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## Mixed-method evaluation of social media-based tools and traditional strategies to recruit high-risk and hard-to-reach populations into an HIV prevention intervention study

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### Abstract

Men who have sex with men and transgender women are hard-to-reach populations for research. Social media-based tools may overcome certain barriers in accessing these groups and are being tested in an ongoing study exploring HIV home-test kit use to reduce risk behavior. We analyzed pre-screening responses about how volunteers learned about the study (n=896) and demographic data from eligible participants who came for an initial study visit (n=216) to determine the strengths and weaknesses of recruitment strategies. Social media-based strategies resulted in the highest number of individuals screened (n=444, 26% eligible). Dating sites/apps reached large numbers of eligible participants. White-Hispanics and African-Americans were more likely to be recruited through personal contacts; community events successfully reached Hispanic volunteers. Incorporating recruitment queries into pre-screening forms can help modify recruitment strategies for greater efficacy and efficiency. Findings suggest that recruitment strategies need to be tailored to reach specific target populations.

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#equal contribution

#### Compliance with Ethical Standards

**Ethical approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional review board and with the 1964 Helsinki declaration and its later amendments. Recruitment procedures were approved by the Institutional Review Board at the New York State Psychiatric Institute and at University of Puerto Rico Medical Sciences Campus of San Juan.

**Informed Consent:** Informed consent was obtained from all individuals included in the study.

**Conflict of Interest:** The authors declare no conflict of interest.

Los hombres que tienen relaciones sexuales con hombres y las mujeres transgéneros son poblaciones difíciles de alcanzar para la investigación. Las herramientas basadas en los medios sociales pueden superar ciertas barreras en el acceso a estos grupos y se están probando en un estudio en marcha que explora el uso del kit de prueba para el VIH para reducir el comportamiento de riesgo. Analizamos las respuestas preliminares sobre cómo los voluntarios se enteraron del estudio (n = 896) y los datos demográficos de los participantes elegibles que acudieron a la visita inicial de estudio (n = 216) para determinar las fortalezas y debilidades de las estrategias de reclutamiento. Las estrategias basadas en los medios de comunicación sociales resultaron en el mayor número de individuos contactados para determinar elegibilidad (n = 444, 26% elegibles). Los sitios web y las aplicaciones móviles de citas alcanzaron un gran número de participantes elegibles. Los blancos-hispanos y afro-americanos eran más propensos a ser reclutados a través de contactos personales; los eventos comunitarios llegaron exitosamente a los voluntarios hispanos. La incorporación de las consultas de reclutamiento en los formularios de pre-selección puede ayudar a modificar las estrategias de reclutamiento para una mayor eficacia y eficiencia. Los hallazgos indican que las estrategias de reclutamiento deben adaptarse para alcanzar poblaciones específicas.

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## INTRODUCTION

Men who have sex with men (MSM) and transgender women (TGW) are at higher risk for acquiring HIV and carry a higher burden of HIV compared to the general population (1–3). According to the US Centers for Disease Control and Prevention (CDC), the number of newly diagnosed cases of HIV among MSM has increased by 6% compared to a decrease of 19% in the general population between 2005 and 2014 (4). Although MSM make up roughly 4% of the US population, they now account for 56% of the estimated 1.1 million persons living with HIV in the US (4). Similarly, although 0.6% or about 1.4 million adults identify as transgender individuals in the US,(5) in a 2013 report, new HIV diagnoses among transgender individuals were more than three times the national average, and among a sample of TGW, 22% were living with HIV (3).. Of 2351 transgender individuals identified in the National HIV Surveillance System with newly diagnosed HIV infection during 2009–2014, 84.0% were TGW (male-to-female) (6). In particular, TGW (male-to-female) youth of color have been identified as at extreme risk of acquiring HIV (7). A CDC projection analysis estimates that one of every six MSM in the US is at risk of acquiring HIV in his lifetime if current trends persist, including half of all African-American MSM and one quarter of Latino MSM (4).

Recruitment of these populations for ongoing research into prevention modalities is time-consuming and costly, in part due to persistent stigma and discrimination (1, 4, 8–11). This has led to an underrepresentation of Black and Latino men in HIV research relative to their HIV prevalence (12, 13). Similarly, the enrollment of TGW into HIV prevention and care clinical trials is often lacking or too small (14).

