Removing Barriers to Knowing HIV Status

Same-Day Mobile HIV Testing in Zimbabwe

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Objectives: We developed a mobile HIV voluntary counseling testing (VCT) strategy. Our aims were (1) to describe those using the services, (2) to assess the acceptability of such services, (3) to assess reasons for not testing previously, and (4) to compare those who used the services with those who did not to determine how to increase acceptability.

Methods: We provided free anonymous mobile VCT using 2 rapid HIV tests in 12 marketplaces in Epworth and Seke, Zimbabwe. Qualitative interviews were conducted to assess motivations for and barriers to testing. A subsample of HIV testers and individuals near testing vans who declined testing (nontesters) completed a questionnaire.

Results: A total of 1099 individuals participated in mobile VCT between March 2002 and August 2003. The proportion of participants infected with HIV was 29.2%. Overall, 98.8% of participants elected to receive HIV test results the same day. Reasons for not testing previously were often logistic (eg, inconvenience of hours [25.6%] and location [20.7%] or cost [8%]). Those who used the same-day mobile testing services (testers vs. nontesters) perceived themselves at higher risk for HIV infection (adjusted odds ratio [AOR] = 1.8) but were less likely to have known people with HIV (AOR = 0.49) or where to get tested (AOR = 0.57).

Conclusions: Same-day HIV testing in community settings seems to be acceptable in sub-Saharan Africa. Barriers to HIV testing are often logistic and can be overcome with community-based strategies. These strategies need to be refined to address the needs of those not using mobile testing services.

Key Words: HIV testing, sub-Saharan Africa, rapid testing, community strategies, HIV stigma

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HIV voluntary counseling and testing (VCT) has emerged as a central prevention strategy in national AIDS control plans in most developing countries because it leads individuals to reduce HIV risk behavior[1] and is cost-effective relative to other prevention interventions in the developing world.[2] Because many developing countries are now able to plan for antiretroviral therapy (ART) implementation, VCT also has emerged as an important tool linking people to care.

Despite the priority assigned to VCT in prevention and treatment access plans, the actual uptake of VCT in most of sub-Saharan Africa remains quite low.[3–8] In Zimbabwe, only approximately 11.8% of women and 9.2% of men report having been tested and being aware of their HIV status.[9] The overall low uptake of VCT may be associated with the lack of resources to implement plans fully for rolling out test sites[10] and the intense stigma associated with HIV that leads to ambivalence toward HIV testing.[11] Mobile VCT is a strategy for overcoming the practical barriers to accessing such services and linking individuals to other services.

In this study, we evaluated a strategy to remove barriers to knowing one's HIV status in sub-Saharan Africa by implementing a mobile VCT service that provided free, anonymous, rapid testing in public marketplaces in a rural community and a high-density community in Zimbabwe. Our aims were (1) to describe those using the services; (2) to assess, through qualitative interviews, the acceptability of such services; (3) to assess, through a survey, reasons for not testing previously; and (4) to compare those who used the services (testers) with those who did not (nontesters) to determine how to increase the acceptability of mobile VCT.

METHODS

The study was conducted in 2 Zimbabwe communities to understand better the acceptability of mobile VCT in a high-density setting and a rural setting. The first community, Epworth, is a high-density residential community with a population of 113,884 situated 15 km outside Harare, the capital.

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The inhabitants are largely migrants from rural areas who have moved near the city looking for work, often leaving their families behind to continue farming. Residents of Epworth are poor and live in conditions similar to those of rural villagers, with no electricity or running water. The second community, Seke, is a rural community of 77,840 spread out over a large area in Mashonaland East province, about 45 km from Harare, with limited options for transportation to existing VCT centers in Harare. In Epworth and Seke, 6 open-air marketplaces, where women typically sell vegetables and men often congregate around bottle stores (shops selling alcohol), were selected in consultation with community advisors to reflect areas where community members congregate during the day.

Aim 1: Mobile Rapid Testing

The field staff consisted of a driver/outreach worker, 4 HIV nurse-counselors, and a study interviewer. A mobile van provided free anonymous VCT using 2 parallel rapid HIV tests, visiting the sites on a rotating basis 4 times for 4 days per site. VCT services as well as HIV/AIDS educational materials and condoms were made available from the van during the course of the study.

