The Surveillance and Epidemiology of Sexually Transmitted Diseases in Switzerland

W. John Paget

« Pour que la lutte contre les maladies contagieuses épidémiques ou endémiques puisse être menée avec quelque chance d'efficacité, il est une condition indispensable: il faut que nous connaissions l'origine de ces maladies, leurs modes de propagation et leur extension. Un fléau dont nous avons pu déterminer le siège et l'importance devient par la même beaucoup moins redoutable. »

Hubert Jaeger. Les maladies vénériennes en Suisse d'après les résultats de l'enquête entreprise (1er octobre 1920 au 30 septembre 1921) par l'Association suisse pour la lutte contre les maladies vénériennes. Berne, Imprimerie Büchler & Cie, 1923.

Paget W.J.

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Genehmigt von der Philosopisch-Naturwissenschaftlichen Fakultät auf Antrag der Herren Professor Dr. Marcel Tanner, Professor Dr. med. Dieter Stürchler und Professor Dr. med. Theo Rufli.

Basel, den 15. Januar 2002

Professor Dr. Andreas D. Zuberbühler
Dekan

Dedicated to:

My grandparents

My mother and father, Susan and Hedley

My godmother, Carolyn

My wife, Dineke

My children, Max, Daan and Marieke

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Summary

The goal of the PhD was to describe and assess the surveillance and epidemiology of three sexually transmitted diseases (STDs) – gonorrhoea, syphilis and genital chlamydial infections – in Switzerland, and to define minimum essential data for the surveillance of these STDs. Minimum essential data were of particular importance to the Swiss Federal Office of Public Health (SFOPH) as this Office had prioritised its communicable disease surveillance activities and found that chlamydia and gonorrhoea were a "medium" priority and syphilis was a "low" priority. The SFOPH was therefore interested in a critical evaluation of its STD surveillance activities to streamline the surveillance of STDs in Switzerland.

Four different surveillance systems are used to monitor STDs in Switzerland: 1) national laboratory reports of *N gonorrhoeae*, *T pallidum* and *C trachomatis*; 2) STD reports made by the Swiss Network of Dermatology Policlinics; 3) STD reports by the Swiss Sentinel Surveillance Network (a network of general practitioners, internists, paediatricians and gynaecologists); and 4) STD prevalence studies. The available data indicate that there have been major declines in gonorrhoea and syphilis since the early 1980s in Switzerland. A number of possible reasons could explain these declines (e.g. more widespread use of antibiotics and demographic changes), but evidence for only two factors is available: 1) the introduction of new treatments for gonorrhoea in the early 1980s which were simpler to administer and more effective; and 2) the national HIV/AIDS prevention campaign which began in 1987 and was associated with major increases in condom use in the Swiss population (condom sales increased from 7.63 million in 1986 to 16.16 million in 1998).

The declining trends in gonorrhoea observed in Switzerland were also observed in nine other countries in Europe between 1991 and 1996. These trends were based on data from STD clinics (in Switzerland, from the Swiss Network of Dermatology Policlinics) and were validated by laboratory reports in each country, when this data was available. Interestingly, a number of countries reported increases in gonorrhoea in 1996 (England & Wales, the Netherlands and Scotland), particularly among men having sex with men. Our study highlighted these increases and the need for further investigations. These initial trends have been confirmed in recent years, and increases in gonorrhoea have been reported in a number of countries in western Europe (England & Wales, the Netherlands, France and Belgium), associated with increased antimicrobial resistance and a resurgence of high-risk sexual behaviour, particularly among gay and bisexual men.

The only national source of data on genital chlamydial infections in Switzerland is laboratory reports of *C trachomatis* to the SFOPH. The number of infections and trends over time are difficult to assess because many infections are asymptomatic (particularly among women), laboratory reports are sensitive to case detection rates (the more screening the more cases) and there have been changes in diagnostic procedures over time. A chlamydia prevalence study was therefore performed in 1998 to assess the frequency of genital chlamydial infections among women aged 15-34. Two groups of women who attended gynaecologist practices were tested for the presence of *C trachomatis* in cervical smears, and prevalences of 1.3% were found among pregnant women and 2.8% among women consulting for a routine check-up. The latter results were used to make a conservative estimate of the total number of genital chlamydial infections among women aged 20-34 who consulted a gynaecologist in Switzerland in 1998: 24,400 (95% confidence interval: 14,300 to 34,300). The study found that total laboratory reports made to the SFOPH in this age group of women in 1998 (n = 1150) represented less than 5% of this estimate. These results highlight the limitations of laboratory reports of *C trachomatis* and the importance of using prevalence studies to measure the frequency of a predominantly asymtomatic infection.

Another important area of investigation was the prevalence of HIV among STD patients. A project was initiated in January 1990 to monitor HIV prevalences in STD patients consulting the Swiss Network of Dermatology Policlinics. One of the objectives of this project was to establish an "early warning" system for the spread of HIV among heterosexuals. Persons treated for an STD are a particularly appropriate population to monitor HIV prevalences as they are at increased risk for HIV infections: STD patients have increased numbers of sexual partners, low levels of condom use and frequently acquire their infection abroad, often in regions where HIV is highly prevalent. The study found that HIV prevalences among heterosexuals (1.6%) and male homo/bisexuals (24.0%) with an STD were indeed higher than prevalences normally observed in these populations. Importantly, it found that the prevalences remained stable in both populations in the 1990s. This provided important information on epidemiology of HIV in Switzerland and its spread in the general population.

In an attempt to evaluate the implementation of the HIV prevalence study and to better assess the study results, a questionnaire was sent to the six policlinics participating in the Swiss Network of Dermatology Policlinics. This survey found that the policlinics had correctly implemented the HIV prevalence study and that the network was a homogeneous sentinel surveillance system. The findings validated the stable HIV trends

observed among both heterosexual and male homo/bisexuals diagnosed with an STD at the policlinics. Another study looked at the effect of STD patients refusing the voluntary HIV test and found that refusal rates were significantly higher among heterosexuals with relatively low risk behaviours and significantly higher among male homo/bisexuals with high risk behaviours. These results suggest that HIV test refusers biased HIV prevalences in different directions: HIV prevalences were probably overestimated in heterosexuals and underestimated among homo/bisexuals. This was a surprising finding as it was generally assumed that the HIV prevalences would be underestimated, as high-risk persons would refuse the voluntary HIV test.

Finally, a CDC-designed evaluation protocol was used to establish minimum essential data for the surveillance of STDs in Switzerland in the year 2003. In 1998/99, the four surveillance systems were generally used to monitor gonorrhoea, syphilis and genital chlamydial infections. The outcome of the evaluation recommends the future use of only two surveillance systems for each STD, an overall reduction of 33-50% per STD. The implementation of these recommendations should free resources within the SFOPH for the surveillance of other communicable diseases.

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Abbreviations

AIDS	Acquired immunodeficiency syndrome
Adjusted Odds Ratio	aOR
BAG	Bundesamt für Gesundheit
C trachomatis	*Chlamydia trachomatis*
CDC	Centers for Disease Control and Prevention
CDSC	Communicable Disease Surveillance Centre
DALYs	Disability-adjusted life years
ELISA	Enzyme-linked immunosorbent assays
HIV	Human immunodeficiency virus
LCR	Ligase chain reaction
N gonorrhoea	*Neisseria gonorrhoeae*
OR	Odds Ratio
PCR	Polymerase chain reaction
PHLS	Public Health Laboratory Service
PID	Pelvic inflammatory disease
SCPS	Sentinella Chlamydia Prevalence Study
SFOPH	Swiss Federal Office of Public Health
STDs	Sexually transmitted diseases
STI	Swiss Tropical Institute
SNDP	Swiss Network of Dermatology Policlinics
SSSN:	Swiss Sentinel Surveillance Network
SSSNG:	Swiss Sentinel Surveillance Network among Gynaecologists
TB	*Tuberulosis bacterium*
T pallidum	*Treponema pallidum*
WHO	World Health Organization
95 % CI	95% confidence interval

Chapter 1

An introduction to sexually transmitted diseases in Switzerland

An introduction to sexually transmitted diseases in Switzerland

1.1. Public health importance of sexually transmitted diseases

Sexually transmitted diseases are an important public health problem. The World Health Organization estimated that there were more than 333 million curable STD episodes (gonorrhoea, syphilis, chlamydial infection and trichomoniasis) in adults aged 15-49 years in 1995: 62 million cases of gonorrhoea, 12 million cases of syphilis, 89 million of chlamydial infection and 170 million cases of trichomonias [Gerbase et al, 1998a]. Geographically, the vast majority of new cases occurred in the developing world, which reflects the global distribution of population (Table 1.1). The figures for western Europe were 1.23 million cases of gonorrhoea, 200,000 cases of syphilis, 5.50 million of chlamydial infection and 11.06 million cases of trichomoniasis.

Table 1.1 Estimated incidence of gonorrhoea, syphilis and chlamydia (in millions) in people aged 15-49 years for 1995 [Gerbase et al, 1998b]

	Gonorrohea		Syphilis		Chlamydia	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**
Western Europe	0.60	0.63	0.10	0.10	2.30	3.20
North America	0.83	0.92	0.072	0.072	1.64	2.34
Australasia	0.063	0.069	0.005	0.005	0.12	0.17
Latin America and the Caribbean	3.45	3.67	0.56	0.70	5.01	5.12
Sub Saharan Africa	7.30	8.38	1.56	1.97	6.98	8.44
North Africa and Middle East	0.77	0.77	0.28	0.33	1.67	1.28
Eastern Europe and central Asia	1.17	1.16	0.050	0.050	2.15	2.92
East Asia and Pacific	1.80	1.47	0.26	0.30	2.70	2.63
South and southeast Asia	14.56	14.55	2.66	3.13	20.2	20.28
Total	**30.54**	**31.62**	**5.55**	**6.66**	**42.75**	**46.38**

Because STDs and their sequelae have a widespread effect on men, women, youth and newborns, the problem of STDs is costly to individuals and the health care system. The World Bank has estimated that STDs collectively rank second, excluding HIV, in importance among diseases for which intervention is possible among women aged 15-44 worldwide [World Bank, 1993]. The

vast majority of disease burden from STDs is a result of the complications and sequelae that may follow infection. For example, primary infection with gonorrhoea and chlamydia in women is usually symptomless. When left untreated, however, infections may migrate upwards from the lower reproductive tract and lead to pelvic inflammatory disease, chronic pelvic pain, tubo/ovarian abscesses, ectopic pregnancies and infertility [Gerbase et al, 1998].

The AIDS epidemic has led to increased interest in the epidemiology of STDs. This is because STDs serve as an important marker of behaviour associated with a risk of HIV transmission and they have therefore been proposed as a means of evaluating AIDS prevention campaigns [Renton & Whitaker, 1994]. In addition, STDs may act as co-factors or facilitators in the transmission of HIV [Wasserheit, 1992] and the treatment of STDs could therefore have an important impact on the spread of HIV in a population (see 1.2). Finally, attention and interest within the STD surveillance community has shifted from the surveillance of traditional STDs (syphilis and gonorrhoea) to other STDs that have previously received little attention [Suligoi et al, 1994] e.g. *Chlamydia trachomatis*, genital herpes and the human papillomavirus, which is implicated in cervical cancer.

1.2. STDs as a co-factor for HIV infection

There is increasing evidence that STDs are a co-factor for the transmission of HIV. STDs which lead to sexually acquired lesions and inflammations, involving both the ulcerative and non-ulcerative STDs, could facilitate the transmission of HIV. The interrelationshop between HIV infection and STDs – "an epidemiological synergy" [Wasserheit, 1992] – has been supported by biological [Cohen, 1998], clinical [Cohen, 1998] and epidemiological studies [Wasserheit, 1992; Dickerson et al, 1996].

Although the biological mechanisms remain unclear, inflammation associated with STDs enrich mucosal tissues with activated cells that are receptive to HIV-1 infection and could increase physical access to such cells [Kiviat et al, 1990]. Equally important, STDs and reproductive-tract inflammation may increase levels of HIV-1 shedding in genital secretions and lead to increased infectiousness and a greater possibility of HIV-1 transmission [Kreiss et al, 1994; Moss et al, 1995; Atkins et al, 1996; Eron et al, 1996].

The "epidemiological synergy" between STDs and HIV has led to the integration of STD case-management into HIV prevention strategies, both in developed and developing countries. This development was further supported by the findings of a community randomised trial carried out

in a rural area of Tanzania in 1992 (Mwanza) which offered improved STD case-management to the population and found a 42% reduction in HIV incidence [Grosskurth et al, 1995]. These results were spread rapidly and largely throughout the public health world [O'Reilly & Gerbase, 2001] and were a bolster to STD control activities. However, another study carried out in Uganda (Rakai) at about the same time, which offered the treatment of STDs to all subjects irrespective of symptoms ("mass treatment"), had to be stopped because there was no difference in the incidence of HIV between the intervention and control arms [Wawer et al, 1999]. These results have led to a reappraisal of the Mwanza study results [Grosskurth et al, 2000; Hudson, 2001] and suggestions that that there is probably no single 'magic bullet' intervention that will make control of the HIV epidemic possible [O'Reilly & Gerbase, 2001].

1.3. Microbiological and clinical aspects of gonorrhoea, chlamydia and syphilis

A large number of micro-organisms can be sexually transmitted (see Table 1.2). This thesis concentrates on three of these: *N gonorrhoeae*, *T pallidum* and *C trachomatis*. These three STDs are bacterial, treatable (see Table 1.3) and are the main STDs (excluding HIV) monitored by the SFOPH.

Table 1.2 Micro-ogranisms which can be sexually transmitted

Bacteria	**Viruses**
Chlamydia trachomatis	Herpes simplex virus types 1 and 2
Neisseria gonorrhoea	Wart virus (papillomavirus) – HPV 6, 11, 16 18
Gardnerella vaginalis	*Molluscum contagiosum* virus (poxvirus)
Treponema pallidum	Hepatitis A and B virus
Group B *haemolytic streptococcus*	Cytomegalovirus
Haemophilus ducreyi	HIV 1 and 2
Calymmatobacterium granulomatis	
Donovania granulomatis	
Shigella species	
Mycoplasmas	**Protozoa**
Ureaplasma urealyticum	*Entamoeba histolytica*
Mycoplasma hominis	*Giardia lamblia*
Mycoplasma genitalis	
Trichomonas, vaginalis	

Ecto-Parasites	Fungi
Sarcoptes scabiei	*Candida albicans*
Phthirus pubis	

Gonorrhoea

Gonorrhoea (commonly called clap) is transmitted almost exclusively through sexual contact. The causative agent is *N gonorrhoeae* and humans are the only reservoir. Gonorrhoea produces purulent exudates. The clinical symptoms among women are lower congenital tract infections, pelvic inflammatory disease and related sequelae (infertility and ectopic pregnancy). Among men the symptoms are urethritis and epididymitis. Proctitis, pharyngitis, conjunctivitis and a disseminated infection affect both men and women [Van Dyck et al, 1999].

A variety of specimens can be collected for laboratory testing. The appropriate sites for specimen collection depend on the sex, age and sexual practices of the individual, as well as the clinical manifestations of the infection [Van Dyck et al, 1999]. Specimens can be collected from the following sites: endocervix (women), urethra, rectum and oropharynx.

The signs and symptoms of gonorrhoea may be absent or indistinguishable from those of chlamydial infection and laboratory procedures are needed for diagnosis, case-finding and test-of-cure. A variety of laboratory tests can be used. These include microscopy (e.g. the Gram stain procedure), culture, non-culture detection methods (e.g. ELISA and PCR) [Van Dyck et al, 1999]. Serology is not recommended because the procedures cannot differentiate current from past infection.

An important element of gonorrhoea control is the availability of single-dose treatment regimens, which facilitate compliance [Jones & Wasserheit, 1991]. However, many isolates of *N. gonorrhoeae* are now resistant to penicillin and tetracycline, and other antibiotics, such as ceftriaxone and spectinomycin, must be used.

Table 1.3 Characteristics of gonorrhoea, chlamydia and syphilis (adapted from [Jones & Wasserheit, 1991])

Characteristic	Gonorrhoea	Syphilis	Chlamydia
Incubation period (in days)			
Men	3-7 days	21 days	7-10 days
Women	7-60 days	21 days	7-? days
Proportion asymptomatic			
Men	10-20%	50-90%	25%
Women	50-80%	>90%	60-75%
*Transmission probability**			
Male-to-female	50-70 %	33%?	45-60%
Female-to-male	20-30 %	33%?	15-25%
Period of infectiousness	untreated, variable	variable	untreated, <1yr
Efficacy of treatment	>90% cure	>90% cure	>90% cure
Transmission to infants (perinatal)	0-7%	30-100%	~70%

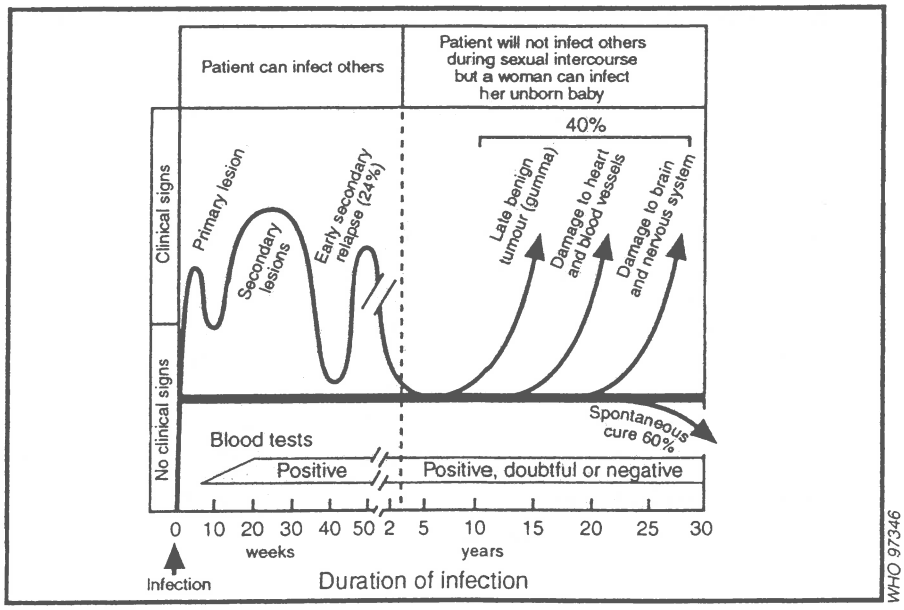
* From infected to uninfected person, per contact

Syphilis

Venereal syphilis is characterised clinically by a primary lesion, a secondary eruption involving skin and mucous membranes, long periods of latency, and late lesions of skin, bone, viscera, the central nervous system and the cardiovascular system [Benenson, 1995] (see Figure 1.1). Each of these clinical manifestations is associated with a different stage of the infection: stage 1 with the primary lesion, stage 2 with the secondary eruption and late stages with longer-term developments.

Stage 1 (or primary stage) occurs 10 days to 3 months after infection, usually three weeks. Stage 2 (or secondary stage) occurs 6 weeks to 6 months later and the lesions heal spontaneously over a period of 2-6 weeks. An asymptomatic or latent period, which can last for years or even a lifetime, then follows. During the early latent stage (less than 1 year's duration) all serological tests are reactive, but during late latent syphilis the reactivity in non-treponemal tests decreases over time (see Figure 1.1).

Figure 1.1 Various stages and clinical manifestations of venereal syphilis



Humans are the only natural host of the responsible organism, *T pallidum* [Van Dyck et al, 1999]. Venereal syphilis is diagnosed by dark-field or fluorescence microscopy from specimens of the lesions. A number of serological tests can be performed such as the VDRL (Venereal Disease Research Laboratory) or TPHA (*T pallidum* hemagglutinating antibody) tests.

Chlamydia trachomatis infection

Chlamydia trachomatis is almost exclusively a human pathogen and consists of 15 servovars [Van Dyck et al, 1999]. The servovars A, B, Ba and C cause trachoma; servovors D, E, F, G, H, I, J and K are associated with genital tract infections, conjunctivitis and infant pneumonia; and servovors L_1, L_2 and L_3 cause lymphogranuloma venereum (LGV). *C trachomatis* is known to cause cervicitis, pelvic inflammatory disease and endometritis in women and epididymitis in men. It produces urethritis and conjunctivitis in both sexes. *C trachomatis* is also an important cause of ophtalmia neonatorum and infant pneumonia.

A variety of specimens can be collected for laboratory testing: the eye, nasopharynx (for infant pneumonia), throat, rectum, urethra, cervix and bubo pus [Van Dyck et al, 1999]. The

most accurate method for the diagnosis of *C trachomatis* infections from all sites is a tissue culture technique employing cicloheximide-treated McCoy cells. Non-culture methods for the direct detection of chlamydial antigen in clinical specimens, based on either microscopic demonstration of organisms using fluorescein-labelled monoclonal antibodies or immunochemical detection of solubilized chlamydial components, are now widely available.

DNA isolation procedures followed by polymerase chain reaction (PCR) and ligase chain reaction (LCR) are now also available. Recent data suggest that testing of male and female urine specimens for *C trachomatis* by PCR or LCR may be as sensitive or even more sensitive than the usual cell culture of urethral and cervical specimens [Van Dyck et al, 1999]. These developments have important implications for the screening of genital chlamydial infection. To date, all available serological methods have been of limited use in the diagnosis of acute chlamydial infection.

1.4. Surveillance of sexually transmitted diseases in Switzerland

Surveillance and epidemiological studies are essential components of effective STD control programmes [Catchpole, 1996]. Surveillance data are used both to determine the need for public health action and to assess the effectiveness of these programmes. They are required for:

- Setting priorities;
- Planning and allocating resources for services;
- Defining population subgroups and risky behaviours for targeted interventions;
- Directing public health policy;
- Informing diagnostic and therapeutic practice;
- Evaluating interventions;
- Stimulating further research [Catchpole, 1996].

The surveillance of sexually transmitted diseases has been ongoing in Europe for the past 150 years [Catchpole, 1996]. In Switzerland, the Federal Council established the Federal Service of Public Hygiene in June 1893 [BAG, 1993]. The objectives of this office – the predecessor to the Swiss Federal Office of Public Health – were the implementation of three federal laws concerning health in Switzerland: the free movement of doctors, veterinarians and pharmacists (law of 1877), epidemics (law of 1886) and food products (law of 1905) [BAG, 1993].

1.4.1 Historical data

Between 1909 and 1930/31, the SFOPH collected data on a number of communicable diseases, including gonorrhoea and syphilis, using data reported by hospitals in Switzerland [BfS, 1995]. The total number of cases was reported on a weekly basis and appeared in the Bulletin of the SFOPH (Table 1.4). The number of hospitals in the system gradually increased over time. In 1936 the Swiss Office of Statistics ("Bundesamt für Statistik") took the leading role in collecting this data and the system became known as VESKA [BfS, 1995]. The Swiss Federal Office of Social Insurance ("Bundesamt für Sozialversicherung") joined the system in 1970 [BfS, 1995] and the data covered about 50% of all public hospitals in Switzerland in 1994 [Bosshard, 1995].

This surveillance system is now called H+ and will be extended to all hospitals – both public and private – in Switzerland. The original objective was to collect data on communicable diseases; today the system collects data on a whole range of issues concerning hospitals and the Swiss health care system. It would be possible to create a historical graph on trends in gonorrhoea and syphilis based on this surveillance system. However, to date and to the knowledge of the author, this has not been done.

Table 1.4 Hospital reports to the Swiss Federal Office of Public Health, April 1935

Aufnahmen vom 14. bis 20. April 1935 — *Admissions du 14 au 20 avril 1935.*

Kantone *Cantons*	Gesamtbest. a. 13. IV. 35. Effectif au 13 IV. 35.	Aufnahmen — *Admissions*																													Total der Aufnahmen *Total des admissions*	Davon Ortsfremde *Dont étrangers à la localité*	Gesamtbest. a. 20. IV. 35. Effectif au 20 IV. 35.
		Pocken - *Variole*	Masern - *Rougeole*	Scharlach - *Scarlatine*	Keuchhusten *Coqueluche*	Diphther. u. Croup	Typhus abdom. *Fièvre typhoïde*	Poliomyelitis ant. acuta	Mening. cerebro-spin. epidemica	Encephalitis letharg.	Erysipel	Syphilis	Gonorrhoea	Ophthalmo-blennorrhoea	Lungentuberkulose *Tubercul. pulmon.*	And. tub. Krankh. *Autr. maladies tub.*	And. lokale Krankh. *Autres mal. locales*	Rheumatismus *Artic. acutus*	Ak. Krankh. der Atmungsorg. - *Malad. aiguës des organes de la respir.*	Chron. Krankh. d. Atmungsorg. - *Autres maladd. d. org. respir.*	Appendicitis und Typhlitis	Sonst. Krankh. d. Verdauungsorg. - *Autres mal. d. syst. digest.*	Struma - *Goitre*	Maligne Tumoren *Tumeurs malignes*	Krankh. d. Zirkul.-Org. *Malad. d. org. circul.*	Krankh. d. Nervensyst. *Malad. d. syst. nerv.*	Krankh. d. Harnorgane *Malad. des org. urin.*	Alle übr. Krankheit. *Toutes l. autres mal.*	Unfälle - *Accidents*			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Zürich	2123	—	—	9	—	—	—	—	1	—	3	2	10	2	14	5	12	2	28	9	35	31	9	18	25	21	19	186	28	469	180	2002
Bern	1638	—	2	7	2	—	—	—	1	—	1	2	4	—	10	8	10	3	10	19	34	25	10	6	20	5	13	151	34	377	202	2129
Luzern	565	—	—	6	—	—	—	—	—	—	1	—	—	—	2	1	3	—	2	—	17	1	—	—	4	1	1	44	10	93	71	517
Uri	45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	4	1	9	4	41
Schwyz	163	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	6	—	—	1	1	1	1	10	5	27	19	148
Obwalden	48	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	2	—	2	6	6	45
Nidwalden	77	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	2	1	88
Glarus	138	—	—	—	—	1	—	—	—	—	—	—	—	—	—	2	—	—	1	5	4	3	—	—	—	—	1	16	5	38	32	134
Zug	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	1	—	—	—	3	1	11	5	51
Fribourg	556	—	—	—	—	2	—	—	—	—	—	—	—	—	5	2	5	—	2	1	14	6	1	2	4	—	4	16	6	70	38	546
Solothurn	383	—	—	—	1	1	—	—	—	—	—	—	—	—	—	1	3	1	3	1	11	5	—	1	2	—	2	47	2	81	57	350
Baselstadt	776	—	—	4	4	2	—	—	—	—	—	—	—	—	6	2	1	1	12	2	14	9	2	6	11	7	4	66	16	171	41	705
Baselland	109	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—	2	1	—	5	—	—	8	9	28	25	110
Schaffhausen	159	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	2	—	3	2	3	4	—	1	3	3	—	25	3	51	30	151
Appenzell A.-Rh.	199	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	1	—	1	2	3	1	—	1	1	1	1	15	4	33	17	172
Appenzell I.-Rh.	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	1	—	1	1	—	1	—	—	—	—	2	8	—	27
St. Gallen	974	—	—	—	—	1	—	—	—	—	—	1	—	—	4	6	3	1	6	1	16	15	6	5	6	6	6	59	16	158	100	902
Graubünden	418	—	—	5	—	—	1	—	1	—	—	—	—	—	3	1	—	2	5	5	10	2	—	3	3	5	1	36	12	95	49	441
Aargau	450	—	1	—	—	—	—	—	—	—	—	1	1	—	3	1	5	2	2	2	15	5	—	4	3	4	5	50	12	116	88	444
Thurgau	377	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2	—	8	—	—	2	5	1	—	22	7	49	16	326
Ticino	252	—	—	3	—	—	1	—	—	—	—	—	—	2	2	—	1	7	11	1	12	3	1	—	4	1	2	17	13	81	27	262
Vaud	1185	—	1	9	—	1	—	—	—	—	1	1	4	—	5	3	8	3	18	6	9	19	—	7	13	5	6	63	16	198	92	1230
Valais	104	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3	10	2	—	—	2	1	—	8	6	34	30	105
Neuchâtel	345	—	—	2	—	—	—	—	—	—	—	1	—	—	2	—	—	—	1	1	6	6	—	—	4	—	—	56	5	84	37	346
Genève	629	—	—	1	—	5	—	—	1	—	1	3	2	—	2	—	18	—	7	4	19	12	—	3	14	13	1	10	9	119	6	580
Total	11776	—	4	47	7	15	2	—	4	—	7	10	23	4	61	36	70	23	117	64	254	152	30	61	130	75	69	919	224	2408	1173	11832

Verzeichnis der beteiligten Spitäler s. Seite 3. — *Voir à la page 3 la liste des hôpitaux.*

Keine Angaben erhalten - Pas reçu de données: 1 hôpital dans le canton du Tessin (env. 60 lits).

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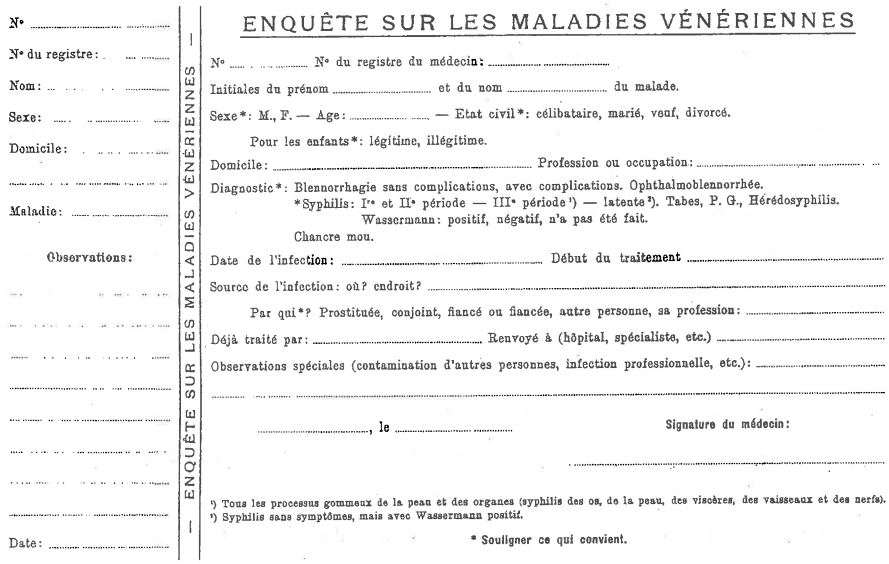
Between the 1st of October 1920 and 30th of September 1921 the Swiss Association for the Fight against Venereal Diseases undertook a study to estimate the total number gonorrhoea, syphilis and chancroid cases in Switzerland [Jaeger, 1923]. All doctors and medical institutions were contacted by the association and asked to give the total number of cases seen in 1921 [Figure 1.2]. This study estimated that there were about 9000 cases of gonorrhoea, 6,400 cases of syphilis and 180 cases of chancroid [Jaeger, 1923].

Box 1.1 Questionnaire used to assess the total number of cases of gonorrhoea, syphilis and chancroid in Switzerland in 1920/21 [Jaeger, 1923]



N° .....
N° du registre: .....
Nom: .....
Sexe: .....
Domicile: .....
.....
Maladie: .....
Observations:
.....
.....
.....
.....
.....
.....
.....
.....
Date: .....

I — ENQUÊTE SUR LES MALADIES VÉNÉRIENNES — I

ENQUÊTE SUR LES MALADIES VÉNÉRIENNES

N° ..... N° du registre du médecin: .....

Initiales du prénom ..... et du nom ..... du malade.

Sexe*: M., F. — Age: ..... — Etat civil*: célibataire, marié, veuf, divorcé.

Pour les enfants*: légitime, illégitime.

Domicile: ..... Profession ou occupation: .....

Diagnostic*: Blennorrhagie sans complications, avec complications. Ophthalmoblennorrhée.
*Syphilis: I^re et II^e période [1]) — III^e période — latente [2]). Tabes, P. G., Hérédosyphilis.
Wassermann: positif, négatif, n'a pas été fait.
Chancre mou.

Date de l'infection: ..... Début du traitement .....

Source de l'infection: où? endroit? .....

Par qui*? Prostituée, conjoint, fiancé ou fiancée, autre personne, sa profession: .....

Déjà traité par: ..... Renvoyé à (hôpital, spécialiste, etc.) .....

Observations spéciales (contamination d'autres personnes, infection professionnelle, etc.): .....

....., le .....

Signature du médecin:

.....

[1]) Tous les processus gommeux de la peau et des organes (syphilis des os, de la peau, des viscères, des vaisseaux et des nerfs).
[2]) Syphilis sans symptômes, mais avec Wassermann positif.

* Souligner ce qui convient.

Today, the SFOPH has four main sources of data for the surveillance of STDs in Switzerland: national laboratory reports, the Swiss Network of Dermatology Policlinics, the Swiss Sentinel Surveillance Network and prevalence studies. Each of these systems is described below.

