ORIGINAL ARTICLE

Incidence of repeat testing and diagnoses of *Chlamydia trachomatis* and *Neisseria gonorrhoea* in swingers, homosexual and heterosexual men and women at two large Dutch STI clinics, 2006–2013

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ABSTRACT

Objective Swingers, that is, heterosexuals who as a couple have sex with others, including group sex and bisexual behaviour, are an older-aged risk group for STIs. Here, we report on their repeat testing (reattendance) and STI yield compared with other heterosexuals and men who have sex with men (MSM, homosexual men) at two Dutch STI clinics.

Methods Swingers are routinely (since 2006, South Limburg, registration-completeness: 99%) or partially (since 2010, Amsterdam, registration-completeness: 20%) included in the clinic patient registries. Data (retrospective cohort) are analysed to assess incidence (per 100 person-years (PY)) of reattendance and STI (*Chlamydia trachomatis* (CT) and/or *Neisseria gonorrhoeae* (NG)) and associated factors calculating HRs.

Results In South Limburg 7714 and in Amsterdam 2070 swinger consultations were identified. Since 2010, swingers' incidence of reattendance was 48–57/100 PY. Incidence was lower in MSM (30–39/100 PY, HR 0.56; 95% CI 0.51 to 0.61, South Limburg; HR 0.88; 95% CI 0.80 to 0.96, Amsterdam), heterosexual men (8–14/100 PY, HR 0.16; 95% CI 0.15 to 0.17, South Limburg; HR 0.33; 95% CI 0.30 to 0.36, Amsterdam) and women (13–20/100 PY, HR 0.56; 95% CI 0.51 to 0.61, South Limburg; HR 0.46; 95% CI 0.42 to 0.51, Amsterdam). Swingers' STI incidence at reattendance was 11–12/100 PY. Incidence was similar in heterosexual men (14–15/100 PY; HR 1.19; 95% CI 0.90 to 1.57, South Limburg; HR 1.20; 95% CI 0.91 to 1.59, Amsterdam) and women (12–14/100 PY; HR 1.14; 95% CI 0.88 to 1.49, South Limburg; HR 0.98; 95% CI 0.74 to 1.29, Amsterdam) and higher in MSM (18–22/100 PY; HR 1.59; 95% CI 1.19 to 2.12, South Limburg; HR 1.80; 95% CI 1.36 to 2.37, Amsterdam). Risk factors for STI incidence were partner-notified (contact-tracing), symptoms and previous STI. Swingers' positivity at any clinic attendance was 3–4% for NG (ie, higher than other heterosexuals) and 6–8% for CT (ie, lower than heterosexuals overall but higher than older heterosexuals).

Conclusions Systematic identification reveals that swingers are part of the normal STI clinic populations. They frequently repeat test yet are likely under-recognised in clinics which not routinely ask about swinging. Given swingers' notable STI rates, usage of services is warranted, although use may be restricted, that is, to those with an STI risk factor (as did Dutch clinics). As swingers have dense sexual networks, enhancing contact-tracing may have high impact.

INTRODUCTION

Swingers, that is, heterosexual men and women who as a couple have sex with others, were by Dutch STI clinic data from 2007 to 2008 identified as older-aged heterosexuals with high rates of STIs, especially *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG).[1 2] This was followed by anecdotal reports from NG outbreaks in swingers observed by STI clinics in other countries. In 2012, a Dutch cluster of swingers with HIV was noted.[3] Since then only a few studies have addressed swingers in relation to STI,[4–8] reporting that drug use[5] and unprotected sex with multiple partners in a short period (concurrent partners) is common.[6] Further, swingers present with genital, anorectal and oropharyngeal STI, indicating that substantial part of CT and NG (23–76%) is extragenital.[7 8] Moreover, swingers identify themselves as heterosexual, not homosexual, although bisexual behaviour in men and women is common.[4–7]

Although the exact number of swingers is unknown, one of the largest dating websites for swingers (SDC.com), with 2 million registered members from >50 different countries, estimates that there are >15 million swingers worldwide. There is a lack of data on their sexual healthcare-seeking behaviour; one study showed that about half of the swingers who attended sex clubs in Canada did not regularly test for STI.[4] It is likely that when swingers attend care they are not identified as swingers as STI services do not usually have a protocol to identify them. This precludes the provision of tailored services. When care services are specifically tailored to a particular clinic population, care will be more effective in benefitting the individual and public health. In swingers, tailoring entails extragenital testing and targeted counselling and contact-tracing, to address their typical risk behaviour with multiple concurrent sex partners. Internationally, STI guidelines to define and to manage swingers are lacking.[9 10] Thereby, they comprise a still missed and potentially largely hidden target group for appropriate STI care.

