

# VENEREAL DISEASE IN THE UNITED STATES<sup>1</sup>

## International Travelling Seminar Sponsored by WHO and the International Union against the Venereal Diseases and the Treponematoses (IUVDT)<sup>2</sup>

*The Second International Travelling Seminar to study VD problems and control methods in the United States was held during October and November 1971. Participants from many different countries visited 20 U.S. cities in order to observe the situation there and to exchange information. The following pages, extracted from the report of the seminar,<sup>2</sup> provide a summary review of the overall situation, an account of U.S. research activities in this field, and a number of recommendations for future action.*

### I. NATURE AND EXTENT OF THE PROBLEM

#### Syphilis

##### *National Statistics*

The number of cases of syphilis now reported in the United States of America exceeds that of any other reportable communicable disease except gonorrhoea, scarlet fever, and streptococcal sore throat, being equivalent to the combined total of tuberculosis, measles, whooping cough, and rheumatic fever (I). (See Table 1.)

*Early infectious syphilis.* In 1950, 32,148 cases of *primary and secondary syphilis* were reported (21.6 per 100,000), compared with the peak of 106,539 cases (75.6 per 100,000) in 1947 (2). This decline continued to a low point of 6,251 cases (3.8 per 100,000) by 1957. During the next eight years the trend was reversed, and there was a progressive annual rise

in incidence to 12.3 per 100,000 in 1965, which was checked by a less marked but progressive decline for four successive years to 9.3 per 100,000 (18,679 cases) in 1969. Since then, however, it has been noted that there was a further increase to 20,186 cases in 1970 (10.0 per 100,000) and to 23,334 cases (11.5 per 100,000) in 1971 (see Figure 1). The case rate for primary and secondary syphilis in the military in 1969 was 23.3 per 100,000 (3).

The incidence of *early latent syphilis* also increased from 7.7 per 100,000 (15,399 cases) in 1969 to 8.8 per 100,000 (17,843 cases) in 1971, having previously declined more or less steadily from 43.5 per 100,000 (64,786 cases) in 1950 and from an earlier peak of 116.0 per 100,000 (149,390 cases) in 1943.

*Late and late latent syphilis.* The incidence of late and late latent syphilis fell continuously from 195.7 per 100,000 (251,958 cases) in 1943 and 75.5 (112,424 cases) in 1950 to 24.6 (49,537 cases) in 1970. There had been a slight rise, however, to 24.8 per 100,000 (50,429 cases) in 1971.

*Congenital syphilis.* The incidence of congenital syphilis decreased, virtually without interruption, from 13.4 per 100,000 (17,600 cases) in 1941 and 9.0 (13,446 cases) in 1950 to 0.9 (1,903 cases) in 1970.

<sup>1</sup>Also appearing in Spanish in *Boletín de la Oficina Sanitaria Panamericana*.

<sup>2</sup>Extracted from *Report of the Travelling Seminar on Venereal Disease in the United States of America*, Washington, D.C., Pan American Health Organization, 1974, pp. 4-11 and 33-44. (PAHO Scientific Publication 280.)

TABLE 1--Venereal disease statistics in the United States of America: Cases of syphilis and gonorrhea and rates per 100,000 population reported by state health departments, fiscal years 1950-1971.

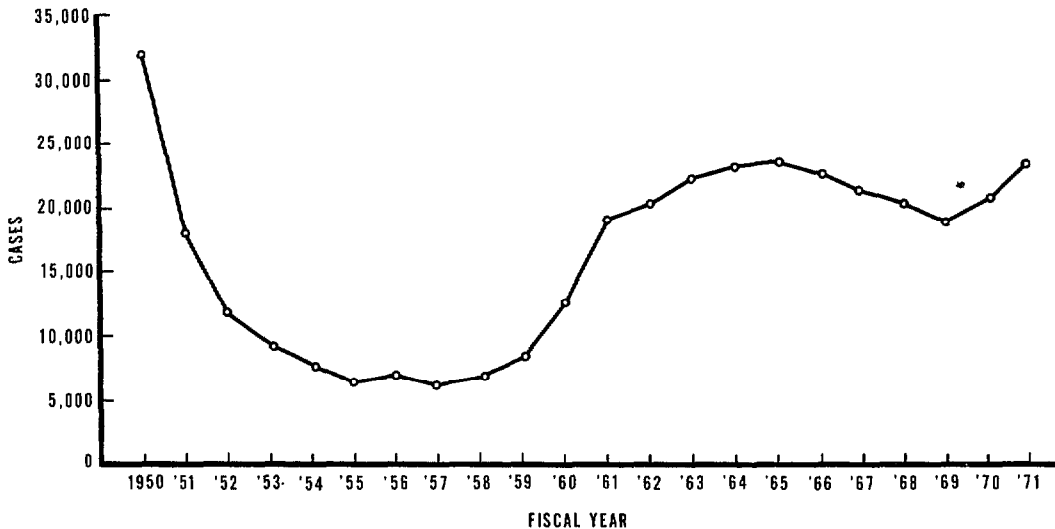
Fiscal Year	Primary and Secondary Syphilis		Early Latent Syphilis		Late and Late Latent Syphilis		Total Syphilis*		Gonorrhea		Total Infectious VD (P&S Syphilis and Gonorrhea)		Total VD (Syphilis** All Stages and Gonorrhea)	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
1950	32,148	21.6	64,786	43.5	112,424	75.5	229,723	154.2	303,922	204.0	336,070	225.6	533,645	358.2
1951	18,211	12.1	52,309	34.7	107,133	71.1	198,640	131.8	270,459	179.5	288,670	191.6	469,099	311.3
1952	11,991	7.9	38,365	25.2	101,920	66.9	168,734	110.8	245,633	161.3	257,624	169.2	414,367	272.1
1953	9,551	6.2	32,287	20.8	100,195	64.7	156,099	100.8	243,857	157.4	253,408	163.6	399,956	258.2
1954	7,688	4.9	24,999	15.9	93,601	59.4	137,876	87.5	239,661	152.0	247,349	156.9	377,537	239.5
1955	6,516	4.1	21,553	13.4	84,741	52.7	122,075	76.0	239,787	149.2	246,303	153.3	361,862	225.2
1956	6,757	4.1	20,014	12.2	89,851	54.8	126,219	77.1	233,333	142.4	240,090	146.5	359,552	219.5
1957	6,251	3.8	19,046	11.4	96,856	58.1	130,552	78.3	216,476	129.8	222,727	133.6	347,028	208.1
1958	6,661	3.9	16,698	9.8	85,974	50.5	116,630	68.5	220,191	129.3	226,852	133.2	336,821	197.8
1959	8,178	4.7	17,592	10.2	86,776	50.1	119,981	69.3	237,318	137.0	245,496	141.7	357,299	206.3
1960	12,471	7.1	16,829	9.5	84,195	47.6	120,249	68.0	246,697	139.6	259,168	146.7	366,946	207.6
1961	18,781	10.4	19,146	10.7	80,942	45.0	125,262	69.7	265,685	147.8	284,466	158.2	390,947	217.5
1962	20,084	11.0	19,924	10.9	78,264	42.9	124,188	68.1	260,468	142.8	280,552	153.8	384,656	210.9
1963	22,045	11.9	18,683	10.1	81,736	44.1	128,450	69.1	270,076	145.7	292,121	157.6	398,526	215.0
1964	22,733	12.1	18,104	9.6	72,184	38.4	118,247	62.9	290,603	154.5	313,336	166.6	408,850	217.4
1965	23,250	12.3	17,315	9.1	67,633	35.7	113,018	59.7	310,155	163.8	333,405	176.1	423,173	223.5
1966	22,473	11.6	16,974	8.8	66,149	34.3	110,128	57.1	334,949	173.6	357,422	185.2	445,077	230.7
1967	21,090	10.8	15,618	8.0	62,653	32.2	103,546	53.2	375,606	193.0	396,696	203.8	479,152	246.2
1968	20,182	10.3	15,379	7.8	58,905	29.9	98,195	49.9	431,380	219.2	451,562	229.5	529,575	269.1
1969	18,679	9.3	15,399	7.7	59,262	29.5	96,679	48.1	494,227	245.9	512,906	255.2	590,906	294.0
1970	20,186	10.0	15,425	7.7	49,537	24.6	87,934	43.8	573,200	285.2	593,386	295.2	661,134	329.0
1971	23,334	11.5	17,843	8.8	50,429	24.8	94,383	46.5	624,371	307.5	647,707	319.0	718,754	354.0

