Title

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Journal
JAIDS Journal of Acquired Immune Deficiency Syndromes, 90(1)

ISSN
1525-4135

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Publication Date
2022-05-01

DOI
10.1097/qai.0000000000002919

Peer reviewed

HHS Public Access
Author manuscript
J Acquir Immune Defic Syndr. Author manuscript; available in PMC 2023 May 01.

Published in final edited form as:
J Acquir Immune Defic Syndr. 2022 May 01; 90(1): 20–26. doi:10.1097/QAI.0000000000002919.

A Peer-Led Online Community to Increase HIV Self-Testing among African American and Latinx MSM: A Randomized Controlled Trial

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Abstract

Objective: We sought to assess the effectiveness of using a peer-led online community to increase HIV self-testing among Latinx and African American men who have sex with men (MSM).

Design: Randomized controlled trial

Methods: Throughout 6 waves, between February 18, 2017 and January 8, 2021, 900 HIV negative and/or serostatus unknown Los Angeles-based MSM (68.9% Latinx, 16.0% African American, 7.4% White) participated in an online 12-week HIV prevention randomized controlled trial. 79 trained role models (peer leaders) were randomly assigned to participants within clusters to build trust and deliver HIV testing information on Facebook groups. Participants in control groups were assigned to groups without peer leaders. Participants were not required to respond to peer leaders or to remain group members. Participants completed self-report assessments at

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Authors Contributions
Sean Young, conceived of and carried out study, wrote manuscript; William Cumberland senior statistician, participated in study design and sample size calculations, reviewed and revised the manuscript, and was responsible for estimation of effects; Parvati Singh, postdoctoral scholar, conducted data management, data analysis and reviewed, revised the manuscript; Thomas Coates, advised on study, reviewed manuscript.

ClinicalTrials.gov Identifier: NCT02944877 (completed)

Conflicts of Interest
No other conflicts to report.

Conflicts of Interest: None to report

baseline and 12-week follow-up and could receive a free HIV self-testing kit during the study period.

Results: Compared to control group participants, intervention group participants were significantly more likely to accept the offer for the HIV self-testing kit (intervention 130 of 450, 29%; control 102 of 450, 22.7%; OR = 1.43, 95% CI [1.04, 1.95], p = .03), report having taken an HIV self-test within the past 3 months (OR = 1.47, 95% CI [1.01, 2.13], p = 0.04), and report drinking fewer glasses of alcohol in an average week (p = 0.01). Effects appeared concentrated within later study waves. Study retention was greater than 93%.

Conclusions: A peer-led online community appears to be an effective method of increasing HIV self-testing among MSM of color. We discuss the implications of the wave effects on public health research and policy.

Keywords

HIV prevention; self-testing; digital interventions; social media; MSM

INTRODUCTION

As with the national epidemic, Latinx and African Americans in Los Angeles (LA) have high rates of both prevalent HIV cases and new diagnoses [1–3]. Cases have primarily occurred among men who have sex with men (MSM), who currently account for more than 80% of all new diagnoses in LA [1]. Approximately one in nine HIV positive individuals in LA are estimated to be unaware of their infection. Novel strategies are needed to increase HIV prevention and testing efforts among Latinx and African American MSM.

The community peer leader model is designed to increase HIV prevention and testing behaviors by changing social norms [4,5]. Peer leader HIV interventions, which enlist peer health educators to disseminate HIV-related information to their communities, have increased condom use and decreased condom-less anal intercourse, with sustained behavior change up to 3 years later [6,7]. To potentially reduce costs and improve scalability, these interventions have been adapted for websites and social media, such as Facebook [8–11]. Social media and online interventions are increasingly needed as a result of COVID-19 pandemic-related trends in technology use and health services usage [12,13]. They are also appropriate platforms for delivering peer-led HIV interventions among communities of color because of the rapid growth and use of social media among communities of Latinx, African Americans, and MSM [14,15].

