

# Reaching Suburban Men Who Have Sex With Men for STD and HIV Services Through Online Social Networking Outreach: A Public Health Approach

Darryl Lampkin, BA,\* Adam Crawley, MPH,† Teresa P. Lopez, BA,\* Christopher M. Mejia, MS,‡ Wesley Yuen,\* and Vivian Levy, MD\*§

**Background:** Technology-enabled approaches may reach suburban and rural men who have sex with men (MSM) who lack physical venues, where they live for sexually transmitted disease (STD)/HIV prevention efforts. We evaluated using *Grindr*, an all-male social networking platform, for STD/HIV prevention services to MSM by a suburban Public Health department.

**Methods:** Phase 1 (October 2012–March 2013) focused on acceptability of prevention messages by MSM on *Grindr* and phase 2 (October 2013–March 2014) *Grindr* use for implementing testing and linkage-to-care. We compared the number of Public Health encounters with MSM before and after initiation of *Grindr* use and the proportion of users who remained engaged with Public Health staff after being told they were interacting with a health educator.

**Results:** For a 6-month period before *Grindr* outreach, Public Health had 60 contacts with MSM. Contacts increased to 305 MSM in phase 1, of which 168/213 (79%) remained engaged. In phase 2, among 903 MSM contacts, 69% remained engaged. Asian and Hispanic MSM were more likely to remain engaged with outreach staff; white men were more likely to be not engaged. No significant difference in age between engaged and nonengaged MSM was seen.

**Conclusions:** *Grindr* outreach by Public Health in a suburban county seems acceptable to MSM and leads to a 14-fold increase in MSM reached for counseling and education compared with a traditional outreach period. Further evaluation of technology-enabled approaches for STD/HIV prevention in suburban and rural MSM is warranted.

**Key Words:** *Grindr*, MSM, suburban

(*J Acquir Immune Defic Syndr* 2016;72:73–78)

Received for publication August 25, 2015; accepted December 15, 2015.

From the \*San Mateo County Health System, San Mateo, CA; †Skoll Global Threat Fund, San Francisco, CA; ‡AIDS Healthcare Foundation–Public Health Division, San Francisco, CA; and §Division of Infectious Diseases, Stanford University, Stanford, CA.

Meetings at which parts of this work presented: Abstract: Using geolocating technology to reach suburban and rural MSM for HIV/STI Outreach and Testing, Youth Tech Health Live Conference, April 6–8, 2014, San Francisco, CA.

All authors were employed by San Mateo County at the time this work was completed. The authors have no funding or conflicts of interest to disclose.

Correspondence to: Vivian Levy, MD, Division of Infectious Diseases, San Mateo Medical Center, 222 West 39th Avenue, San Mateo, CA 94403 (e-mail: vlevy@stanford.edu).

Copyright © 2016 Wolters Kluwer Health, Inc. All rights reserved.

## INTRODUCTION

Sexually transmitted diseases (STDs) are the most commonly reported communicable diseases in California and the United States, and a disproportionate burden of the STD morbidity is among men who have sex with men (MSM). For example, in California, rates of primary and secondary syphilis cases increased each year since 1999, with a large proportion of these cases in MSM.<sup>1</sup> Clearly, the need for STD screening and treatment is great, particularly for MSM. One promising venue for connecting with MSM for public health interventions is online. In California, among MSM diagnosed with primary or secondary syphilis that have been interviewed by Public Health departments, the Internet has remained the most commonly named venue for meeting sexual partners since 2003. In 2013, 43% of California MSM with primary or secondary syphilis reported using the Internet to meet sex partners.<sup>1</sup>

Some US cities have used a number of Internet-based STD/HIV prevention approaches, such as banner advertising in the Internet venues popular among MSM, online outreach, online Internet partner notification, and using online laboratory slips for syphilis testing.<sup>2,3</sup> Although few of these technology-enabled STD/HIV prevention approaches have been formally evaluated, 1 study documented broad acceptance of the Internet partner notification by at-risk MSM, including a willingness to receive or initiate partner notification relayed through email.<sup>4</sup> Given the high acceptance of technology-enabled approaches in MSM, there is a need for studies addressing the effectiveness of these strategies in applied settings.

