Acta Derm Venereol 2004; 84: 145–150

Taylor & Francis
healthsciences

CLINICAL REPORT

Demographics, Sexual Behaviour and STD/HIV Prevalence in Two Groups of Men Who Have Sex with Men, in Rotterdam, The Netherlands

ERIC VAN DER SNOEK[1], JOHN DE WIT[2], HANNELORE GÖTZ[3], PAUL MULDER[4], ADRIE VAN 'T HOF[1], ROEL VERKOOYEN[5] and WILLEM VAN DER MEIJDEN[1]

Departments of [1]Dermatology and Venereology, [5]Medical Microbiology and Infectious Diseases, Erasmus MC, Rotterdam, [2]Department of Social and Organizational Psychology, Utrecht University, Utrecht, [3]Municipal Health Service, Department of Infectious Disease Control, Rotterdam and [4]Institute of Epidemiology and Biostatistics, Erasmus MC, Rotterdam, The Netherlands

This study was performed to investigate whether men who have sex with men visiting the sexually transmitted diseases clinic, and those participating in a gay cohort were different with regard to demographic characteristics, sexual behaviour and sexually transmitted diseases (STD)/human immunodeficiency (HIV) virus prevalence. Data from men who have sex with men presenting at the sexually transmitted diseases clinic (group I; $n=318$) were compared with data from men participating in a cohort (group II; $n=286$). All males underwent a routine venereological examination. Men in group II were more often older ($p<0.0005$), of Dutch descent ($p<0.0005$) and had more sex partners ($p<0.0005$). New cases of HIV infection were detected far more often in group I ($p=0.04$). Also, urethral gonococcal infection was significantly more prevalent in group I ($p=0.003$). Multivariate analyses showed that males presenting at the STD clinic (group I) were at higher risk for urethral gonorrhoea. The higher prevalence of HIV infection in group I was associated with a higher prevalence of recent STD, more concomitant urethral gonorrhoea infections at the time of visit, over 10 sex partners in the previous 6 months, and non-Dutch descent. *Key words: homosexual men; human immunodeficiency virus infection; sex behavioural determinants; sexually transmitted diseases prevalence.*

(Accepted September 8, 2003.)

Acta Derm Venereol 2004; 84: 145–150.

Eric van der Snoek, Department of Dermatology and Venereology, Erasmus MC, Dr. Molewaterplein 40, NL-3015 GD Rotterdam, The Netherlands. E-mail: e.vandersnoek@erasmusmc.nl

Dutch and international reports have recently demonstrated dramatically increasing rates of gonorrhoea and syphilis, as well as an increase in sexual risk behaviour among men who have sex with men (MSM) (1–3). Rotterdam is the second largest city in The Netherlands, with an estimated population of almost 700,000 living in and directly around the city. Few data have been published on sexually transmitted diseases (STD) and HIV prevalence and on sexual risk behaviour of MSM living in Rotterdam (4–7).

Virtually all available information on sexual risk behaviour and the prevalence of STD and HIV among MSM derives from data on visitors to STD clinics (8–10). It is almost impossible to recruit unbiased groups of MSM for research purposes, which means that enrolment of study participants is always prone to selection bias.

We performed the current study in Rotterdam to estimate the prevalence of STD and HIV in MSM and to analyse demographic and sexual behaviour characteristics. To investigate whether MSM visiting the STD clinic on their own initiative and those participating in a newly started gay cohort were different with regard to demography and sexual behaviour, the data of both groups were compared.

Comparison of these different groups of MSM allows for a more general assessment of behavioural indicators and possible risk factors for STD and HIV.

METHODS

Design and procedures

The study took place at the STD clinic of the Department of Dermatology and Venereology, Erasmus MC, Rotterdam, The Netherlands – the main facility in Rotterdam for people to be tested for STD. Persons with STD-related symptoms or sexual risk behaviour can be tested free of charge, and without being referred by a general practitioner. Data are routinely recorded in order to detect changes and trends in the epidemiology of STD at an early stage (4, 5).