The HOPE (Harnessing Online Peer Education) HIV study tests the effectiveness of using peer-led online communities to increase HIV self-testing. This 12-week intervention, based on a version of diffusion of innovations theory that is modified for social media/ online communities [4], tests whether Latinx and African American MSM who receive peer-delivered HIV prevention information over Facebook Groups (compared to control Facebook Groups without peer leaders) will be more likely to request an HIV self-testing kit (primary outcome) and report decreased risk behaviors (secondary outcome). This paper presents the results of those outcomes.

METHODS

Study design

This study describes a randomized controlled trial that was conducted online on Facebook groups. This study was reviewed and approved by the University of California, Los Angeles (UCLA) human subjects review board. Methods conform to recommendations on using online communities for HIV prevention (19). Because the study was based on online community participation, participants needed to be enrolled and assigned to online community groups at the same time. To avoid a long waiting period during recruitment, the study was done in 6 waves. In waves 2, 3, and 5, 120 participants were recruited; in waves 1, 4, and 6, 180 participants were recruited. Once the target number of participants had been recruited and completed a baseline survey within that wave, they were randomly assigned to an intervention or control group. Methods below are the same for each wave, with the exception of the HIV testing company going out of business during wave 3, resulting in a new testing kit that was used for waves 4–6.

Participants

Between December 2016 and September 2020, 900 participants were recruited from online advertisements on Facebook, Craigslist, and other websites/apps (n = 776); community physical venues (n = 69) frequented by Latinx and African American MSM (e.g., restaurants, clubs, schools/universities); and from direct referrals from study participants (n = 55). Before randomization, two participants were found to have completed multiple baseline surveys. The most recent of their responses were included, leaving 900 valid responses.

Interested participants were directed to the study website where they were screened for eligibility (male, ≥18 years, self-reportedly living in the Los Angeles area, Latinx or African American, having had sex with a man in the past 12 months, being HIV negative and/or serostatus unknown, and having a Facebook account). Participants were further screened to verify the authenticity of Facebook accounts by manually calling to talk by phone and validate they had a unique Facebook page [16].

Peer leader recruitment and training

Based on research that approximately 15% of a population is needed for an efficacious peer intervention [4], 79 peer leaders were recruited with help from community organizations serving Latinx and African American MSM. Potential peer leaders were directed to a study website and follow-up phone call to screen for inclusion criteria: friendly and sociable Latinx and/or African American MSM, 18 years of age or older, had had sex with a man in the past 12 months, had a Facebook account or willing to set one up, and interested in educating others about HIV testing.

All peer leaders attended 3 training sessions of 3 hours each in Los Angeles. Training sessions provided lessons on epidemiology, the psychology of building an online community, including building trust among strangers, as well as ways of eliciting participants to discuss health and stigmatizing topics online. For example, in session

1, peer leaders were taught about HIV epidemiology, including risk factors. Session 2 focused primarily on stigma and how to communicate HIV testing and sensitive topics with participants. Session 3 focused more specifically on intervention logistics, including expectations and payment process. Additional information about peer leaders and training is available online [17,18]. Peer leaders were paid in electronic gift cards for their study participation ($30 for the initial 4 weeks; $40 for the next 4 weeks; $50 for the final 4 weeks). 43 of the 79 peer leaders (54%) participated in multiple waves of the intervention since peer leaders were able to participate in multiple waves of the study.

Intervention—We created closed (unable to be accessed or searched for by non-group members) online community groups on Facebook groups. For each wave, half the enrolled participants were randomly (and blindly) assigned to either a peer-led intervention or control group, with approximately 30 participants per group. Peer leaders were randomly assigned to intervention groups, with approximately 5 peer leaders assigned to each intervention group. Within intervention groups, participants were then randomly assigned to at least 2 peer leaders within that group. No peer leaders were assigned to control groups.

Randomization and masking

We (the senior statistician) performed randomization using a random number generator with participants blinded to assignment and unable to request group or condition assignment. Participants and peer leaders were not involved in randomization and were unable to change assignment.

