Morehouse School of Medicine

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The Case for Extragenital Screening of Chlamydia trachomatis and Neisseria gonorrhoeae in the College Health Setting

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The Case for Extragenital Screening of Chlamydia trachomatis and Neisseria gonorrhoeae in the College Health Setting


Background: Although the Centers for Disease Control and Prevention does not recommend routine oropharyngeal and anorectal screening for Chlamydia trachomatis and Neisseria gonorrhoeae in the general population, they do recommend it for men who have sex with men. However, risk-based extragenital screening of men may not have been adopted at all college health centers, and existing research has not focused on the college population.

Methods: We examined health records of men at a college health center in a large urban university over 6 years to evaluate effectiveness of C. trachomatis and N. gonorrhoeae screening. We also evaluated the proportion of C. trachomatis and N. gonorrhoeae infections that would have been missed if risk-based extragenital screening were not performed. Decisions to screen at extragenital sites were based on patient-reported risk behavior.

Results: For 4093 male college students screened, 7.6% of the screening visits used extragenital screening in response to self-reported risk behaviors. The case positivity rate for C. trachomatis was 3.1% with urogenital-only screening and 3.7% with risk-prompted extragenital screening. The case positivity rate for N. gonorrhoeae was 0.7% with urogenital-only screening and 3.3% with risk-prompted extragenital screening. If the college health center had relied solely on urogenital screening rather than risk-based extragenital screening, 26.4% of C. trachomatis infections and 63.2% of N. gonorrhoeae infections would have been missed.

Conclusions: One out of four C. trachomatis infections and 2 of 3 N. gonorrhoeae infections would have been missed without extragenital screening in this analysis of college men. This study reinforces Centers for Disease Control and Prevention recommendations for risk-based extragenital screening and is the first report to focus on college men. Because guidelines exist only for men, future studies should focus on extragenital screening in college women to build evidence for another group of patients that may benefit from this practice, given the high risk in young adults.

Chlamydia trachomatis and Neisseria gonorrhoeae Morbidity

All50 United States and the District of Columbia have regulations that require the reporting of various infectious diseases to their respective state or local health departments. Chlamydia trachomatis and Neisseria gonorrhoeae are the two most frequently reported infections according to 2014 data from the Centers for Disease Control and Prevention (CDC). For both men and women, C. trachomatis infection prevalence is highest in persons aged 24 years and younger. In 2014, 66% of all reported C. trachomatis cases in the United States were among persons aged 15 to 24 years old. This is particularly important to those working in college health because college enrollment is primarily made up of populations in this age group.

N. gonorrhoeae infection was the second most frequently reported sexually transmitted infection (STI) in the United States in 2014. Unlike C. trachomatis, N. gonorrhoeae tends to be more common in men when compared with women. Additionally, the prevalence of N. gonorrhoeae increased 27.9% among men from 2010 to 2014, while the prevalence decreased 4.1% among women during this same period.

Existing Guidelines

The CDC recommends annual screening for C. trachomatis infection in all sexually active women younger than 25 years. Routine C. trachomatis and N. gonorrhoeae infection screening is not recommended for the general population.

The CDC recommends that clinicians consider screening for C. trachomatis infection in sexually active young men in high-prevalence settings and annual C. trachomatis and N. gonorrhoeae infection screening in men who have sex with men (MSM). Since both C. trachomatis and N. gonorrhoeae infections are most prevalent amongst those within the 20 to 24-year-old age group (the age group that includes most college students), the college student population is a high risk population.

In both men and women, C. trachomatis and N. gonorrhoeae infection may occur at sites concurrently with or independent of infection of the genitals. Nonurogenital infections, or extragenital infections, can occur in the throat or rectum. Infections at extragenital sites are typically asymptomatic.

Prevalence of C. trachomatis and N. gonorrhoeae infection is high among MSM. The CDC recommends routine screening for both infections specifically among sexually active MSM. Men who have sex with men who have had receptive oral intercourse during the preceding year should be screened for oropharyngeal infection at least annually for N. gonorrhoeae infections and those who had receptive anal intercourse within the preceding year should be screened for rectal infections at least annually for C. trachomatis and N. gonorrhoeae. These recommendations should be followed regardless of condom or other barrier use. There are currently no recommendations for extragenital testing among women, heterosexual males, or other populations.