\*Includes congenital and other syphilis

\*\*Excludes chancroid, granuloma inguinale, and lymphogranuloma venereum

Source: U.S. Public Health Service

FIGURE 1—Primary and secondary syphilis, reported cases, United States, 1950-1971.



### Local Statistics

In 1970 the lowest case rates, 0.4-1.0 per 100,000, were reported from the States of Montana, Vermont, Idaho, and New Hampshire, while eight other States showed an incidence of less than 2.0 per 100,000. Highest rates, 20.0-27.9 per 100,000, were encountered in Louisiana, New Mexico, Florida, Texas, Nevada, and Georgia (see Figure 2).

In 1969 the mean rates for primary and secondary syphilis were 19.6 per 100,000 in cities with a population exceeding 200,000, 9.8 in those with a population of 50,000 to 200,000, and 4.3 in smaller towns and rural areas (4).

### Economic Consequences of Syphilis

There have been large-scale reductions in the late manifestations of syphilis and consequently in reported fatalities due to cardiovascular syphilis and other complications. These have declined from 14,064 deaths in 1940 and 7,568 in 1950 to 2,381 in 1967, a reduction of 83 per cent in 27 years (2). During the same period, reported infant deaths due to syphilis declined

by 99 per cent from 1,251 in 1940 and 201 in 1950 to only 15 in 1967.

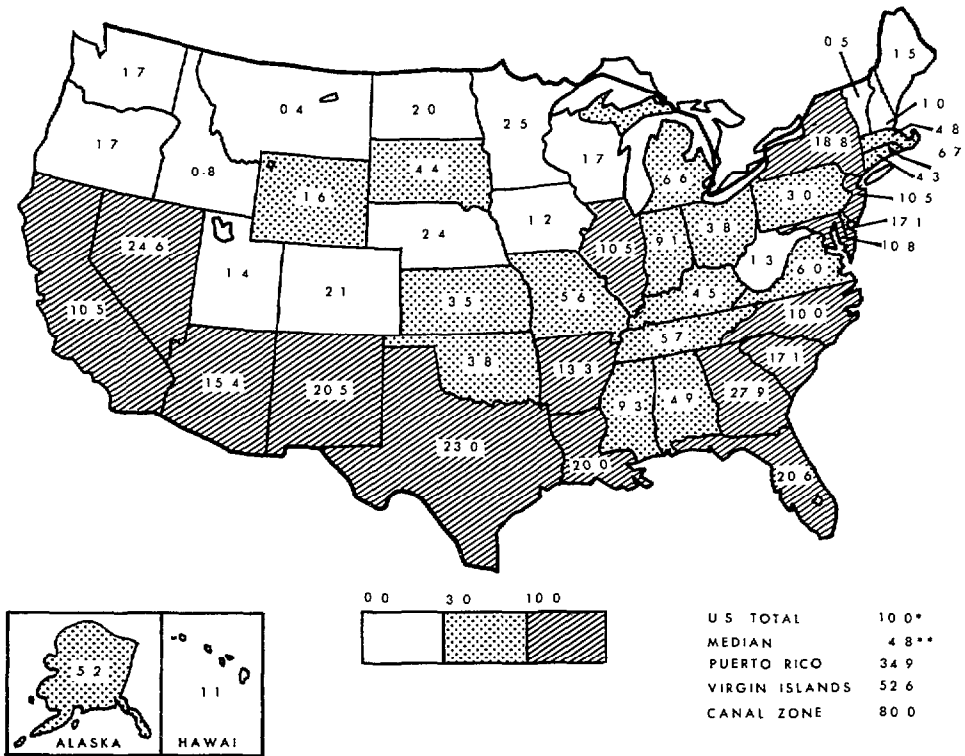
Although the number of new admissions to mental hospitals for syphilitic psychoses has fallen by 98 per cent (from 7,694 cases in 1940 and 3,751 in 1950 to 154 in 1968), owing to inflation the cost of providing institutional treatment for the syphilitic insane in 1968 (the most recent year for which information is available) was \$41 million for the 9,626 resident patients whose disease was acquired in earlier years. In addition, in 1971 some \$4.4 million was paid as compensation for the syphilitic blind.

