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## Efficacy of internet recruitment and HIV Self-Testing for diagnosing HIV infections among Black and Hispanic/Latino MSM and transgender women in 11 US States, 2020–2021

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### Abstract

**Introduction:** We evaluated internet platforms for distributing HIV self-tests (HIVSTs) to Black or African American (Black) and Hispanic or Latino men who have sex with men (MSM) and transgender women (TGW).

**Methods:** We recruited MSM and TGW from general interest, dating, and Lesbian, Gay, Bisexual and Transgender platforms. Two HIVSTs were mailed to all MSM and TGW. Surveys (screening, baseline, 4-month, and results reporting) were completed online. After 4 months, participants were mailed another HIVST and a DBS card. All HIVST interpretations and images of HIVST devices were reported online.

**Results:** Of 2093 MSM and 102 TGW, most were recruited via general interest and dating platforms. Over 50% were 18–29 years of age, most identified as gay or bisexual. 45% had

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Contributors

All authors contributed to the conceptualization of the study, paper, and conceptualization of data analyses. RJ MacGowan, PR Chavez, R Dana, J Raiford, wrote the first drafts of the paper, JA Caldwell, L Hightow-Weidman, JA Johnson, J Jones, R Stephenson, T Sanchez, A Sharma, AJ Smith, S Sullivan, K Wall, and PS Sullivan contributed to subsequent drafts of the paper. PS Sullivan and RJ MacGowan had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Data analyses were conducted by RJ MacGowan, M Hannah, JA Johnson. All authors approved the final draft of the paper.

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not tested for HIV in the past 12 months. 9.1% of MSM reported a positive (reactive for HIV antibodies) result, with the highest percentage among Black MSM (11.5%). Dating platforms recruited higher percentages of MSM who recorded their HIVST result as positive compared with MSM from general interest platforms during the intervention period (11.9% vs 5.5% ( $p < 0.0001$ )); and MSM who had never tested for HIV reported a greater percentage of positive results compared with MSM who had been tested for HIV before enrollment (16.1% vs. 7.1%;  $P < 0.0001$ ). MSM were able to correctly interpret and report HIVST results. Of TGW, 7% reported a positive result.

**Conclusion:** Internet dating and general interest platforms can be key to increasing awareness of infection among BMSM, HMSM and TGW persons, including those who do not use existing HIV services.

**Trial Registration:** [www.clinicaltrials.gov](http://www.clinicaltrials.gov) Identifier: NCT04219878.

## Keywords

HIV self-testing; Internet; Dating sites; men who have sex with men; transgender women

## Introduction:

In the United States (US) an estimated 13% of people with HIV are unaware of their infection<sup>1</sup>, and persons with undiagnosed HIV infection contribute to a disproportionate percentage of new HIV infections<sup>2</sup>. Continued efforts are needed to increase awareness of HIV infection to achieve the aims of the Ending the HIV Epidemic in the US (EHE) initiative<sup>3</sup>. HIV self-testing can eliminate some access to service barriers, enabling people to learn their HIV status.

Providing HIV self-tests (HIVSTs) can increase HIV testing and awareness of HIV infection among gay, bisexual, and other men who have sex with men (collectively MSM)<sup>4-7</sup> without increasing sexual risk behaviors<sup>5</sup>. Existing HIVST programs in the US aspire to reach priority populations<sup>8-10</sup> through in-person distribution of HIVSTs at outreach events or in fixed facilities, internet distribution, and peer-to-peer distribution in social networks<sup>8-10</sup>. Internet distribution programs can reach a wide geographic audience<sup>8,10</sup>. HIVST programs have used various internet platforms such as geospatial dating, social networking, and general interest platforms to reach priority populations<sup>5,8,10-13</sup>. Distributing HIVSTs via the internet can reach people who do not use existing testing services<sup>5,8,10</sup> and is cost-saving<sup>14</sup>. However, program evaluations have documented follow-up rates below 50%<sup>8,10,11</sup>, limiting the representativeness of the data. Therefore, data are needed to provide evidence for the most effective advertising strategies for reaching the priority populations most disproportionately affected by HIV, including Black or African American (Black) and Hispanic or Latino (Hispanic/Latino) MSM, and transgender women (TGW).

In 2017, the Centers for Disease Control and Prevention (CDC) awarded funds to Emory University to conduct a randomized controlled trial (RCT), “Implementation of Rapid HIV Self-Testing among MSM Project” (iSTAMP). Here, we present data on the performance of internet platforms for recruiting BMSM and HLMSM, and a pilot activity adapted for transgender women (TGW) conducted with supplementary funds: the findings of the RCT

will be published separately. We assessed the recruitment yield, positive HIVST results by recruitment platform, and prior HIV test experience. We characterized participants' interpretation of their own HIVST results, laboratory testing for HIV from dried blood spot (DBS) cards, distribution and use of HIVSTs by social network associates (SNAs), and harms related to the use of HIVSTs.

## Methods

The iSTAMP study protocol has been published<sup>15</sup>; modifications were implemented for TGW. Briefly, we developed materials to recruit BMSM, HLMSM, and TGW into an HIV self-testing study. Input on recruitment materials concerning photographic images, messaging, and internet recruitment sources was obtained from BMSM, HLMSM, or TGW representatives and consultants<sup>15</sup>. The study was approved by Emory Institutional Review Board (IRB00099710).

