

# HIV prevalence among clients attending a sexually transmitted diseases clinic in Amsterdam: the potential risk for heterosexual transmission

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## Abstract

**Introduction**—Patients attending a clinic for sexually transmitted diseases (STD) in general have engaged in at risk sexual behaviour. Therefore they are at increased risk of acquiring HIV through sexual contact.

**Objective**—To determine the HIV prevalence among patients attending a STD clinic in Amsterdam.

**Methods**—An anonymous cross sectional study was conducted in two 5-week periods in Spring and Autumn 1991.

**Results**—Of the 2362 patients attending the clinic during the study period, 2292 (97%) consented to participate; of these, 2138 (93%) were interviewed and anonymously tested, while 154 (7%) consented to be interviewed but refused HIV antibody testing. The HIV prevalence was 4.2% (90/2138); 93% of seropositive participants reported homosexual contacts and/or intravenous use of drugs (IVDU). HIV prevalence among heterosexual non-IVDU men was 0.5% and among non-IVDU women 0.1%. Among all heterosexually active participants, including IVDU and bisexual men, the HIV prevalence was 1.5%. The 28 of 90 HIV infected participants that were heterosexually active reported together approximately 135 heterosexual partners in the six months preceding the study; 13 of these 28 heterosexually active participants had a STD diagnosed at their present clinic visit, while four (30%) of them already knew they were HIV infected.

**Conclusions**—From these data we conclude that there is a substantial risk of further transmission of HIV through heterosexual contact. In order to try to reduce this potential for further sexual transmission of HIV, services offered by the STD clinic should not only include voluntary confidential counselling and HIV testing, but also notification of partners of HIV infected clinic-attendants. Finally, we conclude that anonymous HIV prevalence studies that link HIV test results to risk behaviour for HIV infection can be performed with a high rate of participation. Repeating such prevalence studies in time can help in monitoring the HIV incidence in the heterosexually active population.

## Introduction

The most common mode of transmission of the human immunodeficiency virus (HIV) is through sexual contact.<sup>1</sup> Sexual transmission in Western European countries and the United States occurs predominantly among homosexual and bisexual men. The number of AIDS cases that are heterosexually acquired accounts for a small but slowly increasing proportion of the total number of reported cases.<sup>1 2</sup> Of the 1950 cumulative AIDS cases reported in the Netherlands by 31 December 1991, 6.5% is in the heterosexual transmission group.<sup>2</sup>

AIDS case surveillance data reflect, however, patterns of transmission of HIV that took place in the past and therefore do not provide information on the extent to which HIV has penetrated into the heterosexually active population. To obtain more recent information on trends in transmission patterns, sentinel surveys among populations at increased risk for HIV infection are important supplements to AIDS case surveillance.<sup>3</sup> Patients attending sexually transmitted diseases (STD) clinics can serve as such a population; they include men who have had sex with men, intravenous drug users (IVDU) and heterosexual men and women who have engaged in sexual contact with multiple and/or anonymous partners.

In order to determine the HIV prevalence among STD clinic visitors, we conducted a voluntary, anonymous cross sectional study in which information on risk behaviour for HIV infection was linked to HIV test results and STD diagnoses. This study was conducted at the STD clinic operated by the Municipal Health Service of Amsterdam and forms part of a Concerted Action of the Medical and Health Research Council of the European Community, which aims at monitoring HIV infection rates over time in sentinel populations of STD patients in 12 European countries.<sup>4</sup>

## Methods

### Study population

The STD clinic of the Municipal Health Service in Amsterdam offers anonymous and free of charge examination for STD. The clinic serves an important part of the city's population that has a relatively high risk of being infected with STD.<sup>5</sup> Each visit made to the clinic for a possible new STD episode is considered a new consultation. Between

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12 000 and 14 000 new consultations are provided yearly to approximately 10 000 clinic visitors.<sup>6</sup> At each new consultation information on gender, age, nationality, place of residence, (IV) drug use, sexual orientation and STD diagnosis is routinely collected and entered into a computer under a patient identification code. All patients are routinely screened for gonorrhoea (GO), *Chlamydia trachomatis* (CT) and syphilis.

#### Data collection

As part of a Concerted Action of the European Community,<sup>4</sup> a cross sectional anonymous HIV prevalence study was performed in the clinic during two separate 5-week periods in Spring and Autumn 1991.

