



Published in final edited form as:

Sex Transm Dis. 2018 July ; 45(7): 469–475. doi:10.1097/OLQ.0000000000000786.

Self-Reported Chlamydia and Gonorrhea Testing and Diagnosis Among Men Who Have Sex With Men—20 US Cities, 2011 and 2014

Brooke E. Hoots, PhD^{*}, Elizabeth A. Torrone, PhD[†], Kyle T. Bernstein, PhD[†], Gabriela Paz-Bailey, MD, PhD^{*}, NHBS Study Group

^{*}Division of HIV/AIDS Prevention, TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA

[†]Division of STD Prevention, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA

Abstract

Background: Annual screening for chlamydia and gonorrhea is recommended for sexually active men who have sex with men (MSM) at anatomical sites of contact, regardless of condom use.

Methods: We assessed differences in self-reported chlamydia and gonorrhea testing and diagnosis in the past 12 months among MSM using National HIV Behavioral Surveillance data from 2011 and 2014. Men who have sex with men who had 1 or more partners in the past 12 months were included in analyses. Analyses of chlamydia and gonorrhea diagnosis data were limited to participants who reported past 12 months chlamydia and gonorrhea testing, respectively. Differences in testing and diagnosis over time were assessed using Poisson regression models with robust standard errors separately for chlamydia and gonorrhea.

Results: Analyses included data from 18,896 MSM (2011, n = 9256; 2014, n = 9640). Testing for chlamydia was 37% in 2011 and 47% in 2014 (prevalence ratio [PR], 1.25; 95% confidence interval [CI], 1.20–1.30) and 38% and 47% for gonorrhea (PR, 1.24; 95% CI, 1.19–1.29). Testing was higher in 2014 among most demographic subgroups. Prevalence of chlamydia diagnoses was 8% in 2011 and 11% in 2014 (PR, 1.37; 95% CI, 1.18–1.59) and of gonorrhea diagnoses was 10% in 2011 and 14% in 2014 (adjusted PR: 1.40, 95% CI, 1.23–1.60). Larger changes in diagnoses were observed among MSM in the white and “other” racial categories and those who disclosed same-sex behavior to their health care provider.

Conclusions: Self-reported testing and diagnoses among MSM increased from 2011 to 2014. Increased efforts are needed to meet annual sexually transmitted disease screening recommendations among MSM at high HIV risk.

Correspondence: Brooke E. Hoots, PhD, 1600 Clifton Road NE, Mailstop E-46, Atlanta, GA 30329. vie2@cdc.gov.

Conflicts of Interest: None declared.

Disclaimer: The findings and conclusions in this paper are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Chlamydial and gonococcal infections are the 2 most frequently reported infectious diseases in the United States.¹ Untreated chlamydia (CT) or gonorrhea (GC) may increase a person's chances of acquiring or transmitting human immunodeficiency virus (HIV),² particularly among gay, bisexual, and other men who have sex with men (hereafter referred to as MSM), who are disproportionately affected by HIV.³

Asymptomatic infection with CT or GC is common and health care providers frequently rely on screening tests to detect infection.⁴ The CDC provides screening guidelines for CT and GC, and since 2006 has recommended that MSM be screened at least annually for both infections, and more frequently (every 3–6 months) for MSM at increased risk.⁴ The CDC recommends that MSM are screened at exposed anatomic sites, irrespective of condom use, including the urethra and rectum for CT and the urethra, rectum, and pharynx for GC.

Among men, national rates of reported CT have steadily increased since 2000, and rates of reported GC have increased since 2009; however, CT and GC case report data are limited in that they do not include complete information on sex of sex partners, so trends among MSM cannot be calculated. Additionally, because CT and GC infections are often asymptomatic, case report data are heavily influenced by changes in screening practices, and observed case rates cannot provide information on whether increases are due to increases in screening, indicate increases in incidence, or both. Population-based surveillance, such as CDC's National HIV Behavioral Surveillance (NHBS), are critical to help monitor trends in CT and GC among MSM.

To monitor compliance with screening recommendations and address gaps in case report data, we used NHBS data collected in 2011 and 2014 to assess changes in self-reported CT and GC testing and diagnosis among MSM.

METHODS

The NHBS monitors HIV-associated behaviors and HIV prevalence in cities with high acquired immune deficiency syndrome burden among 3 populations at high risk for infection: MSM, persons who inject drugs, and heterosexuals at increased risk for HIV infection. Data are collected in annual rotating cycles such that each population is sampled every 3 years. Cross-sectional behavioral data reported in this analysis are from MSM recruited for interviews and HIV testing through venue-based time-space sampling (VBS) in NHBS surveys in 20 cities in 2011 and 2014. The NHBS VBS procedures have been previously published.^{5,6} Men were systematically approached at recruitment events to screen for eligibility (aged ≥ 18 years, lived in a participating city, ever had sex with another man, and able to complete the interview in English or Spanish), and interviews were conducted using a standardized questionnaire covering demographics, HIV-associated behaviors, and use of HIV prevention and testing services. The NHBS activities were approved by local institutional review boards in each participating city. The NHBS activities were determined to be research in which the Centers for Disease Control and Prevention (CDC) was not directly engaged and therefore did not require review by the CDC institutional review board.