## Participants

iSTAMP recruited BMSM and HLMSM (iSTAMP-MSM) from February 2020 -February 2021, and TGW (iSTAMP-TGW) from April- July 2021. Recruitment comprised tailored advertisements on three types of internet platforms: 1) general interest (e.g., Facebook, Snapchat), 2) dating (e.g., Grindr, Adam4Adam), and 3) Lesbian, Gay, Bisexual and Transgender (LGBT) interest (e.g., [Gay.com](http://Gay.com), [Advocate.com](http://Advocate.com)). People were electronically consented for eligibility screening and enrollment, provided contact information, and completed a baseline survey. Eligibility criteria for iSTAMP-MSM included: Black or Hispanic MSM; 18 years of age; anal sex (insertive or receptive) with a man in past 12 months; willing to download the study app; not taking pre-exposure prophylaxis (PrEP); no prior HIV diagnosis; and were living in Alabama, California, Florida, Georgia, Louisiana, Mississippi, Nevada, New York, North Carolina, South Carolina, or Texas<sup>15</sup> because they have larger state/race-specific population estimates for MSM<sup>16</sup>. Criteria were modified for the iSTAMP-TGW pilot activity to recruit transgender women of any race or ethnicity; a report of anal sex with a man in the past 12 months was not a requirement for this population to allow all TGW to be recruited without regard to sexual history.

BMSM and HLMSM were randomized 1:1 to the control or intervention arm stratified by recruitment source, race or ethnicity, and State of residence. TGW participants were randomly assigned to the control or intervention arm in a 1:2 ratio. BMSM and HLMSM intervention arm participants were provided access to a mobile phone app (Know@Home) based on the HealthMindr platform<sup>17</sup>, and the TGW intervention arm participants were provided a link to a comparable intervention website relevant to TGW. Findings on the effectiveness of the intervention on linkage to services will be published separately.

## Intervention

All participants were mailed two OraQuick® In-Home HIV test (HIVSTs) for personal use or for distribution to a social network associate (SNA). This HIVST is interpreted by the user as positive when reactive for HIV antibodies, negative when non-reactive or as test did not work. Participants could schedule a video counseling session before, during, or after

using the HIVST. Participants who completed the 4-month follow-up survey were mailed a DBS collection kit and a third HIVST (e.g., post-intervention HIVST).

Participants completed up to 5 online surveys during the intervention period and one after the RCT was over, consisting of the following: 1) eligibility, 2) baseline (\$20 compensation), 3) initial HIVST (\$10 compensation to report results during the RCT period), 4) 4-month survey (\$30 compensation, which included an assessment of participant's and any SNA's HIVST results), and 5) the post-intervention HIVST survey (no compensation). HIV laboratory test results were obtained from DBS cards mailed (\$10 upon receipt of DBS card) to CDC.<sup>15</sup>

Response options for the HIVST results included: (1) "positive/HIV reactive"; (2) "negative/HIV non-reactive"; and (3) test did not work i.e., invalid. Participants were presented with images and descriptions of self-test results and instructed to select the response that most closely corresponded to their completed self-test. Participants were asked to photograph their self-test device and electronically upload the photograph. Study staff contacted participants who recorded a "positive", invalid, or discrepant test result (i.e., the result that did not correspond to the image selected) to assist with interpretation of the HIVST and with linkage to services. Two authors (RJM and JAJ) interpreted the photographs of the HIVST devices submitted by participants. One author (RJM) reviewed all photographs, and the second author (JAJ) reviewed all photographs of "positive" and "invalid" devices. Photographs with discordant interpretations were reviewed by both raters and concordance was reached on their disposition.

Laboratory testing of the DBS cards consisted of HIV-1/-2 antibody/antigen combo assay with positive results confirmed as HIV-1 by a reflex antibody differentiation assay.

## Outcomes

We assessed the total number and percentage of positive HIVST results reported by BMSM, HLMSM, and TGW recruited from each platform. We calculated the percentage of positive HIVST results (i.e., a positive HIVST result from the initial HIVST, 4-month, and post-intervention HIVST); results were classified as occurring during or following the intervention period and collectively throughout the study. Denominators for HIVSTs included all participants who provided an HIVST result. We compared proportions of positive HIVST results from participants recruited from general interest platforms with those recruited from dating platforms. Data from iSTAMP-MSM participants recruited from the LGBT interest platform and peer referral were excluded from these analyses due to low recruitment yield, and we were unable to categorize the peer-referrals to one of the three original internet platforms.

Secondary outcomes included a comparison of the initial HIVST results with the authors' interpretations. When the photograph provided was not of an HIVST device (n=22) or the image was too poor to be interpreted (n=7), the authors did not record an interpretation; these photographs were excluded from the analysis. Although some participants recorded results from >1 HIVST, we included only the first HIVST result from each participant.

Data from TGW were excluded from the comparison analyses due to the small number of responses with corresponding images (n=73).

To assess potential harms or pressure associated with HIV self-testing, we calculated the number of people who reported in the 4-month survey that someone was pressured to use an HIVST. Additionally, we determined the use and distribution of HIVSTs, the result of the HIVST used by a SNA, and if the participant already knew that the SNA was living with HIV.