Visitors who attended the clinic for a new consultation in this study period were asked to participate. Written information on the study and its anonymous character was available in six different languages. Informed consent was obtained of visitors who agreed to participate. Specially trained nurses and native tongue speaking interviewers (Spanish and Turkish) collected information on demographic characteristics, risk behaviour for HIV infection and previous HIV test results. A history of STD was defined as having had a prior episode of syphilis and/or gonorrhoea. Questions concerning sexual behaviour included homosexual contacts since 1980, sexual contact with HIV-positive partners ever, commercial sex—defined as sexual contact in exchange for money or drugs in the six months preceding the study—and the number of homosexual and heterosexual partners in the preceding 6 months, categorised as 1, 2–4, 5–10 or > 10 partners.

Participants were also asked about a history of injecting drugs since 1980 and whether they ever received any transfusion with blood or blood products. When tested previously for HIV they were asked for the date of the last negative or the first positive test result.

Routine physical examination for STD was performed after completion of the questionnaire and drawing of a blood sample. A positive culture was used as diagnostic criterion for gonorrhoea; a diagnosis of CT infection was based on positive culture or ELISA. Primary herpes simplex infection was diagnosed by positive culture results in patients with ulcerations but without a history of prior genital herpes infection. A diagnosis of syphilis was based on clinical symptoms and a reactive serology (TPHA and FTA-absorption test) and/or demonstrating *T pallidum* by dark field microscopy.<sup>6</sup> Patients treated for syphilis in the past were diagnosed with a new syphilis infection only when a three fold or more increase in VDRL titre was observed or when *T pallidum* was demonstrated. A diagnosis of trichomoniasis was based on direct microscopic examination of vaginal flora or, when negative, on culture. Laboratory-confirmed STD diagnoses were coded on the study-forms which then were separated from the patient's clinic-file and entered into a

computer under its unique study number. This study was approved by the ethics committee of the Municipal Health Service of Amsterdam.

#### Laboratory

Blood was collected by venepuncture and tested for antibodies to HIV 1/2 by means of recombinant HIV 1/2 enzyme immunoassay (EIA) (Abbott GmbH, Wiesbaden-Delkenheim, Germany). Positive specimens were confirmed by Western Immunoblot (Diagnostic Biotechnology, Singapore).

Sera were screened for antibodies to hepatitis B virus (HBV) surface antigen (anti-HBs, Ausab) and to core antigen (anti-HBc, Corzyme) using EIA (Abbott Laboratory, North Chicago, Ill., USA); testing for HBsAg (Auszyme) was performed only in specimens positive for anti-HBc and negative for anti-HBs. Sera were considered reactive for HBV if at least anti-HBc or anti-HBs was positive; HBV carriers were defined as positive for HBsAg and anti-HBc but negative for anti-HBs.

*Treponema pallidum* haemagglutination assay (TPHA, Fujirebio, Tokyo, Japan) was used for syphilis screening; when positive, the Venereal Disease Research Laboratory test (VDRL, Wellcome, Dartford, England) and the FTA-absorption test (Trepo-spot IF, Biomerieux, Marcy l'Etoile, France) were performed. All tests and cultures were performed at the Regional Laboratory of the Municipal Health Service of Amsterdam.

#### Statistics

The HIV prevalences in the various risk categories are given with 95% confidence intervals, using maximum likelihood techniques. Bivariate associations were analysed using chi square tests for categorical variables and by *t* test for continuous variables. If expected cell frequencies were less than five, Fisher's exact test was used. P-values of < 0.05 were considered as significant.

## Results

#### General description of participants

Of the 2362 visitors who attended the clinic during the study period, 2292 (97%) consented to participate. Of these, 2138 (93%) were interviewed and tested for HIV antibodies, while 154 (7%) consented to be interviewed but refused HIV antibody testing. Refusers were significantly more likely to originate from Surinam and the Dutch Antilles, to have a history of injecting drugs and to have a history of STD; refusers were less likely to be men who visited prostitutes. Between refusers and participants the proportion of those who already knew they were HIV seropositive did not differ (table 1). Knowledge of a previous HIV test result, either positive or negative, was reported by 255 (12%) of the 2138 tested participants.

