Gonorrhea Screening in Family Planning Clinics When Should it Become Selective?

M. WARD HINDS, MD, MPH

THE ALARMING INCREASE in incidence of gonorrhea during the past decade (*1*) and the availability of a selective transport and growth medium for *Neisseria gonorrhea* (*2*) have resulted in routine screening cultures for gonorrhea among sexually active females in many clinics (*3*). In family planning clinics that are funded under a Public Health Service Title X Family Planning Project grant, annual gonorrhea screening of female clients is a requirement. Undoubtedly, such routine screening has been effective in detecting many cases of gonococcal infection in women which otherwise might not have been discovered. However, the question must be raised of the cost effectiveness of continuing the screening for gonorrhea in clinic populations where the yield of positive cultures is very low. Put another way, how much are we prepared to spend out of our increasingly scarce public health dollars to detect a single case of gonorrhea?

This study was performed to examine critically the cost of routine gonorrhea screening in a large family planning project and to relate that cost to screening of high- and low-risk patients among the population served by the project.

Methods

The Family Planning Project of the Seattle-King County Department of Public Health operates seven clinics within King County, Wash., all of which have been open at least since 1972. In each clinic, a single endocervical culture for gonorrhea is obtained at the initial examination and yearly thereafter. In clinic 1, because it is located in the same building as the laboratory, cultures are taken on Thayer-Martin plates and placed in candle jars. All other clinics use Transgrow bottles that are incubated overnight at 35° C before being transported to the laboratory the next day.

In 1974, the health department laboratory examined the results for all gonorrhea screening programs in King County. The examination consisted of a hand tabulation of the outcome of each culture performed in 1973, including those from the family planning project.

In early 1976, because of my impression that the positivity rate for gonorrhea screening in the family planning clinics was decreasing, I reviewed all positive cultures for 1975.

All Title X Family Planning Projects are required to have a coded clinic visit record completed by all patients on their initial visit and annually thereafter. This record contains such demograhpic information as age, race, education, welfare status, pregnancy history, and contraceptive history. The project receives summarized computer printouts of this information, and thus the patient population of each clinic can be defined by these demographic characteristics. The 1975 summaries for each clinic were used to provide denominators so that the rates of gonorrhea culture positivity could be calculated for each clinic and for selected groups within each clinic's population. Unfortunately, the computer information was in a form which allowed only two-dimensional, rather than multidimensional, comparison. Numerators for the rate calculations were obtained by a review of the chart of each patient

☐ *Tearsheet requests to M. Ward Hinds, MD, Health Services Division, Occupational Health Section, Mail Stop 4-1, Washington State Department of Social and Health Services, Olympia, Wash. 98504.*

identified as having a positive gonorrhea culture in 1975.

Each gonorrhea culture was estimated to cost $2.50, of which 30 cents was for materials and the remainder for personnel costs.

Relationship of gonorrhea positivity rate and the cost of detecting a case of gonorrhea through routine screening

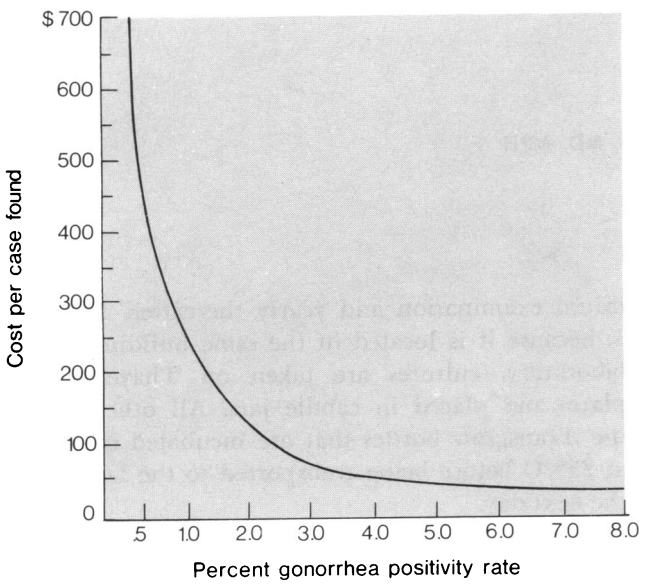

Table 1. 1973 and 1975 gonorrhea screening results in family planning clinics

Clinic No.	Number patients screened	Positive	
		Number	Percent
	1973 [1]		
1	2,008	39	1.9
2	437	11	2.5
3	1,556	13	0.8
4	1,215	9	0.7
5	3,150	36	1.1
6	1,813	19	1.1
7	779	7	0.9
Total	10,958	134	1.2
	1975 [2]		
1	1,686	31	1.8
2	371	11	3.0
3	1,649	7	0.4
4	1,098	15	1.4
5	2,934	11	0.4
6	1,709	16	0.9
7	734	4	0.5
Total	10,181	95	0.9

[1] $\chi^2 = 20.3$. $df = 6$, $P < 0.01$. [2] $\chi^2 = 49.3$. $df = 6$, $P < 0.001$.