Statistical computations were performed using SAS, version 9.4 (SAS Institute) with  $\alpha = 0.05$ , and results are reported per CONSORT guidelines.

## Results

Of 56,298 people who initiated the screening process, only 4,935 (8.8%) were eligible, of whom 2,195 (44.5%) met all enrollment requirements (Figure 1). Participants comprised 2,093 Black and Hispanic/Latino MSM and 102 TGW (Table 1). Most participants were aged <30 years and had more than a high school education. Nearly all BMSM and HLMSM identified as gay or bisexual and 72 TGW included gay or bisexual in their response. Most participants were recruited from the eight southern States, were employed, and had health insurance. At enrollment, nearly half of all participants had not tested for HIV in the past 12 months; substantial proportions of all groups (22%–38%) had never been tested for HIV.

Most BMSM were recruited from dating platforms, however approximately half of the HLMSM and TGW were recruited from general interest platforms (Table 1). Overall, 1750 (80%) were retained (Figure 1) and retention rates did not vary among enrollment groups or by randomization status (data not shown). There was no difference in retention rates at 4 months among BMSM by recruitment platform; however, HLMSM recruited from dating platforms had a significantly lower retention than those from general interest platforms, 76% vs 83%, respectively ( $P<0.04$ ). Among TGW, there was no significant difference in retention by recruitment platform. Men recruited from general interest and dating sites are statistically significantly different on several characteristics. (Supplemental Table.)

## Primary Outcomes

A positive HIVST result was reported in the initial HIVST survey by 68 (7.9%) BMSM, 22 (3.0%) HLMSM, and 4 (6%) TGW (Table 2). In the 4-month post-intervention survey, 82 (10.4%) BMSM, 38 (5.9%) HLMSM, and 5 (7%) TGW reported a new positive HIVST result since enrollment, including those that may have been reported on the initial HIVST survey. Combining reported HIVST results from both data sources, 162 (9.0%) participants (108 (11.5%) BMSM, 48 (6.1%) HLMSM, and 6 (7%) TGW) recorded 1 positive HIVST result by the end of the intervention period. After the intervention period, 28 (5.2%) participants (19 (6.9%) BMSM, 5 (2.0%) HLMSM and 4 (21%) TGW) recorded a positive post-intervention HIVST result. MSM who had never been tested for HIV before enrollment were more likely to report a new positive HIVST result compared with MSM who had been tested for HIV before enrollment. (Table 2) In total, 175 unique participants (9.6%) recorded a positive HIVST result in 1 or more of the surveys. The all-survey percentage

of positive HIVST results was significantly higher among BMSM (12.3%) than HLMSM (6.5%;  $P < 0.0001$ ). One in 10 TGW recorded a positive HIVST result. (Table 2)

MSM recruited from dating platforms were more likely to report positive HIVST results than MSM recruited from general interest platforms. (Figure 2) MSM recruited on dating platforms were more likely than those recruited on general interest platforms to report positive HIVST results on the initial HIVST reporting survey; on the 4-month survey; during the intervention period; and across all surveys. (Table 2.) There was no difference between the percentage of MSM reporting positive HIVST results on the post-intervention survey or from DBS cards with a positive HIV laboratory test result by recruitment platform. Among TGW, in all three surveys, a higher percentage of positive HIVST results were recorded by participants recruited from dating platforms.

### Secondary outcomes:

During the intervention period, 1816 (83%) participants reported an HIVST result in either the initial or 4 month surveys. Among persons never tested for HIV before enrollment, the percentage of HIVST results during the intervention period were similar across populations (BMSM: 80%; HLMSM, 83%; TGW: 74%). However, only 550 (31%) participants completed and recorded a result in the post-intervention HIVST result survey. (Figure 1).

An adequate photograph and corresponding result of an HIVST was submitted by 1295 MSM in the initial HIVST survey. Of these, 60 (4.6%) were recorded by participants as positive, 1229 (94.9%) as negative, and 6 (0.5%) as invalid. The authors interpreted 58 (4.5%) of the photographs as reactive (positive), 1203 (93.9%) as non-reactive (negative), and 21 (1.6%) as invalid. Overall, 1265 (98%) of all comparisons were concordant. Of 30 photographs that had discordant interpretations, the authors interpreted 17 (57%) as invalid and 5 (17%) as non-reactive (negative). Of the remaining 8 photographs the authors interpreted as reactive (positive), 7 participants interpreted and recorded the result as negative (e.g., false negative report). Additionally, 10 people interpreted and recorded the result as positive when the authors could not identify a positive test band in the photographs (e.g., false positive report). Seventy-three TGW submitted an image of their HIVST device, and they were interpreted by the authors as 5 (7%) reactive (positive), 67 (92 %) non-reactive (negative), and 1 (1%) was invalid.

DBS collection kits were mailed to 912 BMSM, 757 HLMSM, and 82 TGW. DBS cards were returned by 262 (29%) BMSM, 253 (33%) HLMSM, and 20 (24%) TGW. Of 515 DBS cards from MSM submitted for laboratory analyses, 6 (1%) had insufficient quantity for testing. Excluding the 9 DBS cards submitted by MSM from LGBT platforms, 29 (5.8%) yielded reactive results from laboratory analyses (HIV-1/-2 antibody/antigen combo assay), confirmed as HIV-1 by a reflex antibody differentiation assay: 21 (8.2%) from BMSM and 8 (3.3%) from HLMSM. (Table 2.) TGW returned 20 DBS cards, of which one had insufficient quantity for testing and 2 (11%) yielded reactive results from laboratory testing.