Previous studies have identified structural interventions for HIV/STD prevention, such as local STD test site directories and anonymous partner notification information for STD exposure that were supported by most of the Web site administrators. However, these studies did not address mobile applications such as *Grindr* that use Global Positioning Systems (GPS) technology.<sup>5</sup>

Importantly, technology-enabled approaches may hold particular promise for reaching suburban and rural MSM who lack physical MSM friendly venues where they live, reducing their exposure to traditional outreach strategies optimized for urban settings.<sup>6</sup> National HIV behavioral surveillance and prevention efforts focus on MSM in urban centers, the population and location where HIV is most heavily concentrated.<sup>7</sup> However, among the estimated 7.1 million MSM in

the United States (6.4% of the US male population), published estimates are not available on the percentage of MSM living in suburban or rural areas.<sup>8</sup> The Internet provides opportunities for suburban and rural MSM, who may be geographically isolated from gay culture centers, to locate sexual partners.<sup>9</sup> Suburban and rural MSM may use technology to access high-risk sexual networks that include MSM from urban areas where HIV seroprevalence is higher.

This article describes findings from San Mateo County (SMC), a suburban northern California County, whose Public Health system began using a social networking platform for engaging MSM in STD outreach, education, and testing. *Grindr* is an all-male social networking smartphone application launched in 2009, available for the iPhone and Android platforms, which targets gay and bisexual men. In addition to the typical communication capabilities common on other social network platforms, *Grindr* uses a geolocation feature that allows users to locate other users on the network that may be in close proximity. Users create profiles and can engage other members in text conversation, send photos, and share their location with one another. The application enables communication between men in close geographical location and facilitates in-person meetings and sexual encounters. *Grindr* (Nearby Buddy Finder, LLC, Los Angeles, CA) markets both a free downloadable version of the application and also a premium version (*Grindr Xtra*) available for a fee. The premium version allows a user to insert commonly used phrases, alerts a user to any new messages even when not logged on to the application, and allows the option for text conversation with users who are currently online.

In an attempt to reach MSM in a suburban area and to increase STD/HIV testing and linkage to treatment services, the local health department used *Grindr* to reach MSM and encourage testing and linkage-to-care. Before 2011, the health department exclusively used traditional outreach methods to reach populations at increased risk for STD/HIV infection. Traditional outreach included teams of outreach workers moving down a street, stationed at a specific physical location in the community, or dropping-off materials to distributors for the purpose of delivering risk reduction information, materials, and/or referrals, and identifying members of priority populations for STD/HIV-risk assessment and screening. However, the effectiveness of these strategies was limited. The yield of successful contacts with SMC MSM using traditional outreach methods was limited by the lack of identifiable physical venues, gathering spaces, affinity groups, and organized efforts. Before the implementation of technology-enabled strategies, outreach efforts with MSM relied mainly on traditional social networking strategies and repeat testing for MSM with exposures and/or incident sexually transmitted infections (STIs).

In 2011, the Health Department chose to adopt *Grindr* as a tool for STD/HIV outreach and prevention efforts to engage MSM, regarded as a hard-to-reach population in SMC. Despite its proximity to urban centers, the county had no identifiable gay venues or gathering places. A public walk-in STD clinic was operated 2 d/wk, and 2 mobile-outreach testing vans (Testing on Demand) were also used, where clients could arrange a time and location to obtain services.

Although others have used *Grindr* for recruitment into research studies<sup>10,11</sup> and for an STD outbreak awareness campaign,<sup>12</sup> to our knowledge, ours is the first report describing the use of a social networking platform with geolocation features for STD/HIV prevention and linkage-to-care services. We report outcomes related to 2 implementation phases: phase 1 (October 2012–March 2013) focused on willingness of MSM on *Grindr* to receive prevention health messages, and phase 2 (October 2013–March 2014) focused on implementing and measuring the service outcomes of STD/HIV testing, and linkage to treatment and care for infected men.