The study population included adults 18 years or older in 2 Zimbabwe communities who were capable of providing informed consent and volunteered for mobile VCT or declined VCT but consented to a study interview. At each market, the outreach worker distributed informational pamphlets describing VCT and the study. A total of 1099 interested individuals volunteered for the service and were assigned a counselor who conducted informed consent and issued the subject a study identification number before pretest counseling.

The VCT counseling protocol was adapted from the VCT-1 efficacy trial.[12] Pre- and posttest counseling was consistent with the standards developed by the US Centers for Disease Control and Prevention (CDC). This client-centered HIV counseling approach decreases the emphasis on education, persuasion, and test results in favor of personalized risk assessment and the development of a personalized risk reduction plan for each client. The emphasis on client-centered counseling, integral to VCT, is on developing a risk reduction plan for each client that takes into account his or her emotional reactions, interpersonal situation, specific risk behaviors, and readiness to change.

Rapid HIV testing was conducted using a parallel rapid testing algorithm approved by the Zimbabwe Ministry of Health. Two rapid HIV tests, Unigold (Trinity Biotech, Bray, Ireland) and Determine (Abbott, Tokyo, Japan), were run simultaneously in the mobile laboratory. Blood samples that were concordantly positive or negative by the 2 rapid enzyme immunoassays (EIAs) were considered to be a true-positive or true-negative result. A single discordant result was obtained and was forwarded to the University of Zimbabwe Central Laboratory for confirmatory testing by Capillus (Trinity Biotech, Wicklow, Ireland) and HIV 1/2 gO EIA (Abbott Laboratories, Abbott Park, IL).

Volunteers tested in the mobile van were given the option of receiving their results on the same day, approximately 30 minutes after pretest counseling, or returning at a future date to receive results at a local clinic. Individuals were given a card with a study identification number written on one side; if feedback at a future date was requested, their appointment time was written on the other side.

Aim 2: Qualitative Assessment of Acceptability of Mobile Rapid Testing

A convenience sample of 30 testers and 29 nontesters completed in-depth interviews in Epworth to assess the acceptability of mobile VCT and motivations for testing or not testing. Testers responded to posted advertisements at a local HIV posttest club or, in some cases, were asked by VCT counselors to come back at a future date for an in-depth interview. Nontesters, recruited using a convenience sample of individuals in the vicinity of the van who chose not to receive VCT (nontesters), were asked to complete the in-depth interviews. Participation in the qualitative interviews was not dependent on having completed a HIV testing survey instrument (see aims 3 and 4). It was not feasible to record refusal rates. Participants were reimbursed a small amount for their time and travel expenses, approximately $5 US. Interviews were conducted in Shona, the local language, at a local community clinic or in a small tent separate from the mobile van.

Interview guides were developed to engage participants in discussing motivations for testing or not testing, attitudes and barriers to testing, the role of stigma in HIV testing, preferences for VCT services, and views about appropriate posttest support services. Interviews lasted approximately 1 hour. Each interview was tape recorded, transcribed, and translated from Shona to English.

Aims 3 and 4: Reasons for Not Testing Previously and Comparison of Testers and Nontesters

Among those individuals seeking VCT at the mobile sites, a random number table was used to select a sample of 483 testers who agreed to complete the study survey instrument on reasons for testing. A convenience sample of individuals in the vicinity of the van who chose not to receive VCT (nontesters) was asked to complete a survey on reasons for declining testing. Research staff members were asked to help identify available individuals in the area around the mobile van who were not interested in VCT but willing to complete the survey. Given the informal nature of the marketplaces, refusal rates of those approached were not systematically recorded.

Survey Instruments

The survey instrument included 86 items for testers and 76 items for nontesters assessing demographics, HIV knowledge and attitudes, history of HIV testing, risk behaviors, and reasons for testing or not testing. Questionnaire items were developed to assess multiple domains related to HIV testing decisions, including logistic and psychologic barriers to testing. The survey took approximately 20 minutes to complete and was conducted in the Shona language. The interviewer recorded responses by hand, and data were then double-entered by study staff into a relational database.