In the Netherlands, STI clinics started to register swingers in their electronic patient registry a

decade ago. Here, we use such registry data (retrospective cohort) from 2006 to 2013 from two STI clinics to evaluate completeness of swinger registration and swingers' (repeat) testing behaviour and STI diagnosis compared with other clinic target groups, like men who have sex with men (MSM) and non-swinging heterosexuals.

METHODS

The outpatient Public Health Service STI clinics in Amsterdam and South Limburg (36 000 and 6500 consultations/year totalling a third of all Dutch STI clinic consultations) offer free and anonymous STI testing to people with and without symptoms including those notified. From January 2006 to December 2013, data from all consultations from clients aged 16 years or older who were tested for CT and/or NG were included.

Study procedures: testing

Clients were routinely tested for urogenital CT and NG, HIV and syphilis. In South Limburg, clients were tested for anorectal CT and NG on indication, that is, when reporting anal sex or symptoms.[9] [10] Since 2010, MSM and swingers were routinely tested for anorectal and oropharyngeal CT and NG. In Amsterdam, MSM were routinely tested for anorectal NG, oropharyngeal CT (since 2011) and oropharyngeal NG, and for anorectal CT on indication. Women were tested for anorectal NG and CT on indication. In South Limburg and Amsterdam, women who were notified, reported symptoms or were paid for sex were tested for oropharyngeal CT (since 2011, Amsterdam) and NG on indication.

Specimens tested for CT and NG consisted of urine (men) and self-collected or nurse-collected vaginal, urethral, anorectal and oropharyngeal swabs. Tests were performed according to the manufacturer's protocol. In South Limburg, specimens were processed at two regional laboratories using three different nucleic acid amplification assays (SDA, Becton Dickinson ProbeTec ET system, Maryland, USA, up till 2012; Cobas Amplicor, Roche, California, USA, 2006–2011; Cobas 4800, Roche, California, USA, since 2012). In Amsterdam, since 2008 the Aptima combo CT/NG assay for the detection of rRNA (Hologic Gen-Probe, San Diego, USA) was used and before 2008 also Cobas Amplicor. In Amsterdam, oropharyngeal (until 2008), urogenital and anorectal NG was tested by culture in case of symptoms, notified, paid for sex or MSM. Each consultation included a standardised nurse-taken medical and sexual history.

Study procedures: swinger registration

South Limburg

Swingers were included in a paper registry (since 2006) and electronic patient registry (since July 2007). A client is considered a swinger when he or she identifies as a heterosexual who as a couple has sex with other heterosexuals, including group sex, or has sex with such couples. For such identification, several questions are used by a clinic nurse (face-to-face/phone) when a client makes an appointment or attends care. Examples are 'are you a swinger?', 'do you practice partner-swapping?', 'do you have sex with other couples together with your partner?' and 'do you visit sex clubs for couples?'. This is a routine procedure as all people are asked to answer such questions; completeness of swinger-registration was 99% (figure 1).

Amsterdam

Since 2010, the clinic implemented a partial and voluntary swinger registration. The question 'are you a swinger (visit couples clubs, sex parties and/or practice partner swapping)?' is filled in online by a client who wants to make an appointment. Yet, it is only asked to clients reporting three or more sex partners of the opposite sex in the past six months and clients are allowed to skip the question. This resulted in a lower completeness of 20%.

Risk group definitions

We defined a client as swinger when this person was registered as swinger (yes) at one or more of his/her consultations. That means that, retrospectively, all consultations of this person were identified as swinger consultations, revealing also other (possibly missed) swinger consultations than only the registered ones. A man was defined as MSM at all his consultations when he was no swinger (according to the definition above) and reported sex with other men in the past six months at least at one consultation. All other clients (who were no swinger and no MSM according to the definitions above) were defined as heterosexuals (including women who have sex with women). The resulting variable was compiled hierarchically, with non-overlapping categories, from swinger (male and female), MSM, to male heterosexual and female.

