Rapid Surveillance Report

The Annual American Men's Internet Survey of Behaviors of Men Who have Sex with Men in the United States: 2014 Key Indicators Report

Travis Sanchez, MPH, DVM; Maria Zlotorzynska, MPH, PhD; Craig Sineath, MPH; Erin Kahle, MPH, PhD; Patrick Sullivan, PhD, DVM
Emory University, Rollins School of Public Health, Atlanta, GA, United States

Corresponding Author:
Travis Sanchez, MPH, DVM
Emory University
Rollins School of Public Health
1518 Clifton Rd NE
Atlanta, GA, 30322
United States
Phone: 1 404 727 8403
Fax: 1 404 727 8737
Email: Travis.Sanchez@emory.edu

Abstract

The American Men’s Internet Survey (AMIS) is an annual Web-based behavioral survey of men who have sex with men (MSM) who live in the United States. The purpose of this Rapid Surveillance Report is to report on the second cycle of data collection (November 2014 through April 2015; AMIS-2014) on the same key indicators previously reported for AMIS (December 2013 through May 2014; AMIS-2013). The AMIS survey methodology has not substantively changed since AMIS-2013. MSM were recruited from a variety of websites using banner advertisements or email blasts. Adult men currently residing in the United States were eligible to participate if they had ever had sex with a man. We examined demographic and recruitment characteristics using multivariable regression modeling (P<.05) stratified by the participants’ self-reported human immunodeficiency virus (HIV) status. The AMIS-2014 round of data collection resulted in 9248 completed surveys from MSM representing every US state. Participants were mainly white, 40 years or older, living in the US South, living in urban/suburban areas, and recruited from a general social networking website. Self-reported HIV prevalence was 11.34% (1049/9248). Compared with HIV-negative/unknown status participants, HIV-positive participants were more likely to have had anal sex without a condom with any male partner in the past 12 months (76.55% vs 67.17%; P<.001) and more likely to have had anal sex without a condom with their last male sex partner who was discordant/unknown HIV status (39.66% vs 18.77%; P<.001). Marijuana and other illicit substance use in the past 12 months was more likely to be reported by HIV-positive participants than HIV-negative/unknown status participants (26.02% vs 21.27%, and 27.26% vs 17.60%, respectively; both P<.001). The vast majority (86.90%, 7127/8199) of HIV-negative/unknown status participants had been previously HIV tested, and 58.23% (4799/8199) had been tested in the past 12 months. Sexually transmitted infection (STI) testing and diagnosis was also more likely to be reported by HIV-positive participants than HIV-negative/unknown status participants (26.02% vs 21.27%, and 27.26% vs 17.60%, respectively; both P<.001). The vast majority (86.90%, 7127/8199) of HIV-negative/unknown status participants had been previously HIV tested, and 58.23% (4799/8199) had been tested in the past 12 months. Sexually transmitted infection (STI) testing and diagnosis was also more likely to be reported by HIV-positive participants than HIV-negative/unknown status participants (71.02% vs 37.34%, and 20.59% vs 7.54%, respectively; both P<.001). HIV-negative/unknown status participants <40 years of age were more likely than those 40 years or older to have had anal sex without a condom, were more likely to report substance use, were less likely to have been HIV tested, but were more likely to have been tested for and diagnosed with an STI. Compared with those from general social networking, HIV-negative/unknown status participants from a geospatial social networking website were more likely to have reported all risk behaviors but were more likely to have been HIV tested, STI tested, and diagnosed with an STI.

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KEYWORDS
MSM; gay; homosexual; bisexual; HIV; STD; Internet; survey; surveillance

Notice to the reader: Rapid Surveillance Reports are brief reports, which primarily report new data in table format from an existing well-described surveillance system, making a methods (and sometimes an introduction) section redundant.
The idea of this new article type is to allow rapid publication of emerging trends, or continuous publication in regular intervals of public health relevant data. If a method or system description has been published previously in JMIR Public Health Surveill or JMIR Res Protoc, the report does not have to be peer-reviewed again (although in many cases they still are).

Introduction

The American Men’s Internet Survey (AMIS) is an annual Web-based behavioral survey of men who have sex with men who live in the United States. The methods have been previously published [1]. Methods in AMIS-2014 are unchanged from the previously published manuscript unless otherwise noted below.

