Using a Social Network Strategy to Distribute HIV Self-Test Kits to African American and Latino MSM

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Background: Men who have sex with men (MSM) continue to be disproportionately impacted globally by the HIV epidemic. Studies suggest that HIV self-testing (HIVST) is highly acceptable among MSM. Social network strategies to increase testing are effective in reaching MSM, particularly MSM of color, who may not otherwise test. We tested a social network–based strategy to distribute HIVST kits to African American MSM (AAMSM) and Latino MSM (LMSM).

Setting: This study was conducted in Alameda County, California, a large, urban/suburban county with an HIV epidemic mirroring the national HIV epidemic.

Methods: From January 2016 to March 2017, 30 AAMSM, LMSM, and transgender women were trained as peer recruiters and asked to distribute 5 self-test kits to MSM social network members and support those who test positive in linking to care. Testers completed an online survey after their test. We compared peer-distributed HIVST testing outcomes to outcomes from Alameda County's targeted, community-based HIV testing programs using χ^2 tests.

Results: Peer-distributed HIVST to 143 social and sexual network members, of whom 110 completed the online survey. Compared with MSM who used the County's sponsored testing programs, individuals reached through the peer-based self-testing strategy were significantly more likely to have never tested for HIV (3.51% vs. 0.41%, $P < 0.01$) and to report a positive test result (6.14% vs. 1.49%, $P < 0.01$).

Conclusion: Findings suggest that a network-based strategy for self-test distribution is a promising intervention to increase testing uptake and reduce undiagnosed infections among AAMSM and LMSM.

Key Words: HIV self-testing, black MSM, Latino MSM, social networks, sexual networks

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INTRODUCTION

Men who have sex with men (MSM) account for the majority of new HIV infections in the United States, with African American MSM (AAMSM) and Latino MSM (LMSM) carrying the highest and second highest burden of infection, respectively.[1] It is estimated that up to 46% of HIV-positive AAMSM and 37% of HIV-positive LMSM are unaware of their status.[2] Furthermore, a larger proportion of AAMSM and LMSM delays testing and is diagnosed with AIDS within 1 year of receiving an HIV diagnosis when compared with white MSM.[3,4]

Improving early HIV diagnosis in MSM communities is critical to reaching the UNAIDS goal of 90% of people being aware of their status.[5] For MSM at risk, testing is recommended at least once every 3–6 months.[6] However, many structural barriers to HIV testing exist including fear of a positive status, anticipated stigma and discrimination in clinics, privacy concerns, inadequate access to affordable services, lack of culturally competent medical services, and mistrust of medical providers.[7–9] Among effective strategies that can overcome a number of these structural barriers and reach nonfrequent and infrequent testers, HIV self-testing (HIVST) has demonstrated promise in MSM populations.[10–12] In the United States and abroad, HIVST has been shown to be highly acceptable and often preferable to provider- or clinic-based testing among MSM and is more likely to result in partner testing.[13–16] Furthermore, HIVST was found to double testing frequency among MSM in one trial[14] and is now recommended as an effective strategy by the World Health Organization.[17]

At the same time, network-based strategies have demonstrated that peers are better than researchers and traditional medical clinics in locating members of marginalized, underserved, or hidden populations.[18–20] Peers have access to broader networks of MSM who may be untested or who rarely test and can access these networks outside clinic hours and in venues often not accessible to traditional outreach workers. Specifically, peer-driven approaches have

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been demonstrated to be highly effective in identifying persons with undiagnosed HIV infection in high-risk networks.[19] Network-based strategies can overcome some of the structural barriers encountered by vulnerable populations and may be an efficient vehicle for the distribution of HIVST.

We sought to integrate peer-based recruitment and distribution of HIVST to expand testing among minority MSM—making HIV testing accessible to difficult to reach sexual and social networks. We aimed to determine the promise of this peer HIVST program, called "Project T," by examining the program's success in identifying undiagnosed HIV infection among AAMSM and LMSM in comparison with a public health department's traditional targeted HIV testing strategy. As is typical with many health departments, their strategies also sought to encourage testing uptake among MSM; this traditional strategy also sought to encourage testing among MSM but primarily at community-based testing sites and regular outreach events.