Only 618 (35%) MSM and TGW participants reported on distributing the HIVSTs, of whom 479 (78%) gave an HIVST to a SNA, including 12 participants who distributed 2 HIVSTs; 491 HIVSTs were distributed to SNAs. Of 240 HIVST results from SNAs reported by



participants, 10 (4.2%) were positive, of which one SNA had a prior HIV diagnosis; 230 (95.8%) were negative. Thus, 9 (3.8%) of SNAs obtained a preliminary HIV diagnosis.

Few participants reported either pressuring someone 93 (5.4%), being pressured 21 (1.2%), or both 23 (1.3%) to use a study HIVST. The study counselors conducted video conference calls with 89 (4.1%) of all enrolled MSM and TGW, and no participant disclosed an adverse event related to the use of the HIVSTs in case reports or video counseling sessions.

## Discussion

BMSM, HLMSM and TGW were predominately recruited from general interest and dating sites, of whom, over 20% had never tested for HIV at enrollment. The HIVSTs provided were used to identify HIV infections, especially among those recruited through online dating platforms. With nearly 10% of participants reporting a preliminary HIV diagnosis, most of which were reported during the intervention period, this study demonstrated that it is possible to recruit and engage these populations for HIV self-testing using these platforms. The image analyses of HIVST devices demonstrated that most participants correctly used, interpreted and recorded their HIVST results.

In 2020, the CDC encouraged health departments and community-based organizations to distribute HIVSTs, and to report the number of tests and people to whom the HIVSTs were distributed<sup>18</sup>. Our results provide further evidence for the use of dating and general interest platforms for the distribution of HIVST to BMSM, HLMSM, and TGW to increase awareness of HIV infection<sup>5,12,19</sup>. In our study, general interest platforms also yielded a large proportion of positive HIVST results; therefore, HIVST programs for BMSM, HLMSM and TGW might consider also advertising on general interest platforms, as these sites may reach different populations.

Most participants accurately interpreted and recorded their HIVST results. The few results that were discordant between participants and study staff interpretations might have been due to data entry or interpretation errors. Project staff attempted to contact all participants who recorded a “positive” result or selected an image that was not consistent with the recorded result to discuss their result and assist with linkage to services. The study’s video counselling sessions were also available to help study participants with conducting and interpreting the HIVST.

As with previous research<sup>5</sup>, we found that participants who had never been tested reported higher percentage of positive HIVST results compared to those who had previously tested. Therefore, it is critical for HIVST programs to reach persons from disproportionately affected populations who have not used existing HIV testing services. Persons with risk factors for HIV who have never been tested might have barriers to accessing testing, including experienced or anticipated stigma, proximity to a testing site, or lack of access to healthcare providers. Providing HIVSTs to disproportionately affected populations, especially to those who are unwilling or unable to access existing services, will be crucial for the diagnose pillar/strategy of the EHE initiative and ultimately prevent infections<sup>3</sup>.

A CDC demonstration project and our previous HIVST study implemented a direct-to-consumer delivery of HIVSTs to participants, resulting in all eligible participants receiving HIVSTs <sup>5,10</sup>. Other studies, or programs, have required people to redeem codes or coupons to obtain an HIVST <sup>8,11,12,19,20</sup>. Coupon redemption programs can result in a substantial number of people not redeeming the coupon, limiting the reach of the program <sup>8,11,12,20</sup>. Redeeming coupons may be a barrier for some; therefore, the direct-to-consumer provision of HIVST might be more successful in reaching priority populations.

Programs that only provide one HIVST to participants may be limiting a key public health benefit of HIVST programs, secondary distribution <sup>21-24</sup>. Some iSTAMP participants distributed HIVSTs to SNAs, resulting in SNAs learning their HIV status <sup>5,21</sup>. In a previous study, wherein four HIVSTs were provided every 4 months, we found that 67% reported distributing an HIVST to a SNA <sup>22</sup>. In that study, some participants wanted to keep the HIVST for their use and some were not aware they could give the HIVSTs to SNAs <sup>22</sup>. When MSM living with HIV infection were encouraged to distribute HIVSTs to SNA, nearly three-quarters of the tests were distributed <sup>21</sup>. In the current study, we provided two HIVSTs at enrollment and informed participants that an HIVST could be given to a SNA, but only one in three distributed HIVSTs. This limited distribution of HIVSTs to SNAs might be a result of only providing two HIVSTs at enrollment or from insufficient messaging on providing HIVSTs to SNAs. Providing additional HIVSTs and enhanced messaging around sharing of the HIVSTs might increase the secondary distribution of HIVSTs <sup>22</sup>.

HIVSTs are designed to allow the user to learn their HIV status privately and anonymously. Requirements to provide contact information for counseling and return of results might be a barrier to some potential HIV testers. Program managers should weigh the needs of participants with the needs of programs to determine if HIVSTs are only provided to persons willing to obtain counseling and return results. Alternative approaches could be considered to evaluate the public health benefits of these programs, such as documenting characteristics of the population receiving tests and how many tests are distributed, as suggested by the CDC Dear Colleague letter <sup>18</sup>, and triangulation of data from state surveillance programs.

