Importance of the so-called 'other' sexually-transmitted diseases

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Scope of problem

There are numerous sexually-transmitted diseases other than syphilis and gonorrhoea caused by bacteria, *Chlamydia*, viruses, protozoa, fungi, and parasites (Table—see Willcox, 1972). In addition, excluding viruses like that of *glandular fever* which may be transmitted by kissing, there are numerous other sexually-transferable organisms which are known or suspected to be responsible for significant pathology. These include *Haemophilus vaginalis*, β streptococcus, mycoplasmas, cytomegalovirus and the virus of hepatitis B, and on occasion protozoa such as *E. histolytica* and helminths such as *Enterobius vermicularis* may also be passed in this way.

many times, that of primary and secondary syphilis or even that of gonorrhoea, but relatively few figures are available. Those provided by the venereal disease clinics of England and Wales in 1973 are presented in Annex I, which also includes particulars of primary and secondary syphilis and of gonorrhoea. It is noted that the first five conditions, in the order most commonly encountered in males, were non-specific genital infection, post-pubertal gonorrhoea, condylomata acuminata, candidiasis, and herpes genitalis—and in females the first five were candidiasis, post-pubertal gonorrhoea, trichomoniasis, non-specific genital infection, and condylomata acuminata. Only the figures for candidiasis and trichomoniasis in the female exceed those of the male.

TABLE Sexually-transmitted diseases

Organism	Disease
Spirochaetes	<i>T. pallidum</i>
Bacteria	Gonococcus <i>H. ducreyi</i> <i>D. granulomatis</i>
<i>Chlamydia</i>	LGV agent
	TRIC agent
Viruses	Type 2 herpes virus Other viruses
Protozoa	<i>T. vaginalis</i>
Fungi	<i>Candida albicans</i> <i>Torulopsis glabrata</i>
Parasites	<i>Acarus scabei</i> <i>Phthirus pubis</i>
	Syphilis
	Gonorrhoea Chancroid Granuloma inguinale
	Lymphogranuloma venereum Non-gonococcal urethritis
	Herpes genitalis Condylomata acuminata Molluscum contagiosum
	Trichomoniasis
	Thrush
	Scabies Pediculosis pubis

ANNEX I Sexually-transmitted diseases in England and Wales, 1971–1973

Disease	Males		Females	
	1973	Per cent. change since 1971	1973	Per cent. change since 1971
Non-specific genital infection	69,993	+16.1	15,022	+10.9
Post-pubertal gonorrhoea	38,871	— 0.4	21,299	+15.5
Condylomata acuminata	11,922	+30.7	6,449	+31.5
Candidiasis	5,058	+67.8	27,545	+25.5
Herpes simplex	3,419	+21.5	1,567	+67.1
Pediculosis pubis	3,263	+ 2.8	1,143	+13.5
Scabies	2,167	—17.3	465	—39.1
Trichomoniasis	1,643	+18.5	18,032	+ 1.1
Primary and secondary syphilis	1,329	+38.0	220	— 1.8
Molluscum contagiosum	490	+29.6	180	+25.0
Lymphogranuloma venereum	60	+33.3	8	figures too small
Chancroid	34	—32.0	2	
Granuloma inguinale	5	nil	3	

(Courtesy of the Department of Health and Social Security)

Incidence

In many developed countries several of the conditions listed have an incidence exceeding, sometimes by

It is also shown that, between 1971 and 1973, increases of 20 per cent. or more have occurred in the incidence of candidiasis, primary and secondary syphilis, lymphogranuloma venereum, condylomata acuminata, molluscum contagiosum, and herpes simplex in declining order in males, and of herpes

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simplex, condylomata acuminata, candidiasis, and molluscum contagiosum in females.

The object of this paper is to indicate that the morbidity of sexually-acquired diseases other than syphilis and gonorrhoea, in terms of potential disability and even death, is likewise not inconsiderable. Where figures are available from the clinics of England and Wales they are compared with those for syphilis and post-pubertal gonorrhoea.

