Rising prevalence of genital *Chlamydia trachomatis* infection in heterosexual patients at the Sydney Sexual Health Centre, 1994 to 2000

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Abstract

This study sought to investigate trends in the prevalence of genital *Chlamydia trachomatis* infection in heterosexual patients attending an urban sexual health service. Data from cases of *C. trachomatis* in all new self-referred heterosexual patients who were tested at the Sydney Sexual Health Centre from 1994 to 2000 were extracted from the Centre's database. Female sex workers and homosexually active men were excluded. Over the study period the prevalence of *C. trachomatis* infection doubled from 1.8 per cent to 3.5 per cent among the women (p=0.004) and tripled from 2.1 per cent to 6.6 per cent among the men (p<0.001) who were tested. Both men and women reported an increasing overall trend in the mean (but not median) number of sexual partners during the previous 3 months (p=0.039 and p=0.001, respectively). There were modest increases in the proportion of men and women that reported unprotected vaginal or anal sex in the previous 3 months, from 76.5 per cent to 81.7 per cent for males (p=0.122) and from 65.1 per cent to 70.2 per cent (p=0.01) for females. The introduction of more sensitive DNA-based testing probably only accounted for 8 per cent of the rise in prevalence among women and 16 per cent among men. These findings complement the rising trends in national notifications of *C. trachomatis* infection. Further investigation and interventions on a national scale to reduce the prevalence of *C. trachomatis* seem timely. Commun Dis Intell 2002;26:51-54.

Keywords: Chlamydia trachomatis; *heterosexual; genital infection*

Introduction

Chlamydia trachomatis infection is the most common bacterial sexually transmissible infection (STI) in the world. Often under-estimated because of its clinical subtlety, it is the leading cause of pelvic infections, preventable infertility and ectopic pregnancy in wealthier nations. In men, *C. trachomatis* is a common cause of frequently asymptomatic urethritis, which may lead to epididymitis.[1]

Notifications of *C. trachomatis* infection in Australia more than doubled between 1995 (36 cases per 100,000 population) and 2000 (91 cases per 100,000 population)[2] making it the most commonly reported bacterial infection. The extent to which this rise in notifications represents a real increase in incidence and prevalence, the introduction of easier and more sensitive DNA-based tests, or improved surveillance, is unknown. New South Wales was the last jurisdiction to begin contributing *C. trachomatis* notifications to the National Notifiable Diseases Surveillance System (end of 1998). The reporting rate for New South Wales (57 cases per 100,000 population) is lower than the overall national rate.

Specialist sexual health services offer the potential to contribute longitudinal sentinel site data to complement population-based surveillance.[3] These services can provide greater patient demographic and risk behaviour detail, have consistent STI screening practices and the testing technologies that they use are known. The Sydney Sexual Health Centre (SSHC) is based at Sydney Hospital in the Central Business District. Because of its proximity to public transport and to where many people work or socialise, the Centre's patients are drawn from throughout metropolitan Sydney. This study sought to investigate trends in *C. trachomatis* infection among heterosexuals attending SSHC between 1994 and 2000.

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Methods

Study population

All patients who attended SSHC for the first time between January 1994 and December 2000 were eligible for the study with the following exclusions:

- patients not tested for *C. trachomatis* at SSHC (consistently in the range 15-20% during the study period), because of prior testing or treatment elsewhere; because they were at negligible risk and presented for reasons such as counselling, contraception or cervical cytology; or because they declined the offer of testing;
- patients referred by other doctors, because of the unpredictable effects of concentrating patients with known infections and of previous screening or treatment for *C. trachomatis*;
- men who reported having sex with other men in the previous 12 months, because this group have sexual networks that differ from the bulk of the community so they are the subject of a separate study;
- women who reported that they were currently engaged in sex work, because they were a mixture of heavily screened local sex workers (diminishing the prevalence) and women who may have arrived from overseas with infections acquired in high prevalence countries (inflating the prevalence).[4]

Thus the study population comprised a mixture of all symptomatic and asymptomatic heterosexuals who had referred themselves to an inner city sexual health service.

Data collection

Patients attending SSHC have their demographics, medical history, sexual behaviour, drug use, tests performed, and diagnoses, routinely recorded on a proforma medical record which is then transferred to a database after quality checking.