Recruitment and Enrollment

As in the prior year, AMIS participants were recruited through convenience sampling from a variety of websites using banner advertisements or email blasts to website members (hereafter referred to generically as “ads”). Men who clicked on the ads were taken directly to the survey website hosted on a secure server administered by SurveyGizmo. To be eligible for the survey, participants had to be 15 years of age or older, consider themselves to be male, reside in the United States, and report that they had oral or anal sex with a man at least once in the past (hereafter referred to as MSM). Persons who reported being <15 years of age or refused to provide their age were not asked any other screening questions. MSM who met the eligibility criteria and consented to participate in the study started the Web-based survey immediately. The full questionnaire for AMIS-2014 is presented in Multimedia Appendix 1. AMIS-2014 ran from November 2014 through April 2015, and resulted in 77,611 persons clicking on the ads and landing on the study’s recruitment page (Table 1). Most were from a general social networking website (59,670/77,611, 76.88%). Nearly half (35,462/77,611 46.89%) of those who landed on the study’s page started the screening process and 60.75% (47,149/77,611) were eligible. The most common reason for ineligibility was not ever having male-male sex. Nearly three-quarters (57,176/77,611, 73.67%) of those who were eligible consented to participate in the survey. There were 6.81% (1109/77,611) of the surveys determined to likely be from duplicate participants. Among unduplicated surveys, more than two-thirds (52,979/77,611, 68.25%) were considered successful. Success was defined using an examination of completed survey sections [1]. Most successful surveys were among men who reported having sex with another man in the past 12 months (9248/10,359, 89.28%).

Measures and Analyses

For AMIS-2014 analyses, we categorized participants by recruitment website and based on target audience and purpose: gay social networking (n=2), gay general interest (n=4), general social networking (n=1), and geospatial social networking (n=2). We do not provide the names of the websites to preserve operator/client privacy, particularly where a website category has only one operator. The participants who were eligible, consented, unduplicated, successful, and reported male-male sex in the past 12 months were included in analyses of participant characteristics and behavior.

The following behavioral measures differed in AMIS-2014 from those previously published: both sexual behaviors (any condomless anal sex and condomless anal sex with a discordant/unknown status partner) were assessed for the past 12 months, binge alcohol drinking was not included, and substance using behaviors were recategorized. Human immunodeficiency virus (HIV) serostatus concordance was based on the participant’s HIV status and the status of their sex partner. Discordant/unknown status was defined as either the participant or partner having unknown status or when one was HIV-negative and the other was HIV-positive. For substance-using behaviors in the past 12 months, we separated marijuana use from other illicit substance use. For AMIS-2014 all participants received questions on sexually transmitted infection (STI; chlamydia, gonorrhea, and syphilis) testing and diagnoses in the past 12 months. Participants could have been tested for an STI but not diagnosed with an STI. Persons who were diagnosed with an STI in the past 12 months all were considered to have been tested for an STI in the past 12 months.

The analysis methods for AMIS-2014 did not substantively differ from those previously published but are repeated in this report for clarity [1]. Overall chi-square tests were used to identify whether participant characteristics significantly differed between recruitment website types. Multivariable logistic regression modeling was used to determine significant differences in behaviors based on self-reported HIV status while controlling for race/ethnicity, age group, National HIV Behavioral Surveillance (NHBS) city residency, and recruitment website type. HIV-testing behaviors were only examined among those who did not report that they were HIV-positive and were also presented by participant characteristics. Multivariable logistic regression results are presented as Wald chi-square P-values to denote an independently significant difference in the behavior for each subgroup compared with a referent group. Statistical significance was determined at P<.05.

Results

Summary for AMIS-2014

Three-quarters (6819/9248, 73.73%) of participants included in this report were white, non-Hispanic, half (4676/9248, 50.6%) were ≥40 years of age, and their most common region of residence was the South followed by the West (Table 2). AMIS-2014 had participants from all US states and at least 100 participants from each of 27 states (Figure 1). Overall, 11.34% (1049/9248) of participants reported being HIV positive and 88.66% (8199/9248) reported being HIV negative or having an unknown HIV serostatus. There were significant differences in all participant characteristics based on where they were recruited (Table 2). Most of those differences were observed among participants recruited from geospatial social networking websites, who were less likely to be white, less likely be 40 years or older, less likely to live in an NHBS city, more likely to live in the West, more likely to live in urban areas, and more likely to report being HIV positive.
Most participants had anal sex without a condom with another man in the past 12 months (Table 3). Compared with HIV-negative/unknown status participants, those who were HIV-positive were significantly more likely to report anal intercourse without a condom, including with male partners who were discordant/unknown status. Anal intercourse without a condom significantly differed by age group (HIV-positive and -negative/unknown status participants), recruitment website type (HIV-positive and -negative/unknown status participants), and race/ethnicity (HIV-negative/unknown status participants only).

