HHS Public Access

Author manuscript

Sex Transm Dis. Author manuscript; available in PMC 2023 May 24.

Published in final edited form as:

Sex Transm Dis. 2020 June ; 47(6): 361–368. doi:10.1097/OLQ.0000000000001170.

Extragenital Gonorrhea and Chlamydia Positivity and the Potential for Missed Extragenital Gonorrhea With Concurrent Urethral Chlamydia Among Men Who Have Sex With Men Attending Sexually Transmitted Disease Clinics—Sexually Transmitted Disease Surveillance Network, 2015–2019

Winston E. Abara, MD[*], **Eloisa L. Llata, MD**[*], **Christina Schumacher, PhD**[†,‡], **Juli Carlos-Henderson, MPH**[§], **Angela M. Peralta, MPH**[¶], **Dawn Huspeni, MPH**[‖], **Roxanne P. Kerani, PhD**[**], **Heather Elder, PhD**[††], **Kim Toevs, MPH**[‡‡], **Preeti Pathela, PhD**[§§], **Lenore Asbel, MD**[¶¶], **Trang Q. Nguyen, PhD**[‖‖], **Kyle T. Bernstein, PhD**[*], **Elizabeth A. Torrone, PhD**[*], **Robert D. Kirkcaldy, MD**[*]

[*]Division of STD Prevention, Centers for Disease Control and Prevention, Atlanta, GA

[†]Baltimore City Health Department, Baltimore, MD

[‡]Department of Pediatrics, Johns Hopkins School of Medicine, Baltimore, MD

[§]Los Angeles County Department of Public Health, Los Angeles, CA

[¶]Florida Department of Health, Tallahassee, FL

[‖]Minnesota Department of Health, Minneapolis, MN

[**]Department of Medicine and Epidemiology, University of Washington, Seattle, WA

[††]Massachusetts Department of Health, Boston, MA

[‡‡]Multnomah County Department of Health, Portland, OR

[§§]New York City Department of Mental Health and Hygiene, New York City, NY

[¶¶]Philadelphia Department of Public Health, Philadelphia, PA

[‖‖]San Francisco Department of Public Health, San Francisco, CA

Abstract

Background: Extragenital gonorrhea (GC) and chlamydia (CT) are usually asymptomatic and only detected through screening. Ceftriaxone plus azithromycin is the recommended GC treatment; monotherapy (azithromycin or doxycycline) is recommended for CT. In urethral CT-positive/urethral GC-negative persons who are not screened extragenitally, CT monotherapy can lead to GC undertreatment and may foster the development of gonococcal antimicrobial resistance.

Correspondence: Winston E. Abara, MD, 1600 Clifton Rd., MS US12-2, Atlanta, GA 30329. wabara@cdc.gov.

Conflicts of Interest and Sources of Funding: None declared.

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

We assessed urethral and extragenital GC and CT positivity among men who have sex with men (MSM) attending sexually transmitted disease clinics.

Methods: We included visit data for MSM tested for GC and CT at 30 sexually transmitted disease clinics in 10 jurisdictions during January 1, 2015, and June 30, 2019. Using an inverse-variance random effects model to account for heterogeneity between jurisdictions, we calculated weighted test visit positivity estimates and 95% confidence intervals (CI) for GC and CT at urethral and extragenital sites, and extragenital GC among urethral CT-positive/GC-negative test visits.

Results: Of 139,718 GC and CT test visits, we calculated overall positivity (GC, 16.7% [95% CI, 14.4–19.1]; CT, 13.3% [95% CI, 12.7–13.9]); urethral positivity (GC, 7.5% [95% CI, 5.7–9.3]; CT, 5.2% [95% CI, 4.6–5.8]); rectal positivity (GC, 11.8% [95% CI, 10.4–13.2]; CT, 12.6% [95% CI, 11.8–13.4]); and pharyngeal positivity (GC, 9.1% [95% CI, 7.9–10.3]; CT, 1.8% [95% CI, 1.6–2.0]). Of 4566 urethral CT-positive/GC-negative test visits with extragenital testing, extragenital GC positivity was 12.5% (95% CI, 10.9–14.1).

Conclusions: Extragenital GC and CT were common among MSM. Without extragenital screening of MSM with urethral CT, extragenital GC would have been undetected and undertreated in approximately 13% of these men. Undertreatment could potentially select for antimicrobial resistance. These findings underscore the importance of extragenital screening in MSM.

