

# Gonorrhoea in 1972

## A 1-year study of patients attending the VD Unit in Uppsala

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During 1972 all patients visiting the Venereal Disease Clinic of the University Hospital in Uppsala were subjected to careful and extensive interrogation, and the information so obtained was adapted for computer reading, as were the results of clinical examination and microbiological tests. The aim of this programme was not only to evaluate the adequacy of current therapy and epidemiological efforts, but also to illuminate problems concerned with information and attitudes.

### Methods

#### PATIENTS

These consisted of 2,090 men and 1,489 women; their mean ages were 24 and 21.5 years respectively, most of them (86 per cent.) being between 15 and 29 years old. The total of 963 cases in the gonorrhoea group was made up of 469 men and 494 women, comprising 81 per cent. of all cases of gonorrhoea known in the area served by the Venereal Disease Clinic, which has about 120,000 inhabitants (including 20,000 registered university students). All women with a gonococcal infection diagnosed by culture at the Department of Gynaecology were followed-up in our clinic and are included in this series. They totalled 74, of whom 48 had salpingitis.

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#### DIAGNOSIS OF GONORRHOEA

The diagnosis of gonorrhoea was made if either a smear or a culture was positive for gonococci. Smears were considered positive if there was a collection of monomorphic diplococci within a neutrophilic granulocyte stained with methylene blue. Specimens from men were taken from the urethra and in a few cases also from the rectum, and in women from the urethra, cervix, and rectum. The material was transported in Stuart's medium to the laboratory and the culture set up within a few hours. Tonsillar swabs were taken from patients with an untreated gonococcal infection and from patients named as contacts. These were also sent to the laboratory in Stuart's medium and positive cultures from this site were confirmed with fermentation reactions.

#### TREATMENT SCHEDULES FOR GONORRHOEA

The standard treatment was a total of 2 g. ampicillin taken orally as two doses of 1 g. with a 5-hr interval. This treatment was given to 84 per cent. of the patients and the others were treated with either doxycycline, 300 mg. in a single oral dose, or 1 m.u. aqueous benzyl penicillin plus 1.2 m.u. aqueous procaine penicillin in a single injection. The efficacy of the therapy was checked by culture for *N. gonorrhoeae* of specimens taken one and two weeks after treatment.

### Results

#### REASON FOR ATTENDING

The main reasons for attending the VD clinic are presented in Table I, where the patients are grouped

TABLE I *Main reason for attending the VD clinic*

Reason for attendance	Men (per cent.)		Women (per cent.)	
	With GC	No GC	With GC	No GC
Letter from Public Health Officer	10	9	14 <sup>a</sup>	8
Referred by a doctor	4	10	31 <sup>a</sup>	13
Referred by a sexual partner	15 <sup>a</sup>	6	39 <sup>a</sup>	14
Symptoms of venereal disease	68	67	13	56 <sup>a</sup>
No symptoms but suspicion of venereal disease	3	8	3	9
Total percentage	100	100	100	100
Total patients	469	1621	494	995

<sup>a</sup>P < 0.001

P = The probability that the difference between the group with *N. gonorrhoeae* and the group without is caused by random factors

according to the presence or absence of gonococcal infection. A letter from the Public Health Officer brought 14 per cent. of the women with gonorrhoea to the clinic, 31 per cent. were referred by other doctors, and 39 per cent. by a sexual partner. These figures are all significantly higher than those for women without gonorrhoea which were 8, 13, and 14 per cent. ( $P < 0.001$ ). The sexual partner had referred 15 per cent. of the men with gonorrhoea and 6 per cent. of the men without ( $P < 0.001$ ).

Symptoms of venereal disease in the male group were irrelevant as specific indicators of gonococcal infection, as we found almost the same percentage of symptoms among the men with and without gonorrhoea. Of women with gonorrhoea only 13 per cent. sought medical attention because of symptoms, compared with 56 per cent. in the non-gonorrhoea group ( $P < 0.001$ ).

#### DRUGS

All patients were interviewed about any drugs taken during the previous 2 weeks; the drugs reported are listed in Table II. Salicylates were mentioned by 36 per cent. of the men and 47 per cent. of the women. Oral contraceptives were used by 45 per cent. A history of allergic reactions to penicillin was given by 2 per cent. of the patients and 40 per cent. of these had probably had urticaria or angioneurotic oedema.

