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Surveillance of sexually transmitted diseases in Switzerland, 1973–1994: Evidence of declining trends in gonorrhoea and syphilis

Summary

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 (e.g. 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 beforementioned 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.*

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 of evaluating the effectiveness of AIDS prevention campaigns[1]. In addition, STDs may act as co-factors or facilitators in the transmission of HIV infection[2] and recent evidence has been presented which has shown that a comprehensive STD intervention programme can reduce the incidence of HIV in a population[3].

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[4,5], laboratory reports of *Neisseria gonorrhoeae*, *Treponema pallidum* and *Chlamydia trachomatis* since 1988[5], and the Swiss Sentinel Network which collected epidemiological information on STDs between June 1991 and December 1993[6,7]. 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 (Stadtspital Triemli in 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[8,9].

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[10]. 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[11]. 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 gonorrhoeae* 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[6,7].
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[12].

Results

The six policlinics of dermatovenereology

Figure 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%).
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

Figure 1. *STDs reported by the six policlincis of dermatovenereology, 1973–1994.*

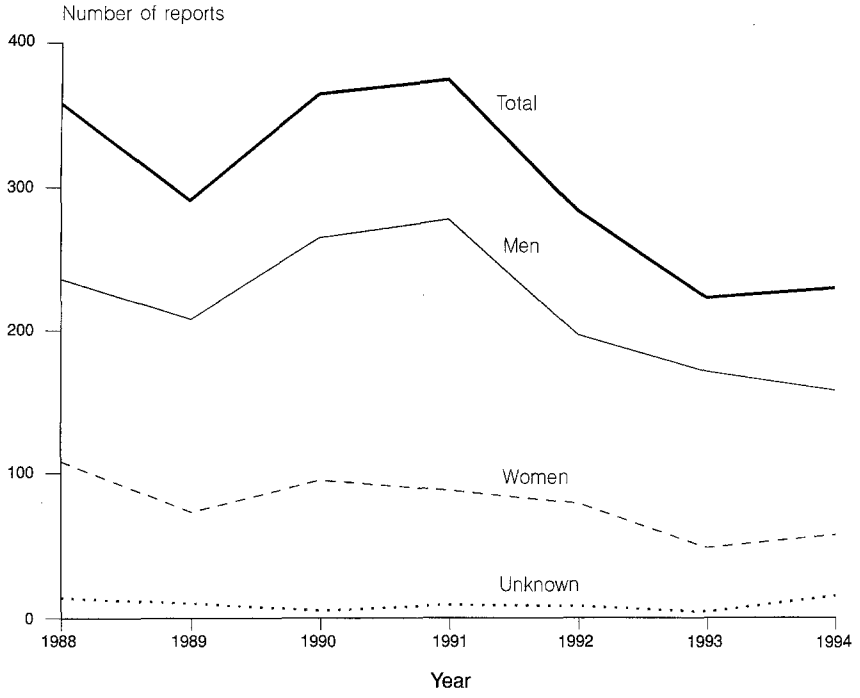

Figure 2. *Laboratory reports of* Neisseria gonorrhoeae *to the SFOPH by sex, 1988–1994.*

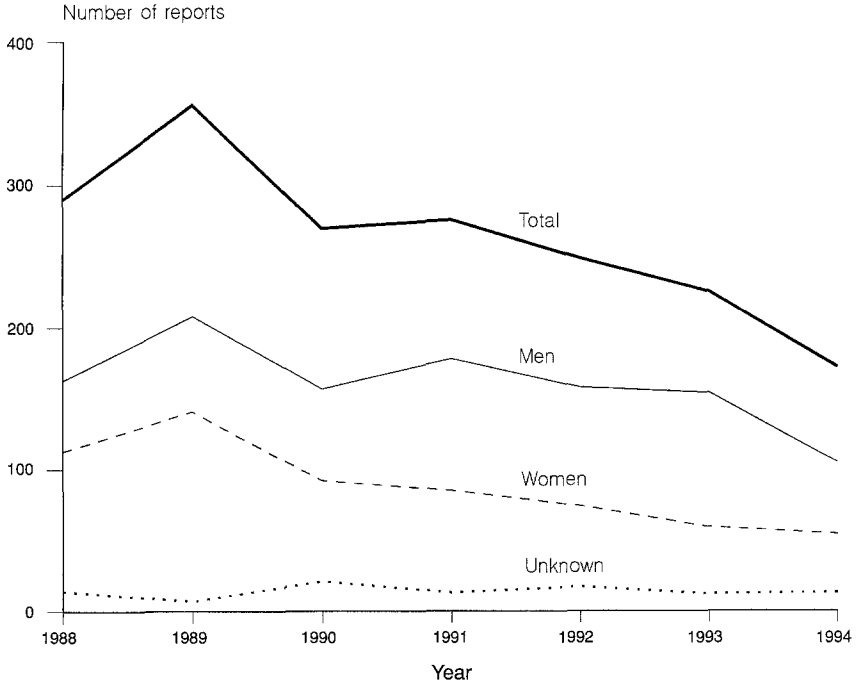

Figure 3. *Laboratory reports of* Treponema pallidum *to the SFOPH by sex, 1988–1994.*

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 2). Annual reports of *Treponema pallidum* also generally declined over the seven year period from 290 in 1988 to 172 in 1994 (Figure 3). Reports of *Chlamydia trachomatis* first increased and then decreased after 1991 (Figure 4). The "Unknown" category means that the sex of the patient was not recorded in the laboratory report sent to the SFOPH.