Institutional Review Boards at the University of California, San Francisco (UCSF) and the Medical Research

Council of Zimbabwe (MRCZ) approved the study protocol. Community preparedness was undertaken with local leaders and officials before entering communities, and a community advisory board in Epworth provided extensive feedback on ways to make the mobile VCT more acceptable in public settings.

Qualitative Data Analysis

Data analysis procedures followed an open-coding process developed by Strauss and Corbin.[13] During the initial phase of analysis, 5 analysts established a preliminary codebook of emerging concepts and categories after reading a cross-section of the interviews. Analysts then applied this preliminary codebook to 10 interviews across the 2 groups interviewed and modified codes to reflect further nuances in conceptual categories. This version of the codebook was then applied to all interviews. Codes were applied to blocks of relevant text with Atlas TI, a software program used to organize qualitative data and to facilitate analysis. A second independent qualitative analyst verified coded data. Discrepancies in coding were discussed among analysts and resolved. Coded data were summarized. Convergent and divergent perspectives were then examined.

Statistical Analysis

Demographic characteristics and reported risk behaviors as well as HIV knowledge and stigma were examined as correlates of acceptance of mobile VCT using the χ^2 test, Fisher exact test, or Wilcoxon 2-sample test. Likewise, estimates of HIV infection rates by demographic characteristics were evaluated using contingency tables and the Fisher exact test. Ninety-five percent confidence intervals for HIV infection rates were calculated with standard equations using the normal approximation. Significant differences in the relation between HIV infection rates and demographic factors by site (Epworth or Seke) were evaluated using tests of homogeneity for contingency tables. For identification of predictors of acceptance of mobile VCT, we first employed univariate logistic regression, modeling acceptance of testing as the binary dependent variable. Individual items found to be significant in univariate analysis at the $P = 0.05$ level were then included in a stepwise multivariate logistic regression model to identify independent predictors of acceptance of mobile VCT. The effect of clustering by marketplace was evaluated using generalized estimating equations (GEEs). All statistical analyses were conducted using the SAS Statistical Analysis System, version 9.0 (SAS Institute, Cary, NC).

RESULTS

Aim 1: Mobile Voluntary Counseling and Testing Participation

A total of 1099 individuals participated in mobile HIV VCT between March 2002 and August 2003 (867 in Epworth and 232 in Seke). Among the 1099 HIV testers, all were Shona speaking, 58.3% were male, and 41.7% were female. The distribution of male and female participants did not differ significantly between Epworth and Seke ($P = 0.45$). Mean age among VCT participants was 29.2 years overall and was significantly higher in Seke (mean = 32.7 years) than in Epworth (mean = 28.2 years; $P = 0.04$).

The proportion of VCT participants infected with HIV is presented in Table 1. The overall proportion infected with HIV was 29.2%, with a significantly higher proportion in Epworth (30.8%) than in Seke (23.2%). In general, HIV infections were significantly higher in women (40.0%) than in men (21.5%), driven mainly by elevated infection among women in Epworth (44.1% in women vs. 21.5% in men) but not in Seke (25.5% in women vs. 21.5% in men). HIV infection varied significantly by age as seen in Table 1, with a peak of 47.3% among those aged 31 to 35 years, and it was lowest among those aged 18 to 20 years (9.1%). Mean age among HIV-infected participants was higher in Seke (37.4 years) than in Epworth (30.0 years;

TABLE 1. HIV Seroprevalence, Acceptance of Same-Day Testing, and Characteristics of Testers

	All	Epworth	Seke	*P*
HIV^+	321/1099 (29.2%)	267/867 (30.8%)	54/232 (23.2%)	0.028*
Received same-day test results	1085/1098 (98.8%)	854/866 (98.6%)	231/232 (99.6%)	0.321†
Sex (% HIV^+)				
Male	138/641 (21.5%)	110/511 (21.5%)	28/130 (21.5%)	0.015‡
Female	183/458 (40.0%)	157/356 (44.1%)	26/102 (25.5%)	
Age, y (% HIV^+)				
18–20	17/186 (9.1%)	17/136 (12.5%)	0/50 (0%)	<0.002§
21–25	81/346 (23.4%)	69/288 (24.0%)	12/58 (20.7%)	
26–30	74/195 (38.0%)	67/169 (39.6%)	7/26 (26.9%)	
31–35	70/148 (47.3%)	64/131 (48.5%)	6/17 (35.3%)	
36–45	56/128 (43.8%)	40/93 (43.0%)	16/35 (45.7%)	
46+	23/96 (24.0%)	10/50 (20.0%)	13/46 (28.3%)	

