

## CLINICAL REPORT

# Gonorrhoea in Denmark: High Incidence Among HIV-infected Men Who Have Sex with Men

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**Diagnosis of gonorrhoea indicates that relatively recent unprotected sex has been practised and thus there is possibly a risk of HIV transmission. A retrospective analysis of gonorrhoea cases reported to the Danish national surveillance system was carried out for the period 1994–1999. The analysis included demographic pattern and mode of transmission of gonorrhoea in Denmark with the focus on trends and factors related to infection in men who have sex with men (MSM). We found that 646 (82.7%) reported cases of gonorrhoea were men, among whom 41.2% cases were due to sex with men, 52.9% were transmitted by heterosexual contact and 5.9% were due to unknown causes. The estimated mean annual reported incidence of gonorrhoea was more than 30 times greater among MSM than among heterosexual men and 6 times greater in MSM known to be HIV-positive, when gonorrhoea was diagnosed, than among other MSM ( $p < 0.001$ ). No difference was found between the sites of infection among HIV-positive and HIV-negative MSM. A trend towards increase in the annual incidence of gonorrhoea has been seen since 1997, with an increase of 35% from 1997 to 1998 and a further increase of 41% from 1998 to 1999. The increase was mainly due to an increasing number and proportion of cases among MSM. The notified cases comprised 49% of patients with laboratory-confirmed gonorrhoea, which indicates a similar increasing trend. In conclusion, the rising trend of incident gonorrhoea, especially in MSM, may indicate a relapse to more unsafe sexual practices, which could lead to the spread of HIV infection. The higher incidence among HIV-positive MSM compared with other men underlines this concern.**

**Key words:** trends; epidemiology; site of infection.

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An increasing incidence of gonorrhoea has been reported from several countries in Europe (1–5) and the United States (6). This has caused concern as incident cases of gonorrhoea indicate relatively recent unprotected sex and the possible risk of HIV transmission (2, 6). A mandatory national case-reporting system for

gonorrhoea was established in Denmark in 1994. Through this surveillance, detailed demographic and behavioural data are routinely collected for each case. The current analysis describes trends and mode of transmission of gonorrhoea in Denmark with focus on factors related to infection in men who have sex with men (MSM).

## MATERIAL AND METHODS

Since 1994 all physicians in Denmark have had a statutory duty to notify the Department of Epidemiology (Statens Serum Institut) of each case of gonorrhoea. This is done using a standard form containing information regarding demographic variables and risk factors. The form is without a unique identifier and the reporting is thus anonymous.

This study concerns all notified gonorrhoea cases diagnosed in the 6-year period from 1 January 1994 to 31 December 1999. The notified cases constituted 49% of the 1,599 patients with laboratory-confirmed gonorrhoea. The male:female ratio was similar among the laboratory-confirmed cases and the notified cases. The age distribution among the laboratory-confirmed cases was available for the years 1996–1997 and was identical among the notified cases, when comparing the age group 15–19 years, those from 20–29 years and 30 years.

The incidences were calculated using population statistics from 1 January 1997 covering the adult population of 15 years or more. The number of MSM was estimated as 45,000 and the number of living HIV-positive MSM as 2,000 persons assessed by back calculations using AIDS data from the Danish surveillance system (7).

## RESULTS

In this 6-year period 781 persons (646 males and 135 females, M/F ratio: 4.8:1) with gonorrhoea were notified, making a mean annual incidence of 3/100,000 of the adult population. The median age was 31 years for men and 26 years for women.

Among men, the source of infection was reported as another man in 266 cases (41.2%) and a woman in 342 cases (52.9%); for 38 men (5.9%) no information regarding exposure was given (Table I).

### Trends

In the observation period from 1994 to 1999, the lowest number of notified cases was seen in 1997 with 78 cases, rising to 105 cases in 1998 and 148 cases in 1999. An increasing number and proportion of MSM was seen among the notified cases. In 1994–1996 MSM

Table I. Characteristics of gonorrhoea cases reported to the Danish national surveillance system, 1994–1999

	MSM n = 266	Heterosexual men n = 342	Women n = 135	Unknown (men) n = 38
Immigrants/tourists	32 (12.1%)	78 (22.9%)	17 (12.6%)	8
Infection acquired in Denmark	216 (81.2%)	184 (53.6%)	123 (91%)	10
Infection source				
Spouse/regular partner	46 (17.4%)	57 (16.7%)	64 (47.4%)	
Casual partner	155 (58.3%)	160 (46.8%)	41 (30.4%)	
Prostitute	1 (0.4%)	51 (14.9%)	0	
Immigrant/tourist	24 (9.1%)	37 (10.8%)	11 (8.1%)	
Other/unknown	37 (14.0%)	37 (10.8%)	19 (14.1%)	
Residence in the capital area	212 (79.7%)	152 (44.4%)	52 (38.5%)	18
Reported HIV status	223 (84.6%)	196 (57.3%)	68 (50.4%)	12
Reported HIV-positive	58 (21.8%)	1 (0.3%)	2 (1.5%)	3
Mean incidence gonorrhoea*/100,000 population/year	Whole group: <b>98.5</b> HIV-positive: 483.3 Remaining MSM: 80.6	2.7	1.0	

MSM: Men having sex with men.