1.4.2. National laboratory surveillance system

In September 1987 a new surveillance ordinance was introduced which created a laboratory-based surveillance system of communicable diseases [Swiss Confederation, 1987]. Included in the list of communicable diseases were three STDs: *C trachomatis*, *N gonorrhoeae* and *T pallidum*. Laboratories recognised by the SFOPH (about 100 laboratories) had to report (see

Appendix 1) the age, sex and canton of residence of each patient with these infections (anonymous).

In March 1999 a new surveillance ordinance was introduced which modernised the laboratory-based surveillance system of communicable diseases [Stürchler, 1999]. The number of communicable diseases monitored by the SFOPH was reduced and further information was requested, for example, what sort of laboratory test was performed (see **Appendix 2**). Importantly for the surveillance of STDs, *T pallidum* was dropped from the list of infections reported to the SFOPH.

In 1995 the Division of Epidemiology and Infectious Diseases of the SFOPH sent all laboratories in Switzerland – public and private – a questionnaire concerning tests performed in 1994 (see **Appendix 3**). This study found that national laboratory reports represented about 70% of all *C trachomatis* infections, 60% for *N gonorrhoeae* and 50% for *T pallidum* [Paget, 1997]. The SFOPH expects these levels to increase over time due to the introduction of the new health insurance law which states that health insurance companies ("Krankenkasse") only need to reimburse tests performed by recognised laboratories. This has led to a massive increase in laboratories registering to be recognised by the SFOPH [personal communication, BAG].

1.4.3. Swiss Network of Dermatology Policlinics

The Swiss Network of Dermatology Policlinics (SNDP) is composed of the six policlinics of dermatology which exist in Switzerland. These are: the University Hospital policlinics of Basel, Bern, Geneva, Vaud and Zürich, and the Triemlispital in Zürich. The clinics are open to all and see many foreigners (45%), men (90% of STD patients) and homo/bisexuals (13%) [Paget et al, 1999a: **Chapter 5**]. Only a very small percentage of consultations concern STDs (1-10% of patients) [Paget, 1999] and the policlinics are therefore quite different to STD clinics in the United Kingdom or United States of America.

The surveillance of gonorrhoea and syphilis by the SNDP was begun in 1973. In 1990 this network joined a European Concerted Action to assess trends in HIV among STD patients [The European Study Group, 1993] (see **Appendix 4** and **Appendix 5**). The aim of this study was to establish an early warning system for the spread of HIV among heterosexuals in Europe, as STD patients are at high risk of acquiring HIV. An important outcome of this study was that detailed epidemiological information was collected on patients treated for thirteen different STDs (male urethritis, proctitis, mucopurulent cervicitis, chlamydia, gonorrhoea,

genital herpes, chancroid, syphilis, genital warts, trichomonas vaginalis, pelvic inflammatory disease, pediculosis pubis, scabies). This has allowed a more detailed analysis of the epidemiology of STDs in this group of patients (Paget & Zimmermann, 1997: **Chapter 3**).

1.4.4. Swiss Sentinel Surveillance Network

The Swiss Sentinel Surveillance Network (SSSN), or Sentinella, is a surveillance system which has existed since June 1986. The main objective of this surveillance system is to monitor vaccine preventable diseases such as mumps, measles, rubella and influenza [Matter et al, 1999]. The system is based on the voluntary participation of primary care physicians from four different specialties: general practitioners, internists, paediatricians and gynaecologists. The physicians participating in the system see an estimated 2.5-3.5% of all consultations in Switzerland in each specialty each year.

There are a number of advantages of having a surveillance system based on primary health care physicians. It has direct access to the general population and the information is by definition doctor-defined. It also allows the collection of data concerning a broader spectrum of diseases, as not all diseases are managed in the secondary health care setting (e.g. hospitals).

The SSSN collected data on STDs between 1990 and 1995 among general practitioners and internists [Matter et al, 1999] (see **Appendix 6**) and between 1995 and 2000 among gynaecologists [Paget, 1998] (see **Appendix 7**). Initially, any STD diagnosis was collected and questions about the validity of the diagnoses were raised. To address this issue, only STD patients who were diagnosed on the basis of a laboratory test were reported to the SSSN as of 1997.

1.4.5. Prevalence studies

The SFOPH has undertaken or collaborated with a number of STD prevalence studies to better determine the epidemiology of STDs in Switzerland. For example, the SFOPH launched the Sentinella Chlamydia Prevalence Study in 1998 [Paget et al, submitted: **Chapter 8**] (see **Appendix 7** and **Appendix 8**) and collaborated with a herpes prevalence study carried out in Basel in 1997 (Laubereau et al, 2000).

1.4.6. Other sources

There are two other sources of national STD data that exist in Switzerland. One is serological testing of blood donations for syphilis by the Swiss Red Cross [Swiss Red Cross,

2000]. The other is self-reported STDs in the general population collected by telephone surveys which are carried out on a regular basis by the Institute of Social and Preventive Medicine at the University of Lausanne to evaluate the Swiss STOP AIDS campaign [Dubois-Arber et al, 1997]. A random sample of about 2,800 persons aged 17-45 are asked questions related to HIV/AIDS, and in 1997 a series of questions concerning STDs were included in the survey. The 1997 survey provided data on the percentage of the general population who reported that they had ever had an STD (8.7%) or had an STD in the previous 12 months (1.7%) [Paget et al, 1999b].

1.5. International STD surveillance systems and trends in gonorrhoea, syphilis and chlamydia

The experiences of other industrialised countries can provide valuable information for the surveillance of STDs in Switzerland: they can suggest improvements (e.g. new types of surveillance systems) and can also be used to validate trends observed in Switzerland. As opposed to a number of other communicable diseases (e.g. HIV, TB, influenza), there is no centralised data collection of STDs in Europe [Fenton et al, 2001]. The Concerted Action on HIV prevalences among STD patients [The European Study Group, 1993] in Europe collected STD data between 1990 and 1996 and was used to analyse gonorrhoea trends during this period (Van der Heyden et al, 2000: **Chapter 4**). However this data collection was stopped and trends are now based on national reports, over varying time periods that are from very different sources [Eurosurveillance Weekly, 2000]. The texts below describe the surveillance systems and recent trends in gonorrhoea, syphilis and chlamydia in a number of European countries and the United States.

England: England has one of the oldest and best-documented STD surveillance systems in the world. This is due to the country's long tradition of STD surveillance, epidemiology and public health research. The surveillance of STDs is based on three main sources of data: laboratory reports, genitourinary medicine (GUM) clinics and the surveillance of infections in blood donations [Hughes & Catchpole, 1998]. The network of GUM clinics offer free, open access, confidential, sexual health services as part of the National Health Service [Lamagni et al, 1999]. A national network of clinics was set up in 1916 after the Royal Commission on Venereal Disease report was enacted in the *Venereal Diseases Regulations* [Royal Commission on Venereal Disease, 1960].

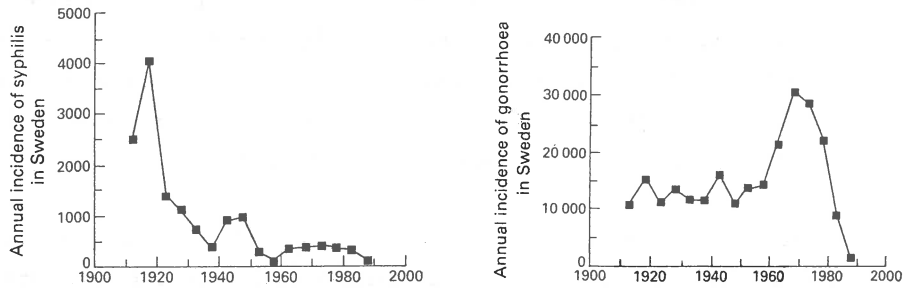
Long-term trends in gonorrhoea and syphilis (particularly among men) [CDSC, 2000] are declining in England. This is not the case for chlamydia; rates of uncomplicated chlamydia infection have increased in recent years in the GUM clinics [Lamagni et al, 1999] and in the laboratory reports of *C trachomatis* [Simms et al, 1997a], particularly among women. This rise may reflect an increased number of diagnostic tests performed rather than an actual increase in incidence due to increased public and professional recognition of genital chlamydial infection and improved diagnostic techniques [Simms et al, 1997b].

Sweden: All cases of sexually transmitted diseases have been reported and registered in Sweden since 1912 [Cromberg, 1993]. Syphilis reached a peak at the end of the First World War when an annual incidence of 4056 cases was reported in a population of about 6 million (see Figure 1.2). The incidence dropped to 375 cases in the 1930s, but then rose to 1000 cases during and after the Second World War. With the advent of penicillin it dropped to 100 in the 1950s, but then rose and stabilised at around 400 cases a year (mainly affecting homosexual men). There are now fewer than 50 cases per annum among indigenous Swedes, due to the change in sexual behaviours in the homosexual community in response the AIDS epidemic [Cromberg, 1993].

The annual incidence of gonorrhoea remained stable at 11,000 to 16,000 infections per annum between 1912 and 1960 (see Figure 1.2) and does not appear to have been influenced by the introduction of suphonoamides or penicillin [Cromberg, 1993]. With the arrival of contraceptive pills, the annual incidence rose to 30,000 cases in 1966-1975. Between 1976 and 1980 this number declined to 23,000 cases and the arrival of AIDS it has abruptly declined to 500 cases in recent years.

Laboratory reports of *C trachomatis* have been monitored since 1987 [Smittskyddsinstitutet, 1996]. The total number of infections has declined from 38,223 in 1987 to 14,561 in 1996 (a decline of 60%) [Smittskyddsinstitutet, 1996]. The decline was more pronounced among women (68%) than men (48%). Sweden also collects information on the total number of tests carried out by the laboratories and the percentage of positive tests has declined from 8% in 1987 to 5% in 1996.

Figure 1.2 Annual incidences of syphilis and gonorrhoea in Sweden [Cromberg, 1993]



France: A compulsory system of notification of cases of syphilis, gonorrhoea, chancroid and lymphogranuloma venereum (LGV) has existed in France since the introduction of a law passed in 1942. The primary purpose of this law was the control of infection rather than epidemiological surveillance [Meyer et al, 1994]. A number of voluntary general practitioner and laboratory networks were set up in the 1980s to monitor trends in male acute urethritis (the French Communicable Disease Network (Massari & Valleron, 1989)), laboratory diagnosed gonorrhoea (e.g. the National Network of Gonorrhoea (Goulet & Sednaoui, 1998)) and chlamydia (the National Network of Chlamydia (Goulet & Sednaoui, 1998)). Data from all STD clinics have also been collected by the Ministry of Health since 1985, mainly to assess clinical activity [Meyer et al, 1994].

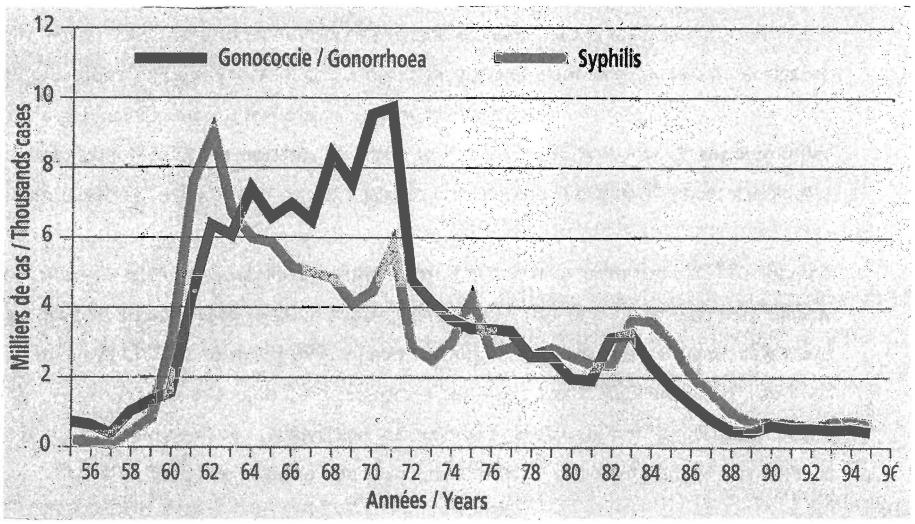
Generally, there has been a declining trend in cases of gonorrhoea and syphilis seen by the STD clinics since the 1980s and an increasing number of cases of chlamydia [Meyer et al, 1994]. In 1998 the National Network of Gonorrhoea saw a sudden increase in gonorrhoea [Goulet et al, 2000]. The fact that there was an increase in anorectal isolates and there was a change in the sex ratio suggested that the upsurge occurred particularly among homosexual and bi-sexual men (in the Île-de-France). At the national level, the increase seemed to also affect female heterosexual women. Resistance patterns did not change between 1997 and 1998, either in the Île-de-France or other regions [Goulet et al, 2000].

Italy: The surveillance of STDs in Italy is based on statutory notifications and the Italian National STD Surveillance Network (mainly dermatovenereology clinics, but also gynaecology clinics) [Suligoi et al, 1992; Suligoi et al, 1994]. The statutory notifications have been ongoing since 1956 and the network of clinics since 1990. Originally, the statutory notifications included syphilis, gonorrhoea, lymphogranuloma venereum and chancroid, but in

1991 the latter two were dropped and hepatitis B, pediculosis pubis, scabies and AIDS were added to the list [Suligoi et al, 1994].

A comparison of the statutory notifications and data from the Italian National STD Surveillance Network revealed a large gap, which was increasing with time and differed by geographical area (increasing from north to south) [Greco et al, 1990]. There has been an overall decline in statutory reports of gonorrhoea and syphilis over time (see Figure 1.3 [Giuliani et al, 1998]) and the network data has provided data on other ("second-generation" or "new") STDs such as chlamydia, genital herpes and genital warts.

Figure 1.4 Trend of statutory notifications for gonorrhoea and syphilis in Italy, 1955-96 [Giuliani et al, 1998]



Gonorrhoea in western Europe: There is much discussion at the moment as to whether Europe is experiencing a possible reversal in gonorrhoea trends. In the paper on trends in gonorrhoea in western Europe between 1990 and 1996 (Van der Heyden et al, 2000: Chapter 4), we mention that "there are signs of an increase in gonorrhoea in England and Wales and in The Netherlands, particularly among older homo/bisexual men". Recently, increases have been observed in France (see above) and among men and women in England (CDSC, 2000). Similar increases have been observed in Belgium, but have not been confirmed in Germany, Italy, Norway, Portugal or Spain (Eurosurveillance Weekly, 2000).

One problem that has been identified in Europe is the increasing importance of antibiotic resistant strains to gonorrhoea: in France, almost a quarter of isolates are resistant to penicillin and in England almost a fifth of homosexual men have a penicillin resistant strain [Hughes & Fenton, 2000]. The findings also suggest that there has been a resurgence of high-risk sexual behaviours within the general population, particularly among gay and bisexual men [Hughes & Fenton, 2000]. This may reflect a perception that the threat of HIV/AIDS has abated and the phenomenon of 'safer sex fatigue'.

USA: The United States is another country with a long tradition of STD research, surveillance and public health action. The CDC receives federal funding for the prevention of chlamydia, gonorrhoea and syphilis and therefore invests considerable resources into the surveillance of these three STDs. Data in the United States are based on reports made by state health departments and seem to include both physician and laboratory reports, depending on the state. All types of reports are included, public and private institutions, clinics (e.g. STD clinics) and physicians [Division of STD Prevention, 1999]. In addition, the CDC funds a number of prevalence studies that are repeated on a regular basis to monitor trends over time.

Trends in STDs are similar to those in Europe, with overall declining rates of gonorrhoea and syphilis (see Figures 1.4 and 1.5). Interestingly, as in a number of western European countries, there was an increase in the rate of gonorrhoea in 1998 [Division of STD Prevention, 1999]. For both STDs, the CDC has established a national 2000 objective as part of an operational public health target for the nation. The objective for syphilis has been met and a national plan to eliminate syphilis from the United States has been established [CDC, 1999a].

Figure 1.5 Gonorrhoea – Reported rates: United States, 1970-1998 and the Health People year 2000 objective [Division of STD Prevention, 1999]

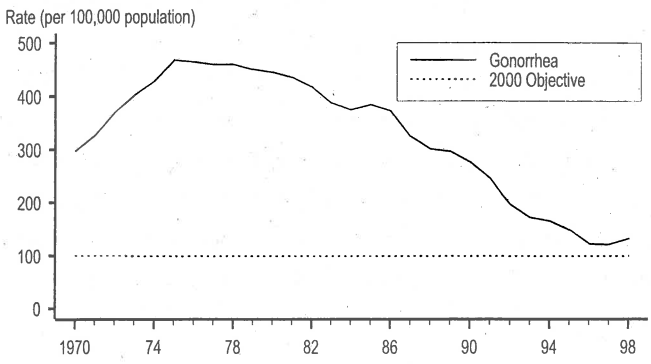
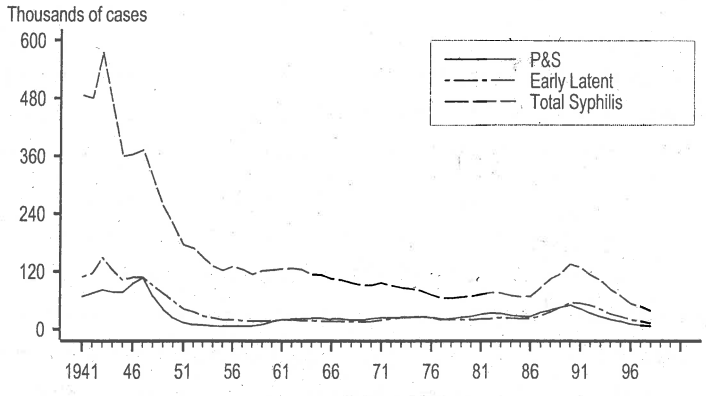


Figure 1.6 Syphilis – Reported cases by stage of illness: United States, 1941-1998 [Division of STD Prevention, 1999]



The reported number of cases of genital *C trachomatis* infections was 237 per 100,000 persons in 1997, a rate that exceeds all other notifiable diseases in the United States [Division of STD Prevention, 1999]. The overall reported rate for women was 382 per 100,000 persons compared to 83 among men, a difference which is attributable to screening strategies that focus on women and because these infections are asymptomatic in the majority of cases of women.

1.6. Epidemiology of sexually transmitted diseases

An important concept concerning the epidemiology of STDs is the dynamic topology of an epidemic [Wasserheit & Aral, 1996]. The dynamic topology of STDs is based a simple and elegant formula used to describe the dynamics of an infectious disease epidemic [May and Anderson, 1987]. The basic reproduction rate (R_o) of a sexually transmitted disease in a susceptible population is a function of the transmission efficiency of the organism (_), the rate of sex partner change (D) and the duration of infectiousness (D):

$R_o = \beta D c$

If R_o is equal to 1, the epidemic is stable; if it is greater than 1 it is increasing and if it is less than 1 it is decreasing.

It is important to note that each STD has a different R_o and that one can assume that there are populations within the susceptible population, frequently called "core groups" (for example homo/bisexual men), who have different R_os.

The dynamic topology of an STD epidemic is based on the concept that the epidemic goes though different phases (see Figure 1.7). In Phase I the infection is introduced into the susceptible population and spreads to the core groups and the number of cases increases (Ro>1). In Phase II equilibrium is reached between the population and the pathogen, technical experts identify the infection and opinion leaders are informed. Phase II* is the stage when prevention efforts are initiated (e.g. the STOP-AIDS campaign in Switzerland [Kocher, 1993]). In both Phase II and II* Ro=1. Phase III occurs when the prevention efforts take effect and the relationship between the prevalence and incidence changes and there is a decline in the number of infections. Phase III stops when a new equilibrium is met and Phase IV begins when the infection is stable, under control and endemic at a low level.

Reaching Phase II, III or IV does not mean that there will be no return to Phase I. If there is a change in the factors influencing the incidence of new infections, such as a change in the pathogen or a breakdown in the health care system, it is possible to return to Phase I. The Russian Federation experienced this with syphilis since the early 1990s [Renton et al, 1998] due to the rapid socio-economic breakdown (see Figure 1.8).

1.7. Minimum essential data

Several national and international initiatives have attempted to set priorities for different aspects of communicable diseases in recent years [Carter, 1991; RIVM, 1994; Murray & Lopez, 1997; NCID/CDC, 1994; Rushdy & O'Mahoney, 1998]. Some of these initiatives have been integrated into a wider assessment of health priorities [RIVM, 1994; Murray & Lopez, 1997], whilst others have focussed specifically on communicable diseases [Carter, 1991; NCID/CDC, 1994; Rushdy & O'Mahoney, 1998]. The objective of these analyses has been "*to protect the public health by ensuring that the right things are being done and being done well within finite resources*" [Rushdy & O'Mahoney, 1998].

The Division of Epidemiology and Infectious Diseases of the SFOPH initiated its own assessment in 1999, largely centred on the surveillance of communicable diseases. The idea was to prioritise its surveillance activities and to target its limited resources. The results of this analysis are presented in Chapter 9.

This PhD tries to take this analysis a step further by proposing minimum essential data for the surveillance of STDs in Switzerland. In the evaluation of the surveillance of communicable diseases in Switzerland [BAG, 1999], the surveillance of gonorrhoea, syphilis and chlamydia were not a "high" priority and it was necessary to find ways to monitor these STDs in such a way that the surveillance systems were sensitive to any substantial increases in cases, but required a minimum amount of resources. The establishment of minimum essential data for the surveillance of gonorrhoea, syphilis and chlamydia by the year 2003 was the main goal of this thesis.

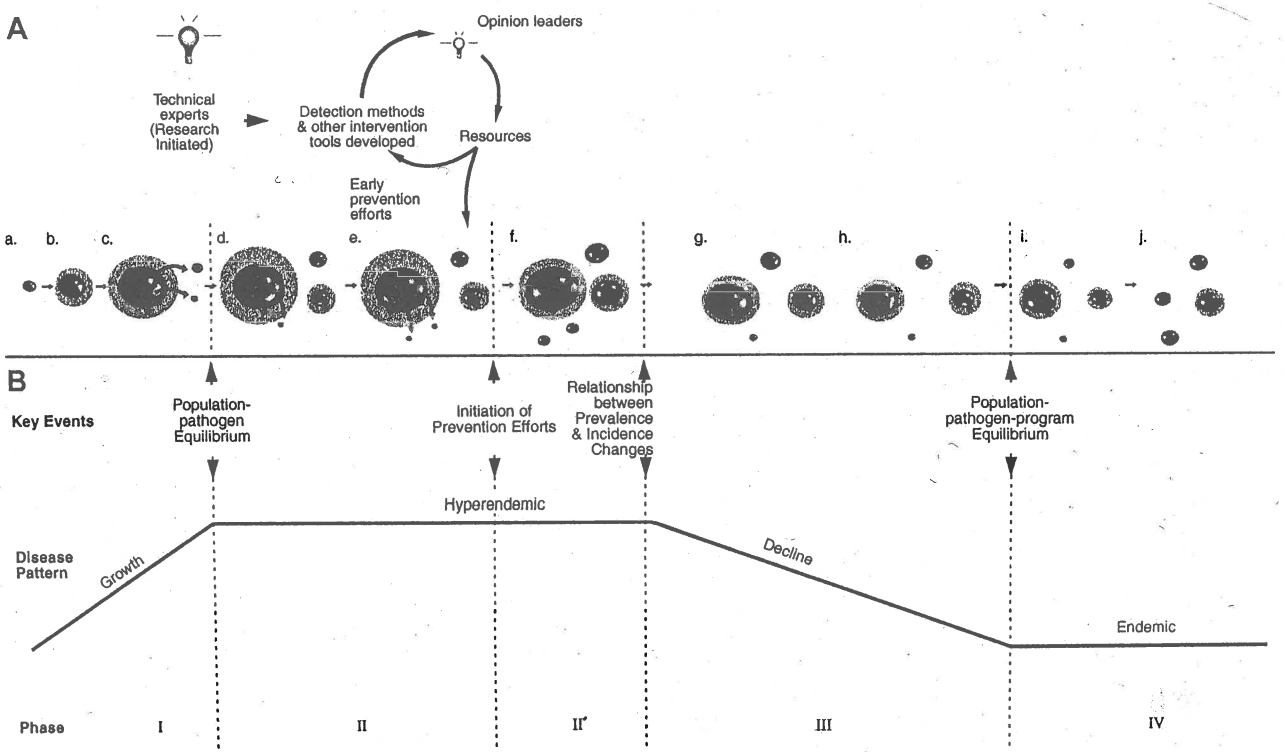


Figure 1. A, "Natural" and "controlled" history of STD epidemics from perspective of changes over time in subpopulations in which spread and maintenance sexual networks are located. Dense spheres depict subpopulations containing spread networks, while mottled "halos" represent subpopulations containing maintenance networks. Arrows that link spheres with halos or with new spheres represent bridge populations. This population-level, host-focused perspective emphasizes importance of program interventions and social networks as determinants of epidemiology of STDs. B, "Natural" and "controlled" history of STD epidemics from perspective of changes over time in disease patterns, highlighting key events that mark transitions into new phases of epidemic. This population-level, pathogen-focused perspective is complementary to that in A, and each disease phase corresponds to stage in evolution of sexual networks and subpopulations that are central to STD transmission.

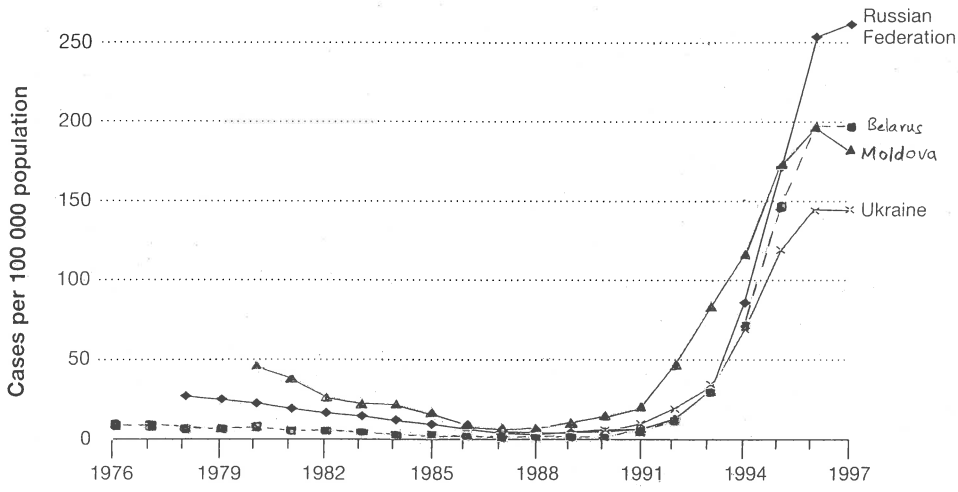
Footnotes: See next page

Figure 1.7 Dynamic topology of STD epidemics [Wasserheit & Aral, 1996]

A. The history of STD epidemics from the perspective of changes over time in subpopulations in which spread and maintenance sexual networks are located. Dense spheres depict subpopulations containing spread networks, while mottled "halos" represent subpopulations containing maintenance networks.

B. The history of STD epidemics from the perspective of changes over time in disease patterns, highlighting key events that mark transitions into new phases of the epidemic.

Figure 1.8 Reported annual incidence of syphilis in Belarus, the Russian Federation, Moldova and Ukraine, 1976-1997



Source: *WHO Regional Office for Europe*

Chapter 2

Goals and objectives

Goal and objectives

The goal of the studies presented in this thesis is:

To describe and assess the surveillance and epidemiology of three sexually transmitted diseases (gonorrhoea, syphilis and genital chlamydial infections) in Switzerland, and to define "minimum essential data" for the surveillance of sexually transmitted diseases by the Swiss Federal Office of Public Health in the year 2003.

This goal was pursued by the following approaches:

General objective 1:

To assess the national laboratory surveillance system.

Specific objectives:

- To describe the present STD surveillance system in Switzerland;
- To describe STD surveillance systems in other industrialised nations;
- To evaluate the national laboratory reporting system in Switzerland.

General objective 2:

To assess a sentinel surveillance system of HIV and STDs based on six policlinics of dermatology.

Specific objectives:

- To describe the rationale of this type of surveillance system;
- To describe the policlinics of dermatology, their activities, the patients attending them and other relevant surveillance characteristics;
- To assess the prevalence of HIV among STD patients consulting the policlinics over time;
- To assess risky sexual behaviours of STD patients consulting the policlinics.

General objective 3:

To assess a sentinel surveillance system of STDs based on gynaecologists (the Sentinella surveillance system).

Specific objectives:

- To describe the rationale of this type of surveillance system;
- To estimate the prevalence and risk factors of genital Chlamydial infections among women consulting gynaecologists in the Sentinella surveillance system;
- To extrapolate the results of this study and compare them to the laboratory tests of *C trachomatis* reported to the Swiss Federal Office of Public Health.

Chapter 3

Surveillance of sexually transmitted diseases in Switzerland, 1994-1994: evidence of declining trends in gonorrhoea and syphilis

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Surveillance of sexually transmitted diseases in Switzerland

Abstract:

The HIV/AIDS epidemic has led to growing interest in the epidemiology of sexually transmitted diseases (STDs) in Switzerland. STD surveillance data from three sources are presented: reports from six policlinics of dermatovenereology since 1973, laboratory reports of *Neisseria gonorrhoeae*, *Treponema pallidum* and *Chlamydia trachomatis* since 1988, and reports by the Swiss Sentinel Network between June 1991 and December 1993. The data indicate that there has been a decline in the number of cases of syphilis and, in particular, gonorrhoea since the early 1980s in Switzerland. Since many factors could explain the declines (eg: more effective treatments, more widespread use of antibiotics, marked changes in behaviour such as increased levels of condom use) it is difficult to identify their exact causes. Evidence for two of the before-mentioned factors exists and these probably played important roles in the declines. Firstly, as a result of the emergence of penicillinase producing strains of *N. gonorrhoeae*, the introduction of new treatments for gonorrhoea in the early 1980s which were simpler to administer and more effective (in particular the use of spectinomycin). Secondly, the national AIDS prevention campaign which began in 1987 and has been associated with major increases in condom use in the Swiss population.

Introduction

The HIV/AIDS epidemic has led to growing interest in the epidemiology of sexually transmitted diseases (STDs) in Switzerland. This is because STDs serve as an important marker of behaviour associated with a risk of HIV transmission and they have been proposed as a means evaluating the effectiveness of AIDS prevention campaigns [Renton & Whitaker, 1994]. In addition, STDs may act as co-factors or facilitators in the transmission of HIV infection [Catchpole, 1992] and recent evidence has been presented which has shown that a comprehensive STD intervention programme can reduce the incidence of HIV in a population [Grosskurth et al, 1995].

The Swiss Federal Office of Public Health (SFOPH) has three sources of information concerning the epidemiology of STDs in Switzerland: reports by six policlinics of dermatovenereology since 1973 [BAG, 1989; BAG, 1992], laboratory reports of *Neisseria gonorrhoeae*, *Treponema pallidum* and *Chlamydia trachomatis* since 1988 [BAG, 1992], and the Swiss Sentinel Network which collected epidemiological information on STDs between June 1991 and December 1993 [Zimmermann, 1993; Paget, 1995]. This paper pays particular attention to trends in gonorrhoea and syphilis.

Methods

The six policlinics of dermatovenereology

The six policlinics of dermatovenereology are the six specialised centres for the treatment of dermatological and venereological problems in Switzerland. Five of these centres are based at University Hospitals (in Basel, Bern, Geneva, Lausanne and Zürich) and one is attached to a major hospital (Triemlispital Zürich). Between 1973 and 1988, these policlinics had their own surveillance system for gonorrhoea and syphilis. From 1989 onwards, the data analysis was transferred to the SFOPH as part of a European Concerted Action to monitor the prevalence of HIV among STD patients [The European Study Group, 1993; BAG, 1993].

The European project brought about three major changes in the data gathered. Firstly, information was collected on voluntary HIV test results. Secondly, the number of reported STDs increased from two (gonorrhoea and syphilis) to 15. Thirdly, anonymous, socio-demographic and behavioural information was collected for each patient [Paget et al, 1995]. Before the start of the European study, only the crude number of gonorrhoea and syphilis cases were collected by the six policlinics.

Laboratory reports of Neisseria gonorrhoeae, Treponema pallidum and Chlamydia trachomatis

Laboratory reports of *Neisseria gonorrhoeae*, *Treponema pallidum* (the pathogenic agent for syphilis) and *Chlamydia trachomatis* to the SFOPH began in September 1987 when the Federal Ordinance on the Reporting of Infectious Diseases was changed [Swiss Confederation, 1987]. These reports are made by recognised laboratories, are anonymous, and include the sex, place of residence (canton) and the year of birth of the patient (no clinical information is reported).

