Chlamydia prevalence in young attenders of rural and regional primary care services in Australia: a cross-sectional survey

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Abstract

Objective: To estimate chlamydia prevalence among 16–29-year-olds attending general practice clinics in Australia.

Design, participants and setting: A cross-sectional survey was conducted from May 2010 to December 2012. Sexually experienced 16–29-year-olds were recruited from 134 general practice clinics in 54 rural and regional towns in four states and in nine metropolitan clinics (consecutive patients were invited to participate). Participants completed a questionnaire and were tested for chlamydia.

Main outcome measure: Chlamydia prevalence.

Results: Of 4284 participants, 197 tested positive for chlamydia (4.6%; 95% CI, 3.9%–5.3%). Prevalence was similar in men (5.2% [65/1257]; 95% CI, 3.9%–6.4%) and women (4.4% [132/3027]; 95% CI, 3.5%–5.2%) ($P = 0.25$) and high in those reporting genital symptoms or a partner with a sexually transmissible infection (STI) — 17.0% in men (8/47; 95% CI, 2.8%–31.2%); 9.5% in women (16/169; 95% CI, 5.1%–13.8%). Nearly three-quarters of cases (73.4% [130/177]) were diagnosed in asymptomatic patients attending for non-sexual health reasons, and 83.8% of all participants (3258/3890) had attended for non-sexual health reasons. Prevalence was slightly higher in participants from rural and regional areas (4.8% [179/3724]; 95% CI, 4.0%–5.6%) than those from metropolitan areas (3.1% [17/548]; 95% CI, 1.5%–4.7%) ($P = 0.08$). In multivariable analysis, increasing partner numbers in previous 12 months (adjusted odds ratio [AOR] for three or more partners, 5.11 [95% CI, 2.35–11.08]), chlamydia diagnosis in previous 12 months (AOR, 4.35 [95% CI, 1.52–12.41]) and inconsistent condom use with most recent partner (AOR, 2.90 [95% CI, 1.31–6.40]) were significantly associated with chlamydia in men. In women, increasing partner numbers in previous 12 months (AOR for two partners, 2.59 [95% CI, 1.59–4.23]; AOR for three or more partners, 3.58 [95% CI, 2.26–5.68]), chlamydia diagnosis in previous 12 months (AOR, 3.13 [95% CI, 1.62–6.06]) and age (AOR for 25–29-year-olds, 0.23 [95% CI, 0.12–0.44]) were associated with chlamydia.

Conclusions: Chlamydia prevalence is similar in young men and women attending general practice. Testing only those with genital symptoms or a partner with an STI would have missed three-quarters of cases. Most men and women are amenable to being tested in general practice, even in rural and regional areas.

Chlamydia is the most common bacterial sexually transmissible infection (STI) in Australia and notifications have nearly quadrupled in the past decade, with over 80 000 cases diagnosed in 2012.[1] In women, chlamydia can cause pelvic inflammatory disease and lead to serious health consequences such as ectopic pregnancy and tubal infertility.[2-5] In men, untreated infection can develop into epididymo-orchitis.[6] In men and women, chlamydia can increase the risk of HIV transmission.[7]

Given that over 80% of chlamydia infections are asymptomatic,[8] and testing rates are less than 10% in young Australian adults,[9] notification data greatly underestimate the prevalence. A recent meta-analysis estimating chlamydia prevalence in Australian settings found that prevalence among young adults ranged from 4%–5% in general practice to 6%–10% in sexual health or family planning clinics.[10] However, few data were available for men.

In 2008, the Department of Health and Ageing funded a trial to investigate whether annual chlamydia testing for 16–29-year-olds in general practice clinics can reduce chlamydia prevalence.[11] The Australian Chlamydia Control Effectiveness Pilot (ACCEPt) trial was initiated in 2010. We report on the findings of the baseline prevalence survey, the largest survey to estimate chlamydia prevalence in general practice in Australia conducted to date.

Methods

ACCEPt is based in rural and regional towns to reduce the possibility that patients will attend both participating and non-participating clinics, which is more likely to happen in a large city. To be eligible for inclusion, towns had to have a minimum of 500 people aged 16–29 years in the 2006 census, be at least 150 kilometres away from an Australian capital city and have fewer than seven general practice clinics. A total of 134 general practice clinics and Aboriginal medical services in 54 towns (clusters) in rural and regional Victoria (18 towns), New South Wales (21 towns), Queensland (11 towns) and South Australia (four towns) were enrolled in ACCEPt. Towns with a military base, university or mine nearby and tourist towns were excluded.