### Gonorrhea

#### National Statistics

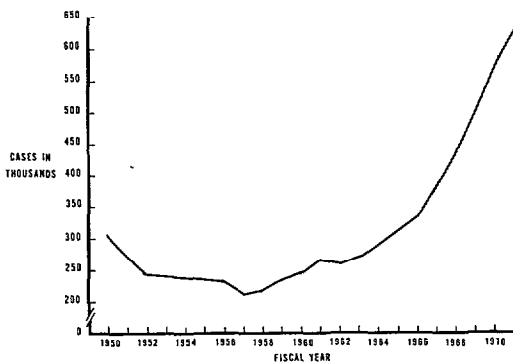
The incidence per 100,000 of the reported cases of gonorrhea, which had declined from 284.2 (400,639 cases) in 1947 to 204.0 (303,922 cases) by 1950, continued to fall until a low point of 129.3 per 100,000 (220,191 cases) was reached in 1958 (see Figure 3). Subsequently, however, apart from a small drop in 1962-1963, there had since been an annual

FIGURE 2—Primary and secondary syphilis case rates per 100,000 population, fiscal year 1970.



\*U.S. TOTAL INCLUDES DISTRICT OF COLUMBIA  
 \*\*EXCLUDES PUERTO RICO, VIRGIN ISLANDS, AND CANAL ZONE

FIGURE 3—Gonorrhea in the United States, reported cases, 1950-1971.



rise in incidence to 285.2 per 100,000 (573,200 cases) in 1970 and yet further to 307.5 per 100,000 (624,371 cases) in 1971. For the past

two years the immediate postwar peak in incidence has been exceeded, and gonorrhea is now the commonest communicable disease in the United States after the common cold.

It has, however, been pointed out that although the incidence of reported cases was still mounting, the annual increase in the incidence rate, which had averaged 8.9 per cent each year between 1962-1968, rose more steeply to 12.2 per cent in 1968-1969 and to nearly 16 per cent in 1969-1970, but decreased to 7.8 per cent in 1970-1971. The gonorrhea case rate for the military in 1969 was 1,481.1 per 100,000 (3).

*Local Statistics*

The lowest gonorrhea rates in 1970 (64.1-84.1 per 100,000 population) were noted

in New Hampshire, North Dakota, Wyoming, Montana, and Utah, and the highest (434.3-888.0 per 100,000) in South Carolina, Illinois, Georgia, California, and Alaska. In all but four States (Delaware, North Dakota, Rhode Island, and Utah) there was an increase in numbers over those for the previous year (see Figure 4).

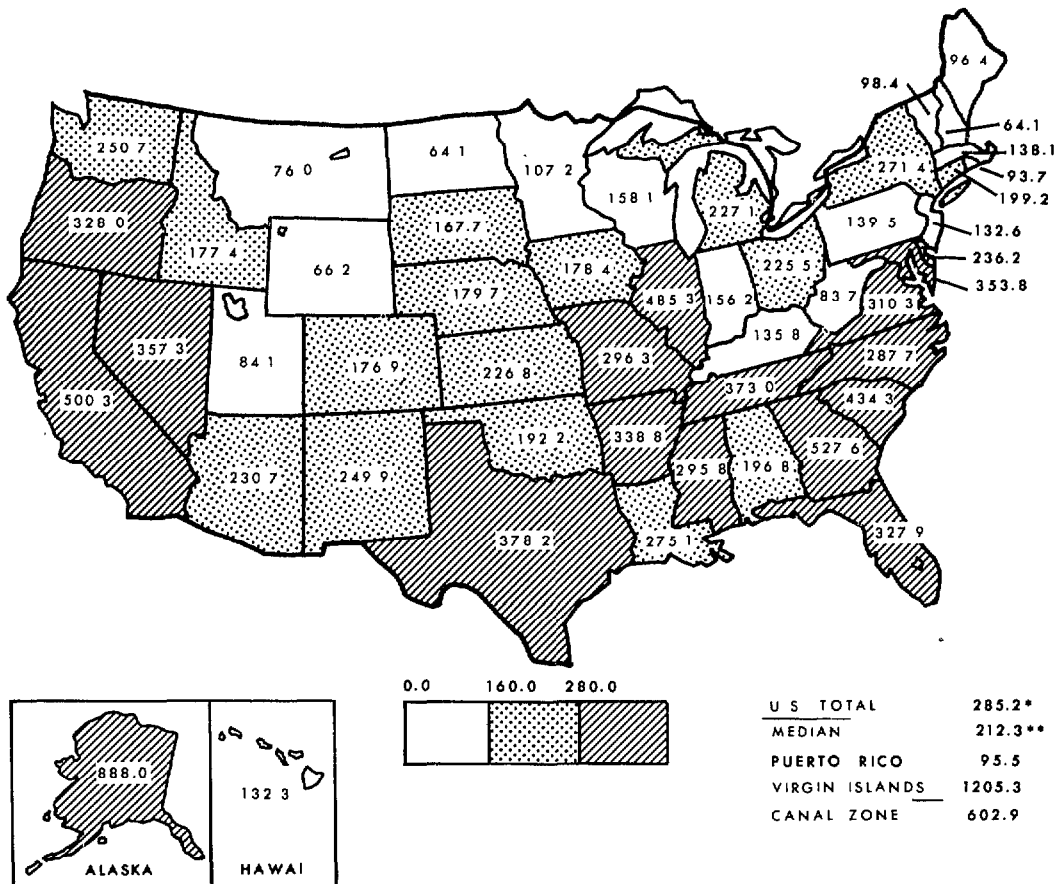
The rates were highest (610.3 per 100,000) in cities of over 200,000 population; were intermediate (289.4 per 100,000) in cities with a population of 50,000-200,000 inhabitants; and were lowest (84.6 per 100,000) in the remainder of the United States (5).

*Economic Importance of Gonorrhea*

No data are available concerning the economic importance of gonorrhea. Although complications are estimated to occur in 1-2 per cent of the cases, such information is less easy to obtain for this disease than for syphilis.

It was noted that a study is underway in Memphis, Tennessee (6), of the cost to the community of gonococcal complications in terms of death, pelvic inflammatory disease with incapacitating pain, sterility, ectopic pregnancy, arthritis, and blindness.

FIGURE 4—Gonorrhea case rates per 100,000 population, fiscal year 1970.