Since there were important variations in the participation of laboratories between 1988 and 1994 and we wanted to present trends over time, only reports from laboratories which provided reports in each year were analysed. Using this selection criteria, the majority of cases reported to the SFOPH were retained for the analysis (for *Neisseria gonorrohoeae* 87% of reports, for *Treponema pallidum* 81% and for *Chlamydia trachomatis* 88%).

Swiss Sentinel Network

The Swiss Sentinel Network began in 1986. The network is based on a sample of general practitioners, internists and paediatricians (average annual number of participating physicians: 144). Physicians report epidemiological information on different diseases, predominantly infectious ones, on a weekly basis. Some diseases have been included in the surveillance system since 1986 (e.g. influenza or measles) whilst others have been introduced for shorter time periods (e.g. streptococcal diseases). STDs were included in the questionnaire between June 1991 and December 1993 [Zimmermann, 1993; Paget, 1995].

Information collected on each patient diagnosed with an STD included: sex, age, diagnosis and aetiology (if obtained). As with the policlinics of dermatovenereology since 1990, a wide range of STD diagnoses were reported. For the analysis of this data we excluded the paediatricians as they only reported 4 cases during the two and a half year period. The average annual number of general practitioners and internists participating in the Swiss Sentinel Network during this period was 119, representing 2.4% of physicians working in these two specialities [Matter et al, 1995].

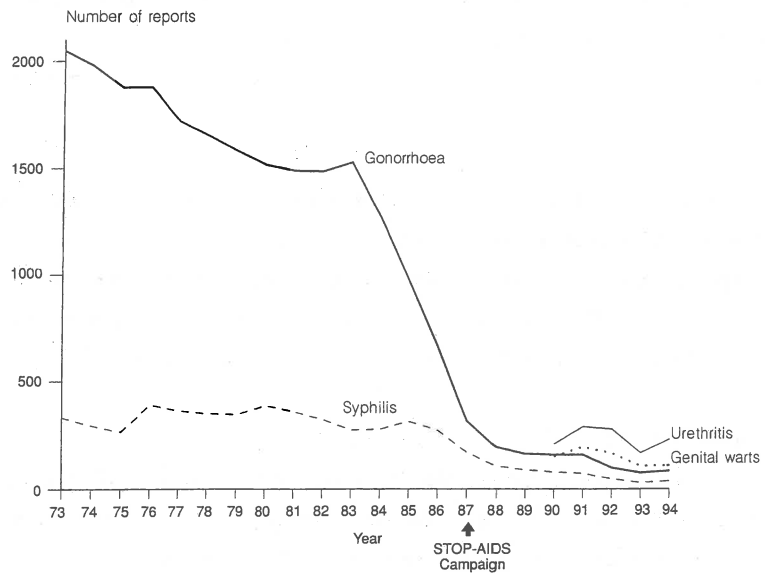
Results

The six policlinics of dermatovenereology

Figure 3.1 shows reports by the policlinics of dermatovenereology of gonorrhoea and syphilis between 1973 and 1994 and urethritis and genital warts since 1990. Urethritis was the most

common STD reported between 1990 and 1994 (29% of total reports) followed by genital warts (18%) and gonorrhoea (14%).

Figure 3.1 STDs reported by the six policlinics of dermatovenereology, 1973-1994



Between 1973 and 1994, the number of cases of gonorrhoea fell from 2049 to 83 (a decline of 96%) and of syphilis from 331 to 37 (89%). The largest decline in gonorrhoea was observed between 1983 and 1988 when reports fell from 1525 to 194 (87%). For syphilis, the largest decline began in 1987 when reports fell from 271 in 1986 to 88 in 1989 (67%).

Laboratory reports of Neisseria gonorrhoeae, Treponema pallidum and Chlamydia trachomatis

Between 1988 and 1994, 17 laboratories reported 2,126 cases of *Neisseria gonorrhoeae*, 5 laboratories reported 1,838 cases of *Treponema pallidum* and 24 laboratories reported 18,205 cases of *Chlamydia trachomatis*. There was an overall declining trend in the annual number of reports of *Neisseria gonorrhoeae* with infections falling from 358 in 1988 to 230 in 1994 (Figure 3.2). Annual reports of *Treponema pallidum* also generally declined over the seven year period from 290 in 1988 to 172 in 1994 (Figure 3.3). Reports of *Chlamydia trachomatis* first increased and then decreased after 1991 (Figure 3.4). The "Unknown" category means that the sex of the patient was not recorded in the laboratory report sent to the SFOPH.

Figure 3.2 Laboratory reports of Neisseria gonorrhoeae to the SFOPH by sex, 1994-1004

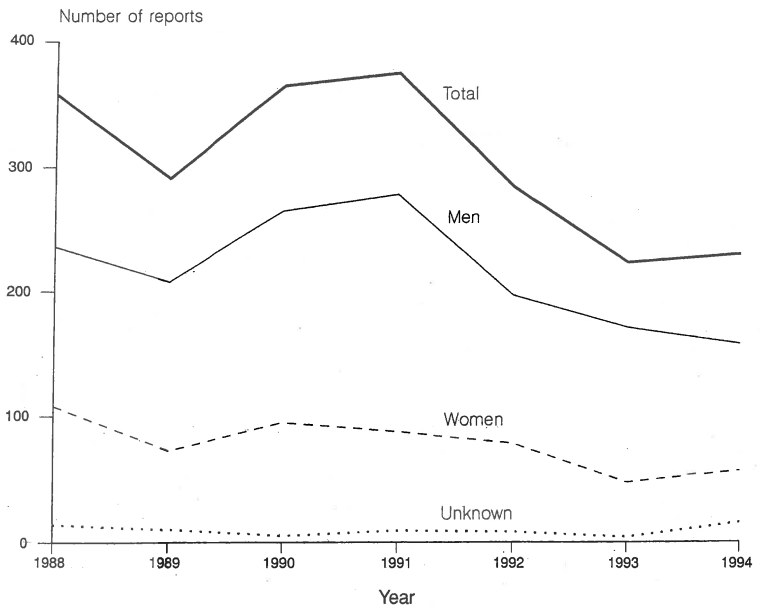


Figure 3.3 Laboratory reports of Treponema pallidum to the SFOPH by sex, 1988-1994

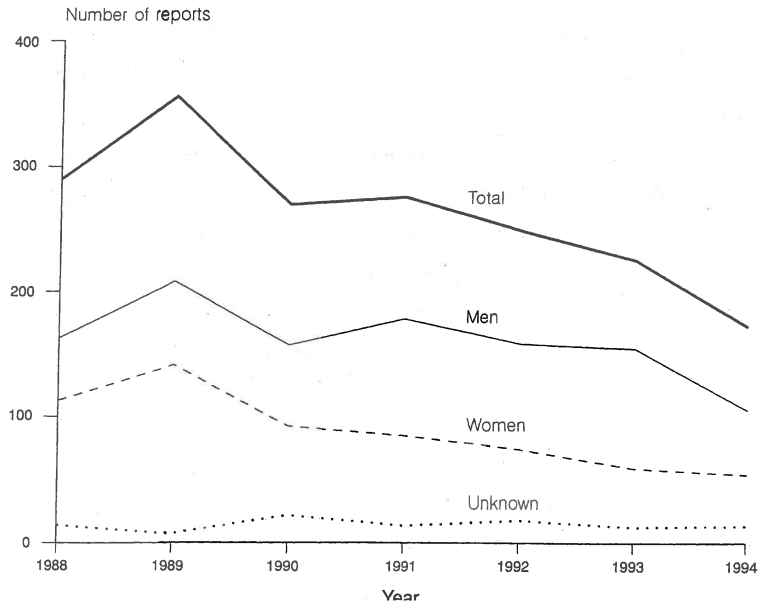
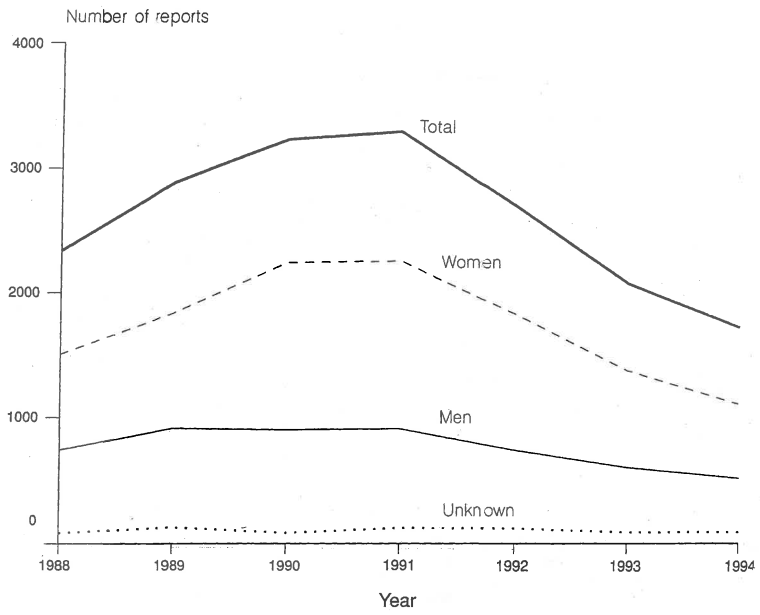


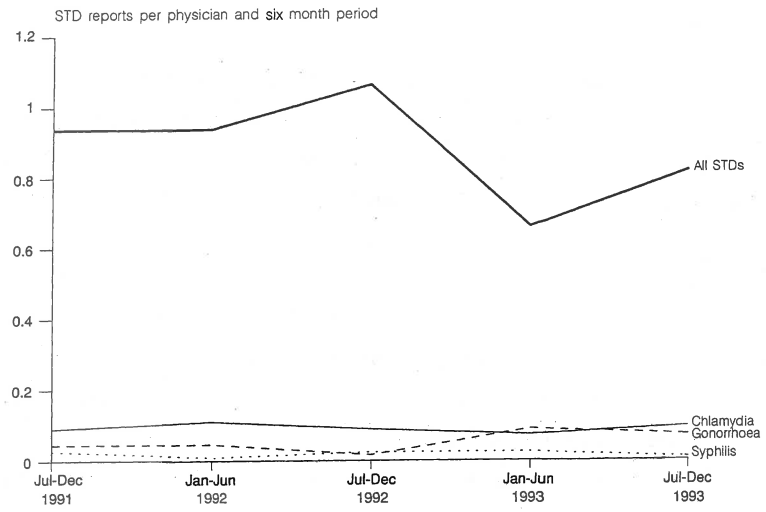
Figure 3.4 Laboratory reports of Chlamydia trachomatis to the SFOPH by sex, 1988-1994



Swiss Sentinel Network

Figure 3.5 shows trends in gonorrhoea, syphilis, chlamydia and the total number of STDs reported to the Swiss Sentinel Network between June 1991 and December 1993. These trends are presented in terms of the number of STDs reported per physician and six month period and are stable over time. Overall, roughly one STD was reported per physician and six month period. Over a six month period, roughly one case of chlamydia was reported per 10 physicians, one case of gonorrhoea per 20 physicians and one case of syphilis per 50 physicians. The most frequent STDs reported during the two and a half year period were urethritis (25% of total reports), chlamydia (10%) and genital warts (10%).

Figure 3.5 Swiss Sentinel Network: STD reports per physician and six month period, July 1991 – December 1993.



All STDs=urethritis, genital warts, genital herpes, chlamydia, trichomoniasis, gonorrhoea, scabies, pediculosis pubis, genital ulcers, syphilis, cervicitis, PID, chancroid, vulvo-vaginitis, epididymitis, other.

Discussion

The surveillance of STDs in Switzerland is based on three different sources of data. Each surveillance system produces data which are representative of different populations and are based on particular case definitions. These two important factors are developed and trends over time are discussed.

Representiveness of the data

Reports from the policlinics of dermatovenereology are characterised by low levels of representiveness. Based on the detailed reports available since 1990, the policlinics mainly see men (the overall sex ratio is 10:1), treat many non-Swiss patients (46% of all patients) and an urban population (the policlinics are located in the five largest urban centres of the country).

Laboratory reports of *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and *Treponema pallidum* should be characterised by high levels of representiveness as the major laboratories report these cases to the SFOPH. The SFOPH is presently undertaking a study to assess the

representativeness of the laboratory reports by comparing them with the testing practices of all laboratories in Switzerland.

The Swiss Sentinel Network STD reports are characterised by high levels of representiveness for men but low levels for women as gynaecologists are not included in the network [Paget, 1995]. To correct for this deficiency, the SFOPH has enrolled a sample of gynaecologists into the 1995 network which will once again include the STD theme.

Case definitions

The only surveillance system with clearly defined case definitions is the network of six policlinics of dermatovenereology. In comparison, laboratory reports may include asymptomatic infections and exclude chlamydia, gonorrhoea and syphilis infections not confirmed by micro-biological tests and reports from the Swiss Sentinel Network are deficient as there are no clear case definitions and many diagnoses may have been mis-classified (only 40% of STDs were based on a laboratory test).

Trends over time

It is difficult to comment on the trends over time in *Chlamydia trachomatis* due to the particular nature of this STD. Among women as many as 70% of infections are asymtomatic [Schachter et al, 1983] and among men this figure is 25-50% [Stamm et al, 1984]. Since no clinical information is reported with the laboratory reports, many of these reports could be asymptomatic infections. In addition, reports are very sensitive to case detection rates (the more screening the more cases) [Herrmann & Egger, 1995] and we have no information on the total number of laboratory tests performed each year. It is therefore very difficult to assess the trends of *Chlamydia trachomatis* over time and we have limited this analysis to gonorrhoea and syphilis.

The trends in gonorrhoea and syphilis can be split into two periods: trends before 1988, which are solely based on reports by the policlinics of dermatovenereology, and trends afterwards which are based on all three surveillance systems. Before 1988, the policlinics of dermatovenereology indicate a massive decline in gonorrhoea infections in the mid 1980s and generally declining trends in syphilis infections. Since this data is representative of a particular population (see discussion above), the trends cannot be directly extrapolated to the general population. From 1988 onwards, both the policlinics of dermatovenereology and the laboratory reports indicate similar declining trends in gonorrhoea and syphilis and the Swiss Sentinel Network indicate low and stable trends in gonorrhoea and syphilis between

June 1991 and December 1993. The data from the laboratories is probably the most representative of the general population and give a reasonably accurate indication of trends over time in the Swiss population.

To draw some conclusions on national trends in gonorrhoea and syphilis before 1988, data from the policlinics of dermatovenereology were compared with reports from the laboratories. Between 1980 and 1983, the policlinics of dermatovenereology reported an average of 1,503 gonorrhoea infections per annum (for the country as a whole the figure would have been much higher as the policlinics only treat a small fraction of all infections). In comparison, in 1988, the laboratories reported a total of 414 cases of *Neisseria gonorrhoeae* for the whole of Switzerland (all laboratories included). This would strongly suggest that the decline in gonorrhoea infections observed at the policlinics of dermatovenereology was more than a development in a particular population group but a national phenomenon.
A similar analysis can be performed for syphilis. Before 1987, there was a slowly declining trend in the number of syphilis cases at the policlinics of dermatovenereology with peaks in 1976 (390 infections) and 1980 (386 infections). In comparison, in 1988 the laboratories reported a total of 360 *Treponema pallidum* infections for the country as a whole (all laboratories included). This also suggests that there was a national decline in syphilis infections before 1988 (though clearly not as important as the decline in gonorrhoea infections). Furthermore, this trend (and the one observed for gonorrhoea) is similar to those observed in other European countries [Renton & Whitaker, 1994; Walckiers et al, 1991; Meyer et al, 1994; Cronberg, 1993; Renton & Whitaker, 1991]

Transmission models of infectious diseases have identified a wide range of factors which are likely to exert an important influence on the incidence rate of sexually transmitted diseases. These can be split into three groups: "biological" factors (period of infectiousness, incubation period, infectivity, protective immunity and fatality), "behavioural" factors (sexual contact rate, type of contact, sexual mixing patterns, condom use) and "other" factors (contact tracing programmes, widespread prescribing of antibiotics, biological changes in the organisms and demographic changes) [Catchpole, 1992]. It is not possible to identify the precise factors which caused the declines in gonorrhoea and syphilis in Switzerland. However, evidence for at least two factors exists: new forms of treatment for gonorrhoea introduced in the early 1980s and the national AIDS prevention campaign which began in 1987 with the launch of the STOP-AIDS campaign (an information brochure was distributed to all households in 1986) [Kocher, 1993].

With the emergence of penicillinase producing strains of *N. gonorrhoeae* (PPNG) in the late 1970s, new and more powerful antibiotics were introduced to treat gonorrhoea. In the early 1980s, a very popular treatment among physicians in Switzerland was spectinomycin [Eichmann & Piffaretti, 1984]. In addition to being an effective treatment, it was also easy to administer as it involved a single injection. The widespread use of this new treatment probably played an important role in the decline in gonorrhoea infections observed in Switzerland.

The national AIDS prevention campaign has been associated with major behavioural changes in the Swiss population (heterosexuals, homo-bisexuals and injecting drug users) [Dubois-Arber et al, 1993]. Evaluation studies have found that this campaign has been associated with dramatic increases in condom use and stable sexual contact rates in the general population [Dubois-Arber et al, 1993; Hauser & Michaud, 1994]. For example, among persons aged 17-30 who reported a casual sexual partner in the previous six months, the proportion of respondents who said they always used condoms increased from 8% in January 1987 to 61% in October 1992. At the same time the proportion of respondents who reported that they had had a casual sexual partner in the previous six months remained stable at about 15% [Dubois-Arber et al, 1993]. The behavioural changes concerning condom use are supported by condom sales which increased from 7.63 million in 1986 to 14.99 million in 1992 (data for roughly 80% of the Swiss market) [Dubois-Arber et al, 1993]. These spectacular increases in condom use have probably contributed to the decline in gonorrhoea and syphilis infections observed in Switzerland since 1987.

Surveillance des maladies sexuellement transmissibles en Suisse, 1974-1994: diminution des cas de gonorrhée et de syphilis

L'épidémie du VIH/sida a provoqué un intérêt grandissant dans l'épidémiologie des maladies sexuellement transmissibles (MST) en Suisse. Trois sources de données concernant les MST sont présentées: les déclarations de six policliniques de dermato-vénérologie depuis 1973, les déclarations des laboratoires de *Chlamydia trachomatis*, *Neisseria gonorrhoeae* et *Treponema pallidum* depuis 1988 et les déclarations Sentinella de juin 1991 à décembre 1993. Ces données montrent une diminution des cas de syphilis et plus particulièrement de gonorrhée depuis le début des années 1980 en Suisse. Comme il y a beaucoup de facteurs qui pourraient expliquer ces diminutions (p.ex. des traitements plus efficaces, une utilisation plus répandue des antibiotiques, un changement marquant dans les comportements sexuels telle qu'une augmentation de l'utilisation des préservatifs) il est difficile d'identifier les causes exactes. Deux des facteurs précités ont été documentés et ont probablement joué un rôle important. Premièrement, l'introduction de nouveaux traitements plus simple et plus efficaces (spectinomycin) utilisés dès le début des années 1980 en raison de l'apparition de souches de *N. gonorrhoeae* productrice de pénicillinase. Deuxièmement, la campagne nationale de prévention du sida qui a commencé en 1987 et qui a été associée à l'utilisation beaucoup plus fréquente des préservatifs par la population suisse.

Surveillance der sexuell übertragbaren Krankheiten in der Schweiz, 1973-1994: Abnahme von Gonorrhoe und Syphilis

Die HIV-/AIDS-Epidemie hat zur Folge gehabt, dass den sexuell übertragbaren Krankheiten (STDs) in der Schweiz vermehrt Beachtung geschenkt wird. STD-Surveillance-Daten aus drei Quellen werden präsentiert: die Meldungen der sechs Polikliniken für Dermatologie und Venerologie seit 1978, die Labormeldungen von Neisseria gonorrhoeae, Treponema pallidum und Chlamydia trachomatis seit 1988 und die Arztmeldungen im Rahmen des Sentinella-Meldesystems von Juni 1991 bis Dezember 1993. Diese Daten belegen eine Abnahme von Syphilis und insbesondere Gonorrhoe in der Schweiz seit den frühen 80er-Jahren. Da eine Reihe von Ursachen für den Rückgang dieser Erkrankungen in Frage kommen können (z.B. effektivere Behandlung, breitere Anwendung von Antibiotika, Verhaltensänderungen wie vermehrter Gebrauch von Kondomen), ist es schwierig, die hauptverantwortlichen Gründe für diese Abnahme zu bezeichnen. Es gibt Hinweise, dass zwei den folgenden Faktoren eine wichtige Rolle zukommen dürfte: erstens die Einführung von wirksameren und in der Anwendung einfacheren Medikamenten (insbesondere Spectinomycin) zur Behandlung der Gonorrhoe als Folge der Zunahme von Penicillinase produzierenden Gonokokken in den frühen 80er-Jahren und zweitens die 1987 gestartete nationale AIDS-Präventions-Kampagne, welche zu einer wesentlichen Zunahme des Kondomgebrauchs in der Schweizer Bevölkerung geführt hatte.

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Chapter 4

Trends in gonorrhoea in nine western European countries, 1991-96

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Trends in gonorrhoea in nine western European countries

Abstract

Objective: To present, describe and assess trends in gonorrhoea in western Europe between 1991 and 1996.

Methods: A European Union Concerted Action was initiated in 1990 to monitor the prevalence of HIV among patients with a sexually transmitted infection in sentinel networks in western Europe. Data from this Concerted Action were used to assess trends in gonorrhoea across western Europe between 1991 and 1996. Where possible, the trends were validated by comparing them with national laboratory reports or data from more extensive sexually transmitted infection networks.

Results: A total of 7192 episodes of gonorrhoea were recorded at 38 sentinel sites in nine countries between 1991 and 1996. In most networks, there was a decline in the number of cases of gonorrhoea among heterosexual men and women. The decline was most marked in the Scandinavian countries. Decreases were also observed among men having sex with men, but in some networks – England and Wales, The Netherlands and Scotland – an increase was observed in more recent years. This increase was mainly due to an increase in cases among the older age group (25 years and above). The trends observed in six of the sentinel networks were confirmed by trends in national laboratory reports or data from more extensive networks of patients with a sexual transmitted infection.

Conclusions: These data indicate that, overall, there was a decline in the number of gonorrhoeal cases in western Europe between 1991 and 1996. The results, however, also indicate that in more recent years there was an increase in the number of gonorrhoeal cases among men having sex with men in some countries. Further investigations are necessary to determine if this observation is related to a possible increase in risky sexual behaviours in this population group.

Key words:

gonorrhoea, western Europe, trends

Introduction

Sexually transmitted infections are a well-recognised public-health problem [Gerbase et al, 1998a]. The importance of these diseases is not only limited to their high incidence and the acute effects of infection but also to the complications they may cause and their now well-established capacity to facilitate the transmission of HIV [Wasserheit, 1992; Cohen, 1998]. Trends in the incidence of sexually transmitted infections may reflect temporal changes in sexual activity within the population. For this reason, monitoring the incidence of sexually transmitted infections has been proposed as a means of evaluating the effectiveness of AIDS prevention programmes [Renton & Whitaker, 1994]. Gonorrhoea is particularly well suited to the purpose of monitoring trends in risky sexual behaviours because the risk of infection from a single exposure is high, treatment eliminates the infection, and long term immunity is not acquired [Sherrard & Bingham, 1995].

Even though many European countries have established sexually transmitted infection surveillance systems [Renton & Whitaker, 1991], the comparison of surveillance data – e.g. data on gonorrhoea - across European borders has been conspicuous by its absence. No formal European body collects data on sexually transmitted infections at a European level, as is the case with HIV/AIDS or tuberculosis. Between 1990 and 1996, a Concerted Action of the European Communities monitored the prevalence of HIV in STI patients attending clinics in 17 sentinel networks across 15 European countries [The European Study Group, 1993]. The main results have been presented and discussed previously [Van der Heyden et al, 1997; Batter et al, 1997]. This paper presents and assesses the Concerted Action data on trends in gonorrhoea between 1991 and 1996 in nine western European countries.

Methods

The Concerted Action collected standardised information on patients attending sentinel network clinics with one or more episodes of a sexually transmitted infection between June 1990 and December 1996. A detailed description of the methodology and study design has been published previously [The European Study Group, 1993]. The list of selected sexually transmitted infections is presented in Table 4.1.

Table 4.1 List of 12 sexually transmitted infections with minimum methods of diagnosis for selection of patients.

Sexually transmitted infection	Minimum method of diagnosis
1. Male urethritis	Clinical or microscopy[1]
2. Proctitis	Clinical or microscopy
3. Mucopurulent cervicitis	Clinical and/or microscopy[2]
4. Chlamydia	Culture, ELISA or IF
5. Gonorrhoea	Microscopy or culture
6. Herpes genitalis[3]	Clinical, culture, ELISA, IF
7. Chancroid	Clinical and microscopy or culture
8. Syphilis[4]	Dark ground microscopy or RPR ≥ 1 : 16 and one specific test
9. Genital warts (HPV)[5]	Clinical
10. Trichomonas vaginalis	Microscopy or culture
11. Pelvic inflammatory disease	Clinical or laparoscopy
12. Pediculosis pubis	Clinical

1 Except chlamydia and gonorrhoea
2 Except gonorrhoea
3 First clinical presentation only
4 All early cases = first 2 years
5 First clinical presentation only

ELISA, enzyme-linked immunosorbent assay; IF, immunofluorescence; RPR, rapid plasma reagin; HPV, human papillomavirus

This list of diseases was adopted by consensus between the participating networks as representing infections that were likely to have been acquired through recent sexual contact, and that could be diagnosed through standardised widely available methods. A standard questionnaire was completed for each selected episode. The following items were recorded: age, sex, country of birth and residence, education, diagnosis of the sexually transmitted infection(s), method(s) of diagnosis, current sexual orientation (in previous 6 months, as stated by the patient), number of sexual partners during the previous 6 months, intravenous drug use since 1978, previous and present HIV-antibody testing. Each national co-ordinator was responsible for establishing and running his or her network. The networks consisted of clinics for sexually transmitted infections, dermato-venereology clinics or gynaecology clinics.

One network (Belgium) consisted mainly of sentinel general practitioners. A list of the networks and the number of sexually transmitted infection episodes per network is presented in Table 4.2.

This paper presents trends in diagnoses of gonorrhoea. The case definition used in the study protocol included infections identified by culture or, where appropriate, microscopy, in the cervix, urethra, rectum or throat. Information on the anatomical site of the gonorrhoeal infection was not available in all networks and was therefore not included in the analyses.

Table 4.2 Number of sexually transmitted infection episodes and episodes of gonorrhoea in the European Union Concerted Action Programme and number of sites and gonorrhoea episodes included in the trend analysis

Network's location	Total number of STI episodes in the project	Total number of gonorrhoea episodes in the project from 1991 to 1996	Number of selected sites out of total	Total number of gonorrhoea episodes in selected sites from 1991 to 1996*
Belgium	2693	98	0/69	0
Czech Republic	8277	1518	0/4	0
Denmark	13368	692	7/9	657
England/Wales	50604	2783	6/6	2783
Finland	3140	143	1/1	143
France	6387	N/A	0/15	0
Germany	1156	139	0/5	0
Greece	5669	323	4/4	323
Italy	9902	753	4/7	551
Netherlands (Amst.)[1]	4702	564	1/1	564
Netherlands (Rott.)[2]	2056	308	0/1	0
Norway	6063	127	0/1	0
Portugal	2182	242	1/1	242
Scotland[3]	24221	1228	3/3	1228
Spain (Basque C.)	2102	37	0/1	0
Sweden	8325	150	5/5	150
Switzerland	4078	551	6/6	551
Total	**154926**	**9656**	**38/140**	**7192**

Footnotes: See next page

1 No data for 1993
2 Network joined only in 1993
3 No data for the second semester of 1996
* Exclusion criteria:
1. Less than 120 gonorrhoea cases during the whole study period
2. Not submitting data on a consistent basis
3. Change in catchment population due to events such as the opening or closing of a nearby health facility

Analyses were restricted to networks that reported at least 120 gonorrhoea cases during the whole study period and to sites that submitted data on a consistent basis and did not experience changes in their catchment population due to events such as the opening or closing of a nearby health facility. The latter was assessed through an evaluation study that was carried out between December 1996 and April 1997 [Batter et al, 1997]. The evaluation was based on a questionnaire that was sent to each network co-ordinator and the lead collaborator at each of the reporting clinics.

The sentinel populations were chosen as they represented a group at elevated risk of HIV infection through recent sexual contact, rather than being representative of the total population of all patients with a sexually transmitted infection in a country.

Because of the heterogeneity of the type, size, and catchment populations of the networks, it was decided that the data should not be aggregated but that differences and similarities across the networks would be explored. When possible, the observed trends were validated by comparing the data with laboratory reports or with more extensive clinical reporting or notification data on sexually transmitted infection in the same country. Parameter values used in the analyses were expressed relative to the relevant 1991 value.

Trends for all networks were presented for men having sex with men, heterosexual men and all women. Men having sex with men were defined as 'men who were homosexually active during the past 6 months, as stated by themselves'. If sufficient data was available, trends were also assessed for under twenty-fives and over twenty-fives, separately. Finally, some patient characteristics and the change of these characteristics over time were studied. This was performed by gender, sexual orientation among men, age, and being born or having normal residence in another country.

Statistical methods

Within network trends were tested for significance by linear regression analysis. Statistically significant changes in the proportions of patient characteristics between 1991 and 1996 are reported by presenting the difference, with 95% confidence intervals.

Results

Networks

Ten networks were eligible for inclusion in the analyses (see Table 4.2). The numbers of cases in the Swedish and Finnish networks were considerably smaller than in the other eligible networks. As the characteristics of the sites and the patients were similar in both networks, it was decided that data from these two networks should be aggregated together, resulting in a total of nine networks in the analyses.

Two clinics in Denmark and one clinic in Scotland reported changes in the opening times of their clinic during the study period, but the effects of these changes were considered as marginal and not likely to affect the overall trends.

Table 4.2 shows that the proportion of sexually transmitted infections accounted for by gonorrhoea varies considerably among the networks: from two per cent (150/8325) in Sweden to 18% (1518/8277) in the Czech Republic. These differences may be partly explained by geographical differences in the incidence of gonorrhoea but are also due to differences in the composition of the catchment population. Table 4.3 specifies some differences among the networks in terms of type of included health facilities and their location.

Table 4.3 Site characteristics of the networks selected in the analysis

Network	Total N° of sites	N° of sites located in			N° of sites which are mainly a		
		major town	Small town	rural area	STD clinic	dermato clinic	gynae clinic
Nordic Countries							
Sweden and Finland	6	4	2	0	1	5	0
Denmark	7	5	1	1	4	3	0
Netherlands	1	1	0	0	1	0	0
Mediterranean countries							
Greece	4	4	0	0	0	4	0
Italy	4	2	2	0	0	3	1
Portugal	1	1	0	0	1	0	0
Other countries							
England & Wales	6	3	0	3	6	0	0
Scotland	3	3	0	0	3	0	0
Switzerland	6	6	0	0	0	6	0

A total of 7192 episodes of gonorrhoea from 38 sites, most of them sexually transmitted infection clinics, were included in the final analysis.

Characteristics of gonorrhoea cases

Some of the characteristics of the patients per network are described in Table 4.4. Among the gonorrhoeal cases the proportion of men varied from 60.3% in Portugal to 95.1% in Italy. This variation is a reflection of the populations which are attracted to one or more of the clinics in some of the networks, for example men having sex with men. The proportion of cases among patients aged less than 25 ranged from 16.3% in Switzerland to 44.3% in Scotland. An HIV seroprevalence of 10% or more was found in four networks, especially networks with a high proportion of men having sex with men. In the seven networks for which this information was available, the proportion of cases among patients with five or more sexual partners during the previous six months ranged from 23.2% in Sweden and Finland to 66.1% in Greece.