More than one-quarter (273/1049, 26.02%) of HIV-positive participants reported using marijuana or other illicit substances in the past 12 months (Table 4). Compared with HIV-negative/unknown status participants, those who were HIV-positive were significantly more likely to report use of marijuana and other substances in the past 12 months. Marijuana or other illicit substance use significantly differed by age group (HIV-positive and -negative/unknown status participants), residence in an NHBS city (HIV-negative/unknown status participants only), and recruitment website type (HIV-negative/unknown status participants only).

HIV testing behaviors were only examined among those who did not report being HIV-positive. Most of those participants (7125/8199, 86.90%) had ever been previously tested for HIV infection, and just over half (4799/8199, 58.53%) reported being tested in the past 12 months (Table 5). HIV testing significantly differed by age group (ever tested), race/ethnicity (ever tested), residence in an NHBS city (past 12 months tested), and recruitment website type (past 12 months tested).

Compared with HIV-negative/unknown status participants, those who were HIV-positive were more likely to report being tested for and diagnosed with an STI in the past 12 months (Table 6). The most common STI diagnoses were syphilis (132/1049, 12.58%) and chlamydia (88/1049, 8.39%) among HIV-positive participants. STI testing significantly differed by age group, residence in an NHBS city and recruitment website type only for participants who were HIV-negative/unknown status. STI diagnosis significantly differed by age group (HIV-positive and HIV-negative/unknown status participants), race/ethnicity (HIV-negative/unknown status participants only), residence in an NHBS city (HIV-negative/unknown status participants only), and recruitment website type (HIV-negative/unknown status participants only).

Figure 1. Number of MSM participants in the American Men's Internet Survey by state, 2014.
Table 1. Recruitment outcomes with different recruitment website types for the American Men's Internet Survey, United States, 2014.

| Recruitment Outcomes | Total N (%) | Gay social networking (n=2) | General gay interest (n=4) | General social networking (n=1) | Geospatial social networking (n=2) |
|----------------------|-------------|-----------------------------|----------------------------|-------------------------------|-----------------------------------|
| Clicked ad           | 77,611      | 1988 (25.8)                 | 8372 (47.4)                | 59,670 (47.6)                 | 7,581 (90.6)                     |
| Screened             | 36,392      | 944 (26.0)                  | 1293 (41.0)                | 26,576 (44.5)                 | 7,579 (99.9)                     |
| Ineligible           | 14,285      | 171 (12.0)                  | 523 (39.0)                 | 11,356 (42.0)                 | 2,235 (29.5)                     |
| Not 15+ years of age | 10,219      | 118 (11.6)                  | 340 (33.3)                 | 8,008 (79.0)                  | 1,753 (17.3)                     |
| Not male             | 10,942      | 138 (12.6)                  | 380 (34.5)                 | 8,494 (78.0)                  | 1,930 (19.3)                     |
| Not ever MSM         | 13,776      | 167 (12.2)                  | 510 (36.9)                 | 11,073 (80.2)                 | 2,026 (14.6)                     |
| Not a US resident    | 3,733       | 22 (0.6)                    | 161 (43.5)                 | 2,460 (66.0)                  | 1,090 (29.3)                     |
| Eligible             | 22,107      | 773 (3.5)                   | 770 (3.4)                  | 15,220 (69.0)                 | 5,344 (24.1)                     |
| Consent ed           | 16,286      | 574 (35.1)                  | 595 (36.6)                 | 10,821 (65.1)                 | 4,296 (26.3)                     |
| Unduplicated         | 15,177      | 557 (36.7)                  | 564 (36.9)                 | 9,960 (65.1)                  | 4,096 (26.7)                     |
| Success              | 10,359      | 414 (40.4)                  | 410 (39.9)                 | 6,913 (66.2)                  | 2,622 (25.2)                     |
| MSM past 12 months   | 9,248       | 377 (4.1)                   | 369 (4.0)                  | 5,987 (6.5)                   | 2,515 (2.7)                      |

aProportion is of total who clicked ad. Includes those who started the screening questionnaire.
bProportion is among total screened. Ineligible includes those who did not complete the screening questionnaire.
cProportion is among total ineligible. Includes those who may not have responded to the question.
dMSM: men who have sex with men.
eProportion is among eligible.
fProportion is among consented. Unduplicated removes participants who were marked as duplicates using an Internet protocol address and demographic data matching.
gProportion is among unduplicated. Success removes participants who did not pass the test for survey completeness.
hProportion is among successes.
Table 2. Characteristics of MSM participants in the American Men’s Internet Survey by recruitment website type, United States, 2014.