TABLE II *Percentage taking drugs during a 2-week period before the first visit*

Sex		Male	Female
No. of cases		2,090	1,489
Type of drug	Salicylates	36	47
	Antihistamines	2	3
	Sulphonamide	2	5
	Nitrofurantoin		
	Metronidazole		
	Penicillin		
	Tetracycline	3	3
	Hypnotics	8	10
	Sedatives		
	Contraceptives		
	Other	5	9

#### DISEASES DIAGNOSED

The final diagnoses for all patients during 1972 are shown in Table III. The most frequent diagnosis for men was non-gonococcal urethritis (38 per cent.) and for women non-gonococcal vaginitis (34 per cent.). Gonorrhoea was found in 22 per cent. of the men and in 33 per cent. of the women. Syphilis was quantitatively no problem, as we had only ten men and four women with that disease. Of the patients with genital warts, eight per cent. of the men and 16 per cent. of the women had a concomitant gonococcal infection. Among patients with pediculosis, *N. gonorrhoeae* was found in 5 per cent. of

the men and 29 per cent. of the women, but among patients with scabies 50 per cent. of the men and 60 per cent. of the women had gonorrhoea.

TABLE III *Diagnoses recorded (per cent.)*

Sex		Male	Female
No. of cases		2,090	1,489
Diagnosis	Gonorrhoea	22.5	33.2
	Syphilis	0.5	0.3
	Genital warts	7.8	4.6
	Genital herpes	2.6	1.8
	Pediculosis	2.0	2.1
	Scabies	0.9	0.3
	Eczema/mycosis	3.0	0.5
	Non-gonococcal urethritis	38.0	6.4
	Non-gonococcal vaginitis	—	34.0
	Other diagnosis	5.6	3.4
	Observation	26.2	23.2
Total percentage		109.1	109.8

#### THE GONORRHOEA GROUP

##### *Sex ratio*

Gonorrhoea was diagnosed in 469 men and 494 women, a male : female ratio of 1 : 1.05.

##### *Complications*

Table IV shows the frequencies of complications of the gonococcal infection. Salpingitis was found in 10 per cent. (all of whom were first diagnosed in the Department of Gynaecology) and disseminated gonorrhoea in 0.8 per cent. of the women. Epididymitis was found in 0.4 per cent. and disseminated infection in 0.2 per cent. of the men. Gonococcal infection of the tonsils was diagnosed in 6 per cent. of the men and 9 per cent. of the women.

TABLE IV *Types of gonococcal infection observed during 1972*

Types of infection	No. of patients	
	Men	Women
Uncomplicated	466	442
Salpingitis	—	48
Epididymitis	2	—
Disseminated	1	4

##### *Age*

The mean ages for the men and women with gonorrhoea were 21 and 20.5 years respectively, and the age distribution for the whole group was about the same as for the whole series.

##### *Marital status*

The marital status is shown in Table V (opposite).

Homosexual contacts were mentioned by nine men with a gonococcal infection, which is 28 per cent. of all homosexual men attending during the year.

Fifty-five men and sixteen women were foreigners who had little knowledge of Swedish, Finnish, English, German, or French, so that the records were incomplete. Further information about the

TABLE V *Marital status of 469 men and 494 women with gonococcal infection (per cent.)*

Sex	Married	Steady partner or engaged	Unmarried	Not recorded	Total
Male	11	22	66	1	100
Female	10	32	58	0	100

gonorrhoea group is therefore available only for a reduced total of 892 patients (414 men and 478 women).

#### Previous infection

An earlier gonococcal infection was recorded for 44 per cent. of the men and 30 per cent. of the women (Table VI). Within the previous 12 months, 17 per cent. of the men and 13 per cent. of the women had had one or more infections (Table VII).