Group I consisted of MSM who attended the STD clinic on their own initiative between January and December 1999. The data concern only the first visit during this recruitment interval. Group II consisted of MSM who were recruited to participate in the Rotterdam gay cohort study. Former (before 1999) visitors to the STD clinic were informed about the possibility of taking part in the study. Men visiting gay bars and saunas in Rotterdam – informed by trained volunteers – were also asked to join the study. In order to enrol a diversity of men, volunteers also visited so-called 'meeting places' where MSM have (anonymous) sex contacts. Advertisements were placed in local mainstream as well as gay periodicals in order to interest potential participants.

 ISSN 0001-5555
DOI: 10.1080/00015550310006833

Participants in group II were enrolled between February 1999 and February 2000.

Cohort participants were asked to undergo testing for STDs and HIV every 6 months during a period of 3 years. Data from these participants concern only their first visit in the prospective study. Being willing to provide a blood sample was considered an inclusion criterion for enrolment in group II. To recruit as many participants as possible, men could choose not to be informed of their HIV serostatus.

Data collection and questionnaires

Demographic and behavioural data collected for all men in groups I and II included ethnic background, age, highest educational qualification, sexual orientation, age at first sexual experience, number of sex partners during the previous 6 months, practice of anal intercourse, intravenous drug use, participation in prostitution and earlier diagnoses of STD or HIV infection. Self-administered questionnaires provided data from group II participants about condom use during sexual intercourse.

Patient investigation

Patients who had had sexual contact with at least one person of the same gender during the previous 6 months were considered homosexual. When sexual contact with a person of the opposite sex had taken place during the previous 6 months as well, they were recorded as bisexual. All patients underwent a routine venereological examination using standardized procedures.

Gonococcal urethritis was diagnosed by taking urethral swabs and, in the case of urethral discharge, Gram-stained genital specimens for direct visualization of diplococci. First-voided urine was used in testing for chlamydial infection.

Tests on rectal infections with gonorrhoea and chlamydia were carried out in all men in group II. In group I, rectal sampling was performed only in the event of complaints of the rectum and/or when receptive anal sex had taken place during the previous 6 months. Oropharyngeal tests for gonorrhoea were done in all men in both groups.

HIV-testing

Individual testing for HIV took place after counselling and after written informed consent had been obtained. Test results were given personally to the subjects involved. Those who did not want to know their serostatus were tested 'unlinked', in which case the blood sample was given a serial number that could not be linked to a certain individual. Unlinked testing is being done as part of an HIV sentinel surveillance program in The Netherlands. A leaflet handed out to all new patients explains the procedure of HIV-testing beforehand.

Exceptions to routine HIV-testing were only made in group I when a patient refused any blood sampling or wanted to be tested selectively, e.g. for chlamydia only. New HIV cases were defined as positive test results in persons who had either never been tested before or had tested negative previously.

Laboratory methods

Blood samples were analysed for HIV antibodies (micropartide enzyme immunoassay AxSym HIV-1/2 reagens; Abbott, Santa Clara, CA, USA), syphilis (*Treponema pallidum* particle agglutination (TPPA) test; Serodia-TPPA, Fujirebio Inc., Tokyo, Japan) and hepatitis B (anti-HBc and HBsAg, micropartide enzyme immunoassay IMX; Abbott, Santa Clara, IL, USA). Microbiological investigation included testing on gonorrhoea (Gram-stained genital specimens; GC-Lect agarplates; Becton & Dickson Europe, Meylan, France), *Chlamydia trachomatis* infection (Cobas Amplicor PCR, Roche Diagnostic Systems; Branchburg, USA) and microscopy of first-voided urine for non-specific urethritis (NSU). NSU was defined as the presence of >6 leucocytes per 10^{-6} litres of first-voided urine specimen (KOVA-system; Hycor Biomedical Inc., Garden Grove, CA, USA; in full accordance with the manufacturer's instructions) (11).

STD diagnoses

Gonorrhoea was diagnosed in the case of Gram-negative diplococci within polymorphonuclear leucocytes or in the event of a positive culture. Patients with primary and secondary syphilis, and those with early latent syphilis, were categorized as having early syphilis. Early latent syphilis was diagnosed in patients without clinical signs, with a positive TPPA-test, a positive fluorescent treponemal antibody-absortion (FTA-abs) test and a positive Venereal Disease Research Laboratory (VDRL) test with a titre greater than or equal to 1:8. Subjects were asked for a history of previous treatment for treponematoses, a negative syphilis serology in the past and a recent history of syphilitic symptoms, in order to guarantee a correct classification.