Research studies usually compensate participants for responding to surveys, and HIV self-testing studies have documented a high percentage of participants return HIVST results <sup>5,12</sup>. In this study, we received a greater percentage of HIVST results in surveys where compensation was provided compared with the uncompensated post-intervention HIVST survey <sup>15</sup>. Conducting cross-sectional evaluations on program participants and providing compensation may help meet data needs of program managers who are concerned they might not be identifying people with HIV in their HIV self-testing programs.

Results of laboratory testing for HIV support that the data provided by participants were reflective of their HIV status. Only about one in three participants returned a DBS card; most were adequate for laboratory testing. In contrast, nearly 9 in 10 recorded an HIVST result. Most people will use an HIVST <sup>5,11,12,25</sup>, but DBS card return rates for laboratory HIV testing are generally lower <sup>25</sup>. DBS cards or other self-collected specimens might still



play an important role in telehealth programs that require laboratory analyses for monitoring viral load or medication adherence.

Our results also confirm the safety of HIVST distribution. Only a small percentage of people either pressured a partner or were pressured to use an HIVST, and no adverse events related to the use of HIVST were reported. These results are consistent with previous studies<sup>26–28</sup>. The video-conference service was used by a small percentage of participants, suggesting that this component of a program could be supported with minimal resources.

### Limitations

Although our sample was not representative of all BMSM, HLMSM, or TGW in the US, we were able to recruit a large sample of participants over a large geographic region and in predominately EHE jurisdictions<sup>29</sup>. Recruitment materials and data collection surveys were only provided in English, possibly deterring some individuals from participating. Some under-reporting of results or misclassification of results might have occurred in online reporting systems.

### Conclusions

HIVST programs that advertise on dating platforms may be most successful in reaching persons with undiagnosed HIV infections, especially those who have not used existing services. To effectively reach priority populations, tailored advertising on both dating and general interest platforms may be necessary, and on-demand counseling may not require significant programmatic resources.

### Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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### Data Sharing Statement

Deidentified participant data are available upon request from the Emory University principal investigator (Dr. Patrick Sullivan). The requestor must describe the proposed analyses which must be within the scope of the intended use of the data, and sign a data use agreement prior to release of the data. In addition to participant data, a data dictionary and supporting documentation will be provided. The data will be available January 1, 2024.

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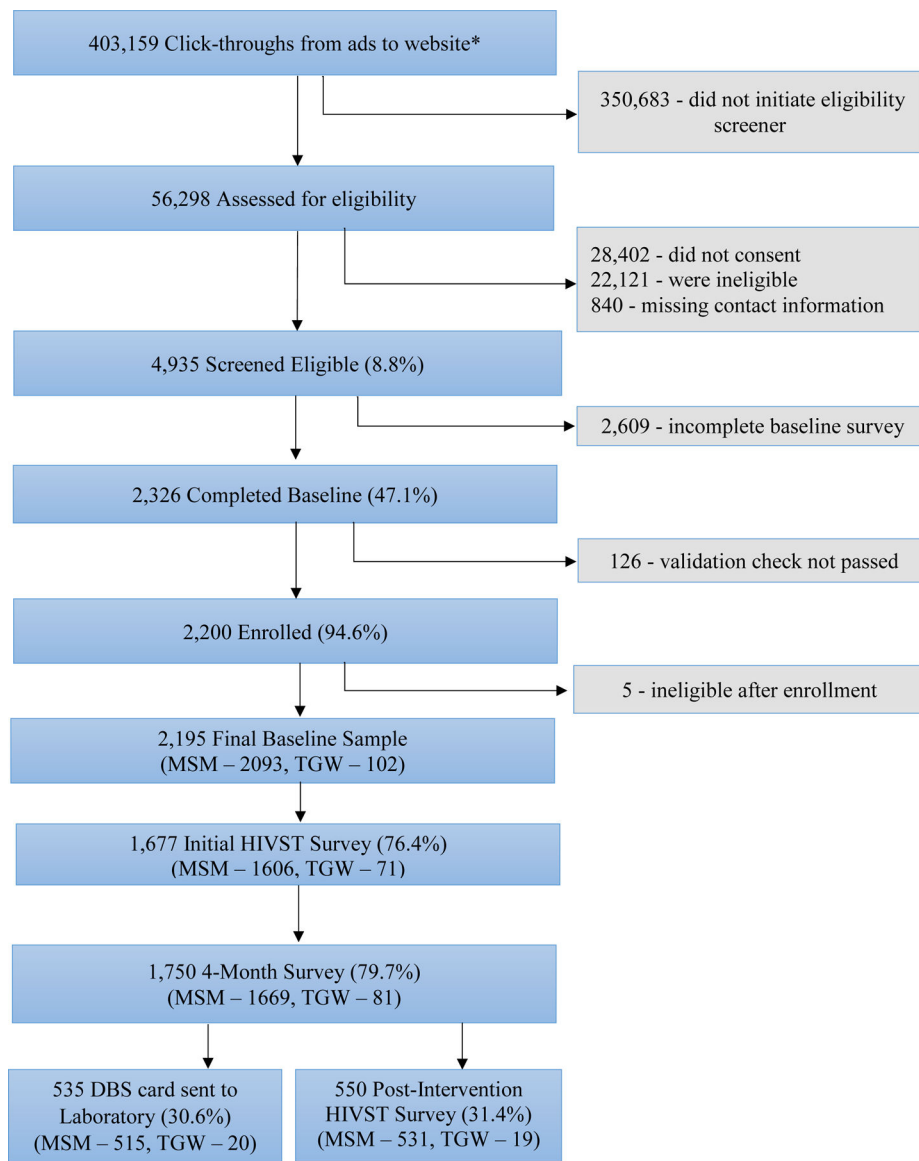
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**Figure 1. Recruitment, eligibility, and retention of MSM and TGW in Implementation of HIV Self-Testing, 2020–2022. iSTAMP Consort Diagram**