Procedures

During each week of a 12-week study wave, peer leaders in the intervention group attempted to communicate with their assigned participants in the online community, by sending messages, chats, and wall posts. Peer leaders were instructed to first build trust by discussing friendly topics and other "team-building" discussions before discussing HIV prevention and testing. Peer leaders submitted weekly response sheets on their attempts and results from the attempts to contact participants. Response sheets included the topic of discussion to participant (e.g., HIV test, stigma, friendly conversation), mode of communication (e.g., chat, wall post), and whether the participant responded. Peer leaders had weekly meetings with the peer leader trainer on ways to increase participant engagement and were advised to tailor messages each week based on participant responses and engagement. Peer leaders were not required (but were allowed) to interact with participants other their assigned group participants. Participants were not obligated to respond to or communicate with peer leaders or other participants, or to remain a member of the online community.

Every four weeks, research staff offered participants in both groups a free HIV self-testing kit. The first 3 waves used the Home Access kit. After wave 3 Home Access was no longer in business; we switched to the MyLabBox self-test. Participants were able to receive 1 self-collection (blood draw) mail-in test kit during each wave of the intervention.

At baseline and follow-up (12 weeks after baseline), participants completed a 91-item survey (23) focused on demographics; internet and social media use; and prevention/risk behaviors (including self-reported recent HIV self-testing, sexual risk behaviors, and substance use). Demographic, HIV risk, and general health-related items had been validated in previous studies; Internet and social media items were not validated but borrowed from previous studies.

Outcomes

The primary intervention endpoint was based on a verifiable behavioral outcome at the end of the intervention: request for a HIV self-testing kit. Secondary study endpoints were self-reported history of HIV self-testing and reduction in HIV-related risk behaviors, including sexual risk behaviors and substance use.

Statistical analysis—Sample size and power were determined based on expectations of 10–15% differences between control and intervention groups. Assuming a testing rate of 0.05 in the control group, power was designed to be above .80 for detecting differences of .11 or more if the intraclass correlation (ICC) was .04 or less. For a difference of .10, power was designed to be above .80 as long as the ICC was .03 or less.

Statistical analyses were done using Stata SE version 16.1 [19]. Demographic characteristics measured at baseline were compared using chi-squared tests for categorical variables and t-tests for continuous outcomes. HIV testing requests, returned tests and follow-up, and sexual and substance use-related risk behaviors were summarized by individual Facebook group, within condition. We also conducted multivariate logistic regression analyses (with random effects per study cluster to account for correlation among cluster participants) predicting the odds of request for an HIV test kit in the intervention group (relative to controls), adjusting for socio-demographic control variables per participant. To aid the interpretation of results from logistic regressions, we re-estimated binary outcome models using Linear Probability Models to obtain intervention effects as probability or proportional difference in outcome (=1) in the intervention group, relative to control. We examined the effect of our intervention on requests for HIV test kits stratified by whether participants reported ever (or never) having taken a home-based HIV test in the baseline survey.

For self-reported HIV self-testing and substance use, we examined changes in outcomes at the end of the intervention (i.e., 3 months post-baseline) using multivariate random effects logistic and linear regression analyses.

We conducted additional analyses by stratifying participants into 2 groups: early phase, Waves 1–3 (February 18, 2017- April 6, 2018), and later phase, waves 4–6 (September 13, 2018- January 8, 2021). There were several reasons for this stratification: 1) COVID-19, which occurred after wave 3 data collection and during wave 4 data collection, 2) to study assess potential evolving attitudes and perceptions about Facebook and social media, and 3) to account for the use of a different HIV self-test company, which occurred after wave 3.

Role of the Funding Source—This work was supported by funding from the National Institute of Mental Health (NIMH 5R01MH106415). The funding agency played no role in study design, analysis, or manuscript.

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RESULTS

Between February 18, 2017 and September 18, 2020, 900 enrolled participants completed baseline surveys and were randomly assigned to an intervention or control group (450 HIV intervention participants, 450 control participants (Figure 1).

Table 1 presents baseline socio-demographics data by condition. As expected from the randomization, there were no significant demographic differences by condition at baseline. Participants' mean age was 32.0 years (SD=8.8); 68.9% were Latino, 16.1% African American, 7.4% White, and 3.8% Asian. Almost 50% reported having a high school, graduate equivalent degree (GED), or associate degree; approximately 50% reported obtaining a bachelor's degree or higher. More than 88% of participants reported having been tested for HIV within the past 3 years. Approximately 88% described themselves as Gay and 10% as bisexual. Greater than 10% reported having had unprotected vaginal sex within the past 3 months. There were no significant recruitment differences between the intervention and control groups (more than 75% in each group were recruited online and fewer than 25% were recruited from offline local organizations and referrals). 93.4% (n = 421) of intervention and 92.9% (n= 418) of control group participants completed the follow up survey.

