
Tracing and Treating Contacts of Gonorrhea Patients in a Clinic for Sexually Transmitted Diseases

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TRACING FEMALE CONTACTS of males with gonorrhea and giving them epidemiologic treatment—treatment based on exposure rather than proved infection—has been the policy of the Center for Disease Control (CDC) since 1950. More recently, this policy was expanded to include male contacts of culture-positive females (1). State and local programs that bring contacts to treatment have been encouraged to include male contacts by CDC monies and a nationwide corps of public health advisors.

Clinics that provide epidemiologic treatment for gonorrhea should give contacts an estimate of their risk of infection. To meet the demand of informed consent, the risk estimate should be current, sex specific, and pertain to a particular clinic's population. However, some difficult questions remain as to the cost effectiveness of contact tracing in the overall effort of gonorrhea control.

To answer these questions, we devised a surveillance system for contact-tracing activities that enables a clinic for sexually transmitted diseases to monitor the risk of infection in male and female contacts of patients with gonorrhea, the contribution of gonorrhea identified through contact tracing to the total clinic gonorrhea caseload, and the relative cost effectiveness of two methods of bringing contacts to treatment: CDC-trained investigators versus self-referral contact cards administered by a clinician.

Study of the Surveillance System

A study of the surveillance system for contact-tracing activities was conducted at the Denver Metro Health Clinic (DMHC) from January 1975 through August

1976. The DMHC provides walk-in diagnostic and treatment services for persons with sexually transmitted diseases. In 1976, 45 percent of all reported cases of gonorrhea in the Denver metropolitan area were diagnosed and treated at the clinic.

When contacts of gonorrhea patients report to the clinic, a clinician performs a Thayer-Martin culture on a specimen from the urethra of heterosexual men; the urethra, anal canal, and pharynx of homosexual men; and the endocervix and anal canal of women. Gram's stain is used on urethral exudates.

The clinician then determines whether the contact with an infected person is "established" or merely "suspected." An established contact is one in which the contact had sexual intercourse within the past 30 days with a person whose gonorrhea has been documented, that is, if the contact presents an official contact card or names a patient seen at the DMHC or anywhere that the diagnosis can be confirmed by a record search. Men who qualify as established contacts but who have Gram's stain positive urethral exudates (about 10 percent of all established male contacts) are counted as cases rather than contacts. Suspected contacts comprise a group for whom contact with an infected person cannot be documented, and it includes those who say that they were exposed to "VD," "it," a "discharge," or gonorrhea. Although suspected contacts are at greater risk of infection than are asymptomatic persons with no history of exposure, we rarely offer them epidemiologic treatment.

Because of the uncertain motives for which suspected contacts or established male contacts with gonococcal exudates seek care at the clinic, we exclude them from analysis and limit our surveillance system to the smaller numbers of asymptomatic established contacts who relate more specifically to contact tracing.

The data for the contact surveillance system are

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extracted from a daily patient log in which the names of established gonorrhea contacts and their culture results are recorded. Each month a secretary computes the number of male and female contacts, the percentage of these who have gonorrhea, and the contribution of gonorrhea in contacts to the total gonorrhea caseload at the clinic (see table). These contact-tracing activities were used to compare the cost effectiveness of two methods for bringing contacts to treatment: (a) CDC-trained investigators and (b) self-referral contact cards administered by a clinician.

During the first 8 months of the study (January–August 1975), contact tracing was shared by four trained investigators assigned by the Colorado Department of Health. An investigator was present during 80 percent of the clinic hours and interviewed only 30 percent of the gonorrhea patients (38.8 percent of the males and 10 percent of the females).

After patients were treated, an investigator interviewed them in a private room for 10–15 minutes. He counseled them on certain aspects of gonorrhea transmission, symptoms, potential complications, and reinfection. The names and addresses of the patients' contacts within the past 30 days were recorded. Additional efforts by an investigator (home visits, telephone calls, and paperwork) increased the average time spent per patient to 3.2 hours. When an investigator was making home visits or interviewing longer than 30 minutes, new patients were simply offered contact cards by the clinician, as described later.

An estimated cost of the investigator service for 8 months was calculated from salary, fringe benefits, training, and administrative overhead. To determine the minimum estimated cost of detecting a new case of gonorrhea in a contact, the cost of the service was divided by the number of culture-positive contacts diagnosed in the clinic during the 8 months.