Men who have sex with men who were currently sexually active, defined as having 1 or more male partners in the past 12 months, were included in the analyses. The main outcomes in this analysis were self-reported CT and GC testing and diagnosis in the past 12 months. Testing was ascertained from the question, “In the past 12 months, were you tested by a doctor or other health care provider for a sexually transmitted disease like gonorrhea, chlamydia, or syphilis? Do not include tests for HIV or hepatitis.” If the participant answered yes, he was then asked separately if he was tested for CT and if he was tested for GC. Analyses of CT and GC diagnosis data were limited to participants who reported CT and GC testing, respectively. Diagnosis was ascertained from the question, “In the past 12 months, has a doctor or health care provider told you that you had...” and was asked for CT and GC separately. Data on anatomical site of testing and diagnosis were not obtained.

Bivariate analyses were conducted to explore differences by demographic and sexual behavior characteristics for the four outcomes (self-reported testing for CT and GC, and self-reported diagnosis of CT and GC). The primary exposure assessed in this analysis was year of NHBS survey (2011 vs 2014). Prevalence ratios and 95% confidence intervals (CIs) were calculated from log-linked Poisson regression models with generalized estimating equations clustered on VBS recruitment event. Separate models were built for each covariate and outcome combination. Models included year, the covariate of interest, and the interaction term between year and the covariate. Prevalence ratios correspond to the change in the outcome with respect to interview year (2011–2014). Other variables associated with the covariates and outcomes in bivariate analyses with P values less than 0.10 were considered as potential confounders in the multivariable models and a change-in-estimate approach was used to reduce models; variables that changed the prevalence ratio by 10% or more were retained in the model as confounders. If no covariates were retained as confounders, the unadjusted models are presented. To examine which demographic groups were more likely to be tested for CT and GC in 2014, we also developed models as described above with the demographic variable in question as the exposure and CT or GC testing as the outcome restricting the data to the 2014 survey sample. All analyses were conducted using SAS 9.3 (SAS Institute Inc., Cary, NC).

RESULTS

In 2011, 9881 men were eligible for and completed the NHBS survey. After excluding those with incomplete ($n = 53$) or invalid interviews ($n = 9$) and those who were not currently sexually active ($n = 729$), 9256 were left for analysis. In 2014, 10,457 men were eligible for and completed the NHBS survey. After excluding those with incomplete ($n = 72$) or invalid interviews ($n = 16$) and those who were not currently sexually active ($n = 563$), 9640 were left for analysis.

Approximately 40% of the sample was white in each year (Table 1). Although there was no difference in the 2011 and 2014 samples by race, the 2011 sample was slightly younger than the 2014 sample (44% 18–29 years in 2011 versus 42% in 2014, $P = 0.001$). Health insurance coverage increased between the 2 sample years, with 70% reporting current health insurance in 2011 and 79% in 2014 ($P < 0.001$), as did self-reported HIV prevalence (13% in 2011 and 16% in 2014, $P < 0.001$). Men who have sex with men in 2014 were more

likely to report 6 or more partners in the past 12 months and to have disclosed their same-sex behavior to a provider ($P < 0.001$ for both).

CT Testing

For the CT testing analysis, 68 men in 2011 and 79 in 2014 were missing testing data, leaving 9188 and 9561 men, respectively, for analysis (Table 2). Prevalence of self-reported CT testing in the past 12 months in 2011 was 37.2%, and increased to 46.7% in 2014, for an overall prevalence ratio of 1.25 (95% CI, 1.20–1.30). Testing significantly increased and with a similar magnitude to the overall increase among all subgroups except those with unknown HIV status.

In 2014, those of other race were more likely to report testing for CT compared with whites (prevalence ratio [PR], 1.10; 95% CI, 1.02–1.19) (Fig. 1A). The MSM with HIV were also more likely to report testing in the previous 12 months compared with those who reported being HIV-negative (PR, 1.37; 95% CI, 1.31–1.44). Testing was less common with increasing age (PR, 0.67; 95% CI, 0.63–0.71 among those 40 years or older compared with those 18–29 years), and among those with current insurance compared with those without (PR, 0.79; 95% CI, 0.75–0.84). Testing was also less common among those who reported fewer sex partners in the past 12 months (PR, 0.58; 95% CI, 0.54–0.62 among those with 1 partner compared to those with 6+; PR, 0.75; 95% CI, 0.72–0.79 among those with 2–5 partners compared to those with 6+) and among those who had not disclosed same sex behavior to their health care provider (PR, 0.54; 95% CI, 0.50–0.59).

CT Diagnosis

Of those who reported CT testing in the past 12 months, 5 men in 2011 and 2 men in 2014 were missing diagnosis data, leaving 3417 and 4459 for analysis, respectively (Table 3). Prevalence of self-reported CT diagnosis in the past 12 months was 7.7% in 2011 and 10.6% in 2014, for an overall PR of 1.37 (95% CI, 1.18–1.59). The CT diagnoses increased among most subgroups, although the magnitude of the increases differed. Blacks and Hispanics had a higher prevalence of reported CT diagnoses than whites and persons of other race/ethnicity in 2011, but whites and MSM of other race/ethnicity experienced greater relative increases in diagnoses between 2011 and 2014. Men who have sex with men aged 18 to 29 years had the highest prevalence of CT diagnoses in 2011, but MSM aged 30 to 39 years had a greater increase (adjusted PR [aPR], 1.93; 95% CI, 1.42–2.63 for ages 30–39 years vs aPR, 1.20; 95% CI, 0.98–1.48 for ages 18–29 years), resulting in similar prevalences for the 2 age groups in 2014. Prevalence also increased more and resulted in higher prevalences among those without current insurance (PR, 1.56; 95% CI, 1.17–2.08) and those who were self-reported HIV-positive (PR, 1.55; 95% CI, 1.14–2.10).