Overall, compared with participants in the control groups (102 of 450, 23%), a greater proportion of participants in the intervention groups (130 of 450, 29%) accepted the offer for an HIV self-test (OR= 1.43, 95% CI [1.04, 1.95], p = 0.027; mean difference in proportion = 6%)). As shown in the regression results (Table 2), participants in the intervention groups, compared to those in the control groups, were also more likely to self-report having taken a HIV self-test within the past 3 months at follow-up, relative to baseline (OR = 1.47, 95% CI [1.01, 2.13], p = 0.04; mean difference in proportion = 5%). Analyses stratified by whether participants reported ever (and never) having taken a home-based HIV test at baseline indicated higher odds of HIV test kit request in the intervention group, relative to controls (among those who reported ever having taken a home-based HIV test, OR = 2.3, p = 0.031; among those who reported never having taken a home-based HIV test, OR = 1.49, p = 0.014). Those in the intervention group, compared to the control group, reported drinking less alcohol per week (mean reduction of 0.8 drinks, $p < .05$). There were no significant differences in sexual risk behaviors (condom-less sex, sexual activity under the influence of drugs) and drug use by condition (results available upon request).

Table 3 displays results of the regression analyses for test requests, self-testing, and alcohol use for each condition by earlier and later phase. Significant differences appear to be concentrated in the later phase. The later phase (i.e., waves 4, 5, 6) showed significant intervention effects on increased odds of accepting the offer for the HIV test kits (OR = 2.65, 95% CI [1.55, 4.54]), greater odds of self-reported HIV home-testing (OR = 1.87, 95% CI [1.11, 3.15]) and about 1 unit decline (i.e. one fewer alcoholic drink) in weekly alcohol consumption (coefficient = −0.99, 95% CI [−1.79, −0.18]). Interaction tests of intervention and study phase (reference = early phase) support statistical difference in intervention effects across the two study phases for HIV test kit requests and self-reported HIV home-testing, but not for change in alcohol consumption.

DISCUSSION

Results suggest that the HOPE, peer-led online community intervention is an effective platform for increasing HIV self-testing and reducing weekly alcohol consumption among MSM of color. Study retention was high throughout the four-year study, with approximately 93% of participants retained at 3-month follow-up. The results, combined with the potential scalability of technologies and impact of the COVID-19 pandemic on increasing use of technologies, suggest that the HOPE online community intervention may be a cost-effective platform for scaling HIV testing among MSM of color.

Although overall, we found significant differences between intervention and control conditions on testing outcomes, when stratifying by phase, the differences were found to be due to the later waves. There are a number of potential factors that may have occurred resulting in this finding that warrant greater discussion. First, there may have been a learning curve whereby peer leaders, approximately 50% of whom participated in multiple waves, became "better" peer leaders after receiving training in a prior wave. We will further explore this hypothesis in subsequent analyses using network data. This observation may have highly significant research and policy implications. For example, a finding related to a learning curve for peer leaders could suggest that prior studies and programs that had lacked significant effects might have actually been effective if they had been run longitudinally in multiple waves for program/study staff and peer leaders delivering the intervention to have gained sufficient knowledge and experience based on implementation science data.

Second, it provides support for the need for implementation science research in public health, especially for studies that use new technologies. Because new technologies, including online communities/social media and HIV self-tests, change and become "less new" over time, it is important to plan for and study ways to address the impact of participants and society's changing views around technologies.