| Recruitment website type | Total | Gay social networking (n=2) | General gay interest (n=4) | Geospatial social networking (n=1) | General social networking (n=1) | Geospatial social networking (n=2) | P-value<sup>a</sup> |
|--------------------------|-------|-----------------------------|---------------------------|----------------------------------|---------------------------------|-----------------------------------|-------------------|
|                          | N     | (%)                         | N (%)                     | N (%)                            | N (%)                           | N (%)                             |                   |
| Race/ethnicity           |       |                             |                           |                                  |                                 |                                   |                   |
| Black, non-Hispanic      | 415   | (4.49)                      | 11 (2.92)                 | 21 (5.69)                        | 225 (3.76)                      | 158 (6.28)                       | <.001             |
| Hispanic<sup>b</sup>     | 1308  | (14.14)                     | 14 (3.71)                 | 37 (10.03)                       | 713 (11.91)                     | 544 (21.63)                      |                   |
| White, non-Hispanic      | 6819  | (73.73)                     | 327 (86.74)               | 286 (77.51)                      | 4643 (77.55)                    | 1563 (62.15)                      |                   |
| Other or multiple races  | 706   | (7.63)                      | 25 (6.63)                 | 25 (6.78)                        | 406 (6.78)                      | 250 (9.94)                        |                   |
| Age (years)              |       |                             |                           |                                  |                                 |                                   | <.001             |
| 15-24                    | 1389  | (15.02)                     | 21 (5.57)                 | 47 (12.74)                       | 857 (14.31)                     | 464 (18.45)                       |                   |
| 25-29                    | 1221  | (13.20)                     | 24 (6.37)                 | 48 (13.01)                       | 612 (10.22)                     | 537 (21.35)                       |                   |
| 30-39                    | 1962  | (21.22)                     | 40 (10.61)                | 86 (23.31)                       | 1164 (19.44)                    | 672 (26.72)                       |                   |
| 40 or older              | 4676  | (50.56)                     | 292 (77.45)               | 188 (50.95)                      | 3354 (56.02)                    | 842 (33.48)                       |                   |
| Region                   |       |                             |                           |                                  |                                 |                                   | <.001             |
| Midwest                  | 1560  | (16.87)                     | 68 (18.04)                | 64 (17.34)                       | 985 (16.45)                     | 443 (17.61)                       |                   |
| Northeast                | 1933  | (20.90)                     | 117 (31.03)               | 55 (14.91)                       | 1306 (21.81)                    | 455 (18.09)                       |                   |
| South                    | 3634  | (39.29)                     | 122 (32.36)               | 180 (48.78)                      | 2369 (39.57)                    | 963 (38.29)                       |                   |
| West                     | 2110  | (22.82)                     | 69 (18.30)                | 65 (17.62)                       | 1323 (22.10)                    | 653 (25.96)                       |                   |
| US dependent areas       | 11    | (0.12)                      | 1 (0.27)                  | 5 (1.36)                         | 4 (0.07)                        | 1 (0.04)                          |                   |
| NHBS city resident<sup>c</sup> |       |                             |                           |                                  |                                 |                                   | <.001             |
| Yes                      | 3553  | (38.42)                     | 137 (36.34)               | 206 (55.83)                      | 2177 (36.36)                    | 1033 (41.07)                      |                   |
| No                       | 5695  | (61.58)                     | 240 (63.66)               | 163 (44.17)                      | 3810 (63.64)                    | 1482 (58.93)                      |                   |
| Population density<sup>d</sup> |       |                             |                           |                                  |                                 |                                   | <.001             |
| Rural                    | 2774  | (30.00)                     | 133 (35.28)               | 80 (21.68)                       | 1902 (31.77)                    | 659 (26.20)                       |                   |
| Urban/suburban           | 6300  | (68.12)                     | 241 (63.93)               | 285 (77.24)                      | 4001 (66.83)                    | 1773 (70.50)                      |                   |
| Self-reported HIV status |       |                             |                           |                                  |                                 |                                   | <.001             |
| Positive                 | 1049  | (11.34)                     | 23 (6.10)                 | 32 (8.67)                        | 554 (9.25)                      | 440 (17.50)                       |                   |
| Negative                 | 6992  | (75.61)                     | 277 (73.47)               | 303 (82.11)                      | 4588 (76.63)                    | 1824 (72.52)                      |                   |
| Unknown                  | 1207  | (13.05)                     | 77 (20.42)                | 34 (9.21)                        | 845 (14.11)                     | 251 (9.98)                        |                   |
| Total                    | 9248  | (100.00)                    | 377 (100.00)              | 369 (100.00)                     | 5987 (100.00)                   | 2515 (100.00)                     |                   |

<sup>a</sup>Chi-square testing difference in characteristics between website type.

