Preliminary Report on a Mass Program for Detection of Gonorrhea

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THE REPORTED incidence of gonorrhea in Chicago, Ill., has continued to climb each year since 1962 (see chart). The 41,306 cases reported to the Chicago Board of Health in 1969 represent nearly twice the reported incidence in 1959.

Confronted with the failure of conventional epidemiologic techniques in controlling gonorrhea, as evidenced by the steadily increasing incidence, Chicago health authorities began to search for new methods to combat the rising incidence. It was evident that in any successful approach consideration would need to be given to the many obstacles to effective control—the lack of knowledge concerning true incidence, the questionable adequacy of current treatment schedules, the short incubation period of the disease, the lack of natural or acquired resistance, and the extent of asymptomatic gonorrhea, particularly in the female population.

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The Chicago health authorities decided that the three points fundamental to an attack on gonorrhea were (*a*) identification of the extent of untreated gonorrhea among females, (*b*) removal of these infected females, at least temporarily, from the reservoir of infection through treatment, and (*c*) evaluation of the effectiveness of the treatment schedules currently in use.

Method

The staff of the Chicago Board of Health embarked on a program of examining a minimum of 45,000 females within 18 months (July 1968–December 1969). During the the first 12 months, the program was conducted in the following 22 health facilities:

1. Eighteen prenatal and family planning clinics operated by the board of health
2. The Martin Luther King Neighborhood Health Center, a facility supported by the Office of Economic Opportunity, the Children's Bureau, and the board of health
3. The Chicago Maternity Center
4. The Chicago Loop clinic of the Planned Parenthood Association
5. The Kaplan Clinic, a private facility.

Most of the participating clinics provide health service to residents in the low socioeconomic areas of the city.

Culture specimens were obtained from the cervical canal of all females given pelvic examinations at these clinics. Specimens were ob-

tained from prenatal patients at the time of their initial examination and during the seventh month of pregnancy. Family planning patients were tested at the time of their initial and annual examinations, in conjunction with the Papanicolaou smear. The majority of females randomly selected for testing were clinically asymptomatic for gonorrhea as determined by bimanual examination.

With the widely accepted Thayer-Martin medium, to which an antibiotic supplement of vancomycin, nystatin, and colistimethate was added, it was possible to conduct a manageable and accurate program of mass screening for gonorrhea among women (*1*). Cultures of colonies grown in the T-M medium that reacted positively to the oxidase reagent and revealed characteristic gram-negative diplococci upon microscopic examination allowed a presumptive diagnosis of gonorrhea. Once a week, 10 to 15 randomly selected cultures were subcultured to sugars as a test of the presumptive method.

After removal of the mucus plug, each specimen was taken from the cervical os on a cotton swab, placed in a Stuart's transport medium, and refrigerated immediately. Although direct plating is bacteriologically ideal, logistics required the use of a transport medium. This method will allow the isolation of gonococci from approximately 90 percent of the specimens when the transport period is under 24 hours (*2*). Once a day a messenger delivered the collected specimens to the bacteriology laboratory of the board of health, where the specimens were cultured on the T-M selective culture medium (*3*). The same techniques were used in evaluating therapeutic failures and treatment schedules.

The venereal disease control section of the board of health followed, in the field, all females with positive cultures, except those patients from the Martin Luther King Neighborhood Health Center and the Chicago Maternity Center who were followed by personnel from the respective center. All females with positive cultures were immediately referred for diagnosis and treatment to either their private physician or to the Municipal Social Hygiene Clinic, operated by the board of health. Tests of cure on the first 200 females treated at the social hygiene clinic were done within a minimum of 3 days and a maximum of 4 from the date of treatment. This schedule was necessary in order to differentiate treatment failures from reinfections. Following the tests of cure on the first 200 patients, an average of one in 25 patients was tested to verify treatment.

Most of the infected persons were administered 3.0 million units of procaine penicillin G with 2 percent aluminum monostearate (PAM), the normal treatment schedule established by the board of health for treatment of females with gonorrhea. Persons verbally indicating sensitivity to penicillin received either 250 mg. of tetracycline orally 4 times a day for 3 days (total 3 gm.) or 1 gram of streptomycin intramuscularly.