Gonorrhea (GC) and chlamydia (CT) are the 2 most commonly reported nationally notifiable diseases in the United States.[1] More than 580,000 GC cases and 1.7 million CT cases were reported to the U.S. Centers for Disease Control and Prevention (CDC) in 2018.[1] Additionally, rates of both of these sexually transmitted diseases (STDs) are increasing.[1] Rates of reported GC cases have increased disproportionately among men, likely reflecting increasing rates among gay, bisexual, and other men who have sex with men (hereafter referred to as MSM).[1,2] The CT rates have increased more among men than among women, which may also suggest increasing CT rates among MSM.[1] As GC and CT can be asymptomatic, increasing rates may reflect increases in incidence, as well as increases in screening coverage.

Depending on the anatomic site of sexual exposure, GC and CT can occur in the urethra, pharynx, or rectum. Rectal and pharyngeal (i.e., extragenital) GC and CT occur among MSM,[3] are usually asymptomatic, and hence unlikely to be detected if rectal and pharyngeal screening is not performed.[4–6] The CDC recommends, regardless of condom use, at least annual screening for urethral GC/CT in MSM who have had insertive sex during the preceding year, for rectal GC/CT in MSM who have had receptive anal sex during the preceding year, and for pharyngeal GC in MSM who have had receptive oral sex during the preceding year.[7] More frequent screening at 3- to 6-month intervals is recommended for MSM at higher risk for STDs, such as those with multiple or anonymous partners.[7] Highlighting the importance of extragenital screening, 2010 to 2012 data from STD clinics participating in the STD Surveillance Network (SSuN) demonstrated rectal GC and CT positivity among MSM at 10.2% and 14.1%, respectively, while pharyngeal GC and CT positivity were 7.9% and 2.9%, respectively.[5] Furthermore, more than 70% of extragenital

GC and 85% of extragenital CT were associated with negative urethral tests and would have been missed with urethral screening alone.[5] Unfortunately, recent studies suggest that extragenital screening rates among MSM are suboptimal (29–65%).[5,8,9]

Nonadherence to extragenital screening recommendations may not only result in undetected extragenital GC/CT but also could potentially result in subtherapeutic exposure of *Neisseria* gonorrhoeae to azithromycin. For example, if a patient with urethral CT and undetected pharyngeal GC was treated only for urethral CT with recommended treatment (eg, azithromycin 1 g), the patient would not receive recommended treatment for pharyngeal GC (250 mg ceftriaxone plus azithromycin 1 g). Theoretically, subtherapeutic azithromycin exposure might select for gonococcal azithromycin resistance, potentially contributing to emerging antimicrobial resistance. However, the degree to which this may occur is unclear, as the prevalence of extragenital GC in patients with urethral CT is not well described.

The objectives of this analysis were: (1) to assess urethral, rectal, and pharyngeal GC and CT testing visit positivity among MSM seeking care in STD clinics; and (2) to assess the proportion of extragenital GC that might have been undetected in MSM with concurrent urethral CT had extragenital screening not been performed.

METHODS

Data Collection and Eligibility Criteria

We used routinely collected demographic and clinical data from STD clinics participating in SSuN. The SSuN is a sentinel STD surveillance network comprised of 10 local health jurisdictions conducting facility-based surveillance in 30 urban STD clinics. The 10 jurisdictions include Baltimore, MD (2 clinics); Los Angeles County, CA (12 clinics); Miami, FL (1 clinic); Boston, MA (1 clinic); Multnomah County, OR (1 clinic); Minneapolis, MN (1 clinic); New York City, NY (8 clinics); Philadelphia, PA (2 clinics), San Francisco, CA (1 clinic); and Seattle, WA (1 clinic).

We restricted the analysis to nonexpress STD clinic visits during January 1, 2015, to June 30, 2019, for men 18 years or older who self-identified as gay or bisexual, or whoever reported having sex with only men or with both men and women. Express test visits are visits where patients who do not have any symptoms and report no known exposure to an STD can choose to be screened for STDs without having to be examined by a health care provider; nonexpress visits are, thus, full clinical encounters that include examinations by a health care provider. Because of these differences and to mitigate the introduction of bias into the study, we restricted this analysis to nonexpress test visits. We obtained data on race, age, and human immunodeficiency virus (HIV) diagnosis for each MSM, and visit-level data on anatomic site-specific (urethral, rectal, and pharyngeal) GC and CT testing and test positivity. We classified MSM as HIV-infected if they ever had a laboratory-documented positive HIV antibody test in their clinic records or ever self-reported an HIV diagnosis. Urethral GC and CT were diagnosed by nucleic acid amplification tests (NAAT) using urine specimens or urethral swabs, or by culture of urethral swabs. Pharyngeal and rectal GC and CTwere diagnosed initially by culture, and subsequently, diagnosis was done by NAAT using either patient-collected or clinician-collected swabs. The clinic in 1 jurisdiction

(Miami, FL) did not perform pharyngeal GC testing and the clinics in 2 jurisdictions (Los Angeles County, CA and Miami, FL) did not perform pharyngeal CT testing. Test visit data obtained in 2019 from clinics in the jurisdiction of Los Angeles County, CA, were not available for this analysis; however, test visit data for all other years were included in this analysis.