Statistical analyses

For the current analyses, STI is defined as a CT and/or NG diagnosis. HIV and syphilis are not included due to low numbers of diagnoses. Positivity of STI did not differ between a first consultation and first through fifth repeated tests, and did not differ between clinics. We calculated incidence rates of the first repeat tests (reattendance) and of STI at the first repeat test per 100 person-years (PY). Exposure time was defined for reattendance as the time between the first consultation until first repeat test or end of study period, and for STI as the time until first repeat test (see online supplementary appendix 1). Then, outcomes were compared between target groups using Kaplan-Meier survival plots and Cox proportional-hazards regression calculating HRs and 95% CIs. Restricting to swingers, univariate and multivariate (using stepwise backward models entering all univariately associated factors) Cox proportional-hazards regression analyses were used to assess associations with age, nationality, sex, bisexual behaviour, being paid for sex (women), number of sex partners (South Limburg), symptoms, notified and STI at a previous visit. We considered a variable as statistically significant when its overall p value was <0.05. Analyses were performed using SPSS V.20.0 (IBM, Somers, New York, USA).

RESULTS

New swingers entering the STI clinics

In South Limburg (2006–2013), 1918 individual swingers and in Amsterdam (2010–2013) 897 individual swingers entered the clinic (figure 1), comprising 6% (South Limburg) and 1% (Amsterdam) of all clients. Swingers were older than most other target groups (Table 1). Bisexual behaviour was reported by 77% (734/951, South Limburg) and 62% (220/354, Amsterdam) female swingers, and by 42% (405/967, South Limburg) and 23% (124/543, Amsterdam) male swingers. In South Limburg, the median number of sex partners at the first consultation was 5 (IQR 3–10). Of female swingers, 6% (South Limburg) and 4% (Amsterdam) reported being paid for sex. Most (73% in South Limburg and 75% in Amsterdam) swingers were of Dutch nationality. These characteristics were similar before and after 2010 in South Limburg, except for age and number of sex partners (p<0.05). New swingers were getting older (table 1) and were having more sex partners, that is, 70%
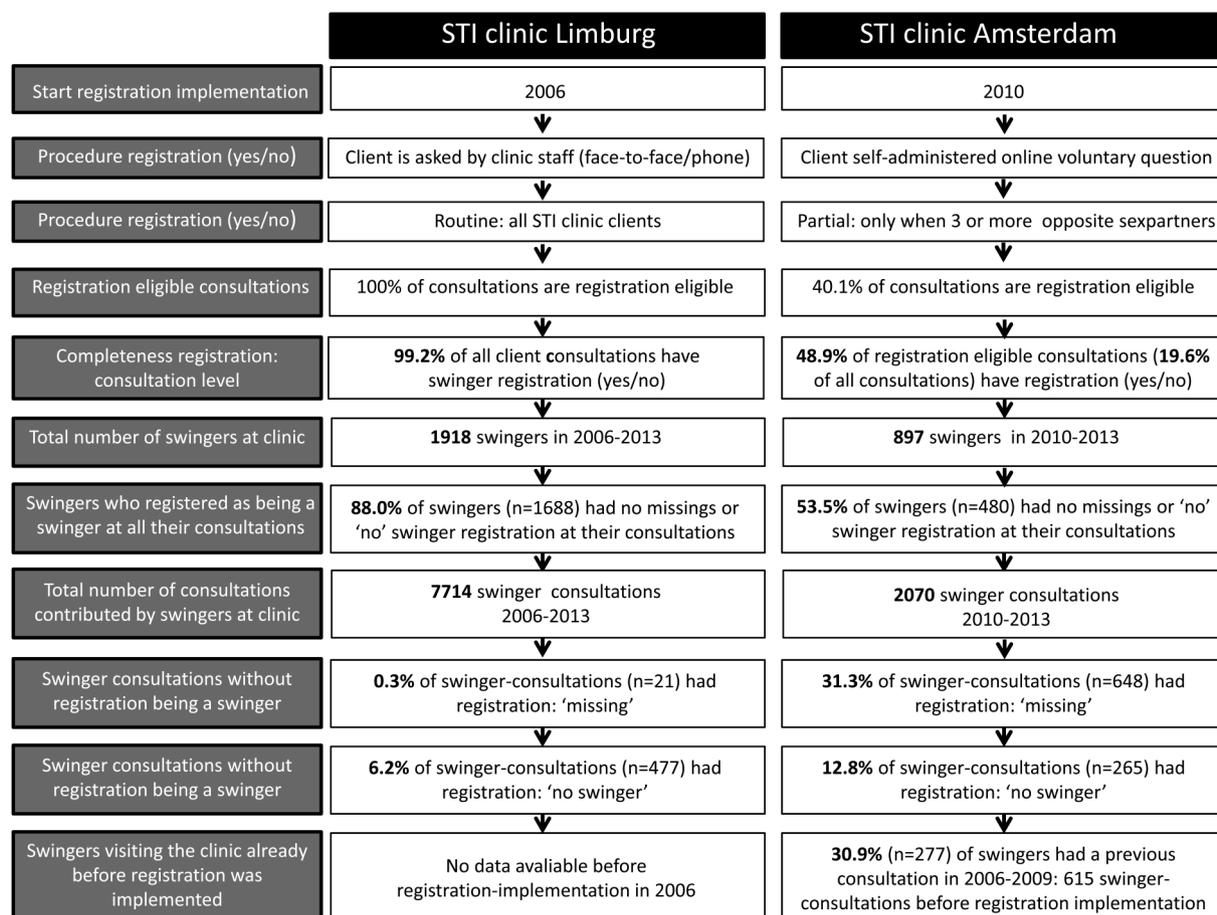
Figure 1 Flow chart of swinger registration procedure, completeness of registration and swingers identified at two Dutch STI clinics.