\*U S. TOTAL INCLUDES DISTRICT OF COLUMBIA

\*\*EXCLUDES PUERTO RICO, VIRGIN ISLANDS, AND CANAL ZONE

### Other Venereal Diseases<sup>3</sup>

In 1970, 1,189 cases of *chancroid* were reported, compared with 5,796 in 1950 and 8,354 in 1943. The recent figure was the highest since 1964.

There were also 587 reported cases of *lymphogranuloma venereum*, compared with 1,635 in 1950 and 2,858 in 1944, and this was the highest annual figure since 1966.

The number of cases of *granuloma inguinale* reported in 1970 was 168, compared with 2,017 in 1950 and 2,611 the previous year. The last figure, with one exception, was the highest total in any one year since 1963.

Cases of *nongonococcal urethritis* and other sexually transmitted diseases are not reported for statistical purposes (see Table 2).

### Actual Prevalence of Syphilis and Gonorrhea in the United States

The reported figures are from civilian

<sup>3</sup>In addition to syphilis and gonorrhea, only chancroid, *lymphogranuloma venereum*, and *granuloma inguinale* are classified as venereal diseases, and budgets and appropriations are allocated only for these five.

sources only. As more than four-fifths of the cases of syphilis and gonorrhea seen by private physicians are not reported (7) and the data do not include the military, they do not reveal the true picture. It is estimated that the actual occurrence of new syphilis is about 75,000 cases annually, with an estimated prevalence of untreated cases exceeding half a million (4), while the annual number of cases of gonorrhea is probably around two-and-a-half million (8). The prevalence of all of the sexually transmitted diseases, including nongonococcal urethritis and others not reported, must be several times this figure.

### Characteristics of Patients with Venereal Disease

#### Sex

The cases of all forms of syphilis are fairly evenly spread between the sexes, but almost twice as many cases of *primary and secondary syphilis* are reported in males as in females due to the early lesions being less apparent in the female and to the high incidence among homosexual men. Serologic surveys indicate almost equal rates of infection in the two sexes. The

TABLE 2—Sexually transmitted diseases affecting man.

Organism	Disease
Spirochetes: <i>T. pallidum</i>	Syphilis
Bacteria: <i>Gonococcus</i> <i>H. ducreyi</i> <i>Donovania</i>	Gonorrhea Chancroid Granuloma inguinale
Virus: <i>Chlamydia</i>	Non-gonococcal urethritis Lymphogranuloma venereum
Other viruses	Herpes simplex Molluscum contagiosum Condylomata acuminata
Protozoa: <i>T. vaginalis</i>	Trichomoniasis
Fungi: <i>C. albicans</i> Epidermophyton inguinale	Candidiasis Tinea cruris
Parasites: <i>Acarus scabei</i> <i>Phthirus pubis</i>	Scabies Pediculosis

male:female ratio for reported *gonorrhoea* in 1970 was 2.8:1 (421,135 males and 152,065 females), indicating a considerable undetected reservoir in the female sex.

### Age

The age incidence rates per 100,000 for *primary and secondary syphilis* in 1969 were 18.9 for those aged 15-19, 36.1 for those of 20-24 years, and 29.2 for those aged 25-29 years. Teenagers accounted for 18 per cent of reported cases and those aged 15-24 years for 46 per cent. Eighty-seven per cent of reported cases were in persons 14-39 years of age (4).

The incidence rates for *gonorrhoea* were highest in those of 20-24 years in both sexes, and those 15-24 years of age accounted for 59.3 per cent of infections in males and 72.7 per cent of infections in females (see Table 3).

### Race

Whether by reported cases or those detected by routine screening, the rates of venereal disease are higher among minority groups. Routine serum tests for syphilis have shown the disease to be nine times more common in nonwhite than in white persons (9), with consequently substantially higher death rates and infant mortality rates due to syphilis in the former group (2). Also, the reported gonorrhoea

rates in 1969 and 1970 were 14 times higher in nonwhite persons.

It is considered that racial differences based on reported cases may be less marked than at first appears, as most studies have a bias toward young, single, nonwhite persons using public facilities, while the majority of cases treated by private practitioners are unreported or selectively reported.

### Social Class

The same objections regarding utilization of public facilities apply to data on social class. A survey of social class of patients with infectious syphilis (10) indicated 0.6 per cent to be of Class I (which comprises 2.0 per cent of the population), 2.0 per cent to be of Class II (10.0 per cent of the population), 7.3 per cent of Class III (22.0 per cent of the population), 37.6 per cent of Class IV (46.0 per cent of the population), and 52.5 per cent of Class V (20.0 per cent of the population).

However, among 23,000 females routinely screened for gonorrhoea over a one and one-half year period in Seattle, Washington, the overall positivity for women residing in low socio-economic areas was 19.2 per cent, in medium areas 7.3 per cent, and in the more opulent areas 6.9 per cent. As patients attending public facilities might not be considered representative, a survey was made of 7,800 women

TABLE 3—Reported cases of gonorrhoea by age groups, 1969.

Age (years)	Male			Female		
	Cases	Percentage	Rate per 100,000	Cases	Percentage	Rate per 100,000
0-14	2,283	0.6	7.6	3,970	2.8	13.6
15-19	80,433	20.3	895.8	48,638	34.8	532.4
20-24	154,260	39.0	2,366.0	52,961	38.0	649.5
25-29	82,642	20.9	1,335.7	19,615	14.1	293.2
30-39	54,837	13.9	520.0	10,755	7.7	94.4
40-49	15,729	4.0	135.2	2,575	1.8	20.6
50+	5,091	1.3	22.9	1,083	0.8	4.1
Total	395,275	100.0	410.5	139,597	100.0	135.0

attending private physicians where a similar pattern was noted, although the overall rates were lower (6.7, 2.0, and 1.1, respectively).

Nevertheless, members of the seminar were given abundant evidence to indicate that all social groups were involved in the current epidemic of venereal disease.

## Social Problems

### *Changing Patterns of Sexual Behavior*

It was generally agreed that there has been a change in the pattern of sexual behavior during the past decade, especially among young people. They are starting to have sexual intercourse at a younger age than formerly, and premarital sexual experience is now normal in most areas. The contraceptive pill is used by an increasing number of women and provides no protection against the spread of infection. Greater mobility of people in modern society produces increased opportunities for promiscuous sexual intercourse. It is probable that these and other social factors will result in a further increase in the incidence of all the sexually transmitted diseases in the future, and these therefore merit special study (11).