TABLE VI *Percentage of patients with earlier gonococcal infections*

Sex	No. of cases	No. of earlier infections			
		0	1	2-3	>3
Male	414	56	24	14	6
Female	478	70	23	5	2

TABLE VII *Percentage of patients with gonococcal infections during previous 12-month period*

Sex	No. of cases	No. of gonococcal infections			
		0	1	2-3	>3
Male	414	83	15	1	1
Female	478	87	12	1	0

#### Age at first infection

The mean age for the group of patients with a first gonococcal infection was 23 years for men and 20.5 years for women. There was no male patient less than 16 years old and 12 per cent. were older than 30 years. Of the females, 2 per cent. were younger than 15 years and 8 per cent. were older than 30 years at the time of their first gonococcal infection.

TABLE VIII *Percentage of patients with a gonococcal infection by number of partners during previous 30 days*

Sex	No. of cases	No. of partners					Not recorded
		0	1	2	3-4	>4	
Male	414	4	50	22	12	5	7
Female	478	11	63	16	6	0	4

TABLE IX *Percentage of patients grouped according to number of days between acquiring gonococcal infection and first visit to VD clinic*

Sex	No. of cases	Number of days					Time unknown
		1-3	4-7	8-14	15-30	>30	
Male	414	5	18	26	20	8	23
Female	478	1	5	14	22	20	38

#### Sexual partners

The numbers of sexual partners during the previous 30 days are shown in Table VIII. No sexual intercourse during the past month was reported by 4 per cent. of the men and 11 per cent. of the women. Two or more partners during that period were mentioned by 39 and 22 per cent. respectively.

#### Time of infection

As shown in Table IX, the probable time of infection was unknown in 23 per cent. of the men. In 8 per cent. it was known to be more than one month. Corresponding figures for the female cases were 38 and 20 per cent. Eight per cent. of the men and 9 per cent. of the women mentioned two or more partners after the supposed time of infection. By examining 434 contacts (187 men and 247 women) of the 892 patients with a gonococcal infection, 259 further cases of gonorrhoea were found, *i.e.* 60 per cent. of the contacts examined (49 per cent. of the men and 68 per cent. of the women) were found to be infected.

No symptoms of infection had been noticed by 23 per cent. of the men and 50 per cent. of the women. In most of these cases the sexual partner had attended first. The incubation period of the gonococcal infection for the 200 men and 96 women who had developed symptoms before examination was done and for whom the day of infection was known is shown in the Figure (overleaf). Symptoms had appeared in 50 per cent. of the men 5 to 6 days after infection and 50 per cent. of the women had symptoms after 9 to 10 days.

#### Laboratory tests

The results of direct microscopical examination and culture at the first visit in 414 men and 343 women

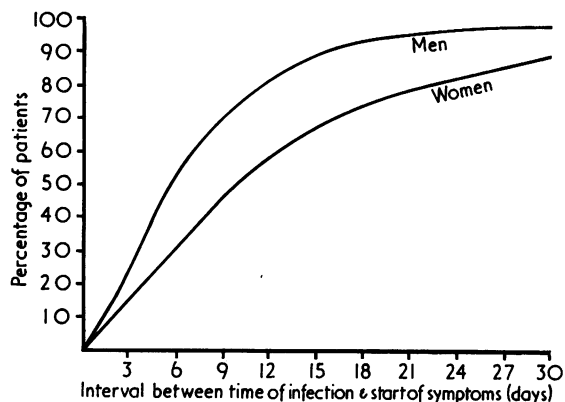


FIGURE *Incubation period for 200 men and 96 women with symptoms of gonococcal infection and with known day for the infection*

who were diagnosed as having gonorrhoea at the VD Clinic are compared in Table X. A concomitant positive result of microscopy and culture was found in 82 per cent. of the specimens taken from the male urethra and in 44 and 29 per cent. respectively of the specimens from the female urethra and cervix. Of the male cases, 99 per cent. of the positive tests were from the urethra and 1 per cent. from the rectum (Table XI). Rectal specimens from men were, however, not taken as a routine. In three homosexual men only the rectal site was positive. In women, cultures from the urethra were positive in 80 per cent., from the cervix in 90 per cent., and from the rectum in 44 per cent. In 3 per cent. only

TABLE XI *Percentage positive gonococcal cultures found in specimens taken from different genital sites from 381 men and 333 women*