<sup>b</sup>Hispanic persons could have been of any race, including other or multiple.

<sup>c</sup>NHBS: National HIV Behavioral Surveillance System.

<sup>d</sup>There were 71 participants missing information needed to determine the population density of the area where they lived.
Table 3. Sexual behaviors with male partners of MSM participants in the American Men’s Internet Survey, United States, 2014.

| Participant characteristics | N in sample | Anal intercourse without a condom | Anal intercourse without a condom with a partner of discordant or unknown HIV status |
|-----------------------------|------------|----------------------------------|-------------------------------------------------------------------------------------|
|                             | n          | (%) P -value                      | n                                      | (%) P -value                |
| HIV positive overall        | 1049       | 803 (76.55) <.001 b               | 416 (39.66)                             | <.001 b                    |
| Race/ethnicity              |            |                                  |                                        |                            |
| Black, non-Hispanic         | 92         | 69 (75.00) .459                  | 34                                     | (36.96) .253              |
| Hispanic                    | 172        | 134 (77.91) .636                 | 73                                     | (42.44) .893              |
| White, non-Hispanic         | 716        | 546 (76.26) REF                  | 281                                    | (39.25) REF                |
| Other or multiple races     | 69         | 54 (78.26) .878                 | 28                                     | (40.58) .794              |
| Age (years)                 |            |                                  |                                        |                            |
| 15-24                       | 68         | 62 (91.18) .038                  | 38                                     | (55.88) .090              |
| 25-29                       | 110        | 96 (87.27) .226                  | 65                                     | (59.09) .002              |
| 30-39                       | 251        | 199 (79.28) .086                 | 111                                    | (44.22) .278              |
| 40 or older                 | 620        | 446 (71.94) REF                  | 202                                    | (32.58) REF                |
| NHBS city residentc         |            |                                  |                                        |                            |
| Yes                         | 464        | 361 (77.80) .217                 | 173                                    | (37.28) .291              |
| No                          | 585        | 442 (75.56) REF                  | 243                                    | (41.54) REF                |
| Recruitment website type    |            |                                  |                                        |                            |
| Gay social networking       | 23         | 18 (78.26) .620                  | 16                                     | (69.57) .007              |
| General gay interest        | 32         | 24 (75.00) .768                  | 17                                     | (53.13) .478              |
| General social networking   | 554        | 403 (72.74) REF                  | 192                                    | (34.66) REF                |
| Geospatial social networking| 440        | 358 (81.36) .642                 | 191                                    | (43.41) .002              |
| HIV negative or unknown overall | 8199   | 5507 (67.17) REF                 | 1539                                   | (18.77) REF                |
| Race/ethnicity              |            |                                  |                                        |                            |
| Black, non-Hispanic         | 323        | 202 (62.54) .043                 | 80                                     | (24.77) .121              |
| Hispanic                    | 1136       | 777 (68.40) .377                 | 276                                    | (24.30) .088              |
| White, non-Hispanic         | 6103       | 4109 (67.33) REF                 | 1053                                   | (17.25) REF                |
| Other or multiple races     | 637        | 419 (65.78) .808                 | 130                                    | (20.41) .323              |
| Age (years)                 |            |                                  |                                        |                            |
| 15-24                       | 1321       | 870 (65.86) <.001                | 334                                    | (25.28) .359              |
| 25-29                       | 1111       | 820 (73.81) <.001                | 193                                    | (17.37) .954              |
| 30-39                       | 1711       | 1281 (74.87) <.001               | 241                                    | (14.09) .572              |
| 40 or older                 | 4056       | 2536 (62.52) REF                 | 505                                    | (12.45) REF                |
| NHBS city residentc         |            |                                  |                                        |                            |
| Yes                         | 3089       | 2053 (66.46) .300                | 607                                    | (19.65) .442              |
| No                          | 5110       | 3454 (67.59) REF                 | 932                                    | (18.24) REF                |
| Recruitment website type    |            |                                  |                                        |                            |
| Gay social networking       | 354        | 187 (52.82) <.001                | 76                                     | (21.47) .318              |
| General gay interest        | 337        | 219 (64.99) .909                 | 68                                     | (20.18) .680              |
| General social networking   | 5433       | 3592 (66.11) REF                 | 825                                    | (15.18) REF                |
| Geospatial social networking| 2075       | 1509 (72.72) <.001               | 570                                    | (27.47) <.001             |