Diseases caused by bacteria

CHANCROID

Caused by *H. ducreyi*, soft sore had at one time a world-wide high prevalence, but it has now become rare in developed countries (primary and secondary syphilis in 1973 was 43 times more common and gonorrhoea 1,671 times more common in the venereal disease clinics of England and Wales). It nevertheless remains a significant problem in many areas, *e.g.* parts of Africa and the Far East, and in Vietnam resistance has arisen to treatment with sulphonamides and tetracyclines (Marmar, 1972). In severe cases, with associated phagedena, much tissue destruction may result. A recrudescence of chancroid in parts of Europe, *e.g.* France, has recently been reported (Colomb, Brunet, and Valignat, 1971; Perrot, Beyuin, and Étienne, 1971).

GRANULOMA INGUINALE

Caused by *Donovania granulomatis*—a Gram-negative bacterium, donovanosis is usually rare; it is more common in the tropics and subtropics but is occasionally encountered in Europe (in the clinics of England and Wales in 1973 primary and secondary syphilis was 194 times and gonorrhoea no less than 7,521 times more common). The condition is endemic in the southern States of India, especially along the Eastern seaboard (Rajam and Rangiah, 1954), and is prevalent to a remarkable degree in Papua New Guinea (Maddocks, 1967) where in 1973 in the Central (Port Moresby) District the reported cases were 82 times more numerous than those of primary and secondary syphilis and only 2.6 times less than those of gonorrhoea (Willcox, 1974).

Remote lesions in skin and bone may be encountered and there is an apparent relationship between granuloma inguinale and cancer of the vulva and penis (Stewart, 1964; Goldberg and Annamunthodo, 1966).

HAEMOPHILUS VAGINALIS

This bacterium, the significance of which is still unclear, is frequently isolated from the female genital tract (Dunkelberg, Skaggs, Kellogg, and Domescik,

1970) and is found in a significant number of patients with vaginitis (Lewis, O'Brien, Ural, and Burke, 1971). No data are available as to incidence, but in 1973 in England and Wales, excluding those cases due to trichomoniasis and thrush, there were 68 times more cases of non-specific genital infection in females than of primary and secondary syphilis, and gonorrhoea in females was only 1.4 times more common: the proportion in which *H. vaginalis* may have been involved is unknown.

The organism, which has been considered a possible cause of non-specific urethritis in the male (Furness, Kamat, Kaminski, and Seebode, 1971), can be responsible for maternal and neonatal septicaemia (Carney, 1973) and sepsis (Platt, 1971).

MYCOPLASMAS

For some years these organisms have been incriminated as a possible or likely cause of the bulk of cases of non-gonococcal urethritis, especially the T-strain (Shepard, 1956). While undoubtedly sexually transmitted—attachment to sperms has been demonstrated (Gnarpe and Friberg, 1972)—their prime position in this respect has now been assumed by *Chlamydia* (*q.v.*).

Mycoplasmas have been found in cases of salpingitis and genital infections in the female (Mårdh and Weström, 1970) and some authors (*e.g.* Foy, Kenny, Wentworth, Johnson, and Grayson, 1970; Kundsinn and Driscoll, 1970; Harwick, Purcell, Iuppa, and Fekety, 1971; Caspi, Solomon, and Sompolsky, 1972; Soldatova, Bashmakova, and Stepanova, 1972; Di Musto, Bohjalian, and Millar, 1973) have pointed to an association between the presence of both *M. hominis* and T-strains with high-risk pregnancies including such pathology as abortion, stillbirth, prematurity, low birth weight, and puerperal infection.

OTHER BACTERIA

Cases of arthritis apparently due to *Mimea* have been recorded by Kozub, Bucolo, Sami, Chatman, and Pribor (1968) and by Feigin, San Joaquin, and Middlekamp (1969) and one of ophthalmia neonatorum was described by Sood and Madhavan (1968). The β streptococcus has likewise been incriminated as a cause of neonatal sepsis.

Diseases caused by *Chlamydia*

LYMPHOGRANULOMA VENEREUM

This condition is widely distributed but is generally uncommon. It is endemic in the South American ports, the West Indies, and the West African coast and Madagascar, but seems to be a dying disease (Duhamel and Cohen, 1970). In the clinics of England and Wales in 1973, it was 23 times less common than

syphilis and 885 times less common than gonorrhoea.

It may be responsible for genital ulceration, elephantiasis, polypoid growths, proctitis, and perirectal abscesses in both sexes, and in the female particularly for rectovaginal fistulae, tissue loss with disabling urinary and rectal incontinence, and rectal strictures (Lawson, 1963; Weinstein, Hayashida, and Clark, 1966).