and 83% reported more than three partners in 2006–2000 and 2010–2013, respectively.

Consultations by swingers: registered or missed?

In South Limburg (2006–2013), 7714 swinger-consultations (15% of total) and in Amsterdam (2010–2013) 2070 swinger consultations (2% of total) were identified. In Amsterdam, where partial and voluntary registration started in 2010, 31% of swingers already attended the clinic before 2010 (thus without being registered as swinger) totalling 615 consultations in 2006–2009 (figure 2). Further, after 2010, some swingers did not register as swinger at all their consultations (figure 1). In 13% and 31% of the swinger consultations, swingers answered the swinger question as 'no swinger' or did not fill in the question, respectively (figures 1 and 2). In South Limburg, 6% of swinger consultations registered as 'no swinger' and 0.3% had missing swinger registration, while at another consultation this person did register as swinger.

Repeat testing behaviour, incidence and associated factors

Majority of swinger consultations were repeat tests performed within a short time (table 1). Repeat test incidence was 48–57/100 PY in swingers and lower in MSM (30–39/100 PY, HR 0.56, 95% CI 0.51 to 0.61, South Limburg; HR 0.88, 95% CI 0.80 to 0.96, Amsterdam), heterosexual men (8–14/100 PY, HR 0.16, 95% CI 0.15 to 0.17, South Limburg; HR 0.33, 95% CI 0.30 to 0.36, Amsterdam) and women (13–20/100 PY, HR 0.56, 95% CI 0.51 to 0.61, South Limburg; HR 0.46, 95% CI

0.42 to 0.51, Amsterdam) in 2010–2013 (table 1, see online supplementary appendices 1 and 2).

In both clinics, bisexual behaviour was associated with a higher incidence of repeat testing (table 2). Further associated factors were older age, non-Dutch nationality, paid for sex (women), a higher number of sex partners or absence of symptoms in South Limburg and previous STI in Amsterdam. In multivariate analyses, independently associated factors were bisexual behaviour, and additionally in South Limburg, older age and absence of symptoms, or previous STI in Amsterdam (table 2, footnote).

STI positivity, incidence and associated factors

In swingers, STI positivity at clinic attendance (all consultations) was between 8% and 11% (table 1). In 2010–2013 swingers' STI positivity was lower compared with MSM and (overall younger) heterosexuals (see online supplementary appendix 5). Yet, different trends were observed when stratifying to type of STI and age. Swingers (NG 3–4%; CT 6–8%) had higher NG positivity compared with non-swinging heterosexuals (NG 0.5–2%) and higher CT positivity compared with older heterosexuals (CT 2–5%, see online supplementary appendix 3). Some cases of HIV (two women and seven men in South Limburg and one man in Amsterdam) and syphilis (four men in South Limburg and five men in Amsterdam) were noted.

Incidence of STI at the first repeat test was 11–12/100 PY in swingers. Compared with swingers, incidence was higher in MSM (18–22/100 PY, HR 1.59, 95% CI 1.19 to 2.12, South Limburg; HR 1.80, 95% CI 1.36 to 2.37, Amsterdam) and

Table 1 Number of swinger and non-swinger clients, their (repeated) consultations, incidence of repeat testing and incidence of STI diagnoses (*Chlamydia trachomatis* and/or *Neisseria gonorrhoea*), at two Dutch STI clinics in South Limburg, 2006–2010 and 2010–2013, and Amsterdam, 2010–2013