Although multiple extragenital testing methods exist to detect C. trachomatis and N. gonorrhoeae infection, nucleic acid amplification tests are the method recommended by the CDC. This method allows for the testing of the widest variety of specimen
types. Despite the fact that the Food and Drug Administration has yet to clear its use for all specimen sites, the CDC still recommends nucleic acid amplification tests to test for extragenital infections based on increased sensitivity, ease of specimen transport, and efficient processing.6

Prior Evidence on Extragenital Screening

Clinicians have historically based extragenital STI testing decisions on patient-reported symptoms. However, when using a symptom-based protocol rather than a risk-based protocol, 1 study found that 85% of anorectal infections and 100% of oropharyngeal infections would be missed.7 Because extragenital infections are frequently (or rectal isolates) or usually (for oropharyngeal isolates) asymptomatic, anatomic-site screening of individuals based on sexual history is preferable than relying on site-specific symptoms. A study conducted among HIV-positive active duty Air Force members found clinicians would diagnose, treat, and prevent substantially more C. trachomatis and N. gonorrhoeae infections when screening extragenitally.5 Similarly, another study concentrating on female patients found an increase in STI detection when including extragenital sites in its protocol.8 These studies highlight the importance of sexual history, or risk-based screening, as opposed to symptom-based screening, when determining what anatomical sites to test for infection.5,8 These findings further prove a standard symptom-based screening protocol is insufficient. Sexual history and behaviors are essential in identifying what anatomic sites are appropriate for C. trachomatis and N. gonorrhoeae infection screening.

The purpose of this study is to review results from implementing extragenital testing and discuss recommendations for college health clinical practices moving forward. To our knowledge, no reports have examined the question of extragenital screening and infection concurrence with at least 1 extragenital site (anorectal or oropharyngeal). This was accomplished by identifying patients who were diagnosed with an infection through a positive oropharyngeal and/or anorectal swab specimen but whose concurrent urogenital specimen was negative.

RESULTS

Study Demographics

Data from 4093 unique adult men resulted in 5962 STI screening visits at the college health center during the study period. As summarized in Table 1, more than 56% of patients were non-Hispanic white, and approximately 47% fell within the 20- to 24-year-old age group.

C. trachomatis

Overall, 4079 (99.6%) of men in the sample were tested for C. trachomatis at least once during the study period, generating a total 5906 unique C. trachomatis screens, 7.6% of which were collected based on a risk-based extragenital screening criteria (Table 1). Those 5906 unique screening visits for C. trachomatis resulted in 6456 collected specimens; 5823 urogenital (90.2%), 422 oropharyngeal (6.5%), and 211 anorectal (3.3%).

When evaluating all specimens collected at all sites for C. trachomatis screening (N = 6456), 207 were positive in at least 1 site. A total of 30 were positive in an extragenital site. The case positivity rate was higher for tests done in conjunction with risk-based extragenital screening (N = 989) than for urogenital

TABLE 1. Study Demographics of Men at a College Health Center, 2009–2015

<table>
<thead>
<tr>
<th>Demographics</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race/ethnicity</td>
<td></td>
</tr>
<tr>
<td>Amerind*, Native Alaskan</td>
<td>22 (0.5%)</td>
</tr>
<tr>
<td>Asian</td>
<td>620 (15.1%)</td>
</tr>
<tr>
<td>Black, African-American</td>
<td>354 (8.6%)</td>
</tr>
<tr>
<td>Caucasian, White</td>
<td>2313 (56.5%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>271 (6.6%)</td>
</tr>
<tr>
<td>Multi-ethnic/racial</td>
<td>303 (7.4%)</td>
</tr>
<tr>
<td>Unknown race/ethnicity</td>
<td>210 (5.1%)</td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
</tr>
<tr>
<td>≤ 19</td>
<td>280 (6.8%)</td>
</tr>
<tr>
<td>20–24</td>
<td>1910 (46.7%)</td>
</tr>
<tr>
<td>25–29</td>
<td>1414 (34.5%)</td>
</tr>
<tr>
<td>30–39</td>
<td>469 (11.5%)</td>
</tr>
<tr>
<td>40+</td>
<td>20 (0.5%)</td>
</tr>
<tr>
<td>Unique screening visits</td>
<td></td>
</tr>
<tr>
<td>Chlamydia</td>
<td>5906</td>
</tr>
<tr>
<td>Extragenital screen†</td>
<td>446 (7.6%)</td>
</tr>
<tr>
<td>Urogenital only</td>
<td>5460 (92.4%)</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>5899</td>
</tr>
<tr>
<td>Extragenital screen†</td>
<td>446 (7.6%)</td>
</tr>
<tr>
<td>Urogenital only</td>
<td>5453 (92.4%)</td>
</tr>
</tbody>
</table>

*American Indian.
† Extragenital screens include urogenital screens that were ordered in concurrence with at least 1 extragenital site (anorectal or oropharyngeal).
screening alone (N = 5467, 3.7% vs 3.1%). Looking chronologically, the positivity rate preimplementation of routine extragenital testing was 2.6% and the postimplementation rate was 4.0%. In total, had the college health center relied solely on urogenital screening, 26.4% of active C. trachomatis infections would have been missed (Fig. 1).

**N. gonorrhoeae**

Overall, 4063 (99.3%) of men in the sample were tested for N. gonorrhoeae at least once during the study period, generating a total 5899 unique N. gonorrhoeae screening visits, 7.6% of which using risk-based extragenital screening (Table 1). Those 5899 unique screening visits for N. gonorrhoeae resulted in 6447 collected specimens; 5811 (90.1%) urogenital, 426 (6.6%) oropharyngeal, and 210 (3.3%) anorectal.