NON-GONOCOCCAL URETHRITIS

This extremely widespread condition is more common than gonorrhoea in males in many areas, and even where its incidence is reported many cases in which it follows treated gonorrhoea are not statistically noted. In the clinics of England and Wales the numbers increased more than three-fold between 1951-1970 (Annex II) and in 1973 non-specific genital infections in males were 53 times more common than primary and secondary syphilis and 1.8 times more common than post-pubertal gonorrhoea in men.

Chlamydia (TRIC agent) have been isolated from about 40 per cent. of cases (Dunlop, Vaughan-Jackson, Darougar, and Jones, 1972; Oriel, Reeve, Powis, Miller, and Nicol, 1972a; Richmond, Hilton, and Clarke, 1972). This agent has been found in material from the cervix of partners of infected men and may also be responsible for a form of ophthalmia neonatorum (Jones, 1972). The possibility of a genital reservoir for trachoma has been suggested (see Jones, 1972; Al-Hussaini, Wasfy, Shokeir, Shaaban, and Khaleil, 1970; Shaaban, Shokeir, Wasfy, and Al-Hussaini, 1972). *Chlamydia* have also been incriminated as a cause of pelvic inflammatory disease (Mordhorst and Dawson, 1971).

One of the distressing complications of non-gonococcal urethritis is that of *Reiter's syndrome* which may result in acute, subacute, and/or chronic arthritis, recurrent uveitis, and occasionally aortic valvular defects with cardiac invalidism (Csonka, Litchfield, Oates, and Willcox, 1961).

In the 8 years 1963-1970, some 266,258 cases of non-gonococcal urethritis were treated in the clinics of England and Wales and there were also 2,675 additional patients with arthritis (1 per cent. of the total)—see Annex II. This would seem to support the thesis that only certain persons are susceptible to Reiter's syndrome should they be exposed to infection and that this predisposition may have a genetic basis (Lawrence, 1974).

Diseases caused by viruses

HERPES GENITALIS

In the clinics of England and Wales in 1973 infections with genital herpes simplex were 2.6 times more common than those with primary and secondary syphilis in males and 7.1 times more common in

ANNEX II Incidence of arthritis and non-gonococcal urethritis (England and Wales)*

Year	Non-gonococcal urethritis	NGU with arthritis	
		No.	As percentage of cases without arthritis
1951	14,975	NR	NR
1963	25,001	288	1.15
1964	27,166	355	1.31
1965	28,846	295	1.02
1966	30,135	327	1.09
1967	31,961	357	1.12
1968	35,423	298	0.84
1969	40,814	375	0.92
1970	46,912	380	0.81
Total	266,258	2,675	1.01

*Figures by courtesy of Dr. J. H. Berrie

females; the condition was 11.4 times less common than gonorrhoea in males and 13.6 times less common in females. The primary infection may affect the cervix without external signs (Willcox, 1968).

The sexually-transmitted Type 2 herpes virus has a highly significant potential morbidity. Apart from the occasional systemic infections with meningo-encephalitis in adults (Illis and Merry, 1972; Craig and Nahmias, 1973), it may result in abortion if the mother is infected early (Nahmias, Josey, Naib, Freeman, Fernandez, and Wheeler, 1971) or in generalized, often fatal, infection in the newborn if she contracts the disease late in pregnancy (Hudson and McFarland, 1969; Pettay, Leinikki, Donner, and Lapinleimu, 1972). Involvement in the infant may include encephalitis (Hare, 1974).

After infection the virus persists and there is a strong association between antibodies in the blood and cancer of the cervix (Nahmias, Josey, Naib, Luce, and Guest, 1970; Rawls, Gardner, and Kaufman, 1970; Royston and Aurelian, 1970).

If herpes virus is truly the cause of cervical cancer, it carries an ultimate mortality considerably greater than that of syphilis and gonorrhoea combined—seven times that of syphilis in both sexes under present-day conditions in the eleven countries listed in Annex III and no less than 1,517 times that of gonorrhoea. As 1,567 infections were recorded in the female in the clinics of England and Wales in 1973 and 2,343 deaths from cervical cancer in the country as a whole, it is evident that, if this thesis is correct, the great majority of cases are seen outside the venereal disease clinics, or are not recognized.