Swiss Sentinel Network

Figure 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%).

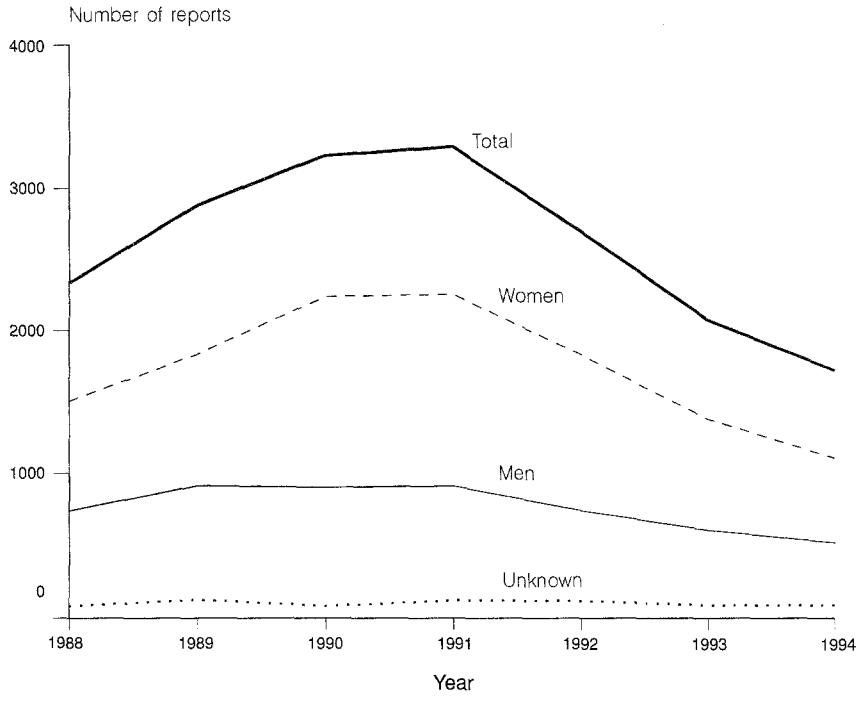

Figure 4. *Laboratory reports of* Chlamydia trachomatis *to the SFOPH by sex, 1988–1994.*

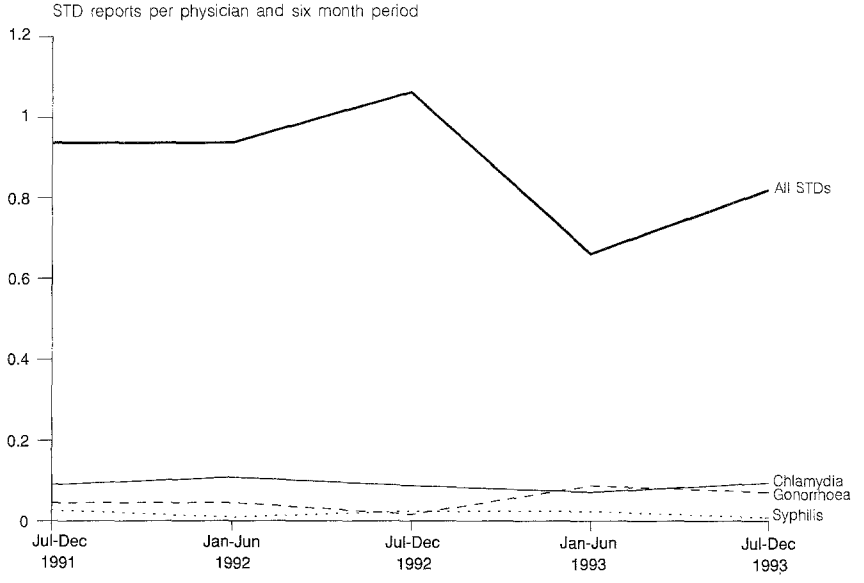

Figure 5. *Swiss Sentinel Network: STD reports per physician and six month period, July 1991–December 1993. All STDs = urethritis, genital warts, genital herpes, chlamydia, trichomoniasis, gonorrhoea, scabies, pediculosis pubis, genital ulcers, syphilis, cervicitis, PID, chancroid, vulvo-vaginitis, epididymitis, 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[7]. 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 misclassified (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 asymptomatic[13] and among men this figure is 25–50%[14]. 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)[15] 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 dermatovenereoloy, 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 indicates 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 gives 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[1,16–19].

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)[3]. 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)[20].

With the emergence of penicillinase producing strains of *N. gonorrhoeae* (PPNG) in the late 1970s, new and more powerful antibiotics were introduced to treat gonorrhoeae. In the early 1980s, a very popular treatment among physicians in Switzerland was spectinomycin[21]. 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)[22]. 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[22,23]. For example, among persons aged 17–30 who reported a casual 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%[22]. 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)[22]. These spectacular increases in condom use have probably contributed to the decline in gonorrhoea and syphilis infections observed in Switzerland since 1987.

Zusammenfassung

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 den beiden 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.*

Résumé

Surveillance des maladies sexuellement transmissibles en Suisse, 1973–1994: 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.*

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