## METHODS

The implementation and evaluation of *Grindr* as an outreach and education platform were conducted by the SMC Health System (SMCHS). SMC has approximately 750,000 residents and borders the City and County of San Francisco to the north and the city of San Jose to the south. The population of adult men age 18 years or older in SMC is 287,189: 43% are of white race/ethnicity, 25% Hispanic, 25% Asian Pacific Islander, 3% African American, and the remaining approximately 4% other.<sup>13</sup> According to data from the American Community Survey, approximately 34% of SMC residents are born outside the United States.<sup>14</sup> It should be noted that SMCHS STD/HIV prevention staff follow a practice of including “Hispanic” as an option in a single race/ethnicity classifier to reflect the preferences of constituents to self-identify as such. Using the probability survey method for a California suburb next to a metropolitan statistical area, we estimate our target population of MSM in SMC as 5.8% of the male population over 18 years or 16,657 men.<sup>15</sup> Although this number represents the total estimated number of MSM living in SMC, the estimated number of MSM who use online social networking applications to seek sexual partners, specifically *Grindr*, is unknown. Among SMC interviewed early syphilis and gonorrhea cases, social networking applications are the main named venue for meeting sexual partners. MSM who use *Grindr* in SMC may be at increased risk for HIV and other STIs compared with MSM who do not seek partners in this venue.

SMC syphilis cases increased significantly from 59 cases in 2012 to 97 cases in 2013, a 64% increase. Most (76.3%) of SMC’s syphilis cases in 2013 were primary, secondary, or early latent syphilis (early syphilis), and 80% of these syphilis cases self-identified as MSM. Between 2009 and 2013, a mean of 63 new HIV cases was diagnosed each year in SMC. Since 2009, MSM represent an increasing majority of new HIV cases (51% in 2009 vs. 70% in 2013). As a public health education, screening, and linkage-to-care initiative, this project was designated as public health practice and not classified as research or subject to IRB approval.

### Phase 1: Acceptability (October 2012–March 2013)

To integrate the use of *Grindr* into existing Public Health activities, 9 STD/HIV outreach health educators were

trained on the use of the *Grindr* application. Training included reviewing rationale for using *Grindr* for HIV/STD prevention, the basic functionality of the application, client-centered counseling by instant messaging and texting, cultural and linguistic competence, setting boundaries with users, combining the use of this strategy into other prevention activities, making referrals for STD and HIV testing, enlisting client permission through texting for follow-up, and program documentation. The training was conducted in a half-day didactic orientation and was followed by a 3-month period of supervised use by the trainee outreach health educator using *Grindr* outreach. Text dialogs were reviewed by an outreach supervisor with the goal of improving response time to text messages, rapport building, clarity and specificity of prevention messages, appropriateness and completeness of referrals, and enlisting Public Health follow-up with the user. Outreach health educators were instructed to always use standard outreach education skills and keep the chat conversation focused on prevention and promotion of sexual health, especially regarding maintaining a neutral stance in response to explicit chat conversation and/or images sent by users. Work-related *Grindr* use was always separate from any personal use by SMC outreach health educators.

The purpose of phase 1 was to assess to what degree users of *Grindr* in SMC would be receptive to receiving STD/HIV prevention messages on the *Grindr* platform. During phase 1, the *Grindr Xtra* application was installed on 2 mobile smartphones used by SMC STD/HIV program staff. Outreach health educators created “avatars” on *Grindr* using purchased stock images of young men (\$2–\$7 per image) and constructed profiles that contained limited demographic and descriptive details. The profile pictures were updated twice per month. Outreach health educators conducted passive outreach on *Grindr* through the avatar, identifying their purpose and role as health educators whose intent was to provide HIV/STD education, counseling, and testing information early in the conversation. Outreach health educators did not initiate contact with men on *Grindr*. Outreach health educators continued conversations only if the other user remained engaged (Table 1), which was defined by a user’s continued chat conversation after the avatar identified as a health educator along with the user having provided responses to the avatar’s questions about STI testing history, awareness of STD status, and knowledge about available local prevention services. For those users who remained engaged, outreach health educators provided health education and information about SMC STD/HIV testing and other services available in SMC. Outreach health educators conducting *Grindr* outreach used a variety of methods to encourage and facilitate users in actualizing referrals for face-to-face service encounters. These methods included: (1) sending maps of mobile testing van locations to users through the application, (2) arranging convenient dates for service provision on the mobile testing van, (3) making referrals to the County STD Clinic, (4) providing field delivered STD treatment, and/or (5) sending reminders to users for follow-up testing and/or treatment and facilitating linkage to a continuum of care for users diagnosed with HIV or hepatitis C virus infection.