\*Based on an estimated number of 45,000 MSM, 2,000 HIV-positive MSM (7) and population data from the beginning of 1997.

constituted 24% of all notified cases, while this proportion rose to 47% in 1997–1999 (Fig. 1),  $p < 0.001$ ,  $\chi^2$  test for trend. The proportion of HIV-infected MSM with gonorrhoea did not show a trend towards increase.

Men infected by heterosexual contact outside Denmark constituted between 14% and 22% of all notified cases, with no clear trend (Fig. 1). Among women, a decreasing number of notified cases was seen in the period 1994–1998, from 57 cases in 1994 to 9 cases in 1998. In 1999 the number of reported cases increased to 17.

The proportion of cases in the age group of 15–19 years was below 10% in each calendar year – no increasing trend shown.

#### Men who have sex with men (MSM)

Of the 266 cases reported, 216 (81.2%) contracted the infection in Denmark, 25 in other countries and in 25

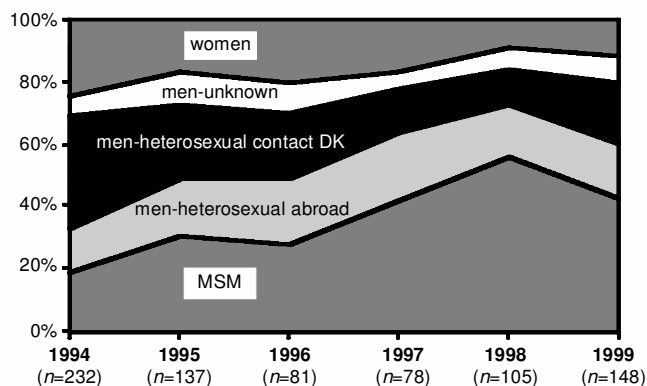


Fig. 1. Reported cases of gonorrhoea. The relative distribution of notified cases according to mode of transmission in percentage of the total number of cases reported each year. The total number of reported cases of gonorrhoea is shown in parentheses. MSM: men who have sex with men. DK: Denmark.

patients the country of infection was unknown. Thirty-two patients (12.1%) were immigrants or tourists. In 155 cases (58.3%) the source of infection had been a casual partner, and in one case a prostitute. Two hundred and twelve (79.7%) of the patients lived in the capital city area, Copenhagen.

At the time of gonorrhoea diagnosis, 58 persons (21.8%) were known to be HIV-positive; 3 of these were immigrants/tourists. In 41 patients (15.4%) the HIV status was unknown. The median age among those who were HIV-positive was 32 years (quartiles: 29; 38 years) versus 31 years (quartiles: 26; 35 years) in the remaining group of MSM. The results of swabbing from urethra, rectum and pharynx were reported in 75%–93% of MSM. Of those, 92% had urethral gonorrhoea, 19% rectal and 8% pharyngeal gonorrhoea. There was no difference in the distribution of the site of infection between HIV-positive and HIV-negative MSM. The estimated mean minimal yearly incidence of gonorrhoea among the whole group of MSM was  $98/10^5$  persons, with an incidence of  $483/10^5$  among MSM known to be HIV-positive at the time of gonorrhoea diagnosis and  $80.6/10^5$  among the remaining MSM,  $p < 0.001$ ,  $\chi^2$  test (Table I).

#### Heterosexual men

Of the 342 cases reported, 184 (53.8%) contracted their infection in Denmark, 142 (41.5%) in other countries and in 16 men the country of infection was unknown. Fifty-six men acquired their infection in Asia, Thailand alone accounting for 25 men. Seventy-eight (22.8%) of the heterosexual men were immigrants or tourists.

In 160 (46.8%) men the source of infection was a casual partner and in 51 (14.6%) men the source was a prostitute; 152 (44.4%) lived in the capital city area and one man was known to be HIV-positive. The estimated

mean minimal yearly incidence of gonorrhoea among men infected by women was  $2.7/10^5$  persons (Table I).

### Women

Of the 135 women reported, 123 (91%) acquired their infection in Denmark. Seventeen were immigrants or tourists.

In 64 cases (47.4%) the source of infection was a regular partner. Fifty-two women (38.5%) were from the capital city area. Six women worked as prostitutes, 2 of whom were known to be HIV-positive at the time of gonorrhoea diagnosis; one was born in Thailand the other, an intravenous drug user, was born in Denmark. No other HIV-positive women were seen. The mean minimal yearly incidence of gonorrhoea among adult women was  $1.0/10^5$  women (Table I).