GC Testing

For the GC testing analysis, 58 men in 2011 and 77 in 2014 were missing testing data, leaving 9198 and 9563 men for analysis (Table 2). Self-reported prevalence of GC testing in the past 12 months was 38.0% in 2011 and increased to 47.3% in 2014, for a prevalence ratio of 1.24 (95% CI, 1.19–1.29). As with CT testing, GC testing increased among all subgroups except those of unknown HIV status, and the increases seen were of a similar

magnitude to that seen overall. The percentage of agreement between reporting CT testing and GC testing (Cohen's κ statistic) was 0.95, meaning it was unlikely for a man to report being tested for one infection and not the other.

GC Diagnosis

Of those who reported GC testing in the past 12 months, 3 in 2011 and 7 in 2014 were missing data on GC diagnosis, leaving 3490 and 4514 for analysis, respectively (Table 3). Prevalence of self-reported GC diagnosis increased from 10.1% in 2011 to 14.2% in 2014 (PR, 1.40; 95% CI, 1.23–1.60). Although prevalence of GC diagnoses was higher than CT diagnoses, the magnitude of the increase in diagnoses between 2011 and 2014 was similar. Whites and MSM of “other” race/ethnicity experienced greater increases in GC diagnoses between the 2 study years (PR, 1.68; 95% CI, 1.35–2.09 for whites; PR, 2.27; 95% CI, 1.44–3.58 for “other”), resulting in these groups having a higher prevalence of GC diagnoses in 2014 compared with blacks and Hispanics. Those older than 30 years also had greater increases in GC prevalence (PR, 1.70; 95% CI, 1.33–2.18), which led to 30- to 39-year-olds matching the prevalence of 18- to 29-year-olds in 2014. Although those without current insurance did not experience a statistically significant increase in GC diagnoses (PR, 1.15; 95% CI, 0.92–1.45), those with insurance did (PR, 1.58; 95% CI, 1.35–1.85).

In 2014, prevalence of GC testing within selected demographic groups was similar to that of CT testing (Fig. 1B).

Sensitivity Analyses

There were 53 men in 2011 and 38 men in 2014 who reported a CT diagnosis without reporting testing for CT in the prior 12 months. Similarly, there were 79 men in 2011 and 49 men in 2014 who reported a GC diagnosis without reporting testing for GC in the prior 12 months. These men were not included in the diagnoses analyses because those analyses were restricted to those who reported testing in the past 12 months. There are several potential reasons for why these men may not have reported testing, but reported a sexually transmitted disease (STD) diagnosis. First, they may have not recalled being tested, but recalled being told about their STD diagnosis. Second, they may have received expedited partner therapy⁷ for CT or GC from a sexual partner and assumed this was a diagnosis. Finally, they may have been presumptively treated for CT or GC by a physician based on symptoms or based on the diagnosis of a sexual partner. To examine the effect of inclusion of these self-reported diagnoses, we built additional models for CT and GC diagnoses not restricting the denominator to those who reported testing in the past 12 months.

For CT, self-reported diagnoses increased from 3.4% (318/9247) in 2011 to 5.3% (512/9633) in 2014 (PR, 1.54; 95% CI, 1.33–1.78). For GC, self-reported diagnoses increased from 4.7% (432/9249) in 2011 to 7.2% (689/9629) in 2014 (PR, 1.53; 95% CI, 1.34–1.74). Our prevalence ratios restricted to tested persons were similar to these estimates, but were more conservative.

DISCUSSION

Among MSM participating in NHBS during the 2011 and 2014 cycles, we found an increase in the proportion of MSM who reported being tested for CT or GC and increases in the self-reported diagnoses of these 2 bacterial STDs. Prevalence of self-reported testing and diagnosis in the past 12 months increased among most subgroups between 2011 and 2014. Testing prevalence was similar for CT and GC, which is expected since testing for both infections is often performed through dual-screening tests.⁴ Although self-reported testing for CT or GC increased from 2011 to 2014, it is important to note that less than half of MSM (47%) in 2014 reported receiving a test for CT or GC in the prior 12 months. Between 2011 and 2014, self-reported testing for CT or GC increased by 25% and 24%, respectively. Yet, the self-reported prevalence of these 2 bacterial infections increased by 37% and 40% among those tested.

Changes in the availability of extragenital (rectal and oropharyngeal) CT/GC tests could partially account for the increases in reported screening. Currently, no commercially available CT or GC nucleic acid amplification tests (NAATs), which increase case finding, have been approved by the Food and Drug Administration for use with rectal or oropharyngeal swab specimens.⁴ Culture is the only approved method for diagnosis at these sites. However, an increasing number of public health and commercial laboratories are using Clinical Laboratory Improvement Amendments guidelines and conducting verification studies for off-label use of NAATs, allowing these test results to then be used for clinical management⁴; as such, more clinical sites are offering extragenital testing, likely resulting in increased screening among MSM. The NHBS does not ask about anatomical site of test, so we are unable to determine from our data if more extragenital tests were done in 2014 compared with 2011.