METHODS

Study Setting

The study was conducted in Alameda County, California, in partnership with the HIV STD section of the Alameda County Public Health Department. Alameda County, which includes Oakland, CA, is a large, urban/suburban county with an HIV epidemic mirroring the national HIV epidemic. MSM accounted for approximately 70% of all new infections in 2015.[21] African Americans and Latinos represent 34.1% of the population of the county[22] yet account for 63.2% of all new infections from 2013 to 2015. And Latinos and African Americans have the first (40.1%) and second (34.8%) highest proportion of late diagnoses, respectively.[21]

Procedures

Formative research, including focus groups and interviews with AAMSM and LMSM and service providers, and a small pilot of the intervention was undertaken to shape the final protocol before full implementation. From January 2016 to March 2017, we identified AAMSM, LMSM, and transgender women peer recruiters. The peer recruiters were identified from HIV-related support groups, local gay bars, online social networking and dating apps, community-based organizations, and word of mouth. Eligibility criteria for peer recruiters included identifying as African American or Latino; identifying as male or transgender female; being in the target age group (18–45 years); self-identified as having recent sexual activity with a man; and being comfortable discussing HIV with a friend. The age range was chosen as new HIV diagnoses in Alameda County are most common among those between 20 and 50 years old, and the only age group with increasing rates is the group between 20 and 29 years old.[21] Peer recruiters underwent training on HIV basics, HIVST kit use, strategies to support friends who test positive and link them to care, resources for confirmatory testing and treatment, and data collection procedures. Training also included role-plays and discussion on specific ideas for approaching friends identified as potential testers. Trainings were conducted in community locations easily accessible by public transit.

Each peer recruiter was provided with 5 OraQuick oral fluid HIV test kits (OraSure Technologies, Bethlehem, PA) and asked to distribute the test kits to friends who they believed were AAMSM or LMSM, age 18–45, and had not tested in the last year. Peers, who were most effective at reaching infrequent, and nontesters were asked to distribute an additional 3 tests. Each peer received $100 for participating in the 3-hour training and $150 after distribution of all 5 HIVST tests. Those asked to distribute an additional 3 tests received an additional $50. After distributing HIVST kits, we asked each peer recruiter for the age, race, sexual identity, and gender of the friends to whom they gave a test, the nature of their relationship (eg, friend, family member, sex partner, etc), if they knew whether or not the test was completed, and the test result.

Peer recruiters were also asked to encourage testers to complete a brief, anonymous online survey after using the HIVST kit, and those who tested positive were asked to complete another survey 6 weeks after testing. The survey included social network characteristics; testing history; self-testing uptake, acceptability, and results; health care utilization; sexual behavior; and substance use history. The domains of the follow-up survey, for testers that received a positive result, included testing motivations, social support, and linkage to care. Testers were offered incentives in the form of Amazon Flex gift cards that were attached to test kits. Once the HIVST kit was used, the participant entered the number of the test kit in the survey and staff loaded $25 on the Amazon card. This incentive procedure ensured anonymity (ie, no contact information was required from testers). Testers had the alternative option to provide contact information for receipt of cash or another gift card, which could be mailed or emailed. After testing and completing the survey, testers were asked whether they would be interested in becoming peer recruiters themselves to potentially reach deeper into peer networks. There were 6 "second wave" peers recruited using this method. The study protocol and research materials were reviewed and approved by the Institutional Review Board of the University of California, San Francisco.

We completed a debriefing discussion with each peer recruiter at the completion of their study participation. This included all peers who completed their test distribution and those who chose to discontinue their participation without distributing all the test kits. Although these were not formal qualitative interviews and were, thus, not recorded and transcribed, we took notes on each discussion to capture the experiences of the peer recruiters.