*P value for comparison of proportion infected with HIV between Epworth and Seke.
†P value for comparison of proportion receiving same-day results between Epworth and Seke.
‡Breslow-Day test for homogeneity of the odds ratios.
§P value for the effect of site (Epworth vs. Seke) on the relation between HIV infection and age (from logistic regression).

$P < 0.0001$). Most notably, among subjects aged 18 to 20 years, 12.5% of 136 tested HIV-positive in Epworth and none of 50 tested HIV-positive in Seke.

Overall, 98.8% of subjects chose to receive their HIV test results on the same day. Only 13 of 1098 individuals did not choose to receive test results on the same day as testing. This acceptance of same-day testing did not differ between the 2 communities.

Aim 2: Acceptability of Mobile Rapid Testing

A total of 31 testers (14 male and 17 female) and 30 nontesters (21 male and 9 female) completed in-depth interviews in Epworth to assess acceptability of mobile VCT. Detailed analysis of qualitative interviews is to be provided in a future publication. Briefly, 10 testers reported that they had been sick with an opportunistic infection, a sexually transmitted infection, tuberculosis, or unexplained weight loss or had witnessed the illness or death of a spouse or child (especially women) or of a close friend (especially men). Two testers linked their desire to know their serostatus with plans to get married, to have children, or to plan for the future otherwise. None of the testers mentioned access to treatment as a motivation for testing, and none of the nontesters cited lack of access to treatment as a reason for not testing.

Perceived behavioral risk played an important role in the decision to test for most testers. Nine of the 10 testers whose primary motivation for testing was illness described themselves as being at risk for HIV infection, as did 16 additional testers who had not been ill or affected by the illness of a child, spouse, relative, or friend. Thirteen women reported that their only risk factor was suspicion or knowledge that their husbands or male partners had other sexual partners. Four of these women reported that their male partner was a patron of beerhalls or known as a heavy drinker, and they suspected these men of having sex with commercial sex workers. Women in this situation sought testing themselves or put pressure on their husbands to present for testing. Four men recognized that their sexual behavior under the influence of alcohol put them at risk for infection and decided to test on their own accord.

Of the 31 testers interviewed, 8 mentioned that the cost of testing and the cost of transport to Harare (both less than $1 US) as well as the time it took to travel to Harare presented considerable barriers to testing. Six participants who had never tested before said that these costs had prevented them from testing in the past, despite wanting to know their status. One female tester pointed out that women often had to ask men for money at urban testing sites, making it impossible for them to be tested without the approval of a husband or male partner. Three participants who had tested previously at the VCT center in Harare reported that although neither the cost nor the travel time involved proved prohibitive, they were nonetheless burdensome.

Fear of testing positive or of the test itself was a commonly expressed psychologic barrier for study participants. Twenty-one participants (5 testers and 16 nontesters) reported that their fear of receiving or disclosing an HIV-positive test result had prevented them from testing in the past or currently. One tester had previously feared contracting HIV from the test itself, but accepted testing after the counseling staff reassured him that this could not happen. Many nontesters thought that the stress and worry associated with testing HIV-positive posed a greater threat to their health than HIV itself.

Most interviews with testers contained themes about the role of stigma in discouraging HIV testing. Participants who discussed stigma said that a person being seen presenting for HIV testing risked being stigmatized as a sick person or as an HIV-infected person. These types of stigma were distinct in participants' minds. Some also thought that gossip would lead to worry, poor health, and an early death from AIDS. Only 3 nontesters discussed stigma as a personal reason not to test, however.

