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Time to Treatment for Women With Chlamydial or Gonococcal Infections: A Comparative Evaluation of Sexually Transmitted Disease Clinics in 3 US Cities

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Abstract

Background: Many women with positive screening tests for chlamydia or gonorrhea are not promptly treated and are at risk for complications and further disease transmission. Improved methods for notifying infected patients might increase timely treatment in this population.

Goal: Describe notification procedures at STD clinics in Washington, DC; Los Angeles; and San Diego and compare timeliness of treatment during 2000 to 2002.

Study: Interviews were conducted to determine methods for notifying infected patients. Data were abstracted from 327 medical records of women with chlamydia or gonorrhea who had not been treated presumptively. The interval between specimen collection and treatment ("time to treatment") was calculated.

Results: Each clinic had different procedures for notifying untreated infected women. Among those treated, the median time to treatment was 18 days in Washington, DC, and 8 days in Los Angeles. In San Diego, the median time to treatment was initially 14 days, which improved to 7 days after patient-notification procedures were changed.

Conclusion: Simple changes in patient notification procedures can decrease time to treatment at STD clinics. STD programs should evaluate time to treatment and institute methods for efficient patient follow-up.

CHLAMYDIAL AND GONOCOCCAL INFECTIONS are the 2 most common notifiable diseases in the United States and disproportionately affect young women. Women with these infections are often asymptomatic and may not seek medical care, yet untreated chlamydia

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and gonorrhea can lead to pelvic inflammatory disease (PID) and its sequelae of ectopic pregnancy, chronic pelvic pain, and infertility.[1–3] In addition, the longer the duration of infectiousness, the greater the probability that infection will be transmitted to a sexual partner. For women attending sexually transmitted disease (STD) clinics, screening for both *Chlamydia trachomatis* and *Neisseria gonorrhoeae* is generally performed[4–6]; however, identification of infected women does not necessarily result in prompt treatment. Several studies[7–9] have shown treatment delay in this population, and at least 2 studies[7,10] have described the development of PID in up to 4% of women during the interval between testing and treatment.

Postscreening treatment of women attending STD clinics is often challenging since reliable point-of-care testing for *C trachomatis* or *N gonorrhoeae* is not currently available, and patients must obtain their results at a later date. STD clinics are often busy or understaffed, and notification of women who have positive test results may not happen promptly, despite best intentions. Finally, in some STD clinics, patients are not required to present identification, and names, addresses, and telephone numbers may be inaccurate and may lead to difficulties when trying to locate infected patients for treatment.

STD programs and clinics have traditionally addressed these challenges with 2 general approaches in order to improve treatment coverage: (1) presumptive treatment of those suspected of having infection (e.g., signs, symptoms, current sexual behavior, contact of known infected individual, etc); and (2) efficient recall of those who tested positive but were not treated (e.g., having clinicians or health department staff actively notify infected patients). In practice, both approaches are employed by all STD clinics to some degree but with varying success and with no clear standardized guidelines or recommendations.

In order to explore these issues further, we evaluated publicly funded STD clinics from 3 US cities. We analyzed data for women with laboratory-confirmed *C trachomatis* or *N gonorrhoeae* infections and qualitatively described and compared the recall methods used by each of the clinics. We hypothesized that recall methods would differ among the STD clinics and that differences in these processes might impact the rates and timeliness of treatment.

Methods

Study Sites

STD clinics from Washington, DC; Los Angeles; and San Diego were chosen for this evaluation; all 3 cities have a medical epidemiologist assigned from the Field Epidemiology Unit of the Division of STD Prevention at CDC and offer typical STD services. Washington, DC, has 1 STD clinic, which serves a district population of 570,000 residents[11], a proportion of clients are also seen from the surrounding metropolitan areas in Virginia and Maryland. Los Angeles County has 13 STD clinics, serving a population of 9.8 million residents[12]; 3 clinics with high STD rates were sampled for this study. San Diego County has 1 main STD clinic and 3 part-time clinics for a population of 2.9 million residents[4]; only the main STD clinic was included in this assessment.