Results

The relationship between the cost of finding a case of gonorrhea through routine screening and the gonorrhea positivity rate in a population is exponential rather than linear, as shown in the chart. With a positivity rate of less than 1 percent, the cost of finding a case of gonorrhea rises very rapidly.

In 1973, gonorrhea screening in the family planning project yielded the results shown in table 1. The difference in positivity rates among the seven clinics was significant, with a high rate of 2.5 percent and a low rate of 0.7 percent.

By 1975, the overall positivity rate for the project had decreased from the 1973 level of 1.2 percent to only 0.9 percent (table 1). This decrease was significant ($\chi^2 = 4.13$, $df = 1$, $P < 0.05$). Additionally, by 1975 the positivity rate differences among the seven clinics had become more pronounced, with a high rate of 3.0 percent and a low rate of only 0.4 percent.

When 1975 age-group-specific positivity rates were calculated for the entire project, no significant differences were found (table 2). An analysis of age-group-specific positivity rates for each of the seven clinics revealed only one, clinic 2, where a significant difference existed among age groups. In this clinic, which exhibited the greatest overall positivity rate, there was a marked trend of decreasing positivity rate with increasing age (table 2).

Only two racial groups were examined because the numbers in other racial and ethnic groups were

Table 2. Age-group-specific positivity rates for gonorrhea, all 7 family planning clinics and clinic No. 2

Age group (years)	Number patients screened	Positive	
		Number	Percent
	All 7 clinics		
Under 18	1,726	20	1.2
18–19	2,614	21	0.8
20–24	3,943	39	1.0
25–29	1,266	10	0.8
30 and over	632	5	0.8
Total	10,181	95	0.9
	Clinic No. 2 [1]		
Under 18	59	6	10.2
18–19	67	2	3.0
20–24	144	3	2.1
25–29	65	0	0.0
30 and over	36	0	0.0
Total	371	11	3.0

[1] $\chi^2 = 14.7$, $df = 4$, $P < 0.01$.

Table 3. Gonorrhea screening results for new and continuing patients

Age group (years)	New patients			Continuing patients		
	Number screened	Positive		Number screened	Positive	
		Number	Percent		Number	Percent
Under 18	1,171	11	0.9	555	9	1.6
18–19	1,015	7	0.7	1,599	13	0.8
20–24	1,089	18	1.7	2,854	21	0.7
25–29	419	6	1.4	847	4	0.5
30 and over	223	2	0.9	409	3	0.7
Total	3,917	44	1.1	6,264	50	0.8

small. Of 9,404 white females screened, 74 or 0.8 percent had positive cultures. In contrast, 16 of 269 or 5.9 percent of the black females screened were positive, a significant difference ($\chi^2 = 75.7$, $df = 1$, $P < 0.0001$). Neither racial group showed a difference in age-group positivity rates.

Patients were categorized as new (receiving their first gonorrhea screening culture in the project) or continuing, and positivity rates were examined for these two categories. For all age groups combined, there were 3,917 new patients; 44 or 1.1 percent of these had positive cultures. In contrast, of 6,264 continuing patients, only 51 or 0.8 percent were positive. When new and continuing patients were grouped by age (table 3), new patients under age 20 had lower positivity rates and those 20 and over had higher positivity rates. Although the difference between total new and total continuing patients' rates of positivity was not statistically different, for patients age 20 and over, new patients had a positivity rate of 1.5 percent compared to only 0.7 percent for continuing patients ($\chi^2 = 8.96$, $df = 1$, $P < 0.01$).

The families of 1,133 females screened were receiving welfare, and the cultures of 19 or 1.7 percent of these females were positive for gonorrhea. Of the remaining 9,048 nonwelfare recipients screened, only 76 or 0.8 percent had positive cultures ($\chi^2 = 7.57$, $df = 1$, $P < 0.01$). Of the gonorrhea-positive welfare patients, 7 or 37 percent were black. However, it was not possible to determine if blacks were overrepresented among gonorrhea-positive welfare patients since the proportion of blacks among all welfare patients was unknown. The positivity rates for welfare patients were higher than those for nonwelfare patients at all clinics except two, where there was no difference. A comparison of age-specific positivity rates among both welfare and nonwelfare patients revealed no significant difference.

It was possible to group new patients into those who were and those who were not using some contraceptive method at the time of their initial clinic visit. Among the 1,058 new patients who were not using any contraception at the time of their first gonorrhea screening, 26 or 2.5 percent had positive cultures. However, among the 2,859 new patients who were using contraception when first screened, only 18 or 0.6 percent had positive cultures ($\chi^2 = 22.6$, $df = 1$, $P < 0.001$).

When positivity rates were examined among continuing patients using different methods of birth control (table 4), only statistically nonsignificant differences were found. Analysis of screening culture results by patients' gravidity, parity, and education revealed no significant findings.

Discussion

The family planning project in this study experienced a significant decline in the overall productivity of its routine gonorrhea screening between 1973 and 1975. The 1975 positivity rate of 0.9 percent for this project is lower than that of any nationwide reporting source with the exception of cancer detection clinics in community health centers, where the rate is 0.8 percent (*3*). All other reporting sources range from 1.5 percent in cancer detection clinics of health departments to 5.8 percent in hospital outpatient clinics.