During the next 4 months (September–December 1975), the trained investigator service was phased out and replaced by a self-referral contact card system administered by a clinician. This system was used exclusively during the first 8 months of 1976. In this system, the clinician (a nurse or a male physician's assistant) who has diagnosed gonorrhea asks the patient how many sexual contacts from the preceding 30 days he or she can locate and then hands the patient the appropriate number of contact cards with the following exhortation:

At least one, and perhaps all of these people are infected with gonorrhea, but they probably don't know it since gonorrhea doesn't often cause symptoms. It is your responsibility to see that each one of them is told to get treated. These cards will help. If your partners come to this clinic or the one at Colorado General Hospital, treatment will be free and confidential. We will not tell them who you are.

This process usually takes less than 1 minute, which is used to compute the cost of the self-referral contact card system, based on a clinician's hourly wage of \$7.50 (includes salary, fringe benefits, training, and administrative overhead).

Results

As shown in the table, the risk of gonorrhea infection during the entire 20-month study was 28.3 percent in 699 male contacts (monthly range was 11.1 to 43.6 percent) and 64.6 percent in 1,241 female contacts (monthly range was 54.3 to 79.3 percent). A higher percentage of female contacts were found infected during the trained investigator period (67.4 versus 65.0 percent), whereas a higher percentage of male contacts were found infected during the self-referral contact card period (29.5 versus 25.5 percent).

The percentages of the total gonorrhea caseload at the clinic that were derived from both male and female contacts (see table) were almost equal during the trained investigator period (19.2 percent) and the self-referral card period (19.4 percent); they ranged

from 15.9 to 24.6 percent per month (see chart). For the entire study period, contact tracing of 3,451 males with gonorrhea led to 802 previously undetected cases in females—47.1 percent of the total number of infected females—but contact tracing of 1,704 females with gonorrhea led to only 198 previously undetected cases in males—5.7 percent of the total number of infected males.

The cost for 8 months of trained investigator service was \$15,797, in contrast to \$268 for the self-referral card system (calculated from the 2,140 cases of gonorrhea diagnosed during the 8 months). The average cost of detecting a new case of gonorrhea in a contact was \$42.25 ($\$15,797 \div 372$ cases) if we assume that all contacts brought to treatment resulted from the investigator's efforts, or \$94 if only the 168 cases actually proved by the investigators' field reports were generated by the investigators' efforts. The cost for the self-referral system was only 65 cents ($\$268 \div 413$ cases).

Discussion

In Great Britain, it is believed that a diagnosis of gonorrhea in contacts should be confirmed rather than assumed, and that epidemiologic treatment is seldom indicated (2). In the United States, how-

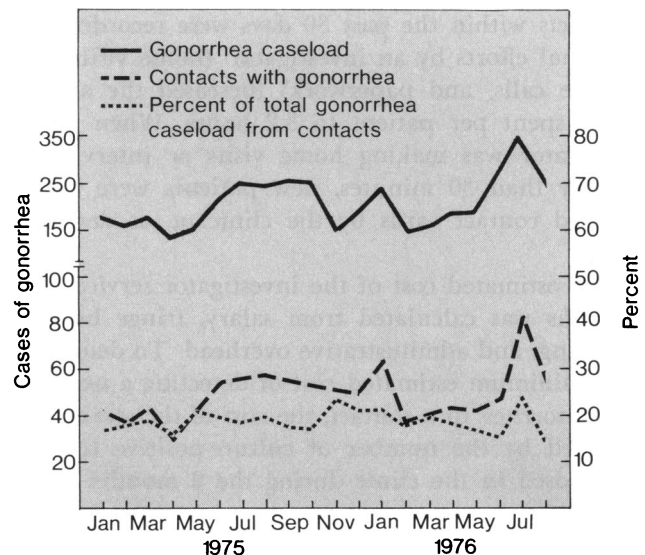
ever, the view is that epidemiologic treatment is fundamental to gonorrhea control and is justified when the benefits of treating contacts outweigh the risk of not treating them. It is unfortunate that the benefits depend directly on the risk of infection, which often is unknown. Thus, it is difficult to practice medicine ethically and to respond intelligently to the contact who is mindful of civil liberties and refuses treatment or, at least, demands to know the probability of infection. Now, in response to the demand for informed consent, we can refer to our monthly surveillance data and give established contacts a current estimate of their risk of infection.