Laboratory tests

Male patients between 1994 and November 1996 provided a first-void urine which was tested for *C. trachomatis* by enzyme immunoassay. Thereafter, polymerase chain reaction (PCR; Amplicor, Roche) testing of urine was used. For women, cell culture of an endocervical swab was used to the end of December 1995: thereafter all swabs were tested by in-house PCR at the South Eastern Area Laboratory Service at the Prince of Wales Hospital.

Analysis

The Mantel-Haenszel chi-square test for trend was used to compare proportions of positive tests for *C. trachomatis* year-by-year over the study period, with a SPSS package.

Results

Between 1994 and 2000, 14,020 self-referred, heterosexual, non-sex working, new patients were tested for *C. trachomatis* at SSHC. While there were some year-to-year fluctuations there was no overall trend in the age of female or male patients, nor in the likelihood that they presented with anogenital symptoms (Table). The symptoms were not necessarily due to *C. trachomatis* infection.

The frequency distribution of the number of sexual partners is shown in Figure 1. There was no change in the median (1) number of sexual partners reported by women in the previous 3 months though there was a marginal increase in the mean between 1994 and 2000, from 1.23 to 1.35 (p=0.039). The proportion reporting unprotected vaginal or anal sex increased slightly from 76.5 per cent to 81.7 per cent (p=0.122), while the small proportion that presented as contacts of *C. trachomatis* or non-gonococcal urethritis (NGU) did not vary (p=0.909) (Table).

For men, there was no change in the median (1) number of sexual partners in the previous 3 months but a significant increase in the mean over the study period from 1.65 to 1.79, p=0.001. There were also modest increases in the proportions who reported unsafe sex (from 65.1% to 70.2%, p=0.010), and the proportion who presented because of known contact with *C. trachomatis* (p=0.006) (Table).

During the study period there were 357 diagnoses of *C. trachomatis* in men and 157 diagnoses in women. The percentage yield of positive *C. trachomatis* tests increased among women from 18 of 997 tests (1.8%) in 1994 to 28 of 800 tests (3.5%) in 2000 (p=0.004). Among men the positive yield rose from 36 of 1,685 tests (2.1%) in 1994 to 74 of 1,114 tests (6.6%) in 2000 (p<0.001) (Figure 2).

Making the assumption that the real prevalence of *C. trachomatis* did not rise in the first year that PCR testing was introduced, then the additional yield over culture would have been 8 per cent (from 2.2% in 1995 to 2.4% in 1996 among women) and a 16 per cent additional yield over enzyme immunoassay (from 3.6% in 1996 to 4.3% in 1997 among men).

Table **Self-referred heterosexual patients tested for *Chlamydia trachomatis* at the Sydney Sexual Health Centre, 1994 to 2000, by sex, sexual behaviour and reason for presentation**

	Women						
	1994	1995	1996	1997	1998	1999	2000
Median age in years	26	25	25	26	26	25	25
Median/mean number of sexual partners in the last 3 months*	1/1.23	1/1.21	1/1.29	1/1.30	1/1.30	1/1.28	1/1.35
Range	0-10	0-7	0-7	0-7	0-11	0-7	0-20
Per cent reporting any unprotected vaginal or anal sex in last 3 months	76.5	81.4	78.4	79.0	77.9	79.3	81.7
Per cent presenting as NGU or chlamydia contacts	6.1	5.8	5.4	6.6	5.3	6.3	6.4
Per cent presenting with genital or anal symptoms	NA	NA	43.0	38.0	47.1	44.1	39.6

	Men						
	1994	1995	1996	1997	1998	1999	2000
Median age in years	29	29	29	30	29	30	28
Median/mean number of sexual partners in the last 3 months*	1/1.65	1/1.60	1/1.75	1/1.88	1/1.83	1/1.92	1/1.79
Range	0-36	0-20	0-20	0-40	0-30	0-40	0-41
Per cent reporting any unprotected vaginal or anal sex in last 3 months	74.6	78.6	76.2	74.5	76.0	76.1	80.3
Per cent presenting as chlamydia contacts	1.3	2.1	2.6	1.9	2.7	3.8	2.3
Per cent presenting with genital or anal symptoms	NA	NA	55.1	54.0	56.9	54.9	52.8

* 3 outliers (100, 120 and 150 partners) excluded.