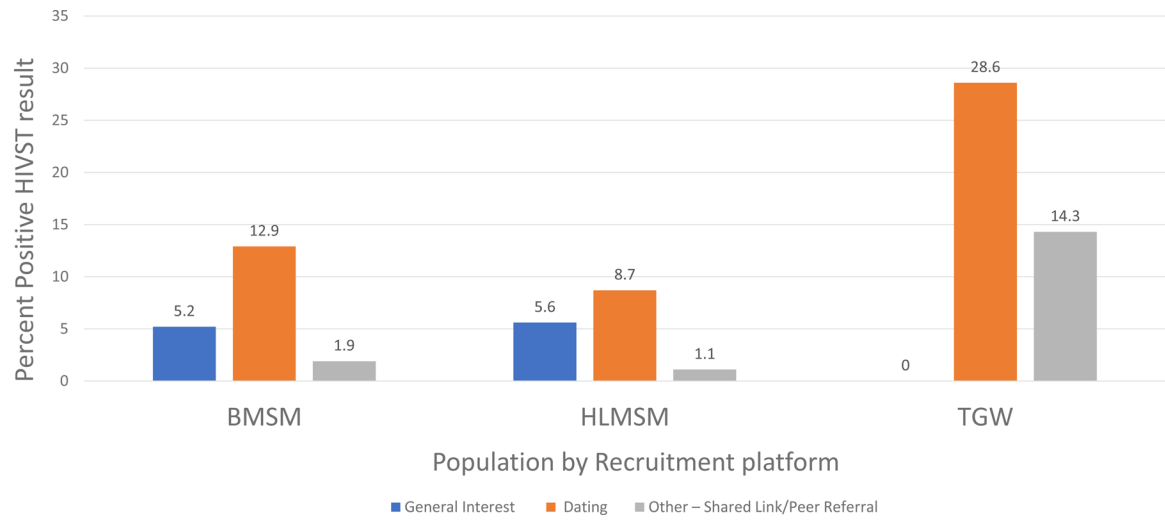
MSM – Gay, bisexual and other men who have sex with men

TGW – Transgender women

iSTAMP – Implementation of HIV self-testing among MSM Project

HIVST – HIV self-test

\*Excludes ad clicks from TGW sites: data not available



**Figure 2.**  
Positive HIVST results reported during Intervention period by recruitment platform  
BMSM – Black men who have sex with men, HLMSM – Hispanic/Latino men who have sex with men, TGW – Transgender women

**Table 1.**

Characteristics of Black MSM, Hispanic MSM, and Transgender Women enrolled in iSTAMP study, 2/2019 – 12/2021

Characteristic		Black MSM (N = 1149) n (Col%)	Hispanic MSM (N = 944) n (Col%)	TGW (N = 102) n (Col%)
<b>Platform</b>	General interest	113 (9.8%)	487 (51.6%)	57 (55.9%)
	Dating	974 (84.8%)	332 (35.2%)	11 (10.8%)
	LGBT <sup>a</sup>	3 (0.3%)	13 (1.4%)	NA
	Other – shared link/peer referral <sup>b</sup>	59 (5.1%)	112 (11.9%)	34 (33.3%)
<b>Group assignment<sup>c</sup></b>	Control	574 (50.0%)	475 (50.3%)	33 (32.4%)
	Intervention	575 (50.0%)	469 (49.7%)	69 (67.6%)
<b>Age group (years)</b>	18–29	600 (52.2%)	669 (70.9%)	55 (53.9%)
	30	549 (47.8%)	275 (29.1%)	47 (46.1%)
<b>Education<sup>d</sup></b>	High School/GED	326 (28.4%)	241 (25.6%)	26 (25.5%)
	Some college, technical school, associate degree	542 (47.3%)	469 (49.8%)	48 (47.1%)
	Bachelor, master, or doctoral degree	278 (24.3%)	232 (24.7%)	28 (27.5%)
<b>Sexual Orientation<sup>d, e</sup></b>	Gay	840 (73.2%)	712 (75.4%)	15 (16.9%)
	Bisexual	275 (24.0%)	197 (20.9%)	20 (22.5%)
	More than one response	--	--	38 (42.7%)
	Other response	33 (2.9%)	35 (3.7%)	16 (18.0%)
<b>Census region of residence<sup>f</sup></b>	Northeast	137 (11.9%)	135 (14.3%)	9 (8.8%)
	South	885 (77.0%)	515 (54.6%)	64 (62.7%)
	West	127 (11.1%)	294 (31.1%)	29 (28.4%)
<b>Employment/student<sup>d</sup></b>	Employed	667 (58.5%)	549 (58.5%)	49 (48.0%)
	Not employed	296 (25.9%)	172 (18.4%)	37 (36.3%)
	Student	178 (15.6%)	217 (23.2%)	16 (15.7%)
<b>Health insurance<sup>g</sup></b>	Yes	742 (64.6%)	649 (68.8%)	77 (75.5%)
	No	364 (31.7%)	270 (28.6%)	23 (22.5%)
	Don't Know	43 (3.7%)	25 (2.6%)	2 (2.0%)
<b>Any social services<sup>h</sup> used in past 3 months<sup>d</sup></b>	Yes	435 (39.8%)	283 (32.8%)	63 (64.3%)