Table 4.4 Characteristics of the gonorrhoea cases in the networks selected in the analysis

Network	Sex ratio (M/F)	% homo/ bisexuals among men	% <25 yrs	% foreigners[1]	HIV sero-prev. (%)	Cases of gonorrhoea
Nordic countries						
Sweden & Finland	2.5	11.8	29.7	N/A2	1.2	293
Denmark	3.5	38.7	30.3	25.7	12.3	657
Netherlands	5.5	46.7	23.2	60.0	12.0	564
Mediterranean countries						
Greece	9.8	19.4	26.6	26.9	1.6	551
Italy	19.4	35.9	20.3	33.4	10.3	564
Portugal	1.5	3.4	25.2	26.0	8.1	242
Other countries						
England & Wales	3.8	59.5	35.7	N/A2	10.5	2783
Scotland	3.2	37.8	43.7	N/A2	2.4	1228
Switzerland	17.3	32.2	16.2	45.0	7.8	551

1 Patients being born or whose normal residence is in another country
2 Information not available

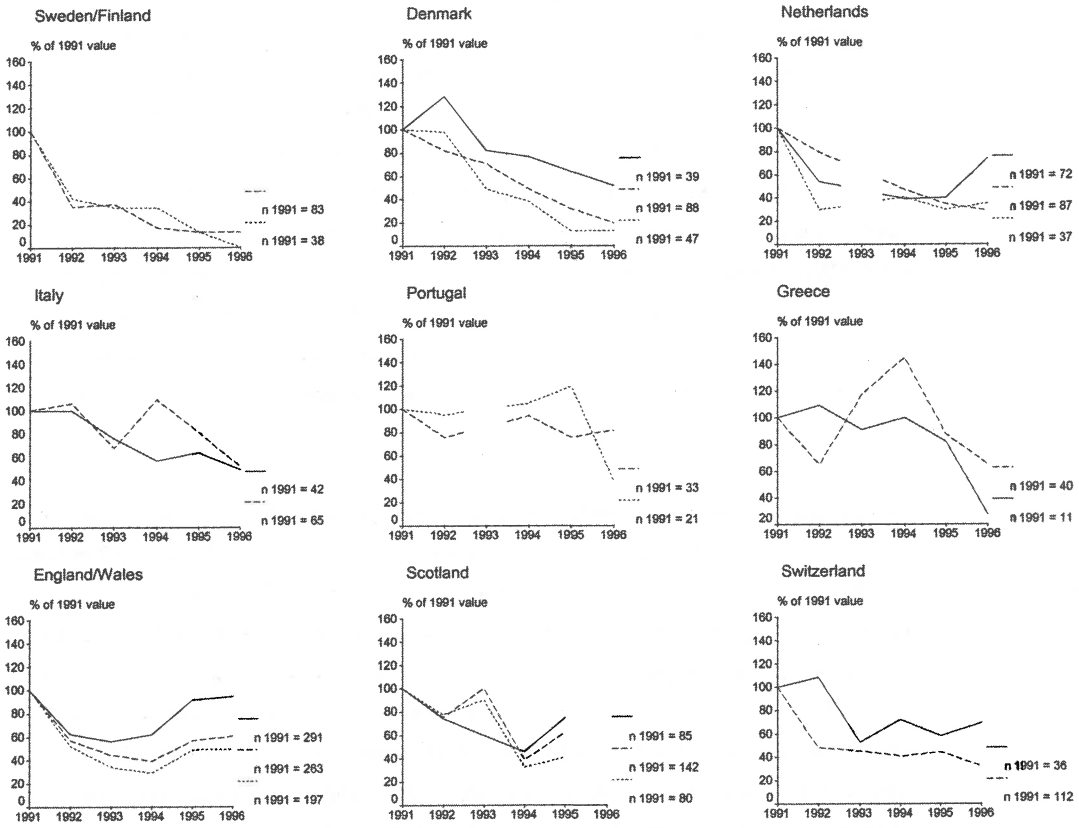
A significant increase in the proportion of men between 1991 and 1996 was observed in Denmark (+12.9% ;95%CI:0.6-25.2%), England and Wales (+ 7.8%;CI:3.0-12.8%), Italy (+ 8.3%;CI:1.9-14.7%) and Scotland (+ 9.1%;CI:0.4-17.9%). In most networks this was due to an increasing proportion of men having sex with men. A significant increase in the proportion of men having sex with men among all men was indeed observed in Denmark (+23.2%;95%CI 5.4-41.3%), England and Wales (+10.7%;95%CI 4.1-17.4%), The Netherlands (+22.7%;95%CI 9.7-35.6%), Scotland (+17.8%;95%CI 5.5-30.1%) and Sweden-Finland (+24.3%;95% CI 1.7-46.9%). The proportion of cases among patients aged less than 25, the proportion of patients born, or whose normal residence was in another country, the HIV seroprevalence among all cases and the proportion of cases among patients reporting five or more sex partners during the previous 6 months remained stable in most of the networks during the whole study period.

Trends in the networks

Figure 4.1 presents gonorrhoea trends by network among men having sex with men, heterosexual men and women between 1991 and 1996. In most networks, there was a sharp decline in cases in the early 1990s followed by a levelling off – or even an upturn – in cases towards the end of the study period. A continued decline in cases beyond 1994 was only seen in Denmark, Greece, Italy, Portugal and Sweden and Finland. The declining trend was most marked among heterosexual men and all women. The decrease in the number of cases among heterosexual men between 1991 and 1996 ranged from 87% in the Swedish and Finnish network to 18% in the Portuguese network. The decline was only statistically significant in the two Scandinavian networks ($p < 0.001$ for the Danish network and $p = 0.038$ for Sweden and Finland). The decrease in the number of cases among women varied from 100% in the Swedish and Finnish network (38 cases in 1991 compared to none in 1996) to 51% in the English and Welsh network. Once again, the decline was only statistically significant in the two Scandinavian networks ($p = 0.003$ for Denmark and $p = 0.012$ for Sweden and Finland).

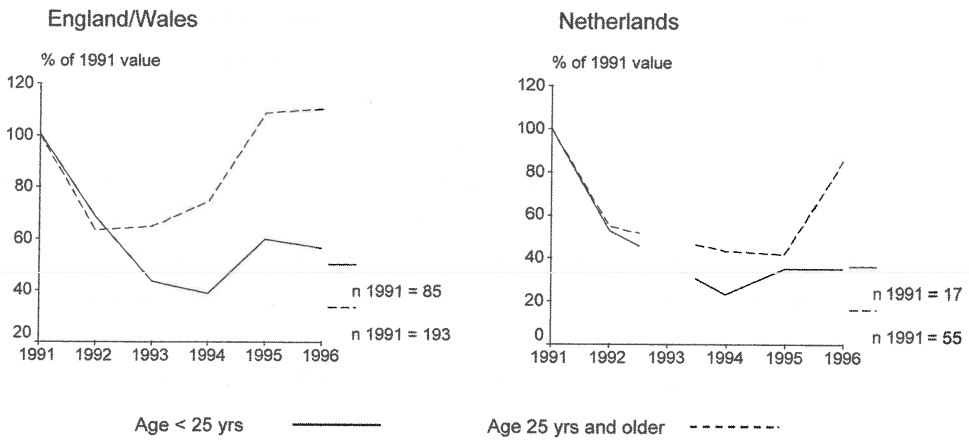
Two patterns in gonorrhoea trends among men having sex with men could be distinguished. In Denmark, Italy and Greece, a continued decline in cases was observed beyond 1994. These trends were significant in the Danish and Italian networks ($p = 0.027$ and $p = 0.006$, respectively). In England and Wales, The Netherlands, Scotland and Switzerland, the number of cases of gonorrhoea among men having sex with men remained stationary or even increased after 1994. This was most marked in The Netherlands and England and Wales, where the number of cases in 1996 increased by 90% and 52%, respectively, compared to 1994. Stratification by age group (see Figure 4.2) indicated that this increase was mainly due to an increase among the men among men (25 years and above).

Figure 4.1 Gonorrhoea cases among men having sex with men, heterosexual men and women in 9 European networks, reported by sexually transmitted infection services during the period 1991-996, relative to the values in 1991



No results are presented for women in the Italian, Greek and Swiss network and men having sex with men in the Swedish and Finnish and the Portuguese network because the total number of observations over the 6 years for those strata was too small (30 or less)

Figure 4.2 Gonorrhoea among men having sex with men in two European networks by age group, reported by sexually transmitted infection services during the period 1991-996, relative to the values in 1991



Comparison of trends in the networks with national available data

The comparison of trends observed in the Concerted Action data with trends observed in laboratory reports of *Neisseria gonorrhoeae* or more extensive clinical reporting or notification data of gonorrhoea in the same country could be carried out in six networks (see Figure 4.3).

For the Danish, Swedish and Finnish and Swiss networks, trends were compared with data from laboratory reports [Statens Serum Institut, 1998; Swedish Institute for Infectious Disease Control, 1996; Swedish Institute for Infectious Disease Control, 1998; National Public Health Institute, 1995; National Public Health Institute, 1997; BAG, 1998]. In the England and Wales network, the trends were compared with aggregated data from all sexually transmitted infection clinics in England and Wales [CDSC, 1996]. For the Italian network, the comparator was data from the National Surveillance System for Sexually Transmitted Diseases [Suligoi et al, 1994; Giuliani & Suligoi, 1998]. In The Netherlands, data between 1991 and 1996, stratified by gender, was only available for the sexually transmitted infection clinic in Amsterdam and the comparator was data from other sexually transmitted infection clinics in the country [Cairo, 1998]. Figure 4.3 reveals that the trends observed in the Concerted Action are remarkably similar to those observed in the other data sets, even though the number of cases in the Concerted Action, especially for women, were, for some networks, small.

Discussion

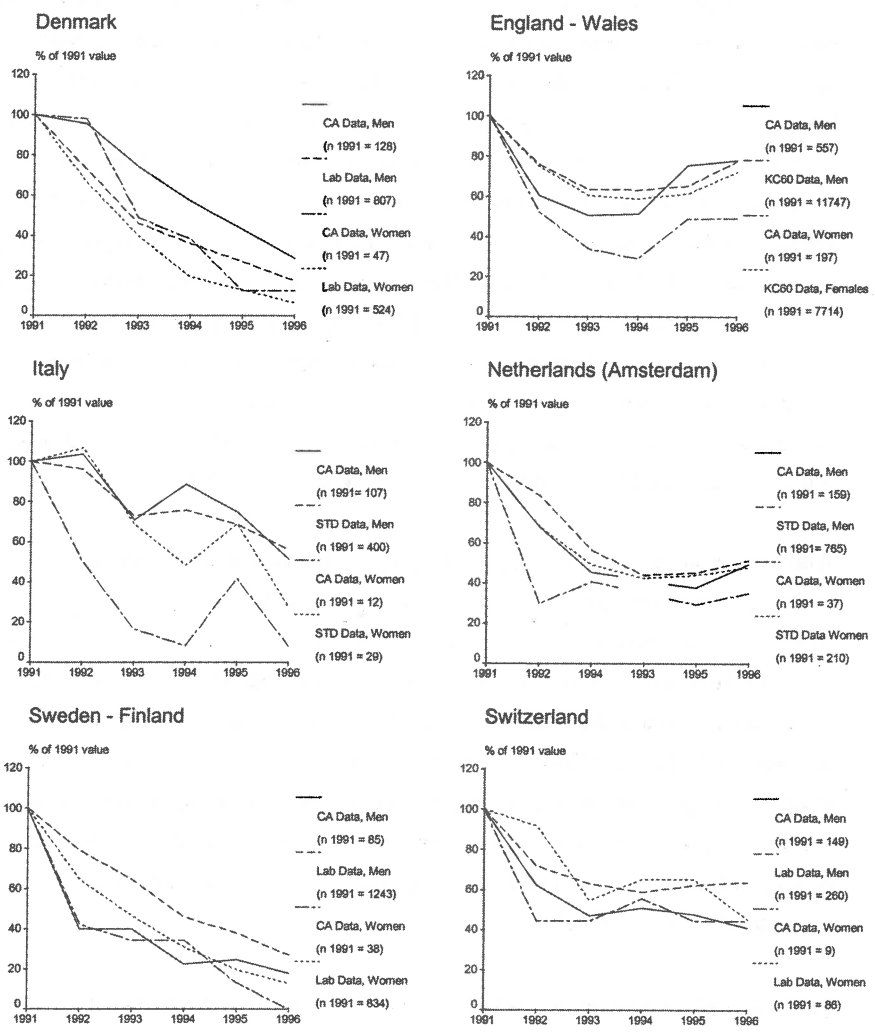
Although the main purpose of the European Concerted Action was not to monitor trends in sexually transmitted diseases, a major outcome of the project was that a large databank was created with sexually transmitted infection data from different sentinel networks across Europe. The data were collected according to a standard protocol and validated and centralised by the co-ordinating centre in Brussels.

It is acknowledged that the proportion of patients with gonorrhoeal disease which are covered by the type of health facility participating in this concerted action programme will vary substantially from one country to another. The primary objective of the Concerted Action project was, however, to detect changes in the proportion of HIV infected individuals over time. The sentinel populations were not chosen to be representative of the total population of all patients with a sexually transmitted infection in a country. The objective of this analysis, in accordance with the objective of the Concerted Action, was to assess trends over time. In this respect, representativeness is less important than the stability of the networks over time. Since each network remained stable, in terms of catchment population and patient characteristics, and data were stratified according to gender and sexual orientation, and since other nationally available data indicated similar trends, we believe that it is possible to draw conclusions and make comparisons of the trends that were observed.

A declining trend in cases of gonorrhoea among heterosexual males and all women was observed in the Concerted Action data between 1991 and 1996 in several European countries. Trends among men having sex with men also showed a decline in the early 1990s, but in the second half of the study period a levelling off – or even an upward trend – was observed in some networks. For those countries with information on laboratory reports of *Neisseria gonorrhoea* or clinical reports/-notifications of gonorrhoea during the same period, trends were similar to those in the Concerted Action.

The Concerted Action trends are also in line with previous reports in a number of western European countries during the past two decades [Catchpole, 1992; Paget & Zimmermann, 19997; Cribier et al, 1994; Cronberg, 1993]. Several factors may explain the overall decline in gonorrhoea in western Europe during the last two decades [Renton & Whitaker 1991; Piot & Islam, 1994]. These include improved treatment facilities, a wider use of antibiotics for other illnesses that might result in the serendipitous treatment of coincident gonorrhoea, and increased condom use and safer sexual behaviours resulting from sexual health promotion developed in response to the emergence of HIV/AIDS. In Sweden the decline has also been attributed to intensive contact tracing [Ruden et al, 1993; Piot & Islam, 1994].

Figure 4.3 Comparison between trends observed in the EU Concerted Programme and trends observed in laboratory reports of Neisseria gonorrhoeae or more extensive sexually transmitted infection networks (6 networks), relative to the 1991 value. A description of the comparison data sets is presented on page 8



If the trends do reflect changes in sexual behaviour, it would be valuable to get a better insight into the nature of these changes. The notion that gonorrhoea occurrence in a population reflects some evenly distributed parameter of sexual behaviour is generally not supported. The more accepted concept is that of the core-group model, which emphasises that changes in gonorrhoea incidence mainly reflect changes in behaviour among a small number of highly sexually active individuals [Yorke et al, 1978; Rothenberg, 1983; Rothenberg

& Potterat, 1988]. Our data support this concept as an important proportion of the gonorrhoea episodes were observed among individuals who were highly sexually active. Figure 1 suggests that trends in gonorrhoea are less favourable among men having sex with men than among heterosexual men and women. Increases of gonorrhoea in men having sex with men were documented at the end of the 1980's both in the UK and The Netherlands [Evans et al, 1993;Van den Hoek et al, 1993] and more recently in the UK [CDSC, 1999; Hughes et al, 2000] and is clearly confirmed by the Concerted Action trends observed in England and Wales. There were also increases in the absolute number of cases of gonorrhoea in the Swiss and the Dutch networks among men having sex with men between 1995 and 1996. A possible explanation for the increase in cases of gonorrhoea among men who have sex with men in England and Wales and The Netherlands at the end of the study period is that a group of men, who had previously made appropriate changes towards safer sex, are reverting to unsafe sexual practices. Figure 2 would suggest that in both countries this group is largely made up of men having sex with men above the age of 25. This is in line with a recent study in Greece where a gradual quantitative and qualitative shift toward older ages was observed among gonorrhoea cases in men [Kyriakis et al, 1999].

The correlation between trends in reported gonorrhoea incidence and the effectiveness of disease prevention programmes is not straightforward [Adler, 1997], and it would therefore be incorrect to conclude that the different trends observed in this study represent simple performance measures of different health systems in Europe. Nonetheless, the more pronounced decline in the number of gonorrhoeal cases, especially among heterosexual men and women, in the Scandinavian networks compared to the other European networks is notable. The significance of this phenomenon remains unclear. It may reflect differences of health care sytems but may also reflect differences in cultural attitudes to discussion of biology and sexual relations and the effect of that on AIDS and sexually transmitted infection prevention [Cronberg, 1993].

Although the Czech network was not included in our analysis because complete data were only obtained from 1992 onwards and the catchment population changed during the study period, it is worthwhile mentioning that this network was the only network to report an increase in cases of gonorrhoea among women between 1992 and 1996. This is in line with increasing sexually transmitted disease rates among prostitutes that have earlier been observed in the Czech Republic [Kastankova, 1995]. The sharp contrast between the declining trends in western Europe and the explosive trends in eastern Europe needs to be

emphasised. According to WHO figures, the estimated incidence of gonorrhoea in eastern Europe and central Asia was almost twice the level estimated in western Europe in 1995, among both men and women [Gerbase et al, 1998a]. The increasing incidence of gonorrhoea and other sexually transmitted infections in eastern Europe will be without any doubt a growing public health problem during the coming years and may possibly influence future trends in western Europe.

With the increasing mobility of people within Europe and especially the influx of people from eastern Europe to other European regions, there is greater need to look at changing patterns of sexually transmitted infection at a European level and to compare trends between different areas. A sexually transmitted infection surveillance programme based on a network of sentinel sexually transmitted infection centres in different European countries, including countries in eastern Europe would be a useful tool to reach this objective. The Concerted Action has shown that such a project is feasible and that it would be possible to integrate the sexually transmitted infection surveillance systems which are already in place in most of the European countries.

The data from the project indicate that in most countries and most exposure categories gonorrhoea in western Europe declined during the first half of the nineties. Against this positive observation on the sexual health of heterosexuals in western Europe we found less favourable trends among men having sex with men during more recent years, and a possible rise in cases in the one network from eastern Europe. Further investigations are necessary to determine if this observation is related to a possible increase in risky sexual behaviours in this population group.

Chapter 5

The Swiss Network of Dermatology Policlinics HIV prevalence study:

rationale, characteristics and results (1990-1996)

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The Swiss Network of Policlinics of Dermatology

Abstract

The Swiss Network of Dermatology Policlinics (SNDP) has monitored the prevalence of HIV among patients treated for a sexually transmitted disease (STD) since January 1990. A questionnaire was sent to each policlinic in the network (Basel, Bern, Geneva, Lausanne, and two in Zurich) to collect information on their participation in this study and the characteristics of the network. The responses reveal that the six policlinics followed the HIV prevalence study protocol in a uniform manner and had similar logistical and organisational characteristics. HIV prevalences in this population were high (1.6% among heterosexuals, 24.0% among male homo/bisexuals, and 35.7% among injecting drug users), have remained stable, and vary considerably by policlinic. In conclusion, we found that the policlinics have correctly implemented the HIV prevalence study and that the SNDP is a homogeneous sentinel surveillance system. Knowledge of the organisation and characteristics of the SNDP has allowed us to better interpret and present our data, and we recommend that other sentinel surveillance systems of this type collect this sort of information.

Introduction

The Swiss Network of Dermatology Policlinics (SNDP) has monitored the prevalence of HIV among STD patients since January 1990. This study was begun as part of a European Concerted Action (CA) to monitor HIV prevalences among sentinel STD populations in Europe [Batter et al, 1997]. An important objective of this CA was to establish an "early warning" system for the spread of HIV among heterosexuals in Europe. STD patients are a particularly appropriate population to monitor HIV prevalences since they are at increased risk for HIV infection [Quinn et al, 1990]. The STD patients consulting the SNDP have been shown to have low levels of condom use [Paget et al, 1995], high numbers of sexual partners [BAG, 1993], and to have frequently acquired their STD infection abroad, often in regions where HIV is highly prevalent [Gebhardt & Paget, 1995].

The CA allowed 15 European countries (Belgium, the Czech Republic, Denmark, England and Wales, Finland, France, Germany, Greece, Italy, Netherlands, Portugal, Scotland, Spain, Sweden, and Switzerland) to establish a common surveillance protocol in 1990. The co-ordination of the CA was performed by the Scientific Institute of Public Health (previously, the Institute of Hygiene and Epidemiology) in Brussels, with funding from the European Commission (DGXII - Medical Research Programme). The CA came to an end in October 1997 and a final evaluation report summarising the project and its findings has been published [Batter et al, 1997]. As in most countries, the HIV prevalence study in Switzerland did not stop with the end of the CA.

To interpret the HIV prevalence trends, both nationally and for all European networks grouped together, it is critical to know how the HIV prevalence study was implemented and the characteristics of the different networks [Batter et al, 1997]. A questionnaire dealing with these issues was therefore sent to each of the networks participating in the CA in November 1996. This paper presents this information for each of the policlinics in the SNDP, plus HIV prevalences between 1990 and 1996 by patient category.

Methods

The HIV prevalence study

Patients were eligible for the European CA HIV prevalence study when they consulted the policlinic with a new episode of one or more of a selected list of 12 STDs (male urethritis, proctitis, mucopurulent cervicitis, chlamydia, gonorrhoea, herpes genitalis, chancroid, syphilis, genital warts, trichomonas vaginalis, pelvic inflammatory disease, pediculosis pubis), provided that the patient had not been seen for any of these STDs in the previous 90 days [2]. The

SNDP also collected data on scabies and later stages of syphilis (i.e. non-stage I and II), and therefore collected data on a total of 13 different STDs.

Each STD patient was offered a voluntary confidential HIV test (testing with "informed consent"). A standard questionnaire was completed for each patient, even if s/he refused the test. Information on the patient (e.g. age, sex, country of birth), the STD infection, his/her sexuality (e.g. sexual orientation, number of sexual partners in the previous six months), history of injecting drug use, and the HIV test result was collected for each patient. Identification numbers rendered the questionnaires anonymous to those performing the data analysis.

The SNDP reported 5106 STD patients between January 1990 and December 1996. The following patients were excluded from the analysis of HIV prevalences: patients whose place of residence was not Switzerland (n=240), female homo/bisexuals (n=5), patients whose risk of HIV infection could not be established (n=25), and, in accordance with the CA study protocol, persons diagnosed with scabies (n=537) or later stages of syphilis (n=146). The HIV prevalence results are therefore based on a total of 4153 STD patients, of whom 3340 (80.4%) had an HIV test.

The questionnaire sent to each of the policlinics

Each policlinic in Switzerland was sent a questionnaire which was put together by the European study co-ordinators in Brussels. The questionnaire had 63 questions which covered areas such as: a description of the service, participation in the European study, HIV testing and counselling, and resources available for the study. In addition, questions were included which asked about changes at the policlinics within the last 5 years which could be relevant to the interpretation of the HIV prevalences over time (e.g. a change in the population characteristics of those consulting the policlinics, the opening or closure of medical facilities/services dealing with STDs/HIV, or the HIV testing procedure at the policlinic).

Results

Table 5.1 presents the characteristics of the six policlinics in Switzerland. All policlinics reported that they mainly worked in the field of "Dermatology", two considered themselves to be "STD clinics" (Basel and Zurich-Triemli) and two to be "Medical facilities for students" (Basel and Geneva). The mean number of policlinic patient visits per week ranged from 75 in Lausanne to 150-200 in Geneva. The proportion of all consultations which concerned a STD was low (estimated to be about 0.75% in Basel and about 10% in Zurich-Triemli and Zurich-

University). Apart from two policlinics which based their patient inclusion criteria on 12 rather than 13 STDs, the policlinics reported that they correctly followed the European CA study protocol (data not shown).

The STD patients consulting the policlinics between January 1990 and December 1996 were predominantly male (89%), and either heterosexuals (83%) or homo/bisexuals (13%) (Table 5.2). Foreigners represented 45% of all STD patients, and the two policlinics in Zurich saw 50% of all STD patients.

The HIV test was accepted by 3340 STD patients (80.4%), refused by 700 (16.9%) and no information was provided for 113 patients (2.7%). Overall, HIV prevalences between 1990 and 1996 were 1.6% among heterosexuals, 24.0% among homo/bisexual men, and 35.7% among injecting drug users (Table 5.3). HIV prevalences ranged from 0.8% (Zurich-Triemli) to 2.9% (Lausanne) among heterosexuals, from 18.2% (Zurich-Triemli) to 41.4% (Lausanne) among homo/bisexual men, and from 11.5% (Basel) to 62.2% (Zurich-University) among injecting drug users (range excludes Lausanne where there were only two injecting drug users). With the exception of a borderline significant increase in the prevalence of HIV among heterosexual STD patients in Lausanne (test for trend: $\chi 2 = 3.69$, $p=0.055$), HIV prevalences remained unchanged over time (by patient category and policlinic).

Table 5.1 Characteristics of the policlinics participating in the Swiss Network of Dermatology Policlinics

	University Hospital, Basel	**University Hospital, Bern**	**University Hospital, Geneva**	**University Hospital, Lausanne**	**University Hospital, Zurich**	**Triemli Hospital, Zurich**
Type of service STD clinic medical facility for students	dermatology,	dermatology medical facility for students	dermatology,	dermatology	dermatology STD clinic	dermatology,
Mean number of visits per day	100	about 80	150-200	75	100	80-90
Mean number of STD visits per day/month	15 per month	don't know	don't know	don't know	10 per day	8-10 per day
Identify visitors with repeated STDs	yes	yes (at depart-mental level)	no	no	yes	yes
If yes, what proportion of STD patients were seen 12 months before their current visit?	approx. 20%	no data	–	–	unknown	approx.20%
Pre-/post HIV test counselling	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
Population not returning For HIV test result (%)	20%	no data, guessed to be small	don't know	<5%	<5%	<5%

Table 5.2 STD patients[1] attending the Swiss Network of Dermatology Policlinics, January 1990-December 1996

	University Hospital, Basel	University Hospital, Bern	University Hospital, Geneva	University Hospital, Lausanne	University Hospital, Zurich	Triemli Hospital, Zurich	Total
Total	**963**	**357**	**822**	**435**	**224**	**305**	**5106**
Sex							
Men	856 (88.9)	335 (93.8)	731 (88.9)	399 (91.7)	1112 (90.8)	1131 (86.7)	4564 (89.4)
Women	107 (11.1)	22 (6.2)	91 (11.1)	35 (8.0)	111 (9.1)	174 (13.3)	540 (10.6)
Unknown	–	–	–	1 (0.2)	1 (0.1)	–	2 (0.0)
Patient category							
Heterosexual	792 (82.2)	330 (84.0)	690 (83.9)	386 (88.7)	1021 (90.8)	1044 (80.0)	4233 (82.9)
Homo/bisexual man	122 (12.7)	31 (8.7)	108 (13.1)	42 (9.7)	151 (9.1)	209 (16.0)	663 (13.0)
Injecting drug user	45 (4.7)	21 (5.9)	21 (2.6)	4 (0.9)	44 (0.1)	34 (2.6)	169 (3.3)
Unknown	4 (0.4)	5 (1.4)	3 (0.4)	3 (0.7)	8	18 (1.4)	41 (0.8)
Nationality							
Swiss	505 (52.4)	222 (62.2)	268 (32.5)	196 (91.7)	696 (56.7)	903 (69.2)	2790 (54.6)
European	345 (35.8)	78 (21.8)	281 (34.2)	137 (31.5)	328 (26.8)	271 (20.8)	1440 (28.2)
Asian	58 (6.0)	25 (7.0)	55 (6.7)	11 (2.5)	88 (7.2)	52 (4.0)	289 (5.7)
African	21 (2.2)	11 (3.1)	103 (12.5)	18 (4.1)	34 (2.8)	23 (1.8)	210 (4.1)
Other	30 (3.1)	14 (3.9)	89 (10.8)	31 (7.1)	62 (5.1)	54 (4.1)	280 (5.5)
Unknown	4 (0.4)	7 (2.0)	26 (3.2)	42 (9.7)	16 (1.3)	2 (0.2)	97 (1.9)

[1] STD diagnoses: male urethritis, proctitis, mucopurulent cervicitis, chlamydia, gonorrhoea, herpes genitalis, chancroid, syphilis (all stages), genital warts, trichomonas vaginalis, pelvic inflammatory disease, pediculosis pubis, and scabies

Table 5.3 HIV prevalences among STD patients' by policlinic of dermatology, patient group and year: Swiss Network of Dermatology Policlinics, January 1990-December 1996

	1990	1991	1992	1993	1994	1995	1996	Total
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
All policlinics								
Heterosexual	2.1 (467)	1.9 (640)	0.4 (473)	1.3 (307)	1.8 (283)	3.2 (279)	1.2 (347)	1.6 (2796)
Homo/bisexual man	30.9 (55)	21.4 (84)	25.6 (86)	20.8 (53)	22.0 (59)	20.5 (39)	26.4 (53)	24.0 (429)
Injecting drug user	47.4 (19)	31.3 (32)	52.6 (19)	33.3 (12)	33.3 (15)	16.7 (6)	16.7 (12)	35.7 (115)
University Hospital, Basel								
Heterosexual	1.8 (112)	0 (89)	0 (48)	0 (52)	2.0 (50)	2.8 (72)	1.3 (79)	1.2 (502)
Homo/bisexual man	27.3 (11)	17.6 (17)	41.7 (12)	30.0 (10)	37.5 (16)	25.0 (4)	12.5 (8)	28.2 (78)
Injecting drug user	20.0 (5)	0 (7)	0 (2)	0 (1)	0 (2)	0 (1)	25.0 (8)	11.5 (26)
University Hospital, Bern								
Heterosexual	3.8 (52)	6.3 (32)	0 (28)	0 (13)	0 (27)	7.1 (14)	0 (28)	2.6 (194)
Homo/bisexual man	0 (3)	0 (3)	12.5 (8)	0 (1)	75.0 (4)	–	0 (1)	20.0 (20)
Injecting drug user	0 (3)	33.3 (3)	50.0 (2)	0 (2)	25.0 (4)	0 (2)	–	18.8 (16)
University Hospital, Geneva								
Heterosexual	5.3 (95)	1.3 (78)	1.3 (79)	0 (52)	2.0 (49)	0 (35)	0 (27)	1.9 (415)
Homo/bisexual man	43.8 (16)	25.0 (12)	10.0 (10)	0 (11)	16.7 (6)	0 (10)	28.6 (7)	19.4 (72)
Injecting drug user	75 (4)	25.0 (1)	0 (1)	0 (3)	0 (2)	100.0 (1)	–	33.3 (15)
University Hospital, Lausanne								
Heterosexual	0 (15)	1.5 (66)	0 (36)	6.3 (32)	2.9 (35)	6.7 (30)	4.0 (25)	2.9 (239)
Homo/bisexual man	–	50.0 (10)	28.6 (7)	33.3 (3)	0 (2)	57.1 (7)	–	41.4 (29)
Injecting drug user	–	–	–	–	0 (1)	–	0 (1)	0 (2)

University Hospital, Zurich								
Heterosexual	1.2 (86)	2.2 (232)	0 (113)	1.9 (54)	2.9 (68)	5.0 (60)	1.9(106)	1.9 (719)
Homo/bisexual man	45.5 (11)	22.7 (22)	33.3 (24)	21.4 (14)	7.7 (13)	22.2 (9)	31.3(16)	26.6 (109)
Injecting drug user	100.0 (5)	42.9 (14)	75.0 (8)	75.0 (4)	60.0 (5)	–	0 (1)	62.2 (37)
Triemli Hospital, Zurich								
Heterosexual	0 (107)	2.1 (143)	0.6 (169)	1.0(104)	0 (54)	1.5 (68)	0 (82)	0.8 (727)
Homo/bisexual man	14.3 (14)	10.0 (20)	20.0 (25)	28.6 (14)	11.1 (18)	11.1 (9)	28.6(21)	18.2 (121)
Injecting drug user	0 (2)	50.0 (4)	50.0 (6)	50.0 (2)	100.0 (1)	0 (2)	0 (2)	36.8 (19)

1 STD diagnoses: male urethritis, proctitis, mucopurulent cervicitis, chlamydia, gonorrhoea, herpes genitalis, chancroid, syphilis (all stages), genital warts, trichomonas vaginalis, pelvic inflammatory disease, pediculosis pubis, and scabies

The policlinic at the Geneva University Hospital was the only policlinic to mention that there had been a change during the previous five years which may affect the observed HIV prevalences. This policlinic reported that a new HIV/AIDS treatment centre and an HIV testing site had been opened during the prevalence study (data not shown).

Discussion

The responses to the November 1996 questionnaire reveal that the six policlinics in the SNDP have formed a relatively homogenous sentinel surveillance network. They had similar logistical characteristics, they stuck to the HIV prevalence study protocol, they saw similar STD patients (mainly heterosexual and homo/bisexual men), and the environment within which the networks operated in the previous five years generally remained stable.

The homogeneity of the network is a good basis to monitor HIV prevalences over time. As expected, HIV prevalences in this population were high: 1.6% among heterosexuals, 24% among male homo/bisexuals, and 35.7% among injecting drug users. In comparison, HIV prevalences among persons attending anonymous HIV test sites at the five university hospitals in Basel, Bern, Lausanne, and Zurich ranged from 0.27% to 0.51% among heterosexuals, from 2.1% to 5.0% among homo/bisexual men, and from 3.3% to 8.6% among injecting drug users (1990-96) [Gebhardt, 1998]. Self-reported HIV prevalences among homo/bisexual men who participated in a national HIV-related behavioural survey ranged from 10% to 13% between 1990 and 1994 [Moreaux-Gruet & Dubois-Arber, 1995].

