

Emergency Department Screening for Asymptomatic Sexually Transmitted Infections

ABSTRACT

Catherine S. Todd, MD, Carolyn Haase, MD, and Bradley P. Stoner, MD, PhD

Objectives. This study assessed the prevalence and correlates of asymptomatic genital tract infection with *Neisseria gonorrhoeae* and *Chlamydia trachomatis* among emergency department patients.

Methods. Individuals seeking emergency department evaluation for non-genitourinary complaints provided urine samples for *N gonorrhoeae* and *C trachomatis* testing by ligase chain reaction and completed a sociodemographic and behavioral questionnaire.

Results. Asymptomatic *N gonorrhoeae* or *C trachomatis* was found in 9.7% of persons tested. Correlates of *C trachomatis* infection included younger age, residence in high-morbidity zip code areas, previous history of *N gonorrhoeae* or *C trachomatis*, and number of sex partners in the past year.

Conclusions. Urine-based screening of asymptomatic emergency department patients detected significant numbers of *N gonorrhoeae* and *C trachomatis* infections. Targeted screening programs may contribute to community-level prevention and control of sexually transmitted infections. (*Am J Public Health*. 2001;91:461-464)

Asymptomatic sexually transmitted infections (STIs) may lead to significant physical and financial sequelae.^{1,2} Direct costs attributed solely to infection with *Chlamydia trachomatis* are estimated at \$2.4 billion annually.³ Yet, many persons with STIs do not seek routine medical care, and a high percentage of young adults lack health insurance to cover health maintenance visits.⁴

Widespread screening for STIs has been limited by access to medical care and the need for a pelvic examination or urethral swab.⁵ Nucleic acid amplification testing of urine specimens can now detect *Neisseria gonorrhoeae* and *C trachomatis* with high sensitivity and specificity.^{6,7} Previous screening studies have demonstrated high prevalence rates of asymptomatic chlamydial infection in family planning centers, adolescent health facilities, detention centers, school- and community-based clinics, and military settings.⁸⁻¹⁵

The emergency department represents another health care access site for identifying persons with asymptomatic STIs. Many persons at risk for STIs use emergency departments as a primary source of health care. Significant numbers of HIV infections have been identified among emergency department patients undergoing serologic testing,¹⁶ yet screening for *N gonorrhoeae* and *C trachomatis* has been limited.^{17,18} We sought to evaluate the prevalence of asymptomatic gonococcal and chlamydial genital tract infections in an urban emergency department population by using noninvasive urine-based screening methods.

Methods

The study was conducted in the emergency department of Barnes-Jewish Hospital, a 1000-bed tertiary care facility in St. Louis, Mo. Annual emergency department volume is more than 65 000 patient visits per year, with approximately 25% of patients covered by federal low-income health assistance (Medicaid) and approximately 31% uninsured (self-pay). Urine-based screening for *N gonorrhoeae* and *C trachomatis* was performed from May 1 to October 31, 1998.

Screening was offered to consecutively selected ambulatory patients aged 18 to 30 years presenting for evaluation of nongenitourinary complaints. Patients were specifically excluded if they had symptoms referable to possible STI

(e.g., dysuria, discharge, pelvic pain), if they had suffered sexual assault, or if study participation could not be conveniently included in the course of emergency department evaluation (e.g., in the case of major trauma).

After written informed consent had been obtained, study participants completed a demographic and sexual behavior questionnaire and provided a 20- to 30-cm³ first-catch urine specimen for STI testing. No monetary incentives were offered for participation in the study. Urine samples were transported to the laboratory and refrigerated at 4°C, and ligase chain reaction testing for *N gonorrhoeae* and *C trachomatis* was performed within 24 hours of urine collection by the Barnes-Jewish Hospital microbiology laboratory using a commercially available assay (LCx; Abbott Laboratories, Abbott Park, Ill). Samples were separately processed and prepared for amplification testing to avoid cross contamination in the laboratory.

Test results were available within 1 week of testing. All patients testing positive for *N gonorrhoeae* or *C trachomatis* were contacted, and appropriate treatment was prescribed; results were reported to the Missouri Department of Health, as required by state law. Epidemiologic and statistical software (Epi Info, Version 6.04b; Centers for Disease Control and Prevention, Atlanta, Ga) was used in analyzing study data. All procedures were reviewed and approved in advance by the Washington University Human Studies Committee.

Results

Study Sample

Of 359 individuals approached and offered participation in the study, 312 agreed to

The authors are with the Washington University School of Medicine, St. Louis, Mo. Catherine S. Todd is with the Department of Obstetrics and Gynecology, Carolyn Haase is with the Division of Emergency Medicine, and Bradley P. Stoner is with the Division of Infectious Diseases, Department of Internal Medicine.

Requests for reprints should be sent to Bradley P. Stoner, MD, PhD, Division of Infectious Diseases, Washington University School of Medicine, 660 S Euclid, Box 8051, St. Louis, MO 63110 (e-mail: bstoner@im.wustl.edu).