### *Homosexuals*

Homosexual men are contributing an increasing number of cases of sexually transmitted diseases each year, especially syphilis and gonorrhea.<sup>4, 5</sup> They tend to be very promiscuous, and the very casual nature of their relationships produces difficulties in contact tracing and epidemiologic control. Some research into homosexuality is currently being undertaken by behavioral scientists throughout

<sup>4</sup>It has been estimated that about 4 per cent of adult males are predominantly homosexual, but, including those who have occasional homosexual contact, at least 30 million people are involved. (P. H. Gebhard; paper presented at International Venereal Disease Symposium, St. Louis, Mo., May, 1971.)

<sup>5</sup>In some cities the main sources of infection were stated to be Turkish and sauna baths.

the United States, including the military (12, 13).

### *Drug Dependence*

Drug dependence is becoming more common in the United States, possibly associated with prostitution to earn more money to pay for drugs. Drug takers may contribute to the spread of venereal diseases, although no accurate figures are available on this point. An active organized program against drug abuse, involving the maintenance of an information center, the formation of community groups, and pilot studies of the problem in cosponsorship with the American Association against Drug Addiction, is being conducted by the American Social Health Association (14).

### *Other Social Problems*

Patients attending clinics for venereal diseases frequently have social problems, such as unwanted pregnancies and difficulties with housing, work, and finance. There may be psychiatric or personal difficulties, such as depression, anxiety, or loneliness. The facilities available to deal with these considerable problems in a developing industrial society were few, nor were social workers attached to the clinics.

## II. RESEARCH ASPECTS

### *Introduction*

The vast majority of research being carried out in the United States continues to be centralized at the Venereal Disease Research Laboratory (VDRL) of the Center for Disease Control, Atlanta, where there are both treponematoses and neisseria research units (15). The former also administers a primate center at nearby Chamblee. All research at VDRL is goal-oriented.

Some other centers currently concerned



with basic treponemal research are in Houston (Texas), Baltimore (Maryland) (where the World Health Organization Treponematoses Laboratory is located), Miami (Florida), Blacksburg (Virginia), and Los Angeles (California); other centers currently concerned with gonorrhoea research are located in New York City, Seattle (Washington), and Chapel Hill (North Carolina).

## Treponemal Research

### Orientation

The ultimate objective of treponemal research is the development of a safe and effective syphilis vaccine, with the subgoal of the in vitro cultivation of *T. pallidum*, which would provide greater quantities of antigen for testing purposes than can be obtained at present.

A second goal is to develop an early-warning specific serologic test capable of detecting the disease during the incubation period (16). Research toward both of these ends involves intimate morphological, biochemical, antigenic, and virulence studies of *T. pallidum* and associated organisms.

### Programs of Treponemal Research

These include:

- studies of the ultimate structure of *T. pallidum* by electron microscopy (17, 18, 22);
- studies of the biochemistry and immunochemistry of treponemes (19-22), including such methods as the fractionation and radioactive labelling of treponemal antigens. Unlabelled antibody enzyme methods are also used;
- studies of cultivable treponemes (23-25);
- attempts at the in vitro growth of *T. pallidum* on artificial media, including tissue culture;<sup>6</sup>

<sup>6</sup>By A. W. Hanson. See Wilcox, R. R. (1971), WHO document VDT/RES/71.244. It was understood that this method had so far proved less successful than was first hoped.

- an immunization program in rabbits, using as a vaccine fractionated (26, 27) and irradiated Nichols pathogenic strains of *T. pallidum* (28). Some success has been obtained in Los Angeles using multiple intravenous injections of the latter (29);

- studies of *T. carateum*, the organism of pinta, which has been successfully transferred to chimpanzees at Atlanta (30), and cross-immunity investigations of this organism with those of other treponematoses;<sup>7</sup>

- studies of immunoglobulins reactive with *T. pallidum* arising in the course of syphilitic infection in man (31, 32), animals (33), and in normal humans (34);

- investigations into the phenomenon of spiral organisms found in the aqueous humor, cerebrospinal fluid, lymph nodes, and other sites of untreated and treated syphilitic patients and animals (35-39). These investigations have been enhanced by the development of techniques which enable treponemes to be separated from tissue debris (40). In addition to those with syphilis, clinical studies have been made of patients with yaws and pinta (41).

The basic research currently being undertaken on *T. pallidum* is essential if knowledge of this organism is to be improved, and will be necessary if the ultimate aim of producing an effective and safe vaccine is to be attained. Of more immediate reward is the development of serologic tests which will give an earlier and more reliable diagnosis of syphilis, especially if these tests can be automated.

## Neisseria Research

### Serologic Test for Gonorrhoea

At the VDRL in Atlanta, where the most varied high-quality research has been carried out, the first priority is considered to be the development of a blood screening test for gonorrhoea useful in detecting the asymptomatic

<sup>7</sup>From previous human experiments it was expected that infection with *T. carateum* would provide immunity against syphilis. It was understood that recent work had shown this might not be the case.

disease, particularly in the female, without the necessity in the first place of genital examination.

Following the discovery at the VDRL that colonial morphologic types could be related to virulence (42), and the introduction of the pressure press for exploding bacteria, whereby cell wall and protoplasmic antigens could be separated from virulent gonococci (43), a number of serologic procedures have been carried out in Atlanta and elsewhere using different techniques, including precipitin (44, 45), complement-fixation (46-48), flocculation (49, 50) immunofluorescence, and hemagglutination (51, 52) tests. Some of these have been automated (48, 53).

At present better results are obtained in females than in males with these tests, and there are up to 12 per cent or more of apparent false-positive readings. Positive findings are also observed in those who have had previous disease.

#### *Immunologic Research*

Hitherto, hopes for a vaccine against gonorrhea, in view of the lack of immunity following multiple natural infections, have not been high, but a reappraisal has appeared justified in view of some recent reported success against the meningococcus following the large-scale isolation, fractionation, and definition of highly purified immunogenic polysaccharides (54, 55). This has stimulated further work on the endotoxins and antigenic constituents of the gonococcus and attempts at liquid culture of the organisms; radioimmune assays of gonococcal antibodies are also being made (56). Studies are being undertaken of other aspects of immunity, including cell-mediated immunity, local antibodies, and the possibility of inducing a local immunity (16).