The use of social media and internet venues in research studies offer a unique opportunity to reach and involve these underrepresented populations in research. For example, social media and smartphone apps have been reported as effective recruitment tools for health-related

research and may have benefits over traditional recruitment strategies (e.g., tabling or distributing flyers) (15–17). Compared to online recruitment, enrolling a single MSM in a randomized controlled trial via field-based recruitment strategies could require an additional 2.5 person-hours on average (18). Internet recruitment methods have also been demonstrated to be effective for recruiting transgender individuals into research studies (19). Arayasirikul et al. (20) successfully used online social networking platforms to recruit young TGW into a study that examined HIV risk and resilience factors. Martinez et al. (2014) (21) also used multiple social media platforms including Facebook, Craigslist, and various smartphone apps to quickly reach sampling/recruitment goals. Using an online pre-screening eligibility survey, Grov et al. (2013) (22) found that this method resulted in a higher likelihood that participants would present for face-to-face interviews (17, 23).

Such success can be attributed to increase in access and use of online tools. According to the Pew Research Center, 84% of American adults and 96% of adults from ages 18 to 29 use the internet; 65% of Americans use social media platforms (24). With more and more of the world population online, dating behaviors have evolved as evidenced by the increasing number and popularity of dating sites/apps. MSM were early adopters of using the internet to meet sexual partners (25, 26). In a 2011 study, 94% of MSM reported a history of having sex with a partner met online, and 78% reported sex with an online partner in the prior six months (27). In a qualitative study to understand social media use and how it related to HIV risk behaviors among urban youth Black and Latino gay and bisexual men and TGW, all used social media (e.g., over half (56.7%) social media to seek sex partners) demonstrating the feasibility of using the media to reach these at-risk population (28). However, less is known about transgender persons' use of websites and apps for social and sexual networking (29). This rise in social media has also led to the creation of multiple platforms for MSM to find sexual partners; many of these are geo-social networking (GSN) platforms that use location to enable connections among people in close proximity. These sites are in wide use among MSM: a Washington, D.C., study found that 63.6% of MSM reported using GSN apps to find sexual partners in the past year (30).

Evidence suggests that MSM who seek sexual partners using social media tools are more likely to have previous diagnoses of sexually transmitted infections (STIs), a greater number of sexual partners, a greater number of sexual partners known to be HIV-positive, and more frequent unprotected anal intercourse (UAI) (31). In addition, time spent seeking a sexual partner online has been shown to correlate with an increase in the odds of having UAI (32). In a systematic review that included MSM and TGW social networking app users, there were substantial ranges in the prevalence of unprotected sex, number of partners, and prevalence of HIV (33). Other researchers found that transgender and older participants were less likely to use websites or apps compared to other participants (29). Therefore, using these apps for research recruitment has the potential to reach high-risk and potentially underrepresented populations but may be less successful for recruiting transgender individuals.

## Study Objectives

We analyzed recruitment strategies seeking HIV-negative MSM and TGW for a randomized controlled trial for efficiency in (1) reaching eligible participants, (2) finding participants who would make and attend an enrollment appointment, and (3) determining relative time investments per successful recruitment.

## METHODS

### Summary

The Home Testing 3 (HT3) study is a 5-year, randomized controlled trial in New York City (NYC) and San Juan, Puerto Rico, which explores whether a high-risk population with access to rapid HIV self-testing kits will reduce risk behaviors when compared to a similar group without easy access to the tests. Participants are HIV-uninfected, non-monogamous MSM and TGW who never or seldom use condoms for anal intercourse. Recruitment commenced late March 2014 and continues through 2017 with a planned target of 300 participants. To prospectively evaluate recruitment strategies, questions were incorporated into a pre-screening form to assess how potential participants learned about the study and what led them to inquire about it. Recruiters tracked recruitment methods and noted challenges and successes in weekly team meetings. Recruitment procedures were approved by the Institutional Review Board at the New York State Psychiatric Institute and at University of Puerto Rico Medical Sciences Campus of San Juan. This paper reports on the findings to achieve approximately the first half of planned enrollment.

### Pre-screening questionnaire

All those approached were pre-screened in person or by telephone and asked how they learned about the study and what led them to seek more information about it. They could respond to a list of options or specify other motivations not included on the form. All participant inquiries were recorded in a database.

### Eligibility criteria

Eligible participants were HIV-negative MSM or TGW at least 18 years of age. They reported having multiple sexual partners, never or seldom using a condom, at least 3 episodes of unprotected receptive anal intercourse, and having intercourse at least three times per month on average in the past three months with a serostatus-unknown or HIV-positive partner. Eligibility was confirmed at the initial, in-person study appointment (Visit 1).

For in-person recruitment, staff solicited phone numbers from interested individuals at one-time events or community organizations and contacted them for pre-screening. Those contacted via Craigslist or Facebook could call recruitment staff directly while those using dating apps received IRB-approved messages about the study and, if interested, received or exchanged contact information.