Late latent syphilis was diagnosed in case of a positive TPPA-test, a positive FTA-abs test and a positive VDRL test with a titre below 1:8. Symptomatic as well as asymptomatic neurosyphilis were categorized as late syphilis (12).

Individuals with HBsAg, with or without HBeAg, were categorized as having infectious hepatitis B, while past hepatitis B infection was defined as the presence of anti-HBc without HbsAg.

Statistical methods

Data were compared in order to assess statistically significant differences in the prevalence of STD and the number of new HIV cases in groups I and II. Prevalence was calculated as the number of positive tests per 100 tested individuals. For testing differences between the groups, the exact chi-square test was used after all explanatory variables had been dichotomized. The test was considered significant if the p-value was less than 0.05.

Next, the prevalences of new HIV cases and of urethral gonorrhoea were compared between groups. In order to adjust for confounding variables, logistic regression analysis was used. The p-values in this analysis were based on likelihood ratio tests. The primary selection of covariables for entering in the model, along with group, was based on univariate analysis in 2×2 tables; an exact p-value below 0.05 was used. In the logistic regression model, the covariables with a p-value above 0.30 (based on the likelihood ratio method) were eliminated using a stepwise backwards elimination method.

RESULTS

Demographic characteristics

Group I (MSM attending the STD clinic) consisted of 318 males, half of whom (51.0%) attended the clinic because of symptoms related to STD. Others (23.3%) wanted to be tested on a regular basis because of their sexual lifestyle. A small minority (3.6%) visited the STD

clinic because of a new sexual relation or after referral by their general practitioner. In group II, 286 men were included, a minority of whom (less than 5%) had symptoms when they arrived for their first planned, semi-annual visit. The majority of these men, 189 (66.1%), had never visited the Rotterdam STD clinic before. Only 63 (22.0%) had visited the STD clinic during the 2 years before their enrolment in the cohort study.

Table I summarizes age, ethnic background, sexual orientation and highest educational qualification of both groups. In group I the median age was 34.5 years (range 13–74), while in group II it was 39.5 (range 18–75; $p<0.0005$). In group I, 81.3% of participants were of Dutch descent compared to 93.0% in group II ($p<0.0005$).

Sexual behaviour

Table II summarizes sexual history and sexual behaviour of both groups in the previous 6 months. Due to a registration deficit there are different denominators in group I for 'number of partners in previous 6 months' and 'practised anal sex'. Group I participants had fewer sex partners during the previous 6 months, with a median of 3 (range 0–99), compared to 7 (range 0–130) in group II ($p<0.0005$). There was no significant difference between the two study groups concerning practice of anal sex and type of anal sex practised. An earlier diagnosis of STD was reported by 53.3% men in group I and 63.3% in group II ($p=0.02$).

Table I. *Demographic characteristics of the STD clinic visitors (group I) and the cohort participants (group II). Presented figures are numbers and (percentages)*

Description	Group I	Group II
Age (years)	($n=318$)	($n=286$)**
≤19	9 (2.8)	1 (0.3)
20–24	25 (7.9)	12 (4.2)
25–29	57 (17.9)	24 (8.4)
30–34	68 (21.4)	55 (19.2)
35–39	45 (14.2)	51 (17.8)
40–44	41 (12.9)	50 (17.4)
45–49	23 (7.2)	33 (11.5)
≥50	50 (15.7)	60 (21.0)
Ethnic background	($n=315$)	($n=286$)**
Native Dutch	256 (81.3)	266 (93.0)
Surinamese	13 (4.1)	2 (0.7)
Antillean	7 (2.2)	2 (0.7)
Turkish	2 (0.6)	1 (0.3)
Moroccan	4 (1.3)	1 (0.3)
Other	33 (10.5)	14 (4.9)
Sexual orientation	($n=318$)	($n=286$)
Homosexual	261 (82.1)	251 (87.8)
Bisexual	57 (17.9)	35 (12.2)
Highest educational qualification	($n=269$)	($n=286$)
Primary/none	32 (11.9)	37 (12.9)
Secondary	124 (46.1)	127 (44.4)
Higher	113 (42.0)	122 (42.7)

**$p<0.005$.

STD/HIV prevalence

Table III summarizes the prevalence of STD and HIV infection (new diagnoses) in both groups. Eleven persons in group I and 11 in group II who were already known to be HIV-positive when they visited the STD clinic ($p=1.00$) were excluded from the analysis of HIV-testing. For various reasons (e.g. no blood samples taken; recent unlinked HIV test at earlier visit; administrative oversight) 41 males in group I were not tested for HIV. In group II, two participants were not tested because of an administrative oversight.