An increase in extragenital screening could also be contributing to the higher-magnitude increase in diagnoses. Urogenital testing alone misses a significant percentage of chlamydial and gonococcal infections among MSM because it misses other sites of sexual contact, particularly among men who only report receptive anal sex or oral sex.^{8,9} In a recent review of 7 studies reporting the prevalence of extragenital infections in MSM, Chan et al¹⁰ reported that if MSM had been screened for urogenital infections alone and not at rectal and oropharyngeal sites, 14% to 85% of GC and CT infections would have been missed. Because extragenital testing increases not only the number of tests done (and therefore the number of diagnoses) but also the likelihood that some MSM test positive, the increase we see in CT and GC diagnoses may be attributable to an increase in extragenital testing. The increase in testing may also reach a subgroup of MSM that potentially has higher prevalences of CT and GC. For example, screening increased the most among MSM in the 30- to 39-year-old age group, and this group also experienced the greatest increase in diagnoses.

Data from CDC's STD Surveillance Network (SSuN) also support an increase in GC diagnoses over the time period. A random sample of reported GC cases was interviewed to determine MSM status in 6 SSuN jurisdictions and population denominators of MSM were estimated for the jurisdictions to calculate rates of GC among MSM.¹¹ The estimated MSM

rate increased from 1369 cases per 100,000 in 2010 to 3435 cases per 100,000 in 2015. Further, rate ratios comparing MSM with women and men who had sex with women only showed a disparity in GC among MSM compared with the other 2 groups.

Although increases in screening may account for some of the observed increases in both reported diagnoses in SSuN and self-reported history of diagnoses in NHBS, it is likely that there have been concurrent increases in incidence among MSM. In the NHBS data, the observed increase in self-reported diagnoses (37% increase for CT, 40% increase for GC) was larger than the self-reported increase in testing (25% for CT, 24% for GC) between 2011 and 2014, suggesting incidence may be contributing to observed increases in diagnoses. Although case report data are not available to estimate trends in CT and GC incidence among MSM, the number of reported cases of primary and secondary syphilis among MSM has increased during 2011 and 2014, suggesting increased transmission of STDs among MSM.¹

There have been concerns in the public health community about pre exposure prophylaxis (PrEP) use resulting in lower condom use and higher STD transmission. However, in our analysis, the increases in CT and GC diagnoses in the years studied are unlikely due to use of preexposure prophylaxis, or PrEP, as self-reported use among self-reported HIV-negative MSM was less than 1% in 2011 and 4% in 2014.¹² An HIV-negative MSM who is not in a monogamous relationship with a recently tested HIV-negative man and who has also been diagnosed with an STD in the past 6 months is eligible for PrEP according to the CDC clinical guidelines.¹³ This is an important population to offer PrEP as a prevention tool due to the higher prevalence of HIV infection among MSM and the increased risk of HIV acquisition with CT or GC coinfection.

Despite increases between the 2 periods, testing for CT and GC remains suboptimal, with less than half of MSM reporting a test in the past 12 months. Other studies have also reported relatively low levels of CT and GC testing prevalence among MSM, even at STD clinics.^{14,15} Barriers to testing include provider time constraints and competency.¹⁶ Providers have described needing to prioritize more urgent or complex medical assessments and not having time left for STD screening.^{17,18} Some providers also feel uncomfortable taking a detailed sexual history or are unfamiliar with the availability of NAAT testing, current testing guidelines, or current treatment guidelines for GC.¹⁴ Patient barriers include discomfort in discussing sexual practices and a misunderstanding about the risk for extragenital STDs.¹⁶ Among this population of MSM sampled, culturally competent health care may be associated with higher rates of screening and detection of untreated infections.

Our analysis is subject to several limitations. NHBS is conducted at venues in high HIV prevalence urban areas, so results may not be generalizable to all cities or to all MSM in participating cities. Data are self-reported and might be subject to social desirability bias or recall error. Social desirability would lead to underestimation of past diagnosis and likely overestimation of self-reported testing, whereas it is unclear how recall error would affect estimates. However, our results are based on differences between 2011 and 2014 and are less likely to be affected by bias than point estimates provided the bias remained consistent over time. The analysis is limited to 2 time points and cannot be interpreted as a trend.

As mentioned above, we did not have data on anatomical site of testing to examine if the increase in testing was due to an increase in extragenital testing specifically. Finally, data are not weighted to account for complex VBS sampling methodology. Point estimates may therefore be biased by overrepresented or underrepresented subgroups of the sample. However, multivariable analysis of differences across years should not be affected by a lack of weighting.

In summary, diagnoses of both CT and GC increased among MSM beyond the magnitude of the increases in testing between 2011 and 2014. Testing in the past 12 months was low, and increased efforts are needed to meet annual STD screening recommendations among MSM at high risk for HIV. Further, MSM who are diagnosed with an STD are important candidates for interventions to reduce HIV acquisition and transmission, including PrEP among HIV-negative individuals and engagement or reengagement in care to achieve viral suppression among HIV-infected individuals.