Those eligible on pre-screening were invited to complete an in-person eligibility questionnaire at our research office (Visit 1) using a computer-assisted self-interview

(CASI), which asked for detailed information about sexual risk behavior and willingness to test sexual partners for HIV. The purpose of the two-part eligibility screening was to ensure that the study truly reached a population with a high HIV risk profile. Individuals who passed the second eligibility screening were invited to return in the near future to be randomized into either the intervention or control group.

## Recruitment

The recruiting team was comprised of 5 part-time staff members at the NYC site and 1 primary recruiter and 2 secondary recruiters at the San Juan, Puerto Rico study site. Other team members participated in one-time recruitment events. In NYC all but two recruiting staff were bilingual English-Spanish; one was a native Puerto Rican. In San Juan all team members were bilingual and native Puerto Rican.

**Traditional approaches**—In-person strategies in NYC and San Juan included single events, referrals, distribution of flyers and palm cards, and information tables. Word-of-mouth referrals were considered an in-person recruitment strategy and included family, friends, other participants, and recruiters from a separate study. In San Juan, prior study registries were used to contact potential participants; this was categorized as a type of referral. The San Juan team also had access to radio announcements and newspaper coverage and used printed palm cards at in-person events and for pick-up at other recruitment sites.

**Social media-based (websites and apps)**—Social media-based strategies included: Craigslist posts and responses, a Facebook page for the study which was frequently updated and contained links to further study information and a Twitter link, and apps. The apps included, for example: *Adam4Adam*, *Grindr*, *Growlr*, *Hornet*, *Scruff*, and *Jack'd*. The recruitment team maintained field notes, and recruitment strategies were logged in weekly team meeting minutes. Scripts for social media interactions were developed and approved by the IRBs. These could be copied and pasted easily and sent to potential participants. Our recruitment protocol was similar to that developed and applied successfully by Martinez et al. (2014)(21).

## Recruiter Debriefing

Recruiting staff estimated the average time investment per week on each recruiting strategy and were interviewed/queried to outline in detail the advantages and disadvantages of each approach.

## Data Analysis

We extracted descriptive statistics for all pre-screening responses and Visit 1 questionnaire data regarding race/ethnicity, gender and age. We compared each recruitment strategy based on the total number of individuals pre-screened according to their eligibility. Recruitment strategies were ranked in terms of successfully recruited participants. We summarized recruitment team responses to questions and additional experiences to report advantages and challenges for each recruitment strategy.

## RESULTS

Of the 896 individuals pre-screened, 265 were eligible, 216 came in for Visit 1 and completed a demographic questionnaire, 169 were determined eligible to enroll, and 164 are currently enrolled in the study or have completed all procedures. Of those who attended Visit 1, 20 were ineligible due to testing HIV-positive, and an additional 25 were ineligible based on their responses to survey questions. Four eligible participants dropped out before Visit 2. Social media based recruitment strategies resulted in the highest number of individuals screened at both sites (n=444, 26% eligible); however, referrals as a category produced the highest percentage eligible (n=129, 49% screened eligible; Table 1). The strategy that had the lowest percentage eligible was in-person, one-time events (n=193, 19% screened eligible). Among those who tested HIV positive at Visit 1, 6 were recruited using apps, 6 from community info table, 3 from Craigslist, 3 with referral/word-of-mouth, 1 through the internet (non-specified), 1 printed material, and 0 in-person one-time event. The study Facebook page had 166 likes since it was published.

### Differences by site

The NYC site utilized eight internet/app recruitment methods while San Juan recruiters used three. Information tables were more effective in NYC versus San Juan (34 eligible at pre-screening in NYC versus 3 in San Juan). Recruitment at bars and clubs was more effective in San Juan (13 eligible participants versus 1 in NYC).

### Demographics of participants attending Visit 1

Relatively high percentages of minority racial and ethnic groups were reached (Table 2). Non-Hispanic Black/African Americans comprised 48% of the Visit 1 sample in NYC, and those of Latino/Hispanic ethnicity an additional 23%. White participants comprised 18%. Nearly half of the Visit 1 sample (49%) were in the 18–29 age group, and 8.3% (n=18) identified as TGW.

### Recruitment strategies at Visit 1

Social media platforms were effective in recruiting participants of all races and ethnicities compared to other methods (Figure 1). Hispanic and African-American participants were effectively recruited through the referral method while Whites were not. One-time events worked well to recruit Latinos/Hispanics while community-based information tables tended to recruit more African-Americans and more participants over age 60 (Figure 2). TGW participants were most likely to enter the study through referrals (8 of 18 enrollees) (Figure 3).

### Referrals

Referrals included participants alerted to the study by active or formerly enrolled persons as well as collaborations with recruiters from other HIV studies with different inclusion criteria. Additionally, the PR staff contacted individuals who had participated in previous research studies at their study site.