Of the 307 males in group I, 266 (86.6%) were tested for HIV; 151 (56.8%) of these men wanted an individual test and 115 (43.2%) were tested unlinked. In group II, 273 of the 275 (99.3%) were tested for HIV; 206 (75.5%) of these men wanted an individual test and 67 (24.4%) males were tested unlinked. One-hundred-and-fifty-two (47.9%) of all men in group I

Table II. *Sexual history and sexual behaviour in previous 6 months of the STD clinic visitors (group I) and the cohort participants (group II)*

	Group I	Group II
No. of partners in previous 6 months	($n=273$)	($n=286$)**
None	15 (5.5)	4 (1.4)
One	61 (22.3)	34 (11.9)
2–4	117 (42.9)	68 (23.8)
5–9	27 (9.9)	46 (16.1)
10–14	23 (8.4)	41 (14.3)
15–19	7 (2.6)	15 (5.2)
≥20	23 (8.4)	78 (27.3)
Practised anal sex	($n=306$)	($n=286$)
Never	56 (18.3)	58 (20.3)
In previous 6 months	194 (63.4)	183 (64.0)
Not in previous 6 months	56 (18.3)	45 (15.7)
Type of anal sex practised (ever)	($n=238$)	($n=228$)
Only receptive	44 (18.5)	45 (19.7)
Only insertive	55 (23.1)	52 (22.8)
Receptive and insertive	139 (58.4)	131 (57.5)
STD in previous 6 months (any)	($n=315$)	($n=286$)
	27 (8.6)	29 (10.1)
Ever had an STD	($n=315$)	($n=286$)
	168 (53.3)	181 (63.3)*
Worked as a prostitute in last 6 months	($n=313$)	($n=286$)
	4 (1.3)	1 (0.3)
Had sex with a male prostitute in last 6 months	($n=309$)	($n=286$)
	11 (3.6)	11 (3.8)
IV drug-use (ever)	($n=310$)	($n=286$)
	1 (0.3)	0 (0)

*$p<0.05$; **$p<0.005$.

Table III. *Prevalence of STD and HIV infection – new diagnoses – in the STD clinic visitors (group I) and cohort participants (group II)*

Description	Group I	Group II
HIV tests	($n=266$)	($n=273$)
Individual test	151 (56.8)	206 (75.5)**
Unlinked test	115 (43.2)	67 (24.4)**
HIV antibody positive	12 (4.5)	4 (1.5)*
Individual test	7 (4.6)	2 (1.0)*
Unlinked test	5 (4.3)	2 (3.0)
Past hepatitis B (anti-HBc positive)	($n=276$) 31 (11.2)	($n=228$) 33 (14.5)
Infectious hepatitis B (HBsAg positive)	($n=276$) 1 (0.4)	($n=228$) 0 (0)
Syphilis[a]	($n=305$)	($n=281$)
Early	6 (2.0)	1 (0.4)
Late[b]	5 (1.6)	3 (1.0)
Gonococcal infection	($n=318$)	($n=286$)
Any type	26 (8.1)	10 (3.5)*
Urethral gonorrhoea	17 (5.3)	3 (1.0)*
Tonsillar gonorrhoea	2 (0.6)	1 (0.3)
Rectal gonorrhoea (absolute numbers in group I)	10	7 (2.4)
Chlamydial infection	($n=318$)	($n=286$)
Any type	28 (8.8)	23 (8.0)
Urethral chlamydia	21 (6.6)	12 (4.2)
Rectal chlamydia[c]	12	16 (5.6)
Non-specific urethritis	($n=318$) 23 (7.2)	($n=286$) 23 (8.0)

[a]Primary, secondary and early latent syphilis (VDRL $\geq$ 1:8).
[b]Late latent syphilis and (a)symptomatic neurosyphilis
[c]absolute numbers in group I
*$p<0.05$; **$p<0.005$.

and 159 (55.6%) of all men in group II had undergone earlier HIV-testing ($p=0.61$).