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aWald chi-square from multivariable logistic regression comparing behavior (yes versus no) among group with some characteristic compared to a referent (REF) group.
bWald chi-square from multivariable logistic regression comparing behavior (yes versus no) among HIV-positive participants compared to HIV-negative or unknown serostatus participants. Model controlled for race/ethnicity, age, NHBS residency, and website type.
cNHBS: National HIV Behavioral Surveillance System.
Table 4. Substance using behaviors of MSM participants in the American Men's Internet Survey, United States, 2014.

| Participant characteristics | N in sample | Substance use behaviors in the past 12 months | | | |
|-----------------------------|-------------|------------------------------------------|---|---|---|
|                             |             | Used marijuana (n, %) | Used other substance(s) (N, %) | P-value | P-value |
|                             |             | n | (%) | | n | (%) | | |
| HIV positive overall        | 1049        | 273 (26.02) | <.001 b | 286 (27.26) | <.001 b |
| Race/ethnicity              |             | | | | | | |
| Black non-Hispanic          | 92          | 24 (26.09) | .549 | 19 | (20.65) | .110 |
| Hispanic                    | 172         | 46 (26.74) | .468 | 44 | (25.58) | .571 |
| White non-Hispanic          | 716         | 181 (25.28) | REF | 202 | (28.21) | REF |
| Other or multiple races     | 69          | 22 (31.88) | .359 | 21 | (30.43) | .400 |
| Age (years)                 |             | | | | | | |
| 15-24                       | 68          | 21 (30.88) | .988 | 17 | (25.00) | .360 |
| 25-29                       | 110         | 40 (36.36) | .082 | 34 | (30.91) | .441 |
| 30-39                       | 251         | 76 (30.28) | .771 | 91 | (36.25) | .011 |
| 40 or older                 | 620         | 136 (21.94) | REF | 144 | (23.23) | REF |
| NHBS city resident^c         |             | | | | | | |
| Yes                         | 464         | 123 (26.51) | .781 | 130 | (28.02) | .573 |
| No                          | 585         | 150 (25.64) | REF | 156 | (26.67) | REF |
| Recruitment website type    |             | | | | | | |
| Gay social networking       | 23          | 7 (30.43) | .588 | 4 | (17.39) | .316 |
| General gay interest        | 32          | 10 (31.25) | .610 | 11 | (34.38) | .255 |
| General social networking   | 554         | 119 (21.48) | REF | 134 | (24.19) | REF |
| Geospatial social networking| 440         | 137 (31.14) | .971 | 137 | (31.14) | .353 |
| HIV negative or unknown overall | 8199    | 1744 (21.27) | REF | 1443 | (17.60) | REF |
| Race/Ethnicity              |             | | | | | | |
| Black non-Hispanic          | 323         | 60 (18.58) | .051 | 50 | (15.48) | .060 |
| Hispanic                    | 1136        | 256 (22.54) | .586 | 212 | (18.66) | .596 |
| White non-Hispanic          | 6103        | 1274 (20.87) | REF | 1051 | (17.22) | REF |
| Other or multiple races     | 637         | 154 (24.18) | .123 | 130 | (20.41) | .102 |
| Age (years)                 |             | | | | | | |
| 15-24                       | 1321        | 424 (32.10) | <.001 | 269 | (20.36) | .160 |
| 25-29                       | 1111        | 303 (27.27) | .005 | 259 | (23.31) | .002 |
| 30-39                       | 1711        | 411 (24.02) | .912 | 382 | (22.33) | .002 |
| 40 or older                 | 4056        | 606 (14.94) | REF | 533 | (13.14) | REF |
| NHBS city resident^c         |             | | | | | | |
| Yes                         | 3089        | 717 (23.21) | <.001 | 656 | (21.24) | <.001 |
| No                          | 5110        | 1027 (20.10) | REF | 787 | (15.40) | REF |
| Recruitment website type    |             | | | | | | |
| Gay social networking       | 354         | 48 (13.56) | .032 | 39 | (11.02) | .022 |
| General gay interest        | 337         | 69 (20.47) | .985 | 55 | (16.32) | .535 |
| General social networking   | 5433        | 1095 (20.15) | REF | 861 | (15.85) | REF |
| Geospatial social networking| 2075        | 532 (25.64) | <.001 | 488 | (23.52) | <.001 |

^a Wald chi-square from multivariable logistic regression comparing behavior (yes versus no) among group with some characteristic compared with a
referent (REF) group.

Wald chi-square from multivariable logistic regression comparing behavior (yes versus no) among HIV-positive participants compared to HIV-negative or unknown serostatus participants. Model controlled for race/ethnicity, age, NHBS residency, and website type.