Aim 3: Reasons for Not Testing Previously

The subject characteristics of the 483 testers and 332 nontesters completing the survey are presented in Table 2. Only 17.2% of survey respondents reported having a previous HIV test. Among those who had not previously taken an HIV test, knowledge about VCT centers and reasons for not having tested are presented in Table 3. Knowledge of VCT centers was high (70.0%). Among those with knowledge of VCT centers, however, reasons for not having tested were most frequently logistic, such as cost and inconvenient hours or location. Only 2% indicated a fear that their test results would not be kept confidential, and none of the subjects reported concern about being embarrassed to be seen leaving a testing center.

Aim 4: Acceptance Versus Nonacceptance of Mobile Testing

Predictors of testing are presented in Table 4. In univariate analysis, the only demographic characteristic of note was that testers were more likely to have an income at the median or greater than nontesters. Testers were significantly less likely to report prior knowledge of VCT centers than nontesters. Similarly, those who tested were significantly less likely to know a person with HIV or a person who had died of AIDS than nontesters.

Testers perceived themselves to be at risk for HIV infection more often than nontesters and were more likely to report physical symptoms of having been sick, a history of 1 or more sexually transmitted diseases, and no sexual partners in the last 3 months.

With regard to behavioral risk factors, testers were not significantly more likely than nontesters to report more than 1 partner. Testers were significantly more likely to report having bought or obtained free condoms but less likely to have used them in the last 6 months. Although the overall level of concern about being labeled HIV infected was low, such concerns were reported significantly more frequently among those declining testing (5.1% among nontesters vs. 2.1% among testers).

In multivariate analysis, independent predictors of testing were the perception of increased risk for HIV infection, a history of 1 or more sexually transmitted diseases, and no sexual partners in the last 3 months. Behavioral predictors were buying or obtaining free condoms and reporting not having used condoms at all in the last 3 months. Testers were also significantly less likely to know about VCT centers and less likely to know a person with HIV. Clustering by marketplace had

TABLE 2. Subject Characteristics of Testers and Nontesters

	All	Epworth	Seke	*P*†
Sex				
Male	494/815 (60.6%)	421/694 (60.7%)	73/121 (60.3%)	0.95
Female	321/815 (39.4%)	273/694 (39.3%)	48/121 (39.7%)	
Age (y)*				
18–20	137/810 (16.9%)	112/692 (16.2%)	25/118 (21.1%)	0.0003
21–25	278/810 (34.3%)	241/692 (34.8%)	37/118 (31.4%)	
26–30	151/810 (18.6%)	135/692 (19.5%)	16/118 (13.6%)	
31–35	115/810 (14.2%)	107/692 (15.5%)	8/118 (6.8%)	
36–45	79/810 (9.8%)	63/692 (9.1%)	16/118 (13.6%)	
46+	50/810 (6.2%)	34/692 (4.9%)	16/118 (13.6%)	
Marital status*				
Single	277/810 (34.2%)	222/690 (32.2%)	44/120 (37.0%)	0.0064
Married	411/810 (50.7%)	367/690 (53.2%)	55/120 (45.4%)	
Divorced/separated	77/810 (9.5%)	62/690 (9.0%)	15/120 (12.6%)	
Widowed	35/810 (4.3%)	29/690 (4.2%)	6/120 (5.0%)	
Cohabiting	10/810 (1.2%)	10/690 (1.5%)	0/120 (0%)	
Education*				
None to grade 7	165/806 (20.5%)	136/686 (19.8%)	29/120 (24.2%)	0.19
Form 1–4	205/806 (25.4%)	184/686 (26.8%)	21/120 (17.5%)	
Completed O level	407/806 (50.5%)	343/686 (50.0%)	64/120 (53.3%)	
Form 5 to A Level	24/806 (3.0%)	20/686 (3.0%)	4/120 (3.3%)	
University degree	2/806 (0.2%)	1/686 (0.2%)	1/120 (0.8%)	
Technical training	3/806 (0.4%)	2/686 (0.3%)	1/120 (0.8%)	
Income*				
<$1000	160/718 (22.3%)	126/602 (20.9%)	34/116 (29.3%)	0.41
$1000–$5,000	115/718 (16.0%)	99/602 (16.5%)	16/116 (13.8%)	
>$5000–$10,000	154/718 (21.4%)	134/602 (22.2%)	20/116 (17.2%)	
>$10,000	289/718 (40.3%)	243/602 (40.4%)	46/116 (39.7%)	
Had prior HIV test				
Yes	140/815 (17.2%)	116/694 (16.78%)	24/121 (19.8%)	0.40

*Denominators vary from total because of missing responses to individual questions.
†*P* value for comparison of Epworth versus Seke.

negligible effects on identification of predictors of use of mobile VCT.