	Age (years) Median (IQR)	Individual clients (n)* % of total (N)	Clients with repeat consultations % within-risk group (N)	Total number of consultations % of total consultations (N)	Consultations that are repeat consultations % within-risk group (N)	Consultations per client (N) Median (IQR)	Average time between clients' consultation† Median days (IQR)	Incidence of retesting (first retest) /100 PY, 95% CI within-risk group	Incidence of STI at first retest) /100 PY, 95% CI within-risk group	STI positivity in all consultations % within-risk group (N)
(2006–2009) South Limburg										
Swinger	41 (35–46)	5.9 (956)	62.4 (597)	12.0 (2669)	64.2 (1713)	2 (1–4)	198 (144–262)	69.1 (63.7 to 74.9)	12.4 (9.3 to 16.3)	9.9 (263)
MSM	31 (22–44)	8.0 (1298)	33.5 (435)	10.0 (2215)	41.4 (917)	1 (1–2)	260 (178–424)	23.9 (21.7 to 26.2)	14.4 (10.9 to 18.6)	11.7 (259)
Men	25 (22–34)	37.8 (6144)	14.1 (864)	32.8 (7287)	15.7 (1143)	1 (1–1)	323 (182–543)	8.3 (7.7 to 8.8)	8.2 (6.5 to 10.3)	9.7 (706)
Women	23 (20–28)	48.3 (7853)	19.4 (1521)	45.2 (10 021)	21.6 (2168)	1 (1–1)	292 (170–)483]	11.8 (11.2 to 12.4)	10.6 (9.0 to 12.4)	10.2 (1027)
(2010–2013) South Limburg										
Swinger	43 (37–48)	8.1 (1577)	62.6 (987)	16.7 (5045)	68.7 (3468)	2 (1–4)	203 (161–300)	57.0 (53.5 to 60.6)	10.8 (8.5 to 13.6)	8.3 (418)
MSM	30 (22–45)	10.2 (1985)	44.7 (887)	14.3 (4321)	54.1 (2336)	1 (1–3)	223 (168–345)	30.3 (28.3 to 32.3)	18.0 (15.0 to 21.3)	16.2 (702)
Men	24 (21–30)	34.9 (6824)	15.6 (1067))	27.7 (8340)	18.2 (1516)	1 (1–1)	314 (172–499)	8.3 (7.8 to 8.8)	14.3 (12.1 to 16.7)	13.7 (1140)
Women	22 (20–25)	46.8 (9146)	22.9 (2092)	41.2 (12 426)	26.4 (3280)	1 (1–1)	288 (172–477)	12.8 (12.2 to 13.3)	13.6 (12.0 to 15.3)	12.8 (1586)
(2010–2013) Amsterdam										
Swinger	36 (28–44)	1.1 (897)	52.4 (470)	1.5 (2070)	56.7 (1173)	2 (1–3)	188 (108–331)	48.3 (44.1 to 52.9)	12.1 (9.0 to 15.9)	10.7 (221)
MSM	36 (27–45)	16.2 (12 691)	51.2 (6499)	26.5 (35 983)	64.7 (23 292)	2 (1–3)	168 (98–252)	39.0 (38.0 to 39.9)	21.6 (20.3 to 22.8)	18.0 (6494)
Men	26 (23–33)	34.8 (27 332)	23.8 (6513)	28.3 (38 351)	28.7 (11 019)	1 (1–1)	247 (132–433)	14.0 (13.7 to 14.4)	14.8 (13.9 to 15.7)	13.7 (5236)
Women	23 (21–27)	47.8 (37 531)	30.4 (11 405)	43.7 (59 241)	36.6 (21 710)	1 (1–2)	211 (116–373)	20.3 (19.9 to 20.6)	11.9 (11.3 to 12.6)	11.4 (6752)