When evaluating all specimens collected at all sites for N. gonorrhoeae screening (N = 6447), 72 were positive in at least 1 site. A total of 30 were positive in an extragenital site. The case positivity rate was much higher for tests done in conjunction with risk-based extragenital screening (n = 992) than for urogenital screening alone (n = 5455; 3.3% vs 0.7%). Looking chronologically, the positivity rate preimplementation of routine extragenital testing was 0.7%, and the postimplementation rate was 1.7%. In total, had the college health center relied solely on urogenital screening, 63.2% of active N. gonorrhoeae infections would have been missed (Fig. 2).

**DISCUSSION**

This research underscores the importance of using sexual risk assessment protocols and then applying them for extragenital screening among adult men when screening patients for C. trachomatis and N. gonorrhoeae in the college health setting. Indeed, our results in this university sample closely mirror what was previously observed among MSM at San Francisco STI clinics, where 64% of N. gonorrhoeae infections would have been missed if urogenital screening was used alone.3

An assumed limitation is efficacy of the self-swab. However, several studies show that self-rectal swab was preferred over provider-rectal swab; self and provider swabs have been demonstrated to be concordant with C. trachomatis and N. gonorrhoeae screenings.9,10 A critical barrier in the primary care setting revolves around medical providers’ inability to adequately obtain a patient’s sexual history or provide patients with appropriate sexual health counseling—even though the American Medical Association, CDC, and United States Preventive Services Task Force recommend it for every visit for the adolescent population. Practitioners could use CDC’s “5 Ps” (partners, practices, protection from STI, past STI history, and pregnancy prevention),11–13 although even this well-regarded approach might still have its limitations, especially in sexual minority populations. Barriers to taking a sexual history in a primary care setting include time constraints, inadequate training, concern for patient comfort, and a lack of understanding of sexual practices within the lesbian, gay, bisexual, transgender, and queer communities.14,15; potential approaches might include electronic questionnaires, more inclusive registration templates, and enhanced staff training. This study highlights the importance of providers creating a comfortable environment in which they can elicit the appropriate clinical history to understand each patient’s true level of risk. Obtaining a thorough sexual history is the first step to ensuring medical providers avoids a missed STI diagnosis.

In offering extragenital screening to patients, it is important to recognize that this may introduce additional financial burdens on patients, especially those on higher-deductible plans. Not only will the addition of the extragenital tests result in 2 or 3 tests where a patient may have been expecting to pay for only 1, it is also worth noting that laboratories may charge more to process swab specimens than urine specimens. If patients are bearing these costs themselves, this may necessitate an additional conversation, especially if the patient is on a restricted budget or an international college student who is unfamiliar with the nuances of American healthcare financing. As college health centers increase their volume of tests as a result of instituting extragenital screening, they might be able to negotiate lower rates with their commercial laboratories, and these savings can be passed on to their patients. In the end, implementing extragenital testing is more precise which leads to earlier treatment, before complications (eg, pelvic inflammatory disease, infertility, epididymitis).1

Confidentiality is an important consideration in the college health population, because so many students remain on a parent’s health insurance plan. In such situations, STI testing, if billed to insurance, will appear on the Explanation of Benefits that parents
may receive. Some college health center may choose to protect patient privacy by listing the testing as a generic “health service” (which may or may not be reimbursable by insurance) or simply by not billing for the test at all and building the cost into the clinic’s general operating budget.

This study is limited by the small possibility of misclassification of gender in the electronic health record. Due to the option for students to request a change in their gender classification within the electronic health record at this university, a non-cisgender/nonbinary student might be classified in the electronic health record with a gender category that does not match the gender with which they identify (some students already self-disclose their transgender status; less than 0.3% of the clinic population self-identifies as gender nonconforming). Also, it is possible that a patient might be classified a female during the beginning of the study period and male during the latter part of the study period, or vice versa. The likely number of patients affected by this is extremely low, so we do not anticipate an appreciable impact on the overall results of the study. As mentioned previously, this study is also limited by our inability to stratify the analysis by sexual orientation; were we able to do this, we would likely have found even more striking findings in the subpopulation of male patients who identify as a sexual minority. Finally, our sample and the noted findings may not be generalizable to all college health centers or student populations.

It is important to note that infection rates observed here do not reflect population level infection rates within this 1 university or within colleges in general, but only reflect case positivity results among students who self-selected to be screened at the college health center. It can be presumed that those students who presented for screening believed themselves to be at higher risk for infection. The overall infection rate for the full population of students at this university is likely to be lower, and no conclusions can be inferred with regard to infection rates for college students in general.

Because current CDC recommendations for extragenital screening exist only for MSM, future studies should focus on building the body of evidence for sexual risk behavior-based extragenital screening with women, especially in the college health center setting, given the high risk for *C. trachomatis* and *N. gonorrhoeae* infection in this age range.

**REFERENCES**