If we withheld treatment for female contacts until cultures were processed, we would subject the 65 percent who are culture positive to an extra clinic visit, fail to treat the 3–10 percent with false-negative cultures (3), and expose more sexual partners to infection. Furthermore, untreated females suffer more major gonorrhea complications, including pelvic inflammatory disease and 79 percent of disseminated infection (4). Thus, we strongly advise reluctant female contacts to take epidemiologic treatment. Conversely, we can accept a male contact's decision to defer treatment until culture results are available, although this decision could be more rational if we knew the infectiousness of asymptomatic urethral

Contacts treated, contacts infected with gonorrhea, and percentage of total gonorrhea caseload derived from contacts, by study period and method of contact tracing, Denver Metro Health Clinic, January–August 1976

Study period and method of contact tracing	Number of contacts treated	Contacts with gonorrhea		Percent of total gonorrhea caseload derived from contacts
		Number	Percent	
January–August 1975: Trained investigators and self-referral contact cards administered by a clinician				
.....	679	372	54.8	19.2
Males	204	52	25.5	4.1
Females	475	320	67.4	47.8
January–August 1976: Self-referral contact cards administered by a clinician				
.....	825	413	50.3	19.4
Males	348	103	29.5	7.0
Females	477	310	65.0	45.7
January 1975–August 1976: Both methods				
...	1,940	1,000	51.5	19.4
Males	699	198	28.3	5.7
Females	1,241	802	64.6	47.1

Total gonorrhea caseload at clinic, cases of gonorrhea in contacts, and percentage of gonorrhea caseload from contacts for 3 study periods: January–August 1975 (contact tracing by trained investigators supplemented by self-referral contact cards administered by a clinician); September–December 1975 (transition period); and January–August 1976 (contact tracing solely by self-referral contact cards)



gonorrhoea and the ability of a single Thayer-Martin culture to detect its presence.

The rates of infection at our clinic should not be generalized to other clinics where gonorrhoea prevalence, tracing methods, and definitions differ. Nonetheless, similar contact infection rates have been reported from widely divergent clinic settings, for example, Norfolk, Va., men 9.8 percent and women 56 percent (5); Sweden, women 53 percent (6); England, women 66 percent (2); and upstate New York, men 25 percent and women 53 percent (7).

Established contacts of gonorrhoea patients contribute significantly (19.4 percent) to the total gonorrhoea caseload at the clinic, but it is apparent that tracing female contacts of infected males is more productive than tracing male contacts of infected females. Female contacts accounted for almost one-half (47.1 percent) of all infected females, whereas the corresponding figures for males was only 5.7 percent. This lower percentage for males most likely reflects their twofold higher incidence of gonorrhoea and the higher proportion of males who had already become symptomatic and received treatment. For example, of 748 male contacts examined by Pedersen and Harrah, 88.5 percent had gonorrhoea; however, only 19 (2.5 percent) had not previously sought medical attention and treatment (8). The issue of whether interviewing infected females for their contacts is (1, 5) or is not (8) a valid use of resources is rendered moot by the extremely low cost of the self-referral contact card system.

In the past, contact tracing was done exclusively by specially trained investigators, yet the relative cost effectiveness of their methods has never been tested. We replaced an expensive investigator service by an inexpensive contact card system without any decrement in numbers of contacts reporting to the clinic or in the important ratio of gonorrhoea in contacts to total cases of gonorrhoea. In a smaller clinic, Potterat and Rothenberg also found that a self-referral contact card system was as effective as the standard 15–20 minute investigative interview in bringing infected partners of male heterosexual patients to treatment (9).

The use of trained investigators to trace gonorrhoea contacts is an inefficient use of resources for several reasons. First, a mismatch often occurs between the caseload and the investigator's time. Sometimes the investigator is making home visits or has no one to see at the clinic, and at other times many patients are waiting to be seen. During busy times, the investigator represents an additional time-con-

suming encounter for the patients. Second, one of us (F.C.W.) in a previous study of 1,303 female contacts, found that much of the investigator's effort was unnecessary because 52.2 percent of the contacts had already sought medical attention or had been referred by the patients. For the remaining 47.8 percent of the contacts who received telephone calls or home visits, or both, the investigator stood some chance of being more effective. However, these investigations represented only 18 percent of all contact examinations. Finally, we believe that the actual time spent in interviewing patients correlates poorly with their subsequent attempts to reach their contacts; that is, patients who are inclined to take responsibility for their sexual partners' health will do so with little encouragement. Conversely, patients who do not know or care about their partners are not easily induced to reach them no matter how much time the investigator spends.

We therefore recommend that highly trained investigators concentrate on tracing contacts of patients with syphilis or betalactamase-producing gonorrhoea, locating persons with culture-positive gonorrhoea who have not returned for treatment, and designing and evaluating new programs for controlling sexually transmitted disease. The contact surveillance we have described should detect any resulting shortfall in contact-tracing effectiveness.

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