*Clients may have visited the clinic before this period.
†In clients who have repeated consultations.
MSM, men who have sex with men; PY, person-years.
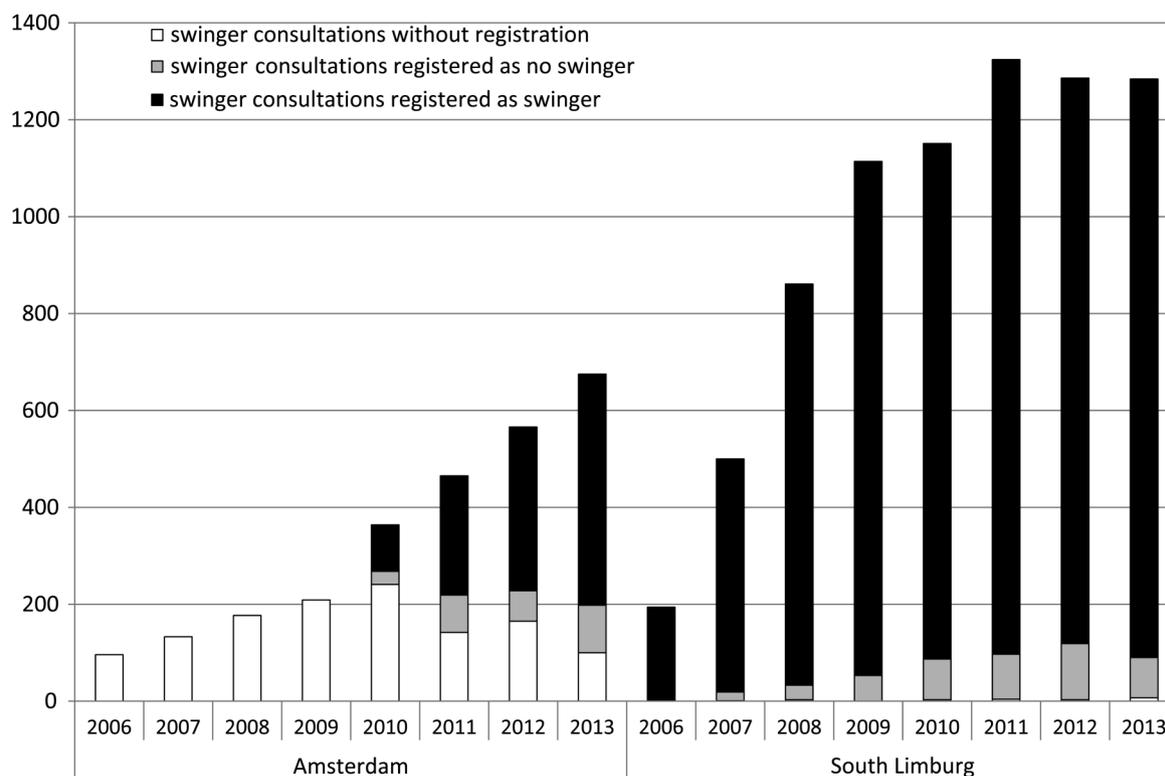
Figure 2 Number of swinger consultations with at that specific consultation a registration of 'swinger' (black), a registration 'no swinger' (grey) or a missing (white) registration at two Dutch STI clinics, 2006–2013.

similar in non-swinging heterosexual men (14–15/100 PY, HR 1.19, 95% CI 0.90 to 1.57, South Limburg; HR 1.20, 95% CI 0.91 to 1.59, Amsterdam) and women (12–14/100 PY, HR 1.14, 95% CI 0.88 to 1.49, South Limburg; HR 0.98, 95% CI 0.74 to 1.29, Amsterdam) since 2010 (table 1, see online supplementary appendices 2 and 4).

When stratifying by type of STI and age, some differences were noted. Compared with swingers, incidence was lower for NG in heterosexuals in South Limburg and lower for CT in older heterosexuals in Amsterdam (see online supplementary appendix 4).

Univariately associated factors for STI incidence at first repeat test in swingers were being partner-notified, previous STI (South Limburg) and symptoms (Amsterdam) (table 2). In multivariate analyses, previous STI (South Limburg), partner-notified and symptoms (Amsterdam) were independently associated.

STI missed in restricted testing scenarios
The proportion of swinger consultations needed to screen when restricting to STI risk factors (notified, symptoms or previous STI) was 26–40% (see online supplementary appendix 5). Yet, between 35% and 50% of CT and NG infections would remain undetected. When extending screening to include the first consultation of swingers or male swingers with bisexual behaviour, between 40% and 71% of consultations would need to be screened, but between 17% and 41% of STI would still be missed (see online supplementary appendix 5).

DISCUSSION
Swingers comprise an important key population of older-aged heterosexuals who commonly report bisexual behaviour with multiple concurrent partners, but who are likely under-recognised in many STI clinics which do not routinely ask about

swinging. Swingers are part of the normal STI clinic population as revealed by their systematic identification at two large Dutch STI clinics.

At clinic attendance, swingers have higher NG and lower CT rates than (overall younger) non-swinging heterosexuals, and higher CT rates than older heterosexuals. Some have HIV and/or syphilis. Swingers further frequently and repeatedly test within a short time interval, resulting in a high demand on the healthcare system. We recommend that swingers are routinely included in STI clinic patient registries in order to be able to provide care that is appropriate (considering extragenital testing and enhanced contact tracing), yet that is also affordable.