DISCUSSION

We found acceptance of the mobile VCT approach in a high-density setting and a rural setting in Zimbabwe. Although we were concerned that testing in public settings would be a potential problem for women, 42% of those coming forward for VCT were women. Same-day rapid testing also seems to be an acceptable approach, with 99% of participants opting for same-day results. Mobile VCT was able to identify a large number of individuals with HIV infection. The 29% infected with HIV is higher than the 17% reported at fixed clinic-based sites in Harare. HIV infection was significantly higher in Epworth (31%) than in Seke (23%), suggesting that targeting mobile VCT to areas with higher migration like Epworth may be helpful. The migration issue may also account for the much higher proportion of HIV infection in the 18- to 20-year-olds in Epworth compared with Seke. Alternative explanations for the low HIV prevalence among younger persons in Seke include differences in social norms in the rural area and more intact families with young people more likely to be living at home until marriage. The higher proportion of HIV infection in younger women than in younger men is consistent with other African studies.[14]

TABLE 3. Reasons for No Prior HIV Testing Among First-Time Testers Participating in Mobile VCT Who Were Aware of VCT Centers

Response	N/Total	% Yes
Previously aware of VCT centers	425/590	72.0
Hours are not convenient	89/348	25.6
Location is not convenient	72/348	20.7
Cost is too high	28/350	8.0
Afraid my test will not be kept confidential	7/350	2.0
Do not trust the result will be correct	1/345	0.3
I am embarrassed to be seen walking in/out of a testing center	0/343	0
Other	65/350	18.6

The most frequent reasons for not being tested previously were convenience of location, hours, and cost. In-depth interviews confirmed the importance of logistic barriers to testing. In fact, when these barriers to VCT were removed in these

TABLE 4. Factors Associated With Testing at Mobile VCT

Predictor	Predictor Frequency		Univariate		Multivariate	
	Testers	Nontesters	OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*
Sex						
Male	62.5%	57.8%	Reference			
Female	37.5%	42.2%	1.2 (0.9 to 1.6)	0.178		
Age >30 (y)	32.3%	26.5%	1.3 (0.9 to 1.8)	0.0765		
Single	35.0%	32.5%	1.1 (0.83 to 1.5)	0.465		
Married	48.5%	53.3%	0.82 (0.62 to 1.1)	0.17		
Education O level or greater	53%	53%	1.0 (0.8 to 1.4)	0.78		
Income median or greater	49.5%	39.5%	1.6 (1.2 to 2.2)	0.0015	1.6 (1.2 to 2.2)	0.0017
Had prior HIV test	18.0%	16.0%	1.2 (0.8 to 1.7)	0.446		
Aware of VCT centers	46.2%	60.8%	0.5 (0.4 to 0.6)	<0.0001	0.57 (0.42 to 0.78)	0.0003
Sex partners in last 3 months						
0	7.9%	1.7%	5.6 (1.9 to 15.9)	0.0014	5.1 (1.7 to 14.8)	0.0029
1	76.5%	78.2%	Reference	—		
2+	15.6%	20.1%	0.91 (0.61 to 1.4)	0.6508		
No condom use in last 6 months	84.9%	80.1%	1.4 (0.97 to 2.0)	0.0763	1.7 (1.2 to 2.6)	0.0085
Bought/collected condoms in last 6 months	11.4%	5.1%	2.5 (1.4 to 4.5)	0.0022	2.1 (1.1 to 3.8)	0.0159
Feel at risk for HIV	49.7%	34.9%	1.8 (1.3 to 2.5)	0.0001	1.8 (1.3 to 2.5)	0.0001
Had been sick	12.4%	4.8%	3.3 (1.8 to 5.9)	<0.0001		
Treated for STD in last 6 months	13.7%	4.8%	3.4 (1.9 to 6.2)	<0.0001	2.8 (1.5 to 5.1)	0.0013
Know person with HIV	26.5%	43.1%	0.4 (0.3 to 0.6)	<0.0001	0.49 (0.36 to 0.67)	<0.0001
Know person who died with HIV	54.7%	65.4%	0.64 (0.48 to 0.85)	<0.0001		
Worried about being labeled HIV-positive	2.1%	5.1%	0.43 (0.2 to 0.92)	0.0300		

95% CI indicates 95% confidence interval; OR, odds ratio; STD, sexually transmitted disease.