Statistical Methods and Analysis

We calculated frequencies to describe the demographic characteristics of MSM included in this analytical sample. We calculated the proportion of visits in which both GC and CT testing occurred (referred to as "test visits") separately by dividing the number of test visits by the total number of clinic visits. Next, we calculated test visit positivity (number of test visits where a positive test result was documented divided by the total number of test visits) for GC and CT separately. To reduce the likelihood that unique test visits and infections were counted more than once, we excluded test visits for the same pathogen by the same patient that were less than 30 days apart, starting with the first recorded test visit in the study period. We calculated overall test visit positivity (number of test visits with a positive test result collected from 1 or more anatomic site divided by the total number of test visits) and test positivity by anatomic site for GC and CT. We defined extragenital test visits as visits where a rectal and/or pharyngeal test was performed, and we calculated extragenital test visit positivity (number of test visits with a positive rectal and/or pharyngeal test divided by the total number of extragenital test visits) for GC and CT. To determine the proportion of extragenital GC and CT that might have been missed if urethral testing alone was done, we examined test visits at which urethral testing was negative for GC and CT and extragenital testing was performed. Of these test visits, we calculated the proportion of such test visits with a positive extragenital test. We calculated this separately for GC and CT. Lastly, we identified test visits at which the urethral CT test was positive and the urethral GC test was negative (urethral CT-positive/GC-negative test visits) and extragenital testing was performed. We then estimated the proportion of extragenital gonococcal infections that might have been missed among urethral CT-positive/GC-negative men attending test visits had extragenital GC testing not been done.

For each GC and CT test visit positivity outcome, we first calculated the unweighted positivity for each jurisdiction. Second, we calculated the total weighted positivity and 95% confidence intervals (CI) using an inverse variance random effects model to account for the heterogeneity in the number of STD clinics and sample sizes between jurisdictions. The inverse variance approach requires weighting each jurisdiction based on the inverse of its variance rather than just its sample size to increase the precision of the weighted pooled estimate from all jurisdictions.[10] We also conducted a sensitivity analysis to determine whether there was a difference between the weighted test visit positivity after excluding test visits for the same pathogen by the same patient that were less than 15 days apart (to reduce the likelihood that unique test visits and infections were counted more than once) and the weighted test visit positivity after excluding test visits for the same pathogen by the same patient that were less than 30 days apart. We compared a < 15 day window period to a less than 30-window period to determine whether there would be differences in test visit positivity if we used a more liberal or a more conservative cut-off periods. We performed all

analyses in SAS version 9.4. The SSuN activities have been determined not to be research by the Institutional Review Board of the CDC, thus approval was not required for this analysis.

RESULTS

Demographic Characteristics of the Sample and Weighted Proportion of GC and CT Test Visits

From January 1, 2015, to June 30, 2019, 77,547 unique MSM attended 206,202 nonexpress STD clinic visits. The race/ethnicity distribution was 40.0% non-Hispanic white, 26.1% Hispanic, 19.2% non-Hispanic black, 6.5% Asian, and 8.2% were categorized as other (Native American, American Indian, Native Hawaiian, Pacific Islander, multiple race, or unknown race) (Supplemental Table 1 http://links.lww.com/OLQ/A490). By age, 17.6% were 18 to 24 years, 44.8% were 25 to 34 years, and 37.6% were 35 years or older. Overall, 3.4% of the MSM were known to be living with HIV. Nearly half of all MSM included in the analytical sample were from New York City (35.1%) or San Francisco (14.8%). Of 206,202 STD clinic visits, the weighted prevalence of overall GC and CT testing was 73.2% (95% CI, 64.8–81.7) of visits (Supplemental Table 2 http://links.lww.com/OLQ/A491). After restricting data to visits where both GC and CT testing occurred and excluding GC and CT test visits that occurred less than 30 days after a prior test visit, the analytic sample included 139,718 STD clinic test visits.

GC Test Visit Positivity

Of 139,718 GC test visits, GC was detected in at least 1 anatomic site at 23,888 visits (weighted test visit positivity, 16.7% [95% CI, 14.4–19.1]; unweighted positivity ranged by jurisdiction from 9.9% to 24.0%) (Table 1). Urethral GC was detected at 9703 of 126,972 test visits (weighted positivity, 7.5% [95% CI, 5.7–9.3]; unweighted positivity ranged by jurisdiction from 3.6% to 12.8%). Rectal GC was detected at 11,745 of 101,466 test visits (11.8% [95% CI, 10.4–13.2]; unweighted positivity ranged by jurisdiction from 8.6% to 19.5%). Pharyngeal GC was detected at 11,330 of 123,326 test visits (9.1% [95% CI, 7.9–10.3]; unweighted positivity ranged by jurisdiction from 3.6% to 19.2%). When pharyngeal and/or rectal tests were aggregated into a combined extragenital testing classification, extragenital GC was detected at 18,527 at 128,767 test visits (14.1% [95% CI, 12.5–15.7]; unweighted positivity ranged by jurisdiction from 9.0% to 19.5%).