## Recruitment time investment

Recruitment efforts were discussed weekly and strategies adjusted accordingly. Recruitment occurred mostly Monday through Friday, but apps also were activated during evening hours and weekends to contact users at times when greater numbers were active. The estimated range of time using social-media based tools was 20–30 hours per week while the estimated range of time using in-person strategies was 15–17 hours per week. Different recruiters specialized in recruitment strategies. For example, one recruiter estimated spending 12 hours per week using social-media based strategies, while another estimated spending 5 hours per week using in-person strategies aimed at recruiting TGW. The San Juan recruitment team spent more time on traditional strategies as users have adopted social media tools there more slowly. Table 3 summarizes the advantages and disadvantages of each recruitment strategy based the recruiting teams' reports.

## DISCUSSION

### Summary

Recruiting hard-to-reach populations of racially and ethnically diverse MSM and TGW reporting high-risk sexual behaviors into research studies is imperative to derailing the current HIV trends and preventing further spread of the disease (1, 4). Although each of our recruitment strategies was successful, social media-based strategies drew in the largest numbers of potential participants, except for the upper-age categories. On the other hand, word-of-mouth referrals reached the most high-risk, eligible participants. One-time events, such as tabling at Pride events, were the least effective and least efficient. Participants who tested HIV positive at Visit 1 were not more likely to be recruited from certain venues. The high number of individuals who reported being HIV negative at recruitment, but tested positive at Visit 1, may highlight our success at reaching high-risk populations.

### Social media-based strategies

Many online and app platforms include search filters (e.g. sexual preference, specific behaviors, self-reported HIV status) that allow recruiters to selectively contact users based on likelihood of meeting eligibility criteria. Additionally, most platforms save message threads for considerable periods, which allowed recruiters to avoid repeated contacts that might agitate users. Since the Internet/Apps can be accessed anywhere, recruiters could consistently contact new individuals by moving about the city.

However, social media recruitment remains time consuming and labor intensive and offers no guarantees of success. In addition, developing a rapport with potential participants is often difficult online. Recruiters must catch potential participants' attention with a single message without the luxury of engaging interested parties in a more personal conversation before providing details about the study. Among the challenges faced in use of social media tools is the frequent suspension or banning of research outreach attempts by the site owners (21) as part of their prohibition of solicitation, often in response to user reports of the profile as "fake." Recreated profiles would then lose important information, such as which users had been contacted previously.

Although the study Facebook page garnered high numbers of likes and page views, it brought in only a single participant. Success in this venue may rely on the need for users to actively “follow” the research team’s profile to receive its messages (21, 34) or on the generation of a substantial level of interactive exchange that is not characteristic of dating platforms such as *Grindr* and *Jack’d*.

While Craigslist was quite successful in recruiting participants, we encountered unique challenges with its use. Posts on Craigslist are automatically prevented from being duplicated or re-posted within one week. Therefore, recruiters re-posted study-related content as often as possible. Similar to experiences in our study, Grov et al. (2013) reported having the ads flagged and removed by the Craigslist community a number of times before or after they received responses. Recruiters also suspended direct messages to Craigslist posters in the “Men Seeking Men” area of the site after a user complaint. Since Craigslist users do not create profiles and messages are sent to a randomly generated email address, recruiters were unable to keep track of prior contacts with any one individual.

### **How social media may reduce stigma**

Findings from our study suggest that the use of social media-based tools facilitated the recruitment of hard-to-reach and underrepresented populations by possibly reducing the stigma associated with traditional recruitment strategies. High prevalence rates of stigma reported by high-risk populations has been well-documented (35, 36). MSM have reported their preference for using the internet as a way to meet sexual partners compared to bars and clubs, attributing this preference to lower levels of stigma associated with anonymous encounters via the internet (37, 38). It is possible that the greater levels of confidentiality provided by social-media based strategies increased the likelihood for individuals to join our study. Interested parties could pursue details of the study with recruiters via the web-based platforms prior to a telephone contact. This may have encouraged individuals wary of disclosing stigmatized behaviors, such as condomless intercourse and multiple sex partners, and enabled recruiters to use their outreach hours more efficiently. Our findings are in line with similar studies in which social media-based methods of recruiting MSM were successful (21, 22, 39). Similarly, Bolding et al. (40) acknowledged online platforms may have been a factor in facilitating the recruitment of hard-to-reach populations to participate in their study due to the increased confidentiality it provided.