#### *Monitoring the Sensitivity of the Gonococcus to Penicillin and Other Antibiotics*

The monitoring of the sensitivities of the

gonococcus to antibiotics, which used to be done annually at CDC (57), is now undertaken every two years. In these studies, variations in sensitivity patterns have been noted in different areas of the United States, resistance to penicillin apparently being greater, for example, in San Francisco than in Philadelphia. Among treatment failures, the minimum inhibitory concentration (MIC) range as regards penicillin has been 0.003-1.32  $\mu\text{g}/\text{ml}$  (micrograms) (88), although one strain with a MIC of 3.5  $\mu\text{g}/\text{ml}$  has been recently isolated at Atlanta (58). In the most recent assessment it was found that the continuing adverse trend towards increasing resistance had been checked among routine strains (59, 60). Research into the genetic and other mechanisms involved in antibiotic resistance was being performed at Chapel Hill, North Carolina (61).

#### *Other Developments*

Of considerable interest is the report of the presence of pilae found on the gonococcus in electron microscope studies (62). Studies are being made as to the association of this phenomenon with virulence and of the possible use of these structures as antigens (16).

Recently an experimental model has been established and a chimpanzee has been infected with the gonococcus (63), but there is a need for a less expensive animal. Work has also been undertaken in human volunteers.

Clinical cases of gonococcal bacteremia are now being recognized in the United States (64) and reports of pharyngeal infections with the gonococcus have also appeared (65). By and large, there is a welcome revival of interest in epidemiologic (66), clinical, and bacteriologic gonorrhea research (67).

#### *Research Into Other Sexually Transmitted Diseases*

Although very little research into the other sexually transmitted diseases has been taking place in the clinics and laboratories visited,

except in a few isolated areas (e.g., investigations into *Haemophilus vaginalis* at Atlanta) (68), some research was known to have been undertaken in a number of university and other centers.

For example, some histologic and ultrastructural research has been conducted on *Granuloma inguinale* at Miami (69) and on the causative agent of *lymphogranuloma venereum* in San Francisco (70).

Sexual transmission of the *mycoplasmas* has been investigated, among other centers, at the Harvard Medical School (71), the Baylor University Center (72), the University of Pennsylvania School of Medicine in Philadelphia (73), the University of Washington in Seattle (74), and the University of Michigan (75).

*Chlamydia* have been investigated in animal experiments (76) and in patients—at centers which include those at Hamilton, Montana, and Bethesda, Maryland (77)—and in patients with Reiter's syndrome (78).

*Herpesvirus hominis* (type II) is being studied antigenically, clinically, and epidemiologically, especially in relation to cervical cancer, in a number of institutions, including Emory University at Atlanta (Georgia) (79), at Houston (Texas) (80), at The Johns Hopkins University School of Medicine, Baltimore (Maryland) (81), at Cleveland (Ohio) (82), and at the University of Washington. Studies of *cytomegalovirus* in the cervix of pregnant females have also been made (74), and clinical and therapeutic research has been undertaken on *Behcet's disease* (83, 84).

Participants felt that much of this research into the sexually transmitted and associated diseases other than syphilis and gonorrhea not only deserved greater support but also should be identified more closely with the venereal disease program. Once treatment for these diseases was given in the clinics, and the clinics were attached to university and other hospitals, there would already be available a firm nucleus of research potential.

#### Prophylaxis Research

Research is being carried out to find a

compound which, when used intravaginally, might prevent the transmission of syphilis and gonorrhea as well as acting as a contraceptive (85, 86) (although it has been considered doubtful that such a compound could protect the female external genitalia from infection with syphilis). A number of commercially available genital toilet preparations are currently being tested (85). Other prophylactic research concerns condom utilization (87) and chemoprophylaxis with orally administered antibiotics.<sup>8</sup>

#### Behavioral Studies

A considerable amount of research work on homosexuality is being carried out at the Institute for Sex Research at Bloomington, Indiana, and at the Reproductive Biology Research Foundation at St. Louis, Missouri. Other research into the patterns of sexual behavior is also taking place at these centers and elsewhere. There is a need for behavioral scientists to study attitudes and behavior, particularly among high-risk groups, indicating how the venereal diseases are regarded as a problem, why persons expose themselves unnecessarily to infection, the acceptance or otherwise of prophylactic measures against both venereal disease and pregnancy, and how far such attitudes or behavior may be capable of modification.

### III. DISCUSSION

#### Extent of the Problem

Although accurate figures of incidence are not available because of the failure of reporting by private physicians, there has been a very great rise in the number of reported cases of gonorrhea throughout the country and a lesser rise of primary and secondary syphilis. Gonorrhea is now the commonest communicable disease in the United States after the

<sup>8</sup>In Los Angeles (W. H. Smartt).

common cold, and its incidence is still rising. No information is available about the prevalence of the other sexually transmitted diseases, including nongonococcal urethritis, but it is probable that their incidence is even higher than that of gonorrhea. This situation, certainly as regarding gonorrhea and nongonococcal urethritis, is common to the other countries from which the international participants of the seminar were drawn.

It is obvious that the present measures are failing to control the incidence of the sexually transmitted diseases in the United States, and a serious situation is developing. Social and medical factors, not only in the United States but throughout the world, have led to the rising incidence of these diseases. These factors are likely to continue to be of significance in the foreseeable future. A further rise in the prevalence of these conditions must therefore be anticipated.

### Legislation

Members of the teams noted that, although under individual State laws the nominal notification of patients diagnosed as suffering from venereal diseases remains mandatory, only a small minority of cases treated by practicing physicians are in fact reported.

As a direct consequence, contact tracing is probably not being carried out on a majority of cases of contagious venereal disease. This causes a serious defect in epidemiologic control.

It was suggested by some participants that many private practitioners might cooperate much better in regard to nominal notification if such cases could be notified to a specialist in venereal and sexually transmitted diseases for appropriate contact investigation, rather than to the public health department as the laws currently demand.

Laws passed in the majority of States permitting the examination and treatment of young persons without the knowledge of parent(s) or guardian facilitate disease control in this group. Discriminatory laws of a few States making illegal any homosexual associa-

tion, even between consenting adults, could discourage such patients from telling the truth about their sexual contacts.