Table 1 Demographic and other characteristics of 2292 participants who were tested and who refused testing for HIV

Variable	Tested n = 2138 n (%)	Not tested n = 154 n (%)	Total n = 2292 n (%)	p value
Mean (sd) age (years)	30.6 (9.0)	30.9 (7.8)	30.7 (8.9)	0.64
Gender—male	1338 (63)	92 (60)	1430 (62)	0.48
Dutch nationality	1431 (67)	114 (74)	1545 (67)	0.053
Born in the Netherlands	1117 (52)	74 (48)	1191 (52)	0.35
Ethnicity—Netherlands	1124 (53)	76 (50)	1200 (52)	
—Surinam and Dutch Antilles	222 (10)	33 (21)	255 (11)	
—Turkey	220 (10)	3 (2)	223 (10)	
—Southern Europe	33 (1.5)	5 (3)	38 (2)	0.0002
—Northern Africa	91 (4)	7 (5)	98 (4)	
—Other	448 (21)	29 (19)	477 (21)	
Homosexual contact ever*	324 (24)	27 (29)	351 (25)	0.28
History of IVDU ever*	52 (2)	9 (6)	61 (3)	0.01
History of STD ever*	650 (31)	65 (42)	715 (32)	0.004
Present STD diagnosis§	438 (21)	26 (17)	464 (20)	0.28
Visited prostitutes†	440 (33)	21 (23)	461 (33)	0.045
Active as prostitute‡	257 (32)	19 (32)	275 (32)	0.92
Known HIV seropositive	42 (2)	1 (0.6)	43 (2)	0.20

\*since 1980

†six months preceding the study, men only

‡six months preceding the study, women only

§including syphilis, gonorrhoea, genital chlamydia, primary genital herpes, first episodes of genital warts, trichomoniasis.

### HIV Prevalence

Table 2 shows selected characteristics, STD diagnoses and the HIV prevalence by risk groups and gender of the 2138 participants who were tested for HIV.

The overall HIV prevalence was 4.2% (90/2138; 95%—CI:3.4–5.1%). The HIV prevalence among homosexual men was 22% (70/324; 95%—CI:18–27%), among heterosexual male IVDUs 11% (2/17; 95%—CI:3–37%) and among heterosexual men who never injected drugs 0.5% (5/997; 95%—CI:0.2–1.2%). The HIV prevalence among female IVDUs was 41% (12/29; 95%—CI:25–60%) and among heterosexual women who never injected drugs the HIV prevalence was 0.1% (1/771; 95%—CI:0.0–0.9%). Six homosexual IVDUs, all HIV negative, were categorised as homo/bisexual men.

The five men who are assumed to be HIV infected through heterosexual contact were all residents of Amsterdam. One was born in The Netherlands, two in Turkey, one in Pakistan and one in Ghana. None of these five men reported sexual contact with HIV infected partners or was a transfusion recipient. The one woman who is assumed to be heterosexually infected was Dutch and reported to have been tested negative for HIV in 1988 (table 3). Among heterosexually active participants—including bisexual men and IVDU—the HIV prevalence was 1.5% (28/1884; 95%—CI:1.0–2.1%).

Forty-eight of 90 HIV infected patients knew the results of previous HIV tests; of these, 38 (79%) already knew they were seropositive and 10 had tested negative previously (table 4). Taking into account these self reported previous HIV test results, six men

Table 2 General description and HIV prevalence among 2138 study participants\* who consented to HIV testing, by risk group

	Males			Total n = 1338 (%)
	Homosexual and bisexual n = 324 (%)	Heterosexual IVDU n = 17 (%)	Heterosexual non-IVDU n = 997 (%)	
Dutch nationality	243 (75)	11 (65)	574 (58)	828 (62)
Residence Amsterdam	272 (84)	17 (100)	830 (84)	1119 (83)
History of STD	154 (48)	9 (53)	276 (30)*	439 (33)
STD diagnosis at present visit:				
syphilis	6 (2)	0 (—)	21 (2)	27 (2)
gonorrhoea	67 (21)	1 (6)	80 (8)	148 (11)
primary herpes	2 (0.5)	0 (—)	8 (1)	10 (0.7)
chlamydia	12 (4)	0 (—)	77 (8)	89 (7)
genital warts	12 (4)	0 (—)	14 (1)	26 (2)
HBV markers	159 (49)	7 (41)	234 (23)	400 (30)
HIV antibody positive†	70 (22; 18–27)	2 (11; 3–37)	5 (0.5; 0.2–1.2)	77 (5.8; 4.6–7.1)
	Females			
	Heterosexual IVDU n = 29 (%)	Heterosexual non-IVDU n = 771 (%)	Total n = 800 (%)	
Dutch nationality	10 (34)	590 (77)	600 (75)	
Residence Amsterdam	25 (86)	650 (84)	675 (84)	
History of STD	18 (62)	175 (23)	193 (24)	
STD diagnosis at present visit:				
syphilis	2 (7)	17 (2)	19 (2)	
gonorrhoea	4 (14)	26 (3)	30 (4)	
primary herpes	2 (7)	4 (0.5)	6 (0.7)	
chlamydia	3 (10)	72 (9)	75 (9)	
genital warts	0 (—)	16 (2)	16 (2)	
trichomoniasis	5 (17)	41 (5)	46 (6)	
HBV markers	12 (41)	144 (19)	156 (20)	
HIV antibody positive†	12 (41; 25–60)	1 (0.1; 0.0–0.9)	13 (1.6; 0.9–2.7)	

† = between ( ): prevalence and 95% confidence interval.

