' self-reported HIV screening behaviors lag behind their generally favorable beliefs regarding the potential benefits of routine HIV screening. Provider, systems, and policy interventions that promote HIV screening regardless of risk and streamline consent requirements will likely increase adoption of universal routine HIV screening in outpatient general internal medicine practices. Modifying state statutes regarding written informed consent for HIV screening, in particular, may further reduce barriers to implementing routine HIV screening in primary care.

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BARRIERS AND FACILITATORS TO ENHANCING HIV TESTING IN PUBLICLY FUNDED PRIMARY CARE CLINICS: FINDINGS FROM SAN FRANCISCO

Janet J. Myers, Kimberly A. Koester, and Mi-Suk Kang Dufour

Although the City of San Francisco hosts a number of community-based HIV test sites, about 2,500 infected individuals are unaware of their serostatus. Primary medical care settings may provide improved access to HIV testing, particularly if testing programs are well matched to the setting where they are implemented. To plan for expanding testing in these settings, we assessed trends in testing in publicly supported clinics and conducted qualitative interviews to assess current testing practices, linkage to care and partner services practices, and barriers to implementing and/or expanding HIV testing. We presented the results to stakeholders and asked them to help develop recommendations to expand testing and linkage to care. Since 2007, testing has increased in primary care settings although a gap in access remains. Primary care providers endorsed the concept of routine HIV testing but raised concerns and recommended a staged approach to expanding testing. Stakeholders recommended that the city's public health department provide enhanced capacity building assistance and support a new linkage to care and partner services team. This study holds lessons for other jurisdictions seeking to expand HIV testing in primary care.

Despite a robust community-based HIV counseling and testing program, an estimated 15-20% of people who have HIV in San Francisco do not know they are infected (Das-Douglas et al., 2010). Routine HIV testing in medical settings can provide an effective access point to testing for individuals unaware of their status (Dieffenbach & Fauci, 2009). Sometimes used synonymously with the terms *provider-initiated* or *opt-out* testing, the term *routine testing* can be defined as the practice of delivering HIV screening to all patients aged 13-64 in all health care settings (Branson et al, 2003). HIV status awareness is important because, in addition to providing people the information they need to obtain appropriate medical care, when a person be-

Janet J. Myers, Kimberly A. Koester, and Mi-Suk Kang Dufour are with the Center for AIDS Prevention Studies, University of California, San Francisco.

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Address correspondenct to Janet Myers, Associate Professor of Medicine, Center for AIDS Prevention Studies, University of California, San Francisco, 50 Beale St., Suite 1300, San Francisco, CA 94105; e-mail: janet.myers@ucsf.edu

comes aware they are HIV infected, they are likely to reduce their transmission risk behavior (Marks, Crepaz, Senterfitt, & Janssen, 2005).

Although routine testing in clinical settings has considerable potential for improving access to testing and for increasing the number of people who know their HIV status, the practice is not widespread (Voelker, 2009). Implementation challenges include lack of buy-in among primary care providers, lack of access to clinical referral for HIV-infected individuals with newly diagnosed infection, limited funding for equipment related to testing including test kits, lack of access to training for clinical providers on how to perform tests and deliver positive test results, and regulatory barriers such as the requirement that HIV tests be performed only after a patient provides as separate, written consent (Burke et al., 2007; Hanssens, 2007).

One key strategy for overcoming these challenges is to tailor testing efforts to the clinical settings where they will be implemented (Myers, Modica, Bernstein, Kang, & McNamara, 2009). Tailoring requires a data-based understanding of the clinical environments in which testing will occur. With this in mind, we conducted a situational assessment of primary care settings to understand current efforts and how new programs could enhance access to HIV testing. The specific aims of this project were to (a) assess HIV testing practices and barriers and facilitators to expanding routine HIV testing in publicly funded primary care settings in San Francisco (b) to develop recommendations and strategies for expanding routine HIV testing and comprehensive follow-up for HIV-infected patients based on the results of the situational assessment and the input of stakeholders and experts in the field.

METHODS

Investigators from the Center for AIDS Prevention Studies at the University of California, San Francisco (UCSF) performed this study under contract and in collaboration with the San Francisco Department of Public Health (SFDPH). All study procedures were reviewed and approved by the UCSF Committee for Human Research.

SETTING

The SFDPH funds primary medical care in hospital-based clinics in a major medical hospital, San Francisco General Hospital (SFGH), and in 12 community-oriented primary care community health centers (CHCs). SFGH and the CHCs provide services to patients who are generally low-income, ethnically diverse and medically underserved. According to the San Francisco Community Clinic Consortium, in CHCs reporting data in 2007, 64% of patients fell below 100% of the federal poverty level, 65% were people of color and one-fifth was uninsured. Across these settings, in response to the Center for Disease Control and Prevention's (CDC's) 2006 Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health-Care Settings" (Branson et al., 2006), there has been increased interest to offer or expand HIV testing programs, although the scope of current testing and the level of interest in expanding HIV testing remained unknown prior to this study.

METHODS USED FOR ASSESSING TESTING VOLUME

To determine the number and sites where tests were performed, we used data compiled from three sources. First, we assembled frequencies of tests performed during calendar years 2007, 2008 and 2009 by extracting test data from the records

kept by the two labs performing tests for the SFGH-based clinics and the CHCs. We matched the HIV test data to specific clinics by linking individual patients, HIV test orders and clinic site where the patient was seen that same day using the citywide lifetime clinical record (LCR), which contains clinical data on any patient registered to receive care at an SFDPH-funded clinical site. Matches were assembled for each of the three years examined.

To determine the overall patient volume for use in computing percent of patients tested, we used the LCR to find all "active patients" for each clinic. Active patients were defined as those between the ages of 13 and 65 (corresponding to the CDC guidelines) who had at least one visit with a doctor in the prior 24 months at each clinical site. The number of active patients at each clinic was used to calculate an estimate of the average percent of the patient population tested per year. Although it is likely that some tests performed were diagnostic (defined as tests performed because of a clinical presentation suspected to be due to HIV infection), rather than screening (tests performed for reasons other than symptoms or signs of HIV infection), we included all tests to establish a baseline HIV testing rate.

To determine trends in testing across sites over time, we computed the percent change in the number of patients tested in 2008 compared to 2007 and 2009 compared to 2007. We also computed the percentage change in the overall number of tests performed.

METHODS FOR ASSESSING BARRIERS AND FACILITATORS TO EXPANDED TESTING

To explore barriers and facilitators to expanded testing, we conducted qualitative interviews with a sample of key informants representing SFDPH administrators responsible for funding and managing testing programs and medical directors and medical doctors providing care in the hospital-based clinics and the CHCs. Clinic-based respondents were purposefully selected in conjunction with SFDPH administrators based on their role as either decisionmakers within the clinic (i.e., medical directors) and/or were known to be involved in promoting HIV testing within the clinical venue (i.e., medical doctors). During the qualitative interviews, we asked about current practices regarding HIV testing, partner services, and linkage to care, barriers to implementing and/or expanding HIV testing, and strategies to overcome HIV testing barriers. The qualitative interview protocol was developed by UCSF investigators in collaboration with SFDPH collaborators. Most interviews were conducted inperson on-site, although a few were conducted over the telephone because of scheduling difficulties.

METHODS USED TO GENERATE DATA-BASED RECOMMENDATIONS

To develop recommendations on how to best expand access to testing and ensure linkage to medical care and partner services, we convened a consensus meeting of 12 experts and stakeholders. Consensus meeting participants were a subset of qualitative clinic-based respondents and were selected because they demonstrated a commitment of time and energy toward promoting HIV testing that had resulted in an increase in the number of tests conducted in their clinic. The consensus meeting was convened over a half day and the proceedings comprise the third source of data for this study. The consensus meeting was guided by SFDPH's desire to ensure that recommendations for expanding testing and related services resulting from this project were maximally feasible and based on current practices, experiences, community knowledge and expert input.

The first part of the consensus meeting was devoted to presentation and discussion of the results of the study. The second part of the meeting focused on development of recommendations. The expert consultation focused primarily on developing recommendations for city-funded primary care settings, and, secondarily on how recommendations applied to other clinical settings (e.g., for private medical providers, private hospitals, community-based HIV counseling and testing sites, etc.). For this analysis we present only recommendations which were agreed upon by a majority of meeting participants. Experts were also asked to provide feedback on collecting information and tracking it and on ensuring patient confidentiality.

RESULTS

CURRENT TESTING PRACTICES

Testing Volume. Data on annual test volume for 2007, 2008, and 2009 are shown in Table 1. In 2009, there were more than 6,000 tests performed in the hospital-based clinics and the CHCs. Compared with 2007, this figure represents an increase of more than 2,400 tests, or a 58% increase. The overall rate of HIV testing in primary care settings increased from 9.6% in 2007 to 15.1% in 2009. There was considerable variation in the percentage of patients tested across clinical settings. The proportion of patients tested ranged from 1% to 35% in 2007, 2% to 37% in 2008 and 1% to 34% in 2009.

FINDINGS FROM THE KEY INFORMANT INTERVIEWS

Sample. Eighteen in-depth, open-ended key informant interviews were conducted during the qualitative study period (between March and July 2009). Participants included six SFDPH administrators and 12 medical directors or medical doctors working in 9 of the 12 SFDPH-funded medical settings under study.

Current Practices in HIV Testing in Clinical Settings. Across clinics, there was no "standard" practice for incorporating HIV testing into medical care. All medical directors indicated that in principle if a patient requested an HIV test, it would be done. Although no clinic had formally implemented the CDC recommendations to offer a test to every patient between the ages 13 and 64, three clinics had begun to implement procedures to provide HIV testing to all new patients. This change in standard of care was based primarily on a new funding source for HIV tests, a recently enacted city-funded program that provides affordable medical care (including lab tests) to uninsured and underinsured residents called Healthy San Francisco. Most clinics did not have formal HIV testing policies in place for existing patients, although many clinicians reported offering HIV tests on a regular basis to existing patients known to be at risk for HIV including, for example, gay men and other men known to have male sex partners.

Current Practices for Linking Newly Diagnosed Patients Into Care. Linking patients newly diagnosed with HIV into appropriate care settings is a crucial component of routine HIV testing. The majority of medical directors had not had a newly diagnosed patient in the recent past to offer as an example. However, all of the medical directors felt confident that existing policies and procedures would ensure that

TABLE 1. Conventional HIV test volume and proportion of patients tested by SFDPH-funded primary care site, 2007,2008 and 2009

		2007		2008			2009		
	Estimate of Number of Active patients[a]	Number of Tests	% of Patients Tested	Number of Tests	% of Patients Tested	Percentage Change in Number of Tests 2007 to 2008	Number of Tests	% of Patients Tested	Percentage Change in Number of Tests 2007 to 2009
Community Health Centers									
Health Center 1	3,963	178	4.49%	231	5.83%	29.78%	372	9.39%	108.99%
Health Center 2	3,721	209	5.62%	326	8.76%	55.98%	518	13.92%	147.85%
Health Center 3	3,017	217	7.19%	274	9.08%	26.27%	331	10.97%	52.53%
Health Center 4	3,459	171	4.94%	151	4.37%	-11.70%	167	4.83%	-2.34%
Health Center 5	2,883	32	1.11%	43	1.49%	34.38%	116	4.02%	262.50%
Health Center 6	2,843	229	8.05%	334	11.75%	45.85%	422	14.84%	84.28%
Health Center 7	3,414	430	12.60%	611	17.90%	42.09%	1,161	34.01%	170.00%
Health Center 8	4,856	780	16.06%	1,271	26.17%	62.95%	931	19.17%	19.36%
Health Center 9	1,025	45	4.39%	24	2.34%	-46.67%	13	1.27%	-71.11%
Health Center 10	751	42	5.59%	60	7.98%	42.86%	27	3.59%	-35.71%
Health Center 11	155	4	2.58%	3	1.94%	-25.00%	31	20.00%	675.00%
Health Center 12	1,071	377	35.20%	397	37.07%	5.31%	342	31.93%	-9.28%
Hospital-Based Clinics									
Clinic 1	7,811	932	11.93%	1,280	16.39%	37.34%	1,685	21.57%	80.79%
Clinic 2	4,768	538	11.28%	566	11.87%	5.20%	490	10.28%	-8.92%
Total	43,737	4,184	9.56%	5,571	12.73%	33.15%	6,606	15.10%	57.89%

Note. [a]Active patients are estimated for the period of July 2008 to June 2010.

newly diagnosed patients were linked to HIV care either within their medical clinic or in a "sister" clinic with a good reputation for treating people living with HIV.