Site of infection	Positive culture	
	Men	Women
Urethra	99	5
Cervix	—	12
Rectum	1	3
Urethra plus cervix	—	39
Urethra plus rectum	—	2
Cervix plus rectum	—	5
Urethra plus cervix plus rectum	—	34
Total	100	100

TABLE X *Results (per cent.) of direct microscopical examination of smears and of culturing for gonococci in 414 men and 343 women*

Sex	Site	Culture					
		Positive			Negative		Total
		Positive smear	Negative smear	Smear not done	Positive smear	Percentage	
Male	Urethra	82	10	—	8	100	411
	Rectum	—	—	100	—	100	4
Female	Urethra	44	49	2	5	100	280
	Cervix	29	68	—	3	100	309
	Rectum	—	—	100	—	100	147

the rectal sample was positive. In one man and in one woman, only the tonsillar specimen gave a positive culture, and the male patient showed symptoms of a disseminated gonococcal infection. Tonsillar specimens were taken in 363 men and 311 women with an untreated gonococcal infection and the results are presented in Tables XII and XIII, where positive cultures are correlated with the practice of oro-genital contact. Cultures were positive in 15 per cent. of the male group practising oro-genital contact compared with 2 per cent. in the group denying this. The corresponding figures for the women were 16 and 5 per cent. These differences are significant ( $P < 0.001$ ;  $P < 0.01$ ).

TABLE XII *Results of gonococcal cultures from the tonsillar region in 363 men*

Culture	Practising oro-genital contact			Total
	Yes	No	Not recorded	
Positive	15 <sup>a</sup>	5	0	20
Negative	87	252	4	343
Total	102	257	4	363

<sup>a</sup> $P < 0.001$

P = The probability that the difference between the group practising oro-genital contact and the group not doing so is caused by random factors.

TABLE XIII *Results of gonococcal cultures from the tonsillar region in 311 women*

Culture	Practising oro-genital contact			Total
	Yes	No	Not recorded	
Positive	16 <sup>a</sup>	11	0	27
Negative	81	197	6	284
Total	97	208	6	311

<sup>a</sup> $P < 0.01$

P = The probability that the difference between the group practising oro-genital contact and the group not doing so is caused by random factors.

#### *Results of sensitivity tests and treatment*

The sensitivities to penicillin of the gonococci isolated from 389 male specimens and 324 female specimens taken from genital sites are shown in Table XIV. Minimum inhibitory concentrations of  $\geq 0.1$   $\mu\text{g./ml.}$  were found in thirteen male and eight female specimens, which is 3 per cent. of all the specimens tested. The standard treatment was

TABLE XIV Number of positive cultures from genital site and their sensitivity to penicillin

Sex	Minimum inhibitory concentration ( $\mu\text{g./ml.}$ )			Culture positive No sensitivity test	Total
	<0.1	0.1-1.0	>1.0		
Male	367	12	1	9	389
Female	311	8	0	5	324

effective in these cases with the exception of one man (MIC 0.1  $\mu\text{g./ml.}$ ) and one woman (MIC 0.2  $\mu\text{g./ml.}$ ) who were considered to be true treatment failures. The percentage of cures and the reasons for recurrence after standard treatment are given in Table XV. The cure rate with re-infections and defaulters excluded was 98 per cent. Table XVI gives the results of treatment of tonsillar gonorrhoea. The failure rate was 61 per cent. among the 41 patients initially given the standard treatment. Fourteen of the failures were given 2.0 m.u. aqueous benzyl penicillin plus 2.4 m.u. aqueous procaine penicillin in a single injection for two consecutive days. Two patients failed to respond to this treatment and were finally cured with tetracycline 0.5 g. twice daily for one week.

TABLE XV Effect of ampicillin in patients with culture-proven genital gonorrhoea (per cent.)