In group I, 12 (4.5%) new HIV cases were diagnosed compared to 4 (1.5%) in group II ($p=0.04$). Among individually tested persons, 7 in group I (4.6%) and 2 in group II (1.0%) tested HIV-positive ($p=0.04$). Of those who were tested unlinked, 5 (4.3%) in group I and 2 (3.0%) in group II were HIV-positive ($p=1.00$).

New HIV cases were seen more often in persons of non-Dutch descent than in those of Dutch descent, namely 8.9% (7/79) versus 1.7% (9/522; $p=0.002$). Of the total of 12 new HIV cases diagnosed in group I, 6 men were of non-Dutch descent. In group II, one of the 4 new HIV cases diagnosed was of non-Dutch descent. No significant differences were found when comparing the rate of STD in Dutch and non-Dutch males in both groups ($p=0.09$).

Gonococcal infection was found in 26 (8.1%) men from group I and in 10 (3.5%) participants from group II ($p=0.02$). Seventeen patients from group I (5.3%) versus 3 from group II (1.0%) suffered from urethral gonorrhoea ($p=0.003$). All males with urethral gonorrhoea had symptoms, i.e. urethral discharge and/or dysuria. The rate of tonsillar gonorrhoea did not differ significantly between groups (0.6 versus 0.3%; $p=1.00$). Rectal gonorrhoea was seen in 10 men in group I and in 7 men in group II. We could not compare the prevalence because of the different criteria for testing in both groups. Only 4 of 10 (40.0%) men in group I and one of 7 (14.3%) in group II had rectal symptoms.

Chlamydial infections were seen in 28 (8.8%) persons from group I and in 23 (8.0%) from group II ($p=0.77$). Twenty-one (6.6%) males from group I versus 12 (4.2%) from group II suffered from urethral chlamydial infection ($p=0.21$). Urethral chlamydial infection was symptomatic (discharge and/or dysuria) in 15 of 21 (71.4%) men in group I and in 5 of 12 men (41.7%) in group II. Rectal chlamydial infections were diagnosed in 12 men from group I and in 16 men from group II. Again, we could not compare these numbers because of the different criteria for testing. Only 2 of 12 (16.7%) men in group I and 1 of 16 (6.3%) in group II had rectal symptoms (itching or painful sensations).

Univariate analysis was done to find associations between demographic characteristics, sexual behaviour and presence of urethral gonorrhoea and new HIV positivity. After dichotomization, the variables age (until 35 years or over), ethnicity (Dutch descent or non-native Dutch descent), sexual orientation (homosexual or bisexual), educational qualification (higher or primary/secondary), number of sex partners in previous 6 months (until 10 or over), practice of anal sex (never or ever), anal sex practised (only receptive or active/both), STD in previous 6 months (yes or no), ever had an STD (yes or no), group (I or II) and HIV positivity or positive urethral gonorrhoea were used in these analyses. The presence of urethral gonorrhoea was significantly associated with HIV positivity ($p=0.011$; OR 5.76; 95% CI 1.79–18.55) and with belonging to group I ($p=0.003$; OR 5.33; 95% CI 1.55–18.38). New HIV positivity was significantly associated with non-native Dutch descent ($p=0.021$; OR 2.83; 95% CI 1.20–6.68), over 10 sex partners in previous 6 months ($p=0.006$; OR 3.06; 95% CI 1.39–6.71), had an STD in the previous 6 months ($p=0.003$; OR 4.32; 95% CI 1.81–10.32), ever had an STD ($p=0.030$; OR 2.74; 95% CI 1.09–6.86) and with positive urethral gonorrhoea ($p=0.011$; OR 5.76; 95% CI 1.79–18.55).

Multivariate logistic regression was conducted to assess the independent contribution of univariately significant predictors of prevalence of urethral gonorrhoea and HIV positivity (Table IV). The presence of urethral gonorrhoea was significantly associated with belonging to group I.

New HIV positivity was significantly associated with non-native Dutch descent, over 10 sex partners in the previous 6 months, an STD in the previous 6 months and with positive urethral gonorrhoea.