Acknowledgements:

The authors would like to thank all of the NHBS 2011 and 2014 participants. The authors would also like to thank the members of the NHBS Study Group: Atlanta, GA: Pascale Wortley, Jeff Todd, Kimi Sato; Baltimore, MD: Colin Flynn, Danielle German; Boston, MA: Dawn Fukuda, Rose Doherty, Chris Wittke; Chicago, IL: Nikhil Prachand, Nanette Benbow, Antonio D. Jimenez; Dallas, TX: Jonathon Poe, Shane Sheu, Alicia Novoa; Denver, CO: Alia Al-Tayyib, Melanie Mattson; Detroit, MI: Vivian Griffin, Emily Higgins, Kathryn Macomber; Houston, TX: Salma Khuwaja, Hafeez Rehman, Paige Padgett; Los Angeles, CA: Ekow Kwa Sey, Yingbo Ma; Miami, FL: Marlene LaLota, John-Mark Schacht, David Forrest; Nassau-Suffolk, NY: Bridget Anderson, Amber Sinclair, Lou Smith; New Orleans, LA: William T. Robinson, Narquis Barak, Meagan C. Zarwell; New York City, NY: Alan Neaigus, Kathleen H. Reilly; Newark, NJ: Barbara Bolden, Afework Wogayehu, Henry Godette; Philadelphia, PA: Kathleen A. Brady, Mark Shpaner, Jennifer Shinefeld; San Diego, CA: Lissa Bayang, Veronica Tovar-Moore; San Francisco, CA: H. Fisher Raymond, Theresa Ick; San Juan, PR: Sandra Miranda De León, Yadira Rolón-Colón; Seattle, WA: Tom Jaenicke, Hanne Thiede, Richard Burt; Washington, DC: Jenevieve Opoku, Irene Kuo; CDC: Winston Abara, Alexandra Balaji, Dita Broz, Jonathan Cook, Laura Cooley, Melissa Cribbin, Paul Denning, Teresa Finlayson, Kathy Hageman, Kristen Hess, Brooke Hoots, Wade Ivy, Binh Le, Rashunda Lewis, Stacey Mason, Gabriela Paz-Bailey, Kathryn Salo, Catlainn Sionean, Amanda Smith, Justin Smith, Michael Spiller, Cyprian Wejnert, Mingjing Xia.

REFERENCES

- Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance 2015. Atlanta: U.S. Department of Health and Human Services, 2016.
- Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sex Transm Infect* 1999; 75:3–17. [PubMed: 10448335]
- Centers for Disease Control and Prevention. Diagnoses of HIV infection in the United States and dependent areas, 2015, in HIV Surveillance Report 2015.
- Workowski KA, Bolan GA. Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines, 2015. *MMWR Recomm Rep* 2015; 64(RR-03):1–137.
- MacKellar DA, Gallagher KM, Finlayson T, et al. Surveillance of HIV risk and prevention behaviors of men who have sex with men—a national application of venue-based, time-space sampling. *Public Health Rep* 2007; 122(Suppl 1):39–47. [PubMed: 17354526]
- Finlayson TJ, Le B, Smith A, et al. HIV risk, prevention, and testing behaviors among men who have sex with men—National HIV Behavioral Surveillance System, 21 U.S. cities, United States, 2008. *MMWR Surveill Summ* 2011; 60:1–34.
- Centers for Disease Control and Prevention. Expedited Partner Therapy. <https://www.cdc.gov/std/ept/>. Accessed on May 12, 2017.

8. Kent CK, Chaw JK, Wong W, et al. Prevalence of rectal, urethral, and pharyngeal chlamydia and gonorrhea detected in 2 clinical settings among men who have sex with men: San Francisco, California, 2003. *Clin Infect Dis* 2005; 41:67–74. [PubMed: 15937765]
9. Marcus JL, Bernstein KT, Kohn RP, et al. Infections missed by urethral-only screening for chlamydia or gonorrhea detection among men who have sex with men. *Sex Transm Dis* 2011; 38:922–924. [PubMed: 21934565]
10. Chan PA, Robinette A, Montgomery M, et al. Extragenital infections caused by chlamydia trachomatis and neisseria gonorrhoeae: a review of the literature. *Infect Dis Obstet Gynecol* 2016; 2016:5758387. [PubMed: 27366021]
11. Stenger MR, Pathela P, Anschuetz G, et al. Increases in the rate of neisseria gonorrhoeae among gay, bisexual and other men who have sex with men—findings from the sexually transmitted disease surveillance network 2010–2015. *Sex Transm Dis* 2017; In press.
12. Hoots BE, Finlayson T, Nerlander L, et al. Willingness to take, use of, and indications for pre-exposure prophylaxis among men who have sex with men—20 US Cities, 2014. *Clin Infect Dis* 2016; 63:672–677. [PubMed: 27282710]
13. US Public Health Service. Preexposure prophylaxis for the prevention of HIV in the United States—2014: a clinical practice guideline. <http://www.cdc.gov/hiv/pdf/guidelines/PrEPguidelines2014.pdf>. Accessed on May 12, 2017.
14. Barbee LA, Dhanireddy S, Tat SA, et al. Barriers to bacterial sexually transmitted infection testing of HIV-infected men who have sex with men engaged in HIV primary care. *Sex Transm Dis* 2015; 42:590–594. [PubMed: 26372931]
15. Patton ME, Kidd S, Llata E, et al. Extragenital gonorrhea and chlamydia testing and infection among men who have sex with men—STD Surveillance Network, United States, 2010–2012. *Clin Infect Dis* 2014; 58:1564–1570. [PubMed: 24647015]
16. Lutz AR. Screening for asymptomatic extragenital gonorrhea and chlamydia in men who have sex with men: significance, recommendations, and options for overcoming barriers to testing. *LGBT Health* 2015; 2:27–34. [PubMed: 26790015]
17. Carter JW Jr, Hart-Cooper GD, Butler MO, et al. Provider barriers prevent recommended sexually transmitted disease screening of HIV-infected men who have sex with men. *Sex Transm Dis* 2014; 41:137–142. [PubMed: 24413496]
18. Hoover KW, Butler M, Workowski K, et al. STD screening of HIV-infected MSM in HIV clinics. *Sex Transm Dis* 2010; 37:771–776. [PubMed: 20585275]