**TABLE 1.** Definition of Service Terms and Activities in SMC Online Social Networking Outreach

Service Terms and Activities	Definition
Contact	User initiates conversation on <i>Grindr</i> by avatar profile
Engaged	User continues chat after avatar identifies as health educator and user provides responses to avatar’s questions about user’s testing history, awareness of STD status, and knowledge about available local prevention services
Risk reduction/referral	Specific STD/HIV information, discussion, and/or service referral provided in response to user’s specific queries
Face-to-face contact	User actualizes a visit to mobile testing van or STD Clinic for face-to-face encounter
Linkage-to-care or follow-up contact	User receives field-delivered treatment of STD; or user actualizes a visit to provider for treatment of STD resulting from testing; or user returns for follow-up testing

With each interaction on the *Grindr* network, the following variables were recorded: (1) time of day, (2) self-reported demographics including age and race/ethnicity, (3) whether health education and/or risk reduction counseling was provided, (4) whether a referral to other services was provided, and (5) geographic proximity to the Public Health phone if the user had enabled the geolocation feature on their profile. It should be noted that proximity is measured as the radius from the user and direction of proximity cannot be determined. As *Grindr* users are not required to complete most fields within their profile, many users chose not to disclose any demographic variables.

We examined 2 variables of acceptability. First, we compared number of contacts by SMCHS with MSM both before and after initiation of the *Grindr* strategy. The number of users who initiated contact with the avatar between October 2012 and March 2013 was compared with the number of contacts initiated through all outreach activities during the same 6-month period from October 2011–March 2012, when only traditional outreach strategies were used. Second, we examined acceptability, calculating the proportion of users who remained engaged with outreach health educators after the health educator had identified themselves and their purpose on the *Grindr* network. The proportion was calculated as the number of users who remained engaged (ie, continued the conversation) divided by the total number of users who initiated contact with the avatar.

### Phase 2: Defining Service Activities and Measuring Outcomes (October 2013–March 2014)

During phase 2, we continued to examine the same metrics as those in phase 1. In addition, we measured service outcomes. Service outcomes were measured by analyzing the number and types of service activities, such as providing a referral or user visiting mobile van for STD testing. Descriptions of these service activities can be found in

Downloaded from http://journals.lww.com/jaids by BHD/M/5e/P/H/Kav12/Eum11Q/N4+hK/LhEz/gbsh/04XMI0h/CywcX1A WNYQp/IIaCIH3I3D00dR/TVTSFACI3V/C4/OAVpdDa8K/GKAV0Vmy+78= on 03/20/2023

Table 1. Only referrals that were a response to a user specific query were counted. General prevention messaging conducted by the outreach health educator was not counted as service units. *Grindr* users presenting for face-to-face encounters signed a consent for testing that allowed for tracking of these users. We evaluated the seroprevalence of specimens obtained from *Grindr* users who accessed STD/HIV testing in our system and the degree to which individuals with newly identified STDs/HIV obtained treatment and/or linkage to a continuum of care.

We also extended our examination of acceptability by performing a descriptive analysis of user characteristics. Users who were “engaged” (continued conversation with an SMCHS employee) and “not engaged” (ceased conversation after the SMCHS employee identified themselves and their purpose) were stratified by age category and race/ethnicity. Chi square statistics were calculated to explore differences in engagement by race/ethnicity and age group.

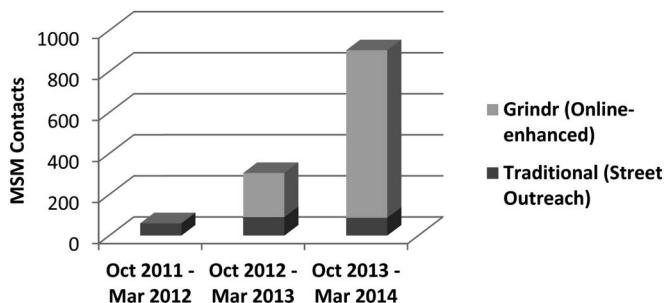
## RESULTS

### Phase 1: Acceptability

From October 2011 to March 2012, when only traditional outreach methods were used, SMC Public Health had contact with 60 MSM (Fig. 1). After implementation of *Grindr*, from October 2012 to March 2013, 213 MSM were contacted through *Grindr* (305 total contacts with MSM occurred during this period) reflecting a 500% total increase in contacts with MSM. Of the 213 *Grindr* contacts with MSM, 78.8% (n = 168) of men remained engaged after the avatar identified as a health educator.