The HIV prevalences observed in this population are representative of a particular subgroup of all STD patients. This is highlighted by a number of population characteristics: the clinics are located in the five largest urban centres in the country, roughly 90% of patients are male and 45% are foreigners. The results should therefore be interpreted primarily in the context of the patients treated for an STD at the six policlinics and can hardly be generalised to all STD patients in Switzerland.

There are indications that HIV prevalences increased among heterosexual STD patients in Lausanne between 1990 and 1996. In 1990 and 1991, HIV prevalences in this population were 0.0% and 1.5%, and in 1995 and 1996 they were 6.7% and 4.0%. There may have been a real increase in the prevalence of HIV infection among heterosexual STD patients in Lausanne, but the trend may also be associated with the small number of heterosexuals consulting this policlinic (an average of 34 each year). Indeed, the reclassification of a single HIV infected heterosexual as a homo/bisexual (e.g. in 1996) or the exclusion of an HIV infected

heterosexual who made repeated consultations to the policlinic would make the trend disappear.

HIV testing was voluntary and confidential, and many persons (17.6%) refused an HIV test. An analysis of HIV test refusers has shown that low-risk persons are more likely to refuse the test among heterosexuals and high-risk persons are more likely to do so among male homo/bisexuals [Paget et al, 1997]. The HIV prevalences in the Swiss HIV prevalence study are therefore probably overestimated among heterosexuals and underestimated among homo/bisexual men.

In conclusion, we found that the policlinics have correctly implemented the HIV prevalence study and that the SNDP is a homogenous sentinel surveillance system which has successfully monitored HIV prevalences in a population at increased risk for HIV infection since 1990. This data has been integrated into the national HIV surveillance system [Gebhardt, 1998] and has allowed a better understanding of the epidemiology of STDs in Switzerland [Paget & Zimmermann, 1997]. Knowledge of the organisation and characteristics of the SNDP has allowed us to better interpret and present our data, and we recommend that other sentinel surveillance systems of this type collect this sort of information.

L'étude de prévalence VIH dans le Réseau suisse des policliniques de dermatologie: buts, caractéristiques et résultats (1990-1996)

Résumé

Le Réseau suisse des Policliniques de Dermatologie (RSPD) suit la prévalence du VIH chez les patients atteints d'une maladie sexuellement transmissibles (MST) depuis janvier 1990. Un questionnaire a été envoyé à chaque policlinique dans le réseau (Bâle, Berne, Genève, Lausanne, et deux à Zurich) pour collecter des informations sur leur participation à l'étude et les caractéristiques du RSPD. Les résultats montrent que les six policliniques ont suivi le protocole de l'étude d'une manière uniforme et qu'elles ont une organisation et une logistique similaires. La prévalence de l'infection à VIH dans cette population était élevée (1.6% chez les hétérosexuels, 24.0% chez les hommes homo/bisexuels et 35.7% chez les personnes s'injectant des drogues), est restée stable, et varie considérablement selon la policlinique. En conclusion, nous avons trouvé que les policliniques ont correctement mis en œuvre le protocole de l'étude de prévalence VIH et que le RSPD est un système de surveillance sentinelle homogène. La connaissance de l'organisation et des caractéristiques du RSPD nous permet de mieux interpréter et présenter nos données. Nous recommandons donc que ce genre d'information soit également collecté par d'autres systèmes de surveillance sentinelle de ce type.

Die HIV-Prävalenzstudie im Schweizerischen Netzwerk der Dermatologischen Polikliniken: Zielsetzungen, Charakteristika und Resultate (1990-1996)

Zusammenfassung

Seit Januar 1990 hat das Schweizerische Netzwerk der Dermatologischen Polikliniken (SNDP) die HIV-Prävalenz bei Patienten mit einer Geschlechtskrankheit (STD) erfasst. Ein Fragebogen wurde an alle Polikliniken im SNDP versandt (Basel, Bern, Genf, Lausanne, und die beiden Kliniken in Zürich), um Informationen über die Charakteristika und Teilnahme jeder Poliklinik an dieser Studie zu erhalten. Die Umfrage zeigte, dass die sechs Polikliniken das Studienprotokoll einheitlich befolgten und ähnliche organisatorische und logistische Charakteristiken aufwiesen. Die HIV-Prävalenz in der erfassten Bevölkerungsgruppe war hoch (1.6% bei heterosexuellen Personen, 24.0% bei homo/bisexuellen Männern und 35.7% bei Personen mit Drogeninjektion), hat sich seit 1990 nicht wesentlich verändert, und war in den Polikliniken untershiedlich. Die Polikliniken haben somit die HIV-Prävalenzstudie korrekt implementiert und die SNDP stellt ein homogenes Sentinel-Überwachungs-System dar. Die Kenntnis der logistischen Organisation und Charakteristika des SNDP erlaubte es uns, die erhobenen Daten angemessen zu interpretieren und zu beschreiben. Deshalb empfehlen wir, dass andere ähnliche Sentinel-Überwachungs-Systeme ebenfalls diese Art Information erheben.

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Chapter 6

Voluntary confidential HIV testing of STD patients in Switzerland, 1990-1995:

HIV test refusers cause different biases on HIV prevalences in heterosexuals and homo/bisexuals

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3 This network is made up of the six policlinics of dermatovenereology which exist in Switzerland; five at University hospitals and one at a large public hospital. The following persons were responsible for the study at the policlinics: Prof. T. Rufli in Basel, Prof. L.R. Braathen in Bern, Prof. J.-H. Saurat in Geneva, Prof. E. Frenk in Lausanne, Prof. G. Burg in Zürich and Prof. A. R. Eichmann at the Triemli City Hospital in Zürich. The staff working at the policlinics are thanked for their precious contribution to the study.

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HIV prevalences among STD patients in Switzerland

Abstract

Objectives: To monitor the prevalence of HIV infection among heterosexual and male homo/bisexual STD patients and assess the effect of HIV test refusers on the HIV prevalences.

Methods: A voluntary confidential HIV test was offered to all persons diagnosed with an STD at the Swiss Network of Dermatovenereology Policlinics (SNDP) between July 1990 and June 1995. Anonymous socio-demographic and behavioural information was collected for each patient regardless of whether s/he accepted or refused the HIV test.

Results: The prevalence of HIV was 1.6% among heterosexuals and 22.4% homo/bisexual men and remained stable between July 1990 and June 1995. Refusal rates were 17.5% among heterosexuals and 16.0% among homo/bisexual men and did not change significantly over time. To assess the potential effect of HIV test refusers on the monitored HIV prevalences, we analysed test refusers by multivariate logistic regression. Among heterosexuals, refusal rates were significantly higher among persons with relatively low risk behaviours (persons reporting 0-1 sexual partners in the previous six months) whilst among homo/bisexual men they were significantly higher among those with high risk behaviours (persons reporting 10 or more sexual partners in the previous six months).

Conclusions: We found high and stable HIV prevalences among patients treated for an STD at the SNDP. It appears that HIV test refusers biased HIV prevalences among heterosexuals and homo/bisexual men in different directions: in heterosexuals HIV prevalences were overestimated and in homo/bisexuals they were underestimated. A regular analysis of the characteristics of HIV test refusers should be an integral part of surveillance systems which use voluntary confidential HIV testing.

Introduction

Patients treated for a sexually transmitted disease (STD) are a population at increased risk for HIV infection [Quinn, et al, 1990] and are therefore a particularly relevant group to monitor trends in HIV. The national HIV surveillance system has monitored the prevalence of HIV in this population since January 1990 [Gebhardt, 1996]. Data is collected at the Swiss Network of Dermatovenereology Policlinics (SNDP) which groups together the six policlinics of dermatovenereology which exist in Switzerland [Paget & Zimmermann, 1997].

HIV testing at the SNDP is voluntary and confidential. One of the main disadvantages of using this approach is that participation rates are generally too low for unbiased estimates of HIV prevalence [Unlinked Anonymous HIV Surveys Steering Group, 1995]. Previous studies have found that the use of voluntary confidential HIV testing can lead to a participation bias because those at higher risk of infection are more likely not to contribute specimens and/or a selection bias if clinicians encourage testing in those they consider to be more at risk [Unlinked Anonymous HIV Surveys Steering Group, 1995; Hull et al, 1988]. A number of countries (for example, the UK [Unlinked Anonymous HIV Surveys Steering Group, 1995] and United States [Weinstock et al, 1995]) use unlinked anonymous HIV testing to control for this factor.

This paper describes the prevalence of HIV among STD patients accepting an HIV test and the probable effect of HIV test refusers on the observed HIV prevalences. The latter is particularly relevant to the surveillance of HIV among STD patients in western Europe since most surveillance networks use voluntary confidential HIV testing. In a European Concerted Action Project to monitor HIV prevalences among STD patients, 12 networks use voluntary confidential HIV testing and only three – England and Wales, Scotland, France – use unlinked anonymous testing [The European Study Group, 1993].

Methods

Subjects

The SNDP is made up of five university policlinics of dermatovenereology (Basel, Bern, Lausanne, Geneva and Zürich) and the city policlinic of dermatology at the Triemli Stadtspital, Zürich. The criterion for eligibility into the study was attendance with a new episode of one or more of a selected list of STDs (male urethritis, proctitis, mucopurulent cervicitis, chlamydia, gonorrhoea, herpes genitalis, chancroid, syphilis, genital warts, trichomonas vaginalis, pelvic inflammatory disease and pediculosis pubis) provided that the patient had not been seen for any of these STDs in the previous 90 days [The European Study Group, 1993].

Each STD patient was offered a voluntary confidential HIV test and a standard questionnaire was completed, even if the patient refused the HIV test. Responses were recorded by a medical intern and included information on the patient (eg: age, sex, country of birth), the STD infection, his/her sexuality (eg: sexual orientation, number of sexual partners in the previous six months), history of injecting drug use and the HIV test. Identification numbers rendered the questionnaires anonymous.

The study began in July 1990 following a six month pilot phase. This paper presents data collected between July 1990 and June 1995 for heterosexuals (n=2588) and homo/bisexual men (n=393). Of a total 3245 STD patients who attended the SNDP during this period, 264 patients were excluded from the analysis: 130 non-Swiss residents, 112 injecting drug users, 3 female homo/bisexuals and 19 patients whose risk for HIV infection could not be classified.

Statistical methods

Data entry and analysis were performed at the Swiss Federal Office of Public Health (SFOPH). The analysis used Epi-Info Version 5.0 (Centers for Disease Control and Prevention, Atlanta, Georgia, USA and World Health Organization, Geneva, Switzerland) and LOGISTIC 3.11 (GE Dallal, Andover, Massachusetts) to obtain $\chi 2$, Mantel-Haenszel $\chi 2$, and the unadjusted and adjusted odds ratios (ORs).

Results

HIV test refusal rates and HIV prevalences by exposure category between July 1990 and June 1995 are presented in Table 6.1. Overall, refusal rates were 17.5% among heterosexuals and 16.0% among homo/bisexual men and these rates remained stable over time ($\chi 2$ for linear trend=2.3, p=0.13 for heterosexuals and $\chi 2$ for linear trend=0.4, p=0.52 for homo/bisexual men). Total HIV prevalences among STD patients accepting an HIV test was 1.6% among

heterosexuals and 22.4% among homo/bisexual men. These prevalences remained stable over time ($\chi 2$ for linear trend=0.4, p=0.55 for heterosexuals and $\chi 2$ for linear trend=0.02, p=0.90 for homo/bisexual men).

Table 6.2 presents factors associated with refusing the HIV test among heterosexuals and homo/bisexual men. Only factors which were significantly associated with refusing the HIV test in the univariate or multivariate analysis ($p<0.05$) are presented in the table. Among heterosexuals, the number of sexual partners reported in the previous six months was the only independent predictor for refusing the HIV test in the multivariate analysis: the more sexual partners the heterosexuals reported the less likely they were to refuse the test. This association was not only observed for the five year time period but also when the data was stratified by year (data not shown).

Among homo/bisexual men, both the number of sexual partners reported in the previous six months and the level of education were independent predictors for refusing the HIV test. Homo/bisexual men who reported 10 or more sexual partners in the previous six months had refusal rates of 29.7% compared to 12.5% among those reporting 0-1 sexual partners (adjusted Odds Ratio of 2.6, 95% CI 1.1-6.1). Also, the higher the reported level of education the higher the percentage of men who refused the HIV test. These associations were also observed when the data was stratified by year (data not shown).

Table 6.1 HIV testing and HIV positives among heterosexuals and male homo/bisexuals treated for an STD at the SNDP, July 1990 - June 1995.

	July 1990 - June 1991 n (%)	July 1991 - June 1992 n (%)	July 1992 - June 1993 n (%)	July 1993 - June 1994 n (%)	July 1994 - June 1995 n (%)	Total for five year period n (%)
Heterosexuals:						
Total	**800**	**667**	**479**	**308**	**334**	**2588**
HIV test:						
Refused	165 (20.6)	106 (15.9)	72 (15.0)	48 (15.6)	61 (18.3)	452 (17.5)
Accepted	635 (79.4)	561 (84.1)	407 (85.0)	260 (84.4)	273(81.7)	2136 (82.5)
HIV positives:						
HIV infected[1]	13 (2.0)	7 (1.2)	2 (0.5)	5 (1.9)	8 (2.9)	35 (1.6)
Homo/bisexual men:						
Total	**85**	**102**	**83**	**69**	**54**	**393**
HIV test:						
Refused	14(16.5)	13 (12.7)	15 (18.1)	10 (14.5)	11 (20.4)	63 (16.0)
Accepted	71(83.5)	89 (87.3)	68 (81.9)	59 (85.5)	43 (79.6)	330 (84.0)
HIV positives:						
HIV infected[1]	14(19.7)	24 (27.0)	14 (20.6)	10 (16.9)	12 (27.9)	74 (22.4)

[1] % is based on number of test acceptors.

*Table 6.2 Factors associated with refusing the HIV test among heterosexuals and male homo/bisexuals treated for an STD at the SNDP, July 1990 - June 1995**

Characteristic	Number of persons	Number who refused HIV test (%)	OR (95% CI)	Adjusted OR[1] (95% CI)
Heterosexuals:				
Total	**2588**	**452 (17.5)**	–	–
Number of sexual partners in the previous six months:				
0-1	1177	243 (20.6)	1.0	1.0
2-4	1046	151 (14.4)	0.6 (0.5 - 0.8)	0.6 (0.5 -0.9)
5-9	165	20 (12.1)	0.5 (0.3 - 0.9)	0.6 (0.3 -1.0)
10+	75	8 (10.7)	0.5 (0.2 - 1.0)	0.5 (0.2 - 1.1)
Unknown	125	30 (24.0)	1.2 (0.8 -1.9)	1.2 (0.7 - 1.9)
Source of STD infection:				
Stable partner	1157	225 (19.4)	1.0	1.0
Casual partner	1182	195 (16.5)	0.8 (0.7 - 1.0)	1.1 (0.8 - 1.4)
Prostitute	218	24 (11.0)	0.5 (0.3 - 0.8)	0.7 (0.4 - 1.1)
Unknown	31	8 (25.8)	1.4 (0.6 - 3.3)	1.3 (0.6 - 3.1)
Homo-bisexuals:				
Total	**393**	**63 (16.0)**	–	–
Number of sexual partners in the previous six months:				
0-1	80	10 (12.5)	1.0	1.0
2-4	149	18 (12.1)	1.0 (0.4 - 2.2)	0.9 (0.4 - 2.1)
5-9	55	7 (12.7)	1.0 (0.4 - 2.9)	0.9 (0.3 - 2.7)
10+	64	19 (29.7)	3.0 (1.3 - 6.9)	2.6 (1.1 - 6.1)
Unknown	45	9 (20.0)	1.8 (0.7 - 4.7)	1.8 (0.6 - 4.9)
Education:				
Higher	133	30 (22.6)	1.0	1.0
Apprenticeship	214	29 (13.6)	0.5 (0.3 - 0.9)	0.6 (0.3 - 1.1)
Basic	37	1 (2.7)	0.1 (0.0 - 0.7)	0.1 (0.0 - 0.7)
Unknown	9	3 (33.3)	1.7 (0.4 - 7.3)	1.5 (0.3 - 6.8)

* OR, Odds ratio; CI, confidence interval.

[1] Adjusted for all variables listed in the table (plus sex and age for the heterosexuals).

Discussion

This study found high levels of HIV infection among heterosexuals and male homo/bisexuals STD patients at the SNDP. In comparison, HIV prevalences among persons attending the anonymous HIV test sites at the five university hospitals which participated in our study ranged from 0.28% to 0.51% among heterosexuals and from 2.4% to 5.0% among homo/bisexual men (1990-95) [Gebhardt, 1996]. Additionally, self-reported HIV prevalences among homo/bisexual men who participated in a national HIV-related behavioural survey ranged from 10% to 13% between 1990 and 1994 [Dubois-Arber, et al, 1996]. In each of these population groups, the HIV prevalences were lower than those recorded at the SNDP.

HIV prevalences and refusal rates remained stable among heterosexuals and homo/bisexual men treated for an STD at the SNDP between 1990 and 1995. The stable HIV prevalences are consistent with trends observed in other European networks and the refusal rates observed in Switzerland (17.6%) were relatively high compared to other networks which used voluntary confidential HIV testing (high refusal rates were observed in Sweden (15.0%), Germany (12.6%) and Finland (12.2%)) [Lavreys et al, 1995].

Among both heterosexuals and homo/bisexual men, the reported number of sexual partners in the previous six months was significantly associated with refusing the HIV test. Interestingly, this association differed by exposure category. The more sexual partners heterosexuals reported in the previous six months, the less likely they were to refuse the HIV test. In complete contrast, the more sexual partners homo/bisexual men reported in the previous six months, the more likely they were to refuse the HIV test. Assuming that the number of sexual partners in the previous six months is a good marker for the overall risk of acquiring an HIV infection, it appears that low risk heterosexuals and high risk homo/bisexual men were more likely to refuse the HIV test in our study. HIV prevalences might therefore have been overestimated among heterosexuals and underestimated among homo/bisexual men.

In general, it has been found that HIV prevalences measured by unlinked anonymous testing tend to be similar or greater than those measured by voluntary confidential testing in the same population [Hull et al, 1988; Schwarcz et al, 1993]. Where HIV prevalences have been greater, the results have frequently been affected by a participation bias with those at increased risk of HIV infection being more likely to refuse the test. Our analysis of test refusers seems to support this general finding for homo/bisexual men but not for heterosexuals (HIV prevalences in this group appear to have been overestimated). This may

reflect a lower desire for heterosexuals to have an HIV test as they don't perceive they were at risk for an HIV infection (another form of participation bias) or the medical interns encouraging HIV testing in heterosexuals they consider to be most at risk (a selection bias). In conclusion, this study suspects that the HIV prevalences were biased by HIV test refusers and that the bias affected heterosexuals and homo/bisexuals in different directions: among heterosexuals the HIV prevalences were overestimated and among homo/bisexuals they were underestimated. Although these findings might be specific to Switzerland, similar associations might be present in other European networks which use voluntary confidential testing to monitor HIV prevalences among STD patients and which have substantial refusal rates. A regular analysis of the characteristics of HIV test refusers should be an integral part of surveillance systems which use voluntary confidential HIV testing.

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Chapter 7

Condom use among patients attending six STD clinics in Switzerland

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Condom use among STD patients in Switzerland

Abstract

Background and Objectives: Persons treated for an STD have been shown to be at increased risk for HIV infection. We present levels of condom use among these patients and analyse sociodemographic and behavioral factors associated with self–reported never use of condoms.

Study Design: Cross–sectional study of 2257 patients treated at six STD clinics in Switzerland between July 1990 and December 1992.

Results: Overall, 46.3% of the patients reported that they had never used condoms. Among heterosexual men this level was 48.3% (n=1751), among homosexual and bisexual men it was 21.6% (n=268) and among heterosexual women it was 60.1% (n=238). In a logistic multivariate regression analysis, significant factors associated with never use of condoms among heterosexual men included: being aged over 29, not being Swiss, having a low level of education, reporting few partners in the previous six months, having acquired the STD from a stable partner and not being an injecting drug user.

Conclusion: These results document high levels of never use of condoms in this population and highlight the importance of the condom promotion activities provided by the STD clinics.

Introduction

The spread of HIV infection and other sexually transmitted diseases (STDs) has been shown to be effectively reduced by the regular use of condoms [Peterman & Curran, 1986;Van de Perre et al, 1987; Cates & Stone, 1992;Weller, 1993; Heusser et al, 1993]. Persons attending STD clinics are an important population in which to study factors determining consistent condom use as they are at increased risk for HIV infection [Quinn et al, 1990; Hull et al, 1988]. In recent years, the determinants of condom use have been studied in a wide range of population groups [Thornton & Catalan, 1993] but, to our knowledge, only a few studies have investigated factors associated with condom use, or never use, among persons attending STD clinics [Orr & Langefeld, 1993;Weinstock et al, 1993;Van Haastrecht et al, 1993; Cohen, 1992; Sonnex et al, 1989]. Factors which have been shown to be positively associated with consistent condom use in this population include levels of motivation and positive attitudes about condoms [Orr & Langefeld, 1993]. Negative factors include the use of drugs or alcohol while having sex [Weinstock et al, 1993], perceptions that condoms decrease sexual pleasure [Weinstock et al, 1993] and being a migrant [Van Haastrecht et al, 1993].

Data concerning patients attending six policlinics of dermatology (STD clinics) in Switzerland were collected as part of a collaborative study established by a European Community Concerted Action (DGXII–Medical Research Programme) to monitor trends in HIV seroprevalence among STD patients [The European Study Group, 1993]. In addition to levels of HIV seroprevalence [The European Study Group, 1993; BAG, 1993], this study has provided information on the behavioral characteristics of this population. This paper presents levels of condom use among these patients and an analysis of the sociodemographic and behavioral factors associated with self–reported never use of condoms.

Methods

Subjects

The analysis is based on data collected between June 1990 and December 1992 at the five university policlinics of dermatology of Basel, Bern, Lausanne, Geneva and Zürich, and the city policlinic of dermatology of Zürich. The criterion for eligibility into the study was attendance with a new episode of one or more of a selected list of STDs (male urethritis, proctitis, mucopurulent cervicitis, chlamydia, gonorrhoea, herpes genitalis, chancroid, syphilis, genital warts, trichomonas vaginalis, pelvic inflammatory disease, pediculosis pubis and scabies) provided that the patient had not been seen for any of these STDs in the previous 90 days.

Each patient was offered the possibility of having an HIV test with pre– and post–test counseling. A standard questionnaire was completed for each of the selected STD episodes, even if the patient refused to have an HIV test. Responses were recorded by medical interns working at the clinics and included information on the patient (e.g., age, sex, country of birth), their sexuality (e.g., sexual orientation, number of partners in the previous six months), HIV test results and whether or not the person was an injecting drug user. Identification numbers rendered the responses and HIV test results (when available) anonymous.

A question concerning condom use was added to the Swiss questionnaire. It asked patients whether they used condoms always, sometimes or never with no indication of a timeframe. All patients who reported that they had never used a condom were provided counseling on their utility and, when necessary, were shown how they are used. In addition, condoms were distributed free of charge at the clinics.

The analysis presented in this paper is limited to Swiss residents who responded to the condom use question. Of a total of 2379 patients, 89 patients were excluded as they were not Swiss residents and 16 patients as they did not respond to the condom use question. Additionally, twelve patients who did not provide information on their behavioral risk for infection, two patients who did not provide their nationality, two women who reported that they were homosexuals or bisexuals and one person who did not respond to the question on an HIV test were excluded. The investigation is therefore based on a total of 2257 patients. For the purpose of the analysis, the data was stratified into three groups: heterosexual men (**heterosexual men**, n=1751), homosexual or bisexual men (**homosexual men**, n=268) and heterosexual women (**women**, n=238).

Statistical methods

Questionnaires were sent to the Swiss Federal Office of Public Health (SFOPH) for data entry and analysis. The latter was performed using Epi-Info Version 5.0 (Centers for Disease Control and Prevention, Atlanta, Georgia, USA and World Health Organization, Geneva, Switzerland) and SAS Version 6.8 (SAS Institute Inc., Cary, North Carolina, USA). The data was analysed using <CHI2>, Mantel-Haenszel <CHI2>, and logistic regression to determine the unadjusted and adjusted odds ratios (ORs) for factors associated with never use of condoms.

Results

Table 7.1 shows levels of condom use among heterosexual men, homosexual men and women. Levels of reported condom use in the three groups were very different with homosexual men reporting the lowest levels of never use of condoms and the highest levels of sometimes and always use.

Table 7.1 Condom use (during no defined time frame) among heterosexual men, homosexual men and women attending the six STD clinics, 1990-92.

Condom use	Heterosexual men	Homosexual men	Women	Total
	n (%)	n (%)	n (%)	n (%)
Total	**1751**	**268**	**238**	**2257**
Never	845 (48.3)	58 (21.6)	143 (60.1)	1045 (46.3)
Sometimes	694 (39.6)	127 (47.4)	74 (31.1)	896 (39.7)
Always	212 (12.1)	83 (31.0)	21 (8.8)	316 (14.0)

Tables 7.2, 7.3 and 7.4 show the sociodemographic and behavioral characteristics associated with never use of condoms among heterosexual men (Table 7.2), homosexual men (Table 7.3) and women (Table 7.4). Unless indicated otherwise, only results of the multivariate logistic regression analyses are discussed below.

*Table 7.2 Sociodemographic and behavioral characteristics associated with never use of condoms among heterosexual men attending the six STD clinics, 1990-92**

Characteristic	Number of persons	Number who never used condoms (%)	OR (95% CI)	Adjusted OR[1] (95% CI)
Total	**1751**	**845 (48.3)**	**-**	**-**
Age:				
15-29	812	372 (45.8)	1.0	1.0
30-44	743	361 (48.6)	1.1 (0.9-1.4)	1.2 (1.0-1.6)
45+	196	112 (57.1)	1.6 (1.1-2.2)	1.8 (1.3-2.5)
p for trend			0.0080	0.0007
Nationality:				
Swiss	924	397 (43.0)	1.0	1.0
European	503	285 (56.7)	1.7 (1.4-2.2)	1.5 (1.2-2.0)
Other	324	163 (50.3)	1.3 (1.0-1.7)	1.6 (1.2-2.1)
Level of education:				
Higher	492	207 (42.1)	1.0	1.0
Apprenticeship	820	381 (46.5)	1.2 (0.9-1.5)	1.4 (1.1-1.8)
Basic	407	240 (59.0)	2.0 (1.5-2.6)	2.2 (1.6-3.0)
No response	32	17 (53.1)	1.6 (0.7-3.4)	1.4 (0.7-3.1)
p for trend[2]			<0.0001	0.0001
Number of partners[3]:				
0-1	763	498 (65.3)	1.0	1.0
2-4	755	270 (35.8)	0.3 (0.2-0.4)	0.4 (0.3-0.5)
5+	165	34 (20.6)	0.1 (0.1-0.2)	0.2 (0.1-0.3)
No response	68	43 (63.2)	0.9 (0.5-1.6)	1.1 (0.6-1.9)
p for trend[2]			<0.0001	0.0001
Place of STD infection:				
Switzerland	1283	660 (51.4)	1.0	1.0
Europe	206	102 (49.5)	0.9 (0.7-1.3)	1.1 (0.8-1.5)
Other	245	74 (30.2)	0.4 (0.3-0.6)	0.6 (0.4-0.8)
No response	17	9 (52.9)	1.1 (0.4-3.2)	0.7 (0.3-2.0)
Stable partner was source of STD infection:				
No	993	370 (37.3)	1.0	1.0
Yes	758	475 (62.7)	2.8 (2.3-3.5)	1.7 (1.3-2.2)
Injecting drug user:				
No	1695	827 (48.8)	1.0	1.0
Yes	56	18 (32.1)	0.5 (0.3-0.9)	0.5 (0.3-1.0)
HIV test:				
Accepted	1431	672 (47.0)	1.0	1.0
Refused	320	173 (54.1)	1.3 (1.0-1.7)	1.1 (0.9-1.5)

* OR, Odds ratio; CI, confidence interval

1 Adjusted for all variables listed in the table

2 Excludes non-responders

3 In the previous six months

*Table 7.3 Sociodemographic and behavioral characteristics associated with never use of condoms among homosexual men attending the six STD clinics, 1990-92**

Characteristic	Number of persons	Number who never used condoms (%)	OR (95% CI)	Adjusted OR[1] (95% CI)
Total	**268**	**58 (21.6)**	–	–
Age:				
15-29	127	31 (24.4)	1.0	1.0
30-44	119	21 (17.6)	0.7 (0.3-1.3)	0.7 (0.4-1.4)
45+	22	6 (27.3)	1.2 (0.3-3.5)	1.3 (0.4-3.8)
p for trend			0.5953	0.8071
Nationality:				
Swiss	205	42 (20.5)	1.0	1.0
European	48	12 (25.0)	1.3 (0.6-2.8)	1.5 (0.7-3.2)
Other	15	4 (26.7)	1.4 (0.3-5.1)	1.0 (0.3-3.7)
Level of education:				
Higher	84	18 (21.4)	1.0	1.0
Apprenticeship	146	28 (19.2)	0.9 (0.4-1.8)	0.8 (0.4-1.7)
Basic	34	11 (32.4)	1.8 (0.6-4.6)	1.6 (0.6-4.1)
No response	4	1 (25.0)	1.2 (0.0-16.3)	1.3 (0.1-14.6)
p for trend[2]			0.3768	0.5155
Number of partners[3]:				
0-1	50	15 (30.0)	1.0	1.0
2-4	111	26 (23.4)	0.7 (0.3-1.6)	0.8 (0.4-1.9)
5+	76	10 (13.2)	0.4 (0.1-1.0)	0.4 (0.1-1.2)
No response	31	7 (22.6)	0.7 (0.2-2.1)	0.9 (0.3-2.9)
p for trend[2]			0.0204	0.0811
Place of STD infection:				
Switzerland	221	50 (22.6)	1.0	1.0
Europe	29	4 (13.8)	0.6 (0.1-1.7)	0.5 (0.2-1.7)
Other	17	4 (23.5)	1.1 (0.2-3.6)	1.4 (0.4-4.6)
No response	1	0 (0.0)	–	–
Stable partner was source of STD infection:				
No	207	40 (19.3)	1.0	1.0
Yes	61	18 (29.5)	1.8 (0.9-3.5)	1.4 (0.7-3.1)
Injecting drug user:				
No	257	55 (21.4)	1.0	1.0
Yes	11	3 (27.3)	1.4 (0.2-6.0)	1.2 (0.3-5.2)
HIV test:				
Accepted	227	47 (20.7)	1.0	1.0
Refused	41	11 (26.8)	1.4 (0.6-3.1)	1.7 (0.7-3.7)

* OR, Odds ratio; CI, confidence interval

1 Adjusted for all variables listed in the table

2 Excludes non-responders

3 In the previous six months

*Table 7.4 Sociodemographic and behavioral characteristics associated with never use of condoms among women attending the six STD clinics, 1990-92**

Characteristic	Number of persons	Number who never used condoms (%)	OR (95% CI)	Adjusted OR[1] (95% CI)
Total	**238**	**143 (60.1)**	–	–
Age:				
15-29	134	74 (55.2)	1.0	1.0
30-44	76	48 (63.2)	1.4 (0.8-2.6)	1.5 (0.8-2.8)
45+	28	21 (75.0)	2.4 (0.9-7.2)	2.4 (0.9-6.5)
p for trend			0.0421	0.0598
Nationality:				
Swiss	166	103 (62.0)	1.0	1.0
European	35	23 (65.7)	1.2 (0.5-2.8)	1.1 (0.4-2.5)
Other	37	17 (45.9)	0.5 (0.2-1.1)	0.5 (0.2-1.3)
Level of education:				
Higher	46	25 (54.3)	1.0	1.0
Apprenticeship	120	77 (64.2)	1.5 (0.7-3.2)	1.2 (0.6-2.6)
Basic	62	36 (58.1)	1.2 (0.5-2.7)	1.4 (0.6-3.4)
No response	10	5 (50.0)	0.8 (0.2-4.2)	0.9 (0.2-4.0)
p for trend[2]			0.7950	0.4359
Number of partners[3]:				
0-1	158	111 (70.3)	1.0	1.0
2-4	61	27 (44.3)	0.3 (0.2-0.6)	0.5 (0.2-0.9)
5+	8	1 (12.5)	0.1 (0.0-0.5)	0.1 (0.0-0.8)
No response	11	4 (36.4)	0.2 (0.1-0.9)	0.2 (0.0-1.0)
p for trend[2]			0.0001	0.0037
Place of STD infection:				
Switzerland	202	124 (61.4)	1.0	1.0
Europe	15	8 (53.3)	0.7 (0.2-2.4)	0.5 (0.2-1.8)
Other	17	8 (47.1)	0.6 (0.2-1.7)	0.9 (0.3-2.8)
No response	4	3 (75.0)	1.9 (0.1-100.3)	2.9 (0.2-37.6)
Stable partner was source of STD infection:				
No	55	22 (40.0)	1.0	1.0
Yes	183	120 (65.6)	2.9 (1.5-5.6)	1.5 (0.7-3.3)
Injecting drug user:				
No	222	133 (59.9)	1.0	1.0
Yes	16	10 (62.5)	1.1 (0.4-3.9)	1.0 (0.3-3.0)
HIV test:				
Accepted	185	106 (57.3)	1.0	1.0
Refused	53	37 (69.8)	1.7 (0.9-3.6)	1.7 (0.8-3.5)

* OR, Odds ratio; CI, confidence interval

1 Adjusted for all variables listed in the table

2 Excludes non-responders

3 In the previous six months

Among heterosexual men, age was significantly associated with never use of condoms (Table 7.2). Heterosexual men aged 30-44 and 45+ were significantly more likely to report that they had never used condoms compared to those aged 15-29. Increasing age was also positively associated with never use of condoms among women (Table 7.4, test for trend p=0.06). In contrast, there was no association between age and never use of condoms among homosexual men (Table 7.3).