NHBS: National HIV Behavioral Surveillance System.

Table 5. HIV testing behaviors of HIV-negative or unknown status MSM participants in the American Men’s Internet Survey, United States, 2014.

| Participant characteristics | N in sample | HIV tested ever | HIV tested past 12 months |
|-----------------------------|-------------|----------------|--------------------------|
|                             | n           | (%)            | P-value<sup>a</sup>   | N         | (%)            | P-value<sup>a</sup>   |
| Race/ethnicity              |             |                |                         |           |                |                         |
| Black non-Hispanic          | 323         | 287 (88.85)    | .503                    | 213       | 65.94 (65.94)  | .221                    |
| Hispanic                    | 1136        | 981 (86.36)    | .544                    | 706       | 62.15 (62.15)  | .290                    |
| Hispanic                    | 6103        | 5299 (86.83)   | REF                     | 3454      | 56.60 (56.60)  | REF                     |
| Hispanic                    | 637         | 558 (87.60)    | .469                    | 406       | 63.74 (63.74)  | .308                    |
| Other or multiple races     |             |                |                         |           |                |                         |
| Age (years)                 |             |                |                         |           |                |                         |
| 15-24                       | 1321        | 892 (67.52)    | <.001                   | 699       | 52.91 (52.91)  | <.001                   |
| 25-29                       | 1111        | 997 (89.74)    | .006                    | 742       | 66.79 (66.79)  | <.001                   |
| 30-39                       | 1711        | 1547 (90.41)   | <.001                   | 1037      | 60.61 (60.61)  | .498                    |
| 40 or older                 | 4056        | 3689 (90.95)   | REF                     | 2301      | 56.73 (56.73)  | REF                     |
| NHBS city resident<sup>b</sup> |             |                |                         |           |                |                         |
| Yes                         | 3089        | 2787 (90.22)   | <.001                   | 1992      | 64.49 (64.49)  | <.001                   |
| No                          | 5110        | 4338 (84.89)   | REF                     | 2787      | 54.54 (54.54)  | REF                     |
| Recruitment website type    |             |                |                         |           |                |                         |
| Gay social networking       | 354         | 280 (79.10)    | <.001                   | 172       | 48.59 (48.59)  | <.001                   |
| General gay interest        | 337         | 304 (90.21)    | .054                    | 188       | 55.79 (55.79)  | .068                    |
| General social networking   | 5433        | 4662 (85.81)   | REF                     | 2881      | 53.03 (53.03)  | REF                     |
| Geospatial social networking| 2075        | 1879 (90.55)   | <.001                   | 1538      | 74.12 (74.12)  | <.001                   |
| TOTAL                       | 8199        | 7125 (86.90)   |                         | 4799      | 58.53 (58.53)  |                         |

<sup>a</sup>Wald chi-square from multivariable logistic regression comparing behavior (yes versus no) among group with some characteristic compared with a referent (REF) group.

<sup>b</sup>NHBS: National HIV Behavioral Surveillance System.
Table 6. Sexually transmitted infection testing and diagnosis of MSM participants in the American Men's Internet Survey, United States, 2014.