This study is not without limitations. It is unknown whether swingers that did not register as a swinger indeed recently practised swinging. Although it is unknown how this affected our results, impact is probably small as it seems likely that most did swing recently as research showed that many swingers swing for several years[6] and consider it a 'lifestyle',[11] not an occasional behaviour. Indeed, the majority of swingers in South Limburg registered as swinger at all their consultations. Also, data are incomplete regarding specific sexual practices and drug use precluding a detailed risk factor analyses that would have provided guidance for more tailored counselling. Strengths of this study are its unique large longitudinal data set of swingers and comparing swingers with other risk groups.

Systematic registering of target populations, including swingers, is a key tool for STI clinics and other care providers to gain insight in their patient populations and their testing behaviour. This helps to realise efficient allocation of resources. Previously, swingers were considered to be under-represented in STI care.[1 2] Here, we show that, although the fraction of swingers not attending care is still unknown and may be large, swingers have been frequently attending our STI clinics for many

Table 2 Factors univariately and multivariately (†,‡) associated with incidence of first repeat test and with incidence of an STI diagnosis (*Chlamydia trachomatis* and/or *Neisseria gonorrhoea*) at repeat testing in swingers at two Dutch STI clinics (South Limburg and Amsterdam, 2010–2013)

Swinger characteristics§	Incidence of first repeat test		Incidence of STI	
	South Limburg HR (95% CI)	Amsterdam HR (95% CI)	South Limburg HR (95% CI)	Amsterdam HR (95% CI)
Age <45	1	1	1	1
Age >45	**1.21 (1.06 to 1.37)****†	0.98 (0.79 to 1.22)	1.04 (0.65 to 1.66)	1.10 (0.59 to 2.02)
Non-Dutch	1	1	1	1
Dutch	**0.85 (0.74 to 0.99)***	1.16 (0.93 to 1.45)	1.04 (0.59 to 1.85)	0.78 (0.42 to 1.43)
Men (hetero)	**1**	1	1	1
Women (hetero)	**0.67 (0.51 to 0.90)****†	0.89 (0.67 to 1.19)	2.46 (0.95 to 6.34)	1.01 (0.42 to 2.42)
Bisexual men	**1.92 (1.61 to 2.29)*****†	**2.69 (1.81 to 4.02)*****†	1.99 (0.95 to 4.14)	2.15 (0.83 to 5.58)
Bisexual women	**1.60 (1.37 to 1.88)*****†	**1.51 (1.22 to 1.86)*****†	2.12 (1.08 to 4.18)	0.85 (0.42 to 1.69)
Not paid for sex¶	**1**	1	1	1
Paid for sex¶	**1.61 (1.06 to 2.45)***	1.20 (0.75 to 1.91)	1.50 (0.78 to 12.53)	1.56 (0.28 to 8.83)
<3 sex partners	1	1	1	1
≥3 sex partners	**1.34 (1.13 to 1.59)****	NA	1.05 (0.56 to 1.94)	NA
No symptoms	**1**	1	1	**1**
Symptoms	**0.74 (0.61 to 0.91)****†	1.04 (0.86 to 1.27)	1.60 (0.87 to 2.99)	**3.69 (2.12 to 6.42)*****‡
Not partner-notified	1	1	1	**1**
Partner-notified (contact tracing)	0.93 (0.77 to 1.13)	1.07 (0.81 to 1.41)	**3.24 (1.90 to 5.53)*****	**3.33 (1.86 to 5.98)*****‡
No STI at lag consultation	1	1	1	1
STI at lag consultation	1.23 (0.99 to 1.52)	**2.05 (1.59 to 2.66)*****†	**2.93 (1.36 to 6.31)****‡	1.10 (0.47 to 2.59)

*p<0.05; **p<0.01, ***p<0.001 (all factors with p<0.05 are in bold).

†Independently associated with repeat testing in multivariate analyses. Adjusted HRs in South Limburg were 1.26 (1.11–1.43) for age, 0.69 (0.51–0.92) for women hetero, 1.91 (1.60–2.28) for bisexual men, 1.68 (1.43–1.98) for bisexual women and 0.77 (0.63–0.94) for symptoms. Adjusted HRs in Amsterdam were 2.34 (1.56–3.50) for bisexual men, 1.52 (1.23–1.88) for bisexual women and 1.97 (1.52–2.56) for previous STI.