Current Practices for Offering Partner Services. We asked medical directors to tell us how they managed partner services for patients newly diagnosed with HIV (primarily disclosure of HIV exposure and HIV testing). Some providers offered these services to their patients themselves and invited patients' partners to come to the clinic to be tested. Some preferred that the existing SFDPH partner services team handle partner services. Two medical directors expressed a strong opinion on the topic: They said that they just did not have the resources to offer services related to disclosure and partner testing and felt that these functions were best performed by the specialists on the SFDPH team. In one other case, the clinic had formally established partner services and reported success in working directly with patients rather than having the SFDPH intervene.

BARRIERS AND FACILITATORS TO ENHANCING TESTING

Provider Attitudes. Some provider attitudes presented barriers to expanding testing. In general, the clinicians we interviewed believed that a robust community-based HIV testing infrastructure already existed and that there was a historical demarcation between HIV testing sites and clinical care settings; for these reasons, clinicians said they were not accustomed to ordering HIV tests unless the test was requested by a patient. Some medical directors and providers remained unsure of the added value of offering the test to all patients given what they perceived to be a preexisting high rate of HIV testing. This was especially true in clinics with a reputation for serving the gay community. In clinical settings without a history of treating patients with HIV, there was ambivalence and even some reluctance to increase the offer of tests simply because providers were inexperienced in this area. Some clinicians felt that consent and counseling requirements associated with HIV testing would require too much time; not all clinicians were aware that the California state legislature had passed a statute that removed the requirement for signed, separate informed consent and HIV testing-related counseling. Most medical directors were aware the restrictions were lifted and some--but not all--were aware of the CDC's most recent recommendations.

Other provider attitudes *facilitated* expanding testing or at least had the potential to facilitate it once structural and clinic-level barriers were overcome. For example, medical directors' overwhelmingly felt that it was appropriate and feasible to conduct HIV testing in clinical settings and to promote an increase in HIV testing in accord with CDC recommendations. Medical directors and providers endorsed the concept that offering an HIV test to patients was a sensible health maintenance task; having more patients know their HIV status was perceived as a good clinical practice similar to measuring cholesterol or blood pressure: "We're all for making it routine, like a blood pressure check." Or "it's just tacking on another lab to other labs being drawn." Even for medical directors treating a patient population with just a few patients living with HIV and mostly treating older patients, there was interest in providing the state of the art care for patients and to keep up with the recommendations from the CDC. One particular medical director provided a more nuanced opinion and stated that routine HIV testing was still a new concept and that the best practices were not yet fully conceived.

TABLE 2. CONSENSUS MEETING RECOMMENDATIONS

Strategies for enhancing routine HIV testing

1. Integrate testing into existing health maintenance guidelines. Work with clinical leadership in charge of quality improvement efforts across the health centers to incorporate expectations for HIV testing along side other standards of practice. This can be accomplished by leveraging the expertise of the existing strong team of quality improvement experts.
2. Educate providers about the need for HIV testing in the city; provide them with a refresher course about the epidemiology of HIV, about clinical manifestations, and about the potential for reducing HIV transmission at the community level with population-level viral suppression.
3. Target certain geographic areas first. Either work to develop capacity in health centers where the greatest number of HIV-infected individuals live or use an approach like a mobile testing team that travels to different health centers.
4. Acknowledge that HIV screening is not necessarily about finding new positives; it is about providing what should be a standard of care test. In this context teach providers to frame the reason for testing, even in settings where few positive tests result from screening all patients. In this context, it may be important to streamline the delivery of results so that results are disclosed in ways that are less burdensome to staff in health centers (such as via mail or email).

Linkage and Retention in Care

1. Develop consistent tracking systems for ensuring that appropriate follow-up is associated with all HIV test results.
2. In the case of new positives, it would be best to have a person or team made responsible for following up with the clinic and with the patient to ensure linkage and retention. Because there is an existing model in the city (the linkage to care team working in the San Francisco General Hospital Emergency Department), draw on lessons learned from those providers to set up a similar, but city-wide system.
3. Develop a clinic-level intervention to increase overall awareness of the significance of HIV as a health issue and use the same mechanisms to ensure that clinics know how to link patients who test positive to care.
4. Develop clear definitions and guidelines for linkage to care; for example, ensure that provides know that linkage entails 3 primary care visits in a year, or that there is evidenced that prescriptions are being refilled in patients' charts.

Partner Services

1. Raise awareness about the existing program in place to assist providers with partner disclosure and linkage testing for partners.
2. Clarify how the services of the program are triggered since there is not consistent understanding across health centers about how these services work.
3. If a city-wide linkage to care team is established, it may make the most sense to co-locate the linkage to care and partner services so that linkage to care is ensured for both.

Data/Evaluation

1. Develop systems for tracking all aspects of testing, linkage and retention in care including: 1) whether and when a patient was tested; 2) whether results were delivered; 3) whether a patient was offered and received partner services; 4) whether a patient was linked to HIV care; 5) whether a patient was retained in HI care.
2. Since SFDPH is currently developing a new city-wide electronic medical record system, make sure that HIV data collection is a priority; not only can the new system serve as a complete clinical record, it can also be leveraged to provide clinical reminders regarding testing, delivery of results and linkage to care.
3. Explore new ways to link surveillance datasets (which are distinct from clinical records) to electronic medical records so that when people are lost to follow-up, this can be tracked and acted upon.

Clinic-Level Barriers and Facilitators. Although most providers endorsed the idea of increased HIV testing, they also described challenges they currently faced or anticipated facing when commencing enhanced testing practices. These included addressing the reality of competing clinical priorities that may supersede spending time on health maintenance activities like HIV testing. They said that offering the test requires more than simply "checking off a box on a lab slip" and handing it to a patient; it requires a conversation. Some providers felt they would not be able to add an HIV test to the list of clinical tasks without dropping another service. Others described the challenges they faced when attempting to implement various other testing recommendations, such as diabetes or hepatitis B, and voiced concerns that the clinic staff conducting the majority of the actual labor--offering, charting, educating, following-up—might experience "fatigue" associated with the unending list of demands placed on the clinics to "perform, perform, perform."

Medical directors perceived delivering test results as potentially burdensome because an increase in HIV tests could lead to scheduling appointments solely for the purpose of disclosing results. Medical directors also felt that patient refusal to be tested and a possible increased need for phlebotomy would be a challenge to scaling-up testing. Most medical directors felt that it would be inefficient to send patients for a blood draw strictly for the purposes of an HIV test; they felt, however, that if the lab were simply added on as an additional blood draw, then the additional work for the phlebotomist would be justified. Respondents in some clinics expressed concern over phlebotomy resources, but we found that this was not a concern shared across the clinics.

Policy-Level Barriers and Facilitators. Participants discussed several key factors that facilitated the expansion of HIV testing related to policy-level changes. As previously mentioned, even though not everyone was aware of it, the change in California regulations lifting the lengthy consent and mandatory counseling requirements led to a "blossoming" of HIV tests. Dedicated funding from Healthy San Francisco facilitated higher rates of HIV testing. One of the clinics in Table 1 with the greatest increase in patients tested adopted a "test all new patients" perspective after the program was enacted. However, the central driving facilitator to increase HIV testing was serving an at-risk patient population. Clinics serving men who have sex with men, injection drug users, and homeless patients were more likely to say that testing was a priority--and this enhanced perception of risk was driven to some degree by increased awareness created by the CDC testing recommendations and local HIV risk data compiled by SFDPH.

Developing Consensus Recommendations. Table 2 summarizes the discussion regarding recommendations for enhancing testing, linkage to care, partner services and data capture and use.

Recommendations Regarding Enhancing Testing. Despite an increase over the 3 years studied, the overall recommendation for enhancing HIV testing was to first correct the assumption that testing was uniformly accessible to patients across care settings. Most participants suggested taking a staged approach to enhancing testing. Although the CDC recommendations endorse routine testing of all patients, consensus meeting participants felt that it would be more feasible to incorporate testing into different clinical settings over time, starting with clinics serving patients at high risk for HIV transmission. Identifying potential high-prevalence populations or

subpopulations would provide good evidence for where to begin to enhance testing efforts. Rolling out testing in a health center with enough resources and effort would allow that center to become a leader or standard bearer, bringing lessons learned to its sister health centers. Other ideas for a phased-in approach included offering an HIV test any time a blood draw was required and/or testing only new patients to a clinic as a first step toward enhanced testing.

Recommendations Regarding Linkage to Care. Meeting participants felt that linkage to care is an important issue for two distinct groups of patients: those who test positive for the first time and those who know their HIV status or who have a documented positive test result, but who are not receiving HIV care. Participants overwhelmingly endorsed the idea of disseminating the model used at SFGH to link new positives to care. The model was developed out of SFDPH's decision in May 2006 to move to verbal consent to test for HIV and the signed 2007 California legislation to allow for opt-out HIV testing in medical settings. These two policy changes motivated clinical providers and managers at SFGH to implement expanded testing and to establish a linkage to care *team* to ensure that patients were actively linked to HIV care. Medical directors of the community health centers had some knowledge of the linkage to care team's success and felt that its procedures would be a good model for implementation at a citywide level, if resources became available.

Recommendations Regarding Partner Services. As was the case with the linkage to care services, consensus meeting participants agreed that partner services could be better integrated into the system of care for HIV-infected patients and that the marketing and information sharing about the availability of existing services could be enhanced. Stakeholders felt that co-locating an SFGH-like linkage program with the existing and effective partner services program might make it easier for primary care clinics to work with both. With new capacity (if developed) and with existing services, participants thought that the role of the public health department with regard to partner services could be better clarified, documented and disseminated.

Recommendations Regarding Data Collection and Evaluation. A key limitation of the data available on testing frequency is that the tests are not identified as screening or diagnostic. The general recommendation from the participants was to update the existing clinical and administrative data systems so that they reflect the following data elements in a traceable way: patient identifiers, patient primary health care setting, testing history, tests offered distinguished as routine or diagnostic, tests accepted, test results, and disclosure of results. In the case of newly detected positives, respondents recommended documenting linkage to HIV medical care, partner services offered, medical care received and follow-up care. A suggestion was made to have automatic flags for patients with positive tests who have not received results. Furthermore, point-of-care tests data are poorly captured and the date and result of most recent HIV test may be difficult to locate within the LCR. Although this is currently not a major issue (678 point-of-care tests were administered in one clinic in 2008), the data systems are undergoing transition and this may be an opportunity to change the system to collect to be more clinically useful.

Recommendations Regarding the Fiscal Infrastructure Supporting HIV Testing. Stakeholders agreed that efforts to support, expand and improve financial reimbursement strategies to pay for HIV testing are needed. This effort would signifi-

cantly reduce or remove payment for testing as a barrier to access within CHCs. This project did not examine the cost implications of any of the enhancements. The cost of updating a data system, for example, could be prohibitive in the current environment of limited resources. Developing an enhanced partner linkage mechanism, similar to the successful model in use at SFGH, would be resource intensive as well. Finally, enhancing HIV testing itself will have cost implications. Although California law now mandates that private insurers pay for tests, at the time of this study there was still a gap in payment for those who are not privately insured or were insured through public insurance mechanisms such as Medi-Cal or the state-run Healthy Families program. Fortunately, federal reforms have increased coverage for testing but without considering the cost implications and incorporating guidelines for reimbursement, working to enhance testing may be difficult.

DISCUSSION

Over the 3 years of testing data we analyzed, there was a notable increase in the number of tests and the proportion of patients tested. Nevertheless, there is still a likely gap between the proportions of patients who would be tested if given the opportunity and those who are receiving tests. Other studies have found that the majority of primary care patients—as much as 80%—are willing to be tested (Dietz, Ablah, Reznik, & Robbins 2008; Haukoos, Hopkins, Byyny, & Denver Emergency Department HIV Testing Study Group; 2008; Myers et al., 2009). In this study, in 2009—the year with the greatest number of tests provided—even the highest performing clinic tested just one third of patients. Despite the heartening trend toward increased testing, barriers remain and interventions beyond the issuance of guidelines are needed if testing is to become accessible for all patients in primary care settings in San Francisco and elsewhere.

This study has implications for other jurisdictions seeking to make HIV testing a routine part of primary care. First, interventions may be most effective when they address testing, linkage to care, and partner services as a bundle. The results of this study recommend a multilevel approach to expanding HIV testing combining linkage to care team and partner services so that newly diagnosed patients will be able to receive coordinated and comprehensive services that are timely and patient focused.