This study has limitations. The study recruited individuals based on self-reported information, including HIV negative and/or serostatus unknown. Although self-report is a common method for study recruitment, and we employed commonly used best practices for high quality data collection in online research [16,20,21], it is possible that participants who did not meet intended inclusion criteria were enrolled in the study because of their self-report. Study findings are also limited from generalizing outside the study population. It is also possible that peer leaders knew participants within their clusters and that influenced intervention effects. However, a prior study we conducted on this topic found little contamination across social networks at baseline [22,23] Finally, Facebook has waxed and waned in popularity throughout the course of the study, while more recently decreasing in popularity. Changing trends in use of technologies play a large role in the success and future replication and implementation of interventions. However, because this study was based on a broader psychological framework rather than the specific technology, we believe it should be able to generalize for use across other online community technologies with similar features [24].

Conclusion

New approaches are urgently needed to increase HIV testing among MSM of color. This study suggests that the HOPE online community is an effective platform for increasing HIV testing and reducing weekly alcohol consumption. The study also provides important insights into potential wave effects within interventions and the implications for public health research and policy, especially among technology-delivered behavioral health interventions. Because of the COVID-19 pandemic, technologies have played and will continue to play an increasing role in HIV and broader public health. It is essential that we invest in and implement approaches that have been found to be scalable, acceptable, and effective to improve societal health.

Acknowledgements

This work was supported by funding from the National Institute of Mental Health (NIMH 5R01MH106415) and National Center for Complementary and Integrative Health (NCCIH). The funding agency played no role in study design, analysis, or manuscript.

Sources of Funding:

SY is on the board within the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine to advise on STI-related research and policy; SY is an advisor to digital health startups, including ElevateU, which helps substance use and HIV researchers conduct online studies.

Funding: National Institute of Mental Health (NIMH; Young 5R01MH106415).

Funding

This work was graciously supported by funding from the National Institute of Mental Health (NIMH; Young 5R01MH106415). Funding agencies played no role in study design, analysis, or manuscript.

Reproducible Research Statement: Statistical code and dataset: Not available. Study protocol: Available from Dr. Young (e-mail, syoung5@hs.uci.edu).

Grant Support

National Institute of Mental Health (NIMH; Young 5R01MH106415).

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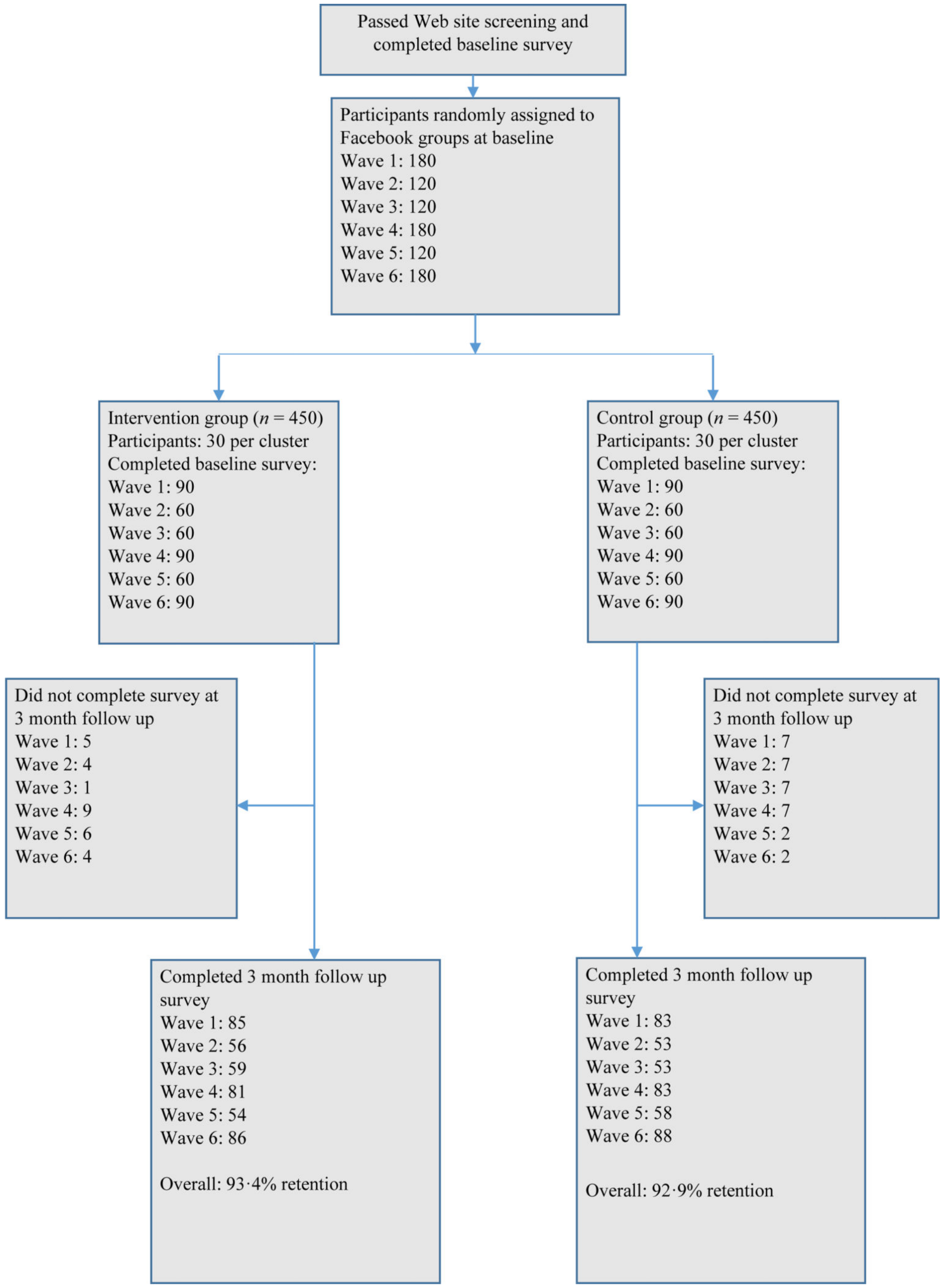