Results

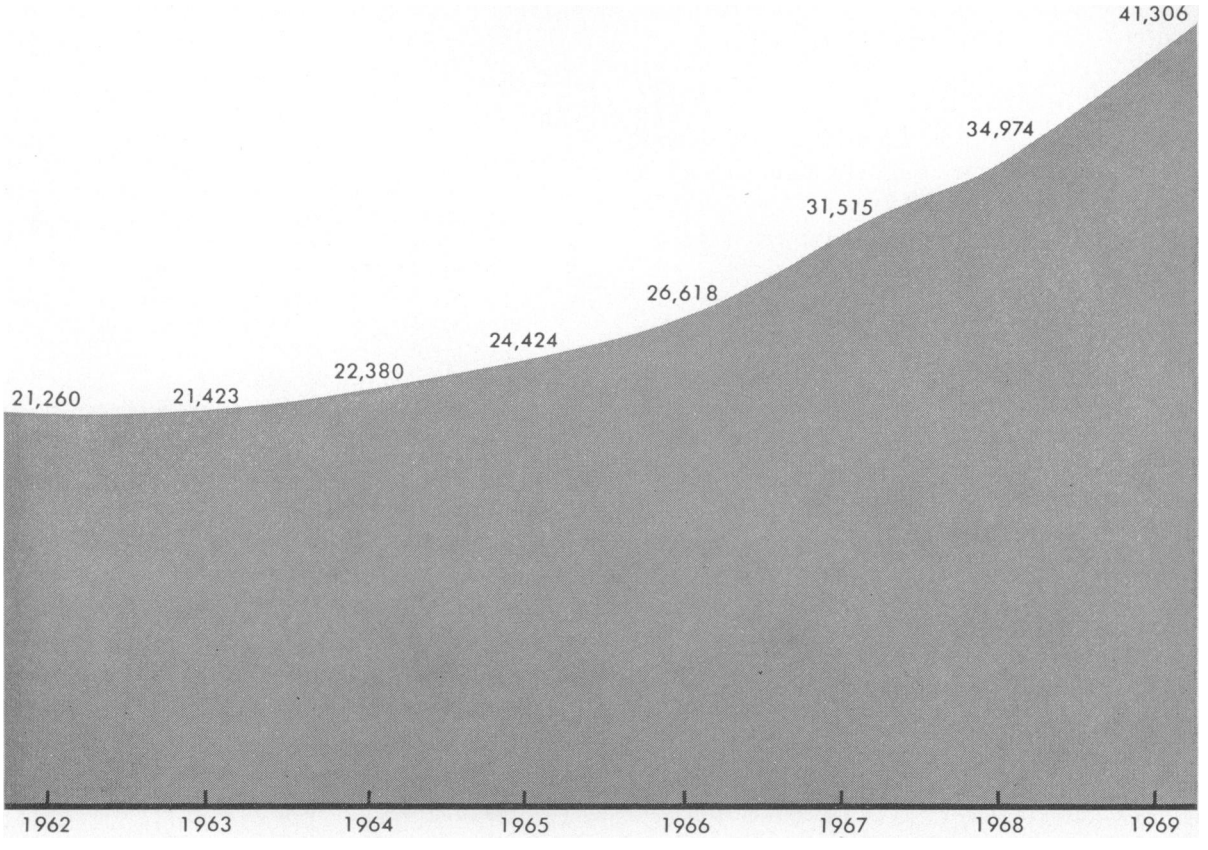
Although the control program is still in progress, data for the first 12 months indicate that, of 32,470 specimens, 1,782 (or 5.5 percent) were positive. At the time this report was prepared, 181 positive cultures were being investigated and had not yet been processed by our computer. The inclusion of these positive specimens increases the percent positive to 6.01 percent. Of the 1,782 females with positive cultures, 1,728 (or 97 percent) were treated for gonorrhea. The remaining 3 percent either could not be located or were uncooperative. Approximately 59 percent of the females tested were family planning patients and 41 percent were prenatal patients.

In all instances, the randomly selected cultures which were subcultured to sugars as a test of the presumptive method gave positive reactions for *Neisseria gonorrhoeae.*

Analysis of total females tested July 1968–June 1969, by age group

Age group (years)	Total tested	Total positive	Percent of total positive	Percent positive within age group
0–14	439	16	0.9	3.6
15–19	9,637	668	37.5	6.9
20–24	11,366	728	40.8	6.4
25–29	5,703	263	14.8	4.6
30–34	2,871	59	3.3	2.1
35–39	1,411	19	1.1	1.3
40–44	459	4	.2	.9
45–98	100	4	.2	4.0
Unknown	484	21	1.2	4.3
All ages	32,470	1,782	100.0	5.5

Reported cases of gonorrhea in Chicago, 1962–69



The 22 testing sites serve both poor and nonpoor areas within the city. While the highest percentage of females with positive specimens, 9.8 percent, did not come from an area of poverty, seven clinics within Chicago's four Model Cities areas reflected a range of from 4.5 to 8.5 percent in the proportions of specimens positive.