Second, our findings support a staged approach to expanding testing across networks of community health centers. Capacity-building assistance (CBA) could be provided to one clinic at a time to support the design and implementation of expanded and tailored testing programs. Data monitoring is an important part of CBA; after a year or more of monitoring in a clinic, the epidemiological data will help determine which clinics should continue to offer HIV testing, based on thresholds in the CDC guidelines. Lab capacity must also be built at the same time to support clinics as they scale up.

Finally, other jurisdictions may benefit from using a similar approach to collecting data and undertaking evaluation of testing. Centralizing and streamlining medical HIV testing data collection and analysis will provide medical sites greater access to their HIV testing data. Data can be used to monitor testing efforts in order to increase the overall number of patients who are tested for HIV, as well as to monitor which medical sites are most successful at finding new HIV positives. This two-tier approach would allow the overall volume of HIV testing to grow and at same

time provide the opportunity to work strategically to increase targeted HIV testing in medical settings that serve populations with high HIV prevalence. As monitoring improves, valuable data will be available for assessing the capacity for HIV testing in medical clinics. These efforts will increase the likelihood that HIV testing will become standard of care.

Our study has some limitations, primarily regarding the results on testing frequency across clinics. Our estimates of the proportion of patients tested are actually low because the patient populations in the clinical settings include individuals with HIV who are being cared for in these settings. Although San Francisco is home to a significant number of people living with HIV, 22% of them are out of care (HIV/AIDS Statistics and Epidemiology Section, 2009) and some receive care in private primary care settings not included in this study, which to some degree reduces the bias which is introduced by including HIV-infected patients treated in the CHCs in the denominators. It is also possible that the views expressed by medical directors of the CHCs do not reflect the feelings or practices of individual providers. However, because most of the medical directors also see patients, their views likely reflect perspectives of those in practice in publicly funded primary care settings. Medical directors may not have felt able to be completely candid with our interviewers; however, because the assessment was conducted by investigators outside of the SFDPH, this bias is likely limited.

More than 4 years after the CDC guidelines for expanded HIV testing were released, primary care sites around the country are working to implement new programs. San Francisco is no exception. However, with near universal endorsement for the concept by community providers and with a health department that is equally motivated to expand access to testing, the time is right to implement HIV testing strategies in medical settings to determine their effectiveness in diagnosing new cases of HIV. Lessons from this effort are already influencing policy and practice in the City and County of San Francisco; these same lessons may hold value for other jurisdictions—particularly those with long-standing community testing programs—as they seek to expand testing in primary care settings.

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AN EVALUATION OF A ROUTINE OPT-OUT RAPID HIV TESTING PROGRAM IN A RHODE ISLAND JAIL

Curt G. Beckwith, Lauri Bazerman, Alexandra H. Cornwall, Emily Patry, Michael Poshkus, Jeannia Fu, and Amy Nunn

There is an increased prevalence of HIV among incarcerated populations. We conducted a rapid HIV testing pilot program using oral specimens at the Rhode Island Department of Corrections (RIDOC) jail. Detainees (N = 1,364) were offered rapid testing upon jail entrance and 98% completed testing. Twelve detainees had reactive rapid tests, one of which was a new HIV diagnosis. To evaluate the program qualitatively, we conducted key informant interviews and focus groups with key stakeholders. There was overwhelming support for the oral fluid rapid HIV test. Correctional staff reported improved inmate processing due to the elimination of phlebotomy required with conventional HIV testing. Delivering negative rapid HIV test results in real-time during the jail intake process remained a challenge but completion of confirmatory testing among those with reactive rapid tests was possible. Rapid HIV testing using oral specimens in the RIDOC jail was feasible and preferred by correctional staff.

BACKGROUND

HIV prevalence among correctional populations is 3.5 times greater than it is for the general population (Maruschak, 2004). Approximately 17% of HIV-positive Americans pass through the correctional system every year (Spaulding et al. 2009). Additionally, racial and ethnic minorities are disproportionately incarcerated and infected with HIV. Respectively, African Americans and Hispanics represent 35% and 18% of the incarcerated population and are approximately 7.5 and 2.5 times more

Curt G. Beckwith and Amy Nunn are with Alpert Medical School of Brown University, Division of Infectious Diseases, Providence, RI. Beckwith is also with the Miriam Hospital, Providence, RI. Lauri Bazerman, Alexandra H. Cornwall, Emily Patry, and Jeannia Fu are with The Miriam Hospital, Providence, RI. Michael Poshkus is with the Rhode Island Department of Corrections, Cranston.

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Address correspondence to Curt G. Beckwith, MD, The Miriam Hospital, 164 Summit Ave., Providence, RI 02906; e-mail: cbeckwith@lifespan.org

likely to be HIV-positive than are Whites (Centers for Disease Control and Prevention [CDC], 2008b; Sabol & Couture, 2008). Persons entering correctional facilities also have increased rates of HIV risk behaviors, particularly substance use (Conklin, Lincoln, Tuthill, 2000; Valera, Epperson, Daniels, Ramaswamy, & Freudenberg, 2009). Correctional facilities therefore provide access to a population with increased prevalence of HIV and increased risk of becoming infected. The CDC (2006, 2009) has recommended routine opt-out HIV testing as part of the medical evaluation of inmates and recently released guidance on HIV testing within correctional facilities.

The correctional system is composed of both jails and prisons. Jails house detainees awaiting trial and inmates serving short sentences, typically less than a year, and serve as the portal of entry to correctional systems. As a result, jails offer important opportunities to deliver HIV testing services to persons passing through the correctional system who might not otherwise have access to health services. However, jails also have rapid turnover rates, with almost one quarter of detainees released within 2 weeks (James, 2004). Rapid HIV testing is an ideal way to reach this transient, high-risk population, and the feasibility of rapid HIV testing in jails has been demonstrated in several studies (Beckwith et al., 2007; Kavasery, Maru, Sylla, Smith, & Altice et al., 2009; MacGowan et al., 2009).

The Rhode Island Department of Corrections (RIDOC) jail has conducted routine opt-out HIV testing using conventional HIV antibody testing since the early 1990s. HIV testing and a tuberculin skin test are completed during the intake medical evaluation within 24 hours of incarceration. Written consent for HIV testing is obtained; however, HIV prevention counseling is not typically completed unless persons test positive. Although this routine HIV testing program has been successful, persons who were released prior to the medical evaluation did not have the opportunity to be tested and persons incarcerated for one week or less were not likely to receive their conventional HIV test result prior to release (Beckwith et al., 2010; Desai, Latta, Spaulding, Rich, & Flanagan, 2002; Beckwith, Rich et al. 2010). In an effort to assess the feasibility of rapid HIV testing within the jail as an alternative testing strategy, a rapid HIV testing pilot program was conducted at the RIDOC. To evaluate the rapid HIV testing pilot program from the institutional perspective, we conducted key informant interviews and focus groups with relevant RIDOC stakeholders. This mixed methods analysis examined the rapid HIV testing pilot program and explored provider and institutional stakeholder perspectives about the rapid HIV testing program.

RAPID HIV TESTING PILOT PROGRAM AT THE RIDOC

The RIDOC is a centralized correctional system for the state that includes one jail and five prison facilities for males, as well as two women's facilities. In 2009 the men's jail facility had approximately 17,000 intakes, of which 54% were White, 25% African American, and 17% Hispanic (RIDOC Planning and Research Unit, 2009). The RIDOC standard HIV testing protocol includes a conventional HIV antibody test using a blood specimen obtained by venipuncture. The HIV antibody test is processed by the state laboratory and results are typically available in 7 to14 days. A RIDOC nurse on the HIV care team notifies persons with positive HIV test results. Individuals are then linked to comprehensive HIV care in the RIDOC and to community care upon release. If a detainee with a positive HIV test is released prior to notification, the Rhode Island Department of Health is notified and an outreach worker is assigned to deliver the test result in the community in conjunction with posttest counseling and referral to HIV care. In a retrospective review of new HIV

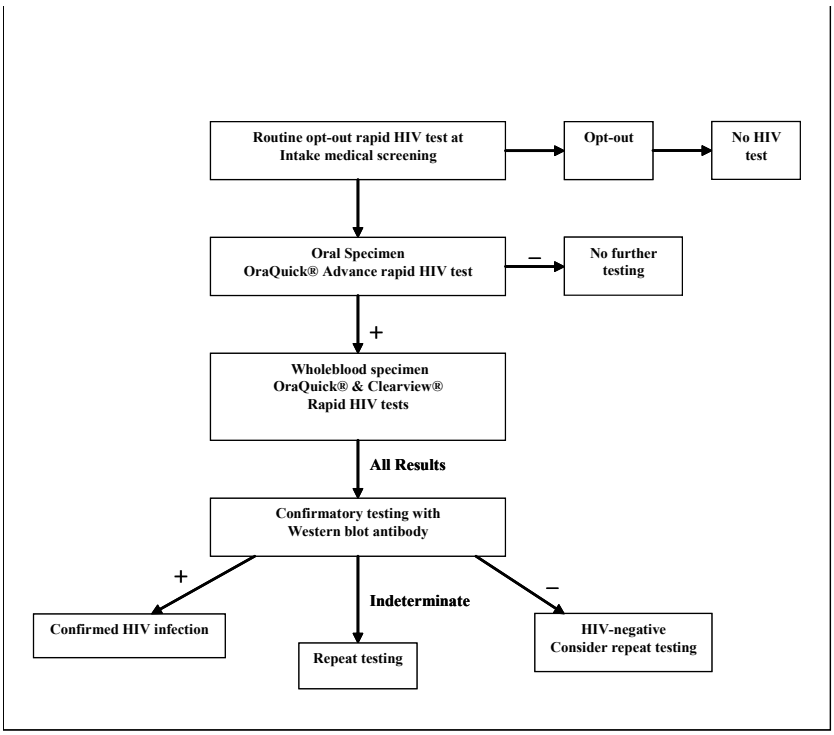

FIGURE 1. Rapid HIV testing algorithm.

diagnoses at the RIDOC from 2000 to 2007, it was determined that 29% of those newly diagnosed were released within 48 hours and 43% were released within 7 days of incarceration. These individuals did not learn of their diagnosis while incarcerated, likely creating a delay in posttest counseling and linkage to HIV care (Beckwith et al., 2010). Similarly, the RIDOC has not been able to consistently deliver negative HIV test results given the rapid turnover of the jailed population.

To ascertain whether rapid HIV testing could successfully be used as an alternative to conventional HIV testing during the intake medical evaluation to identify HIV-infected detainees earlier, we conducted a 12-month clinical pilot program of rapid HIV testing in the men's jail in collaboration with the RIDOC. The goals of the program were to (a) introduce rapid HIV testing to the medical and security staff of the facility, (b) provide education and training for implementation of a rapid HIV testing program, and (c) develop a procedural algorithm for rapid HIV testing during the initial medical evaluation. The pilot program was conducted at the RIDOC from September 2008 to September 2009, during which time rapid HIV testing was conducted one day per week in place of conventional HIV testing. Therefore, persons who completed an intake medical examination on a day when the pilot program was operating were offered rapid instead of conventional HIV testing. Detainees were informed of the rapid HIV testing process and individually provided informed consent for HIV testing. Prevention counseling was not routinely conducted during rapid testing. A rapid testing algorithm (Figure 1) that included the OraQuick Advance HIV 1/2 rapid HIV test as the initial screening test using an oral specimen was utilized. To increase the feasibility of processing multiple rapid tests during the jail commitment process, groups of detainees who consented to test-

ing self-collected oral specimens after receiving appropriate instructions from a staff member. Oral swabs were then processed in a private room. Detainees returned to a general holding area after specimen collection. Detainees who had a reactive rapid test were brought back to the medical clinic by a correctional officer in order to complete confirmatory testing. Detainees were frequently escorted in and out of the general holding area for medical care and other nonmedical purposes so confidentiality was maintained during this process. Using a blood specimen obtained by venipuncture, both the OraQuick Advance HIV 1/2 rapid HIV test and the Clearview HIV 1/2 Stat-Pak rapid tests were processed and the specimen was sent to a state laboratory for confirmatory Western blot antibody testing. This testing algorithm was utilized given previous reports of false positive OraQuick test results with oral specimens (CDC, 2008a). Confirmatory HIV test results were delivered according to the protocol used for conventional HIV testing. Negative rapid HIV test results were not delivered to detainees and this was explained during the explanation of the rapid HIV testing procedures. Detainees were provided with contact information to call a staff member to confirm that their rapid HIV test was negative and they could request results through the RIDOC nursing staff. Rapid HIV test results, and confirmatory test result, were entered into the medical records of all detainees.