NGU non-gonococcal urethritis

NA = not available

Figure 1. The frequency distribution of the number of sexual partners of self-referred heterosexual patients at the Sydney Sexual Health Centre, 1994 to 2000, by gender

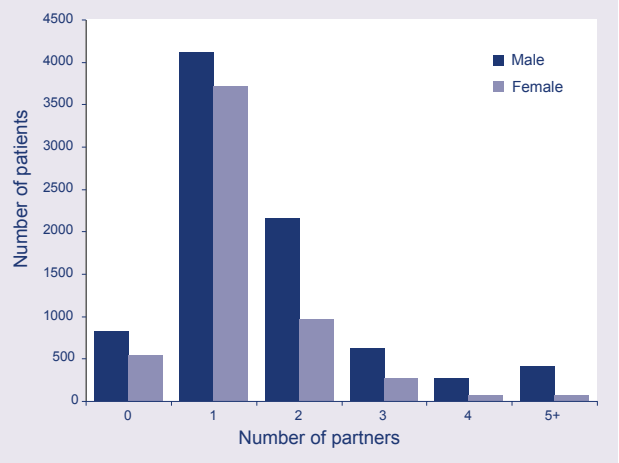
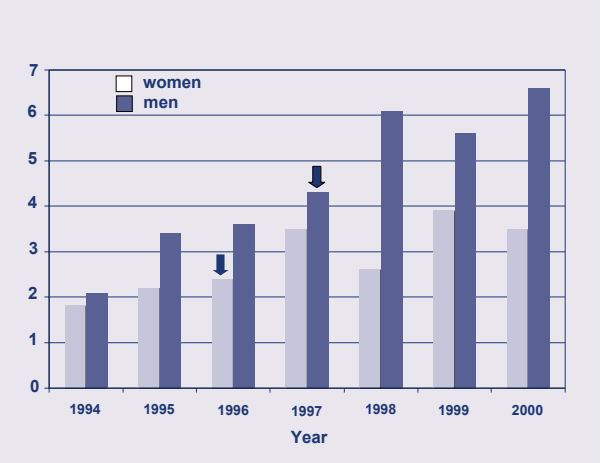


Figure 2. Prevalence of *Chlamydia trachomatis* in self-referred heterosexual patients at the Sydney Sexual Health Centre, 1994 to 2000, by gender



* Arrows signify the first full year of polymerase chain reaction testing for each gender

Discussion

In this carefully selected study population of sexually active heterosexuals attending a sentinel site in Sydney, the prevalence of *C. trachomatis* almost doubled in women and tripled in men between 1994 and 2000. Up to 16 per cent of the increase in men and 8 per cent of the increase in women could be explained by the introduction of more sensitive DNA-based testing, which is consistent with our understanding of the increased sensitivity of DNA-based tests for *C. trachomatis*.[5] Thus most of the increase was attributable to a rising prevalence of *C. trachomatis* infection in the population sampled.

The basis for the increasing prevalence of *C. trachomatis* in this clinical population is unclear and could not be explained by age variation or increasing symptoms. Over the study period both women and men reported modest increases in the mean number of sexual partners and in the likelihood that they reported unprotected sex in the previous 3 months. Whether these sexual behaviour changes reflected trends in the community or just this self-selected population is unknown. Nevertheless, rising STI notifications in Britain have been temporally associated with increasing risk in repeated population-based sexual behaviour surveys.[6]

While sentinel site data have limitations,[3] in the case of STIs the experience of large sexual health services generally reflects what is happening in the community provided appropriate sub-populations are selected.[6,7] In this case the findings were consistent with the increase in national population-based notifications of *C. trachomatis*, including an increasing proportion of diagnoses being made in men.[2]

The major difference between sexual health service and population-based data is that *C. trachomatis* diagnoses are at least as common in men as in women in the former while the male:female ratio in the national reports is around 1:1.5.[2] In part, the prevalence among men would be expected to be higher in the clinic setting because men are more likely to develop symptoms and thus selectively seek health care. However, the difference is also attributable to equal testing rates for men and women in sexual health clinics but much more frequent testing of women than men elsewhere.[7,8] In this respect sexual health service data may better reflect the distribution of *C. trachomatis* in the community – most of which probably remains undiagnosed.[6,9] Consideration should be given to including high risk male patients in any campaign to encourage more testing for *C. trachomatis* by general practitioners.

Further investigation into the underlying causes of the increasing prevalence of *C. trachomatis* and interventions on a national scale to reduce the prevalence seem timely.

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