Study Population and Chart Abstraction

For each site, all women with positive laboratory tests (culture or DNA-based testing) for *C trachomatis* or *N gonorrhoeae* were identified by reviewing primary laboratory data. Medical charts and health department records were reviewed for all infected women; data were abstracted only for those women, selected sequentially, who had not been treated presumptively at the time of specimen collection.

For each record, the interval between specimen collection and treatment ("time to treatment") was calculated; additional subintervals were calculated if dates were available in the medical record for specific events preceding treatment (e.g., date test results received by clinic, etc.). Univariate analyses were conducted to identify factors associated with treatment delay, which was defined as >14 days from the time of specimen collection. All data were entered and analyzed using Epi Info Version 6.04 days (Centers for Disease Control and Prevention, Atlanta, GA).

A minimum of 50 consecutive charts was abstracted at each site, based on initial sample size calculations, which estimated that 75% of women would be treated within 30 days (expected precision ± 12%). Time periods for record abstraction varied among the 3 sites. In Washington, DC, records were abstracted from January 2000 to October 2002, and in Los Angeles, from January to December 2002. In San Diego, clinic follow-up procedures changed in April 2001 after a state Infertility Prevention Project (IPP) evaluation documented treatment delay; therefore, records were abstracted pre- and postintervention. Subsequently, these time periods are referred to as "baseline" (January 2000 to March 2001) and "intervention" (April 2001 to December 2002).

Clinic Procedures

For the qualitative assessment, clinic procedures and practices were outlined from the time of testing until either the time of treatment or time of case closure by disease intervention specialists (DISs). Procedures and methods used to recall infected patients were reviewed at each clinic. Interviews were conducted with program and clinic directors, clinicians, laboratory staff, DISs, and data managers. Data flow and data storage systems were observed.

Results

Positivity Rates

Rates of infection, as illustrated by data from calendar year 2002, varied among the 3 cities (Table 1) and were consistent with data previously reported to CDC. Reportedly, all women were offered testing for *C trachomatis* and *N gonorrhoeae* at each site, regardless of age or symptoms. Positivity was affected by the sensitivity of tests[13,14] used in each locality. Washington, DC, used a DNA probe test (Gen-Probe PACE 2; Gen-Probe Incorporated, San Diego, CA) to identify both organisms, while Los Angeles and San Diego used more sensitive nucleic acid amplification tests (Gen-Probe Aptima Combo 2 or Abbot LCx; Abbott Laboratories, Abbott Park, IL). Less frequently, gonorrhea cultures were also performed in Washington, DC, and San Diego.

Presumptive Treatment

At all sites, most women infected with *C trachomatis* or *N gonorrhoeae* had been treated presumptively at the initial visit (range, 58%–93%) and were not evaluated. Overall, presumptive treatment was more common for chlamydia than for gonorrhea. Washington, DC, had the highest percentage who were presumptively treated (91% for chlamydia, 93% for gonorrhea). San Diego had the lowest percentage presumptively treated for chlamydial infections (69%), and Los Angeles had the lowest percentage presumptively treated for gonococcal infections (58%). Differences in presumptive treatment practices among the 3 cities were not assessed in this evaluation.

Characteristics of Study Population

Among infected women who had not been treated presumptively, a total of 327 records were abstracted from the 3 sites: 50 from Washington, DC; 152 from Los Angeles; and 125 from San Diego. Overall, 67% of the records were for chlamydia and 33% were for gonorrhea; 58% of the women were aged 22 years or less. Race/ethnicity data varied by city. In Washington, DC, 92% of women were black; in Los Angeles, 69% of women were black and 23% were Hispanic; and in San Diego, 34% were Hispanic, 27% were white, and 22% were black. History of any STD (lifetime) was reported by 39% in Los Angeles, 41% in San Diego, and 64% in Washington, DC.