Sex	Male	Female
No. of cases	389	324
Cure	87	91
Re-infection during follow-up period	3	2
Probable true treatment failure	3	1
Defaulted from follow-up	7	6

TABLE XVI Effect of ampicillin in patients with tonsillar gonorrhoea

Sex	Male	Female	Total
No. treated	16	25	41
Failure rate (per cent.)	50	68	61

Given orally as two doses of 1 g. with a 5-hr interval

## Discussion

In Great Britain the year-by-year variation in the incidence of gonorrhoea, syphilis, and other sexually-transmitted diseases (STD) has been recorded for many years. The statutory venereal diseases, *i.e.* gonorrhoea and syphilis, amount to about a quarter of the total and the other STD make up about half the case load and are considered a major problem in themselves (Department of Health and Social Security, 1971). Statistics on gonorrhoea and syphilis in Sweden have been reported since 1913, but no statistics are available for the other STD. As can be seen from this study, the figures for gonorrhoea and syphilis

during one year (27 per cent. of the patients) and for the other STD (50 per cent.) are very close to those reported from clinics in Great Britain.

*Pediculosis pubis* is usually transmitted by sexual contact and promiscuity is also of importance for the spread of scabies (Rook, Wilkinson, and Ebling, 1972). *Pediculosis pubis* was found in 2 per cent. of the patients and this figure is close to the 2.3 per cent. reported from a venereal disease clinic in the United Kingdom by Fischer and Morton (1970), who found gonococcal infections in 28 per cent. of patients with pediculosis. In this study 29 per cent. of the women but only 5 per cent. of the men with pediculosis also had gonorrhoea. As gonorrhoea was found in 22 per cent. of all the men and 33 per cent. of all the women coming to the clinic, it cannot be said that the diagnosis of pediculosis implies a greater risk for a concomitant gonococcal infection. However, this seems to be the case for the patients coming to the VD Unit with a scabies infestation, as nine out of eighteen men and three out of five women also had gonorrhoea.

Swedish law requires that persons with a diagnosed venereal disease name all sexual partners from whom they may have acquired the disease as well as those they may have infected. This information is submitted to the regional Public Health Officer who, in turn, demands by letter that the named persons present themselves for examination. In most cases, however, this request is brought directly to the partner by the infected person and no letter from the Officer needs to be sent. These epidemiological methods seem to be most effective with women, as in this study 53 per cent. of the women with gonorrhoea came to the clinic in response to a letter or on being told by the partner, and this figure was significantly higher ( $P < 0.001$ ) than the 22 per cent. in the group without gonorrhoea coming to the clinic for the same reasons. *N. gonorrhoeae* was found in 60 per cent. of partners of patients with a gonococcal infection which is exactly the same figure as reported by Hammar and Ljungberg (1972) in an earlier report from this clinic. Symptoms of venereal disease brought 68 per cent. of the men with a gonococcal infection to the clinic, but the same percentage of men with symptoms was found in the non-gonorrhoea group.

During a period of 14 days preceding the first visit to the VD clinic 41 per cent. of the patients had taken salicylates, but in most cases only a few tablets. There was no evidence that the use of anti-inflammatory drugs had any effect on the symptoms of venereal disease. A history of allergic reactions to penicillin was given by 2 per cent. of the patients. Estimates of the frequency of penicillin allergy range from 1 to 10 per cent., with the lower figure probably applying to the general ambulatory population (VanArsdel, 1965). In 1969, in a survey in the

United States, 6.6 per cent. of the patients in venereal disease clinics gave a history of sensitivity to penicillin (Rudolph and Price, 1973).

A disseminated gonococcal infection was found in 0.5 per cent. of all patients with gonorrhoea. In a report from Sweden the incidence was 1.9 per cent. (Barr and Danielsson, 1971). The reason for this difference is not known. Reports from other parts of the country, however, shown an incidence very similar to ours (Møller, 1973).