METHODS

During the pilot, a study team member collected deidentified data including the number of detainees who were offered rapid HIV testing, the number of detainees completing rapid testing, and the results from HIV testing were recorded. Data from the rapid HIV testing pilot program were entered into an Excel database. The rapid HIV testing pilot program data was summarized to determine the number and proportion of detainees who (a) opted out of testing, (b) completed rapid testing, (c) had a reactive rapid HIV test, (d) had confirmed HIV infection, (e) were newly diagnosed with HIV infection, and (f) tested positive for HIV infection but had previously identified HIV infection.

QUALITATIVE ANALYSIS OF INSTITUTIONAL PERSPECTIVES

In addition, to evaluate the rapid HIV testing pilot from an institutional and health care provider perspective, we conducted key informant interviews and focus groups with relevant RIDOC stakeholders. The Miriam Hospital Institutional Review Board and the Medical Research Advisory Group at the Rhode Island Department of Corrections reviewed and approved the qualitative research protocol. All RIDOC employees participating in an interview or focus group were compensated $25 for their involvement in the qualitative study.

Key Informant Interviews. We identified six key informants, including physicians who provided HIV care to inmates within the RIDOC, senior members of the medical and nursing staff of the RIDOC, and staff members directly involved with the rapid testing program. All key informants agreed to participate in semistructured interviews and provided verbal consent for participation. Interview guides were developed and used to focus the interviews on the following topics related to the rapid HIV testing program: overall opinions and experiences, benefits, challenges, barriers to expansion of the program, linking inmates to HIV care, and perceived roles of

staff in a hypothetical expansion of the rapid HIV testing program. Interviews were conducted in private locations selected by the key informants and lasted between 15 and 60 minutes. Key informant interviews were digitally recorded, with the exception of one participant who did not consent to recording of the interview. In this case, detailed notes were taken by hand throughout the interview and an executive summary was prepared immediately following the discussion.

Focus Group. Correctional staff at the RIDOC jail that included security, medical, and social work staff were invited to participate in a focus group that explored staff experiences with the rapid HIV testing program. Focus group members did not participate in the key-informant interviews. To be eligible for the focus group, participants had to have worked a minimum of two shifts in the jail when the rapid HIV testing was being administered and must have had direct participation in the program or had contact with detainees who were offered rapid HIV testing. A total of six RIDOC staff members participated in the focus group and verbal consent was obtained from all participants. A semistructured agenda was used to lead the discussion. Topics discussed included: overall opinions and experiences related to the rapid HIV testing program; the impact of rapid HIV testing on security, medical evaluation, safety, and inmates; benefits of the rapid HIV testing program; challenges of the rapid HIV testing program and barriers to expansion of the program; linkage to HIV care; and perceived roles of staff in a hypothetical expansion of the rapid HIV testing program. The focus group was conducted in a private room at the RIDOC, lasted for approximately 1 hour, and was digitally recorded.

Data Analysis. All digital recordings were transcribed and an a priori coding scheme was developed. The transcripts were double-coded by two trained researchers to enhance the validity of the results. Discrepancies in coding were discussed and resolved among the analysts. Care was also taken to identify additional themes that emerged during the coding process. As transcripts were coded, illustrative quotes relevant to these themes were extracted, and interviews were reviewed to identify subcategories within the initial coding groups. Thematic data summaries were created in an interactive process as transcripts were coded. Individual codes/themes were further summarized and interpreted following the coding of all transcripts.

RESULTS

SUMMARY OF THE RAPID HIV TESTING PILOT PROGRAM

The results of the rapid HIV testing pilot are summarized in Table 1. A total of 1,364 detainees were offered rapid HIV testing through this pilot program, and 98% accepted and consented to testing. Twelve of the initial rapid HIV tests with oral specimens were reactive. Of these, 11 detainees were later identified as persons with previously known HIV infection. One individual was newly diagnosed with HIV. Additionally, 1 detainee with a nonreactive rapid test later told medical staff he was HIV-positive. Based upon RIDOC medical records, he was confirmed as HIV-infected and as being on highly active antiretroviral therapy. A repeat OraQuick test with an oral specimen was nonreactive, but rapid HIV testing with both the OraQuick and Clearview tests using blood specimens were reactive. Therefore, this was concluded to be a false-negative rapid HIV test related to the oral mucosal transudate specimen.

TABLE 1. Summary of the RIDOC pilot program HIV testing results

Inmates offered testing	N (%)
Number of detainees offered rapid HIV testing	1364
Number (percentage) of detainees who completed rapid HIV testing	1343 (98%)
Mean number of rapid HIV tests completed per testing day	22
Test results	
Number (percentage) of detainees with reactive rapid tests (initial OraQuick® test)	12 (0.8%)
Number of detainees with confirmed HIV infection	12
Number of detainees who disclosed HIV-positive status after rapid testing	8
Number of detainees who had chronic HIV infection but did not disclose their status after HIV testing	3
Number of detainees newly identified as HIV-infected	1
Number of false positive rapid HIV tests	0
Number of false negative rapid HIV tests	1
Number of detainees who disclosed HIV-positive status during medical questionnaire and were not tested	2

INSTITUTIONAL PERSPECTIVES ON THE FEASIBILITY AND ACCEPTABILITY OF THE RAPID HIV TESTING PROGRAM

Overall Experience with the Rapid HIV Testing Program. Key informant interview and focus group participants overwhelmingly reported positive experiences and opinions about rapid HIV testing at the correctional facility and preferred the rapid testing model to the conventional testing program in place on other days of the week. Benefits were identified at the staff, system, and inmate levels and were frequently related to the use of oral specimens in place of standard phlebotomy.

Impact on Inmate Behavior. All correctional staff participants reported noticing a vast improvement in inmate attitudes and cooperation during the jail intake medical evaluation on days when rapid HIV testing was in place. This facilitated obtaining medical histories during the commitment medical evaluation.

> They were definitely a lot more compliant with it; they're more willing to get it done, as opposed to getting their blood drawn.
>
> [There was] less aggression on the inmates' part. They were so thrilled that we weren't drawing blood.
>
> There's a lot better attitude with the HIV swabs. A lot easier to get information from them afterwards because they didn't have such a bad attitude with us. [The rapid HIV test changes] their whole demeanor.

Participants believed inmates preferred the rapid oral swab to the traditional blood tests because it was less invasive. Several participants noted that many detainees were afraid of needles or have difficult venous access that may make the conventional blood draw uncomfortable, painful, or not feasible.

> I would definitely think [inmates prefer] the rapid, because they don't have to have their blood drawn. I would say nine out of ten people say "I hate needles" and tense up and freak out, and some people are really upset by it.

Impact on Safety and Security. Respondents reported a direct correlation between use of the rapid HIV test and increased perceptions of safety among the staff at the jail. Specifically, the use of oral specimens was viewed to be a safer, more efficient, and more acceptable process for HIV testing at the time of commitment.

> [In the] jail population, I think it would be preferable to do the oral. Wherever there's less risk of blood exposures, you don't have to use the lancets, so I think that would be the benefit of that.

Many correctional staff participants reported feeling safer because their risk of needle-stick injuries and exposure to blood borne pathogens were reduced as a result of the rapid test process.

> They [nursing staff] like it a lot because obviously they don't have to worry about getting stuck by needles. The inmates are less agitated. The corrections officers like it for the same reason. Because when they're less agitated, there's less chance that they're going to have a security issue.

> A lot less stress . . . It's safer. You have guys that are so paranoid of needles they're jumping all in the chair and there's a risk of a nurse being stuck.

Impact on Workflow and Workload. Almost all participants reported that the rapid HIV test streamlined the commitment process, was less staff intensive, and reduced workload. Particularly, having groups of detainees swab their own mouths simultaneously made the commitment process faster and more time efficient.

> From what I've heard from the staff nurses that were actually on the ground doing it, it kind of streamlined the process. Because instead of having the inmate sit there and get their blood drawn, now it was getting 10, I think it was approximately 10-12 inmates lined up. You could swab their mouths and then once the test was developed, they're done. You know, in that amount of time it takes you to do two or three inmates of drawing their blood. So it actually got through quicker.

One nurse specifically noted the benefit of the rapid HIV test using oral specimens as compared with rapid tests that rely on whole blood collected through finger sticks.

> I know it's probably negligible in the grand scheme of time, but if she's got to process 30 guys, it's easier to let 30 guys swab themselves and just run down the line and collect the swabs than have to sit there and finger stick every person.

Another participant discussed how using the oral rapid test eliminated the need for staff to count and secure needles before and after shifts, thereby reducing their workload.

> I think that it may be less of a responsibility for them [the security staff] to supervise the sharps, the needles, the movement there.

Focus group participants also reported experiencing a learning curve over the course of the pilot program in regards to how to best prepare for and administer the rapid HIV tests in the commitment environment.

> It worked well. I think we did enough to make it work well. Like, at first it was a learning curve for all of us. Like, how should we do this? And we tried to just do a few at a time. It was like nope, it works better if we batch them . . . We just, we had it down to

> a science. I think what we did was good. It worked well.

Benefits and Challenges Related to HIV Test Result Delivery. All respondents agreed that immediate access to HIV test results is the key advantage and benefit of a rapid HIV testing program within jails. Detainees with reactive tests could complete confirmatory testing and be linked to appropriate HIV care and discharge planning services more expeditiously than when completing conventional HIV testing. This was noted as a distinct benefit in the jail setting, where time of release can be unpredictable and inmates may leave the correctional facility within hours or days, prior to the availability of conventional HIV test results.

> We might get 40 [new detainees] tonight, and tomorrow maybe only 20 of them are still here.
>
> Even if their treatment isn't initiated at the [RIDOC], at least they're given the opportunity to say, "This is the clinic you should go to." So I think their care out in the community is better also; they could be walking around positive and not even know it.
>
> Obviously the sooner you deliver the results the less chance that somebody would get out and not get, not have, a follow-up.

Multiple respondents discussed the context of the commitment process and the competing issues detainees are faced with during that time. The delivery of positive results within hours of incarceration was seen as an additional stressor to detainees during a chaotic period, but this potential risk was perceived to be outweighed by the benefit of completing the testing and result delivery process.

> Ideally, [results should be] delivered right away, once they're done. Not so much because that's the optimal time to give that news. In fact, it may not be necessarily the optimal time, if they've just been incarcerated . . . [they] may be upset about other things. They may be distraught, they may not be thinking clearly, they may be in withdrawal, they may have . . . uncontrolled psychiatric disease. So it may not be the optimal time, but you know, to me, much more important is that the test actually gets done and the information gets communicated. So rather than focusing on when would be the ideal time, the ideal is anything but, you know, missing them. 'Cause I think that's a much more important problem.

Participants also expressed system-level considerations related to result delivery. One respondent noted:

> One visit within corrections is inherently more efficient than two visits, because a visit in corrections involves moving people. And moving people in corrections takes a lot of time. Or it involves going through facilities, and going through facilities takes a lot of time. So movement of both professional personnel and inmates within corrections is inherently inefficient.

There was no consensus among respondents regarding which staff members should be responsible for delivery of test results. Responses to that line of questioning ranged from lay persons with training to nursing or social work staff, health educators, the HIV care team, or physicians. Explaining why he believed nursing staff or social workers should be responsible for result delivery, one respondent commented that Physicians aren't there as regularly, as frequently as the . . . nursing staff. However, nursing personnel felt that physicians or the HIV care team at the RIDOC should provide results because [detainees] have a lot of questions that we can't answer."

> I've had nurses that have released blood test results and it turns into a nightmare because you don't have all the information . . .Telling someone they have a positive HIV test: "How long am I going to live? What kind of medication should I take? How long do you think I've had it?" You can't answer any of those questions. So if you're not able to answer them, we shouldn't be giving out any of those results. That's why it's really in the realm of the physician I believe.

Other comments focused how the person delivering results can impact the experience of detainees.

> The important thing is [results have] to be given by somebody that's already integrated in the system. If you choose the perfect person that's in the community that's got just the right approach but they can only do it only 2 hours a day, which is what a lot of systems do, you in essence deny the vast majority of individuals the opportunity to get an HIV test result.

> Confidentiality concerns are always an issue at intake, especially if there is potentially one person designated as giving negative results and someone else is positive results. That's why I think it should probably be the same person who's doing both so that they're not just identified as the HIV person.