Time to Treatment and Clinic Procedures

The sites had different procedures for notifying infected women who had not been treated presumptively (Table 2) and had different time-to-treatment intervals (Table 3). Because time to treatment was similar for chlamydia and gonorrhea at each site, the data are not stratified by infection type.

Washington, DC

Patients tested for *C trachomatis* or *N gonorrhoeae* were told to return to the STD clinic in 2 weeks to get their test results. Even though chlamydia and gonorrhea results were usually available within 1 week, patients were told to return in 2 weeks because results for syphilis and HIV tests (commonly performed for most women) took longer to process. No test results were given by telephone. When positive STD results were reported to the clinic, a laboratory coordinator assigned follow-up to a DIS, who was responsible for determining if patients were treated and, if not, bringing them back to clinic for treatment. Callbacks were not routinely made by clinicians. Only a small number of women required follow-up for treatment (approximately 1.9 women per month) because over 90% of infected women received presumptive therapy at the time of specimen collection. No logbook was kept detailing efforts made to notify patients of positive test results.

Among untreated infected women, subsequent treatment was confirmed for 82%, but only 34% were treated within 14 days. Among those treated, the median time to treatment was 18 days and was the longest among the 3 cities. The median time from specimen collection to test result was 4 days, the median time from test result to patient notification was 9 days, and the median time from patient notification to treatment was 4.5 days. Age, race/ ethnicity, and history of STD were not predictors of delayed treatment >14 days.

Los Angeles

Patient notification procedures differed among the 3 Los Angeles STD clinics we evaluated. Because STD and HIV results could not be given by telephone, patients were told to return to clinic to obtain them. Two of the clinics scheduled return appointments 1 week after the initial visit, while the third clinic scheduled return appointments at 2 weeks. Upon receipt of chlamydia or gonorrhea test results, medical charts were reviewed to determine treatment status. This process was performed by a single nurse or nurse manager at 2 of the clinics but was done by many physicians at the third clinic. For one clinic, patient notification of a positive test result was performed by physicians or nurses, but in the other clinics, notification was only performed by DISs. Two clinics maintained logbooks to track treatment compliance among infected women who had not been presumptively treated.

Among untreated infected women, subsequent treatment was confirmed for 92%, and 67% were treated within 14 days. Among those treated, the median time to treatment was 8 days, and the median time from specimen collection to test result was 3 days. Median intervals between test result, patient notification, and treatment could not be accurately calculated from available data. Age, race/ethnicity, and history of STD were not predictors of delayed treatment >14 days.

San Diego

Baseline.—In San Diego, patients were encouraged to call a dedicated telephone line for test results, but most were also given a 2-week return appointment for HIV results, which were only given in person by an HIV counselor. A nurse practitioner in the clinic reviewed all positive laboratory results. Records of infected patients who had not been treated presumptively were forwarded to DISs for notification. No logbook was kept detailing efforts made to notify patients of positive test results.

Among untreated infected women at baseline, subsequent treatment was confirmed for 88%, and 46% were treated within 14 days. Among those treated, the median time to treatment was 14 days. The average time from specimen collection to test result was reportedly 2 to 3 days, though this interval was not formally measured. The median time from posting of the test result in the medical record to patient notification was 6 days, and the median time from patient notification to treatment was 4 days. Seventy-three percent of untreated infected women were referred to DIS for follow-up. Age, race/ethnicity, and history of STD were not associated with delayed treatment >14 days.

Intervention.—New clinic follow-up procedures were implemented in April 2001. Instead of forwarding medical records of untreated patients to DIS, 2 nurse practitioners assumed responsibility for notifying patients. If neither nurse practitioner reached the patient within 24 hours of receiving laboratory results, the case was forwarded to DISs for further follow-up. One of the nurse practitioners was also responsible for maintaining a logbook of untreated infected patients. Dates of specimen collection, first telephone contact, treatment, and DIS referral (if needed) were recorded in the logbook. Return appointments were scheduled 1 week after the initial visit (due to improved efficiency in HIV testing), and patients were encouraged to call a dedicated telephone line for STD test results.