Herpes virus has also been isolated from the urethra, prostate, or testicle in 15 per cent. of males attending a urology clinic who had no history of the disease (Centifanto, Drylie, Deardourff, and Kaufman, 1972). It was concluded that the relationship of herpes virus Type 2 to cancer of the male urogenital

tract would warrant further study (in the countries listed in Annex III the mortality from prostatic cancer was 2.3 times that of the already considerable mortality from cervical cancer).

ANNEX III Deaths in 1970 in eleven countries* from cervical cancer and from syphilis and gonorrhoea in both sexes (WHO, 1973)

Country	Deaths		
	Cervical cancer	Syphilis	Gonorrhoea
USA	6,940	543	3
West Germany	2,763	309	2
England and Wales	2,343	193	2
Japan	1,465	660	1
France	925	159	2
Yugoslavia	743	104	—
Poland	699	153	—
Canada	659	40	2
Italy	595	275	—
Portugal	553	89	—
Czechoslovakia	518	71	—
Total deaths	18,203	2,596	12

*Chosen as having reported more than 500 deaths from cervical cancer (Deaths from prostatic cancer in the same year amounted to 41,035)

CONDYLOMATA ACUMINATA

This virus-induced disease is increasing in prevalence. In the clinics of England and Wales in 1973 condylomata were twelve times more common than primary and secondary syphilis and only 3.3 times less common than gonorrhoea.

Although generally not thought to be serious, giant lesions may occur and occasional malignancy has been reported (Rhatigan, Jimenez, and Chopskie, 1972). In addition, systemic toxicity (Chamberlain, Reynolds, and Yeoman, 1972) or severe haemorrhage (Young, Acosta, and Kaufman, 1973) has followed their treatment in some cases. The condition may be passed from mother to infant (Patel and Groff, 1972) and has been considered to be the cause of laryngeal papillomata in young children. An association of genital warts and cytomegalovirus has also been noted (Morse, Coleman, and Gardner, 1974).

MOLLUSCUM CONTAGIOSUM

This condition is also transmitted sexually (Cobbold and McDonald, 1970). It does not seem to result in any particular complications. In the clinics of England and Wales in 1973 the reported cases of molluscum contagiosum were exceeded 2.3 times by those of secondary syphilis and ninety times by those of post-pubertal gonorrhoea.

CYTOMEGALIC INCLUSION DISEASE

Cytomegalovirus is responsible for a glandular fever-like illness in adults but, when rarely transmitted through the placenta to the foetus, results in

cytomegalic inclusion disease with hepatosplenomegaly, jaundice, choroido-retinitis, and central nervous system damage. Recovery is rare and tends to be associated with microcephaly, neurological dysfunction, and mental deterioration.

The virus has been found in from 0 to 3.6 per cent. of women undergoing routine examination (Jordan, Rousseau, Noble, Stewart, and Chin, 1973; Foy and others, 1970) and in 8.6 to 13.6 per cent. of women attending venereal disease clinics (Morse and others, 1974, at St. Mary's Hospital; Jordan and others, 1973); a higher figure of 23 per cent. of 385 cervical specimens from 100 venereal disease patients was reported by Wentworth, Bonin, Holmes, Gutman, Wiesner, and Alexander (1973). Further support for sexual transmission was provided by Lang and Kummer (1972) who found the virus in the semen of a man after a glandular fever-like illness which persisted for several weeks.

HEPATITIS B

There is some evidence that this condition, once called serum hepatitis, which can have considerable morbidity and is sometimes fatal, may be transmitted sexually, especially amongst homosexuals; this may well be the predominant means by which this virus is now maintained in the community, parental transmission being now only incidental (Fulford, Dane, Catterall, Woof, and Denning, 1973). Jeffries, James, Jefferiss, Macleod, and Willcox (1973) reported that 1.39 per cent. of 1,650 patients attending the venereal disease clinic at St. Mary's Hospital, London, carried the Australian antigen; this was more than ten times the incidence in the blood donor population, and amongst male homosexuals the rate was 3.8 per cent. Fulford and others (1973), testing 974 patients in another venereal disease clinic in the same city, found Australian antigen in 1.7 per cent. and antibody in 4.8 per cent. The antigen was detected in small quantity in the saliva and semen of patients who were serum carriers by Heathcote, Cameron, and Dane (1974), but there is at present no method of ascertaining whether such trace amounts are infective.