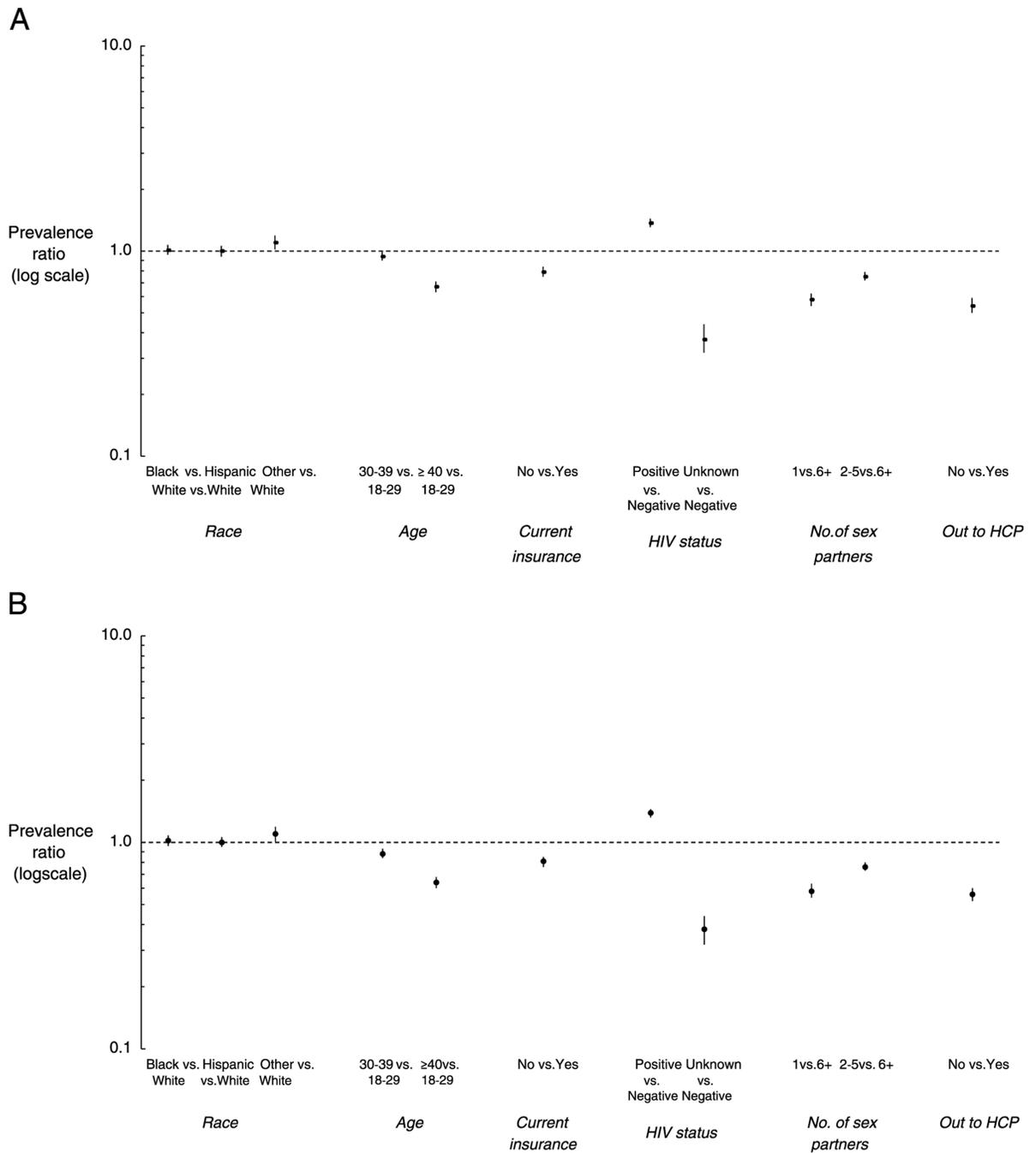


Figure 1. A, PRs and 95% CIs comparing prevalence of CT testing within selected demographic groups, 2014. B, PRs and 95% CIs comparing prevalence of GC testing within selected demographic groups, 2014. HCP, health care provider.

TABLE 1.