CT Test Visit Positivity

Of 139,718 test visits, CTwas detected in at least 1 anatomical site at 18,639 visits (13.3% [95% CI, 12.7–13.9]; unweighted positivity ranged by jurisdiction from 12.2% to 15.9%) (Table 2). Urethral CT was detected at 6412 of 126,747 test visits (5.2% [95% CI, 4.6–5.8]; unweighted positivity ranged by jurisdiction from 3.8% to 8.5%). Rectal CT was detected at 12,631 of 101,338 test visits (12.6% [95% CI, 11.8–13.4]; unweighted positivity ranged by jurisdiction from 10.5% to 15.5%). Pharyngeal CT was detected at 1721 of 93,172 test visits (1.8% [95% CI, 1.6–2.0]; unweighted positivity ranged by jurisdiction from 1.6% to 2.4%). Extragenital CT (rectal and/or pharyngeal) was detected at 13,589 of 121,946 test

visits (11.4% [95% CI, 10.6–12.2]; unweighted positivity ranged by jurisdiction from 10.0% to 14.2%).

Potentially Missed Extragenital GC and CT Infections

The prevalence of potentially missed extragenital infections was calculated as the number of extragenital infections associated with a negative urethral test. We identified test visits where extragenital positivity was recorded and determined the prevalence of urethral infections among these tests visits. Of 17,853 GC test visits where MSM tested positive at 1 or more extragenital site and urethral GC tests were also performed, 74.8% (95% CI, 71.1–78.5) of urethral GC tests were negative (Table 3), indicating that 74.8% of positive extragenital GC tests in this sample would have been undetected if only urethral screening had been performed. The unweighted prevalence ranged by jurisdiction from 60.7% to 82.9%. Of 12,263 CT test visits where MSM tested positive at 1 or more extragenital site and urethral CT tests were also performed, 88.6% (95% CI, 87.0–90.2) of urethral CT tests were negative (Table 3). The unweighted prevalence ranged by jurisdiction from 81.7% to 92.8%. These extragenital infections would have been missed if only urethral testing was performed.

Prevalence of Extragenital GC and CT Test Visit Positivity Associated With a Negative Urethral Test Visit

For this component of the analysis, we sought to estimate the prevalence of extragenital GC and CT among test visits with negative urethral tests. We identified test visits where negative urethral tests were recorded and determined the prevalence of extragenital infections among these tests visits. We restricted the available data to test visits where both urethral and extragenital tests were done and urethral tests were negative. We subsequently assessed the prevalence of extragenital GC and CT positivity. Of 109,048 GC test visits with a negative urethral GC test, extragenital GC was detected at 11.9% (95% CI, 10.5–13.3) of visits. Of 103,662 CT test visits with a negative urethral CT test, extragenital CT was detected at 10.8% (95% CI, 10.0–11.6) of visits. These positivity estimates indicate that there is a 12% chance of undetected extragenital GC if a urethral GC test is negative and an 11% chance of undetected extragenital CT if a urethral CT is negative.

Extragenital GC Test Visit Positivity Among Urethral CT-Positive/Urethral GC-Negative MSM Test Visits

Of 4566 testing visits among MSM found to have urethral CT-positive/GC-negative tests and who were also tested at 1 or more extragenital sites (rectal and/or pharyngeal site), the weighted extragenital GC test visit positivity was 12.5% (95% CI, 10.9–14.1), and the unweighted range by jurisdiction was from 9.1% to 16.2% (Table 4). Weighted rectal GC test visit positivity was 9.4% (95% CI, 7.4–11.4%), and the unweighted range by jurisdiction was from 6.0% to 16.7%. Weighted pharyngeal GC test visit positivity was 8.8% (95% CI, 7.8–9.8), and the unweighted range by jurisdiction was from 0.0% to 12.0%.

Results of sensitivity analyses (not presented) showed that the weighted test visit positivity after excluding test visits for the same pathogen by the same patient that were less than 15 days apart were similar to the weighted test visit positivity estimates obtained after

excluding test visits for the same pathogen by the same patient that were less than 30 days apart.