### **Traditional in-person and referral strategies**

Traditional in-person and referrals were still important recruitment strategies for our study. Referrals resulted in the highest percentage eligible at pre-screen. The in-person approaches require the casting of a broad net as recruiters cannot know anything about sexual risk prior to the initial contact, unlike the dating apps with their extensive user profiles. Despite the hundreds of contacts generated, one-time events produced relatively few enrolled participants despite a considerable time investment. Nonetheless, recruiters in PR favored in-person strategies and found more success with them, possibly due to cultural differences among a tighter-knit, recognized value of family (*familismo*) within the subpopulation that researchers have documented for other types of studies in Latin-America (41). Culture,



context, and familiarity with technology all played a role in the selection of recruitment strategies.

### **Recruitment Strategies by Race/ethnicity**

Our recruitment approaches were successful in drawing in high percentages of both African-American and Hispanic participants (with some overlap due to multiple ethnic identification). Three of five NYC recruiters are fluent Spanish speakers who could field queries from monolingual Hispanic participants. In addition, all study materials and online images were selected to reflect a racially and ethnically diverse MSM population. Sullivan et al. (2011) (11) found that Black MSM were more likely to click on an online advertisement for a survey if it included a Black model. Our findings support those of other researchers who reported that the use of online platforms was more effective than other strategies in reaching eligible minority or ethnically diverse participants (42).

### **Recruitment Strategies by age**

Considering that our study was specifically targeting high-risk individuals, recruiting a larger number of younger participants was not surprising, given that higher risk for HIV infection is found among younger populations(43). The largest number of participants in our study from all age groups, except 60 and older, were recruited using social media. There is evidence from other studies that online venues may lend themselves to recruiting younger persons which was further supported by our study. For example, Buckingham et al. (44) used both social media-based and in-person recruitment methods for an HIV vaccine trial. They found that the mean age of participants recruited through Facebook was significantly younger than those recruited in person, and the oldest participants were recruited in person as well. Similarly, other researchers found that MSM respondents recruited online tended to be younger compared to MSM recruited offline (29, 45). In addition, referral or word-of-mouth was an important recruitment strategy for younger participants ages 18–29 in our study. In contrast, Arayasirikul et al.(20) were more successful at recruiting young (18–24) TGW using online social networking than with respondent-driven (key-informant word-of-mouth) sampling (RDS) alone. We only recruited two individuals over age 60, both by community-based information tables, making it difficult to draw specific conclusions regarding the best strategies to recruit this typically low-risk age group.

### **Recruitment of Transgender Individuals**

Recruitment of transgender individuals often posed unique obstacles distinct from those involving MSM. Although MSM and TGW are often combined for research, it is recognized that needs and experiences vary and often do not overlap (14). At the time of recruiting and writing, there were no mobile dating apps identified specifically for transgender users that could be used for recruitment in contrast to numerous widely used apps geared to MSM. Other researchers found that transgender participants were less likely to use websites or apps (29) which may be due to limited apps tailored for transgender individuals. For our study we found that contact with TGW support groups operated through group “gatekeepers” whose skepticism of researchers’ motives had to be overcome. Personal referrals were most often used for this population, including incentivized RDS (46), shown to be effective in transgender recruitment (20, 47–49).

## Limitations and Strengths

The use of convenience sampling affects the potential generalizability of the overall study results. Because online technology is a fast-moving field especially in the realm of dating apps, the outcomes reported in our study may not be replicated in the future. Nonetheless, our findings highlight successful recruitment of a significant proportion of racial and ethnic minorities.

## Conclusions

Incorporating recruitment queries into pre-screening forms can help tailor, modify, and change recruitment strategy emphasis during study recruitment periods to husband resources and reduce costs. Our findings suggest that recruitment strategies need to be tailored to reach particular age groups, racial/ethnic minorities, and TGW. As internet dating and social media platforms continue to gain popularity, these methods for recruiting hard-to-reach populations for research will remain essential and likely continue to be successful tools.