### Phase 2: Service Outcomes

During phase 2, October 2013–March 2014, 903 contacts with MSM were made through both traditional outreach methods and *Grindr*. Over 90.4% (n = 816) of contacts with MSM resulted from using *Grindr*. This was a >1500% increase in all Public Health contacts over the period October 2011–March 2012 before the implementation of *Grindr* as an outreach tool and a nearly 300% increase over phase 1. These increases are highly significant ( $P < 0.001$ ). Using service terms and activity definitions presented in Table 1, among the *Grindr* contacts reached during phase 2,



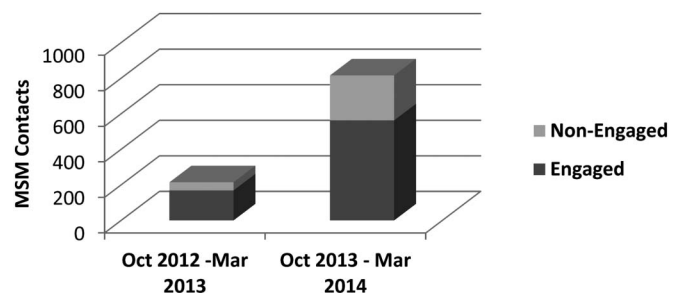
**FIGURE 1.** Number of MSM contacted by San Mateo County Public Health using traditional and online-enhanced outreach October 2011–March 2014.

68.9% remained engaged after the avatar identified as an outreach health educator (Fig. 2). Of those contacts who remained engaged, 35% received some combination of counseling, referrals, testing, treatment, and/or follow-up. The remaining 65% of engaged MSM received general prevention messages, but these messages were not customized for the specific user. Engaged *Grindr* users referred for STD/HIV testing self-identified to County testing sites as having been referred from *Grindr*. For engaged *Grindr* users who self-identified for testing encounters, 14 MSM tested for gonorrhea and chlamydia using nucleic acid amplification testing at pharyngeal, rectal and urogenital sites and HIV infection, 1 case of pharyngeal chlamydia, 2 cases of rectal chlamydia, 1 case of urogenital chlamydia, and 1 new HIV infection were identified. Among 13 MSM tested for syphilis, 1 case of late latent syphilis was identified.

Table 2 describe the age and race/ethnicity of *Grindr* contacts who engaged through *Grindr* for phase 2. Race and ethnicity are available only for *Grindr* users who self-report that information. We found that there was no significant difference in age between users who remained engaged with outreach staff and those that did not remain engaged ( $P = 0.094$ ). However, we found significant differences between racial/ethnic groups in engagement. Asian and Hispanic men were more likely to remain engaged and White men more likely to be not engaged ( $P < 0.001$ ).

## DISCUSSION

Using *Grindr* for STD outreach in our county setting, which includes predominantly suburban areas, we saw a dramatic increase in our ability to provide STD and HIV prevention messages to suburban MSM, with an increase from 60 MSM contacted in a 2010–2011 six-month period when only traditional outreach was used to 903 MSM contacted in a 2013–2014 six-month period with *Grindr* outreach. Our traditional outreach was limited by lack of physical venues where MSM congregate, and the fact that some MSM in SMC do not self-identify as gay. These challenges have been cited by others focusing STD/HIV prevention work in suburban/rural communities<sup>16</sup> and with immigrant MSM.<sup>17</sup> Although the outreach health educator effort to identify contacts in our county was substantial for both traditional and *Grindr* outreach, the yield of contacts was far



**FIGURE 2.** Number of MSM contacts engaged vs. non-engaged through use of online-enhanced outreach in San Mateo County October 2012–March 2014.