\*Some percentages are based on lower numbers due to missing values.

Table 3 Selected characteristics of six heterosexual, non-intravenous drug using HIV infected attenders of an STD clinic

	1	2	3	4	5	6
Gender	Male	Male	Male	Male	Male	Female
Country of birth	Pakistan	Netherlands	Turkey	Turkey	Ghana	Netherlands
Residence Amsterdam	Yes	Yes	Yes	Yes	Yes	Yes
Tested previously	No	No	No	No	No	Yes (neg)
History of STD†	No	No	Syphilis	No	Syphilis	No
Number of heterosexual partners*	1	2-4	> 10	> 10	2-4	5-10
Commercial sex partners*	No	No	Yes	Yes	No	Yes
Sexual partner HIV infected†	No	No	No	No	No	No
STD diagnosis at present visit	Chlamydia	None	Gonorrhoea	Syphilis	Syphilis	None
Transfusion recipient†	No	No	No	No	No	No

\* = in the preceding six months.

† = in the last ten years.

Table 4 Number of sexual partners and STD diagnoses in 90 seropositive STD clinic attenders, by gender and sexual orientation

	Men		Women	Total
	Exclusive homosexual n = 62	Hetero/bisexual n = 15†	n = 13†	n = 90
Number of sexual partners in last six months: 1	10 (16%)	4* (26%)	4 (31%)	18 (20%)
2-4	26 (42%)	7* (47%)	2 (15%)	35 (39%)
5-10	6 (10%)	1* (6%)	2 (15%)	9 (10%)
> 10	19 (31%)	3* (20%)	5 (38%)	27 (30%)
Number diagnosed with STD: syphilis	3	2	1	6
gonorrhoea	15	4	2	21
primary herpes	2	—	2	4
chlamydia infection	2	1	2	5
genital warts	1	—	—	1
trichomoniasis	—	—	2	2
Number previously tested	30	5	13	48
—of whom known HIV positive	25 (83%)	4 (80%)	9 (69%)	38 (79%)

\* = for hetero/bisexual men only heterosexual partners are shown.

† = including IVDU.

and four women apparently had seroconverted since their last test. All six male seroconverters were homosexual or bisexual men; three of four female seroconverters were IVDU while one woman apparently contracted an HIV infection through heterosexual contact.

#### STD Prevalence, number of sexual partners and the risk of further sexual transmission of HIV among seropositive participants

To assess the potential risk of further sexual transmission of HIV, we estimated the total number of homosexual and heterosexual partners reported by HIV seropositive participants and determined the number of STDs diagnosed at the present clinic-visit in this group (table 4). The minimum and maximum number of reported sexual partners was estimated by adding up the products of the number of respondents within each category and the minimum and maximum of this category respectively.

Among 62 HIV infected men who were exclusively homosexual, 51 (84%) reported more than one sexual partner in the six months preceding the study; these 62 HIV infected men together had sexual contact with between 280 and 350 partners in the last 6 months. In 21 of the 62 men one or more STD was diagnosed: three cases of syphilis, 15 cases of gonorrhoea, two cases of primary genital herpes, two cases of genital chlamydia and one case with a first episode of genital warts.

Recent heterosexual partners were reported by 28 of 90 HIV infected participants: 15

men and 13 women. These 28 HIV seropositive participants include bisexual men and IVDU: together they reported between 120 and 150 heterosexual partners in the six months preceding the study, while three men and eight women in this group reported commercial sexual partners in this period. The inconsistent use of condoms is illustrated by the number of STD diagnosed in 13 of these 28 participants: three cases of syphilis—among them two cases of early syphilis—, six cases of gonorrhoea, two cases of primary genital herpes, three cases of genital chlamydia and two cases of trichomoniasis. Of these 13 STD patients, none of seven men had been tested previously; four of the six women already knew they were seropositive. Among exclusively homosexual men as well as among heterosexually active participants the prevalence of STD and the number of reported sexual partners did not differ significantly between seropositive participants who already knew they were HIV infected from previous HIV tests and those who had tested negative or were never tested previously.