Diseases caused by protozoa

TRICHOMONIASIS

T. vaginalis is ubiquitous and is extremely common in venereal disease patients. In females in the clinics of England and Wales it was 12.7 times more common than primary and secondary syphilis in both sexes (82 times in the female) and only 1.2 times less common than gonorrhoea in the female. Although responsible for some cases of non-gonococcal urethritis in the male, its reported complications in both sexes are few in view of the vast numbers of persons involved. These, however, occasionally include

adnexitis and pyosalpinx (Sebek, 1972), haematospemia, and epididymitis (Rasul, 1970), and it has been considered to have a possible role in infertility in both sexes (Nicora and Giarola, 1968; Walther, 1973) and also even in cancer (Bertini and Hornstein, 1969).

OTHER PROTOZOAL DISEASES

Entamoeba histolytica has been reported as occasionally responsible for extensive penile ulceration in Papua New Guinea (Mylius, 1974), the infection being presumed to have been contracted sexually. The amoeba has also been found in the female genital tract by Heinz (1973) in South Africa.

Diseases caused by fungi

CANDIDIASIS

Infections usually due to *C. albicans* or *Torulopsis glabrata* were responsible for 125 times the number of infections with primary and secondary syphilis and 1.3 times those of post-pubertal gonorrhoea in females in the clinics of England and Wales in 1973. Having a high nuisance value, the condition is increasing in prevalence (Nielsen, 1973), possibly because of the increased use of oral contraceptives (Oriel, Partridge, Denny, and Coleman, 1972b). Disease in the female appears to be related to host factors responsible for the proliferation of the organism rather than to the actual introduction of the fungus. Complications such as cystitis (Wise, Weinstein, Goldberg, and Kozinn, 1973) and endometritis (Rodriguez, Okagaki, and Richart, 1972) have been reported, as has azoospermia (Aubert and Arroyo, 1972).

OTHER FUNGUS DISEASES

Epidermophyton inguinale, the usual cause of tinea cruris, must also sometimes be transmitted sexually. Blastomycosis acquired in this way has been described by Farber, Leahy, and Meadows (1968).

Diseases caused by parasites

SCABIES

A survey by Orkin (1971) of 86 American and 73 other dermatologists indicated that scabies, uncommon in the 1950s, had since shown a progressive increase in many parts of the world, for which Maleville and Heid (1972) blamed mass movement, economic depression, and promiscuity. In the clinics of England and Wales in 1973, it was 1.7 times more common than primary and secondary syphilis and 23 times less common than gonorrhoea.

The disease has acquired new bizarre forms through the inappropriate application of steroid ointments (Macmillan, 1972) and so-called 'Norwegian' scabies may also arise during immunosuppressive therapy (Paterson, Allen and Beveridge,

1973). In some parts of the world, e.g. Morocco, nephritis is a common complication following secondary infection (Rollier, 1969).

PEDICULOSIS PUBIS

In the clinics of England and Wales in 1973 pediculosis pubis was 2.8 times more common than primary and secondary syphilis and 13.7 times less common than gonorrhoea.

OTHER PARASITIC DISEASES

Cases of infestation by the threadworm (*Enterobius vermicularis*) have been reported in homosexuals indulging in penile-rectal and oro-genital contact by Waugh (1972) and by Harris and Morton (1973).

Summary and conclusions

(1) Some data are presented concerning the frequency and potential morbidity of sexually-transmitted organisms other than *T. pallidum* or *N. gonorrhoeae*.

(2) Most of the diseases with which these organisms are associated are more prevalent than syphilis and some, at least in one sex, are as common as gonorrhoea. A number appear to carry considerable morbidity, which in the case of Type II herpes virus—if it is responsible for cervical cancer—may ultimately cause many more fatalities than syphilis.

(3) It is concluded: (a) that, if syphilis and gonorrhoea were reduced to the point of representing no public health concern, many other sexually-transmitted conditions would still remain to pose significant problems: and (b) that health education and other methods of prevention should, where possible, be designed to take into consideration the epidemiological implications of the other organisms listed.

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