Table IV. *Multivariate analysis of explanatory variables in logistic regression model*

Explanatory variable	*p*-value	OR	95% CI
Presence of gonorrhoea			
HIV positivity	0.64	1.71	0.21 – 14.00
Group	0.002	6.99	1.58 – 30.86
New HIV positivity			
Non-native Dutch descent	0.006	4.22	1.60 – 11.15
> 10 partners previous 6 mo	0.016	2.89	1.21 – 6.91
STD in previous 6 mo	0.016	3.56	1.33 – 9.53
Ever had an STD	0.26	1.82	0.63 – 5.29
Urethral gonorrhoea	0.014	6.82	1.68 – 27.67
Group	0.78	1.14	0.46 – 2.84

OR: odds ratio; CI: confidence interval.

DISCUSSION

The data of both groups were compared to investigate whether MSM visiting the STD clinic at their own initiative and whether those participating in a newly started gay cohort were different in regard to demographic characteristics, sexual behaviour, STD and HIV prevalence.

To our knowledge, studies on differences in characteristics of these frequently studied types of samples have not been published previously. Comparison of characteristics is therefore useful for obtaining a broader view of behavioural indicators and possible risk factors.

Because of our method of recruitment of group II participants, this group contains former STD clinic patients, which could cause biased results. To reduce the risk of selection bias, we performed a series of multivariate analyses in a logistic regression model. In our study we could not compare rectal infections because of the fact that different criteria for rectal testing were used in the groups investigated.

Our study showed that the males in the cohort (group II) were on average older, more often of Dutch descent and more often had an STD in the past. They also had more sexual partners in the previous 6 months, but were less often diagnosed with a symptomatic STD in this period. HIV seropositivity as well as urethral gonorrhoea were found significantly less often in group II. There was no difference in the prevalence of chlamydial infections between the groups.

It is not surprising to find more persons from group I than from group II presenting with a symptomatic STD. Their reason for calling in is mostly related to urethral symptoms.

Multivariate logistic regression analyses (Table IV) showed that the presence of urethral gonorrhoea was significantly associated with 'group'. Group I had a higher risk of having urethral gonorrhoea. New HIV positivity, used as dependent variable, was significantly related to urethral gonorrhoea, STD in the previous 6 months, being of non-native Dutch descent and having had over 10 sex partners in the previous 6 months.

An important risk factor for a new HIV infection is a recent or concomitant STD. Of all 16 new HIV patients in this study, 4 (25%) had either a recent STD (previous 6 months) or a concomitant urethral gonorrhoea at the time of their visit. It is now well known that ulcerative and inflammatory STDs can facilitate HIV transmission (13).

An explanation for the higher number of STD and HIV infections in group I could be that more males from this group were of non-Dutch descent. This group may frequently or exclusively have sexual contact with persons from non-Dutch origin or perhaps recently migrated from endemic areas (14). More prevalent STD in this group or these areas could possibly explain the higher rate of STD and HIV infection in group I.

Having had over 10 sex partners in the previous 6 months was associated with a higher risk of new HIV infections. However, the number of sex partners does not seem to be the exclusive risk factor for HIV. In group II, one in two participants had had over 10 partners during the previous 6 months, while fewer new HIV cases were seen here. Males from group II seem to be more sexually active and more sexually experienced, based on age, higher number of STD episodes in the past and frequent sex partner change. Males voluntarily participating in a cohort study may be (very) cautious individuals, less at risk of getting an STD. This group is perhaps less at risk for STD or HIV infection because of precautions taken. According to the information from the self-administered questionnaires, 25.7% of all participants from group II who had 'ever' had anal sex stated that they 'always' used condoms. Almost half of the participants (49.4%) having anal sex used condoms 'most of the time' and only 7.1% 'never' used condoms. In this study we could not compare both groups with regard to safe sex behaviour.

Another possible explanation for a more careful sexual behaviour among group II participants could be an earlier diagnosis of STD. Realizing the nuisance of having an STD could be a reason for having safe sex more often. These hypotheses about more cautious sexual behaviour in group II participants voluntarily participating in our cohort suggest the need for a more detailed exploration of behavioural aspects in order to reveal useful information about possible precautions taken. Recently, we started a study using questionnaires among MSM visiting the STD clinic on their own initiative, as is done in the cohort study.