Analysis

We calculated frequencies for each demographic and behavioral variable in the survey. These were compared with data on testers from the Alameda County Public Health Department targeted testing program in 2015. The Department funds community-based HIV testing programs focused on

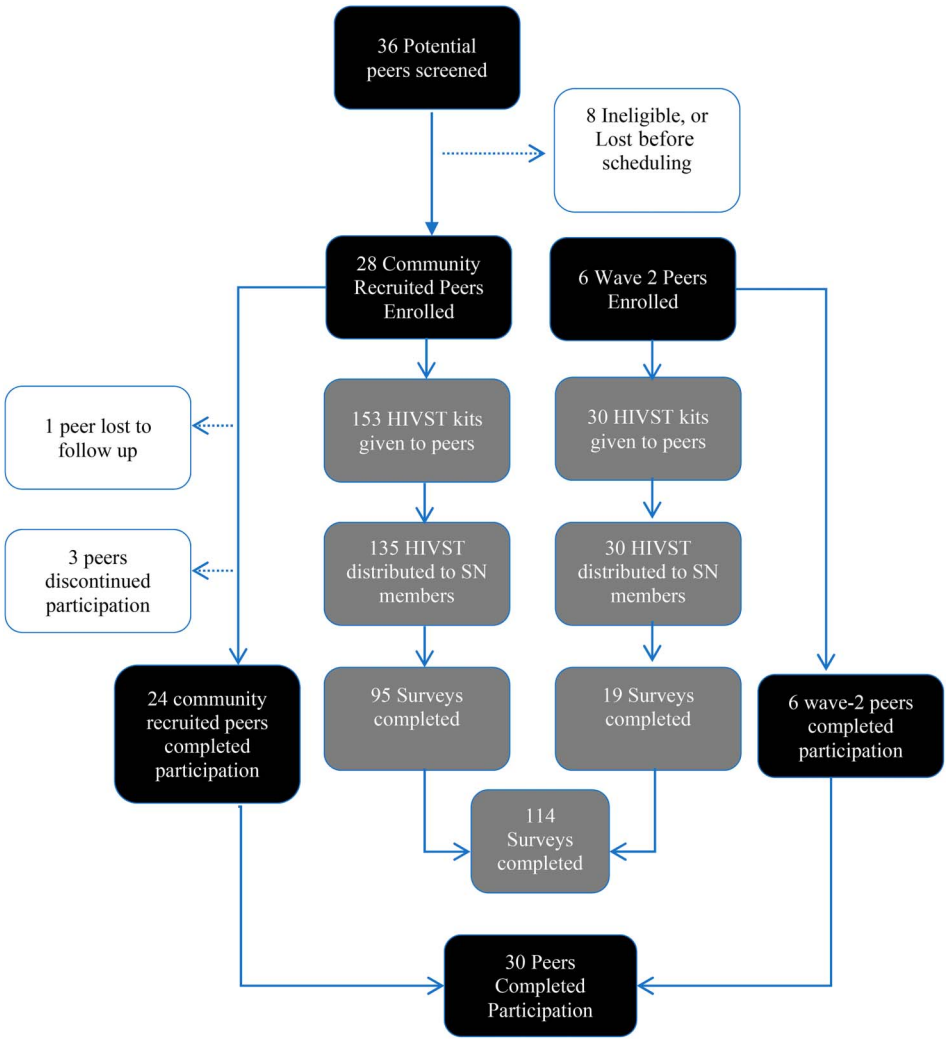

FIGURE 1. Recruitment and retention of peer recruiters, and test distribution.

particular populations or risk groups. In 2015, 9 organizations provided 3483 rapid point-of-care HIV tests funded by the County and detected 4 previously undiagnosed HIV cases. Priority populations for the County community-based testing program include gay men and other MSM and transgender persons, particularly those who are African American or Latinx. However, testing organizations have the flexibility to test persons outside these priority populations. In 2015, the testing programs were geographically spread throughout the County, although most were based in Oakland, and several organizations offered mobile and venue-based testing at various sites including bars and a bath house. Each test is performed by a trained, certified HIV test counselor who also completes data reporting, thus data on HIV test result are reported with a high degree of completeness. Alameda County testing data are reported on a per-test, not per-individual, basis. We restricted the County data set to individuals between 18 and 45 years old, who categorized their race as black or Latino, indicated male, transfemale, or "other" for gender identity and who reported sex with a male or transgender partner.