2 communities, the demand for VCT often exceeded the resources of the research staff. Test seekers who could not be served were invited to return on the next mobile testing date. Thus, our findings suggest that removing practical and logistic barriers to testing could greatly increase the number of people who know their HIV status. Testers at the mobile VCT sites were less likely than nontesters to know about clinic-based VCT sites and to have higher incomes and less likely to know a person with HIV. This latter result was unexpected, possibly reflecting the attraction of the mobile units to those who had less information about HIV, individuals who were newer to the community, or individuals who would not seek out VCT but just came upon it and took advantage of the opportunity.

This community-based approach to VCT also seemed to attract individuals at significant behavioral risk of HIV infection. Testers were significantly more likely than nontesters to perceive themselves at increased risk and to report a history of sexually transmitted diseases. For women, this perception of risk was often associated with a belief that their husbands or male partners had other sexual partners. For men, the perception of risk was associated with sexual behavior under the influence of alcohol. Interviews with men and women included themes of concern over attendance at beerhalls and contact with commercial sex workers, suggesting 2 potential groups for targeted prevention outreach. These findings on increased risk in community settings suggest that mobile VCT can be part of comprehensive prevention outreach efforts, including HIV information, condom availability, and knowledge of HIV status.

We were impressed with the extent to which those who tested did so to confirm a suspicion of why they had physical symptoms of possible HIV-related disease. Testers were significantly more likely than nontesters to report physical symptoms of being sick and were also more likely to report no sexual activity in the last 3 months, possibly related to their poor physical health. This finding of testing to confirm suspicion of illness was consistent with the results of the in-depth interviews, where testers described opportunistic infections and weight loss as reasons for testing. It is important to note, however, that testers did not report an expectation that treatment in the form of ART would be available to them as a result of testing. Although there are ambitious plans to roll out such treatment in Zimbabwe and other African countries, none of the participants in in-depth interviews mentioned such plans or expected access to advanced HIV treatment. Nonetheless, mobile VCT could provide identification of HIV-infected individuals as a means of linking them to whatever treatment options become available.

Psychologic barriers such as fear of the emotional reaction accompanying a positive test result were much more common themes among nontesters. This suggests the importance of providing extensive community outreach and posttest support services as part of a comprehensive VCT program.

Stigma or concerns about being labeled HIV infected did not seem to be the major concern we had expected it to be. Stigma about being tested seemed to be different than stigma about being HIV-positive. Although worry about being labeled HIV infected was significantly more frequent among

nontesters (5.1%) than testers (2.1%), the overall low frequency of such reports was surprising. In the in-depth interviews, although the theme of stigma in discouraging testing was frequent, only 3 nontesters discussed stigma as a personal reason for deciding not to test.

Limitations of this study include the lack of generalizability of qualitative data, convenience sampling, and difficulties in calculating refusal rates associated with recruitment in often chaotic marketplaces. We believe qualitative interviewing provides in-depth contextual information that improves the interpretation of quantitative findings. In addition, we believe that our brief questions in this survey only begin to address the complex issues of the relation between HIV-related stigma and testing. Testers who were interviewed thought that stigma did present a barrier to other community members, who stayed away from the testing sites and were thus not available for recruitment. It may be the case that stigma in the community is better evaluated through community-based qualitative research rather than a standardized survey instrument administered to study participants.

The low overall uptake of VCT in sub-Saharan Africa remains an important area for future research. In particular, it would be important to research whether having a critical proportion of community members aware of their HIV status has an effect on community norms and reduction of behavioral risk taking. Providing mobile testing along with community outreach and support may significantly increase the proportion of people who know their HIV status and, in turn, trigger greater HIV awareness in the community at large. Mobile VCT can also serve as an important link to care and treatment services as they become more widely available in limited recourse settings.

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