Incorporation of Counseling in the Rapid HIV Testing Program. There was also variability in opinions expressed about the extent of counseling that should be provided in the context of a rapid HIV testing program and the methods through which pretest and posttest counseling and HIV education should be conducted. During this rapid testing pilot, prevention counseling was not delivered during the testing procedure but most respondents commented on the need and opportunity for counseling of not only HIV-infected persons, but also those with negative test results.

> It would be their opportunity to say "Okay, you're negative now, you need to remain negative, and this is what you can do to remain negative. You don't share needles." And some kind of education like that. Because there's always that concern when you say "you're negative," it's like "Oh cool, I can just keep doing what I was doing." No, not necessarily. You know, you just dodged a bullet, this time.

Even though desire for the incorporation of HIV education and individualized counseling was expressed by many participants, there were mixed perceptions of the feasibility of both pretest and posttest counseling during the commitment process and it was recognized that counseling all persons may be a barrier to testing.

> I would like in a perfect world to sit down and do one-on-one prevention counseling and prevention case management with everybody that's negative, but it's not feasible. People that are positive need intensive services immediately. People that are negative, it needs to be done in a relatively efficient fashion that's feasible and which can be integrated in. And the question is how do you do that? And that is, that is what's really challenging.

The timing of counseling relative to testing and intake was frequently mentioned and debated. Although the advantages of providing counseling immediately after entry include the opportunity to engage most detainees, several participants expressed barriers to conducting counseling at that time. Speaking of the experience of inmates, one respondent commented:

> They've had a bad day. Let's appreciate this. Whatever the crime was, they've had a bad day. Not the time to sit down in a room and let's talk for an hour about, you know, preventing HIV in the community—they are not going to listen to you.

Expansion of Rapid HIV Testing Upon Jail Entry. The positive experiences and opinions expressed for the rapid HIV testing pilot program led most respondents to voice support for expanding rapid HIV testing using oral specimens in place of conventional HIV testing upon jail entry. Several participants explained that rapid HIV testing has the potential to be more efficient within the correctional setting, but multiple participants expressed that in order for the rapid HIV testing program to be sustainable, the correctional facility would need to independently administer the program. Several nurses discussed their desire for expansion of the program:

> We like it. We wanted it 7 days a week. We did.
>
> There was nothing bad about [rapid testing] at all. It was just a way to figure out a way to implement it so the RIDOC would accept it so we could actually get it in here as something that we normally use, not just a test case.

Another respondent discussed the need for the medical staff and administration at the correctional facility to support the program.

> If it can be done rapidly and easily, I think you can get buy in to the medical staff to do it themselves. If it's not done rapidly and easily and they don't like how it's being done, they won't do it. And you need leadership too.

There also was no consensus on the roles that various categories of staff would play in an expanded rapid HIV testing program, particularly related to coordination and distribution of tests, and result delivery and counseling. However, many participants also noted that additional training related to HIV infection, testing procedures, and counseling would be necessary for the correctional facility staff to operate the program.

Barriers to expanding rapid HIV testing at commitment reported by respondents included both inmate-level and institutional-level concerns. Multiple respondents mentioned the hectic period of commitment, and the desire to minimize additional stressors and maximize attention to the HIV testing and counseling process. Two participants noted that the physical structure of the intake facility made testing difficult owing to space limitations; and multiple respondents expressed concerns surrounding confidentiality given persons are processed through the intake medical evaluation in groups. As one respondent discussed:

> I think the biggest barrier [to expansion] is just the test result delivery. But actual procedural stuff, I think it could probably just very well happen and it wouldn't be a big deal.

The most frequently described institutional hurdles were the resources, both financial and human, required to expand the rapid HIV testing program within the facility and include HIV testing, result delivery and counseling, and record keeping and quality assurance.

> The major issue is financial. I think the . . . administrators, nursing, medical personnel that I've talked to . . . understand that this is an important service that should be done, and . . . are happy to do it as long as they have the resources, the time, the personnel.

DISCUSSION

We successfully conducted a rapid HIV testing pilot program within the RIDOC jail. Ninety-eight percent of the persons who presented for the initial medical intake and were offered rapid HIV testing completed testing. This testing rate is significantly higher than rates of conventional HIV testing completed at the RIDOC jail and rates observed in other jail facilities that offer rapid HIV testing. A recent analysis of the conventional HIV testing program at the RIDOC demonstrated that an estimated 70-80% of males admitted to the jail completed conventional HIV testing (Beckwith et al., 2010). A recent study that examined rapid HIV testing offered during jail intake in New York City reported that 69% of admissions completed testing (Begier et al., 2010). The high testing rate observed during this rapid HIV testing program may be attributable to a longstanding culture and commitment to HIV testing within the RIDOC jail. Therefore, persons who have previously been incarcerated at the RIDOC are likely to be familiar with the HIV testing procedures upon entrance to the jail. Moreover, rapid HIV testing using an oral swab further reduced barriers to completing HIV testing by eliminating venipuncture from the medical evaluation.

Only one detainee, representing 0.07% of those tested, was newly diagnosed with HIV infection during the pilot program. This rate of new HIV diagnoses is below the threshold of 0.1%, which is recommended by the CDC as the minimum rate to justify routine opt-out HIV testing for a medical setting (CDC, 2006). However, this was a limited pilot study that was not designed to estimate the true diagnosis rate of newly identified HIV infections. A more comprehensive review of the RIDOC HIV testing program supports routine opt-out HIV testing in this setting (Beckwith et al., 2010). In addition, providing testing and linkage to care services to individuals who may otherwise have no access to health services by routinely offering rapid HIV testing upon entrance to jail can have benefits beyond identifying persons with previously unrecognized infection. As observed in this program, some persons with known chronic HIV infection chose not to disclose their HIV-positive status at the time rapid HIV testing was offered. Eight individuals completed rapid testing and then disclosed their infection to RIDOC medical staff. Three individuals completed rapid testing and confirmatory testing and were identified as persons with known HIV infection who had been incarcerated at the RIDOC previously. In these cases, the rapid HIV test enabled the medical staff to identify these persons earlier in the incarceration than would have been possible if these persons did not disclose their HIV-positive status and completed conventional HIV testing. Although linkage to HIV care was not assessed during this program, early identification of HIV-infected detainees provides an opportunity for the medical staff to assess whether a detainee is engaged in HIV care in the community. Persons who are not engaged in care can receive dedicated case-management services designed to facilitate linkage to community HIV care and other supportive services prior to their release. This is an often unrecognized benefit of routine rapid HIV testing programs for jailed populations.

The evaluation of the rapid HIV testing program revealed that rapid HIV testing was almost uniformly preferred over conventional testing among key stakeholders and correctional staff. All key informants and focus group participants agreed that oral specimen rapid HIV testing was preferred over testing methods that require phlebotomy. Moreover, providers commented that inmates also overwhelmingly preferred rapid testing over venipuncture. Staff believed that collecting oral specimens would markedly diminish the risk of needle-stick injuries and exposure to bloodborne pathogens during HIV testing. While confirmatory testing with a blood speci-

men is still needed when there is a reactive rapid HIV test, based upon the data from this pilot program, the number of persons that require phlebotomy is substantially decreased when the initial HIV test is conducted with an oral specimen. In addition, using oral specimens increased the cooperation of the detainees undergoing HIV testing, which led to a perception of increased safety among the correctional staff and facilitated the process of taking medical histories. Providers also highlighted reduced clinical workload associated with collecting and processing samples from multiple detainees simultaneously. While this method appeared to maximize feasibility during the busy jail intake, it is necessary to maintain the confidentiality of rapid HIV test results and to protect the autonomy of the detainee when HIV testing is voluntary. With the reduction of phlebotomy and specimen processing, rapid HIV testing may also provide a cost savings compared to conventional testing but further research is needed.

The performance of the OraQuick rapid HIV test using an oral specimen was consistent with the reported sensitivity and specificity in a previous report (Delaney et al., 2006). We did not have any false positive test results, which helped alleviate concerns with using oral rather than blood specimens. However, we did have one false negative rapid test that was processed with an oral specimen in a detainee with well-controlled HIV who was taking highly active antiretroviral therapy (HAART). False negative rapid HIV tests have been reported among individuals on HAART due to seroreversion of anti-gp41 antibody (O'Connell et al., 2003).

During the pilot program, we were not able to deliver rapid HIV test results immediately to detainees. Detainees were informed that unless notified, they could assume that their rapid HIV test was negative and detainees had the option of calling a staff member to confirm the negative result or request the result through nursing. Persons with reactive rapid HIV test results were notified within 24 hours of testing by the HIV clinical nurse. Future implementation research should examine the feasibility of real-time result delivery in order to reduce the number of persons who are released from jail prior to learning of their test result. Evaluation participants agreed that both reactive and nonreactive rapid test results ideally should be delivered to detainees, but there was not consensus on who should deliver test results and when and where these results should be delivered. Jail medical staff members were resistant to assume responsibility for delivering rapid HIV test results during the intake process, yet there was a suggestion that further training with respect to HIV testing may facilitate the delivery of rapid HIV test results in real time.

There were several limitations to this research. The pilot program was designed to be a clinical service provided within the RIDOC, not a research study; therefore, limited data was available on the jailed population that completed rapid HIV testing. The qualitative findings are based on the experiences, opinions, and knowledge of the evaluation participants. Although these individuals were recruited because they were key stakeholders and staff directly involved in the implementation of the rapid HIV testing pilot program, their views may not be representative of all correctional staff at the RIDOC or in other settings. In addition, social desirability bias may have led some respondents to self-censor their actual views, especially in the group setting. The rapid HIV testing pilot program was only conducted in a male jail facility, so we were unable to evaluate rapid HIV testing among incarcerated women. As mentioned, this study did not evaluate inmate perspectives, which is critical to developing acceptable HIV testing programs within correctional facilities, however, the high acceptance rate of testing during this program is suggestive that inmates support rapid testing. Additionally, further research in facilities with

high HIV prevalence is needed to assess if rapid HIV testing in jails results in faster linkage to HIV care both inside the correctional facility and in the community after release compared to conventional HIV testing.

Offering HIV testing in correctional settings is a public health opportunity, and can expand HIV testing among high-risk populations who otherwise may have very limited access to health services. The vast majority of persons entering the RIDOC jail at the time of the rapid HIV testing pilot program completed testing during the intake medical evaluation. Rapid HIV testing was feasible and was preferred by the correctional health care providers and staff compared to conventional HIV testing. The use of rapid HIV testing with oral specimens can streamline HIV testing procedures during intake and can foster safety within the jail by reducing the need for syringes. Delivering rapid test results to detainees in real time remained a challenge. Furthermore, optimal methods of HIV counseling for high-risk persons incarcerated in jail need to be developed and successfully integrated into HIV testing procedures. We believe these findings and future work among jailed populations will contribute to the improved delivery of HIV services to one of our nation's most disenfranchised populations.

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ITERATIVE EVALUATION IN A MOBILE COUNSELING AND TESTING PROGRAM TO REACH PEOPLE OF COLOR AT RISK FOR HIV—NEW STRATEGIES IMPROVE PROGRAM ACCEPTABILITY, EFFECTIVENESS, AND EVALUATION CAPABILITIES

Freya Spielberg, Ann Kurth, William Reidy, Teka McKnight, Wame Dikobe, and Charles Wilson

This article highlights findings from an evaluation that explored the impact of mobile versus clinic-based testing, rapid versus central-lab based testing, incentives for testing, and the use of a computer counseling program to guide counseling and automate evaluation in a mobile program reaching people of color at risk for HIV. The program's results show that an increased focus on mobile outreach using rapid testing, incentives and health information technology tools may improve program acceptability, quality, productivity and timeliness of reports. This article describes program design decisions based on continuous quality assessment efforts. It also examines the impact of the Computer Assessment and Risk Reduction Education computer tool on HIV testing rates, staff perception of counseling quality, program productivity, and on the timeliness of evaluation reports. The article concludes with a discussion of implications for programmatic responses to the Centers for Disease Control and Prevention's HIV testing recommendations.

In 2002 a Seattle, Washington, community-based organization, People of Color Against AIDS Network (POCAAN), began the Health on Wheels (HOW) mobile HIV counseling and testing program, in collaboration with a volunteer medical director from the University of Washington Department of Family Medicine and with technical support provided by Public Health Seattle and King County. The Centers for Disease Control and Prevention (CDC) funded the program for 3 years as a demonstration project, and the King County Council subsequently funded it for an additional 2 years. The program design recognized that people of color at risk for HIV need convenient, culturally appropriate access to HIV counseling, testing and

Freya Spielberg is with RTI International, San Francisco, CA. Ann Kurth is with New York University, College of Nursing, New York, NY. William Reidy is with the Mailman School of Public Health, Columbia University, New York, NY. Teka McKnight is with the University of Texas Medical Branch at Galveston, TX. Wame Dikobe is with St. George's University School of Medicine (SGUSOM) in Grenada, West Indies. Charles Wilson is Director of POCAAN Health on Wheels, Seattle, WA.