The incidence of pharyngeal gonococcal infections has been rising in Uppsala. In 1971 pharyngeal infections were found in 4 per cent. of men and 6 per cent. of women (Wallin and Öhman, 1972). In this study the corresponding figures were 6 and 9 per cent. In a recent report from Denmark (Bro-Jørgensen and Jensen, 1973) gonococcal pharyngeal infections occurred in 7 per cent. of the heterosexual men and in 10 per cent. of the women. Our results may have been influenced by the fact that only one cultural test for gonococci in the pharynx was performed. In the Danish report it was concluded that 'a single negative culture from the pharynx does not exclude the existence of a pharyngeal gonococcal infection' and in 22 per cent. the gonococci were first detected after preceding negative cultures. We also studied the risk of contracting pharyngeal gonorrhoea by oro-genital contact with a partner having a gonococcal infection or suspected of having one. Thus 15 per cent. of the men and 16 per cent. of the women admitting oro-genital contact had acquired a pharyngeal gonococcal infection, and in the group denying such contact *N. gonorrhoeae* was found in the tonsillar region in 2 per cent. of the men and 5 per cent. of the women. These figures are nearly the same as those found in Denmark, with the exception of their higher risk for women (31 per cent.). In an American study (Wiesner, Tronca, Bonin, Pedersen, and Holmes, 1973) 20 per cent. of the women and of the homosexual men who were practising fellatio were found to have *N. gonorrhoeae* in the pharynx, and in the group denying this practice the figure was 3 per cent.

In our study, as in the other studies mentioned, some of the patients with pharyngeal gonorrhoea denied oro-genital contact. The route of infection in these cases has been discussed (Bro-Jørgensen and Jensen, 1973). We did not find even a suspected case of mouth-to-mouth infection, but in some cases the gonococci might have been transmitted from the genital region to the pharynx by contaminated fingers. We also had the impression that a few of our female patients were not frank in their reply regarding the practice of fellatio.

Prophylactic treatment has been tried in an attempt to prevent venereal diseases. Antibiotics have been given to specific groups at risk such as homosexual men (Smart, 1972). We tried to define high-risk

groups among our patients by asking them not only about earlier gonococcal infections at any time, but also about infections during the previous 12 months. We thought that patients with many infections during a short period of time would constitute a suitable group for the study of prophylactic treatment. However, very few such patients were found, as only 2 per cent. of the men and 1 per cent. of the women had had more than one gonococcal infection during the preceding year.

In a report from Sweden (Molin, 1970), the frequency of gonococcal strains with decreased penicillin sensitivity was found to be 12 per cent. Our corresponding figure was only 3 per cent. This difference could in part be explained by the fact that the higher figure was found in Stockholm, a big city and a sea-port, with a large transient population. Many infections were probably imported from countries with altered resistance patterns. As a result of our favourable situation, we had no problems in treating the patients with genital infections in whom the cure rate was 98 per cent. However, as reported by other authors (Bro-Jørgensen and Jensen, 1973; Ødegaard and Gundersen, 1973; Stolz and Schuller, 1974), standard treatment was unsuccessful in pharyngeal infections in which the failure rate was 61 per cent. Promising results were obtained with high doses of penicillin intramuscularly for 2 days.

### Summary

During 1972 a total of 2,090 men and 1,489 women were seen in the VD clinic in Uppsala, Sweden. The most frequent diagnosis among the men was non-gonococcal urethritis (38 per cent.) and among the women non-gonococcal vaginitis (34 per cent.). *N. gonorrhoeae* was found in 22 per cent. of the men and in 33 per cent. of the women. 68 per cent. of the men with gonorrhoea attended because of symptoms, but 67 per cent. of the men without gonococcal infections came for the same reason. 39 per cent. of the women with gonorrhoea attended after being told by their sexual partner; it was found that women coming because of symptoms were most likely to have non-gonococcal infection. Gonorrhoea without subjective symptoms was found in 23 per cent. of the men and 50 per cent. of the women. Gonorrhoea was found in association with scabies in 9 out of 18 men and in 3 out of 5 women. A rising incidence of pharyngeal gonococcal infections has been noticed at the clinic and the figures for 1972 were 6 per cent. of the men and 9 per cent. of the women with gonorrhoea. The route of infection was usually oro-genital contact, but in some cases other routes had to be considered. It was not possible to define a promiscuous group of patients suitable for a planned study of prophylactic treatment, as only

2 per cent. of the men and 1 per cent. of the women had had more than one gonococcal infection during the preceding year. The standard treatment for genital gonorrhoea (ampicillin 2 × 1 g. orally with a 5-hour interval) was very satisfactory and gave a 98 per cent. cure rate. This was possible because there were few gonococcal strains with decreased penicillin sensitivity. There were considerable problems in treating the pharyngeal infections, the standard treatment failing in 61 per cent.

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