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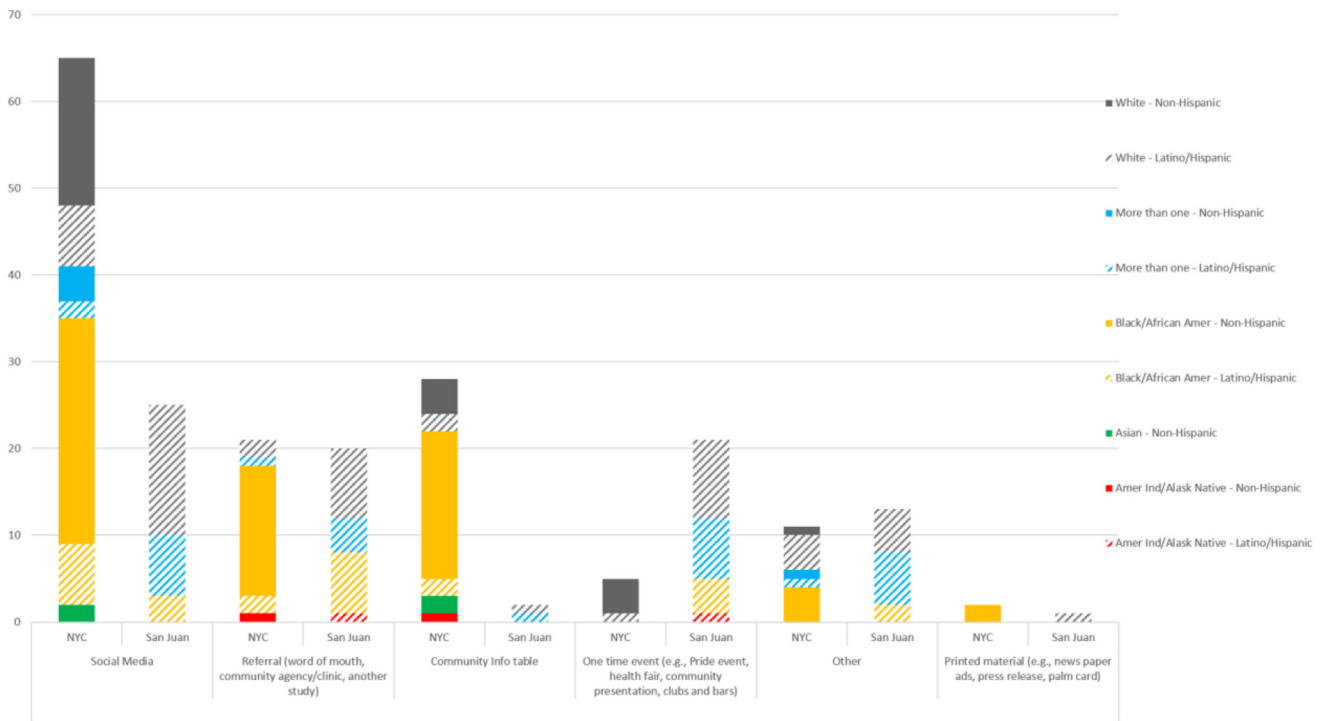


Figure 1.