Among untreated infected women at intervention, subsequent treatment was confirmed for 92%, which was similar to baseline (88%). However, the percentage of women treated within 14 days improved significantly from 46% to 82% ($P < 0.05$), and among those treated, the median time to treatment decreased from 14 days to 7 days ($P < 0.05$). The median time from posting of the test result in the medical record to patient notification decreased from 6 days to <1 day, and the median time from patient notification to treatment decreased from 4 days to 2 days. In addition, the proportion of untreated infected women referred to DISs decreased from 73% to 25%.

Discussion

This evaluation showed that time to treatment was delayed at all 3 sites for women infected with *C trachomatis* or *N gonorrhoeae*. However, simple follow-up changes implemented by the San Diego STD clinic markedly decreased time to treatment to a median of 7 days, which was better than the other clinics evaluated. From previous studies, in Birmingham, AL, the median time to treatment was 11 to 13 days,[8] and in Philadelphia, only 28% of women with untreated chlamydial infections received therapy within 14 days of screening.[9] Both of these studies emphasized the importance of effective patient follow-up; however, our study is the first we are aware of to show the impact that simple procedural changes can have on reducing treatment delay.

Changes in recall methods made by the San Diego STD clinic focused on prompt notification of untreated infected individuals. Important modifications included requiring clinicians to notify patients of positive test results within 24 hours of laboratory receipt, and maintaining a clinic logbook to track progress and treatment compliance. Though the number of women who were treated within 30 days was similar for baseline and intervention periods (85% vs. 89%), there were large differences in the proportion of women treated within 14 days (46% vs. 82%). This improvement in timeliness was manifest primarily by decreasing 2 distinct subintervals: (1) the time between posting of the laboratory result in the medical record and patient notification; and (2) the time between patient notification and treatment. Notably, the modifications made by the San Diego STD clinic did not require any additional personnel; in fact, the number of untreated infected women referred to DIS substantially decreased, allowing DIS to pursue other priority work.

Another important observation from our study was that protocols for patient follow-up and recall varied among the STD clinics in the 3 cities. These differences highlight how practices among STD clinics and programs are largely individual and that protocols may not be routinely shared, even within 1 county (Los Angeles). We recommend that STD programs routinely measure time to treatment to determine if improvements are needed. In some clinics, these evaluations can be performed in collaboration with regional IPP evaluators, as was the case in San Diego, where an annual review resulted in a change in procedure.

Presumptive treatment was more common than we had anticipated. Our findings and recommendations are most directly applicable to patients who are screened for STD and treated based on test results. However, the patient-notification procedures we describe could also benefit presumptively treated patients by providing an efficient mechanism for notifying

patients who have positive tests, delivering timely patient education, and ensuring that all their partners are referred for testing and treatment. Besides STD clinics, these notification procedures could also be implemented in family planning, adolescent, and obstetric/gynecology clinics where a more sizeable proportion of patients are screened for STD.

One limitation of our investigation was that the retrospective chart review meant data collection could not be standardized for all sites. Ideally, an analysis of treatment outcomes would outline the individual steps leading to treatment (e.g., specimen receipt by laboratory, receipt of test result by clinic, etc.), document the timeliness of each step, and then propose interventions for how the timeliness of those steps could be improved. None of the clinics we studied consistently recorded dates for all events; therefore, direct comparisons of these subintervals could not be made. Another limitation of our study was the lack of data regarding reinitiation of sex before treatment. If a large proportion of patients resume sex before receiving treatment, reducing treatment delay warrants higher priority as an STD control measure.