Among the six participants who are assumed to be HIV infected through heterosexual contact, two of the five men reported commercial sexual contacts. The only woman infected through heterosexual contact has been active as a prostitute and reported 5-10 clients in the six months preceding the study. In four of these six heterosexually infected participants two cases of syphilis—including one case of early syphilis—, one case of gonorrhoea and one case of chlamydia were diagnosed (table 3).

## Discussion

The extent to which HIV is transmitted among heterosexually active individuals is crucial for the future course of the epidemic. The HIV prevalence was 4.2% among clients attending the STD clinic in Amsterdam. Homosexual and bisexual men and IVDU accounted for 93% of HIV infected persons in this study. The six HIV infected participants who denied homosexual contacts and intravenous use of drugs are assumed to be infected through heterosexual contact, resulting in a 0.35% prevalence among non-IVDU heterosexuals.

However, to assess the potential risk of further heterosexual transmission of HIV, the HIV prevalence among participants who reported heterosexual contacts is of importance. The HIV prevalence among heterosexually active participants was 1.5%. This group includes intravenous drug users and bisexual men and 28 of them were HIV seropositive. Together these 28 participants reported between 120 and 150 heterosexual partners in the six months preceding the study. The potential risk, however, of sexual transmission of HIV is not only dependent of the number of sexual partners, but also of the techniques practised, the use of condoms and of the serostatus of the partners. The results of this study are limited by the fact that information on these issues was not collected. It seems apparent however, that those attending the STD clinic do so because they have engaged in sexual contacts which has placed them at risk of contracting an STD. Consequently, sexual partners of seropositive clinic attenders may have been at risk of exposure to HIV. This risky sexual behaviour is reflected by the 16 cases of STDs in 13 of the 28 HIV infected heterosexually active participants and 23 cases of STDs in 21 of the 62 exclusively homosexual seropositive men. Among heterosexual men, 30% (4/13) of HIV positive participants with a STD diagnosed at the present clinic visit already knew they were HIV infected. Studies have shown that the presence of STD, in particular ulcerative STD, may greatly enhance sexual transmission of HIV.<sup>7-13</sup>

In order to try to reduce the risk of sexual transmission of HIV, a change towards safer sexual behaviour is necessary. Some studies have shown that this change may be stimulated by knowledge of one's serostatus.<sup>14-17</sup> Therefore, services offered by the STD clinic should include voluntary counselling and confidential HIV testing. Recent studies showed partner notification of HIV positive STD patients to be effective for tracing sexual partners who themselves were HIV infected or exposed to HIV without knowing so.<sup>18-20</sup> Thus, in addition to voluntary counselling and testing, notification, in particular of heterosexual partners of seropositive clinic visitors may contribute to a risk reduction.

Members of certain minority groups who visit the clinic, specifically Turkish men and those originating from Surinam and the Dutch Antilles, have been shown to be at

increased risk for STD.<sup>5 23</sup> Because cultural values and language difficulties can be obstacles for participation in studies like this one, visitors belonging to these minority groups were approached by native tongue speaking ethnic interviewers. This resulted in complete participation of Turkish men and greatly improved participation rates for visitors from Surinam and the Dutch Antilles in the second 5-week study period.

Since participation is voluntary in this study, the results can be biased through selection of participants.<sup>21</sup> Unlinked anonymous screening of blood samples taken for other purposes would be effective to avoid participation bias, but is less informative on HIV related risk behaviours than voluntary surveys.<sup>22</sup> The design of our study allowed for linking of anonymous HIV test results to specific information on risk behaviour. Of patients attending the clinic, 3% rejected any participation in this study and of those who participated less than 7% refused to have their blood tested. Differences, between participants who were tested and who refused testing, concerned prior STD episodes, involvement in commercial sex and a history of intravenous use of drugs. Though these differences suggest that the results of this study may be slightly biased, the direction of this bias is not clear.

From the results of this study several conclusions can be drawn. First, the HIV prevalence among heterosexual clinic visitors who never injected drugs is low. However, the HIV prevalence among visitors who are heterosexually active, including IVDU and bisexual men, is approximately 1.5%. Both the reported total number of heterosexual partners and the number of STD diagnosed in these HIV infected heterosexually active clinic visitors suggest that this group may play an important role in further transmission of HIV through heterosexual contact. To help reduce the further spread of HIV through sexual contact, services offered by the clinic should not only include counselling and confidential HIV testing but also notification of partners (particularly heterosexual partners) of HIV infected clinic visitors. Finally, it is concluded that "linked" anonymous HIV prevalence studies like this one can be performed with a high participation rate for collecting information on risk behaviour for HIV infection. Over time serial performance of this type of prevalence measurement provides information that can help estimating the HIV incidence in the various transmission categories.

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