‡Independently associated with STI in multivariate analyses. Adjusted HRs in Amsterdam were 2.80 (1.55–5.07) for partner-notified and 3.29 (1.88–5.76) for symptoms.

§When evaluating risk factors for repeat testing, characteristics are measured at the screening consultation; when evaluating risk factors for STI diagnosis, characteristics are measured at the current consultation (except previous STI).

¶Only in female swingers.

NA, not applicable.

years. It is likely that nationally and perhaps internationally swingers attend care while they are not recognised as being a swinger. In the absence of a routine inclusion of swingers in STI clinic patient registries, many swinger consultations may remain hidden in plain sight. Providers may not systematically identify swingers as they may focus on other target groups. This may also be the case for general practitioners who contribute a large share of all STI tests performed.[12] In practice, we experienced that swingers may not initially identify themselves as a swinger when in care. Using multiple nurse-taken questions (face-to-face/phone) instead of a single self-administered question has proven important for optimal identification.

Swingers show higher NG rates than non-swinging heterosexuals at clinic attendance and in South Limburg at reattendance. They also show higher CT rates than older heterosexuals at attendance and in Amsterdam at reattendance. Further, swingers present with anorectal and oropharyngeal STI.[7–10] They report various risky sexual behaviours with multiple concurrent sex partners, drug use and sex with same-sex partners, while they self-identify as heterosexual.[4–6] These specific aspects do require tailored care. Notable was that STI positivity in swingers attending the South Limburg clinic was higher a decade ago.[1] Likely, here, when starting to focus on swingers, it first attracted swingers who may not have been tested before and were more willing to identify themselves as swingers to the care providers. In the years that followed, swingers returned for frequent retesting.

The application of swinger registration protocols in our STI clinics has provided much insight into the demand that swingers

place on our care system and how we can optimise care to them in an appropriate and efficient manner. Of all swinger consultations the large majority are repeat consultations. Indeed, swingers repeat tests more frequently than other clinic target groups. Other large surveillance studies on STI clinic attendance found increasing numbers of (repeat) testing in people reporting >10 recent sex partners[13 14] or in older women, even though STI rates remained stable.[15] Whether these older people were swingers or not was unknown, highlighting again the importance of swinger registration in practice.

While frequent testing is a good thing from the perspective of the individual patient and public health, it should also be evaluated from a costs perspective. For example, STI incidence at repeat testing is high in frequently repeat-tested MSM, as also found by others.[16 17] Yet incidence is lower in frequently repeat-tested swingers. For most efficient care, STI clinics target their strategies at the people with the highest STI risk and organise provider referral for others. To do so, since 2015, Dutch clinics restrict to testing on STI risk factors. Best practice may be to test all new swingers to reach the key population of swingers connecting them to care. Further, in case of an STI diagnosis, repeat testing may be actively offered after several months as such strategy may yield substantial STI.[9 10] Some clinics have enhanced contact tracing. With all these measures care is aiming to reach people with the highest STI risk. Obviously, a restricted testing capacity also would leave care opportunities missed and STI undetected. Particularly for undetected NG, the consequences (ie, extragenital infections, potential treatment

resistance, morbidity, further spread) cannot be underestimated.[18] Also, we occasionally saw cases of HIV and syphilis. Partner notification is a highly promising strategy to effectively reach these people. Swingers are very well connected in dense sexual networks, having multiple sex partners within a short time period or even at the same time.[4–6] While such networks facilitate fast spread of STI, they also can be used by swingers themselves and by care providers for effective contact tracing, quickly reaching many swing partners for testing and treatment. Impact of STI control could be high especially when combined with lower time and staff-consuming methods, such as by home collection kits for genital and extragenital CT and NG, online access to testing and sexual health counselling.[19]

In conclusion, swingers are already part of the normal STI clinic population. Yet, they may be under-recognised while being in care when they are not systematically included in the clinic patient registries. Such systematic inclusion is recommended in order to deliver appropriate sexual healthcare to swingers and optimise efficiency of sexual healthcare overall.

Key messages

- ► The important key population of swingers in whom oropharyngeal and anorectal testing may need to be considered is under-recognised in clinics which do not routinely ask about swinging.
- ► Given notable STI rates in this older population, usage of services is warranted, yet with restrictions for affordable care.
- ► There is a population of swingers who consume a large quantity of clinical time and resources due to repeat testing patterns.
- ► Swingers have dense sexual networks for which interventions including customised partner notification (contact tracing) should be developed.

Data sharing statement Data are included in the paper. Coded data can be retrieved from the authors.

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