Using χ^2 test of independence, we compared our study data with the County data by examining measures of previous and current HIV test results, frequency of testing, sexual risk behaviors, as well as demographics, such as gender, age, and sexual identity. We also compared the variables by peer recruiters' demographics, to determine whether the demographic factors or testing behaviors of peer recruiters were predictive of testing outcomes. Fisher exact tests were used when cell sizes were small. Analysis was conducted using Stata 14 (StataCorp, 2015, Stata Statistical Software: Release 14; College Station, TX: StataCorp LP).

RESULTS

We identified 36 potential peer recruiters through our recruitment efforts. Six were determined to be ineligible (3 were older than 45 years, 2 were new to the area and did not have a social network from which to recruit, and one presented with emotional health issues and was determined to be unfit for supporting peers through testing). We lost contact with 2 potential recruiters before training. Of the 28 peer recruiters who were enrolled and trained, one was lost to follow-up and 3 chose to discontinue their participation in the study after partially distributing a total of 4 HIVST kits.

TABLE 1. Demographic Characteristics of Testers in Project T, Who Completed Surveys, did Not Complete Surveys, and Among a Comparable Population in Alameda County–Targeted Testing Programs

	Testers in County Testing Program (2015) (N = 1205)		Self-Testers (Survey Sample) (N = 114)	
	n	%	n	%
Gender				
Male	1138	94.44	102	89.47
Transfemale	56	4.65	9	7.89
Another gender identity*	11	0.91	3	2.63
Race				
African American	448	37.18	69	49.64
Hispanic/Latino(a)	757	62.82	38	27.34
White	—	—	12	8.63
Asian/Pacific Islander	—	—	5	3.60
Mixed race/other	—	—	9	6.47
Missing/declined	—	—	6	4.32
Age				
19–24	331	27.70	17	15.89
25–34	533	44.60	63	58.88
35–44	151	12.64	18	16.82
45+	180	15.06	9	8.41
Missing	10		7	
Sexual identity				
Heterosexual	92	7.63	11	10.09
Bisexual	240	19.92	30	27.52
Gay/homosexual	837	69.46	67	61.47
Unspecified	36	2.99	1	0.92
Current test result				
Negative	1186	98.42	101	88.6
Positive	18	1.49	7	6.14
Don't know	1	0.08	6	5.26

*"Another gender identity" from County data: "queer" (n = 8), "fluid" (n = 1), "transgender—unspecified" (n = 1), "femme" (n = 1), missing (n = 1).

Among the remaining 24 peer recruiters, 131 testers were provided with HIVST kits, 6 of whom agreed to become peer recruiters themselves. The 6 testers who became peer recruiters distributed an additional 30 test kits, resulting in a total of 165 HIVST kits distributed to social and sexual network members. Of those testers, 114 (69%) completed the survey (Fig. 1). Most (n = 69) testers chose to receive their survey incentive using the attached Amazon card, which was the only completely anonymous option. The remaining testers chose to receive a different gift card by mail or email (n = 31) or to meet a staff member in person to receive a cash incentive (n = 17).

Among testers who completed the survey, the majority identified as African American (49.6%) or Latino (27.3%) (Table 1). Most identified as male (89.5%) and 3 quarters (74.77%) were between the ages of 18 and 34. Our survey sample was statistically similar to the sample in the County data on gender and sexual identity, however, the samples differed statistically by race ($P < 0.001$) and age ($P < 0.001$), with our sample containing a greater proportion of African Americans (49.6% vs. 37.2%) and a smaller proportion of Latinos (27.3% vs. 62.8%). In addition, our sample had fewer testers in the 19–24 age group (14.9% vs. 27.5%) and more in the 24–34 age group (55.3% vs. 44.2%). Among those testers who did not complete the survey, peer recruiters reported that 60% were African American, 23% were Latino, and 75.6% were between the ages of 18 and 34. This group was statistically similar to the County data sample on race ($P = 0.434$) and age ($P = 0.216$).