DISCUSSION

We found high GC and CT test positivity among MSM attending STD clinics participating in a sentinel STD surveillance project. Rectal and pharyngeal GC positivity estimates were approximately 12% and 9%, respectively, whereas rectal and pharyngeal CT positivity estimates were approximately 13% and 2%, respectively. Approximately 75% of extragenital gonococcal infections and 89% of extragenital CT infections occurred in the presence of negative urogenital tests and would have been undetected if extragenital screening had not occurred.

Notably, we found approximately 13% extragenital GC positivity among visits of urethral CT-positive/GC-negative MSM; these gonococcal infections might have been missed and potentially undertreated had extragenital screening not been done. This could result in ongoing transmission of untreated GC. Gonococcal infections of the pharynx, which can be more challenging to treat than infections at other anatomic sites,[7] were present at 9% of visits. In the absence of extragenital screening, clinicians would have likely undertreated such urethral CT-positive/GC-negative patients with either azithromycin 1 g orally or doxycycline 100 mg orally twice daily.[7] Doxycycline is unlikely to be effective for GC treatment because of the high prevalence of gonococcal tetracycline resistance[1] and treatment of such patients with 1 g of azithromycin would lead to exposure of *N. gonorrhoeae* to subtherapeutic doses of azithromycin, potentially selecting for macrolide resistance. N. gonorrhoeae has a remarkable ability to develop resistance and treatment of GC with azithromycin monotherapy has been avoided because of the ease with which *N. gonorrhoeae* can develop macrolide resistance.[7] Importantly, gonococcal azithromycin susceptibility has been declining.[1] Although it is unclear whether exposure of *N. gonorrhoeae* to subtherapeutic doses of azithromycin during CT treatment is contributing to declining azithromycin susceptibility, the potential for this to occur and the urgency of slowing the impending GC multidrug resistance point to the urgency of adhering to CDC's guidelines for extragenital screening and GC treatment.[7]

The high prevalence of extragenital infections among MSM attending a network of STD clinics underscores the importance of adhering to current CDC screening recommendations. Because extragenital infections are usually asymptomatic and may be missed if urethral screening alone is done, extragenital sites can serve as reservoirs for *N. gonorrhoeae* and *Chlamydia trachomatis*, and contribute to ongoing disease transmission and persistence.[4,11–13] Extragenital GC and CT may also facilitate HIV transmission among MSM.[14,15] Missed extragenital infections may also represent missed opportunities to identify candidates for HIV preexposure prophylaxis (PrEP), initiate PrEP in at-risk MSM, or identify and treat extragenital infections in MSM already on PrEP.

Despite guidelines that recommend extragenital GC and CT screening, barriers to screening extragenital anatomic sites remain. Challenges with billing and reimbursement for extragenital tests may pose barriers to extragenital screening.[16] Some insurance providers

limit the number of pathogen-specific tests that can be performed per clinical visit.[16] Additionally, many nonSTD clinic providers do not conduct routine sexual risk assessments (required to know from which anatomic sites to collect specimens) or are unaware of CDC recommendations for extragenital screening.[17] Fewer than half of MSM participating in a national survey reported receiving a sexual risk assessment from their primary health care provider in the past year.[18] Time constraints and competing priorities during the clinical encounter may also pose provider-level barriers to extragenital screening.[12,16,17] Some clinical facilities also lack the staff capacity to obtain extragenital specimens from MSM who need to be tested.[16] At the patient-level, MSM may be uncomfortable discussing sexual behaviors and/or the gender of their sex partners with their providers, particularly if ascertainment of sexual histories is not conducted in a culturally-competent manner, and may decline extragenital screening because they are unaware of its importance.[16]

Electronic reminders and standing protocols to conduct sexual risk assessments on all patients are examples of interventions that may increase extragenital screening.[16] Educating health care providers about the availability of extragenital screening kits recently approved by the Food and Drug Administration, extragenital screening recommendations, and the importance of obtaining a comprehensive sexual history is another strategy.[12,16] The use of patient-collected extragenital specimens has been shown to detect *N. gonorrhoeae* and *C. trachomatis* at similar rates to provider-collected specimens and can be used to improve extragenital screening.[16,19] Improved clinical competency in providing comprehensive health care appropriate for lesbian, gay, bisexual, transgender, and queer patients will result in appropriate extragenital screening. Institutional policies that ensure that the Food and Drug Administration–approved extragenital testing kits are available in clinical settings may also increase extragenital screening.