Address correspondence to Freya Spielberg, MD, MPH, RTI International, 114 Sansome St., Suite 500, Room 503, San Francisco, CA 94104; E-mail: fspielberg@rti.org

referral services, and it attempted to integrate new testing and counseling strategies (Spielberg et al., 2003, 2005) to ensure the program's acceptability and effectiveness. This study presents evaluation data from continuous quality improvement efforts undertaken between 2002 and 2007 to answer the following questions: Does Mobile testing reach a different population then clinic based health department testing?; Does offering a $10 incentive increase the identification of new positives?; How do alternative testing strategies impact program effectiveness?; How does interactive computer counseling impact counseling quality, program productivity and evaluation capabilities?

Of the estimated 56,000 new HIV infections each year in the United States, 63% occur among Black and Hispanic/Latino populations (CDC, 2010). In King County, Washington, at the time this program was developed, HIV rates among minorities had been growing at an alarming rate (Hopkins, 2001). According to 2000 census data, ethnic minorities were 21% of the population in King County but represented 41% of AIDS cases in 2000, up from 15% in 1986. The evidence suggested that existing models of HIV testing and counseling in clinical settings had reached only a portion of the communities of color at risk for HIV in Seattle. An application was awarded to develop a mobile counseling and testing program to reach people of color based on local research that identified optimal HIV counseling and testing strategies in outreach settings (Spielberg, 2005).

Iterative evaluation was possible within this program owing to the incorporation initially of paper outreach logs and risk assessments and made easier by the later use of the CARE tool that collected complete data in real time and automated reports. The evaluation findings presented in this article provide new information describing the potential design benefits of mobile testing, rapid testing, incentive use, and interactive computer counseling to facilitate automated evaluation and to improve the quality and productivity of mobile HIV counseling and testing programs.

PROGRAM IMPLEMENTATION

The HOW program was designed, based on local research (Spielberg, 2003; Spielberg et al., 2005), to use a mobile-testing van staffed by two recruiters and two testers who initially offered a variety of testing options (oral fluid, rapid blood, standard blood, urine) to people of color at high-risk venues, such as bars and parks where people at high risk for HIV congregate. Initially, the program did not offer monetary incentives and used a standard SPSS database of recruitment and risk assessment data to provide program evaluation.

With time, several program improvements were implemented and evaluated. To improve testing acceptance rates, monetary incentives ($10) were offered for HIV testing. Although these incentives may have induced some people to be tested repeatedly, staff discouraged testing more frequently than every 3 months. Follow-up of HIV-positive individuals through health department tracking determined first time HIV diagnosis rates. Staff used confidential lists of names to avoid duplicate testing. To improve rates of receipt of test results, the program evolved to offer only rapid HIV testing, first by finger stick and when approved, using the OraQuick Advance oral fluid rapid HIV test. The program demonstrated that they were able to reach people of color at risk for HIV; however, data management and reporting were problematic. Program staff did not have the expertise to manage a standard database, and so generating program reports was difficult and time consuming.

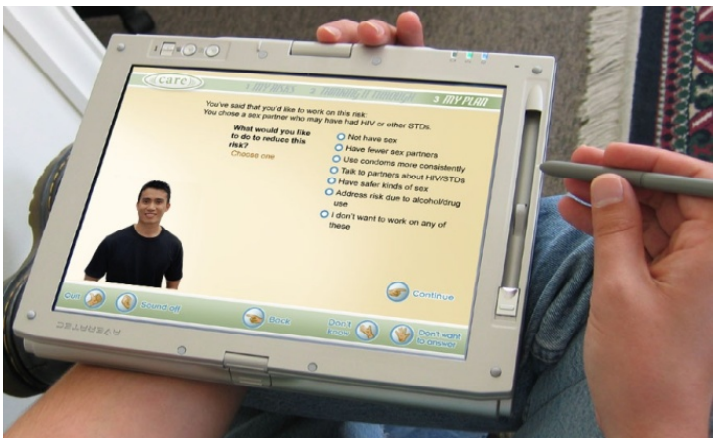

FIGURE 1. The CARE tool Provides Automated Interactive HIV Counseling and Evaluation.

To facilitate data entry, a simplified ACASI computer program (QDS, NOVA Research Company) was initially used so that all staff could enter outreach testing data. However, the staff prioritized spending their time offering services to clients, so it often took months before data were entered. The program also had to hire an outside consultant to generate program reports. There was such delay between data collection and evaluation reports that program staff were unable to use the evaluation data in any meaningful way, and the associated paperwork made staff dislike the evaluation process.

Staff turnover was another problem. Salaries in community-based organizations were lower than those in health department and clinical settings; thus, trained staff frequently left to take other opportunities. With high rates of staff turnover it was difficult to keep up with training needs and to ensure that quality counseling and referrals were being provided.

In January 2006 the program implemented the Computer Assessment and Risk Reduction Education (CARE) tool for routine use with rapid HIV counseling and testing. CARE is an interactive multimedia computer tool that allows patients to receive individualized risk assessment, for HIV and sexually transmitted infections (STIs) information about rapid HIV testing, and provides evidence-based HIV/STI risk reduction counseling (Figure 1). A typical CARE session has six elements: (a) anonymous log-in, welcome, and selection of counselor; (b) rapid HIV test consent; (c) risk assessment; (d) tailored feedback and counseling, including skill-building videos; (e) an individualized risk reduction plan; and (f) a printed report and referrals, if applicable. The tool has been designed to recognize clients for longitudinal care, so that even when in the field, staff are able to pull up past risks and behavior change plans to determine progress made and supplement counseling.

Although the CARE tool had been used successfully as a client-administered audio computer-assisted self-interview (ACASI) tool with rapid HIV testing in clinic settings, POCAAN staff decided to use it with clients to guide and enhance their counseling, to eliminate paperwork and subsequent data entry, and to provide clients with a printed summary of their risks, risk reduction plan, and referral needs.

Automated reports were generated for daily quality assessment and weekly reports for the health department. HIV Prevention Program Monitoring and Evaluation reports were also developed in response to CDC reporting requirements.

TABLE 1. ITERATIVE EVALUATION OF A MOBILE HIV COUNSELING AND TESTING PROGRAM

(1) Does mobile testing reach a different population than clinic-based health department testing?

Using culturally similar outreach workers in a mobile program targeting high risk venues reached populations that were almost twice as likely to have never tested and significantly more likely to have had unprotected anal or vaginal sex since their last test.

Health Department Testing (n = 1838)

People of color – 29%

Never tested – 22%

Unprotected anal or vaginal sex since last HIV test – 54%

CBO Testing (n=610)

People of color – 84% ($p < 0.001$)

Never tested – 40% ($p < 0.001$)

Unprotected anal or vaginal sex since last HIV test – 72% ($p < 0.001$)

(2) Does offering incentives increase identification of new positives?

A $10 incentive made the testing program four times more effective in reaching people at risk and identifying HIV cases:

No Incentive – 362 tested (5 HIV positive)

$10 incentive – 1437 tested (25 HIV positive)

(3) How do alternative testing strategies impact program effectiveness?

Offering only rapid testing made the testing program almost twice as effective as when oral fluid testing was offered in combination with other test strategies.

Oral fluid testing (n=829) – 55% received results

Rapid testing (n=1470) – 99% received results ($p<0.001$)

(4) How does interactive HIV computer counseling impact counseling quality, program productivity and evaluation capabilities?

CBO staff and health department payers appreciated the impact of the CARE tool:

Counseling Quality – Minimally trained counseling staff appreciated the CARE tool guiding them through all key components of counseling and felt that the program improved their ability to provide longitudinal counseling in the field, through bringing up past risk behaviors and counseling plans.

Program Productivity – With the CARE tool staff did not have to spend time in the office entering data, and so could spend more time out in the field reaching clients.

Timeliness of Evaluation Reports– Staff for the first time appreciated evaluation data because they received it in real time and were able to better tailor outreach. Program administrators appreciated the automated evaluation reports and for the first time were able to submit their reports on time to the health department and receive prompt payment.

PROGRAM EVALUATION

When the program was first implemented, the primary evaluation question was "Does the mobile program reach different populations than the health department clinic-based testing and counseling programs?" (Table 1). During the initial evaluation period (April 2001–April 2002), POCAAN tested 610 people, and the health department tested 1,838 people. Evaluation of POCAAN data showed that its programs not only reached a greater percentage of people of color (84% vs. 29%, $p < .001$) and first-time testers (40% vs. 22%) than the health department, but it also tested more people younger than 20 years old (19% vs. 3%, $p < .001$), people with a high school education or less (65% vs. 19%, $p < .001$), substance users in past year (91% vs. 24%, $p < .001$), and binge drinkers in past month (36% vs. 31%, $p < .05$). Even when restricting the evaluation population to men of color who have

TABLE 2. Impact of Computer Counseling on Mobile Outreach Program—Staff Themes

Counseling Improvements
• Minimally trained staff using the CARE tool are lead through critical counseling components so that the quality of their counseling is improved.
• With the CARE tool staff are able to recognize returning clients and are given a summary of their last plan so that they can more effectively tailor their counseling.
• Staff believe that risk reduction counseling may be more effective because clients have a printed summary that they can refer to after they leave.
• Printed individualized summaries, including referral numbers for those who screen positive for depression or substance use, enhances the potential impact of the counseling.
Participant Acceptability
• Participants feel that their personal information is safer in the computer, as compared to paper charts.
• Participants like the skill-building videos and the personalized reports.
Administrative Improvements
• Staff appreciate the ability to focus their efforts on client outreach rather than on data entry.
• Since reports can be generated on-demand, staff appreciate the evaluation data and use it to target their outreach efforts.
• Summary reports can be generated on demand to submit to the health department. For the first time in the program history, it was now possible to generate testing summary reports on time for prompt reimbursement.

sex with men, POCAAN reached a population that was less educated (44% high school or less vs. 20%, $p < .001$), younger (16% younger than 20 vs. 4%, $p < .001$), more likely to use substances (85% vs. 29%) and have unprotected sex while high on drugs or alcohol (39% vs. 18%, $p < .001$), and more likely to be first-time testers (28% vs. 16%, $p < .05$). The prevalence of HIV in this evaluation was not significantly different than the health department testing sites, but a different population was identified.

Next the study sought to determine, "How do alternative testing strategies impact program effectiveness?" Analysis of data initially showed that movie tickets and food did not appreciably increase program productivity. After community feedback was received, $10 incentives were offered and testing rates increased by a factor of 4 (362 in 2003 vs. 1437 in 2004), with five times as many new cases of HIV identified (5 in 2003 vs. 25 in 2004).

The next evaluation question asked, "Is it better to offer a variety of testing options or just rapid testing?" The evaluation data found that with rapid testing (n = 1,470), 99% of clients tested received results ($p < .001$) compared to 55% (n = 829) of clients who received the standard oral fluid test when a choice was given between testing strategies. Although the majority of people preferred to test with the OraSure oral fluid test that was sent to the central lab, because few returned for test results, the program determined that it was more effective to only offer the less acceptable strategy, rapid blood testing, so that people were able to get results during the initial visit. When the OraQuick Advance rapid oral fluid test became available, it allowed the program to offer both the most acceptable specimen collection method (oral fluid) as well as the most effective method for providing test results (rapid testing).

Finally, the study sought to determine, "How does interactive HIV computer counseling impact counselling quality, program productivity and evaluation capabilities?" (Table 1). In the first 3 months of CARE tool implementation, the program tested over twice as many clients per month compared to standard incented rapid testing (255/month vs. 120/month, $p < .001$). As the program evolved, the demo-

graphics of clients reached remained consistent with program goals, although males were more likely to be reached then females. In the first few months of testing using the CARE tool (n = 595), clients had the following attributes:

- Males accounted for 70% of clients reached.
- People of color accounted for 65% including 19% immigrants.
- Nineteen percent were homeless.
- Seventy-five percent screened positive for chemical dependency with 29% injection drug users.
- Ninety-nine percent had had a risk since their last HIV test.
- Nineteen percent had never been tested.
- Their ages ranged from 15 to 76.
- Their highest level of education achieved included 29% who had not attained a high school diploma and 47% who had achieved a High School diploma or GED.