**TABLE 2.** San Mateo County MSM Reached Through *Grindr* Outreach by Age and Race/Ethnicity, October 2013–March 2014, n = 816

	Engaged	Not Engaged	Total
Age category (yrs)			
18–24	108 (72%)	42 (28%)	150
25–34	193 (68.2%)	90 (31.8%)	283
35–44	54 (58.1%)	39 (41.9%)	93
45+	43 (78.2%)	12 (21.8%)	55
No age reported	160 (68.1%)	75 (31.9%)	235
Race/ethnicity			
White	136 (63.3%)	79 (36.7%)	215
Hispanic	110 (75.4%)	36 (24.6%)	146
Asian	58 (85.3%)	10 (14.7%)	68
African American	13 (65%)	7 (35%)	20
Mixed/other	60 (74.1%)	21 (25.9%)	81
Not reported	181 (63.3%)	105 (36.7%)	286
Total	558	258	816

higher using *Grindr*. In phase 1, the use of *Grindr* as an outreach and education platform almost quadrupled the SMC Health System’s contacts with MSM. During phase 2, the number of contacts with MSM increased nearly 3 times over the results for phase 1. Therefore, using online social networking applications seems to be an acceptable and potentially effective strategy for engaging MSM with prevention information and messages in suburban and rural areas.

MSM who seek partners on the Internet are likely at increased risk of STDs and HIV compared with men who meet partners through other venues.<sup>16,18</sup> Although implementation of a social networking platform for engaging MSM was a significant investment in staff time, our ability to reach regional MSM was greatly amplified, and prevention messages could be customized to engaged MSM.

The HIV/STD program is currently seeking to refine the use of *Grindr* in our outreach efforts. Owing to *Grindr*’s terms of service, Public Health chose to create profiles that intentionally contained little user information and instead relied on other users initiating contact at which time STD/HIV staff would promptly identify their purpose for being on the network. The fact that nearly 70% of users who initiated a conversation with STD/HIV staff continued the conversation after the program staff identified their purpose was both encouraging and well above initial expectations. There were no reports of *Grindr* users lodging complaints against SMCHS to *Grindr* for health outreach, and less than 5 men expressed dissatisfaction with meeting an outreach health educator on the *Grindr* platform. Most of the users who did not engage SMCHS staff simply ended the conversation on the platform.

There are a number of limitations to the data available on the use of *Grindr* in a local health department setting for STD/HIV outreach and prevention efforts. Perhaps, the most significant limitation of this work is the small number of men engaged by Public Health through *Grindr* who received STD/HIV testing as a direct result of online counseling. This

may represent our inability to document that men tested were referred after an online encounter, and/or it may represent men who seek partners on social networking applications may be different from men who use other venues. We did not collect data on behavioral characteristics of engaged *Grindr* users such as partner number, condom, or pre-exposure prophylaxis (PreP) use. For many *Grindr* users, basic demographic information, such as age and race/ethnicity, was missing. We did not collect risk behavior data on *Grindr* users who did not engage with Public Health through the *Grindr* network. Our outcome “engagement” was broadly defined to include users who continued speaking to outreach workers for both an extended and limited interval and answered an outreach worker’s questions about risk and prevention services. Additionally, an intervention implemented in a suburban area such as ours without identifiable gay community and/or physical venues may not yield similar results in urban centers. Users engaged through *Grindr* were a convenience sample and may not reflect the broader SMC MSM population or the broader *Grindr* community. Although the increase in MSM reached using *Grindr* may have been due to other unidentified interventions, our Public Health Department undertook no other campaigns to target MSM during the period of this pilot intervention.

In conclusion, *Grindr* outreach was dramatically successful in increasing the number of MSM reached by the Health Department for counseling and education with a 14-fold increase in a 5-year period in our northern California County. This approach was easily integrated into Health Department outreach activities, although a significant investment in staff training was needed. It will be important for public health departments to test and adopt new technology-based outreach and prevention strategies that are both acceptable and effective for all stakeholders as use of the Internet to find and communicate with sexual partners continues to grow.

**ACKNOWLEDGMENTS**

The authors thank Matthew Geltmaker, San Mateo County STD/HIV Director, for his consistent support of this work. The authors also thank the San Mateo County STD/HIV outreach team: Losaline Baker, Veronica Brown, Zonia Herrera, Ana Martinez, and Eduardo Moreira-Orantes for their dedicated education and prevention efforts. The authors appreciate review from Dr. Marguerita Lightfoot, Chief for the Division of Prevention Science at the University of California San Francisco of this article.