Non-Swiss heterosexual men reported significantly higher levels of never use of condoms compared to Swiss heterosexual men (Table 7.2). Similar associations between nationality and never use of condoms were observed among homosexual men although the differences were not significant (Table 7.3). Among women, no significant differences in never use of condoms were observed between Swiss and non-Swiss, and the lowest levels of never use of condoms were reported among women from "Other" nationalities (Table 7.4).

Increasing levels of education were associated with lower levels of never use of condoms among heterosexual men (Table 7.2). Both heterosexual men with basic and apprenticeship levels of education were significantly more likely to report that they had never used condoms compared to those with higher levels of education. In the two other groups, no clear association between levels of education and never use of condoms was observed (Tables 7.3 and 7.4).

Of the behavioral variables analysed, the number of partners in the previous six months was the most important factor associated with never use of condoms among heterosexual men and women. The more partners the patients reported, the less likely they were to report that they had never used condoms (Tables 7.2 and 7.4). Among homosexual men this was not a significant factor (Table 7.3).

Heterosexual men who reported that they had acquired their STD in Switzerland were significantly more likely to have never used a condom compared to those who reported they had acquired their STD outside of Europe (Table 7.2). Among women and homosexual men there were no significant differences between never use of condoms and place of infection (Tables 7.3 and 7.4).

With regard to other behavioral variables, heterosexual men who reported that they had acquired their STD from a stable partner reported significantly higher levels of never use of condoms (Table 7.2) compared to those reporting it from another source (from a casual partner or prostitute). Similar associations were observed in the two other groups but the differences in never use of condom condoms were not significant (Table 7.3 and 7.4).

Finally, heterosexual men who reported they were not injecting drug users were significantly more likely to report that they had never used condoms compared to those who reported they were injecting drug users (Table 7.2). In contrast, no significant association between never use of condoms and injecting drug use was found among homosexual men (Table 7.3) and women (Table 7.4). In all three groups, after controlling for all variables in the table, there was no significant difference in never use of condoms between those who accepted to have an HIV test and those who refused it (Tables 7.2, 7.3 and 7.4).

Discussion

These findings are generally consistent with previous studies (predominantly surveys) which have been carried out in Switzerland. In a representative population survey, heterosexual men and women aged 31-45 reported higher levels of never use of condoms with casual partners in the previous six months than 17-30 year olds [Dubois-Arber et al, 1993]. Lower levels of condom use have also been observed among male immigrant populations living in Switzerland compared to the general population [Haour-Knipe et al, 1993; Samuel-Mertens et al, 1994]. A comprehensive sample of members of the homosexual community also found that condom use did not vary with age or education [Gruet & Dubois-Arber, 1993].

The results presented in this paper are representative of a particular subgroup of all STD patients. This is highlighted by a number of population characteristics: the clinics are located in the five largest urban centres of the country, the sex ratio of the patient population is 8.5:1 (7.4:1 for heterosexual men and women) and 43% of the patients are non-Swiss (in comparison to 18% in the general population [BfS, 1994]. In addition, the data is not representative of persons who attended the clinics but did not have an STD. The results should therefore be primarily interpreted in the context of patients treated for an STD at the six clinics and may only be generalized to all STD patients in Switzerland with caution.

The question used to assess condom use is a very simple one. There is no time reference, no distinction between condom use with stable or casual partners and the "sometimes" response is not a precise measure. The simplicity of the question is linked to the fact that it was not in the European questionnaire and was developed in the first semester of 1990 when the assessment of sexual behaviors using surveillance data was in its early days in Switzerland. These factors render the condom use question a relatively imprecise measure and make comparisons with other studies, for example general population surveys [Dubois-Arber et al, 1993], virtually impossible.

Characteristics influencing condom use among persons at high risk for STDs are complex and, undoubtedly, vary depending on the individual and his or her partner(s) [Weinstock et al, 1993]. The factors analysed in this study were limited to the sociodemographic and behavioral characteristics collected as part of the surveillance of HIV infection in this population. Additional relevant factors such as communication skills [Catania et al, 1989; Heusser et al, 1992], perceived enjoyment of condoms [Catania et al, 1989] or persuasion skills [Wooten & Jason, 1992] which have been identified in other studies could not be examined.

Never use of condoms among heterosexual men and women treated for an STD at the six clinics was very high. However, the results are consistent with the national STOP-AIDS campaign which has been ongoing since February 1987 [Dubois-Arber et al, 1993]. Among heterosexual men and women, the lowest levels of never use of condoms were reported in the youngest age groups (those targeted by the campaign) and among those with the highest levels of education (those who can most easily assimilate the prevention messages and change their behavior). A similar positive finding was found for the behavioral characteristics, with those reporting a more risky behavior for HIV – and therefore a target of the campaign – reporting higher levels of condom use (eg: heterosexual men and women who reported many partners in the previous six months or heterosexual men who reported they were injecting drug users).

The number of partners reported in the previous six months was the most important behavioral factor associated with never use of condoms among heterosexual men and women. The fewer partners these persons reported, the higher the levels of never use of condoms. An association between condom use and multiple partners was not observed in a study carried out in 1989 among heterosexual STD patients in San Francisco [Weinstock et al, 1993] but has been reported in other population groups [Valdiserri et al, 1988; Moatti et al, 1989]. It is likely that this relationship can be partly explained by the fact that some of the persons reporting single partners in the previous six months were in monogamous, long-term, relationships in which condoms were never used. Indeed, heterosexual men and women reporting that their STD infection was acquired from a stable partner had particularly high levels of never use of condoms. In such cases, these persons incorrectly assumed that their stable relationship would protect them from an STD.

Compared to heterosexual men, homosexual men had lower levels of never use of condoms and different sociodemographic characteristics (for age and education) associated with never use of condoms. These differences are probably related to the dramatic impact of HIV on the

homosexual community and the specific prevention efforts which have been targeted at this population group (which began two to three years earlier than in the general population) [Kocher, 1993]. HIV prevention and the use of condoms is much more relevant and more frequent in a community where 73% of persons reported that they knew at least one person who was HIV positive, had AIDS or had died from AIDS [Gruet & Dubois-Arber, 1993].

Whilst there has been extensive epidemiological collaboration between the six STD clinics related to the European HIV surveillance project, prevention activities have been poorly co-ordinated and generally under-developed. The program implications of the high levels of never use of condoms have therefore been to tackle these two immediate problems. This has been achieved by requiring that all medical interns follow a national counseling course on HIV and sexuality. The course was originally designed for general practicitioners [Grüninger et al, 1991] and has been adapted to the requirements of the STD clinics. This initiative will lead to a greater coordination of prevention efforts, highlight the importance of the counseling activities and hopefully render these efforts more effective.

In conclusion, these results describe high levels of never use of condoms among patients attending six urban STD clinics in Switzerland. Both heterosexual men and women had much higher levels of never use of condoms compared to homosexual men. Among heterosexual men significant factors associated with never use of condoms included: being aged over 29, not being Swiss, having a low level of education, reporting few partners in the previous six months, having acquired the STD from a stable partner and not being an injecting drug user. These findings highlight the relevance and importance of the condom promotion activities provided by the six STD clinics.

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Chapter 8

National laboratory reports of Chlamydia trachomatis seriously underestimate the frequency of genital chlamydial infections among women in Switzerland

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National laboratory reports of Chlamydia trachomatis in Switzerland

Abstract

Background: Public health authorities want to evaluate their STD surveillance systems to promote the most effective use of health resources.

Goal of this study: To estimate the sensitivity of national laboratory reports of *C trachomatis* in Switzerland (the proportion of cases detected by national laboratory reports).

Study Design: A cross sectional prevalence study was conducted by the Swiss Sentinella Surveillance Network of Gynecologists in 1998. Two groups of women aged less than 35 were included in the study: first consultations for a pregnancy and consultations for a routine check-up.

Results: A total of 1589 women were tested for *C trachomatis*. The prevalence among pregnant women (n=817) was 1.3% and among sexually active women (n=772) 2.8%. Using the prevalences observed among check-up women, we estimate that there were at least 24,400 *C trachomatis* infections in Switzerland among 20 to 34-year-old women in 1998 (95% confidence interval: 14,300 to 34,300). The number of laboratory reports of *C trachomatis* in this age group was 1150 in 1998.

Conclusion: Our study suggests that the sensitivity of national laboratory reports of *C trachomatis* in 1998 was less than 5% for women aged 20-34.

Introduction

Among women, *Chlamydia trachomatis* infections can cause pelvic inflammatory disease, chronic pelvic pain, tubal infertility and ectopic pregnancy, which are a major personal, social, and health service burden. These complications may be seen in 10-25% of infected women [Grun et al, 1997]. Since up to 70% of infections in women are asymptomatic and are therefore unlikely to be treated [Schachter et al, 1983], screening is an important public health intervention. Such programs have been successfully implemented in Sweden [Egger et al, 1998] and the United States [Mertz et al, 1997; Stamm, 1998], and are being considered in the United Kingdom [CMO's Expert Advisory Group, 1998].

The national laboratory-based surveillance system was established in 1988 and forms the backbone of infectious disease surveillance activities in Switzerland [Stürchler, 1999]. All laboratories recognized by the Swiss Federal Office of Public Health (SFOPH) must, by law, report new infections of *C trachomatis* on a weekly basis. Reports of *C trachomatis* are one of the most common infectious diseases reported by the laboratories [BAG, 2000] and presently this is the only source of national data on chlamydial infections in Switzerland [Paget & Zimmermann, 1997].

The objectives of the Sentinella Chlamydia Prevalence Study were two-fold: 1) to estimate the prevalence and identify factors associated with genital chlamydial infection among women who consult their gynecologist in Switzerland; 2) to make an estimate of genital chlamydial infections among low-risk, sexually active women in Switzerland and to compare this estimate to national laboratory reports of *C trachomatis*. The first objective was aimed at assessing the feasibility of screening women consulting private gynecologists for genital chlamydia infections in Switzerland and the second at providing an estimate of the sensitivity of laboratory reports of *C trachomatis* (sensitivity at the level of case reporting refers to the proportion of cases of a disease or health event detected by a surveillance system [CDC, 2001]).

Methods

Study design

The study was performed between the 27th of December 1997 and the 4th of September 1998. It was carried out within the framework of the Swiss Sentinel Surveillance Network of Gynaecologists (SSSNG), which is a network of gynaecologists working in private practices. Participation in the surveillance system is voluntary and unpaid, and the network sees an estimated 2.5 - 3.5% of private practice gynaecological consultations in Switzerland [Matter et al, 2000].

Gynecologists in the SSSNG sampled two groups of women aged less than 35: first consultations for a pregnancy and sexually active women having a routine check-up. A cervical swab for *C trachomatis* was first taken from a pregnant woman and then from the *next* woman consulting the practice for a routine check-up. The gynecologist then waited for the following woman who consulted the practice for a pregnancy before sampling another check-up woman. The cervical swabs were taken after obtaining informed consent and the gynecologists completed an anonymous questionnaire for each woman, covering simple socio-demographic (e.g. age, nationality) and clinical (e.g. urogenital symptoms) information. The questionnaires were sent to the Sentinella surveillance unit at the SFOPH at the end of each week (see **Appendix 7**).

The cervical swabs were sent (by post) to the Department of Medical Microbiology at the University of Zurich (see **Appendix 8**) where they were tested using the plasmid based ligase chain reaction (LCR) assay (LCX, Abbott Laboratories, Chicago, IL, USA), according to the manufacturer's instructions. The Department of Medical Microbiology sent the laboratory result to the gynecologist by post or fax, depending on the how he or she preferred to receive the result. A copy of the laboratory report was rendered anonymous by removing the patient's name and sent to the Sentinella surveillance unit. The laboratory test results were linked to the questionnaires using the study questionnaire numbers.

Extrapolations

We assumed that the prevalence of *C trachomatis* among the check-up women would be a rough estimate of the prevalence of *C trachomatis* among low-risk, sexually active women in Switzerland. This was based on the fact that women in Switzerland have open access to private gynecologists and they use this service. In the Swiss Health Survey carried out in 1997 [Calmonte et al, 2000] 50% of women (all ages) reported that they had consulted a gynecologist in the previous twelve months (compared to 65% who had consulted a general

practitioner). In the age group 15-24 the percentage was 50% and among 24-34-year-olds it was 68% [Calmonte et al, 2000].

The prevalences observed among low-risk, sexually active women were applied to the Swiss population statistics [BfS, 1998] to provide a conservative estimate of the total number of female genital chlamydial infections in Switzerland. The estimates are conservative as they exclude high-risk women (e.g. women attending public family planning clinics [Nguyen Duy et al, 1989; Lee, 1997] or STDs clinics [Lee, 1997]). Independent predictors for *C trachomatis* among the check-up women were sought to refine the estimates. For example, if significantly higher prevalences were observed among non-Swiss women, the extrapolations would be carried out separately for Swiss and non-Swiss women.

Statistical methods

The univariate analyses, χ^2 and χ^2 for trend were calculated using EPI-INFO Version 5.0. The multivariate analyses were performed using EGRET Version 0.25.6. Independent risk factors of chlamydial infections were assessed using stepwise logistic regression.

Results

Prevalence of C trachomatis

Cervical swabs from 1751 women were collected and tested by LCR at the Department of Medical Microbiology. Of these, 119 were excluded from the analysis because they did not fit into the inclusion criteria (mainly women who were older than 34) and 43 because the women were undergoing antibiotic treatment (in the previous 2 weeks). The analysis was therefore based on a total of 1589 (91%) cervical swabs: 817 from pregnant women and 772 from check-up women. The cervical swabs were collected by 36 gynaecologists working in 15 of the 26 cantons in Switzerland. Each gynaecologist collected an average of 44 cervical swabs (range 1-190).

Pregnant women were more likely to be older (median age of pregnant women was 29 versus 27 among check-up women), in a stable relationship (98.9% versus 89.0%, p=0.000; data not shown), to be foreign (21.2% versus 12.6%; p=0.000) and not to have urogenital symptoms (5.3% versus 8.3%; p=0.02). The prevalence of genital chlamydial infection (Table 8.1) was twice as high among check-up women (2.9%; 95% confidence interval (CI): 1.8% to 4.2%) than among pregnant women (1.4%; 95% CI: 0.7% to 2.3%).

The prevalences in different sub-groups did not vary significantly for any of the variables analysed, except the presence of urogenital symptoms (Table 8.1). Women consulting their gynaecologist with urogenital symptoms were significantly more likely to be infected with *C trachomatis* than those without these symptoms, in both groups of women. Genitourinary symptoms were reported in two of the eleven cases of genital chlamydial infection among pregnant women (18%) and in six of the 22 cases among check-up women (27%).

"Urogenital symptoms" were not defined in the prevalence study and were left to the discretion of the gynecologists in the SSSNG. The gynecologists were asked to list these symptoms and, where this information is available, the most common symptom stated was vaginal discharges (23% (10/43) of women with urogenital symptoms among pregnant women and 22% (14/64) among check-up women), in particular *candidiasis* (28% (12/43) among pregnant women and 17% (11/64) among check-up women).

Extrapolations

The second objective of the Swiss Chlamydia Prevalence Study was to make a conservative estimate of the total number of genital chlamydial infections among low-risk, sexually active women in Switzerland. The multivariate analysis among check-up women did not reveal any population group for which the prevalences should be stratified, for example for Swiss and non-Swiss (Table 8.1). Since no infections were found in the less than 20-year-olds (data not shown) and we expected higher prevalences in this age group based on previous studies [Nguyen Duy et al, 1989; Lee, 1997] (see discussion), we excluded this group from the extrapolations. Prevalences varied by age among check-up women who were older than 19 ($p=0.07$, see footnote 5 in Table 1) and we therefore performed the extrapolations by five-year age group using the Swiss census statistics [BfS, 1998] (Table 8.2). Our conservative estimate of the total number of genital chlamydial infections among women aged 20-34 was 24,400 (95% CI: 14,300-34,300) in 1998.

Table 8.1 The prevalence of C trachomatis among women consulting the Swiss Sentinel Surveillance Network of Gynaecologists, 27th December 1997-4th September 1998

	N[1]	n[1](% positive)	crude OR[1] (95 % CI[1])	adjusted OR[2] (95 % CI[1])	p value
Pregnant women[3]:					
Total	**817**	**11 (1.3)**	–		
Age:					
15-24	156	4 (2.6)	1	1	
25-29	341	3 (0.9)	0.3 (0.1-2.0)	0.5 (0.1-2.2)	0.3
30-34	320	4 (1.3)	0.5 (0.1-2.6)	0.3 (0.1-1.9)	0.2
Nationality:					
Swiss	636	5 (0.8)	1	1	
Non-Swiss	173	4 (2.3)	3.0 (0.6-14.0)	2.5 (0.6-10.1)	0.2
Unknown	8	2(25.0)	–	–	
Urogenital symptoms:					
Yes	43	2 (4.7)	4.1 (0.4-20.9)	5.4 (1.1-27.7)	0.04
No	773	9 (1.2)	1	1	
Unknown	1	0 (0)	–		
Check-up women[4]:					
Total	**772**	**22 (2.8)**	–		
Age[5]:					
15-24	255	9 (3.5)	1	1	
25-29	262	8 (3.1)	0.9 (0.3-2.6)	0.9 (0.3-2.3)	0.8
30-34	255	5 (2.0)	0.6 (0.1-1.9)	0.6 (0.2-1.8)	0.3
Nationality:					
Swiss	668	18 (2.7)	1	1	
Non-Swiss	97	4 (4.1)	1.6 (0.4-4.9)	1.5 (0.5-4.6)	0.5
Unknown	7	0 (0)	–		
Urogenital symptoms:					
Yes	64	6 (9.4)	4.5 (1.4-12.5)	4.2 (1.6-11.1)	0.00
No	704	16 (2.3)	1	1	
Unknown	4	0 (0)	–		

Footnotes: See next page

1 N = total number of women; n = total number of positive test results for C trachomatis; OR=odds ratio; CI = confidence interval

2 The odds ratios were adjusted for age, nationality and urogential symptoms in both groups of women (pregnant and check-up women).

3 We have only presented the variables analyzed in the multivariate analysis. The other variables analyzed in the univariate analysis were: number of children, intentional pregnancy (yes or no), type of partnership woman lives in (single or not), type of health insurance (private or not), time of year (summer or not) and canton of domicile (Latin-speaking or not). None of these variables were significantly associated with a higher prevalence of C trachomatis.

4 We analyzed the same variables as those listed under pregnant women (see point 2), with the exception of intentional pregnancy (yes or no), and the additional variable: type of contraception used in the last month (condom use: yes or no). None of these variables were significantly associated with a higher prevalence of C trachomatis.

5 χ^2 for linear trend: 1.1; p=0.29. When comparing the age groups 20-24, 25-29 and 30-34, the χ^2 for linear trend was: 3.4; p=0.07.

Performing the analysis with no age stratification (in other words applying the prevalence seen in check-up women aged 20-34 to all women in Switzerland in this age group) hardly modified the estimate (24,300; 95% CI: 15,200-36,400). National laboratory reports of *C trachomatis* to the SFOPH among women aged 20-34 in 1998 only represented 4.7% of the estimated number of genital infections in Switzerland (Table 8.2).

Table 8.2 Female C trachomatis infections reported by laboratories to the Swiss Federal Office of Public Health in 1998 and an extrapolation of the Sentinella Chlamydia Prevalence Study results

	Laboratory reports in 1998 (n)	Check-up women prevalences (%)	Total number of women in Switzerland (1998)	Extrapolations[1] (N)	95% confidence interval[2]	Sensitivity n/N (%)
Age group						
20-24	413	5.2	204,801	10,600	4,900 - 19,800	3.9
25-29	453	3.1	252,121	7,800	3,400 - 15,000	5.8
30-34	284	2.0	301,264	6,000	1,900 - 13,600	4.7
Total	**1,150**	**3.2**	**758,186**	**24,400**	**14,300 - 34,300**	**4.7**

1 The prevalence of C trachomatis observed in the check-up women multiplied by the total number of women in Switzerland, rounded to the nearest 100. The total figure (24,400) is the sum of the three age groups.

2 Rounded to the nearest 100

Discussion

A number of *C trachomatis* prevalence studies have been carried out among women in Switzerland. These studies have been characterized by the highly selective nature of the study populations. Two studies were carried out among women attending family planning clinics, and prevalences of 18.5% were observed in Lausanne (1987) [Nguyen Duy et al, 1989] and 9.6% in Zurich (1995-97) [Lee, 1997]. Another study of men and women consulting a policlinic of dermatology was carried out in Zurich (1995-96) and found a prevalence of 13.7% among women [Lee, 1997].

An attempt to estimate the prevalence of *C trachomatis* in the general population in the Zurich agglomeration was made in July 1995 [Lee, 1997]. A total of 2000 residents were randomly sampled and sent a letter describing the objectives of the study, a letter of consent, a detailed questionnaire and the request to come to the University Hospital to give a urine sample. A total of 52 persons voluntarily gave a urine sample and another 48 did so following a telephone recall of 500 non-participants. A total of 100 urine samples were therefore collected (5% of those contacted) and no one tested positive for *C trachomatis* [Lee, 1997]. This study highlights the difficulty of trying to estimate the prevalence of *C trachomatis* in the general population and the need to explore indirect approaches, such as the Sentinella Chlamydia Prevalence Study, to obtain this information.

Very few prevalence studies have been carried out in women consulting their gynecologist in Western Europe, and the results from other studies are difficult to compare because of the different methodologies and clinical settings. A study carried out in Berlin among women aged 20-39 consulting their gynecologist for a cervical smear or the prescription of the pill found a prevalence of 3.6% (n=5022) [Koch et al, 1997]. Another in France carried out by 46 gynecologists in the greater Paris area who screened all consecutive female attendees during one week found a prevalence of 0.8% (n=1893) [Warszawski et al, 1999]. A number of studies have been carried out in the United Kingdom among women consulting their general practitioner. One in London among women aged 18-35 consulting their general practitioner for a cervical smear or a "young well woman" check found a prevalence of 2.6% (n=890) [Grun et al, 1997]. Another in Scotland found a prevalence of 3.5% among patients attending 619 general practitioners in the Lothian region for a genital swab to test for chlamydia [Ross et al, 1996].

Previous studies have suggested that screening for *C trachomatis* becomes cost effective at a prevalence of 6% or more [19-22]. The Sentinella Chlamydia Prevalence Study only found

such prevalences among check-up women with urogenital symptoms (9.4%, see Table 1). From a purely cost effective perspective, our study results only support the systematic screening for *C trachomatis* of check-up women aged less than 35 with urogenital symptoms.

In an attempt to identify a screening strategy that captures more of the *C trachomatis* infections (only 6 (27%) of the 22 infections among check-up women would have been identified if screening was limited to urogenital symptoms), we explored other selective screening criteria. The only criteria that identified a high proportion of infections (+80%) were criteria that tested more than 60% of the women in each group. Among the pregnant women these were all women aged less than 30 (82% of infections and 61% of women) and among check-up women they were all women with urogential symptoms and all women aged less than 30 (81% of infections and 69% of women).

Considering i) the objectives of the Sentinella Chlamydia Prevalence Study were not to identify selective screening criteria, ii) our study probably omitted important screening questions (see below) and iii) screening recommendations should be based on rigorous cost effectiveness studies, we feel that this issue requires further attention. A new study looking specifically at the question of selective screening in this population should explore variables that we did not include in our study. The chlamydia prevalence studies carried out in England [1] and France [17] highlighted the importance of questions concerning "sexual partners in the previous twelve months" (whether the women had two or more sexual partners in the previous twelve months [1] and whether the women had a new sexual partner in the previous twelve months [17]). Another important question that could be explored is whether the women have had a previous treatment for a sexually transmitted disease.

Our estimate of the sensitivity of laboratory reports of *C trachomatis* among women aged 20-34 (4.7%) is based on a fixed numerator (the total number of laboratory reports) and an estimated denominator (the extrapolation estimate). A number of factors can affect these two numbers.

The numerator is based on laboratory reports of *C trachomatis* to the SFOPH by recognized laboratories in Switzerland. A survey of all laboratories in Switzerland – recognized and non-recognised, public and private – found that laboratory reports of *C trachomatis* to the SFOPH represented roughly 70% of all positive laboratory tests for *C trachomatis* in 1994 [Paget, 1997]. We have no reason to believe that this proportion changed four years later and the sensitivity estimate would probably not increase greatly if all laboratories in Switzerland were

to report *C trachomatis* to the SFOPH (from 4.7% to 6.7%). The laboratory reports of *C trachomatis* include genital, urethral, eye and lung infections and the total number of genital infections is therefore lower than the 1150 female reports aged 20-34 received by the SFOPH in 1998. Correcting the sensitivity estimate for this factor would produce a lower percentage.

The estimate of the denominator (the total number of genital chlamydial infections among women age 20-34) is based on check-up women who consult a private gynecologist. A number of selection biases may have affected our prevalence study results. The Sentinella Chlamydia Prevalence Study excluded women who consulted public hospitals (e.g. women's hospitals) and private clinics/hospitals. There was also an important under-representation of foreign women (only 12.6% of the check-up women were foreign compared to 26.0% in the general population aged 20-34 [BfS, 1998]), a group that had a higher, though not significantly higher, prevalence. Also, we had data from all of the major urban cantons, but missed women from many of the rural cantons in Switzerland. Overall, we feel that the prevalences in the check-up group probably underestimated the true prevalence of *C trachomatis* in women consulting a gynecologist in Switzerland, mainly because of the lack of data from public hospitals and the deficit of foreign women.

The overall impact of these different factors on the sensitivity estimate for genital chlamydial infections is that our estimate is probably too low. The numerator is too high because it includes all types of chlamydial infections and the denominator is too low because it is based on a low-risk population. Overall, the sensitivity of laboratory reports of *C trachomatis* infections for genital chlamydial infections among women aged 20-34 is therefore probably less than 4.7% in Switzerland. These findings are important for the evaluation of STD surveillance systems in Switzerland as they demonstrate the limitations of laboratory reports in assessing the frequency of genital chlamydial infections among women and highlight the importance of using prevalence studies to measure the frequency of a predominantly asymptomatic infection.

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Chapter 9

Minimum essential data for the surveillance of STDs in Switzerland

Minimum essential data for the surveillance of STDs in Switzerland

9.1 Introduction

The overall purpose of evaluating public health surveillance is to promote the most effective use of health resources [Klaucke, 1994]. The highest priority public health events should be under surveillance, and the surveillance system should meet its objectives as efficiently as possible [Klaucke, 1994]. When possible, the evaluation of a surveillance system should include recommendations for improving quality and efficiency, e.g. by eliminating unnecessary duplication [CDC, 1988].

An evaluation of surveillance priorities is an important component of the evaluation of communicable disease surveillance activities [Thacker et al, 1983; Thacker et al, 1983; CDC, 1988; CDC, 2000a; CDC, 2001]. "*The defining and setting of priorities – and their use in determining resource allocation – is acknowledged to be one of the prime determinants of the effectiveness of an organization*" [Rushdy &. O'Mahoney, 1998]. A number of countries have carried out evaluations or priority setting exercises of their communicable disease surveillance systems. Published material was found for the following countries: Canada, England and Wales, the European Union, France, Switzerland and the United States.

Canada:

Canada embarked on an evaluation of its communicable disease surveillance system in 1987 [Carter, 1991]. The National Advisory Committee on Epidemiology established a list of 12 criteria that were given scores ranging from 0 to 5. The following criteria were used: interest of WHO, interest of the Canadian Ministry of Agriculture, incidence, morbidity, mortality, case-fatality rates, risk of transmission, risk of clusters, socio-economic impact, risk perception by the general population, possibility to prevent infections by vaccination and necessity for an immediate response by the public health authorities.

The total score of each communicable disease allowed obligatory reports to be classified according to their level of priority. The introduction of a new communicable disease onto the list of reportable diseases is based on a score of 18 points or more (out of a possible 60 points) [Carter, 1991].

England and Wales:

The Public Health Laboratory Service (PHLS) undertook a priority setting exercise in 1997 concerning the surveillance of communicable diseases in England and Wales [Rushdy & O'Mahoney, 1998]. A questionnaire was used to elicit individual responses from: all senior staff in PHLS, all consultants in communicable disease control in England and Wales, senior staff at the Department of Health and members of the PHLS Board. The exercise was based on the following criteria: the present burden of ill health (e.g. age and sex-related morbidity and mortality), the social and economic impact (costs), potential threats (in 5-10 years), health gain opportunity (of interventions), public concern and confidence (media interest) and the PHLS 'added value' ("Can the PHLS make a difference?").

Three priority groups of diseases were established as a result of this priority setting exercise: priority 1 diseases – those of major importance to public health, priority 2 diseases – those of moderate importance, and priority 3 diseases – those whose prevalence is declining as a result of public health action and diseases of low prevalence and/or associated morbidity. Sexually transmitted diseases were classified as priority 1 communicable diseases [Rushdy & O'Mahoney, 1998].

The European Union:

A group of European communicable disease experts are in the process of establishing a document outlining a conceptual framework and recommendations for the evaluation of communicable disease surveillance networks in Europe [Ruutu et al, 2000]. This document mainly deals with EU-wide infection-specific surveillance systems (e.g. EuroHIV, EuroTB, the European Influenza Surveillance Scheme), but also aims to be relevant to national surveillance systems. It outlines a list of performance indicators which should be used to evaluate a surveillance system, highlights the need to integrate external evaluations and recommends that the EC requires grant applicants to have a common evaluation procedure [Ruutu et al, 2000].

France:

The mission of the "Réseau National de Santé Publique" (RNSP) is to develop, coordinate and improve the surveillance of communicable diseases and problems related to the environment [Hubert et al, 1994]. An evaluation of surveillance activities was begun in 1993 to adapt the surveillance system to present day needs. This was done by hierarchising a list of communicable diseases and listing the different surveillance systems which should be used, modified and prioritised.

The first step of the evaluation process was to establish 93 potential infectious diseases which could be monitored. These were grouped into nine groups and each communicable disease was assessed according to three factors:

1) A description of the epidemiological situation of each disease in France (importance of the disease in terms of mortality and morbidity, trend in incidence, geographical distribution, epidemic potential, effectiveness of preventive measures);
2) Recent developments (e.g. vaccinations or treatments);
3) Existing surveillance systems and the systems wished to meet objectives.

The second step was to establish five Working Groups to work on the diseases according to the following themes:

- Diseases which are vaccine-preventable;
- STDs, hepatitis, AIDS;
- Food-borne illnesses;
- Zoonoses and imported infections;
- Respiratory infections, meningitis and other pathogens.

Each Working Group was to be composed of members of the RNSP and the "Direction Générale de la Santé", institutional partners (e.g. the Ministry of Agriculture) and other experts who were, if possible, independent of the existing surveillance systems. Each person in the Working Group was to produce individual evaluations of a group of communicable diseases and these would be brought together to produce an overall synthesis. The five syntheses were to be followed-up by a national forum bringing together all those active in surveillance and to discuss the propositions of each Working Group [Hubert et al, 1994].

Switzerland:

The SFOPH has carried out two evaluations of its communicable disease surveillance activities. The first concerned an evaluation – using the Delphi inquiry method – in 1996/97 of the nine national reference laboratories (e.g. influenza and retroviruses) which the Swiss Confederation supports [Pagano et al, 1998]. The second was carried out in 1999 and involved an evaluation of communicable surveillance priorities [BAG, 1999]. The objectives of this evaluation were to prioritise the surveillance of communicable diseases, to reduce the number of obligatory diseases collected and to assess where resources (mainly personnel) were being used and where they should be allocated in the future.