Our study has some limitations. We obtained data for this analysis from STD clinics in 10 SSuN jurisdictions. Because these clinics were not randomly selected and STD clinics usually have higher screening rates than other clinical settings, these estimates might not be generalizable to all clinical settings. This sample of MSM, recruited from STD clinics, may not be generalizable to all MSM. Screening protocols varied across jurisdictions and may have influenced the positivity estimates observed in this study. For example, some jurisdictions did not test for GC and CT at all anatomic sites and some jurisdictions initiated NAAT at various times during the observation period. This analysis was limited to only nonexpress visits. Express STD clinic visits are visits where patients who do not have any symptoms and report no known exposure to an STD can choose to be screened for STDs without having to be examined by a health care provider. Thus, it is possible that positivity estimates from express visits may be different for patients attending nonexpress visits. Including nonexpress visits in this analytical sample could have negatively biased the observed estimates. We excluded test visits for the same pathogen by the same patient that were less than 30 days apart, starting with the first recorded test visit in the study period, to reduce the that unique test visits and infections were counted more than once. Because we did this, we may have missed new infections that may have arisen from a quick reexposure within 30 days and therefore, underestimated test visit positivity. Lastly, CDC recommends that MSM should be screened at anatomic sites of exposure. Because anatomic site exposure data were not available, we were unable to determine the true number of MSM that should

have been screened. For this analysis, we assumed that MSM with a reported test visit at an exposure site (rectal, pharyngeal, or urethral) had been exposed at the corresponding site. If not all MSM tested at an anatomic site had been exposed at that site, we may have underestimated positivity among exposed MSM.

In conclusion, extragenital GC and CT positivity were common among MSM in this analysis. The vast majority of extragenital infections would not have been identified and likely remained untreated if urethral screening alone had been performed. Furthermore, extragenital GC was common among MSM with urethral CT; these extragenital infections would likely have been undertreated had extragenital screening not been done. The potential for undertreatment of GC in the absence of extragenital screening may also have implications for presumptive expedited partner therapy with azithromycin for sexual contacts of MSM with CT. These findings underscore the importance of current recommendations for at least annual extragenital GC and CT screening at exposed anatomic sites among sexually active MSM. Extragenital screening for GC and CT remains a critical component of STD prevention and control among MSM.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

REFERENCES

1. Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance. Available at https://www.cdc.gov/std/stats18/STDSurveillance2018-full-report.pdf Accessed October 17 2019.
2. 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; 44:393–397. [PubMed: 28608788]
3. Jones ML, Chapin-Bardales J, Bizune D, et al. Extragenital chlamydiaand gonorrhea among community venue–attending men who have sex with men—Five cities, United States, 2017. Morb Mortal Wkly Rep 2019; 68:321–325.
4. 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]
5. 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]
6. Morris SR, Klausner JD, Buchbinder SP, et al. Prevalence and incidence of pharyngeal gonorrhea in a longitudinal sample of men who have sex with men: The EXPLORE study. Clin Infect Dis 2006; 43:1284–1289. [PubMed: 17051493]
7. Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines. MMWR Recomm Rep 2015.
8. Barbee LA, Dhanireddy S, Tat SA, et al. Barriers to bacterial STI testing of HIV-infected men who have sex with men engaged in HIV primary care. Sex Transm Dis 2015; 42:590–594. [PubMed: 26372931]
9. de Voux A, Bernstein KT, Kirkcaldy RD, et al. Self-reported extragenital chlamydia and gonorrhea testing in the past 12 months among men who have sex with men in the United States—American Men's internet survey, 2017. Sex Transm Dis 2019; 46:563–570. [PubMed: 31415039]
10. Borenstein M, Hedges LV, Higgins JP, et al. A basic introduction to fixed-effect and random-effects models for meta-analysis. Res Synth Methods 2010; 1:97–111. [PubMed: 26061376]

11. Bernstein KT, Stephens SC, Barry PM, et al. Chlamydia trachomatis and Neisseria gonorrhoeae transmission from the oropharynx to the urethra among men who have sex with men. Clin Infect Dis 2009; 49:1793–1797. [PubMed: 19911970]
12. 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]
13. Fairley CK, Hocking JS, Zhang L, et al. Frequent transmission of gonorrhea in men who have sex with men. Emerg Infect Dis 2017; 23:1021–1104.
14. Barbe A, Khosropou M, Dombrowks C, et al. . New human immunodeficiency virus diagnosis independently associated with rectal gonorrhea and chlamydia in men who have sex with men. Sex Transm Dis 2017; 44:385–389. [PubMed: 28608786]
15. Bernstein KT, Marcus JL, Nieri G, et al. Rectal gonorrhea and chlamydia reinfection is associated with increased risk of HIV seroconversion. J Acquir Immune Defic Syndr 2010; 53:537–543. [PubMed: 19935075]
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, 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. Copen CE. Receipt of a sexual risk assessment from a doctor or medical care provider in the past year among women and men aged 15–44 with recent sexual activity. Natl Health Stat Rep 2018; 110:1–12.
19. Barbee LA, Tat S, Dhanireddy S, et al. Implementation and operational research: Effectiveness and patient acceptability of a sexually transmitted infection self-testing program in an HIV care setting. J Acquir Immune Defic Syndr 2016; 72:e26–e31. [PubMed: 26959189]

TABLE 1.

