

Short  
reportIncrease in sexually transmitted infections among  
homosexual men in Amsterdam in relation to  
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**Objectives:** We investigated if a rise in rectal gonorrhoea and early syphilis among men who have sex with men (MSM) in Amsterdam coincided with the introduction of highly active antiretroviral therapies (HAART) in July 1996 and determined risk factors for these sexually transmitted infections (STI).

**Methods:** Subjects were patients of the STI clinic of the municipal health service in Amsterdam. Surveillance data (1994–9) represented consultations (n=11 240) of MSM (n=6103). For analyses we used logistic regression.

**Results:** Comparing the periods before and after the introduction of HAART, the infection rate for rectal gonorrhoea increased from 4% to 5.4% (p=.001) and for syphilis, from 0.5% to 0.8% (p = 0.050). Independent risk factors for rectal gonorrhoea (younger age, western nationality, and concurrent infection with another STI) and for early syphilis (non-western nationality and concurrent infection with rectal gonorrhoea) did not change after HAART became available. For rectal gonorrhoea, however, the infection rate increased only among men who had exclusively homosexual contacts (OR 1.38, p<0.01), compared with bisexual men. For early syphilis, the infection rate increased only among men of western nationality (OR 3.38, p<0.01) compared to men of non-western nationality.

**Conclusions:** Infection rates of rectal gonorrhoea and early syphilis increased, indicating a change in sexual behaviour, possibly as a result of the introduction of HAART. For now, it is important to find out how sexual behaviour is changing and to keep monitoring trends in STIs (including HIV) among MSM in Amsterdam.

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Keywords: rectal gonorrhoea; syphilis; HAART; high risk sexual behaviour; MSM

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Table 1 Change in absolute number of cases and infection rates (%) of the different STIs over the years (1994–9) among 11 240 consultations made by men who have sex with men, Amsterdam STI clinic, 1994–9, Netherlands

STI	1994 (n=1410) No (%)	1995 (n=1545) No (%)	1996 (n=1837) No (%)	1997 (n=1886) No (%)	1998 (n=2100) No (%)	1999 (n=2462) No (%)	Change over the years? (linear trend)
Rectal gonorrhoea	56 (4.0)	61 (3.9)	87 (4.7)	96 (5.1)	83 (4.0)	167 (6.8)	p<0.001
Early syphilis	6 (0.4)	5 (0.3)	15 (0.8)	8 (0.4)	9 (0.4)	35 (1.4)	p=0.001

## Introduction

Recently, reports from several cities in industrialised countries described a strong increase in gonorrhoea and syphilis among men who have sex with men (MSM).<sup>1–6</sup> The present increase in gonorrhoea and early syphilis may be related to the introduction of highly active antiretroviral therapy (HAART) in July 1996, possibly because of an increase in high risk sexual behaviour due to treatment optimism.<sup>7–9</sup> In the present study we investigated whether the recently observed rise in rectal gonorrhoea and early syphilis at the STI clinic in Amsterdam coincides with the introduction of HAART, and which study groups are at highest risk in the periods before and after the introduction of HAART.

## Materials and methods

The STI clinic in Amsterdam offers sexual health services free of charge, including the diagnosis and treatment of STIs. At every new

consultation, information about socio-demographic characteristics is routinely collected and entered into a database under a patient identification code, and patients are routinely screened for (rectal) gonorrhoea and syphilis. An individual can have multiple new consultations in one year and/or more than one diagnosis per consultation. A positive culture was used as the diagnostic criterion for gonorrhoea (GC-Lect agar, BBL, Becton Dickinson, Cockeysville, USA). A diagnosis of early syphilis was based on clinical symptoms and a reactive serology. *Treponema pallidum* haemagglutination assay (TPHA, Fujirebio, Tokyo, Japan) was used for syphilis screening; when the assay was positive, the Venereal Disease Research Laboratory test (VDRL, Wellcome, Dartford, UK) and the FTA absorption test (Trepo-spot IF, Biomerieux, Marcy l'Etoile, France) were performed. Patients previously treated for syphilis were diagnosed with a new syphilis infection only when there was a threefold or more increase in VDRL titre