Characteristic		Black MSM (N = 1149) n (Col%)	Hispanic MSM (N = 944) n (Col%)	TGW (N = 102) n (Col%)
	No	659 (60.2%)	581 (67.2%)	35 (35.7%)
<b>Any symptoms<sup>i</sup> of HIV infection in the past 3 months<sup>d</sup></b>	Yes	456 (41.4%)	476 (52.9%)	58 (59.8%)
	No	645 (58.6%)	424 (47.1%)	39 (40.2%)
<b>Anal and vaginal sex partners in past 6 months<sup>j</sup></b>	Only Men	972 (84.6%)	807 (85.5%)	NA
	Men & Women	7 (0.6%)	8 (0.9%)	NA
	Only Women	107 (9.3%)	97 (10.3%)	NA
	No partners	63 (5.5%)	32 (3.4%)	NA
<b>Non-injection drug use in past 12 months<sup>d, k</sup></b>	Yes	273 (23.8%)	291 (30.9%)	44 (43.1%)
	No	876 (76.2%)	652 (69.1%)	58 (56.9%)
<b>Injection drug use in past 12 months<sup>d, k</sup></b>	Yes	35 (3.0%)	47 (5.0%)	5 (5.0%)
	No	1113 (97.0%)	896 (95.0%)	96 (95.0%)
<b>HIV testing experience at enrollment</b>	Never tested	252 (21.9%)	218 (23.1%)	39 (38.2%)
	Tested over 12 months before enrollment	280 (24.4%)	221 (23.4%)	30 (29.4%)
	Tested within 12 months of enrollment	617 (53.7%)	505 (53.5%)	33 (32.4%)
<b>Current HIV status/last result, at enrollment among ever tested</b>	Negative	863 (96.2%)	714 (98.3%)	62 (98.4%)
	Did not get result/test did not work	34 (3.8%)	12 (1.7%)	1 (1.6%)

Abbreviations: GED, General Equivalency Diploma, MSM, men who have sex with men; TGW, transgender women; LGBT, Lesbian, Gay, Bisexual, and Transgender; NA, Not Applicable

<sup>a</sup>LGBT platforms were not used for iSTAMP-TGW

<sup>b</sup>Unknown source due to sharing of link to study website

<sup>c</sup>TGW – 1:2 group assignment

<sup>d</sup>Missing data

<sup>e</sup>MSM in the primary study could only select one response or provide a write-in explanation. MSM who selected heterosexual or “other response” were coded as “other response”. Transgender women were allowed to select more than one option. Transgender women who selected “straight or heterosexual” or “queer or asexual” were coded as “other response”. Transgender women who selected more than one response from either homosexual or gay, heterosexual or straight, bisexual or pansexual, queer, asexual, another term or don’t know were coded as “multiple responses”, which included 37 who selected homosexual or gay, or bisexual or pansexual in combination with other responses.

<sup>f</sup>South – Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina or Texas; Northeast – New York; West – California, Nevada

<sup>g</sup>Health insurance reported from: employer/private, family member, private/Affordable Care Act, government, or “other” plan

<sup>h</sup>Social services included: Education assistance, job training, job placement, unemployment, housing placement, counseling, drug treatment, Medicaid, nutrition assistance, electronic benefits transfer, mental health

<sup>i</sup>Symptoms of HIV infection included: diarrhea, fatigue, fever, headaches, sore or painful lymph nodes, nausea, body rash, sore or painful joints, sore throat, vomiting

<sup>j</sup>Question was not asked of transgender women

<sup>k</sup>Excludes prescription drugs

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**Table 2.**

HIV self-test results recorded by Black MSM, Hispanic MSM, and Transgender Women and Dried Blood Spot results, iSTAMP study, 2/2020–12/2021 <sup>a, b</sup>