Figure 1.
Trial Profile

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Table 1:

Baseline characteristics of study sample, Los Angeles, CA, USA (N=900).

Characteristics	Control (*n* = 450)		Intervention (*n* = 450)	
Highest education				
Less than High School	4	0.89 (%)	4	0.89 (%)
High School Diploma or equivalent	133	29.56 (%)	134	29.78 (%)
Associate’s Degree (2 year college)	82	18.22 (%)	88	19.56 (%)
Bachelor’s Degree	152	33.78 (%)	156	34.67 (%)
Graduate School	79	17.56 (%)	68	15.11 (%)
Monthly income				
$0–$500	78	17.33 (%)	65	14.44 (%)
$501–$1000	63	14 (%)	61	13.56 (%)
$1001–$1500	48	10.67 (%)	52	11.56 (%)
$1501–$2000	50	11.11 (%)	60	13.33 (%)
$2001–$2500	52	11.56 (%)	45	10 (%)
$2501–$3000	47	10.44 (%)	42	9.33 (%)
$3001–$4000	37	8.22 (%)	40	8.89 (%)
$4001–$5000	31	6.89 (%)	27	6 (%)
$5001 or more	30	6.67 (%)	34	7.56 (%)
Prefer not to answer	14	3.11 (%)	24	5.33 (%)
Age (*mean*, SD)	31.6	8.8 (%)	32.3	9.9 (%)
Self-described sexual orientation				
Heterosexual	2	0.44 (%)	2	0.44 (%)
Bisexual	43	9.56 (%)	48	10.67 (%)
Gay	400	88.89 (%)	394	87.56 (%)
Questioning	2	0.44 (%)	4	0.89 (%)
Don’t know	3	0.67 (%)	1	0.22 (%)
(Queer/Pansexual/Transgender)	0	0 (%)	1	0.22 (%)
Current marital status				
Single (never married)	333	74 (%)	338	75.11 (%)
Legally married/legal domestic partnership	33	7.33 (%)	35	7.78 (%)
Partnered or informally married, living together	51	11.33 (%)	61	13.56 (%)
Widowed	2	0.44 (%)	2	0.44 (%)
Separated	12	2.67 (%)	2	0.44 (%)
Divorced	12	2.67 (%)	9	2 (%)
Other	7	1.56 (%)	3	0.67 (%)
Race/ethnicity				
White/European Descent	28	6.22 (%)	39	8.67 (%)
Latino/Caribbean	319	70.89 (%)	301	66.89 (%)
Black/African American	73	16.22 (%)	72	16 (%)
American Indian or Alaska Native	7	1.56 (%)	8	1.78 (%)
Asian or Pacific Islander	16	3.56 (%)	18	4 (%)