Table 2 Independent risk factors for rectal gonorrhoea and early syphilis among men who have sex with men, Amsterdam STI clinic, 1994–9, Netherlands

Risk factors	Rectal gonorrhoea			Early syphilis				
	Infection rate No/in (%)	ORadj	(95% CI)	p Value	Infection rate No/in (%)	ORadj	(95% CI)	p Value
Sexual contacts								
Bisexual	34/1495 (2.3)	1		p<0.001	4/1495 (0.3)	1		p=0.031
Exclusively homosexual	516/9745 (5.3)	0.83	(0.50–1.39)		74/9745 (0.8)	3.05	(1.11–8.40)	p<0.001
Time period								
Before HAART	149/3770 (4.0)	1.38	(0.27–0.79)*		18/3770 (0.5)	1		
Since HAART	401/7470 (5.4)	0.47	(1.12–1.71)*		60/7470 (0.8)	16.48	(6.33–42.86)*	
Nationality								
Non-Western	39/1207	1		p=0.009	55/10033 (0.5)	3.38	(1.53–7.48)*	
Western	5111/10033	1.60	(1.13–2.26)		23/1207 (1.9)	7.27	(2.85–18.53)*	
Age†								
<31	228/3621 (6.3)	1		p<0.001	33/3621 (0.9)	—		
31–35	123/2060 (6.0)	0.81	(0.64–1.03)		14/2060 (0.7)	—		
36–40	125/2540 (4.9)	0.70	(0.55–0.89)*		15/2540 (0.6)	—		
>40	74/3017 (2.5)	0.37	(0.28–0.49)*		16/3017 (0.5)	—		
Being a sex worker‡								
yes	26/970 (2.7)	1		p=0.011	11/970 (1.1)	—		
no	524/10258 (5.1)	1.75	(1.14–2.70)		67/10258 (0.7)	—		
Being a client of sex workers‡								
yes	6/292 (2.1)	—			2/292 (0.7)	—		
no	544/10940 (5.0)	—			76/10940 (0.7)	—		
Concurrent infections								
no	333/10175 (3.3)	1		p<0.001	No: 69/10690 (0.6)	1		p=0.011
Only genital gonorrhoea	132/815 (16.2)	5.02	(4.03–6.26)*		Yes: 9/550 (1.6)	2.50	(1.23–5.06)	
Only pharyngeal gonorrhoea	56/138 (40.6)	16.91	(11.71–24.40)*					
Both genital and pharyngeal	29/112 (25.9)	8.15	(5.23–12.72)*					
Concurrent syphilis infection								
no	541/11162 (4.8)	1		p=0.035				
yes	9/78 (11.5)	2.31	(1.06–5.03)					

\*p<0.05, †The interactions between time period and sexual contacts (p<0.001) for rectal gonorrhoea and between time period and nationality (p<0.001) for early syphilis were included in the multivariate model as new variables with four categories. ‡Missing values excluded.

or when *T pallidum* was demonstrated by dark field microscopy.

Next to the information on diagnosed STI, we used data regarding age, sexual contacts (whether bisexual or exclusively homosexual), nationality, and whether the patient involved in commercial sex, either as a sex worker or as a client (in the past 3 months). Concurrent infection with another STI was also considered a potential risk factor for rectal gonorrhoea and early syphilis. The total study period was divided into a period before and a period after the introduction of HAART (1 July 1996).

STATISTICAL ANALYSES

Firstly, we examined trends in STI infection rates (denoting the total number of diagnoses with a particular STI in a given period per 100 consultations in the same period) over the years, using  $\chi^2$  test for linear trend. We also assessed whether the infection rates after the introduction of HAART differed from those before HAART, using  $\chi^2$  tests and logistic regression. Secondly, risk factors for the different STIs were determined using logistic regression. In order to determine independent risk factors we used a backward stepwise regression procedure, starting with a multivariate model including all predictor variables. Thirdly, we evaluated whether these independent risk factors differed before and after the introduction of HAART. Therefore, we started with a model that included the independent risk factors, added all interaction terms between time period and these risk factors one by one. Only statistically significant interactions were included into the final model. A p value less than 0.05 was considered statistically significant.