GC Test Visit Positivity by Anatomic Site Among MSM Attending STD Clinics, N = 1 39,718 Visits—STD Surveillance NetWork, 2015–2019

Jurisdiction	GC Testing at ≥ 1 Anatomic Site at Visit		Urethral GC Testing at Visit		Rectal GC Testing at Visit		Pharyngeal GC Testing at Visit		Extragenital GC Testing at visit*	
	Tested	Tested Positive	Tested	Tested Positive	Tested	Tested Positive	Tested	Tested Positive	Tested	Tested Positive
	N	n (%)	N	n (%)	N	n (%)	N	n (%)	N	n (%)
Total	139,718	23,888	126,972	9703	101,466	11,745	123,326	11,330	128,767	18,527
Weighted total positivity (95% Cl)		16.7(14.4–19.1)		7.5 (5.7–93)		11.8(10.4–13.2)		9.1 (7.9–10.3)		14.1 (12.5–15.7)
Unweighted positivity by jurisdiction										
Baltimore, MD	2214	516(23.3)	2128	273 (12.8)	1315	256 (19.5)	1718	195 (14.8)	1830	357 (19.5)
Los Angeles County, CA†	7083	1339 (18.9)	6992	505 (7.2)	4963	671 (13.5)	6363	740 (14.9)	6448	1101 (17.1)
Miami, FL‡	4065	542 (13.3)	3989	177(4.4)	2844	257 (9.0)	—	—	2844	257 (9.0)
Boston, MA	1066	106 (9.9)	500	18(3.6)	895	77 (8.6)	1028	32 (3.6)	1040	95(9.1)
Multnomah County, OR	8623	1296(15.0)	8391	434 (5.2)	6279	699(11.1)	7802	697 (11.1)	7920	1089(13.8)
Minneapolis, MN	17,714	2297 (13.0)	17,361	695 (4.0)	12,762	1220 (9.6)	16,029	1287 (10.1)	16,293	1951 (12.0)
New York City, NY	46,495	9209 (19.8)	44,371	4363 (9.8)	33,842	4492 (13.3)	41,576	3906 (11.5)	42,896	6825 (15.9)
Philadelphia. PA	9989	2394 (24.0)	9767	1060 (10.9)	6511	968 (14.9)	9434	1251 (19.2)	9530	1809 (19.0)
San Francisco, CA	28,448	4126(14.5)	27,568	1507 (5.5)	20,872	1936 (9.3)	25,904	2105 (10.1)	26,371	3239 (12.3)
Seattle, WA	14,021	2063 (14.7)	5905	671 (11.4)	11,183	1169(10.5)	13,472	1117(10.0)	13,595	1804 (13.3)

*Rectal and/or pharyngeal test visit.

†Data obtained in 2019 from participating clinics were not available for this analysis.

‡Participating clinics did not perform pharyngeal GC testing.

TABLE 2.

CT Test Visit Positivity by Anatomic Site Among MSM Attending STD Clinics, N = 139,718 Visits—STD Surveillance Network, 2015–2019

Jurisdiction	CT Testing at ≥ 1 Anatomic Site at Visit		Urethral CT Testing at Visit		Rectal CT Testing at Visit		Pharyngeal CT Testing at Visit		Extragenital CT Testing at visit*	
	Tested	Tested Positive	Tested	Tested Positive	Tested	Tested Positive	Tested	Tested Positive	Tested	Tested Positive
	N	n (%)	N	n (%)	N	n (%)	N	n (%)	N	n (%)
Total	139,718	18,639	126,747	6412	101,338	12,631	93,172	1721	121,946	13,589
Weighted total positivity (95% Cl)		13.3 (12.7–13.9)		5.2 (4.6–5.8)		12.6(11.8–13.4)		1.8(1.6–2.0)		11.4(10.6–12.2)
Unweighted positivity by jurisdiction										
Baltimore, MD	2214	352 (15.9)	1993	144 (7.2)	1313	204 (15.5)	1719	37 (2.2)	1829	230 (12.6)
Los Angeles County, CA†,‡	7083	955 (13.5)	6993	323 (4.6)	4963	706 (14.2)	—	—	4963	706 (14.2)
Miami, FL†	4065	464(11.4)	3989	152 (3.8)	2844	301 (10.6)	—	—	2844	301 (10.6)
Boston, MA	1066	130(12.2)	1041	40 (3.8)	896	94 (10.5)	211	5 (2.4)	927	97 (10.5)
Multnomah County, OR	8623	1136(13.2)	8358	385 (4.6)	6274	778 (12.4)	7800	141 (1.8)	7919	852 (10.8)
Minneapolis, MN	17,714	2356 (13.3)	17,361	792 (4.6)	12,762	1735 (13.6)	124	3 (2.4)	12,830	1737 (13.5)
New York City, NY	46,495	6434 (13.8)	44,278	2422 (5.5)	33,766	4143 (12.3)	34,574	728 (2.1)	41,185	4569 (11.1)
Philadelphia. PA	9989	1436 (14.4)	9533	540 (5.7)	6505	899 (13.8)	9432	157(1.7)	9530	997 (10.5)
San Francisco, CA	28,448	3556 (12.5)	27,541	1134(4.1)	20,864	2405 (11.5)	25,878	434(1.7)	26,364	2643 (10.0)
Seattle, WA	14,021	1820 (13.0)	5660	480 (8.5)	11,151	1366 (12.3)	13,434	216(1.6)	13,555	1457 (10.8)