The priority setting survey was carried out internally and included many members of the Division of Epidemiology and Infectious Diseases of the SFOPH. The surveillance activities of the Division were evaluated using the following five criteria:

1. The weight of the illness today (estimates of morbidity, mortality, disability-adjusted life years (DALYs) lost and the financial cost by age and sex);
2. The expected (estimated) weight of the illness in the coming 5-10 years;
3. The potential returns on health in the population if something is improved/promoted;
4. The interest and trust of the population, media and politicians;
5. The specific competence of the SFOPH in this domain.

Several rounds of discussion were held, and a consensus opinion was sought, without the intention of conducting a Delphi method of inquiry. The findings of this evaluation are presented below, in section 9.2.1.

United States:

The CDC has published two sets of detailed guidelines concerning the evaluation of surveillance systems. The first guidelines were published in 1988 ("Guidelines for evaluating surveillance systems" [CDC, 1988]) and the second in 2001 ("Updated guidelines for evaluating public health surveillance systems" [CDC, 2001]).

Interestingly, not a single CDC publication was found which presented a complete evaluation of a communicable disease surveillance system in the United States using the CDC guidelines. Medline searches only found publications outlining evaluations of specific components of a communicable disease surveillance system, both at a national (e.g. the question of the timeliness of reporting [Birkhead et al, 1991]) and local (state or community) [Effler et al, 1999; Schramm, et al, 1991; Rosenblum et al, 1992] level.

9.2. Evaluation of the STD surveillance system in Switzerland

The 1988 CDC guidelines [CDC, 1988] were selected to evaluate the STD surveillance system in Switzerland. The 2001 guidelines [CDC, 2001] were still in a draft format at the time of preparing the analysis [CDC, 2000a] and the 1988 guidelines are more concise and relevant to the needs of this particular evaluation. Technical aspects from the 2001 guidelines (e.g. definitions) were used in the evaluation, as they are more up-to-date.

The CDC evaluation procedure is based on a checklist approach involving a systematic assessment of six different tasks [CDC, 1988]. This approach was chosen as it guarantees a clear and broad evaluation of the STD surveillance system in Switzerland. The responses to

each of the evaluation tasks are based on the data collected and presented in this thesis (see references to the different chapters) and other sources, usually papers or documents produced by the SFOPH. Some of the evaluation tasks are beyond the direct scope of the thesis and have either been answered as accurately as possible or not answered at all. Further developing these particular components of the evaluation tasks could further refine the overall evaluation of the Swiss STD surveillance system.

The last task in the 1988 CDC guidelines is to list the conclusions and recommendations of the evaluation. This should state whether the system is meeting its objectives and address the need to continue and/or modify the surveillance system [CDC, 1988]. The evaluation of the STD surveillance system in Switzerland has been taken a step further by trying to establish minimum essential data. These are defined as the minimum essential data which are necessary to describe and monitor the epidemiology of STDs (gonorrhoea, syphilis and chlamydia) over time, including the persons affected, the time and place where the infection was acquired, diagnosed and treated. The reason for doing this is that the SFOPH has limited resources (personnel and financial) available for communicable disease surveillance and it would like to allocate more of these resources to non-STD priority diseases (e.g. influenza and HIV/AIDS, see 9.2.1).

9.2.1. Task A: Describe the public health importance of the health event

The first step in the CDC evaluation process is to describe the public health importance of the health event (e.g. the total number of cases, incidence and prevalence; indices of severity such as the mortality rate and the case-fatality ratio; preventability). As mentioned above, the SFOPH carried out such an evaluation in 1999 [BAG, 1999] and the results are summarised below in Table 9.1.

Vaccine preventable infections generally have a high priority in Table 9.1. Under sexually transmitted infections (STIs), HIV/AIDS has a high priority, chlamydia and gonorrhoea have medium priorities and syphilis has a low priority. It is noteworthy to mention that there are no weights for herpes, which is potentially an important STD [CDC, 1999b].

9.2.2. Task B: Describe the system to be evaluated

The surveillance of STDs in Switzerland is based on data from four sources: 1) reports from the Swiss Network of Dermatology Policlinics; 2) laboratory reports to the SFOPH of *N gonorrhoeae*, *C trachomatis* and *T pallidum* (until February 1999); 3) reports by the Swiss Sentinel Surveillance Network (available for two groups of physicians: i) general practitioners

and internists, ii) gynaecologists); and 4) prevalence studies (e.g. *C trachomatis* [Paget et al, submitted], *T pallidum* [Swiss Red Cross, 2000] and herpes simplex virus type 2 [Laubereau et al, 2000]). **Chapters 1, 3, 5** and **8** describe these four data sources in greater detail.

1. List the objectives of the system [CDC, 1988]
   The objectives of the STD surveillance system in Switzerland are:
   1. To describe, as accurately as possible, the epidemiology of STDs in Switzerland, particularly trends over time;
   2. To provide data which can be used for public health practice (e.g. for interventions, for the evaluation of prevention activities or for the clinical management of STD patients);
   3. To be an efficient surveillance system for the SFOPH.
2. *Describe the health event(s) under surveillance and state the case definitions for each health event* [CDC, 1988]
   The analysis concentrates on gonorrhoea, syphilis and chlamydia and the case definitions depend on the data source.

Swiss Network of Dermatology Policlinics (SNDP): The SNDP are specialised clinics for the diagnosis of STDs. For the purpose of the STD/HIV surveillance project, the case definition for a case of gonorrhoea was microscopy or culture (minimum method of diagnosis). For chlamydia it was a culture, ELISA, IF (immunofluorescence) or PCR (polymerase chain reaction) test and for syphilis (all early cases; first two years) it was dark ground microscopy or RPR (rapid plasma regain) ≥1: 16 and one specific test [The European Study Group, 1993].

Swiss Sentinel Surveillance Network (SSSN): Data on STDs were collected by the SSSN among general practitioners and internists in 1991/92, 1992/93 and 1995 [Matter et al, 2000]. They have been collected among gynaecologists since 1995. Until 1997, no case definition was used and physicians reported cases which they considered to be an STD (based on clinical symptoms and/or a laboratory result). As of 1997, only cases which had a positive laboratory test result were considered to be an STD [Paget, 1998].

Laboratory reports to the SFOPH: All cases are based on a positive laboratory test result, with no consideration of clinical symptoms.

Prevalence studies: These studies are also only based on positive laboratory test results. For example, the Sentinella Chlamydia Prevalence Study was based on a positive LCR (ligase

Table 9.1 An evaluation of communicable diseases reported to the SFOPH (only communicable diseases with a high (H) or medium (M) global weight and sexually transmitted infections are presented) [BAG, 1999]

	Weight Today (0-2)	Weight 5 yrs (0-2)	Health win (0-2)	Interest media (0-2)	SFOPH competence (0-2)	Global weight (L/M/H)
A. Enteric infections						
Poliomyelitis	0	0	2	1	2	M
Campylobacterosis	1	1	2	1	2	M
B. Respiratory/vaccine preventable						
Influenza	2	2	2	2	2	H
TB	1	1	1	2	2	M
Measles	1	1	2	1	2	M
Pertusis	2	2	2	0	2	M
Meningococcal meningitis	1	1	2	2	1	M
Pneumococcal disease	2	2	1	0	1	M
RSV disease	1	1	1	0	0	M
Streptococcal disease	1	1	0	0	0	M
C. Imported infections						
–						
D. Sexually transmitted infections						
HIV/AIDS	1	1	2	2	2	H
Chlamydia trachomatis infections	1	1	0-1	0	1	M
Gonococcal infections	1	1	1	0	0	M
Herpes						
Syphilis	1	1	0	0	0	L
E. Blood transmitted						
Hepatitis B	1	1	2	1	2	M
Hepatitis C	1	1	0-1	1	1	M
F. Vectors/zoonoses						
Lyme borreliose	1-2	1-2	1	1	1	M
G. Others						
Nosocomial infections	no weights allocated in the evaluation					H
Asthma	no weights allocated in the evaluation					H

Note: A total of 55 infectious diseases were analysed and there were 3 "High" priority diseases (influenza, HIV/AIDS and nosocomial infections), 14 "Medium" priority diseases and 38 "Low" priority ones (with the exception of STIs, these are not shown in table 9.1).

chain reaction) test result and the Herpes prevalence study was based on a positive test result for Herpes-specific antibodies (Laubereau et al, 2000).

3. *Draw a flow chart of the system* [CDC, 1988] and 4. *Describe the components and operation of the system* [CDC, 1988] were not completed as they were considered to be beyond the scope of the thesis.

9.2.3. Task C: Indicate the level of usefulness by describing actions taken as a result of the data from the surveillance system

The epidemiological data obtained from the STD surveillance systems in Switzerland are used for many purposes. One of the most important purposes is to monitor trends in STDs, as the law of epidemics stipulates that communicable diseases must be monitored by the SFOPH to protect the health of the population [Swiss Confederation, 1987]. They are also used to evaluate the sexual health of the Swiss population, particularly the data from the SNDP [Paget & Zimmermann, 1997: **Chapter 3**]. They have been used to initiate interventions (e.g. a counselling course for attending the SNDP with an STD) [Paget et al, 1995: **Chapter 7**] and are used to inform the public, press and health care professionals. Trends in HIV infection among STD patients are used as an early warning system for the spread of HIV in the general population [Paget et al, 1999a: **Chapter 5**].

9.2.4. Task D: Evaluate seven system attributes – simplicity, flexibility, acceptability, sensitivity, predictive positive value, representiveness and timeliness

Each of the attributes is defined and weights (ranging from 0 to 2) are assigned to the four STD surveillance systems used in Switzerland. Table 9.2 presents the findings for each STD (gonorrhoea, syphilis, chlamydia among men and chlamydia among women) and an overall weight is calculated to present a summary of all attributes.

1. *Simplicity:* The simplicity of a surveillance system refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives [CDC, 2001].

Laboratory reports of *N gonorrhoea*, *T pallidum* (until February 1999) and *C trachomatis* are/were very simple as they are a component of the national laboratory surveillance system (weight=2) [Stürchler et al, 1999]. The SNDP is a slightly cumbersome system as it involves six policlinics and requires a national coordinator for the policlinics (based at one of the policlinics) and data (based at the SFOPH):

Table 9.2 An evaluation of the surveillance systems used in Switzerland to monitor STDs: system attributes

	Simplicity	Flexibility	Acceptability	Sensitivity	PVP[1]	Represent-ativeness	Timeliness	Total	Overall weight
Gonorrhoea									
Laboratory reports (0-2)	2	1	2	1	2	2	2	12	high
SNDP[2] (0-2)	1	1	2	0	2	0	1	7	medium
SSSN[3] (0-2)	2	1	1	1	1	1	0	7	medium
Prevalence studies (0-2)	0	0	0	0	2	0	1	3	low
Syphilis									
Laboratory reports (0-2)	2	1	2	0	2	2	2	11	high
SNDP[2] weight (0-2)	1	1	2	0	2	0	1	7	medium
SSSN[3] (0-2)	2	1	1	0	1	1	0	6	medium
Prevalence study[4] (0-2)	2	0	2	0	2	0	1	7	medium
Chlamydia – men									
Laboratory reports (0-2)	2	1	2	1	2	2	2	12	high
SNDP[2] weight (0-2)	1	1	2	0	2	0	1	7	medium
SSSN[3] (0-2)	2	1	1	1	1	1	0	7	medium
Prevalence studies (0-2)	0	0	0	0	2	0	1	3	low
Chlamydia – women									
Laboratory reports (0-2)	2	1	2	0	2	2	2	11	high
SNDP[2] weight (0-2)	1	1	2	0	2	0	1	7	medium
SSSN[3] (0-2)	2	1	1	0	1	1	0	6	medium
Prevalence studies (0-2)	0	0	0	0	2	1	1	4	medium

1 Predictive value positive
2 Swiss Network of Dermatology Policlinics
3 Swiss Sentinel Surveillance Network
4 Prevalence data from blood donors screened for *T pallidum*

weight=1. The SSSN is a relatively simple surveillance system as STDs fit into a system which monitors a number of other diseases (e.g. mumps, measles and rubella) and which has been ongoing since 1986 [Matter et al, 2000] (weight=2). Generally, prevalence studies are not simple to implement as they require special designs and implementation procedures (e.g. the Sentinella Chalmydia Prevalence Study required the coordination of 40 gynaecologists, the Sentinella team at the SFOPH and a laboratory at the University in Zurich): weight=0. Some prevalence studies (e.g. the screening of blood donors for *T palldium* (weight=2)) can be simple exercises.

2 *Flexibility:* A flexible surveillance system can adapt to changing information needs or operating conditions with little additional cost in time, personnel, or allocated funds. Flexible systems can accommodate, for instance, new diseases and health conditions, changes in case definitions or technology, and variations in funding or reporting sources [CDC, 2001].

All of the systems are flexible and have the capacity to integrate changes, some more so than others. The least flexible surveillance system is probably the prevalence studies as their study designs have usually been determined well in advance (e.g. by an ethics committee) and modifications (e.g. a new disease or health condition) cannot be easily integrated (weight=0). The other surveillance systems are reasonably flexible and can generally integrate changes such as new diseases or case definitions (weights=1).

3. *Acceptability:* Acceptability reflects the willingness of individuals and organisations to participate in the surveillance system [CDC, 2001].

Acceptability of laboratory reports is high, probably because it is legal requirement [Swiss Confederation, 1987] and because it has been ongoing since 1989 (weight=2). The acceptability of the SNDP surveillance system was also high in a survey carried out in 1996 (weight=2) [Paget et al, 1999a: **Chapter 5**]. The acceptability of monitoring STDs by the SSSN is unknown, but probably isn't a particular problem as STDs are rare and very little paperwork is required (weight=1). The acceptability of some prevalence studies is low as they require an investment of time, resources and are often associated with ethical considerations which render their implementation complicated (e.g. persons must be explained about the nature of the study): weight=0. The screening of blood donors for *T pallidum* is well accepted (weight=2).

4. *Sensitivity:* The sensitivity of a surveillance system can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease or health event detected by the surveillance system. Second, sensitivity can refer to the ability to detect changes in the numbers of cases over time (outbreaks) [CDC, 2001].

The SNDP only collects a small proportion of the total number of STD cases in Switzerland, as the policlinics of dermatology are located in the five largest cities of Switzerland (weight=0) [Paget et al, 1999a: **Chapter 5**]. Laboratory reports probably measure a good proportion of total *symptomatic* infections in Switzerland and national coverage is relatively high. The Division of Epidemiology and Infectious Diseases at the SFOPH sent a questionnaire to all laboratories in Switzerland concerning tests performed in 1994 and found that laboratory reports represented about 70% of all positive tests for *C trachomatis*, 60% for *N gonorrhoeae* and 50% for *T pallidum* [Paget, 1997] (weight for gonorrhoea and male genital chlamydial infections=1). Since many syphilis infections [Jones & Wasserheit, 1991] and female chlamydial infections are *asymptomatic* [Jones & Wasserheit, 1991; Paget et al, submitted: **Chapter 8**], it is less likely that these infections will be captured by laboratory reports and the sensitivity of these STDs will probably be low (weight=0).

STD reports by general practitioners and internists participating in the SSSN were infrequent (only 24 cases of chlamydia, 12 cases of gonorrhoea and 5 cases of syphilis were reported by 119 general practitioners and internists in 1992 [Paget & Zimmermann, 1997: **Chapter 3**]), but an extrapolation of the findings for chlamydia indicated that many male (but not female) infections in Switzerland were diagnosed in this setting [Paget, 1998 and Paget et al, submitted: **Chapter 8**] (weight=1 for men and 0 for women). Most prevalence studies are carried out in (small) samples of the population and the sensitivity of identified cases is therefore low. The time trends of repeated prevalence studies are also difficult to interpret [Ades & Nokes, 1993] (weight=0).

5. *Predictive value positive:* Predictive value positive (PVP) is the proportion of persons identified as cases who actually have the health event under surveillance [CDC, 2001]. In assessing PVP, primary emphasis is placed on the confirmation of cases reported through the surveillance system.

For the SNDP and the SSSN, the highest PVP is probably obtained in the SNDP, as the policlinics are specialised clinics for the diagnosis of STDs with laboratory testing an integral part of clinical diagnoses (weight=2) [Paget et al, 1999a: **Chapter 5**]. The SSSN probably has a

lower PVP as the standard case definitions for each STD are not clearly defined and laboratory testing does not always appear to be a standard procedure (weight=1) [Paget & Zimmermann, 1997: **Chapter 3**]. The laboratory reports (weight=2) and the prevalence studies (weight=2) both have high levels of PVP because diagnoses are based on positive laboratory test results.

6. *Representiveness:* A surveillance system that is representative accurately describes the occurrence of a health event over time and its distribution in the population by place and person [CDC, 2001].

There is great variability in the representativeness of the four surveillance systems. The SNDP is the least representative, with a large proportion of men, foreigners and male homo-bisexuals [Paget et al; 1999a: **Chapter 5**] (weight=0). The SSSN is reasonably representative of persons consulting their general practitioner or women attending their gynaecologist (weight=1). Laboratory reports probably have a high level of representativeness as data are collected by law and by all types of laboratories in Switzerland: public, private and university laboratories (weight=2). Finally, prevalence studies have the potential for high levels of representativeness, but for technical reasons (e.g. the population tested and response rates associated with voluntary testing [Paget et al, 1999; **Chapter 6**]) it is very difficult to obtain data which is truly representative (weight=0). It should be noted that the screening of blood donations for *T pallidum* is carried out in a selected population and is not a representative sample of the general population (weight=0). Finally, the Sentinella Chlamydia Prevalence Study, carried out by gynaecologists in the SSSN, probably provided a conservative, underestimation of all infections (weight=1) [Paget et al, submitted; **Chapter 8**].

7. *Timeliness:* Timeliness reflects the speed or delay between steps in a surveillance system [CDC, 2001]. The interval usually considered first is the amount of time between the onset of an adverse health event and the report of the event to the public health agency responsible for instituting control and prevention measures. Another aspect of timeliness is the time required to for the identification of trends, outbreaks, or the effect of control and prevention measures [CDC, 2001].

The timeliest STD reports in Switzerland are the laboratory reports (weight=2), as they are published on a weekly basis in the Bulletin of the SFOPH and on the Internet [Stürchler et al, 2000]. A recent evaluation found that over 90% of laboratory reports were received within a time period of 14 days [Stürchler et al, 2000]. STD reports by the SSSN are made on a weekly basis, but the data is only analysed on a yearly basis (weight=0). STD reports by the

SNDP are made on a monthly or two-monthly basis by the policlinics, but the data is generally only entered into the national database on a yearly basis (weight=1). Prevalence studies can be monitored as the data comes into the surveillance system. However, the actual final data analysis is frequently performed some time after the study is completed (weight=1).

9.2.4. Task E: Describe the resources used to operate the system (direct costs)

The 1999 priority setting exercise – carried out at the SFOPH – also included a component concerning the allocation of resources used to operate the communicable disease surveillance system [BAG, 2000]. This was an important as one of the objectives of the exercise was to re-allocate resources within the Division of Epidemiology and Infectious Diseases according to the identified priority diseases. Table 9.3 summarises the overall resources and those allocated to STD surveillance.

Table 9.3 Resources allocated to the surveillance of communicable diseases in Switzerland [BAG, 2000]

	1989-99 Total (% work)[1]	2000 Total (% work)[1]
Total	**2812**	**3459**
Influenza	87	200
HIV/AIDS	161	161
Nosocomial infections	6	6
Sexually transmitted infections[2]	37	37
Other	2521	3055

1 100% = 1 full-time person working for 1 year at the SFOPH (resources were also included for tasks which concerned the Division in general (e.g. the Internet and international activities) and support staff (e.g. secretaries))

2 Chlamydia, gonorrhoea, syphilis and herpes

It can be seen from the table that the surveillance of STDs at the SFOPH in 1998-99 involved one person working at 37%. This represents 1.3% of the total resources within the Division and this amount was to remain stable in 2000. Since the total amount of work planned by the Division was projected to increase in 2000, the surveillance of STDs was to only represent 1.1% of total personnel resources.

It should be noted that the surveillance of STDs using laboratory reports and the SSSN is a very efficient use of resources as STDs fit into ongoing monitoring systems of communicable diseases (laboratory reports) and health events (SSSN). The reports of STDs by the SNDP are not efficient: they come from six policlinics across Switzerland and this is an expensive project for the SFOPH. With the exception of prevalence data from blood donors (syphilis), prevalence studies are usually also expensive.

9.2.6. Task F. List the conclusions and recommendations

This Task involves a statement on whether the system is meeting its objectives and whether the surveillance system needs to be continued and/or modified. No statement on the whether the system is meeting its objectives is made as this evaluation should be made by an independent person/institution and not the person was running these surveillance activities (W. John Paget). Recommendations for continuation and/or modification are listed in 9.3.1 and 9.3.2.

9.3. Recommendations

9.3.1 Recommendations: minimum essential data for the surveillance of STDs in Switzerland

An attempt to devise minimum essential data for the surveillance of STDs in Switzerland on the basis of the material presented so far and historical constraints (e.g. the existence of a surveillance system) is presented below. The overall results are presented in Table 9.4 and a comment is made for each STD.

Gonorrhoea

The evaluation recommends that the surveillance of gonorrhoea in 2003 be solely based on data from laboratory reports of *N gonorrhoeae* and reports of gonorrhoea by the SNDP (Table 9.4). The reporting of gonorrhoea by the SSSN should be stopped and the implementation of prevalence studies is not recommended. The latter could be initiated in specific conditions e.g. a sudden increase in laboratory and SNDP reports. Major problems associated with normal prevalence studies are that they are expensive, labour intensive, difficult to repeat over time and tricky to interpret (with respect to the general population).

It is important to note that laboratory reports of *N gonorrhoeae* could be improved in two ways: if the total number of tests performed each year was collected and if information was

gathered on whether the samples were rectal or not. The first improvement would provide a prevalence measure and hints on whether there have been changes in screening practices. The second improvement would provide trends in gonorrhoea among homo/bisexual men.

Syphilis

The evaluation recommends that the surveillance of syphilis in 2003 be based solely on data from the SNDP and the prevalence of *T pallidum* observed among blood donors [Swiss Red Cross, 2000] (Table 9.4). The latter should be integrated into the STD surveillance system and trends should be obtained for first-time and regular blood donors. The SFOPH uses this data source for the surveillance of HIV [Gebhardt, 2000] and it is used in England and Wales for the surveillance of STDs [Hughes & Catchpole, 1998].

Table 9.4 An evaluation of the surveillance systems used in Switzerland to monitor STDs: overall outcome

	SFOPH priority	**Laboratory reports**	**Swiss Network of Dermatology Policlinics**	**SSSN[1]**	**Prevalence studies**
Gonorrhoea	medium[2]	high[3]	medium[3]	medium[3]	low[3]
Surveillance in 1998/99	–	yes	yes	yes	no
Minimum essential data in 2003	–	**yes**	**yes**	no	no
Syphilis	low[2]	high[3]	medium[3]	medium[3]	medium[3]
Surveillance in 1998/99	–	yes	yes	yes	no
Minimum essential data in 2003	–	no	**yes**	no	**yes[4]**
Chlamydia – men	medium[2]	high[3]	medium[3]	medium[3]	low[3]
Surveillance in 1998/99	–	yes	yes	yes	no
Minimum essential data in 2003	–	**yes**	no	**no**	**yes[5]**
Chlamydia – women	medium[2]	high[3]	medium[3]	medium[3]	medium[3]
Surveillance in 1998/99	–	yes	yes	yes	yes
Minimum essential data in 2003	–	**yes**	no	**no**	**yes[5]**

1 Swiss Sentinel Surveillance Network
2 From the last column of Table 9.1
3 From the last column of Table 9.2
4 Prevalence data from blood donors screened for T pallidum
5 Repeat of the Sentinella Chlamydia Prevalence Study, a prevalence study among patients attending the SNDP or among adolescents (using urine samples)

The reporting of syphilis by the SSSN should be stopped and laboratory reports of *T pallidum* were discontinued in February 1999 with the introduction of a new communicable surveillance ordinance [Stürchler et al, 2000]. *T pallidum* was dropped from the list of communicable diseases for a number of reasons: i) the laboratory reports captured old (stage III and IV) and new (I and II) infections and the SFOPH was really only interested in new infections; ii) many infections are asymptomatic and were probably not measured by the system; iii) there were relatively few reports; iv) the objective of the new surveillance ordinance was to reduce the number of communicable diseases reported to the SFOPH.

Genital chlamydial infections

This analysis has been performed separately for men and women for a number of reasons:

i) The policlinics of dermatology see very few women (9 out of 10 patients are men) [Paget et al, 1999a; **Chapter 5**]
ii) The very different natural history of genital chlamydial infections among men and women (roughly 60-75% of women are asymptomatic compared to only 25-50% [Jones & Wasserheit, 1991]);
iii) The finding that laboratory reports of *C trachomatis* represent less than 5% of all infections among women aged 20 to 34 [Paget et al, submitted; **Chapter 8**].

The evaluation recommends that the surveillance of genital chlamydial infections in 2003 be based solely on data from laboratory reports of *C trachomatis* and, if possible, prevalence studies (a repeat of the Sentinella Chlamydia Prevalence Study, a prevalence study among patients attending the SNDP or among adolescents (using urine samples)). The evaluation does not recommend that chlamydia be monitored by the SNDP and the reporting of chlamydia by general practitioners and internists in the SSSN should be stopped. The reporting of chlamydia by gynaecologists in the SSSN is frequent and relevant to the description of the epidemiology of STDs in Switzerland [Paget, 1998], however, there is serious talk of stopping this surveillance system altogether.

As with *N gonorrhoeae*, the laboratory reports could be improved if the total number of tests performed each year was available: this would provide useful information on screening practices for *C trachomatis* and the percentage of positive test results.

It is important to note that the evaluation recommends laboratory reports of *C trachomatis* for both men and women (Table 9.4), even though this source measures less than 5% of total infections among women [Paget et al, submitted: **Chapter 9**]. There are two main reasons

for making this recommendation: laboratory reports measure a much higher percentage of male infections (only about 25% of infections are asymptomatic among men [Wasserheit & Jones, 1991]) and it would be impractical to ask laboratories to only report male infections.

These recommendations are based on an analysis of surveillance data between 1996 and 1999 and should be reconsidered if there is a sudden increase in one or more of the STDs (e.g. in gonorrhoea infections).

9.3.2 *Recommendations: the surveillance of STDs in Switzerland*

- *Special attention needs to be paid to trends in gonorrhoea in Switzerland*
  Cases of gonorrhoea are increasing in a number of countries in Europe [**Chapter 1;** Van den Heyden et al, 2000: **Chapter 4**), and there are signs they have also increased in Switzerland since 1999 (laboratory reports of *N. gonorrhoeae* to the SFOPH). This development needs to be followed carefully.

- *The surveillance of antibiotic resistant of gonoccocal strains should to be established*
  Many countries have integrated the analysis of antibiotic resistance of gonoccocal strains into their surveillance systems (for example, England & Wales [Hughes & Catchpole, 1998], Denmark [Statens Serum Institut, 1998] and France [Goulet & Sadnaoui, 1998]). This is an important project as it provides information on the diagnosis and therapeutic practices, which is one of the reasons for running an STD surveillance system (Catchpole, 1996).

  In the US, treatments have recently been found to be ineffective to a new strain and treatment directives for gonorrhoea have been changed [CDC, 2000b]. In France and England, the recent increases in gonorrhoea have been partially attributed to the spread of resistant strains [Hughes & Fenton, 2000]. As gonorrhoea is now relatively infrequent at the SNDP level (40 cases in 1999), the best place to analyse resistant strains on a national level would probably be to use laboratory reports of *N gonorrhoeae*. It is important to note that the SFOPH has experience in this domain as it has initiated a programme to monitor resistant strains of TB on the basis of laboratory reports [Helbling et al, 2000].

- *New STD surveillance tools need to be developed*
  New surveillance tools should be developed in Switzerland. Particular attention should be paid to 'new' STDs such as genital herpes [Laubereau et al, 2000] and prevalence studies in a representative sample of the general population. England and Wales has such a surveillance system using residual sera (irrevocably unlinked from any identifying data) collected by participating laboratories for serological surveys [Osborne et al, 2000].

- *Syphilis data collected by the Swiss Red Cross needs to be used*
  This is a data source that could and should be used for the surveillance of syphilis in Switzerland. This is done in other countries (for example, England and Wales [Hughes & Catchpole, 1998]) and for HIV in Switzerland [Gebhardt, 1999].

- *Another chlamydia prevalence study should be initiated*
  The findings presented in **Chapter 8** [Paget et al, submitted] demonstrate the limitations of laboratory reports of *C trachomatis* in assessing the frequency of genital chlamydial infections among women in Switzerland, and highlight the importance of using prevalence studies to measure the frequency of this predominantly asymptomatic infection. Another chlamydia prevalence study should, if possible, be planned to clarify the epidemic stage (see below) of chlamydia in Switzerland.

- *A historical graph of STDs in Switzerland should be created*
  Use the BAG/VESKA/H+ data collected since 1909 to create a historical graph of trends in gonorrhoea and syphilis in Switzerland. This would be a very interesting project for someone interested in health statistics in Switzerland (e.g. a Masters of Public Health thesis) and would be a valuable contribution to communicable disease surveillance in Switzerland.

- *National targets for syphilis, gonorrhoea and chlamydia should be established*
  This is an ambitious challenge and cannot be carried out independently of other infectious diseases or maybe even other health indicators in Switzerland. Many countries are establishing public health targets (for example, the United States established such targets as early as is in 1979 [Public Health Service, 1980]) and targets for STDs are an integral part of this process.

– *The epidemic phase of gonorrhoea, syphilis and genital chlamydial infections in Switzerland*
In 1998/99, the estimated epidemic phase (see **Chapter 1** for further details: 1.1.2) of each STD is listed below:

Gonorrhoea:	Phase IV (possibly I)
Syphilis:	Phase IV
Genital chlamydial infections:	Phase III (probably)

Note: Phase I means that the incidence of the STD is increasing (Ro>1), phase II means the incidence is stable (Ro=1), phase III means it is declining (Ro<1) and phase IV that the STD is under control and endemic.

Gonorrhoea was in phase IV, but the incidence may be increasing in 2000 and 2001 (laboratory reports of *N gonorrhoeae* to the SFOPH increased in 2000 and 2001). It is very difficult to establish the phase of genital chlamydial infections. National laboratory reports of *C trachomatis* seem to indicate that the epidemic is in phase III, with a declining number of reports each year (see **Chapter 3**). However, this may not be the case as screening practices over time are unknown and laboratory reports of *C trachomatis* represent less than 5% of all genital chlamydial infections among women in Switzerland (Paget et al, submitted: **Chapter 8**). To be better informed on this trend, one would need to repeat the Sentinella Chlamydia Prevalence Study (Paget et al, submitted: **Chapter 8**).

9.3.3 Recommendations: the public health implications of the PhD

– *Screening for C trachomatis*
Among women, genital chlamydial infections can lead to many health problems (e.g. ectopic pregnancies). Our Chlamydia prevalence study among women attending their gynaecologist indicated the following public health recommendations (Paget et al, submitted: **Chapter 8**):

1. Women attending their gynaecologist for a routine check-up or for a pregnancy (first consultation) should *not* be routinely screened for *C trachomatis*;
2. Women attending their gynaecologist for a routine check-up or for a pregnancy (first consultation) should be tested for *C trachomatis if they have urogenital symptoms;*
3. The routine screening for *C trachomatis* should be seriously considered in the following settings: women attending family planning clinics, men and women attending the Swiss Network of Dermatology Clinics with an STD.

- *Health promotion at the policlinics of dermatology*
  Unsurprisingly, condom use among persons attending the policlinics of dermatology with an STD was very low [Paget et al, 1995: **Chapter 7**]. These patients are a group at high risk of acquiring an HIV infection and sexual health promotion (e.g. to increase condom use) should be targeted at this group [Paget et al, 1995: **Chapter 7**].

- *HIV infection does not appear to be spreading rapidly in heterosexuals*
  HIV prevalences in STD patients in the 1990s were high and stable among male homo/bisexuals (about 22%) and low and stable among heterosexuals (about 1.6%) (Paget et al, 1995: **Chapter 6**; Paget et al, 1999a: **Chapter 5**;). Prevalences of HIV in this group of heterosexuals are a good early warning system for the spread of HIV in the general population and these results probably indicate that HIV is not spreading rapidly in the general population.

- *Sexual health of the population appears to be good*
  Massive declines in gonorrhoea and syphilis have been observed in Switzerland since the late 1970s and have remained at low levels in the 1990s (Paget & Zimmermann, 1997: **Chapter 3**). This is an indication that the STOP AIDS campaign has had a positive impact on the sexual health of the population. These findings are supported by other sources, such as, condom sales in Switzerland and the reported sexual behaviour of the general population [Dubois-Arber et al, 1997]

In conclusion, this PhD has described the STD surveillance methods and epidemiology of gonorrhoea, syphilis and genital chlamydial infections in Switzerland. It has evaluated the four systems used for the surveillance of STDs using a standardised, CDC-designed evaluation protocol and has proposed minimum essential data for each STD. The implementation of these recommendations would lead to an STD surveillance system based on two surveillance systems for each STD, an overall reduction of 33-50% per STD compared to the surveillance system in 1998/99.