### DISCUSSION

It has been found that MSM account for a disproportionately large number of cases of gonorrhoea in Denmark. One-third of the cases in the Danish surveillance system were of MSM and the estimated mean annual incidence of gonorrhoea was 98/100,000 MSM, about 30 times greater than among heterosexual men. In most other western countries, MSM also account for a considerable proportion of gonorrhoea infections (8).

The estimated incidence of gonorrhoea among MSM depends on a reliable estimate of the nominator. In a nationwide study of sexual behaviour in Denmark, 2.7% of men reported having had homosexual/bisexual experience (9); similar results were found in another study (10). The same estimate is used in the national surveillance system (7). Theoretically, underreporting of cases in heterosexual men may occur in the surveillance system, as not all laboratory-confirmed cases are notified; however, it may also be that not all MSM are willing to admit to their sexual orientations. Even if a considerable underreporting among heterosexual men occurred, the incidence of gonorrhoea would still be significantly higher in MSM than in heterosexual men.

Gonorrhoea was previously a common infectious disease in Denmark, with 10–12,000 new cases annually, corresponding to an incidence of about 200 per 100,000. A marked decline was detected in the mid-1980s (11), as in other Scandinavian countries, to a very low incidence level (8). However, in recent years an increase has been detected in Denmark, where the numbers of notified cases of gonorrhoea increased by 35% from 1997 to 1998, and a further 41% increase from 1998 to 1999. This is mainly due to an increasing number and proportion of cases in MSM (Fig. 1). A similar increase has been observed in the laboratory-confirmed cases. In other Scandinavian countries an increase has also been reported (4, 5) and in the United States the number of gonorrhoea cases in 1998 increased by 9% compared

with 1997 (6). A sudden increase in gonorrhoea was seen in 1998 in France through the national laboratory surveillance network (2); a similar increase in England starting in 1994 has been detected (3) and in Scotland a rise of 71% in the first half of the year 2000 compared with 1999 has been reported (12).

Gonorrhoea trends may reflect changes in sexual behaviours that also influence the risk of HIV infection. In San Francisco, unprotected anal sex and rates of rectal gonorrhoea reported by MSM showed an increasing trend from 1994 to 1997 (13). In the Danish national surveillance system, data on mode of transmission and HIV status is routinely collected at the time of gonorrhoea diagnosis. It was shown that 21.8% of MSM with gonorrhoea were reported to be HIV-positive, similar to other surveys (8, 14). No trend towards increase was found over the years, but the estimated mean annual incidence of gonorrhoea among HIV-positive MSM was 6 times higher than that for MSM not known to be HIV-positive, i.e.  $483/10^5$  vs.  $81/10^5$ ,  $p < 0.001$ .

Increasing rates of gonorrhoea in HIV-infected MSM in the United States have recently been reported (15) and HIV infection has been found to be an independent predictor for acquisition of urethral gonorrhoea in an STD clinic survey of MSM (16). These data suggest that HIV-positive MSM are more prone to practise unsafe sex than MSM with an unknown or negative HIV status, possibly due to an established behaviour pattern related to their acquisition of the HIV infection.

The presence of urethritis in persons with HIV increases the quantity of HIV in their semen (17) and presumably the likelihood of HIV transmission, while the presence of urethritis in persons without HIV has been associated with increased likelihood of HIV transmission in sex between men and women (18).

However, gonorrhoea may also be transmitted through sexual practices not thought to be of high risk for HIV transmission (19, 20). In our investigation there was no indication that the HIV-positive men differed from the remaining group of MSM regarding the site of infection. However, the low rate of reported pharyngeal and rectal gonorrhoea compared to urethral gonorrhoea indicates the existence of an undiagnosed reservoir of infection. Furthermore, the effect of the new antiviral therapy on transmission rates of HIV is still unknown.

While most MSM acquired their infection in Denmark, a considerable proportion of heterosexual men (41.5%) contracted the infection abroad. Contacts in Asia accounted for 56/142 (39%) of those cases.

Asia is an area with a high prevalence of HIV infections, and the proportion of Danes who have been infected with HIV by heterosexual contacts in Asia, particularly Thailand, has increased from 5% in 1991–1993 to 24% in 1997–1999.

Gonorrhoea infections are still rarely reported in women. The wide male:female ratio has been interpreted

as a result of infection in MSM (2). However discounting MSM in this study gave a M:F ratio of 2.5, and by also discounting gonorrhoea acquired by men abroad, this cuts the M:F ratio down to 1.5, still indicating that some women are untreated in the community.

The absolute number of gonorrhoea cases is modest compared with in previous periods, but the rising trend, especially in MSM, may indicate a relapse to more unsafe sexual practices, which could lead to more HIV-infected cases. The high incidence of gonorrhoea among HIV-positive MSM adds to this concern.

Statutory reports of gonorrhoea cases, which also include HIV status, may increase the effectiveness of epidemiological surveillance contributing to public health control.

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