*Rectal and/or pharyngeal test visit.

†Data obtained in 2019 from participating clinics were not available for this analysis.

‡Participating clinics did not perform pharyngeal CT testing.

TABLE 3.

Extragenital GC and CT Test Visit Positivity Associated With Concurrent Negative Urethral Test Visits—STD Surveillance Network, 2015–2019

Jurisdiction	Test Visits With Negative Urethral GC Test and Extragenital GC		Test Visits With Negative Urethral CT Test and Extragenital CT	
	All Test Visits	Test Visits With Positive Extragenital GC Test	All Test Visits	Test Visits With Positive Extragenital CT Test
	N	n (%)	N	n(%)
Total	17,853	13,341	12,263	10,856
Weighted total positivity (95% CI)		74.8 (71.1–78.5)		88.6 (87.0–90.2)
Unweighted positivity by jurisdiction				
Baltimore, MD	347	230 (66.3)	204	181 (88.7)
Los Angeles County, CA[*,†]	1085	818 (75.4)	699	623 (89.1)
Miami, FL[*,‡]	257	213 (82.9)	293	272 (92.8)
Boston, MA	47	36 (76.6)	93	82 (88.2)
Multnomah County, OR	1064	836 (78.6)	821	718 (87.5)
Minneapolis, MN	1898	1547 (81.5)	1685	1510 (89.6)
New York City, NY	7173	5194(72.4)	4355	3798 (87.2)
Philadelphia. PA	1796	1314 (73.2)	951	848 (89.2)
San Francisco, CA	3137	2516 (80.2)	2523	2302(91.2)
Seattle, WA	1049	637 (60.7)	639	522 (81.7)

[*] Participating clinics did not perform pharyngeal CT testing.

[†] Data obtained in 2019 from participating clinics were not available for this analysis.

[‡] Participating clinics did not perform pharyngeal GC.

TABLE 4.

Extragenital GC Test Visit Positivity Among Test Visits With Positive Urethral CT/Negative GC Test and Extragenital Testing Performed—STD Surveillance Network, 2015–2019

Jurisdiction	Test Visits With Positive Urethral CT/Negative GC Test and Extragenital GC Testing Performed		Test Visits With Positive Urethral CT/Negative GC Test and Rectal GC Testing Performed		Test Visits With Positive Urethral CT/Negative GC Test and Pharyngeal GC Testing Performed	
	Test Visits	Test Visits With Positive Extragenital GC Test	Test Visits	Test Visits With Positive Rectal GC Test	Test Visits	Test Visits With Positive Pharyngeal GC Test
	N	n (%)	N	n (%)	N	n (%)
Total	4566	596	3173	320	4432	393
Weighted total positivity (95% CI)		12.5 (10.9–14.1)		9.4(7.4–11.4)		8.8 (7.8–9.8)
Unweighted positivity by jurisdiction						
Baltimore, MD	88	8 (9.1)	50	3 (6.0)	85	5 (5.9)
Los Angeles County, CA*	195	25 (12.8)	132	13 (9.9)	192	18 (9.4)
Miami, FL†	68	11 (16.2)	68	11 (16.2)	-	-
Boston, MA	14	2 (14.3)	12	2 (16.7)	14	0 (0.0)
Multnomah County, OR	266	37(13.9)	199	22 (11.1)	263	27 (10.3)
Minneapolis, MN	564	53 (9.4)	390	25 (6.4)	558	39 (7.0)
New York City, NY	1801	269 (14.9)	1277	159 (12.5)	1770	159(9.0)
Philadelphia. PA	388	54(13.9)	209	23 (11.0)	383	46 (12.0)
San Francisco, CA	821	95 (11.6)	591	44 (7.5)	811	67 (8.3)
Seattle, WA	361	42(11.6)	245	18 (7.4)	356	32 (9.0)

*Data obtained in 2019 from participating clinics were not available for this analysis.

†Participating clinics did not perform pharyngeal GC testing.