Based on our findings, we recommend several steps for STD programs to consider when developing or modifying patient notification procedures. (1) a staff person from the clinic should make the initial callback within 24 hours of laboratory receipt for all untreated infected patients. Having DISs make the initial callback causes delays because time is taken to process paperwork, and DISs may prioritize other tasks (e.g., syphilis case management) above chlamydia and gonorrhea notification. (2) If clinical staff are unable to reach the patient by telephone within 24 hours, the case should be forwarded to a DIS who should initiate a priority follow-up within 48 hours of laboratory receipt. (3) Clinics should maintain a logbook to document follow-up and treatment. Having 1 clinician (with a backup) responsible for the logbook assigns ownership for the task and ensures more complete follow-up. (4) Clinics should allow patients to call for test results (may require a policy change) and/or make the return appointment for results ≤1 week.

Since a major STD program objective is to decrease the duration of infectiousness of bacterial STDs, our findings underscore the continued importance for the development and implementation of a rapid point-of-care test,[15,16] which would both ensure prompt treatment and substantially decrease the use of unnecessary antimicrobial therapy. Other strategies for improving timeliness of treatment, such as delivery of medications to patients by DIS (“field-delivered therapy”), have been explored in different settings[17] but are still in preliminary stages of evaluation and are not currently endorsed by most STD programs. Until affordable rapid diagnostic tests are available, enhanced awareness and modification of follow-up recall procedures can provide a simple, inexpensive way for STD clinics to ensure that more infected women are treated in a timely manner.

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TABLE 1.

Positivity Rates and Treatment Outcomes Among Women With Chlamydial and Gonococcal Infections Seen at STD Clinics in 3 US Cities, 2002

	Washington, DC (1 of 1 clinic)	Los Angeles (3 of 13 clinics)	San Diego (main clinic)
Chlamydia trachomatis			
Positive/tested (%)	149/2607 (5.7) *	522/3764 (13.9) †	131/2203 (5.9) †
% Infected women presumptively treated	91%	79%	69%
Infected women requiring follow-up treatment, per month ‡	1.1	9.3	3.4
Neisseria gonorrhoeae			
Positive/tested (%)	151/2609 (5.8) *	129/3917 (3.3) †	27/2043 (1.3) †
% Infected women presumptively treated	93%	58%	63%
Infected women requiring follow-up treatment per months ‡	0.8	4.5	0.8

* Testing performed with DNA probe test.

† Testing performed with nucleic acid amplification test.

‡ Women coinfected with *C trachomatis* and *N gonorrhoeae* were included in both study groups.

TABLE 2.

Notification Methods Used to Recall Women With Non–Presumptively Treated Chlamydial or Gonococcal Infections, STD Clinics in 3 US Cities, 2000–2002

	Washington, DC	Los Angeles (3 clinics)	San Diego (baseline)	San Diego (intervention)
Patients can call for test results	No	No (3 clinics)	Yes	Yes
Return appointments for test results	Two weeks	One week (2)	Two weeks	One week
Who is responsible for reviewing test results	One laboratory coordinator	Two weeks (1)	One nurse practitioner	Two nurse practioners
		Many physicians (1)		
Clinic logbook tracking treatment compliance	No	One nurse or nurse manager (2)	No	Yes
		Yes (2)		
		No (1)		
Initial notification made prior to return appointment	Sometimes	Sometimes (1)	Sometimes	Yes
		No(1)		
		Clincian (1)		
Who makes initial notification	DIS	DIS (2)	DIS	Clinician

DIS, disease intervention specialist.

TABLE 3.

Treatment Outcomes for Non—Presumptively Treated Women With Chlamydial or Gonococcal Infections, STD Clinics in 3 US Cities, 2000–2002

	Washington, DC, n = 50	Los Angeles, n = 152	San Diego (baseline), n = 52	San Diego (intervention), n = 73
Cumulative % treated within (days) from specimen collection [*]				
7	8	43	10	66
14	34	67	46	82
30	68	83	85	89
60	78	88	87	92
>60	82	92	88	92
% Never treated	18	8	12	8
Median time to treatment, d [†]	18	8	14	7

[*] Includes women treated by other providers.

[†] Time to treatment: interval from specimen collection to treatment.