Characteristics	Control (*n* = 450)		Intervention (*n* = 450)	
Other	7	1.56 (%)	12	2.67 (%)
Have a computer at home				
Yes	407	90.44 (%)	415	92.22 (%)
No	43	9.56 (%)	33	7.33 (%)
Other/Refuse to answer	0	0 (%)	2	0.44 (%)
Have been tested in the past three years				
I have been tested	401	89.11 (%)	392	87.11 (%)
No, I have not been tested	40	8.89 (%)	47	10.44 (%)
Don't know	3	0.67 (%)	6	1.33 (%)
Refuse to answer	6	1.33 (%)	5	1.11 (%)
Time spent in communicating with (or trying to find) dating/sex partners during a typical week in the past three months				
1 minute to 2 hours	138	39.09 (%)	130	37.04 (%)
2–4 hours	107	30.31 (%)	103	29.34 (%)
4–6 hours	45	12.75 (%)	67	19.09 (%)
6–8 hours	24	6.8 (%)	22	6.27 (%)
8+ hours	39	11.05 (%)	29	8.26 (%)
Time spent daily online				
1 minute to 2 hours	30	6.67 (%)	30	6.67 (%)
2–4 hours	123	27.33 (%)	131	29.11 (%)
4–6 hours	148	32.89 (%)	136	30.22 (%)
6–8 hours	77	17.11 (%)	71	15.78 (%)
8+ hours	72	16 (%)	82	18.22 (%)
Unprotected (without a condom) vaginal sexual encounters in past 3 months				
I have not done this in the past None	369	82 (%)	375	83.33 (%)
1–5 times	47	10.44 (%)	42	9.33 (%)
6–10 times	7	1.56 (%)	5	1.11 (%)
11–15 times	6	1.33 (%)	4	0.89 (%)
16–20 times	2	0.44 (%)	1	0.22 (%)
21–25 times	2	0.44 (%)	1	0.22 (%)
More than 25 times	5	1.11 (%)	7	1.56 (%)
Refuse to answer	12	2.67 (%)	15	3.33 (%)
Unprotected receptive anal sexual encounters in past 3 months				
I have not done this in the past None	230	51.11 (%)	240	53.33 (%)
1–5 times	143	31.78 (%)	132	29.33 (%)
6–10 times	27	6 (%)	31	6.89 (%)
11–15 times	12	2.67 (%)	15	3.33 (%)
16–20 times	8	1.78 (%)	5	1.11 (%)
21–25 times	7	1.56 (%)	4	0.89 (%)
More than 25 times	21	4.67 (%)	19	4.22 (%)
Refuse to answer	2	0.44 (%)	4	0.89 (%)
Unprotected insertive anal sexual encounters in past 3 months				

Characteristics	**Control (*n* = 450)**		**Intervention (*n* = 450)**	
I have not done this in the past 3 months	210	46.67 (%)	212	47.11 (%)
1–5 times	142	31.56 (%)	154	34.22 (%)
6–10 times	37	8.22 (%)	31	6.89 (%)
11–15 times	18	4 (%)	12	2.67 (%)
16–20 times	9	2 (%)	7	1.56 (%)
21–25 times	9	2 (%)	8	1.78 (%)
More than 25 times	19	4.22 (%)	21	4.67 (%)
Refuse to answer	6	1.33 (%)	5	1.11 (%)

Data are n (%)

Table 2:

Regression results predicting (i) odds of HIV test kits requested (Model a); (ii) odds of Self-reported ever taken a home-based HIV test kit (Model b); (iii) odds of HIV test kits requested stratified by whether participants self-reported ever having taken a home-based HIV test at baseline survey; (iv) linear estimate of change in weekly alcohol consumption (Model c), as a function of intervention and other control variables. Linear probability estimates reported as proportion (Std. Err.) in last column for models a, b, c.