Data Source	Total <sup>b</sup>	General Interest	Dating	Other – Shared Link/peer referral	General Interest vs Dating ( <i>P</i> value)
<b>Antibody-positive HIV Self-Test results</b>					
<b>Initial HIV ST survey</b>	90/1593 (5.6%) <sup>c</sup>	8/495 (1.6%)	81/958 (8.5%)	1/140 (0.7%)	<i>P</i> <0.001
Black/AA MSM	68/856 (7.9%)	3/90 (3.3%)	64/717 (8.9%)	1/49 (2.0%)	<i>P</i> =0.070
Hispanic/Latino MSM	22/737 (3.0%)	5/405 (1.2%)	17/241 (7.1%)	0/91 (0%)	<i>P</i> <0.001
TGW	4/71 (6%)	0/44 (0%)	1/5 (20%)	3/22 (14%)	
<b>4-month survey</b>	120/1431 (8.4%) <sup>c</sup>	25/436 (5.7%)	94/874 (10.8%)	1/121 (0.8%)	<i>P</i> <0.003
Black/AA MSM	82/787 (10.4%)	3/81 (3.7%)	79/664 (11.9%)	0/42 (0%)	<i>P</i> <0.030
Hispanic/Latino MSM	38/644 (5.9%)	22/355 (6.2%)	15/210 (7.1%)	1/79 (1.3%)	<i>P</i> =0.661
TGW	5/67 (7%)	0/37 (0%)	2/8 (25%)	3/23 (13%)	
<b>Initial HIV ST or 4-month survey</b>	156/1721 (9.1%) <sup>c</sup>	29/524 (5.5%)	125/1052 (11.9%)	2/145 (1.4%)	<i>P</i> <0.001
Black/AA MSM	108/938 (11.5%)	5/97 (5.2%)	102/789 (12.9%)	1/52 (1.9%)	<i>P</i> =0.027
Hispanic/Latino MSM	48/783 (6.1%)	24/427 (5.6%)	23/263 (8.7%)	1/93 (1.1%)	<i>P</i> =0.114
TGW	6/81 (7%)	0/46 (0%)	2/7 (29%)	4/28 (14%)	
<b>post-intervention HIV ST survey</b>	24/520 (4.6%) <sup>c</sup>	3/149 (2.0%)	20/323 (6.2%)	1/48 (2.1%)	<i>P</i> =0.064
Black/AA MSM <sup>c</sup>	19/274 (6.9%)	1/21 (4.8%)	18/234 (7.7%)	0/19 (0%)	<i>P</i> =1.000
Hispanic/Latino MSM	5/246 (2.0%)	2/128 (1.6%)	2/89 (2.2%)	1/29 (3.4%)	<i>P</i> =1.000
TGW	4/19 (21%)	1/7 (14%)	2/2 (100%)	1/10 (10%)	
<b>Initial HIV ST, 4-month or post-intervention HIV ST survey</b>	167/1734 (9.6%) <sup>c</sup>	31/524 (5.9%)	133/1065 (12.5%)	3/145 (2.1%)	<i>P</i> <0.001
Black/AA MSM	116/946 (12.3%)	6/97 (6.2%)	109/797 (13.7%)	1/52 (1.9%)	<i>P</i> <0.038
Hispanic/Latino MSM	51/788 (6.5%)	25/427 (5.9%)	24/268 (9.0%)	2/93 (2.2%)	<i>P</i> =0.120
TGW	8/81 (10%)	1/46 (2%)	3/7 (43%)	4/28 (14%)	

Data Source	Total <sup>b</sup>	General Interest	Dating	Other – Shared Link/peer referral	General Interest vs Dating ( <i>P</i> value)
<b>MSM Initial HIV ST or 4-month survey</b> – by history of testing at enrollment	156/1721 (9.1%)	29/524 (5.5%)	125/1052 (11.9%)	2/145 (1.4%)	<i>P</i> <0.001
Never tested	61/379 (16.1%)	9/149 (6.0%)	51/196 (26.0%)	1/34 (2.9%)	<i>P</i> <0.001
Ever tested	95/1342 (7.1%)	20/375 (5.3%)	74/856 (8.6%)	1/111 (0.9%)	<i>P</i> <0.045
<b>TGW - Initial HIV ST or 4-month survey</b> – by history of testing at enrollment	6/81 (7%)	0/46 (0%)	2/7 (29%)	4/28 (14%)	
Never tested	1/29 (3%)	0/19 (0%)	0/4 (0%)	1/6 (17%)	
Ever tested	5/52 (10%)	0/27 (0%)	2/3 (67%)	3/22 (14%)	
	<b>Positive DBS Test results</b>				
<b>DBS cards returned</b>	29/500 (5.8%) <sup>d</sup>	5/151 (3.3%)	24/297 (8.1%)	0/52 (0%)	<i>P</i> =0.052
Black/AA MSM	21/255 (8.2%)	1/26 (3.8%)	20/210 (9.5%)	0/19 (0%)	<i>P</i> =0.484
Hispanic/Latino MSM	8/245 (3.3%)	4/125 (3.2%)	4/87 (4.6%)	0/33 (0%)	<i>P</i> =0.719
TGW	2/19 (11%)	0/10 (0%)	0/2 (0%)	2/7 (29%)	

**Abbreviations:** ST, Self-Test; MSM, gay, bisexual and other men who have sex with men; TGW, transgender women RCT, randomized controlled trial; SNA, Social Network Associate; LGBT, Lesbian, Gay, Bisexual, and Transgender; DBS, Dried Blood Spot

<sup>a</sup>LGBT platforms were not used for iSTAMP-TGW study

<sup>b</sup>Excludes all MSM recruited from LGBT sites and results from SNA testing

<sup>c</sup>Two reported “test did not work” and are excluded from analyses

<sup>d</sup>Represents data from Black and Hispanic MSM only