| Participant characteristics | N in sample | Tested for any STI<sup>a</sup> | Diagnosed with any STI<sup>a</sup> |
|-----------------------------|-------------|-------------------------------|----------------------------------|
|                             | N           | n (%)                         | P -value<sup>b</sup>            | N     | (%)                         | P -value<sup>b</sup>            |
| **HIV positive overall**    | 1049        | 747 (71.21)                   | <.001<sup>c</sup>              | 216   | (20.59)                     | <.001<sup>c</sup>              |
| Race/ethnicity              |             |                               |                                  |       |                             |                                  |
| Black non-Hispanic          | 92          | 72 (78.26)                    | .508                            | 25    | (27.17)                     | .905                            |
| Hispanic                    | 172         | 129 (75.00)                   | .354                            | 47    | (27.33)                     | .687                            |
| White non-Hispanic          | 716         | 493 (68.85)                   | REF                             | 120   | (16.76)                     | REF                             |
| Other or multiple races     | 69          | 53 (76.81)                    | .867                            | 24    | (34.78)                     | .065                            |
| Age (years)                 |             |                               |                                  |       |                             |                                  |
| 15-24                       | 68          | 57 (83.82)                    | .365                            | 20    | (29.41)                     | .968                            |
| 25-29                       | 110         | 94 (85.45)                    | .086                            | 44    | (40.00)                     | <.001                           |
| 30-39                       | 251         | 203 (80.88)                   | .583                            | 67    | (26.69)                     | .846                            |
| 40 or older                 | 620         | 393 (63.39)                   | REF                             | 85    | (13.71)                     | REF                             |
| NHBS city resident<sup>d</sup> |             |                               |                                  |       |                             |                                  |
| Yes                         | 464         | 344 (74.14)                   | .073                            | 105   | (22.63)                     | .326                            |
| No                          | 585         | 403 (68.89)                   | REF                             | 111   | (18.97)                     | REF                             |
| Recruitment website type    |             |                               |                                  |       |                             |                                  |
| Gay social networking       | 23          | 13 (56.52)                    | .282                            | 2     | (8.70)                      | .302                            |
| General gay interest        | 32          | 24 (75.00)                    | .416                            | 8     | (25.00)                     | .154                            |
| General social networking   | 554         | 364 (65.70)                   | REF                             | 81    | (14.62)                     | REF                             |
| Geospatial social networking| 440         | 346 (78.64)                   | .214                            | 125   | (28.41)                     | .246                            |
| **HIV negative or unknown overall** | 8199        | 3086 (37.64)                  | REF                             | 618   | (7.54)                      | REF                             |
| Race/Ethnicity              |             |                               |                                  |       |                             |                                  |
| Black non-Hispanic          | 323         | 156 (48.30)                   | .272                            | 35    | (10.84)                     | .559                            |
| Hispanic                    | 1136        | 553 (48.68)                   | .173                            | 147   | (12.94)                     | .007                            |
| White non-Hispanic          | 6103        | 2086 (34.18)                  | REF                             | 378   | (6.19)                      | REF                             |
| Other or multiple races     | 637         | 291 (45.68)                   | .470                            | 58    | (9.11)                      | .454                            |
| Age (years)                 |             |                               |                                  |       |                             |                                  |
| 15-24                       | 1321        | 512 (38.76)                   | .033                            | 109   | (8.25)                      | .612                            |
| 25-29                       | 1111        | 579 (52.12)                   | <.001                           | 136   | (12.24)                     | .001                            |
| 30-39                       | 1711        | 754 (44.07)                   | .040                            | 174   | (10.17)                     | .021                            |
| 40 or older                 | 4056        | 1241 (30.60)                  | REF                             | 199   | (4.91)                      | REF                             |
| NHBS city resident<sup>d</sup> |             |                               |                                  |       |                             |                                  |
| Yes                         | 3089        | 1442 (46.68)                  | <.001                           | 300   | (9.71)                      | <.001                           |
| No                          | 5110        | 1644 (32.17)                  | REF                             | 318   | (6.22)                      | REF                             |
| Recruitment website type    |             |                               |                                  |       |                             |                                  |
| Gay social networking       | 354         | 84 (23.73)                    | <.001                           | 14    | (3.95)                      | .173                            |
| General gay interest        | 337         | 109 (32.34)                   | .013                            | 17    | (5.04)                      | .107                            |
| General social networking   | 5433        | 1740 (32.03)                  | REF                             | 284   | (5.23)                      | REF                             |
| Geospatial social networking| 2075        | 1153 (55.57)                  | <.001                           | 303   | (14.60)                     | <.001                           |

<sup>a</sup>STI: sexually transmitted infection; includes chlamydia, gonorrhea and syphilis.
Wald chi-square from multivariable logistic regression comparing behavior (yes versus no) among group with some characteristic compared with a referent (REF) group.

Wald chi-square from multivariable logistic regression comparing behavior (yes versus no) among HIV-positive participants compared with HIV-negative or unknown serostatus participants. Model controlled for race/ethnicity, age, NHBS residency, and website type.

NHBS: National HIV Behavioral Surveillance System.

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Conflicts of Interest
Authors Sanchez and Sullivan are members of the Editorial Board of JMIR Public Health and Surveillance. However, they had no involvement in the editorial decision for this manuscript. It was reviewed and handled by an independent editor.

Multimedia Appendix 1
American Men's Internet Survey, 2014.

Reference
1. Sanchez TH, Sineath RC, Kahle EM, Tregear SJ, Sullivan PS. The Annual American Men's Internet survey of behaviors of men who have sex with men in the United States: Protocol and Key Indicators Report 2013. JMIR Public Health Surveill 2015;1:e3. [doi: 10.2196/publichealth.4314]

Abbreviations
- AMIS: American Men’s Internet Survey
- HIV: human immunodeficiency virus
- MSM: men who have sex with men
- NHBS: national HIV behavioral surveillance system
- STI: sexually transmitted infection

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