Model a: Logistic regression predicting odds of HIV test kits requested as a function of Intervention; adjusted for baseline sociodemographic variables and wave indicators; models include random effect per study cluster					
	Odds Ratio	**Std. Err.**	**P-value**	**[95% Conf. Interval]**	**Proportion (Std. Err.)**
Intervention	1.43	0.23	0.027	[1.04, 1.95]	0.06 (0.03)
Model b: Logistic regression predicting odds of Self-reported ever taken a home-based HIV test as a function of Intervention; adjusted for sociodemographic variables and wave indicator; models include random effect per study cluster					
	Odds Ratio	**Sth. Err.**	**P-value**	**[95% Conf. Interval]**	**Proportion (Std. Err.)**
Intervention	1.47	0.28	0.044	[1.01, 2.13]	0.05 (0.02)
Model c: Logistic regression predicting odds of HIV test kits requested stratified by whether participants self-reported ever having taken a home-based HIV test at baseline, as a function of Intervention; adjusted for sociodemographic variables and wave indicator; models include random effect per study cluster					
	Odds Ratio	**Sth. Err.**	**P-value**	**[95% Conf. Interval]**	**Proportion (Std. Err.)**
Intervention (among those who self-reported having taken a home-based HIV test at baseline, N = 738)	2.3	0.88	0.031	[1.08 4.89]	0.11 (0.05)
Intervention (among those who self-reported never having taken a home-based HIV test at baseline, N = 162)	1.49	0.24	0.014	[1.08 2.04]	0.05 (0.01)

Model d: Linear regression predicting change in weekly alcohol consumption (3 month follow up minus baseline) as a function of Intervention; adjusted for baseline sociodemographic variables and wave indicators; models include random effect per study cluster				
	Coefficient	**Sth. Err.**	**P-value**	**[95% Conf. Interval]**
Intervention	−0.80	0.30	0.008	[−1.39, −0.21]

Table 3:

Stratified regression results by early and later study phase predicting (i) odds of HIV test kits requested (Model a); (ii) odds of Self-reported ever taken a home-based HIV test kit (Model b); (iii) linear estimate of change in weekly alcohol consumption (Model c), as a function of intervention and other control variables. Early phase = waves 1, 2, 3; Later phase = waves 4, 5, 6. Linear probability estimates reported as proportion (Std. Err.) in last column for models a, b.

Model a: Logistic regression predicting odds of HIV test kits requested as a function of Intervention; adjusted for baseline sociodemographic variables; models include random intercepts per study cluster					
	Odds Ratio	**Std. Err.**	**P-value**	**[95% Conf. Interval]**	**Proportion (Std. Err.)**
Intervention (early phase)	0.98	0.20	0.935	[0.66, 1.47]	0.004 (0.05)
Intervention (later phase)	2.65	0.73	0.000	[1.55, 4.54]	0.12 (0.03)
Interaction of Intervention with study phase (reference = early phase)	2.56	0.86	0.005	[1.33, 4.96]	0.12 (0.04)
Model b: Logistic regression predicting odds of Self-reported ever taken a home-based HIV test as a function of Intervention; adjusted for sociodemographic variables; models include random intercepts per study cluster					
	Odds Ratio	**Sth. Err.**	**P-value**	**[95% Conf. Interval]**	**Proportion (Std. Err.)**
Intervention (early phase)	1.05	0.30	0.868	[0.60, 1.83]	0.01 (0.04)
Intervention (later phase)	1.87	0.50	0.019	[1.11, 3.15]	0.08 (0.03)
Interaction of Intervention with study phase (reference = early phase)	1.88	0.60	0.048	[1.01, 3.50]	0.08 (0.04)

Model c: Linear regression predicting change in weekly alcohol consumption (3 month follow up minus baseline) as a function of Intervention; adjusted for baseline sociodemographic variables; models include random intercepts per study cluster				
	Coefficient	**Std. Err.**	**P-value**	**[95% Conf. Interval]**
Intervention (early phase)	−0.52	0.44	0.229	[−1.38, 0.33]
Intervention (later phase)	−0.99	0.41	0.017	[−1.79, −0.18]
Interaction of Intervention with study phase (reference = early phase)	−0.48	0.60	0.42	[−1.66, 0.70]