An analysis of results by age group corroborates an already known fact, that the reported incidence of gonorrhea among females is highest in teenagers and young adults (see table).

A test of cure on 200 females showed that only four did not respond to a total of 3.0 million units of PAM (1.5 million units administered intramuscularly in each buttock). Although three of the patients who were regarded as treatment failures responded to a second dose of 3.0 million units of PAM, the fourth patient, who was infected also with early syphilis, required 4 gm. of Ilozone (erythromycin) and 16 gm. of sulfadiazine. The test of cure performed on every 25th patient confirmed the adequacy of 3.0 million units of PAM or 3 gm. of tetracycline for those indicating a sensitivity to penicillin.

Discussion

Our preliminary study indicates that females infected with gonorrhea do not always show clinical signs of infection. Results of the study confirm the need and desirability of a citywide program of gonorrhea detection. The full epidemiologic impact of our investigation will be reported later since the Chicago Board of Health is continuing this mass detection program. Presently, an additional 59,000 females, who are primarily asymptomatic, are being screened in the program by the method discussed. A minimum of 2,500 females will also be tested from the anal cavity and the cervical os. Additionally, the board of health is now using the platinum loop technique to screen a minimum of 1,000 asymptomatic males for gonorrhea. A future report will evaluate a number of

varied treatment schedules. It is hoped that these aspects of our study will greatly enhance the gonorrhea control effort in Chicago.

Summary

The Chicago Board of Health has been conducting a mass screening program to detect gonorrhea, using the Thayer-Martin selective culture medium in addition to a gram stain and an oxidase reaction test.

Data for the first 12 months of the program revealed 1,782 positive cervical specimens (5.5 percent) of the 32,470 specimens collected in 22 private, public, or nonprofit clinics in Chicago. Approximately 59 percent of the females tested were family planning patients and 41 percent were prenatal patients. A test of cure on the first 200 females examined at one clinic confirmed the efficacy of the current treatment schedule of 3.0 million units or procaine penicillin G with 2 percent aluminum monostearate (PAM) or 3 gm. of tetracycline for those reporting a sensitivity to penicillin.

REFERENCES

(*1*) Thayer, J. D., and Martin, J. E., Jr.: Improved medium selective for cultivation of *N. gonorrhoeae* and *N. menigitidis*, Public Health Rep 81: 559–562, June 1966.

(*2*) Stuart, R. D., Toshack, S. R., and Patsula, T. M.: The problem of transport of specimens for culture of gonococci. Canad J Public Health 45: 73–83, February 1954.

(*3*) Thayer, J. D., and Martin, J. E., Jr.: A selective medium for the cultivation of *N. Gonorrhoeae* and *N. Meningitidis*. Public Health Rep 79: 49–57, January 1964.

Tearsheet Requests

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WHO Fellowships Available to U.S. Health Workers

The World Health Organization is offering a limited number of short-term fellowships for travel abroad related to the improvement and expansion of health services in the United States. These fellowships will be made available in 1971 to U.S. citizens engaged in operational or educational aspects of public health.

A special committee will select applications based on the professional background of the individual, the field and locale of the study proposed, and the use to be made of the experience by the applicant on his return. Priorities of award will be established up to the total of the funds available. The deadline for the receipt of applications is September 30, 1970.

Applications will not be considered for the prosecution of pure research projects, for attendance at international meetings, nor from students in the midst of training at either the undergraduate or graduate level. Employees of the Federal Government are not eligible for the fellowship.

The fellowship awards will cover per diem and transportation and will be limited to short-term travel programs, from 2 to 4 months. Employers of successful applicants will be expected to endorse applications and to continue salary during the fellowship term.

Additional information is available from Dr. Robert W. Jones III, Chief, Foreign Students Education Branch, Bureau of Health Professions Education and Manpower Training, National Institutes of Health, Public Health Service, Room 1014, HEW South, Washington, D.C. 20201.