The efficacy of the computer-assisted counseling has not yet been formally evaluated in the POCAAN population. However, it was modeled after the effective Project RESPECT counseling model that was shown to significantly lower the incidence of sexually transmitted infections (Kamb et al., 1998). An evaluation of the counseling plans that clients chose showed that all clients developed personal risk reduction plans: Nineteen percent chose abstinence, 23% chose fewer partners, 17% chose more condom use, 4% selected talking to their partner about HIV testing, 25% aimed to try safer kinds of sex, and 12% chose to decrease alcohol and drug use. Overall, 97% reported high confidence in their ability to complete their chosen plan, which has been correlated to behavior change in prior research.

Staff interviews were conducted (n = 5) to evaluate their perspective on the impact of the CARE tool on the quality of counseling provided, and on the ability of the program to generate timely reports so that funding reimbursement would not be delayed. Results from staff interviews revealed that the CARE tool had several effects on their outreach testing program (Table 2).

DISCUSSION

The CDC continues to promote expanding access to HIV testing among sexually active people in the United States (CDC, 2006). New guidelines for HIV testing in non-clinical settings are anticipated in 2011. As the program evaluation in Seattle showed, an increased focus on mobile outreach using rapid testing and information technology health tools may facilitate reaching populations unaware of their status who do not proactively seek out clinical services. The CDC also recommends simplifying the consent and counseling process when it presents a barrier to testing. However, many HIV prevention advocates are concerned that simplifying the consent process and counseling procedures may result in inadequate education and poor preparation of clients for receipt of HIV test results. Missed opportunities for HIV prevention is also a concern if in depth risk reduction counseling is eliminated. Use of a mobile health tool such as CARE allows the benefit of standardized consent and in-depth counseling with minimal staff training or time required.

In designing mobile HIV counseling, testing, and referral programs, the authors recommend using culturally similar recruiters, monetary incentives to increase test-

ing acceptance, rapid oral fluid testing to ensure that clients get test results, and computer counseling tools such as CARE (http://www.ronline.com/care/) to improve the acceptability and productivity of the program, to ensure the quality of the counseling provided, and to allow real- time and effortless program evaluation. Promoting broad access to HIV testing without eliminating adequate consent and high-quality counseling may be possible, if these alternative strategies are adopted.

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HIV COUNSELING, TESTING AND REFERRAL EXPERIENCES OF PERSONS DIAGNOSED WITH HIV WHO HAVE NEVER ENTERED HIV MEDICAL CARE

Pamela Morse Garland, Eduardo E. Valverde, Jennifer Fagan, Linda Beer, Catherine Sanders, Daniel Hillman, Kathleen Brady, Maria Courogen, and Jeanne Bertolli for the NIC Study Group

The HIV counseling, testing, and referral (CTR) encounter represents an important opportunity to actively facilitate entry into medical care for those who test positive for HIV, but its potential is not always realized. Ways to improve facilitation of linkage to care through the CTR encounter haven't been explored among HIV-infected persons who have not entered care. We conducted 42 structured and qualitative interviews among HIV-infected persons, diagnosed 5-19 months previously, in Indiana, Philadelphia and Washington State, who had not received HIV medical care. Respondents related individual and system-level barriers, as well as recommendations for improving the effectiveness of CTR as a facilitator of linkage to HIV medical care through more active referrals, and for strengthening the bridge between CTR and linkage to care services. Our findings suggest that standards for active case referral by CTR staff and integration of CTR and linkage to care services are needed.

Counseling, testing, and referral (CTR) services can act as the gateway to medical care and ancillary services for those who test positive for HIV. Current CTR guidelines (Centers for Disease Control and Prevention [CDC], 2001), including the revised guidelines for CTR in health care settings (CDC, 2006), highlight the need for in-person, post-test counseling for those who test positive for HIV. This recommendation for posttest services includes efforts to actively link clients to HIV medical care and other support services as necessary.

Despite current efforts to link infected persons to medical care, a substantial number of HIV-infected persons delay care entry after diagnosis (Fagan, Bertolli, McNaghten, & the NIC Study Team, 2010; Fleming et al., 2000; Samet et al., 1998). Several studies have focused on individual and system-level characteristics to identify factors associated with delayed presentation to care (Reed et al., 2009; Torian, Wiewel, Liu, Sackoff, & Frieden, 2008; Samet, Freedberg, Savetsky, Sullivan & Stein

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Address correspondence to Pamela M. Garland, Centers for Disease Control and Prevention, MS E-46, 1600 Clifton Rd., NE, Atlanta, GA 30333; e-mail: hge2@cdc.gov

2001; Turner et al. 2000). However, there is limited information on the role of the CTR encounter in the initiation of care.

One study focused on the CTR experience from the test providers' perspective (Myers, Worthington, Haubrich, Ryder & Calzavara, 2003), and two have described characteristics of the testing encounter from the patient's perspective (Hult, Maurer, & Moskowitz, 2009; Worthington & Myers, 2002). McCoy et al. (2009) described the barriers and facilitators to HIV testing and care for persons with advanced HIV disease currently in care. However, no study, to our knowledge, has investigated how the CTR encounter may influence the decision to enter HIV medical care among those who have not yet entered care.

In this analysis, we used interview data from the Never in Care (NIC) Pilot Project to describe how the CTR encounter influenced the participants' decision or ability to access HIV medical care among HIV-infected persons who have never received care.

METHODS

STUDY SETTING AND POPULATION

The Never in Care (NIC) Pilot Project is a multisite project designed to enumerate and describe HIV-infected persons who have never accessed care for their HIV infection. The NIC Pilot Project was being conducted in collaboration with 5 health department jurisdictions: Indiana, New Jersey, Washington State, New York City, and Philadelphia. The interview portion of the NIC Pilot Project has a mixed-method design, consisting of both quantitative (structured) and qualitative (open-ended) components. Methods have been fully described previously (Johnson, Bertolli, Reed, & the NIC Project, 2008).

The analysis reported here focused primarily on the qualitative data, with use of structured interview data to describe demographic characteristics of the respondents. Qualitative interviews were conducted in three of the five participating areas: Indiana, Philadelphia, and Washington State. Interviews included in this analysis were conducted between February 2008 and November 2009 with respondents diagnosed between January 2007 and March 2009. Potentially eligible respondents were identified through the electronic HIV/AIDS Reporting System (eHARS) and associated laboratory reporting databases. Once identified, respondents were eligible if they met the following criteria: (a) were at least 18 years old at the time of diagnosis; (b) were at least 90 days post HIV diagnosis on the date of selection; (c) had not yet entered care, as evidenced by having neither CD4 + T lymphocyte count or HIV viral load (VL) level reported to the HIV surveillance system or by self-report; (d) resided in one of the three jurisdictions at the time of interview; and (e) spoke English.

HUMAN SUBJECTS PROTECTION

Informed consent was obtained from all respondents. The NIC Pilot Project design and instruments were approved by the institutional review boards of the CDC and participating state or local health departments.

RECRUITMENT

Following locally established protocols, health department staff contacted persons selected for participation to recruit them for the NIC Pilot Project. Interviews took place in different settings, including the respondents' home and health depart-

ment offices. Locations were chosen based on respondent preference and assurance of confidentiality. Interviewers completed comprehensive training regarding project-specific protocol and methodology, security and confidentiality of sensitive data, and quantitative and qualitative interview techniques. Interviewers recruited up to 25 eligible respondents per area for the qualitative interview from among those who consented to a structured interview. Respondents received a gift card in the amount of $50 for participation in both the structured and qualitative interview components of this study. Both interviews were conducted during the same meeting.

DATA COLLECTION

Qualitative interviews were administered using a semi-structured interview guide, which was developed based on preliminary data from focus groups (Beer, Fagan, Valverde, & Bertolli, 2009). The interview guide consisted of 21 open-ended questions, divided into three domains: health care utilization history, perception of illness and stigma, and access to information about HIV. The majority of qualitative interviews were recorded using a digital audio recording device and lasted an average of 30 minutes. When digital recording was not possible, owing to device failure or respondent refusal, interviewers took detailed handwritten notes.

Additionally, the structured interview component collected data across eight domains, including demographic data and information on HIV testing.

We focused this analysis on responses from the following semistructured interview question: "After you tested HIV-positive, what help were you offered to get into HIV care?" and the standard probe, "Was there something that the person who gave you the diagnosis could have done differently to help you to get into HIV care at that time?"

Respondent characteristics from the structured interview were included to provide context.

ANALYSIS

A professional transcriptionist transcribed all digital recordings verbatim and interviewers reviewed each transcription for errors or clarification.

The research team developed a codebook with structural and thematic codes using a standardized iterative process (MacQueen, McLellan-Lemal, Bartholow, & Milstein, 1998). This process entailed creating an initial draft codebook which coders used to independently code transcripts. Coders would then discuss challenges in applying these codes, make modifications and continue to code with the revised codebook. Coding differences were resolved as they arose through discussion and reevaluation of the data. Thematic analysis was performed on the transcripts using NVivo 8 (QSR International, Australia).

Bivariate analyses were conducted to investigate whether key demographic variables differed by interview location. Differences in categorical and continuous variables were examined using the chi-square test, and *t* test, respectively.

RESULTS

A total of 42 respondents were included in this analysis. All respondents completed both the structured and qualitative interviews. Of the 42 respondents, the majority were male (71%) and African American (64%). Nearly half (45%) of the respondents were ≤ 30 years of age and 50% earned $15,000 or less per year. Respondents

TABLE 1. Respondent Characteristics: Never in Care Pilot Project 2008-2009

Characteristic	*N* (%)
Age (years)	
21-30	19 (45)
31-40	8 (19)
41-50	10 (24)
50+	5 (12)
Gender	
Male	30 (71)
Female	11 (26)
Transgender	1 (2)
Race/Ethnicity	
Black/African American	28 (67)
White	9 (21)
American Indian/Alaska Native	2 (5)
Hispanic	3 (7)
Yearly income[a]	
≤ $15,000	21 (50)
$15,001 – 30,000	13 (31)
≥ $40,000	4 (10)
Missing	4 (10)
Time from Diagnosis to Interview (months)	
5-7	23 (55)
8-10	10 (24)
11-13	3 (7)
14-19	6 (14)

[a]Three hundred percent of federal poverty (2009) for an individual is <$30,830.

differed significantly by age across the three areas ($p < .0001$) but did not differ significantly by race, gender, or income. More than half of the respondents (55%) had been diagnosed with HIV in the past 5-7 months (Table 1). Respondents received their HIV test at a variety of locations, with roughly equal percentages testing in a hospital setting (19%), sexually transmitted disease (STD) clinic (17%) or other medical setting (17%). The majority (67%) of interviews were conducted at Site A (Table 2).

Qualitative analysis revealed satisfaction and dissatisfaction with three main components of the testing encounter: counseling, testing, and referral, in addition to experiences with follow-up services, such as case management, that may bridge the gap between testing and care entry. Respondents also described what could have been done differently during the CTR encounter that might have effectively linked them to care.

COUNSELING AND TESTING

Satisfied With Testing and Counseling. Few respondents who described their perception of counseling and testing expressed satisfaction with their experience. Respondents who tested at a prenatal clinic, drug treatment facility or HIV counseling and testing site were more likely to indicate they were satisfied with the encounter. Although some simply stated that they were satisfied without elaborating, more often, respondents who were satisfied explained that their expectations surrounding testing were met because they were provided with sufficient education or information after receiving their positive HIV test results. Others, however, seemed to base their satisfaction on the level of comfort and support provided by the person conducting the HIV test. One respondent described:

Table 2. Respondent HIV Testing and Interview Location: Never in Care Pilot Project 2008-2009

Characteristic	N (%)
Interview Location	
Site A	24 (57)
Site B	10 (24)
Site C	8 (19)
HIV Testing Location	
Hospital Setting	8 (19)
Sexually Transmitted Disease clinic	7 (17)
Other Medical Setting[a]	7 (17)
Health Dept	5 (12)
HIV Counseling, Testing and Referral Site	4 (10)
Jail	4 (10)
Blood Bank	4 (10)
Other[b]	3 (7)

Note. [a]Includes community clinics, infectious disease clinics, prenatal/family planning clinic, private doctor.
[b]Includes research settings and drug treatment facility.