Characteristics of Sexually Active MSM in 20 US Cities—National HIV Behavioral Surveillance, 2011 and 2014

Characteristics	2011		2014		χ^2 P-value
	n	(%)	n	(%)	
Total	9256		9640		
Race/ethnicity					
Black	2486	(26.9)	2653	(27.7)	0.18
Hispanic/Latino*	2409	(26.1)	2524	(26.3)	
White	3665	(39.7)	3669	(38.3)	
Other [†]	672	(7.3)	743	(7.8)	
Current age, y					
18–29	103	(44.3)	4073	(42.3)	0.001
30–39	2190	(23.7)	2487	(25.8)	
40	2963	(32.0)	3080	(32.0)	
Current health insurance					
No	2776	(30.0)	2060	(21.4)	<0.0001
Yes	6472	(70.0)	7564	(78.6)	
Self-reported HIV status					
Negative	7131	(77.0)	7424	(77.0)	<0.0001
Positive	1244	(13.4)	1586	(16.5)	
Unknown	881	(9.5)	630	(6.5)	
No. sex partners, past 12 mo					
1	2149	(23.2)	2050	(21.3)	<0.0001
2–5	4195	(45.3)	4264	(44.2)	
6+	2912	(31.5)	3326	(34.5)	
Disclosed same sex behavior to HCP					
No	1843	(21.2)	1643	(18.1)	<0.0001
Yes	6842	(78.8)	7456	(81.9)	

Numbers may not add to total due to missing values.

* Hispanic/Latinos can be of any race.

[†] Includes those reporting American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, other race, or multiple races.

HCP, health care provider.

TABLE 2.

Prevalence of Self-Reported CT and GC Testing in the Past 12 Months Among MSM in 20 US Cities—National HIV Behavioral Surveillance, 2011 and 2014

Characteristics	CT Testing				GC Testing					
	2011		2014		2011		2014			
	No.Samples	n (%)								
Overall	9188	3422 (37.2)	9561	4463 (46.7)	9198	3493 (38.0)	9563	4521 (47.3)	1.25 (1.20–1.30)	1.24 (1.19–1.29)
Race/ethnicity										
Black	2476	931 (37.6)	2635	1238 (47.0)	2477	951 (38.4)	2636	1258 (47.7)	1.23 (1.15–1.32)	1.23 (1.14–1.32)
Hispanic [‡]	2396	895 (37.4)	2514	1140 (45.4)	2394	911 (38.1)	2512	1156 (46.0)	1.23 (1.14–1.33)	1.23 (1.14–1.32)
White	3620	1307 (36.1)	3625	1679 (46.3)	3631	1338 (36.9)	3629	1698 (46.8)	1.28 (1.20–1.36)	1.26 (1.19–1.34)
Other [‡]	672	280 (41.7)	736	380 (51.6)	672	284 (42.3)	735	382 (52.0)	1.24 (1.11–1.39)	1.24 (1.10–1.39)
Current age, y										
18–29	4082	1733 (42.5)	4050	2149 (53.1)	4086	1765 (43.2)	4046	2153 (53.2)	1.25 (1.19–1.31)	1.23 (1.17–1.29)
30–39	2178	834 (38.3)	2472	1241 (50.2)	2177	850 (39.0)	2473	1253 (50.7)	1.31 (1.22–1.41)	1.30 (1.21–1.39)
40	2928	855 (29.2)	3039	1073 (35.3)	2935	878 (29.9)	3044	1115 (36.6)	1.21 (1.12–1.31)	1.22 (1.13–1.32)
Current insurance										
No	2763	923 (33.4)	2047	789 (38.5)	2766	949 (34.3)	2045	809 (39.6)	1.15 (1.07–1.25)	1.15 (1.07–1.25)
Yes	6417	2497 (38.9)	7498	3668 (48.9)	6424	2540 (39.5)	7502	3706 (49.4)	1.25 (1.20–1.31)	1.24 (1.19–1.30)
Self-reported HIV status										
Negative	7082	2670 (37.7)	7357	3368 (45.8)	7091	2722 (38.4)	7357	3402 (46.2)	1.22 (1.16–1.27)	1.21 (1.15–1.26)
Positive	1231	627 (50.9)	1575	989 (62.8)	1232	640 (52.0)	1577	1011 (64.1)	1.24 (1.15–1.32)	1.24 (1.16–1.32)
Unknown	875	125 (14.3)	629	106 (16.9)	875	131 (15.0)	629	108 (17.2)	1.15 (0.91–1.45)	1.11 (0.88–1.40)
Number of sex partners, past 12 mo										
1	2130	581 (27.3)	2031	681 (33.5)	2132	589 (27.6)	2030	687 (33.8)	1.23 (1.12–1.35)	1.23 (1.11–1.35)
2–5	4170	1493 (35.8)	4231	1858 (43.9)	4175	1533 (36.7)	4232	1893 (44.7)	1.22 (1.15–1.30)	1.22 (1.15–1.29)
6+	2888	1348 (46.7)	3299	1924 (58.3)	2891	1371 (47.4)	3301	1941 (58.8)	1.25 (1.19–1.32)	1.24 (1.18–1.31)
Disclosed same sex behavior to HCP										
No	1830	426 (23.3)	1636	456 (27.9)	1831	436 (23.8)	1635	473 (28.9)	1.23 (1.18–1.28)	1.21 (1.08–1.35)
Yes	6792	2877 (42.4)	7386	3857 (52.2)	6800	2937 (43.2)	7388	3890 (52.7)	1.19 (1.06–1.34)	1.22 (1.17–1.27)

* PR corresponds to the increase in testing for the increase in interview year; models include year, the covariate, and the interaction between the covariate and year.

[†]Hispanics/Latinos can be of any race.

[‡]Includes those reporting American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, other race, or multiple races.
HS, high school.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

TABLE 3.