An estimated $278 was being spent to detect a single case of gonorrhea in 1975 for the project as a whole (see chart), and the cost ranged from a low of only $83 per case in the highest-yield clinic to $625 per case in the lowest-yield clinic. Obviously, at some level of positivity in a gonorrhea screening program, the initiation of selective, rather than routine, screening is indicated on a cost-effective basis. But what is that level?

If it were possible to know the average cost savings generated by the detection of a case of asymptomatic gonorrhea in a female, it would be relatively simple to determine the level of positivity in a screening

Table 4. Gonorrhea screening results among continuing patients, by contraceptive method used

Method	Number patients screened	Positive	
		Number	Percent
IUD	125	3	2.4
Pill	5,690	44	0.8
Foam, condom, or diaphragm	289	1	0.4

program below which cost effectiveness was lost. However, such a cost savings figure is not now available because of gaps in the epidemiologic knowledge of untreated gonococcal infection in females (*4, 5*). Specifically unanswered are such questions as the rate of spontaneous or accidental cure of gonococcal infection in females, the average level of morbidity resulting from a gonococcal infection that persists untreated until the appearance of symptoms causes the woman to seek medical diagnosis, and the average number of secondary cases resulting from sexual activity during the period between initial infection of a female and the appearance of symptoms leading to a diagnosis.

Gonorrhea detected in the female through the screening process appears to be a primary means of finding cases of asymptomatic or minimally symptomatic gonorrhea in male partners (*6*), and the cost of detecting the secondary male case appears to be much less than that for the primary case (*7*). Still, our current knowledge allows us only a somewhat educated guess about the cost benefit of detecting a case of gonorrhea in a female through the screening process. Decision making on selective screening demands other considerations.

As an example, if 1,000 females are screened at a cost of $2,500, and the positivity rate is only 0.4 percent, then only 4 cases of gonorrhea would be detected. If the $2,500 were used instead to provide comprehensive family planning services at a cost of $37.60 per woman per year (the current Medicaid reimbursement in the State of Washington), then 66.5 women could be served (including being cultured for gonorrhea). If these 66.5 women were part of a high gonorrhea-risk population with a positivity rate of 6 percent, then 4 gonorrhea cases would still be detected. Thus, by shifting the $2,500 from routine gonorrhea screening in a low-yield population to providing comprehensive family planning services in a high-yield population, no fewer gonorrhea cases would be detected and the additional benefits of contraception, cervical cancer screening, and other services would be gained. Such a shifting of funds would assume that a waiver of the requirement for routine gonorrhea screening in Title X Family Planning Projects would be granted when very low-yield populations could be defined. The question of such a waiver needs to be explored.

If selective gonorrhea screening is to be instituted, it should exclude only those in the low-risk populations who are entirely asymptomatic. Any woman with genitourinary signs or symptoms should always be cultured (this is really part of diagnosis, not screening), since any such signs or symptoms increase the probability that she has gonorrhea.

Large family planning projects such as that described here are capable of defining their patient populations to the extent that high- and low-yield subpopulations for gonorrhea screening can be easily identified. Once identified, and as cost considerations demand, those subpopulations for which the rate of gonorrhea positivity is very low should be selectively screened.

Summary

Routine screening of females for gonococcal infection has become common in many clinic settings, particularly in public family planning clinics. The results of such routine screening in one large family planning program operated by the Seattle-King County Department of Public Health was examined.

From 1973 to 1975 a trend toward decreasing rates of positivity for gonorrhea was observed. Use of computer information on the population being served by the program and a review of individual patient's charts enabled identification of certain high-yield subpopulations, including blacks, welfare recipients, new patients over age 19, and new patients who were not using any contraception when first screened. The cost of detecting a case of gonorrhea through screening was related to the positivity rate with the demonstration of a very high cost per case found when the positivity rate is less than 1 percent.

Consideration should be given to identifying high- and low-yield subpopulations for gonorrhea screening in large family planning programs so that, as cost considerations demand, funds now used for routine gonorrhea screening may be used instead for selective screening and provision of family planning services to high-yield groups.

References

1. American Social Health Association: Today's VD control problem, 1975. New York, 1975, p. 11.
2. Martin, J. E., and Lester, A.: Transgrow, a medium for transport and growth of *Neisseria gonorrhea* and *Neisseria meningitidis*. HSMHA Health Rep 86: 30–33, January 1971.
3. Center for Disease Control: Results of screening for gonorrhea—United States, for 3-month period ending September 1975. Morbidity and Mortality Weekly Report 25: 91, Mar. 26, 1976.
4. Kraus, S. J.: Complications of gonococcal infection. Med Clin North Am 56: 1115–1125, September 1972.
5. Reynolds, G. H.: A control model for gonorrhea. Doctoral dissertation. Emory University, Atlanta, 1973.
6. Brown, S. T., and Pederson, A. H. B.: Gonorrhea in the male. New Engl J Med 291: 53–54, July 4, 1974.
7. Blount, J. H.: A new approach for gonorrhea epidemiology. Am J Public Health 62: 710–712, May 1972.