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TABLE 1—Sample Demographic and Medical History Characteristics: St. Louis, Mo, 1998 (n=300)

Characteristic	No. (%)
Sex	
Female	168 (56.0)
Male	132 (44.0)
Race/ethnicity	
African American	234 (78.0)
White	60 (20.0)
Hispanic	4 (1.3)
Asian	2 (0.7)
Age, y	
18–21	93 (31.0)
22–25	95 (31.7)
26–30	112 (37.3)
Employment status	
Employed full time	143 (47.7)
Employed part time	57 (19.0)
Unemployed	100 (33.3)
Receive public assistance	
Yes	109 (36.3)
No	191 (63.7)
Zip code of residence ^a	
High STI morbidity	105 (35.0)
Low STI morbidity	195 (65.0)
Previous STI diagnosis	
Ever had STI	129 (43.0)
Chlamydia	57 (44.2)
Gonorrhoea	57 (44.2)
Trichomoniasis	38 (29.5)
Syphilis	6 (4.7)
Herpes	3 (2.3)
STI in past year	28 (9.3)
HIV test status	
Tested in past year	151 (50.3)
HIV positive	2 (0.7)
Emergency department use	
1 or more visits in past year	193 (64.8)
No visits in past year	105 (35.2)
Medical care use (other than emergency department)	
Saw doctor or nurse in past year	152 (51.2)
Did not see doctor or nurse in past year	145 (48.8)

Note. STI = sexually transmitted infection.

^aHigh STI morbidity sector composed of 6 contiguous postal zip code areas that accounted for the majority of reported STIs in St. Louis in 1996.

take part (an acceptance rate of 87%). Refusers did not differ systematically from accepters in terms of age, sex, or race/ethnicity. Of the 312 study participants, 12 were excluded because adequate urine specimens were not received by the laboratory. Demographic and medical history data on the remaining 300 participants are provided in Table 1. The study sample was predominantly African American (78.0%) and female (56.0%), with a mean age of 23.9 years (SD=3.6). One third of the participants were unemployed, and 36.3% received public assistance (food stamps, unemployment benefits, disability income).

Previous STI analyses conducted in St. Louis identified 6 contiguous postal zip code areas on the city's north side that accounted for more than half of reported gonococcal and chlamydial morbidity in 1996.¹⁹ Individuals from these high-morbidity zip code areas rep-

resented 35.0% of the ligase chain reaction screening study sample.

Presenting emergency department complaints varied widely; chest pain, back pain, asthma, motor vehicle accidents, and headache accounted for more than 30% of presenting morbidity. Other complaints included sprained wrist or ankle, insect bite, fever, and sore throat. Approximately 6% of all visits were secondary to violence (data not shown). History of STI was common among study participants (lifetime: 43.0%; past year: 9.3%). Nearly two thirds of the study population (64.8%) had visited an emergency department at least once in the previous year.

Prevalence of Infection

Twenty-nine persons (9.7%) had positive test results for infection with *N gonorrhoeae* or

C trachomatis (24 [8.0%] with *C trachomatis* only, 3 [1.0%] with *N gonorrhoeae* only, and 2 [0.7%] with both). The highest prevalence of chlamydial infection was seen among participants aged 18 years (25.0%). These participants accounted for 13.8% of all positive test results.

Sociodemographic and Behavioral Correlates of Chlamydial Infection

Because asymptomatic *C trachomatis* was considerably more prevalent than *N gonorrhoeae* in this population, the 3 individuals with positive test results only for the latter were excluded from additional analyses. Results described subsequently pertain to persons with positive test results for asymptomatic *C trachomatis* infection (Table 2).

Risk factors for *C trachomatis* infection included younger age, higher number of sexual partners in the previous 12 months, residence in a zip code area with high STI morbidity, and history of *N gonorrhoeae* or *C trachomatis* infection. Trends toward higher rates of positivity were seen for women and for African Americans, although these effects did not achieve statistical significance.

Other variables did not correlate with infection status, including employment, receipt of public assistance, previous HIV testing, STI self-risk assessment, history of emergency department use, and emergency department visit for violence. Self-reported condom use did not significantly correlate with likelihood of *N gonorrhoeae* or *C trachomatis* infection after stratification by use pattern (ever vs never, always vs not always), sex, and number of partners, although small sample sizes may have limited the ability to detect a protective effect.

Medical Care and Emergency Department Use

Nearly two thirds of the participants (64.8%) reported visiting an emergency department at least once in the previous year, and among more than one third of these individuals (38.7%), the emergency department represented the sole source of medical care (data not shown). Although previous emergency department use did not correlate with STI, 17 of 24 *C trachomatis* infections (70.8%) were identified in persons who had sought emergency department care within the past year.