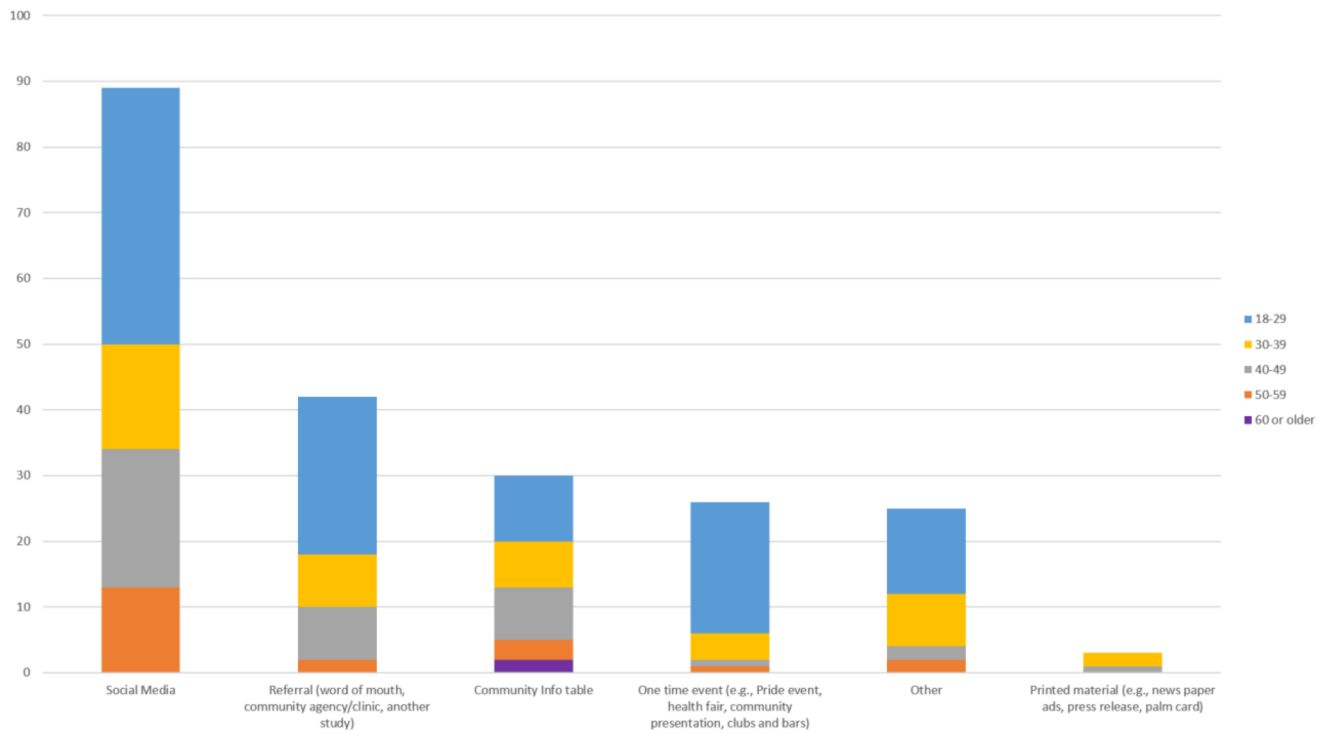


Figure 2.

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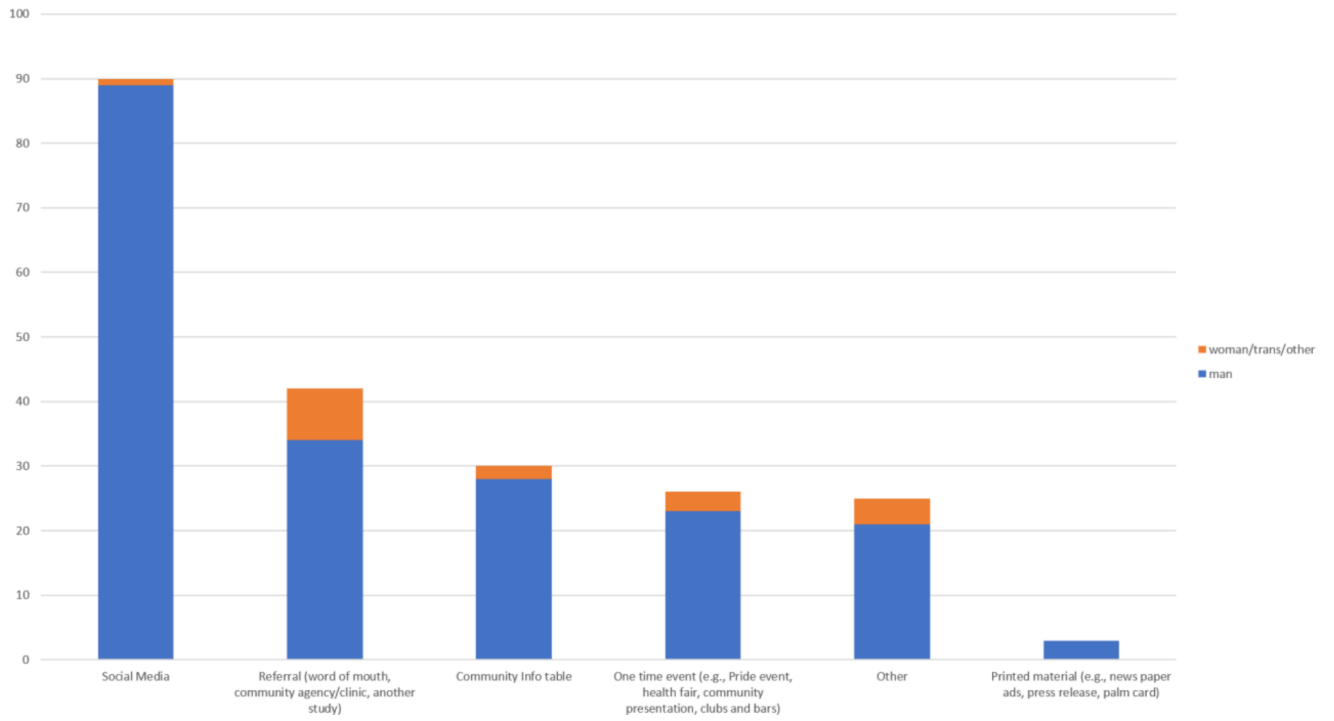


Figure 3.