**Results**

The STI clinic in Amsterdam registered an increasing number of new consultations from 1994 through 1999, and in total, 85 470 new consultations were registered over that period. Among all clinic patients, the proportion of new consultations accounted for by MSM increased from 12% in 1994 to 14.5% in 1999.

The study population consisted of 11 240 new consultations representing 6103 individual MSM, whose mean age was 35.6 years (SD 9.9). Most of the consultations were made by men with exclusively homosexual contacts (86.7%), a western nationality (90.4%), and age above 31 years (67.8%). Fewer than 10% of the new consultations were made by men who were involved in commercial sex.

There is an increasing trend in infection rates of rectal gonorrhoea and early syphilis (both p<0.01), predominantly caused by strong increases between 1998 and 1999 (table 1). Comparing the period before and after the introduction of HAART, the infection rate for rectal gonorrhoea increased from 4% to 5.4% (p=.001), and for early syphilis from 0.5% to 0.8% (p=0.050). The increase in rectal gonorrhoea was found in all groups studied, except for bisexual men, and the increase in early syphilis was also seen in all groups, except for MSM with a non-Western nationality.

In both time periods independent risk factors for rectal gonorrhoea were younger age, having a Western nationality, and concurrent infection with another STI (table 2). Having exclusively homosexual contacts was an independent risk factor only in the period after HAART (OR: 2.97, 95% CI: 1.78–4.97). Strikingly, the infection rate of rectal gonorrhoea among men with exclusively homosexual contacts increased after the introduction of HAART ( $p=0.003$ ), but decreased among bisexual men. This latter effect, however, was not statistically significant.

In both time periods, independent risk factors for early syphilis were having exclusively homosexual contacts, and having a concurrent infection with rectal gonorrhoea (table 2). Although having a non-Western nationality was also an independent risk factor in both time periods, the risk estimate (OR) considerably decreased in the period after the introduction of HAART. Moreover, since the introduction of HAART, the infection rate of early syphilis among men of non-Western nationality has decreased (marginally statistically significant), whereas the infection rate of syphilis among men of Western nationality has increased ( $p=0.003$ ). The group of men with a non-Western nationality, as defined for this study, who had a diagnosis of early syphilis consisted predominantly of men with a Latin American nationality (69.5%) or an eastern European nationality (12.9%).

### Discussion

Our study demonstrates that in addition to an increasing number of new consultations and a generally increasing pool of MSM attending the STI clinic, there is a rise in infection rates of rectal gonorrhoea and early syphilis in this group, as was found in studies in other Western countries.<sup>1 2 4 5</sup> This increase coincided with the introduction of HAART, and continued in the year 2000 (unpublished data).

Rectal gonorrhoea and early syphilis are often used as markers for unprotected anal intercourse (UAI),<sup>10</sup> and their rise in Amsterdam may indicate an increase in UAI. This would be in agreement with recent findings from a cohort of HIV negative young MSM in Amsterdam.<sup>11</sup> Moreover, susceptibility to HIV infection is believed to be facilitated by the presence of these STIs.<sup>12</sup> As a consequence, the increase in STI might suggest a risk for increased transmission of HIV in the near future.

The reported increase in rectal gonorrhoea is present in all groups studied, except among men with bisexual contacts, so having exclusively homosexual contacts is only an independent risk factor after the introduction of HAART. The increase in early syphilis was also seen in all groups under study, except among MSM with a non-Western nationality. However, MSM with a non-Western nationality still have the highest rates with syphilis, as have

MSM with exclusively homosexual contacts or with a concurrent infection with rectal gonorrhoea.

It seems plausible that before HAART was introduced, cases of early syphilis were few and resulted from new introductions by men of non-Western nationality, producing some secondary cases but not sufficient to sustain further spread. This situation seems to have changed and we are now witnessing a renewed spread of syphilis among MSM in Amsterdam.

In conclusion, infection rates of rectal gonorrhoea and early syphilis are increasing, indicating a change in sexual behaviour possibly as a result of the introduction of HAART. To date indirect evidence supporting this hypothesis is accumulating.<sup>7–11</sup> However, there is a need for direct empirical testing of this reasoning. For now, it is important to keep monitoring trends in STIs (including HIV), especially among people at higher risk for these STIs such as, younger MSM, men with exclusively homosexual contacts, and MSM with a western nationality.

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