Discussion

Asymptomatic *C trachomatis* or *N gonorrhoeae* infection (or both) was detected in 9.7% of young adults presenting to an urban emergency department for evaluation of non-

TABLE 2—Sociodemographic and Behavioral Correlates of Asymptomatic Chlamydial Infection: St. Louis, Mo, 1998

Correlates	Infected, No. (%)	No. Screened	Risk Ratio	95% Confidence Interval
Sex				
Female	19 (11.4)	167	2.11	0.9, 4.9
Male	7 (5.4)	130		
Race/ethnicity				
African American	24 (10.4)	231	3.43	0.8, 14.1
Other	2 (3.0)	66		
Age, y				
18	4 (25.0)	16	3.96	1.3, 12.0
19–21	8 (10.5)	76	1.67	0.6, 4.4
22–25	7 (7.4)	94	1.18	0.4, 3.3
26–30	7 (6.3)	111	Reference	
Employment status				
Employed	18 (9.0)	199	1.11	0.5, 2.5
Unemployed	8 (8.2)	98		
Receive public assistance				
Yes	12 (11.0)	109	1.48	0.7, 3.1
No	14 (7.4)	188		
Zip code of residence ^a				
High morbidity	14 (13.6)	103	2.20	1.1, 4.6
Low morbidity	12 (6.2)	194		
Previous STI diagnosis (any)				
Ever had STI	16 (12.5)	128	2.10	1.0, 4.5
Never had STI	10 (6.0)	168		
Previous chlamydial infection				
Ever had chlamydial infection	11 (19.6)	56	3.16	1.5, 6.5
Never had chlamydial infection	15 (6.2)	241		
Previous gonococcal infection				
Ever had gonorrhea	10 (17.5)	57	2.63	1.3, 5.5
Never had gonorrhea	16 (6.7)	240		
Previous HIV test				
No test in past year	13 (8.9)	146	1.03	0.5, 2.1
Tested in past year	13 (8.7)	150		
STI risk assessment				
Considers self at high risk	3 (13.0)	23	1.55	0.5, 4.8
Does not consider self at high risk	23 (8.4)	274		
ED visit for violence				
Yes	2 (11.1)	18	1.29	0.3, 5.0
No	24 (8.6)	279		
Medical care use in past year (non-ED)				
Saw doctor or nurse	13 (8.6)	152	0.95	0.5, 2.0
Did not see doctor or nurse	13 (9.0)	145		
ED use				
1 or more visits in past year	17 (8.9)	192	1.30	0.6, 3.0
No visits in past year	7 (6.8)	103		
Condom use: men				
Not always	6 (6.5)	92	2.35	0.3, 18.8
Always	1 (2.8)	36		
Never	2 (6.7)	30	1.31	0.3, 6.4
Ever	5 (5.1)	98		
Condom use: women				
Not always	12 (10.0)	120	0.57	0.2, 1.4
Always	7 (17.5)	40		
Never	2 (5.6)	36	0.41	0.1, 1.7
Ever	17 (13.7)	124		
No. of sex partners in past 3 months				
0	3 (8.3)	36	1.08	0.3, 3.5
1	17 (8.1)	209	Reference	
≥2	7 (13.7)	51	1.78	0.8, 4.1
No. of sex partners in past year				
0–1	12 (6.5)	184	Reference	
2	9 (14.5)	62	2.23	1.0, 5.0
≥3	5 (10.0)	50	1.53	0.6, 4.2

Note. STI = sexually transmitted infection; ED = emergency department.

^aHigh STI morbidity sector composed of 6 contiguous postal zip code areas that accounted for the majority of reported STIs in St. Louis in 1996.

genitourinary complaints. This rate is comparable to rates of asymptomatic infection among previously examined sexually active populations.^{8–15} Urine-based screening was easy to integrate into emergency department service delivery and was well accepted by the emergency department client population.

The highest prevalence of chlamydial infection was observed in participants aged 18 years, a finding in agreement with other studies demonstrating young age as a risk factor.^{9–13} More than 40% of participants reported a history of STIs, which proved to be a significant risk marker for current infection. Because asymptomatic infection may persist over long periods, number of sex partners in the previous year was a more sensitive marker for infection than number of partners in the previous 3 months. These observations affirm the need for asymptomatic screening in sexually active populations.^{20,21}

Emergency departments represent an important access point to reach medically underserved populations at high risk for STIs, yet screening in these settings has been limited by testing requirements, time constraints, and an inability to provide follow-up care.^{17,18} Nevertheless, emergency department facilities may be the only medical access sites for large numbers of patients at risk for STIs. More than two thirds of *C trachomatis* infections in this study occurred among persons who had visited an emergency department at least once in the previous year, suggesting that the emergency department may be a primary point of access for persons at risk.

Targeted screening based on risk factor stratification may increase the yield of positive cases identified per test performed but will miss cases in subgroups at lower risk. In this study, screening persons 25 years or younger would have resulted in detection of 19 *C trachomatis* infections in 188 persons screened (10.1% prevalence) but would have missed 7 infections in the older age cohort (those aged 26–30 years). Emergency department screening may serve public health goals by permitting detection and treatment of *N gonorrhoeae* and *C trachomatis* infections that may otherwise have remained undiagnosed. Additional research is required to determine the cost-effectiveness of emergency department screening to prevent long-term sequelae and further community spread of infection. □

Contributors

C. S. Todd and B. P. Stoner designed the study, supervised data collection and data entry, conducted data analysis, and wrote the paper. C. Haase assisted with study design and data collection. All authors were involved in interpretation of study findings.

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All procedures were reviewed and approved in advance by the Washington University Human Subjects Committee. Written informed consent was obtained from all study participants.

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