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**Table 1**

Eligibility based on pre-screening questionnaire by recruitment strategy

Recruitment Strategy	Total Screened	Eligible NYC	Eligible PR	Total Eligible	% Eligible
<b>Social-Media</b>	<b>444</b>	<b>88</b>	<b>29</b>	<b>117</b>	<b>26.35</b>
Adam4Adam	149	19	15	34	22.82
Craigslist	83	25	0	25	30.12
Jack'd	51	15	0	15	29.41
Grindr	49	3	13	16	32.65
Growlr	45	13	0	13	28.89
Homnet	25	4	0	4	16
Other app (unspecified, Twitter)	14	2	0	2	14.29
Bareback RT	11	3	0	3	27.27
Facebook	7	0	1	1	14.29
Scruff	6	2	0	2	33.33
Other (searches, don't remember)	4	2	0	2	50
<b>In-person one-time-event</b>	<b>193</b>	<b>12</b>	<b>25</b>	<b>37</b>	<b>18.69</b>
Pride events	116	6	11	17	14.66
Bars and Clubs	51	1	13	14	27.45
Community centers/organization	18	4	0	4	22.22
University presentation	9	0	1	1	11.11
Other unspecified	4	1	0	1	25
<b>Referral</b>	<b>129</b>	<b>31</b>	<b>32</b>	<b>63</b>	<b>48.84</b>
Friend/Family/Partner	46	8	21	29	63.04
Other study	46	10	6	16	34.78
Other participant	14	6	1	7	50
Other unspecified	12	7	0	7	58.33
Community centers/organization	11	0	4	4	36.36
<b>Community info table (consistent presence)</b>	<b>103</b>	<b>34</b>	<b>3</b>	<b>37</b>	<b>35.92</b>
<b>Printed material/radio</b>	<b>19</b>	<b>4</b>	<b>5</b>	<b>9</b>	<b>47.37</b>

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Recruitment Strategy	Total Screened	Eligible NYC	Eligible PR	Total Eligible	% Eligible
Palm card	12	2	2	4	33.33
Newspaper ad/press release	7	2	3	5	71.43

**Table 2**  
Demographics of participants who screened eligible and attended Visit 1 by site

Characteristic	New York (n=134)		San Juan (n=82)	Totals (N=216)
	Latino/Hispanic No. (%)	Non-Hispanic No. (%)	Latino/Hispanic No. (%)	
<b>Race</b>				
American Indian/Alaskan Native	0 (0)	2 (1.49)	2 (2.44)	4 (1.85)
Asian	0 (0)	4 (2.98)	0 (0)	4 (1.85)
Black/African American	11 (8.21)	64 (47.76)	16 (19.51)	91 (42.13)
More than one	4 (2.99)	5 (3.73)	25 (30.49)	34 (15.74)
White	16 (11.94)	26 (19.4)	39 (47.56)	81 (37.5)
<b>Gender</b>				
Male	126 (94.02)		72 (87.80)	198 (91.67)
Transgender female	8 (5.97)		10 (12.20)	18 (8.33)
<b>Age Group</b>				
18–29	55 (41.04)		51 (62.20)	106 (49.07)
30–39	29 (21.64)		16 (19.51)	45 (20.83)
40–49	30 (22.39)		11 (13.41)	41 (18.98)
50–59	17 (12.69)		4 (4.88)	21 (9.72)
60 or older	2 (1.49)		0 (0)	2 (4.44)

**Table 3**

Summary of recruitment strategy advantages and corresponding disadvantages (where applicable) according to recruiters' perspective

Advantages	Disadvantages
<b>In-Person</b>	
Easy to build rapport and provide a sense of legitimacy to the project	Labor intensive
Able to provide immediate specific details regarding the project	Unable to restrict contact to the target population
	Multiple visits to the same location (e.g., community center) led to saturation
<b>Social-Media Based Tools (Facebook, Craigslist, mobile apps)</b>	
Immediate dispersion of study information to many individuals simultaneously	Difficult to build rapport with potential participants
Able to use filters to restrict contact to target populations (e.g., sexual preference, self-reported HIV status, gender)	Users can accuse study profile of being "fake" or messages as solicitation/spam
Can be done remotely from any location	Profiles associated with the study are prone to getting suspended/banned
No fees for basic services	Extra costs associated with upgrading app to view/access users in a larger geographic catchment
Easily able to track individuals who have been previously contacted using certain platforms (e.g., <i>Grindr, Adam4Adam</i> )	Other platforms, specifically Craigslist, unable to determine if users had already been contacted, resulting in one user expressing frustration. Recruiters changed strategy to update only publicly displayed posts containing study-related content
Individuals are contacted privately, allowing for greater confidentiality regarding participation	
The GSN have messaging systems that are based on phone location and will allow messages to other users within the vicinity based on location of user	Requires changing location to avoid messaging the same individuals in one general area
<b>Referrals from other research studies</b>	
Individuals already interested in participating in research	Risk of homogenizing sample
Many have some experience participating in research studies previously, familiar with similar protocols	Risk of recruiting individuals who are trying to qualify regardless of eligibility criteria
<b>Print (Palm Cards, Flyers)</b>	
Visually appealing way of promoting study details concisely	Higher cost for color/laminated option, extra time required for design considerations
Provides study contact information for later use	Some people may not want to carry research study information on his/her person

Note. GSN= geo-social networking