**REFERENCES**

1. California Department of Public Health STD Control Branch, Center for Infectious Diseases, Division of Communicable Disease Control. *Sexually Transmitted Diseases in California, 2013*. January 2015.
2. McFarlane M, Kachur R, Klausner J, et al. Internet-based health promotion and disease control in the 8 cities: successes, barriers, and future plans. *Sex Transm Dis*. 2005;32(10 suppl):S60–S64.
3. Klausner J, Wolf W, Fischer-Ponce L, et al. Tracing a syphilis outbreak through cyberspace. *JAMA*. 2000;284:447–449.

Downloaded from http://journals.lww.com/jaids by BMDiFsePHKav1ZEquum1IQIN4a+KJhEZgbsH04XMI0hCjwCX1A WNYQp/IIaD3I3D00dRy7TYSfAcI3VCA/0AVpdD8kKkGKv0Ymy+78= on 03/20/2023

4. Mimiaga M, Tetu A, Gortmaker S, et al. HIV and STD status among MSM and attitudes about internet partner notification for STD exposure. *Sex Transm Dis*. 2008;35:111–116.
5. Wohlfeiler D, Hecht J, Volk J, et al. How can we improve online HIV and STD prevention for men who have sex with men? Perspectives of hook-up website owners, website users and HIV/STD directors. *AIDS Behav*. 2012; 17:3024–3033.
6. Sullivan P, Grey J, Simon Rosser B. Emerging technologies for HIV prevention for MSM: what we have learned, and ways forward. *J Acquir Immune Defic Syndr*. 2013;63(suppl 1):S102–S107.
7. *The White House Office of National AIDS Policy. National HIV/AIDS Strategy for the United States: Updated to 2020*; Washington, D.C.; White House Office of National AIDS Policy: 2015.
8. Lieb S, Fallon S, Friedman S, et al. Statewide estimation of racial/ethnic populations of men who have sex with men in the US. *Public Health Rep*. 2011;126:60–72.
9. Horvath K, Bowen A. Virtual and physical venues as contexts for HIV risk among rural men who have sex with men. *Health Psychol*. 2006;25: 237–242.
10. Burrell E, Pines H, Robbie E, et al. Use of the location-based social networking application GRINDR as a recruitment tool in rectal microbicide development research. *AIDS Behav*. 2012;16: 1816–1820.
11. Martinez O, Wu E, Shultz A, et al. Still a hard-to-reach population? Using social media to recruit Latino gay couples for an HIV intervention adaptation study. *J Med Internet Res*. 2014;16:e113.
12. Su J, Holt J, Payne R, et al. Effectiveness of using Grindr to increase syphilis testing among men who have sex with men in Darwin, Australia. *Aust N Z J Public Health*. 2015;39:293–294.
13. State of California, Department of Finance. *Report P-3: State and County Population Projections by Race/Ethnicity, Detailed Age, and Gender, 2010–2060*. Sacramento, California, December 2014.
14. US Census Bureau. *State and County Quick Facts*; 2014. Available at: <http://quickfacts.census.gov/qfd/states/06/06081.html>. Accessed November 4, 2015.
15. Catania J, Canchola J, Pollack L. *Using Survey Data to Estimate the Population Size and Distribution of MSM*; 2002. Available at: <https://www.cdph.ca.gov/programs/aids/Documents/RPT2002UsingSurveyDatatoEstPopMSM.pdf>. Accessed November 2, 2015.
16. Kakietek J, Sullivan P, Heffelfinger J. You've got male: Internet use, rural residence, and risky sex in men who have sex with men recruited in 12 US cities. *AIDS Educ Prev*. 2011;23:118–127.
17. Carrillo H. Sexual migration, cross-cultural sexual encounters, and sexual health. *Sex Res Soc Policy*. 2004;1:58–70.
18. Klausner J, Levine D, Kent C. Internet-based site-specific interventions for syphilis prevention among gay and bisexual men. *AIDS Care*. 2004; 16:964–970.