> "When they did the quick test she gave me her card, she talked to me and my mom then . . . Not knowing if I would have that support group, she made herself a support group until I could get to the [AIDS Service Organization]." –(male, 22)

Dissatisfied with Testing and Counseling. Dissatisfaction with the counseling and testing experience was a salient theme among respondents. Those who expressed dissatisfaction were more likely to have been tested at an STD clinic, inpatient facility, private doctor's office or infectious disease clinic. Most often, dissatisfaction stemmed from a perceived lack of counseling, insufficient counseling, or poor quality of counseling. As one 21-year-old male respondent described, inadequate counseling forced him to seek outside social support. "I basically I had to counsel myself and thank God that I have friends, and a brother and like family that was there for me," he said.

For others, the negative experience with the tester or counselor may have created a barrier to seeking further assistance.

> So she had the serious tone but she just made it feel like this is the end of the world, what are you gonna do? So. To me . . . that turned me off. Personally. And it takes me a while to get over some things. (male, 22)

Another respondent described being treated poorly by the medical staff where he received his HIV test, an experience that influenced his decision not to return to that facility for medical care.

> She didn't take in consideration about how I was feeling . . . Like if you in that job, just be caring. Just . . . be considerate . . . Now I would never go back to [medical facility] and, to get those treatments. No. Never ever. (male, 48)

Narratives also highlighted how inadequate information or misinformation at the time of testing can affect perceptions of the encounter. For example, two respondents explained that they were told medical care was unnecessary at the time of testing based on the assumption that their infection was in the early stages. When they later

learned that this information was incorrect, they became disappointed with their CTR experience because they believed that they had been given incorrect or incomplete information, limiting their ability to make informed decisions about their care.

REFERRALS

Although direct referrals to medical were limited, the qualitative data revealed that respondents were often provided with a passive or active referral to a case manager to be linked to care. For many, the method of referral had an impact on the perception of the CTR encounter and may have influenced their decision and/or ability to access the services to which they were referred.

Active Referral. We defined an active referral as one in which the tester made an appointment for the respondent or transported or accompanied the respondent to an appointment, including an appointment for co-located services.

Though few respondents described receiving active referrals, those who did described supportive interactions and thorough referrals to medical care or other ancillary services. According to one respondent:

> she sat down there and she called a bunch of places to see who would help with medical insurance because she said that's the most important part . . . is to get insurance . . . And she actually called all the places and found out who helped with everything . . . so she made an appointment with them for the next day after I got out. (male, 29)

Although this type of referral seems to have had a positive influence on the overall perception of the testing encounter, it did not result in care entry. Respondents who received active referrals also faced individual and system-level barriers (described later) that affected their ability to access care.

Passive Referral. We defined a passive referral as one in which the tester only provided written material, such as a brochure or a business card, or verbally told the respondent where he/she could seek follow-up services.

More than half of all respondents described receiving passive referrals. This type of referral was often perceived to be of little or no help. Respondents seemed to feel that the gravity of their diagnosis warranted more active assistance. When asked what help was offered after diagnosis, one 52-year-old female respondent said, "None. Well, no, okay, I have to retract that statement . . . They gave me cards."

For some, it seems that written materials were of little use without someone to provide guidance on how to interpret or use the information. Respondents describe pushing the materials aside, or ignoring them once they left the testing facility. One respondent explained:

> After I tested positive, I was, I got a little envelope, manila folder, with information in it. It was more information of HIV, general information, like, what it is, and stuff like that . . . But where that is right now, is, I have no clue. (male, 22)

Others explained that instead of a referral, they were told they would receive a follow-up call or letter from the testing or medical facility giving instructions on follow-up care. That contact never came.

No Referral. Several respondents reported that they received no referral at all. This had a negative effect on the perception of the CTR experience. These respondents

tested in a variety of locations, including an emergency room, STD clinic, jail and an HIV/infectious disease clinic.

One of these respondents described getting a referral to care from a friend, but in the absence of referrals or assistance, others had difficulty identifying or accessing medical services on their own.

PERCEPTION OF FOLLOW-UP SERVICES

Follow-up services were defined as HIV-related services that were accessed through referrals from the CTR encounter. Because most referrals were to case management (with the intent of facilitating linkage to care), the narratives predominantly refer to experiences with case management services.

Satisfied With Follow-Up Services. Few respondents described feeling satisfied with follow-up services. Although limited details were given, these respondents described receiving help and feeling supported as they tried to accept their HIV diagnosis.

> Yeah, the case worker came in there and, you know, told me that, you know, she was tryin' to support me, you know, tellin' me that it was all right . . . and, you know, there is care and it's a chronic disease, you know, like, but . . . So I guess he was tryin' to support me. (female, 28)

Based on these narratives, it appears that most of these services were limited to one time interactions.

Dissatisfied With Follow-Up Services. Most of those who provided information on experiences with HIV-related follow-up services highlighted gaps in or limitations with follow-up services that affected their motivation and/or ability to access medical services. Responses often centered on feelings of disappointed in the case management system. Some described a lack of access to their assigned case manager. As one respondent commented,

> Sometimes I guess when I really needed her, the only thing I really kinda hated about it is like I would call and she wasn't there . . . Then I'd have to talk to somebody else when I really just wanted to talk to her. (female, 23)

Several other respondents described organizational challenges within the case management system, leaving them unable to navigate the complexities of the HIV care system.

> I just got lost in the whole shuffle of things . . . I'd call and a lot of times nobody would even answer the phone and I know their opening hours, so I don't know why they wouldn't answer the phone. Um . . . they just gave up and I gave up. . . . I would say they gave up first. (male, 40)

BARRIERS TO FOLLOW-UP SERVICES

The barriers described by respondents when attempting to access follow-up services, revealed a gap between referrals provided through CTR and the follow-up services designed to serve as the bridge to care.

Individual-Level Barriers. Several respondents indicated that an individual-level barrier was impeding their progress toward HIV care entry. Multiple barriers were identified, including fear of disclosure, desire for privacy, distrust of medical provid-

ers, lack of motivation, continually entering/exiting jail, having co-morbidities and feelings of shame. Most commonly, however, respondents described needing more time to accept their diagnosis.

> Right initially it's hard to get involved and all that until it starts to sink in and . . . Earlier on you had asked about how if I was in, like, a denial, and I would think maybe at, like, the first month I might have been . . . I don't even know if denial is the right word, it just, the realization hadn't hit home yet. (male, 42)

System-Level Barriers. More often than individual-level barriers, respondents described system-level barriers. This included barriers relevant to the HIV care system, criminal justice system, or health insurance system.

Lack of financial means or health insurance was most often listed as the primary reason they hadn't accessed any HIV-related follow-up services, including case management. The belief that they wouldn't be able to afford care precluded them from taking any steps toward care entry, including accessing follow-up services.

Others attempted to use follow-up services to alleviate financial barriers to accessing care, but this approach was perceived to be time consuming and difficult. One respondent described his experience attempting to obtain state-funded health insurance.

> And she [case manager] said that I needed a Medicare form to get a denial because usually they deny you. She said if they don't deny you it's great, but if they do . . . she needs that form so that she can sign me up for another health insurance maybe. But she said that one's on the waiting list. So. She it'd probably be about another eight months before I even got medical insurance or . . . in to see my doctor, or a doctor. (male, 29)

WHAT COULD HAVE BEEN DONE DIFFERENTLY?

Half of all respondents described what they thought could have been done differently at the CTR session that might have facilitated their timely entry to care. Themes highlighted during the discussion of dissatisfaction with counseling and testing were repeated here.

Most commonly, respondents focused on the counseling component of the CTR encounter, explaining that they needed more counseling at the time of their diagnosis. As one 54-year-old female respondent said, "They could've sat down and really talked to me about it.

Several explained that they would have benefited from a more active referral process, and wanted more than a passive referral or no referral at all.

> There is just not enough people willing to help people . . . Be more compassionate, offer information . . . to a person. If a person don't know? Offer it to 'em . . . I mean, if a person don't [know] the right questions to ask, why should you act oblivious to it and not help . . . ? (male, 48)

> Someone do somethin' differently rather than kinda just pass out pamphlets to you (female, 23)

For others, system-level barriers, described earlier, were the sole barrier impeding their progress toward care entry. These respondents weren't able to identify anything that could have been done differently that might have helped them enter care.

Still, some said that there was nothing that could have been done differently. Despite satisfaction or dissatisfaction with CTR or follow-up services, these individ-

uals expressed the belief that getting into HIV medical care was their responsibility. One respondent stated:

> I'm m —-I'm my own worst enemy. She did everything in her power to help me. I did this. You know. I made the mistake of not following up. (male, 28)

DISCUSSION

CTR services are critical, not only for the identification of HIV infection, but also for bridging the gap between diagnosis and care entry for those who test positive for HIV. In this study, respondents who have never received care described their experiences with CTR and follow-up services, providing a window into their perceptions of the CTR encounter, the existing systems for linkage to care, and the influence of these on their decision to access care.

Overall, most respondents described feeling dissatisfied with their CTR experience, predominantly owing to a perceived lack of adequate counseling or information at the time of diagnosis. These data add to previous findings by Rudy et al. (2005), which identified deficiencies within the counseling process. Increased training of CTR staff to provide more thorough posttest counseling in all HIV test settings may be needed to counteract this barrier to accessing care.

Despite the current CTR recommendation to provide active referrals to care following a positive HIV test result (CDC, 2006), most of the respondents in our study describe receiving passive referrals for linkage to care services. Respondents agreed that passive referrals were of little help and provided minimal, if any, assistance in accessing care. As shown in previous studies, active referrals are more successful for linking newly diagnosed persons to care (Craw et al., 2008, Gardner et al., 2005). The addition of a detailed, standard definition of an active referral in future CTR guidelines may be necessary to support the provision of an optimal level of service when referring to or providing linkage to care services.

When attempting to access follow-up services to which they were referred at the time of diagnosis, respondents described system-level barriers, identifying inadequacies in the HIV care system. Frequently, lack of health insurance and lack of access to case management services prevented respondents from moving forward into medical care. Although most respondents live at or below 300% of the federal poverty level (U.S. Department of Health and Human Services, 2009; see Table 1), a common financial threshold for federally funded HIV medical care (National Alliance of State and Territorial AIDS Directors, 2010), many seemed unaware of programs that could assist them. Without ongoing access to case management services to assist them with financial and other systemic barriers, respondents got lost in the complexities of the HIV care system. Respondents in our study appear to have had one or fewer encounters with a case manager, which may not be optimal. Previous studies had shown that for newly diagnosed HIV-infected persons, linkage to care activities are more successful when persons have an average of two or more encounters with a case manager (Craw et al., 2008; Gardner et al., 2005). These data support previous findings describing the benefit of ongoing linkage to care activities that may include multiple follow-up encounters to increase the chances of successful linkage to care.

This study had several limitations. Although interviews were conducted in three project areas, one project area contributed more interviews than the others because this area had higher rates of successful contact with persons selected for participa-

tion. Respondents' age differed significantly across project areas, but respondents did not differ significantly across areas with regard to other demographic factors such as race, gender, and income. In addition, themes identified were consistent across the three areas. The findings illustrate the experiences and perceived needs of HIV-infected persons who have not yet entered care. However, these may not be representative of all HIV-infected persons who have not entered HIV care in the United States.

The CTR encounter may be the only chance to link certain HIV-infected persons to care, and for this study group, the process failed. In 2006 the CDC revised CTR guidelines to recommend opt-out testing in all health care settings (CDC, 2006). With increased adoption of these recommendations, we anticipate an increase in the number of HIV infections identified (Millen, Arbalaez, & Walensky, 2008; Saag, 2007). However, to ensure the full public health benefit of increased diagnosis, all who are diagnosed with HIV must be linked to HIV medical care.

Timely linkage to care is believed to be a key factor in decreasing transmission but may be an increasing challenge as expanded testing leads to increasing diagnoses, particularly during a time when budget cuts continue to reduce funding for HIV-related services. Although an HIV diagnosis alone has been shown to reduce transmission risk behaviors (Pinkerton, Holtgrave, & Galletly, 2008), those who have not entered care do not have the benefit of ongoing prevention education or antiretroviral therapy, which may further reduce transmission (Granich, Gilks, Dye, DeCock & Williams, 2009, Lima et al., 2008). Taken together, these considerations highlight the need to strengthen CTR and linkage to care services.

Whereas it is important for health jurisdictions to have the ability to tailor CTR and linkage to care services to meet the unique needs of their communities, our findings suggest that more thorough counseling at the time of diagnosis, clear standards for active referral to care by CTR staff and more seamless integration of CTR and linkage to care services are needed.

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