Compared with the County's data, testers in the HIVST sample who completed the survey were significantly less likely to report a previous HIV test ($P < 0.001$) and were more likely to report that their last HIV test was more than a year ago ($P < 0.001$) (Table 2). A greater proportion reported a positive test result in the HIVST survey sample (6.2%) compared with the County testing program (1.5%) ($P < 0.001$). Among those who reported that their last test was negative, 4.2% reported a positive result in the HIVST sample, compared with 1.2% in the county testing program ($P = 0.013$). Overall, the HIVST sample reported less sexual risk with lower proportions reporting any anal insertive sex ($P < 0.001$) or receptive anal sex ($P < 0.001$) than the County testing program sample (Table 2).

In comparing outcomes of the HIVST sample by peer recruiter HIV status, we found that a greater proportion of testers recruited by HIV-positive peer recruiters reported a positive test result (15.6%) than those recruited by an HIV-negative peer recruiter (2.4%) ($P = 0.02$). Testing outcomes were not associated with any other peer demographics we examined (Table 3).

Peer Recruiter Experience

In our unstructured debrief discussions, peer recruiters overwhelmingly reported positive experiences with the process of distributing test kits. Most reported that they felt that the training they received prepared them well, and that they were motivated by a desire to help people in their community get tested. Some felt that it was initially "weird" or "awkward" to offer people an HIV test. However, those who described these feeling found that once they began to distribute the tests, it was not as hard as they had anticipated. By contrast, some were surprised by the fact that people said no, which made the process more challenging than they expected. Ultimately, peers overwhelmingly reported that their friends were very excited about being able to test at home.

There were some challenges worth noting. For example, some peers experienced initial resistance from friends when they heard that it was a study, or if they thought the peer would have to conduct the test. Although, these concerns were alleviated when peers explained that they could test in privacy, and that the data collection was anonymous and voluntary. Others noted that some testers that were not gay-identified were initially resistant. This was highlighted, primarily, by transwomen peers who distributed tests to men who had sex with men and transgender women but identified as heterosexual. Other challenges they faced were largely logistical. Some found it difficult to get the tests to friends who lived in the more distant regions of the county.

TABLE 2. Comparison of Testing and Risk Outcomes by Testing Program

	Testers in County Program (2015) (N = 1205)		Self-Testers (Survey Sample) (N = 114)		
	n	%	n	%	χ^2 *P**
Previous HIV test					<0.001
No	62	5.15	4	3.51	
Yes	1135	94.19	102	89.47	
Not reported	8	0.66	8	7.02	
Last test result					0.029
Negative	1123	93.20	72	63.16	
Positive	4	0.33	2	1.75	
Not reported	78	6.47	40	35.09	
Time since last test					<0.001
Never	5	0.41	4	3.51	
<6 mo	598	49.63	45	39.47	
6–12 mo	236	19.59	30	26.32	
Over 1 yr	251	20.83	27	23.68	
Can't remember/missing	115	9.54	8	7.02	
Present test result					<0.001
Negative	1186	98.42	101	88.6	
Positive	18	1.49	7	6.14	
Not reported	1	0.08	6	5.26	
Present test result if last test was negative					0.013
Negative	1109	98.75	68	94.44	
Positive	13	1.16	3	4.17	
Not reported	1	0.09	1	1.39	
No. of sex partners					0.05
0	64	5.31	10	8.77	
1	96	7.97	16	14.04	
2–4	309	25.64	30	26.32	
5–10	363	30.12	34	29.82	
11–50	333	27.63	20	17.54	
51+	40	3.32	4	3.51	
Anal insertive sex (last 12 mo)					<0.001
Yes	971	80.58	47	41.23	
No	234	19.42	67	58.77	
Anal receptive sex					<0.001
Yes	803	66.64	43	37.72	
No	402	33.36	71	62.28	

*Fisher exact for expected frequencies of 5 or fewer.