### Undergraduate Medical Education

It was quickly apparent to the members of the seminar that, in the institutions visited, undergraduate medical education about the sexually transmitted diseases was inadequate and frequently nonexistent. This was often because of lack of interest by both teachers and students in the subject, absence of facilities for diagnosis and treatment at teaching hospitals, and the increasing popularity of elective periods in the majority of universities. If undergraduate medical students are not exposed to the problems of venereology and have no academic or clinical instruction in the subject, it is unlikely that when qualified they will show any interest in the patients infected with these conditions or will be competent to diagnose, treat, and manage the increasing number of people with venereal diseases who attend private physicians and hospitals. Moreover, it is improbable that good physicians will be attracted to work in the clinics while the subject is neglected and lacks any status in teaching hospitals. It is something of a paradox that in the majority of university medical schools in the country there is virtually no teaching about the commonest notifiable communicable disease in the United States at the present time, namely gonorrhea.

It is fundamental to ensure that all medical schools provide satisfactory education programs on the sexually transmitted diseases for undergraduate students.

### Postgraduate Medical Education

There is also only a minimal amount of postgraduate education on the sexually transmitted diseases. The majority of doctors treating patients with these diseases have, at best, inadequate or, more commonly, no training in the subject, and as a result the standard of investigation, diagnosis, and management of

infected patients frequently leaves much to be desired. Furthermore, there are relatively few specialists in the subject to whom the inadequately trained physician can turn. Several private physicians indicated that they would welcome a specialist in their area to whom they could refer patients and also ask advice. If a group of specialists in the subject is to be established, interest must be stimulated at the undergraduate level and maintained by imaginative postgraduate education.

### Attachment of Clinics to Hospitals

If the majority of the clinics for venereal diseases are separated from the hospitals, the doctors and staff work in isolation from their colleagues in other disciplines. Furthermore, the doctors working in the clinics do not have to undergo the vigorous selection processes that are usual in hospitals. This leads to the employment of doctors with inadequate training in the specialty and consequently to low standards of medical practice in the clinics. The most important way of raising the medical standards in the clinics is by their incorporation in major teaching and community hospitals. This would enable those working in the clinics to have regular contact with the physicians in other disciplines and also to have the advantages of the auxiliary services of general hospitals as well as access to postgraduate teaching and meetings on a wide range of subjects. If this step were undertaken, it would be essential that the clinics be free to all patients attending with any sexually transmitted disease.

### Administration of Clinics

In the majority of clinics visited there did not appear to be a physician in overall charge whose responsibility it was to maintain clinical standards and organize teaching and research where applicable. In some clinics the public health investigators appeared to have overall charge of the management in accordance with the present trend in the United States toward acceptance of nonmedical managers organizing

health care delivery. The physician in charge of a venereal disease clinic should be a man or woman of wide experience with special training, versed in the management of patients with all varieties of sexually transmitted disease. He should be supported by a sufficient number of properly trained nurses, technicians, and other supporting staff. In many clinics visited, there were sufficient nursing staff members who were efficient, but there was an absence of anyone trained technically in microscopy for immediate diagnosis.

The members of the seminar considered that venereal disease clinics are best situated in the main body of the hospital and that they are best designed and equipped so as to be able to deal with an increasing number of patients who will, no doubt, come to them in the future if the incidence of these diseases continues to rise. The general image of the clinics should be like that of any other medical departments and they should be so situated in the hospital that access to them is easy for the public.

### Publicity

A review of publicity about sexually transmitted diseases indicated that not enough information was available to the public on this subject. Some towns and cities had important programs for informing the public, but in other areas little or no publicity was given. The members of the seminar were forcibly struck by the absence of direct publicity in the form of posters, pamphlets, and notices in the public buildings about the sites, addresses, telephone numbers, and times that the clinics were open for medical consultation. In some areas it was thought that patients would have difficulty in finding the clinics.

Other publicity about sexually transmitted diseases in the form of radio and television programs and newspaper and magazine articles could be helpful. A balance has to be drawn between excessive publicity of a sensational nature and sufficient factual information which will inform the public of the dangers of these diseases and which will enable them to find

their way to centers for investigation and treatment if this should be necessary.

### Interest in All of the Sexually Transmitted Diseases

The absence of interest in main clinics in diseases other than syphilis and gonorrhea and the concentration on these two diseases tends to make the work uninteresting and therefore unattractive to young physicians; this in its turn leads to a lowering of the standards in the departments. In many areas of the world, other sexually transmitted diseases such as non-specific urethritis, trichomoniasis, genital candidiasis, genital warts, and scabies, which often coexist with syphilis and gonorrhea, form a very important part of the work in such clinics. This tends to maintain a wider interest in medicine than if attention is concentrated solely on syphilis and gonorrhea. If greater interest is engendered in sexually transmitted diseases, this can be expected to lead to an improvement in the quality of physicians attracted to the clinics and to higher standards of clinical medicine—including diagnosis, treatment, and follow-up. This in turn would provide a greater interest in the subject among medical and nursing students and an improvement in the recruitment of doctors and nurses. One way to stimulate interest is to make one of the other sexually transmitted diseases, such as nonspecific urethritis, statistically notifiable. This should lead to a more accurate diagnosis of urethritis and also to better results from treatment.

### Epidemiologic Case-Finding

Members of the seminar were struck by the imbalance in some of the clinics between the work done by the public health investigators and the physicians, who appeared to play a relatively small part in the management of the patients. Despite this observation, they were impressed by the high standard of the epidemiologic work carried out by the public health workers in tracing contacts of early

syphilis under the direction of the Center for Disease Control at Atlanta. Relatively little attempt, however, was made to trace contacts of patients with gonorrhea or any contacts of patients with other sexually transmitted diseases.

### Laboratory Services

The various teams comprising the seminar were impressed by the excellent standards of the State and other public health laboratories, which provide a first-class diagnostic service, particularly for syphilis. This service contributes considerably toward case-finding and accurate diagnosis and, while in many laboratories the serum tests for syphilis were automated, the laboratory service as a whole will require expansion in the future to deal with the increasing demands that will probably be made upon it.