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Appendix 1

National laboratory questionnaire used by the Swiss Federal Office of Public Health: December 1987-February 1999

OFFICE FÉDÉRAL DE LA SANTÉ PUBLIQUE
Section de l'épidémiologie médicale

Déclaration collective hebdomadaire des résultats d'examens des laboratoires

A–D **Résultats**
A: titre élevé
B: augm. du titre / séroconversion
C: IgM
D: isolement ou mise en évidence de l'antigène

Indiquer le **nombre** de chaque résultat.
Utiliser au besoin une formule supplémentaire.

E Sexe et année de naissance

Semaine du: _____ au: _____

Laboratoire:

tél. ____ / _____

	genre / espèce type / sous-type	A	B	C	D	E	NPA / Localité (patient, év. médecin)
Virus de l'influenza							
Virus parainfluenza							
Virus-RS							
Adénovirus (resp.)							
Virus de la cytomégalie							
Virus d'Epstein-Barr							
Virus de la rougeole							
Virus des oreillons							
Virus de la rubéole							
Entérovirus (sans poliov.)							

	genre / espèce type / sous-type	A	B	C	D	E	NPA / Localité (patient, év. médecin)
Rotavirus							
Virus de l'immunodéficience humaine (HIV)							
Borrelia burgdorferi							
Mycoplasma pneumoniae							
Streptocoques β-hémolytiques groupe A							
Chlamydia trachomatis							
Neisseria gonorrhoeae							
Treponema pallidum							
Toxoplasma gondii							
autres							

Date: _____ Signature: _____

Form. 311.545.3 12.88 5000 45789/1

Appendix II

National laboratory questionnaire used by the Swiss Federal Office of Public Health: March 1999 -

Vertraulich

Bundesamt für Gesundheit

Labormeldung

Version 1.2001

Bitte ausfüllen und Kopien an das BAG und den Kantonsarzt senden. Besten Dank!

Täglich melden	Methode**	Benötigte weitere Angaben (unterstreichen): (Kommentar).
☐ [1] Häufung		Einzelfallen (bei ≥2 unerwarteten Fällen vom gleichen Ort).
☐ [2] *Neisseria meningitidis* n*	☐ C ☐ G	Entnahmedatum, Material, Serogruppe (nur von Sterilort, Isolate an Nationales Zentrum für Meningokokken senden).
☐ [3] *Corynebacterium diphtheriae* n*	☐ C	Entnahmedatum, Material, Methode, Typ, Toxin-Nachweis.
☐ [4] *Haemophilus influenzae* n*	☐ C	Entnahmedatum, Material, Typ (nur von Sterilort).
☐ [5] *Clostridium botulinum* n*	☐ C	Entnahmedatum, Material, Typ, Toxin-Nachweis.
☐ [6] Hämorrhagische Fiebervirus n*	☐ C ☐ G ☐ S	Entnahmedatum, (bedigfich hohe Antikörper-Titer nicht melden).
☐ [6] Poliovirus n*	☐ [8] *Vibrio cholerae* I*	☐ [34] *Bacillus anthracis* I*
☐ [7] Rabiesvirus n*	☐ [10] *Yersinia pestis* I*	

Wöchentlich melden	Methode**	Benötigte weitere Angaben (unterstreichen): (Kommentar).
☐ [11] HIV I*	☐ C ☐ S ☐ A ☐ S	Typ: ☐ HIV1 ☐ HIV2. (Gemäss Testkonzept in Bull BAG vom 27.4.1998).
☐ [12] *Plasmodium* I*		Entnahmedatum, Species, Methode: ☐ Mikroskopie ☐ Schnelltest ☐ S.
☐ [13] Masernvirus I*	☐ C ☐ G ☐ A ☐ S	Entnahmedatum, serologische Methode, Antikörper-Titer.
☐ [14] *M. tuberculosis*-Komplex n*	☐ C	Entnahmedatum, Material, Species. (Bitte spezielles Formular verwenden. Bei Nachweis säurefester Stäbchen in Sputum-Mikroskopie Kantonsarzt umgehend informieren. Bei kulturellem Nachweis Resultat von Kultur und Sputum-Mikroskopie angeben. Bei Resistenzprüfung angeben, ob resistent oder empfindlich auf Isoniazid, Rifampicin, Ethambutol und Pyrazinamid. Rifampicin-resistente Stämme an Nationales Zentrum für Mycobakterien senden).
☐ [20] *Campylobacter* I*	☐ C	Entnahmedatum, Species.
☐ [21] *Chlamydia trachomatis* I*	☐ C ☐ G ☐ A	Entnahmedatum, Material, Methode. (nur von Genitalorgan).
☐ [22] Verotoxin-produz. *E. coli* I*	☐ C ☐ C	Entnahmedatum, Methode, Serotyp, Toxintyp.
☐ [23] Hepatitis-A-Virus n*	☐ S	Entnahmedatum, (Anti-HAV-IgM).
☐ [24] Hepatitis-B-Virus n*	☐ A ☐ S	Entnahmedatum, ☐ HBsAg oder ☐ anti-HBc IgM).
☐ [25] Hepatitis-C-Virus n*	☐ G ☐ S	Entnahmedatum, Methode (anti-HCV und pos. Bestätigungstest).
☐ [26] Influenzavirus I*	☐ C ☐ A	Entnahmedatum, Material, Typ.
☐ [27] *Legionella* I*	☐ C ☐ A ☐ S	Entnahmedatum, Material, Methode, Antikörper-Titer, Species.
☐ [30] *Salmonella* n*	☐ C	Entnahmedatum, Material, Species, Typ.
☐ [31] *Shigella* I*	☐ C	Entnahmedatum, Species.
☐ [32] *Streptococcus pneumoniae* I*	☐ C	Entnahmedatum, Material, Typ. (nur von Sterilort).
☐ [33] Zeckenenzephalitisvirus I*	☐ S	Entnahmedatum, Methode, Resultat.
☐ [28] *Listeria monocytogenes* I*	☐ [29] *Neisseria gonorrhoeae* I*	☐ [35] *Brucella* I* Species

Benötigte Angaben: Entnahmedatum: _____ Material: _____ Species: _____

weitere: _____

Patient*: Name und Vorname _____ oder Initiale Vorname ___ Initiale Name ___

Geburtsdatum _____ Geschlecht ☐ m ☐ w Kanton ___ PLZ/Wohnort _____

Beauftragender Arzt: Name, Adresse, Tel/Fax Nr.

Labor: Name, Adresse, Tel/Fax Nr (oder Stempel):

Datum: _____ Unterschrift: _____

* Name (evt) oder nur Initialen (v3) eintragen, ausser bei HIV. Bei HIV den ersten Buchstaben und die Anzahl der Buchstaben des Vornamens eintragen, z.B. H4 für Hans, und PLZ/Wohnort leer lassen.

** C=Kulturisolat; G=Genom (DNA/RNA); A=Antigen; S=Serologie (Titeranstieg 2x, Serokonversion oder IgM)

Appendix III

Questionnaire used to assess the coverage of laboratory reports to the Swiss Federal Office of Public Health in 1995

Laborbefragung

ausgefüllt von (Name):

_____

I. HIV-Infektionen

1. Werden in Ihrem Labor HIV-Untersuchungen durchgeführt?

   ☐ nein ☞ Bitte fahren Sie auf der nächsten Seite weiter.

   ☐ ja ☞ Bitte in der folgenden Tabelle die Art der Untersuchungen und die jeweilige Anzahl 1994 durchgeführter Tests eintragen.
   Bitte wenn möglich die genaue Zahl angeben (sonst **Schätzwerte**, die als solche gekennzeichnet sind, z.B. ~ 250).

	HIV 1	HIV 2	HIV 1/2	Totale Anzahl 1994 (~ falls Schätzung)
Enzym-Immuno-Assays:				
Screening	☐	☐	☐	_____
Envacor	☐	☐	☐	_____
Antigen (p24)	☐	☐	☐	_____
Multi-Antigen-Assay (Line-Immuno-Assay)	☐	☐	☐	_____
Western Blot	☐	☐	☐	_____
PCR:				
DNA	☐	☐	☐	_____
RNA	☐	☐	☐	_____
Virus-Kultur	☐	☐	☐	_____

2. Falls in Ihrem Labor zur Zeit gewisse der oben genannten Tests nicht regelmässig durchgeführt werden, für welche bestehen die technischen Möglichkeiten, um solche Untersuchungen routinemässig durchzuführen?

_____

_____

_____

Bemerkungen:

_____

_____

_____

95.6 / #1

II. Hepatitiden

3. Werden in Ihrem Labor Hepatitis-Serologien bestimmt?

☐ nein ☞ Bitte fahren Sie auf der nächsten Seite weiter.

☐ ja ☞ Bitte füllen Sie die folgende Tabelle aus.

	Nein	Ja	Totale Anzahl 1994 (~ falls Schätzung)	davon bestätigt positiv? (~ falls Schätzung)
Hepatitis A:				
Anti-HAV IgM	☐	☐	_____	_____
Hepatitis B:				
HBsAg	☐	☐	_____	_____
Anti-HBc IgM	☐	☐	_____	_____
Hepatitis C:				
Anti-HCV	☐	☐	_____	_____
Hepatitis D:				
Anti-HDV	☐	☐	_____	_____
Hepatitis E:				
Anti-HEV	☐	☐	_____	_____

Bemerkungen:

_____

_____

_____

95.6 / #1

III. Andere Infektionskrankheiten

4. Werden in Ihrem Labor Erregernachweise durch **Kultur** oder **Antigenbestimmung** durchgeführt?

☐ nein ☞ Bitte bei Frage 5 weiterfahren.

☐ ja ☞ Bitte füllen Sie die folgende Tabelle aus.

	Nein	Ja	Totale Anzahl 1994 (~ falls Schätzung)	davon positiv? (~ falls Schätzung)
M. tuberculosis	☐	☐	_____	_____
Meningokokken	☐	☐	_____	_____
Haemophilus influenzae	☐	☐	_____	_____
Chlamydia trachomatis	☐	☐	_____	_____
Neisseria gonorrhoeae	☐	☐	_____	_____
Corynebacterium diphtheriae	☐	☐	_____	_____
Polioviren	☐	☐	_____	_____
Salmonella typhi / paratyphi	☐	☐	_____	_____
Andere Salmonellen	☐	☐	_____	_____

5. Werden in Ihrem Labor **serologische** Erregnachweise durchgeführt (nur IgM)?

☐ nein ☞ Haben Sie allenfalls Bemerkungen?

☐ ja ☞ Bitte füllen Sie die folgende Tabelle aus.

	Nein	Ja	Totale Anzahl 1994 (~ falls Schätzung)	davon positiv? (~ falls Schätzung)
FSME-Virus	☐	☐	_____	_____
Masernvirus	☐	☐	_____	_____
Röteinvirus	☐	☐	_____	_____
Treponema pallidum	☐	☐	_____	_____

Bemerkungen: _____

_____

_____

Danke für Ihre Bemühungen. Sie helfen uns damit, die epidemiologische Erfassung von Infektionskrankheiten in der Schweiz zu evaluieren.

Bitte ausgefüllten Fragebogen zurücksenden an: Bundesamt für Gesundheitswesen, Abteilung Epidemiologie und Infektionskrankheiten, Postfach, 3097 Liebefeld-Bern.

95.6 / #1

Appendix IV

Questionnaire used by the Swiss Network of Policlinics of Dermatology: 1990 - June 1995

étude CE prévalence VIH chez les patients MST

clinique: 06.00.. *semaine : 90/*

patient	1	2	3	4	5	6
No interne						
âge						
sexe 1 = masculin 2 = féminin						
nationalité 100 = CH Europe sans CH: initiales 200 = Afrique 201 = Afr. nord 202 = Afr. ouest/centr. 300 = USA 301 = Canada 302 = Am. centr. 303 = Am.sud 400 = Asie 500 = Océanie						
canton de domicile initiales. étranger: selon nationalité						
formation scolaire 2 = apprentissage 0 = aucune 3 = école supérieure 1 = éducation oblig. 9 = inconnue						
diagnose 1 = urétrite chez l'homme 2 = proctite 3 = cervicite mucopurulente 4 = chlamydia *) 5 = gonorrhée *) 6 = ulcère génital a) herpès génital b) chancroide c) syphilitique 7 = Genital warts *) 8 = Trichomonas vaginalis 9 = PID 10 = pédiculose pubienne 11a = Syphilis II (si non 6c) 11b = Syphilis, autres stades 12 = scabies *) *) a) cervix b) urètre c) rectum d) pharynx *) si maturité sexuelle et transmission sexuelle probable	1)					
	2)					
	3)					
	4)					
méthode diagnostique 1 = clinique 6 = laparascopie 2 = microscopie 7 = ELISA-IF direct 3 = culture 9 = inconnue 4 = sérologie (incl ELISA-IF) 5 = microscopie fond foncé	1)					
	2)					
	3)					
	4)					
source de l'infection a) hétérosexuel b) homosexuel 1 = partenaire stable 2 = partenaire occasional 3 = prostitué(e)						
lieu de l'infection code voir nationalité						
préférence sexuelle 1 = homosexuel 2 = hétérosexuel 3 = bisexuel						
nombre de part. sex. 6 derniers mois 1 = 1 4 = >= 10 2 = 2-4 9 = inconnu 3 = 5-9						
usage de préservatifs 1 = toujours 2 = parfois 3 = jamais						
drogues iv 1 = oui 9 = inconnu 2 = non						
test VIH						
test actuel 1 = oui 2 = pas nécessaire --> * 3 = refusé						
résultat du test 1 = pos 2 = neg						
*) test précédent 1 = oui 2 = non 9 = inconnu						
si oui: résultat du test 1 = pos 2 = neg 9 = inconnu						
date du premier test pos ou du dernier test nég mois/année						

Appendix V

Questionnaire used by the Swiss Network of Policlinics of Dermatology: July 1995 -

Étude CE: prévalence VIH chez les patients avec une MST

Tous les patients traités pour une des maladies sexuellement transmissibles (MST) listées ci-dessous peuvent participer à cette étude. Sont exclus, tous les patients qui ont déjà été traités pour une de ces MST durant les 90 derniers jours. Le test VIH est volontaire et les informations recueillies par ce questionnaire sont anonymes. Un nouveau test VIH n'est pas nécessaire si le patient a déjà été testé durant les 90 derniers jours.
En remplissant soigneusement ce questionnaire vous contribuez à améliorer la qualité des analyses épidémiologiques.

Policlinique de dermatologie: _____ Date: ____ / ____ / ____

Patient

Numéro interne: _____

1. Age (en années): _____
2. Sexe: o homme o femme
3. État civil: o célibataire o marié(e) o divorcé(e) o veuf/veuve o autres
4. Nationalité: _____ (veuillez indiquer le pays)
5. Canton de domicile: _____ (si domicile à l'étranger: pays)
6. Formation scolaire: o aucune o scolarité obligatoire o apprentissage o école supérieure o inconnue

Diagnostic

	Méthode(s) diagnostique(s)							
	Clinique	Microscopie	Culture	Sérologie (incl ELISA-IF)	Microscopie sur fond noir	Laparo-scopie	ELISA-IF direct	Inconnue
Code MST (voir ci-dessous)								
1. _____	o	o	o	o	o	o	o	o
2. _____	o	o	o	o	o	o	o	o
3. _____	o	o	o	o	o	o	o	o
4. _____	o	o	o	o	o	o	o	o

Codes MST:

1 = Urétrite chez l'homme:
- 1a = gonococcique
- 1b = non-gonococcique
- 1c = non-spécifiée

2 = Proctite

3 = Cervicite mucopurulente

4 = Chlamydia; localisation (si possible):
- 4a = cervix
- 4b = urètre
- 4c = rectum

5 = Gonorrhée; localisation (si possible):
- 5a = cervix
- 5b = urètre
- 5c = rectum
- 5d = pharynx

6 = Ulcère génital:
- 6a = herpès génital
- 6b = chancroïde
- 6c = syphilitique

7 = Condylomes acuminés‡

8 = Trichomonas vaginalis

9 = Pelvic Inflammatory Disease (PID)

10 = Pédiculose pubienne

11 = Syphilis II (si non 6c)

12 = Syphilis, autres stades

13 = Gale‡

‡ (si maturité sexuelle et transmission sexuelle probable)

6.95 / #2

Infection

9. Source de l'infection:

o une femme:	→	o partenaire stable	o partenaire occasionelle	o prostituée
o un homme:	→	o partenaire stable	o partenaire occasionnel	o prostitué

10. Lieu de l'infection: _____ (veuillez indiquer le pays)

Si le lieu de l'infection n'est pas la Suisse, veuillez indiquer la nationalité du partenaire: _____

Comportement

11. Drogues i.v.?: o oui o non o inconnu

12. Préférence sexuelle: o sexe opposé o **même** sexe o hommes **et** femmes

13. Nombre de partenaires sexuels durant les 6 derniers mois: _____

14. Utilisation du préservatif avec partenaire(s) **occasionnel/le(s)** durant les 6 derniers mois:
   - o toujours
   - o généralement (≥50%)
   - o quelquefois (<50%)
   - o jamais
   - o pas de partenaire occassionel/le

15. Utilisation du préservatif avec partenaire(s) **stable(s)** durant les 6 derniers mois:
   - o toujours
   - o généralement (≥50%)
   - o quelquefois (<50%)
   - o jamais
   - o pas de partenaire stable

Test VIH

16. Test **antérieur**:
   - o oui → **si oui**; résultat de ce test:
     - o positif → date du premier test positif: ____ mois / ____ année
     - o négatif → date du dernier test négatif: ____ mois / ____ année
     - o inconnu
   - o non
   - o inconnu

17. Test **actuel**:
   - o accepté
   - o pas nécessaire (si la personne a fait un test durant les 3 derniers mois)
   - o refusé

18. Résultat du test **actuel**:
   - o positif
   - o négatif

Office fédéral de la santé publique, Division épidémiologique et maladies infectieuses, Hess-Strasse 27E, 3097 Liebefeld-Berne.

Merci d'avoir rempli ce questionnaire.

Appendix VI

Questionnaire used by the Swiss Sentinel Surveillance Network of General Practitioners

SENTINELLA 1995 — Erkrankungsmeldungen

Arzt (Code) 1 | Woche 4 | Formular Nr. 6

1. HIV-TESTBERATUNG 11-12

Patienten-Nummer 13 1 2
Jahrgang 14
Geschlecht: m = 1, w = 2 16
Wunsch des Patienten (ja = X) 17
Vorschlag des Arztes (ja = X) 18
Test veranlasst? (ja = X) 19
Grund:
- Homosexuelle Kontakte (ja = X) 20
- Heterosexuelle Kontakte (ja = X) 21
- i.v. Drogen (ja = X) 22
- STD (ja = X) 23
- Transfusionen (ja = X) 24
- Berufskontakte (ja = X) 25
- Schwangerschaft (ja = X) 26
- Versicherung (ja = X) 27
- Andere Gründe oder Risiken: (bitte angeben) 28

leer lassen leer lassen
1 / 2 29

Anzahl frühere Tests 32
Davon positive 33

2. SEXUELL ÜBERTRAGBARE KRANKHEITEN (STD) 11-12

Patienten-Nummer 13 1 2
Jahrgang 14
Geschlecht: m = 1, w = 2 16
Nationalität *(Code siehe unten)* 17
Wo hat der Patient die STD erworben *(Nationalitätencodes siehe unten)* 19
Klinik *(Code siehe unten)* 21
Erkrankte der Patient in den letzten 12 Monaten bereits an einer STD (ja = X) 23
Laboruntersuchung veranlasst (ja = X) 24
Aetiologische Diagnose (falls abgeklärt) 25

1 ____ leer lassen
2 ____ 26

Nationalitätencodes: Schweiz = 1, Europa = 2, Nordamerika = 3, Zentralamerika = 4, Südamerika = 5, Karibik = 6, Nordafrika = 7, übriges Afrika = 8, Asien = 9, Ozeanien (inkl. Australien, Neuseeland) = 10, unbekannt = 99

Codes für Klinik: Adnexitis/Epididymitis = 1, Urethritis = 2, mucopurulente Cervicitis = 3, Vulvo-Vaginitis (exkl. Candidiasis) = 4, Ulcera = 5, Condylomata = 6, Scabies = 7, Pediculosis pubis = 8, symptomlose = 9, andere (bitte unter Bemerkungen angeben) = 10

3. WIRBELTIERBISSE UND -KRATZER 11-12

Patienten-Nummer 13 1
Erstkonsultation = 1, Konsultation wegen neuaufretender Komplikation = 2 14
Geboren: Monat 15
Jahr 17
Geschlecht: m = 1, w = 2 19
Biss = 1, Kratzer = 2, beides = 3 20
Tierart: Hund = 1, Katze = 2, (andere angeben) 21
Ist der Besitzer des Tieres dem Patienten bekannt? (ja=1) (nein=2) 24
Ort des Bisses/Kratzers: leer lassen
(Gemeinde und Kanton falls in CH, Land falls im Ausland) 25
Wurde Teilwutimpfung begonnen? (ja=1) (nein=2) 29
Intervall zwischen Konsultation und Biss/Kratzer (in Tagen, *gleicher Tag = 99*) 30
Konsultationsgrund (primäre Wundbeh. =1, Impfung = 2, Komplikation = 3 anderes = 4: 33
Erregernachweis durch Labor veranlasst = 1 35
Leben Patient und Tier im selben Haushalt? 36
Steht Biss/Kratzer in direktem Zusammenhang mit beruflicher Tätigkeit? ja = x falls ja, ausgeübter Beruf zum Zeitpunkt des Bisses/Kratzer: 37

4. MASERN 11-12 | 5. RÖTELN 11-12 | 6. MUMPS 11-12 | 7. PERTUSSIS 11-12

	4. Masern		5. Röteln		6. Mumps		7. Pertussis	
Patienten-Nummer 13	1	2	1	2	1	2	1	2
Geboren: Monat 14								
Jahr 16								
Geschlecht: m = 1, w = 2 18								
Komplikationen = 1, Hospitalisation = 2, beides = 3 19								
war geimpft (ja = X) 20								
IgM/IgG bestimmt (ja = X) 21								

8. ASTHMAANFALL 11-12

Patienten-Nummer 13 1 2 3
Geburtsmonat 14
Jahrgang 16
Geschlecht: m = 1, w = 2 18
Hospitalisation (ja = X) 19
Erste Manifestation (ja = X) 20
Allergie anamnestisch (ja = X) 21
Aufgrund von Tests (ja = X) 22

9. INFLUENZAVERDACHT 11-12

Patienten-Nummer 13 1 2 3 4 5 6 7 8
Jahrgang 15
Geschlecht: m = 1, w = 2 17
Pneumonie (ja = X) 18
Hospitalisation (ja = X) 19

Bemerkungen (positive oder fragliche HIV-Resultate, aussergewöhnliche Beobachtungen in Ihrer Praxis usw.)

10. ARZT-PATIENTENKONTAKTE 11-12

	APK	Notfalldienst
Samstag	13	34
Sonntag	16	35
Montag	19	36
Dienstag	22	37
Mittwoch	25	38
Donnerstag	28	39
Freitag	31	40

offizieller Notfalldienst = 1
Praxis geschlossen = 2

RZ DE 33.04.11 d

Appendix VII

Questionnaire used by the Swiss Sentinel Surveillance Network of Gyneacologists and for the Sentinella Chlamydia Prevalence Study (1998)

SENTINELLA 1998 GYNÄKOLOGISCHE PRAXEN

Erkrankungs-meldungen

Arzt (Code) 1 | Woche 5 (Daten siehe Rückseite) | Formular Nr. 7 **43600**

Bitte mit blauem oder schwarzem Kugelschreiber ausfüllen. Meldekriterien auf der Rückseite beachten!

ARZT-PATIENTEN-KONTAKTE vom _____ bis _____ 12-13 10

Anzahl:

SA	SO	MO	DI	MI	DO	FR
14	17	20	23	26	29	32

WEITERE ANGABEN ZUR PRAXISTÄTIGKEIT
Notfalldienst = 1, Praxis geschlossen = 2

SA	SO	MO	DI	MI	DO	FR
35	36	37	38	39	40	41

SCHWANGERSCHAFT (ERSTKONSULTATION) 12-13 11

Patientinnen-Nummer 14 | Jahrgang der Schwangeren 16 | Schwanger-schaftswoche 18

SEXUELL ÜBERTRAGENE KRANKHEITEN BEI FRAUEN 12-13 12

Pro Frage sind mehrere Antworten möglich.

Falldefinition:
Patientinnen (Nr. 1+2) mit labormässig (z.B. serologisch) bestätigten Krankheiten, deren Übertragung vermutlich sexuell erfolgt ist (z.B. häufiger Partnerwechsel).

		Pat. 1	Pat. 2
Patientinnen-Nummer	14	1	2
Jahrgang	16		
Nationalität[a]: Pat. 1 _____ Pat. 2 _____			
leer lassen	18		
Labordiagnose:			
Chlamydia	21		
Herpes	22		
Trichomonas	23		
Andere: _____	24	leer lassen	leer lassen
Grund für Labor:			
Screening	26		
Symptome	27		
Labormethode:			
Serologie	28		
Kultur	29		
Andere: _____	30	leer lassen	leer lassen
Klinische Diagnose:			
Cervicitis	32		
Genitales Ulcus	33		
Andere: _____	34	leer lassen	leer lassen
Wo erworben*: (Land)			
leer lassen	36	leer lassen	

[a]CH=Schweiz, D=Deutschland, F=Frankreich, I=Italien, A=Oesterreich, P=Portugal; E=Spanien, T=Türkei; bitte alle andern Nationalitäten ausschreiben, U=Unbekannt

CHLAMYDIEN-PRÄVALENZSTUDIE 20 12-13 08

		Schwangerschaft	Check-up*
Patientinnen-Nummer	14	1	2
Geboren: Monat	15		
Jahr	18		
Datum des Abstrichs	20		98 9
Schwanger (ja = 1, nein = 2, unbekannt = 9)	24		
Erwünschte Schwangerschaft (ja = 1, nein = 2, unbekannt = 9)	25		
Anzahl Kinder	26		
Sexuell aktiv (ja = 1, nein = 2, unbekannt = 9)			27
Gebrauch von Verhütungsmitteln im Verlaufe des letzten Monats (max. 2 Antworten möglich) (orale Verhütung = 1, Kondom = 2, IUD = 3, Sterilisation = 4, keines = 5, anderes = 6, unbekannt = 9)			28 1.
			2.
Sozio-Demographie			
Nationalität[a] (s. Codes STD z.B.: Schweiz = CH)			
leer lassen	30		
Patientin lebt: (mit festem Partner zusammen = 1, in anderer Gemeinschaftsform = 2, allein = 3, unbekannt = 9)	33		
Krankenkasse (allgemein = 1, halbprivat = 2, privat = 3, unbekannt = 9)	34		
Klinische Angaben			
Urogenitale Symptome vorhanden (ja = 1, nein = 2, unbekannt = 9)	35		
Falls ja, bitte angeben:			
leer lassen	36		
Behandlung mit Antibiotika während der letzten zwei Wochen (ja = 1, nein = 2, unbekannt = 9)	39		

*Check-up = zu melden sind alle nicht schwangeren Frauen bei einer gynäkologischen Routineuntersuchung, die sexuell aktiv und 34-jährig oder jünger sind.

SPONTANE UND INDUZIERTE ABORTE 12-13 13

Patientinnen-Nummer	14	1	2	3	4
Jahrgang	16				
Schwangerschaftswoche z Zt. des Abortes	18				
Spontan (komplett=1; inkomplett (Curettage)=2; missed abortion (Curettage)=3)	20				
Induziert (ja=X)	21				
Patientin bereits als Schwangerschaftskonsultation gemeldet (ja=1, nein=2)	22				
Beruht der Abort auf einer Infektionskrankheit der Schwangeren? (ja=X)	23				
Wenn ja, auf welcher:	24	leer lassen:			

1 _____ 3 _____
2 _____ 4 _____

Bemerkungen (aussergewöhnliche Beobachtungen in Ihrer Praxis usw.)

12-13 99

BZ DE 33.04.20 d 12.97 4000 20 U 35889

Appendix VIII

Questionnaire used for the laboratory testing of Chlamydia trachomatis in the Sentinella Chlamydia Prevalence Study (1998)

Institut für medizinische Mikrobiologie der Universität Zürich

Bundesamt für Gesundheit Sentinella

Patientin:

Name: _____

Vorname: _____

(im Labor abtrennen)

Geburtsdatum: _____

bitte Blockschrifft

Chlamydien-Prävalenzstudie

WICHTIG

Dieser Auftragszettel ist nur für Sentinella-Ärzte und die Chlamydien-Prävalenzstudie bestimmt.

LCx-Röhrchen fest zugeschraubt mit dem entnommenen Cervikalabstrich (abgebrochener dünner Tupfer im Röhrchen belassen) mit der Versandpackung und diesem Auftragszettel an folgende Adresse schicken: Institut für medizinische Mikrobiologie der Universität Zürich, Gloriastrasse 32, Postfach, 8028 Zürich. Bitte mit 90 Rappen (A-Post) frankieren.

Bitte beachten Sie, dass die Labormeldung an das Bundesamt für Gesundheit (BAG) in anonymisierter Form erfolgt. Die Zuordnung des Laborresultats zur entsprechenden Meldung auf dem Sentinella-Meldeformular erfolgt anhand des Geburtsdatums, der Formular- und der Patientennummer. Es gelangen keine Patientennamen an das BAG.

❑ LCx-Röhrchen Test aus Cervikalabstrich

Arzt

❑ Befund per Fax;

Nr. _____

Probe

Entnahmedatum: ___ / ___ / 19___ ___ . ___ Uhr

Nummer des Sentinella-Meldeformulars: _____

Nummer der Patientin (Sentinella-Meldeformular): ___

LCx-Röhrchen Test Resultat:
(wird vom Labor ausgefüllt)

❑ Positiv
❑ Negativ
❑ Kein Resultat

Falls Sie neues Entnahme- und Verpackungsmaterial brauchen, kreuzen Sie hier an: ❑
oder Bestellung am Institut für medizinische Mikrobiologie: Tel: (01) 634 26 32
Fax: (01) 634 49 06

Die Kosten der Chlamydia-Diagnose durch LCx-Röhrchen werden vom Bundesamt für Gesundheit, dem Institut für medizinische Mikrobiologie der Universität Zürich und Abbott Diagnostics nur für Untersuchungsmaterial, das zusammen mit diesem Laborformular eingeschickt wurde, übernommen.

CURRICULUM VITAE

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Languages	English, French, Dutch, German

Education

1970-82	International Baccalaureat International School of Geneva
1983-86	BSc Economics London School of Economics and Political Science University of London
1987-88	MSc Medical Demography London School of Hygiene and Tropical Medicine University of London
1997-02	PhD Epidemiology Swiss Tropical Institute, University of Basel "The surveillance and epidemiology of sexually transmitted diseases in Switzerland"

Short courses*

1993	Biostatistics I – Dr Ch E Minder, University of Bern
1994	Environmental epidemiology I – Professor U Ackermann–Liebrich, Dr Ch. Braun–Fahrländer, University of Basel
1995	Health statistics – Dr F Gurtner, University of Bern
1996	General linear models – Dr Ch E Minder, University of Bern
1997	Clinical epidemiology for advanced students – Professor J. Lubsen SOCAR Research, Nyon, Vaud
1999	Epidemiologie, Bekämpfung und Prävention von Infektionskrank-heiten – Dr M Zwahlen, University of Zurich

* All of the short courses were part of the joint Masters of Public Health (MPH) programme given by the Universities of Basel, Bern and Zurich

Employment

April 2000 -	Senior Researcher, Netherlands Institute for Health Care Research (Nivel) Coordinator of the European Influenza Surveillance Scheme
January 1992 - March 2000	Epidemiologist, Swiss Federal Office of Public Health HIV/AIDS (1992 - 1994) STDs (1995 - 1996) STDs (50%), measles, mumps, rubella (50%) (1997) Measles, mumps, rubella (80%), STDs (20%) (1998 - 2000)
February 1989 - December 1991	Technical officer, Global Programme on AIDS, World Health Organization, Geneva, Switzerland

Publications (peer-reviewed only)

Heymann DL, Biritwun R, Paget WJ. A quantitative approach to the evaluation of effectiveness of national AIDS programmes. The Handbook of AIDS Prevention in Africa, edited by Peter Piot and Peter Lamptey; pages 220-238. Durham, North Carolina, USA : Family Health International, 1990.

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