Prevalence of Self-Reported CT and GC Diagnosis in the Past 12 Months Among MSM in 20 U.S. Cities—National HIV Behavioral Surveillance, 2011 and 2014

Characteristics	CT Diagnosis						GC Diagnosis					
	2011			2014			2011			2014		
	No. Sample	n (%)	Unadjusted* PR (95% CI)	No. Sample	n (%)	Adjusted† PR (95% CI)	No. Sample	n (%)	Unadjusted* PR (95% CI)	No. Sample	n (%)	Unadjusted* PR (95% CI)
Overall	3417	264 (7.7)	1.37 (1.18–1.59)	4459	474 (10.6)		3490	353 (10.1)	1.40 (1.23–1.60)	4514	640 (14.2)	1.40 (1.23–1.60)
Race/ethnicity												
Black	931	80 (8.6)	1.15 (0.88–1.51)	1236	123 (10.0)		951	111 (11.7)	1.10 (0.87–1.38)	1256	162 (12.9)	1.10 (0.87–1.38)
Hispanic‡	895	72 (8.0)	1.31 (0.98–1.77)	1139	122 (10.7)		911	97 (10.7)	1.17 (0.91–1.51)	1155	146 (12.6)	1.17 (0.91–1.51)
White	1303	91 (7.0)	1.49 (1.17–1.91)	1679	176 (10.5)		1335	120 (9.0)	1.68 (1.35–2.09)	1694	256 (15.1)	1.68 (1.35–2.09)
Other§	279	20 (7.2)	1.83 (1.12–2.98)	379	50 (13.2)		284	24 (8.5)	2.27 (1.44–3.58)	382	70 (18.3)	2.27 (1.44–3.58)
Current age, y												
18–29	1731	159 (9.2)	1.22 (0.99–1.48)	2146	242 (11.3)	1.20 (0.98–1.48)	1765	225 (12.8)	1.23 (1.05–1.45)	2148	339 (15.8)	1.23 (1.05–1.45)
30–39	832	53 (6.4)	1.82 (1.34–2.45)	1241	145 (11.7)	1.93 (1.42–2.63)	848	78 (9.2)	1.70 (1.33–2.18)	1253	200 (16.0)	1.70 (1.33–2.18)
40	854	52 (6.1)	1.34 (0.96–1.86)	1072	87 (8.1)	1.53 (1.08–2.16)	877	50 (5.7)	1.61 (1.14–2.25)	1113	101 (9.1)	1.61 (1.14–2.25)
Current insurance												
No	922	81 (8.8)	1.56 (1.17–2.08)	789	108 (13.7)		948	132 (13.9)	1.15 (0.92–1.45)	809	129 (16.0)	1.15 (0.92–1.45)
Yes	2493	183 (7.3)	1.35 (1.13–1.60)	3664	364 (9.9)		2538	220 (8.7)	1.58 (1.35–1.85)	3699	509 (13.8)	1.58 (1.35–1.85)
Self-reported HIV status												
Negative	2666	196 (7.4)	1.33 (1.11–1.58)	3365	330 (9.8)		2719	274 (10.1)	1.35 (1.16–1.57)	3397	465 (13.7)	1.35 (1.16–1.57)
Positive	626	54 (8.6)	1.55 (1.14–2.10)	989	133 (13.5)		640	66 (10.3)	1.50 (1.12–2.02)	1010	155 (15.4)	1.50 (1.12–2.02)
Unknown	125	14 (11.2)	0.88 (0.41–1.89)	105	11 (10.5)		131	13 (9.9)	1.82 (0.93–3.56)	107	20 (18.7)	1.82 (0.93–3.56)
No. sex partners, past 12 mo												
1	581	15 (2.6)	1.60 (0.86–2.98)	680	28 (4.1)		589	22 (3.7)	1.31 (0.77–2.22)	686	34 (5.0)	1.31 (0.77–2.22)
2–5	1492	100 (6.7)	1.07 (0.84–1.38)	1856	134 (7.2)		1532	139 (9.1)	1.18 (0.95–1.46)	1892	197 (10.4)	1.18 (0.95–1.46)
6+	1344	149 (11.1)	1.45 (1.20–1.75)	1923	312 (16.2)		1369	192 (14.0)	1.48 (1.25–1.74)	1936	409 (21.1)	1.48 (1.25–1.74)

Disclosed same sex behavior to HCP

Characteristics	CT Diagnosis				G+C Diagnosis			
	2011		2014		2011		2014	
	No. Sample	n (%)	No. Sample	n (%)	No. Sample	n (%)	No. Sample	n (%)
No	426	21 (4.9)	455	38 (8.4)	436	41 (9.4)	472	48 (10.2)
Yes	2872	225 (7.8)	3855	423 (11.0)	2934	299 (10.2)	3885	572 (14.7)
				Unadjusted* PR (95% CI)				Unadjusted* PR (95% CI)
				1.67 (0.98–2.84)				1.08 (0.73–1.60)
				1.39 (1.19–1.63)				1.45 (1.26–1.66)
				Adjusted [†] PR (95% CI)				

* PR corresponds to the increase in testing for the increase in interview year, models include year, the covariate, and the interaction between the covariate and year.

[†] Adjusted age models also include current insurance, HIV status, out to health care, provider and city; adjusted education models also include age, current insurance, out to health care provider, HIV status, out to health care provider, and city.

[‡] Hispanics/Latinos can be of any race.

[§] Includes those reporting American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, other race, or multiple races.