On the other hand, facilities for immediate diagnosis in the clinics were usually inadequate. In most clinics dark-field microscopes were available and were usually used in cases of suspicious lesions, but there was a marked lack of facilities for the immediate microscopic diagnosis of gonorrhea and other sexually transmitted diseases. This leads to inaccurate and careless work and to stereotyped treatment of symptoms such as genital discharge, rather than to an accurate definition of the cause of the condition which could then be treated specifically. The use of blunderbuss treatment lowers the standard of medicine and makes it unlikely that good, progressive, thoughtful doctors will continue to work in the field. Furthermore, if the wrong antibiotic or chemotherapeutic agent is given, the patient will not be cured and the disease may be spread to others.

### Research

There is a great deal of research into syphilis and gonorrhea in various centers throughout the United States. Less research work is being

done on the other sexually transmitted diseases, and this, although usually undertaken at university centers, is not closely identified with the venereal disease program. There is, however, a tendency for research into syphilis and gonorrhea to be concentrated in a small number of clinics and at the Center for Disease Control in Atlanta. The quality of the research at Atlanta and at certain other centers is very high, and considerable progress has been made in understanding the immunologic reactions to both syphilis and gonorrhea and in studying the cultural properties of gonococci. Any solutions

to the problems of sexually transmitted diseases will probably come through research, and for this reason an expansion of facilities for research in the world as a whole is required, not only as far as immunology and microbiology are concerned, but also in the behavioral sciences. This area of study of the behavioral scientists includes research into the reasons for the increase in the incidence of sexually transmitted diseases as related to patterns of human behavior that lead to such infections. This field is as yet virtually untouched and holds out some promise for the future.

### SUMMARY AND MAIN CONCLUSIONS

1) An International Travelling Seminar on Venereal Diseases was conducted in the United States from 3 October through 3 November 1971, under the auspices of the World Health Organization (WHO), the Pan American Health Organization (PAHO), and the International Union against the Venereal Diseases and the Treponematoses (IUVDT), in cooperation with the United States Public Health Service (USPHS). Twenty-one doctors from 19 countries outside of the United States in all six WHO Regions participated in the survey. Provision had been made in several States in the north, south, east, and west of the country for group and individual study of clinical, laboratory, epidemiologic, and other relevant problems in the control of these conditions, including behavioral, educational, and social aspects.

2) The participants of the seminar, in noting the rising trends in incidence of both syphilis and gonorrhea in the United States, are of the opinion that the medical, social, and behavioristic factors operating in modern society are likely to lead to a further increase in the prevalence of venereal diseases in the United States as well as in other countries throughout the world. Existing epidemiologic and other methods, in the United States as well as in other countries, have failed to control the spread of these diseases in and between countries, and new approaches are therefore necessary.

3) They believe that the first step in such a situation is to provide adequate training in the sexually transmitted diseases to undergraduate medical students.

4) The development of postgraduate education in these diseases is urgently required, not only for those private physicians and hospital doctors who have hitherto had inadequate training in the subject but also to provide the basis from which groups of specialists, either in venereology or in this plus another speciality, could be recruited. At the present time venereal diseases in the United States are linked with three medical disciplines: dermatology, urology, and preventive medicine (public health).

5) While it was reported that the current trend in the development of health care in the United States is toward the proliferation of smaller units, participants nevertheless noted the many advantages which had accrued in other countries by the association of the larger venereal disease clinics within university and community hospitals, with the physicians working in them having university or hospital appointments. In particular, these clinics serve as models for integrated venereal disease services in the general health program and are the most appropriate bases for undergraduate and postgraduate education.

6) It is necessary that each venereal disease clinic have a physician who will be responsible for clinical standards, and for teaching and research where applicable. Such a physician should have had special training and experience in the management of patients with sexually transmitted diseases.

7) Physicians in charge of venereal disease clinics should be supported by adequately trained nursing and paramedical staff. The clinics should be strategically located and

properly designed, staffed, and equipped to meet the anticipated increase in the number of patients. They should be open at times when the patients can attend, during and after working hours, and, as in the United States, treatment should be free of charge.

8) Even greater efforts are required from health education to inform the public about venereal diseases, to advance public knowledge of the dangers of these conditions and of their rapid spread in the community, nationally, and between countries. Also, ample direct publicity of local facilities is necessary and should include addresses, telephone numbers, and the times the clinics are open. All clinics should have information on the facilities abroad (e.g. the WHO World Directory of Venereal Disease Treatment Centers at Ports, available under the Brussels Agreement).

9) Although sexually transmitted diseases other than syphilis and gonorrhea are regarded as of less immediate public health importance, the expanding trend toward a broadening clinical and research interest in these conditions is noted. The recording of the cases of non-gonococcal urethritis can serve as a first step in their delineation and, where implemented, has proved important in depicting more clearly the extent of the problem of gonorrhea.

10) Worldwide experience has shown that epidemiologic methods of case-finding, as developed and used in the United States, are extremely valuable—but also that a high priority should be placed both by official clinics and by private physicians (general practitioners) on the clinical aspects of the work in order to raise the standards of diagnosis, treatment, and management.

11) Spread of venereal diseases is favored by "high-risk" groups, and further attention should be given to these and to international transmission.

12) There is a great need for making the necessary arrangements so that all practicing doctors will participate in the official program which, if it is to be effective, requires their full cooperation in case-finding, reporting, and treatment. Intensified education of private physicians is especially required in order not only to increase their knowledge of sexually transmitted diseases, but also to more closely standardize their methods of diagnosis and management, as has already been achieved in the United States in the official clinics.

13) The State and other public health laboratories provide good diagnostic services, the standards of which are determined by the Center for Disease Control of the United States Public Health Service. These provide a basis for expansion in the future.

14) The quality of the research work into the venereal diseases in the United States is impressive and has resulted in significant advances, particularly in the fields of gonorrhea and syphilis. Its extent, however, although considerable, is still inadequate in the context of the immensity of the problem. In the future, an increase in research covering wide fields, including the behavioral sciences, will be required all over the world. This, if combined with improvements in the clinical services and in health education, could eventually lead to better control of the sexually transmitted diseases.

15) Participants particularly welcomed the opportunity at the end of the seminar for discussing their findings with the National Commission on Venereal Disease at the time when the Commission was still engaged in preparing its report. They would like to thank its Chairman for arranging the meeting, for the courteous reception they received, and for the frank discussion that took place.

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<sup>9</sup>Only references mentioned in the accompanying extract are included here. For additional references see *Report of the International Travelling Seminar on Venereal Disease in the United States of America*, Washington, D.C., Pan American Health Organization, 1974, pp. 41-44. (PAHO Scientific Publication 280.)



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