Others lived outside of the county but worked or socialized exclusively in Oakland and surrounding areas. This presented a problem because they would be forced to carry the test kits with them just in case they saw a friend. Consequently, there was a great deal of planning and scheduling for some of the peers.

DISCUSSION

We found a peer-based strategy to distribute HIVST kits through social and sexual networks, which was successful in identifying new HIV infections among AAMSM and LMSM. Knowing one's HIV status is the first step in the treatment and care cascade for people living with HIV. AAMSM and LMSM are the groups most disproportionately impacted by the HIV epidemic,[1] yet they also have the highest rates of undiagnosed HIV infection.[23,24] To put these findings in context, we compared the HIVST data to a local County testing program. That comparison indicated we reached a higher proportion of previously undiagnosed MSM, nontesters, and infrequent testers.

To our knowledge, ours is the first study to use a social network–based strategy to distribute HIVST kits. This study supports the emerging concept that social networks and peer strategies are effective in increasing testing among high-risk MSM of color.[18,19,25] For example, a recent study compared a respondent driven sampling approach to conventional outreach-based recruitment strategies for HIV testing and found that peer-based chain recruitment was more efficient than conventional testing and counseling at identifying HIV infections.[26] However, previous studies that assessed peer-based testing strategies typically require testers to present at a clinic or research site for an HIV test. Thus, they only partially address the structural barriers that minority MSM

TABLE 3. Tester Outcomes by Peer Recruiter Demographics

	Peer Recruiters (N = 34)			Testers' Last HIV Test						Test Result				
	N	%	No. (of surveys)	Never	0–6 mo	6–12 mo	Over 1 yr	Can't remember	χ^2 *P*	Negative	Positive	Didn't look	Decline	χ^2 *P*
Totals				3.51	39.47	26.32	23.68	7.02		88.6	6.14	0.88	4.39	
Gender									0.288					0.227
Male	28	82.35	88	3.41	44.32	26.14	20.45	5.68		85.23	7.95	1.14	5.68	
Transfemale	6	17.65	26	3.85	23.08	26.92	34.62	11.54		100	0	0	0	
Sexual identity								0.21					0.657	
Gay/ homosexual	23	67.65	73	4.11	47.95	20.55	21.92	5.48		84.93	8.22	1.37	5.48	
Heterosexual	7	20.59	27	3.70	22.22	29.63	33.33	11.11		96.3	3.7	0	0	
Bisexual	4	11.76	14	0.00	28.57	50.00	14.29	7.14		92.86	0	0	7.14	
Age									0.233					0.134
18–24	4	11.76	15	0.00	13.33	53.33	26.67	6.67		100	0	0	0	
25–34	23	67.65	82	3.66	46.34	19.51	24.39	6.10		90.24	4.88	1.22	3.66	
35–44	6	17.65	13	7.69	23.08	30.07	23.08	15.38		69.23	23.08	0	7.69	
45+	1	2.94	4	0	50	50	0.00	0.00		75	0	0	25	
Race									1.00					**0.052**
African American	23	67.65	26	3.85	38.46	23.08	26.92	7.69		100	0	0	0	
Hispanic/ Latino(a)	6	17.65	68	2.9	39.7	27.9	23.53	5.88		85.29	10.29	1.47	2.94	
Mixed race	5	14.71	20	5.0	40.0	25.0	20	10		85	0	0	15	
HIV status									0.966					**0.02**
Negative	22	64.71	82	3.66	40.24	24.39	24.39	24.39		92.68	2.44	0	4.88	
Positive	12	35.29	32	3.13	37.50	31.25	21.88	6.25		78.13	15.63	3.13	3.13	
Time since last test*								0.834					0.774	
<6 mo	17	50.00	64	3.13	40.63	23.44	23.44	9.38		92.19	3.13	0	4.69	
6–12 mo	2	5.88	9	0	33.33	33.33	33.33	0		100	0	0	0	
Over 1 yr	3	8.82	9	11.11	44.44	22.22	22.22	0		88.89	0	0	11.11	