In conclusion, our study of two different groups of MSM found a higher prevalence of, mostly symptomatic, gonococcal infections in the group visiting the STD clinic on their own initiative. The higher prevalence of HIV infection in this group was related to

the larger number of men of non-Dutch descent and the higher prevalence of recent STDs and concomitant urethral gonococcal infection.

Safe sex messages, as well as active testing for HIV and STD, are both necessary as preventive measures. Continued monitoring of sexual behaviour and STD and HIV is important in MSM of both the cohort and the STD clinic in order to establish target groups for these preventive activities. Special attention should be paid to the group of MSM of non-Dutch descent.

REFERENCES

1. Valleroy LA, MacKellar DA, Karon JM, Rosen DH, McFarland W, Shehan DA, et al. HIV prevalence and associated risks in young men who have sex with men. Young Men's Survey Study Group. J Am Med Acad 2000; 284: 198–204.
2. Dukers NHTM, Goudsmit J, de Wit JBF, Prins M, Weverling GJ, Coutinho RA. Sexual risk behaviour relates to the virological and immunological improvements among homosexual men in HIV infection. AIDS 2001; 15: 369–378.
3. Stolte IG, Dukers NHTM, de Wit JBF, Fennema JS, Coutinho RA. Increase in sexually transmitted infections among homosexual men in Amsterdam in relation to HAART. Sex Transm Infect 2001; 77: 184–186.
4. Van der Snoek EM, Chin-A-Lien RAM, de Ridder MAJ, Willems PWJM, Verkooyen RP, van der Meijden WI. The prevalence of venereal disease and HIV infection among persons attending the VD Outpatient Clinic of the Dijkzigt University Hospital in Rotterdam; a comparison of the years 1993 and 1998. Ned Tijdschr Geneeskd 2000; 144: 1351–1355 (in Dutch).
5. Van der Snoek EM, Götz HM, Mulder PGH, Verkooyen RP, van der Meijden WI. Prevalence of STD and HIV infections among attenders of the Erasmus Medical Centre STD clinic, Rotterdam, The Netherlands, during the years 1996 to 2000. Int J STD AIDS 2003; 14: 119–124.
6. Bosman A, de Zwart O, Schop WA, Schoots B, van der Meijden WI, Chin-A-Lien RA. Increase of early syphilis in a red light district in Rotterdam (1995–1997) and preventive treatment. Ned Tijdschr Geneeskd 1999; 143: 2324–2328 (in Dutch).
7. Hogeweg JA, Hospers HJ. Monitoring research 2000 among homo- and bisexual men in The Netherlands. University of Maastricht, 2000; thesis ISBN 90-5681-087-1 (in Dutch).
8. Ciemins EL, Flood J, Kent CK, Shaw H, Rowniak S, Moncada J, et al. Reexamining the prevalence of *Chlamydia trachomatis* infection among gay men with urethritis: implications for STD policy and HIV prevention activities. Sex Transm Dis 2000; 27: 249–251.
9. Simms I, Rogers P, Catchpole M, McGarrigle CA, Nicoll A. Trends in undiagnosed HIV-1 infection among attenders at genitourinary medicine clinics, England, Wales, and Northern Ireland: 1990–6. Sex Transm Infect 1999; 75: 332–336.
10. Fennema JSA, Cairo I, Coutinho RA. Substantial increase in gonorrhea and syphilis among attenders of the Amsterdam Sexually Transmitted Disease clinic. Ned Tijdschr Geneeskd 2000; 144: 602–603 (in Dutch).
11. Alken CD, Sokeland J. Urologie, 9th edn. Stuttgart, Thiems, 1983.
12. Goh BT, van Voorst Vader PC. European guideline for the management of syphilis. Int J STD AIDS 2001; 12: 14–26.
13. Ciesielski CA. Sexually transmitted diseases in men who have sex with men: an epidemiologic review. Curr Infect Dis Rep 2003; 5: 145–152.
14. Gras MJ, van Benthem BH, Coutinho RA, van den Hoek A. Determinants of high-risk sexual behaviour among immigrant groups in Amsterdam: implications for interventions. J Acquir Immune Defic Syndr 2001; 28: 166–172.