The bold numbers are the *P*-values significance.
*Includes only HIV-negative peer recruiters.

encounter in obtaining an HIV test. Particularly in high-stigma contexts, community-based testing delivered by members of the target community or social group can be more effective in reaching those who may not seek out testing on their own.[27–29] Our testing strategy leveraged the success of peers and their social networks to increase access to HIV testing through HIVST.

We also found that HIV-positive peer recruiters were more effective in recruiting HIV-positive MSM testers than HIV-negative recruiters. This is consistent with other network-based studies that found that networks originating from a seed that was HIV positive resulted in a higher prevalence of HIV among those recruited to test.[30] Although we are unable to determine whether the peer recruiters and those that tested were in the same sexual networks, previous research suggests that closed or small sexual networks might help explain the high prevalence of HIV among AAMSM and LMSM.[31–33] Thus, the MSM living with HIV may have more individuals within their network who are also HIV positive.

Unexpectedly, compared to our sample, the men in the County testing program reported more sex partners and a larger proportion reported having any anal sex. This finding might partially be driven by the differences in age between the 2 samples. The County sample had a larger proportion of 18–24 year olds and men over 45 years than the HIVST sample. A recent study found that between 2002 and 2011, the prevalence of HIV increased for 13–24 and 45–54 year olds, while stabilizing or decreasing in other age groups.[34] In this context, it is not surprising that those age groups reported higher rates of sexual risk behaviors. However, it remains curious that more cases of HIV were found in the HIVST sample despite lower reported sexual risk behavior. Several studies have shown relatively less risk among AAMSM, compared with white MSM, and suggest that the disproportionate number of cases in AAMSM may be due to higher overall prevalence of HIV (both diagnosed and undiagnosed) among their sex partners, rather than more "risky sex."[31–33] It is possible that our strategy reached a set of networks in which there is less risky sex but higher likelihood of an HIV-infected and untreated partner. Furthermore, the County program may capture more regular testers, who may be more likely to practice high risk sexual behaviors. As such, the County data may include duplicate test results for those frequent testers, which would affect the proportions of the sample reporting relevant risk behaviors.

There are some limitations to our findings worth noting. First, despite ensuring anonymity, only 69% of testers

responded to the survey. As the identity of the testers were known only to the peer recruiters, we are unable to infer any information on behavioral risk or testing experience among those testers who opted out of the survey. As a result of these limitations, we cannot make inferences about the behaviors and test results of those who opted not to complete the survey. Thus, we do not know how their data may or may not have impacted our findings. Second, the sample for this study was small. Although it is the first study to test this strategy, and as nearly all peer recruiters completed the distribution of their test kits with very few negative experiences, it seems to be feasible. Third, we were not able to remove duplicates from the county data because we did not have access to any identifying information. Fourth, the method of assessment between our study and the County testing program was different. Consequently, the unexpected results (eg, lower risk but higher prevalence in the HIVST sample) may reflect the substantial difference in how these programs operate. Finally, the anonymity of testers, and the fact that only one HIV-positive tester completed the follow-up survey, limited our ability to fully assess linkage to care outcomes.

CONCLUSION

We sought to explore the feasibility of using a peer network-based strategy for distribution of HIVST kits. Our findings suggest that this strategy for HIVST distribution has the potential to reach those MSM who are at greatest risk. The strategy seems able to overcome some of the well documented individual and social barriers to testing among key populations.[7,9,35] Given our promising results, additional studies are needed to (1) determine the large-scale effectiveness of this strategy to overcome the barriers and increase HIV testing among those most vulnerable to infection; (2) determine whether it is replicable in other geographic locations and populations; and (3) examine the cost effectiveness of this strategy.

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