A list of towns from each state was made and towns were selected in no particular order until the required sample size was obtained. A further nine general practice clinics in metropolitan regions were included to provide some urban data for comparison, and to assess the feasibility and acceptability of the ACCEPt chlamydia testing intervention in an urban general practice clinic setting.

Ethics approval was obtained from the Royal Australian College of General Practitioners, the Aboriginal Health and Medical Research Council and the University of Melbourne human research ethics committees.

Recruitment of participants

Participants were recruited when they attended one of the enrolled clinics for a consultation. A research assistant was based in each clinic for up to 6 weeks and invited consecutive patients to participate as they arrived. Men and women were eligible if they were aged 16–29 years (17–29 years in Queensland and South Australia), and had ever had vaginal and/or anal sex. Participants gave written consent, completed a questionnaire on a handheld computer and provided a self-collected urine specimen or vaginal swab for chlamydia testing. The questionnaire included items about demographics, sexual behaviour, reasons for attending and genital symptoms. Sexual behaviour questions included number of partners in the previous 12 months, concurrency (two or more overlapping partnerships), duration of most recent partnership and condom use with the most recent partner (inconsistent or consistent). The survey was conducted between May 2010 and December 2012.

Chlamydia testing and management

Chlamydia tests were conducted by the clinics' usual pathology service providers. The laboratories used nucleic acid amplification tests to detect *Chlamydia trachomatis*. Clinics were supplied with 1 g doses of azithromycin to treat patients who tested positive and were provided with partner notification resources and advice.

Sample size

Assuming an intracluster correlation coefficient (ICC) of 0.009[12] and a cluster size of 80, a sample size of 4000 would provide precision of ± 0.8% for a prevalence of 4%. This would provide precision of ± 1% in women and ± 1.4% in men, assuming 70% of clinic attenders are women. From each town and metropolitan clinic, 60–100 patients were enrolled.

Analysis of results

We estimated chlamydia prevalence in clinic attenders as the proportion of those with positive test results among those tested, with 95% confidence intervals. Factors associated with chlamydia were investigated; unadjusted odds ratios (ORs), adjusted odds ratios (AORs) and 95% confidence intervals were calculated using a random-effects logistic regression model. Demographic characteristics (such as age, level of education and location), sexual behaviour variables (such as number of partners in previous 12 months, duration of most recent partnership and condom use with most recent partner) and health care use variables (such as previous chlamydia test or reason for attending) were examined. Some variables were highly correlated with others and the likelihood ratio test was used to determine which variable to include in the multivariable model. Covariates which had weak statistical evidence of an association with prevalence ($P \geq 0.1$) in the univariable analysis were excluded from the multivariable model. All analyses accounted for potential intracluster correlation in the town or metropolitan clinic; we used the survey commands for the prevalence estimates and panel commands for the logistic regression. All analyses were conducted using Stata 12.0 (StataCorp).

Results

Response rates

Of 152 rural and regional clinics approached, 134 clinics (88%) agreed to participate (55 clinics in Victoria, 45 in New South Wales, 29 in Queensland and five in South Australia), in addition to the nine general practice clinics in metropolitan regions.

A total of 4284 patients participated in the survey: 3027 women (70.7%) and 1257 men (29.3%). The response rate was 69.7% ($n = 6147$); 71.5% for women ($n = 4233$) and 65.7% for men ($n = 1914$) ($P < 0.01$).

Demographic and sexual behaviour profile

One-quarter (24.3% [1040/4284]) of participants were aged 16–19 years, 6.0% (240/4017) reported Aboriginal and/or Torres Strait Islander background and 93.7% (3793/4046) were born in Australia. Compared with the general population as represented by the most recent Australian census data,[13] participants were more likely to be Aboriginal and/or Torres Strait Islander (2.5% in the census, $P < 0.01$) and more likely to be Australian born (69.8% in the census, $P < 0.01$).

Most participants (87.2% [3724/4272]) were recruited from rural or regional clinics. A total of 699 of 3924

1 Study participants' health care access patterns and reasons for attending a general practice clinic ($N = 4284$)*

	Proportion (number)			Proportion (number)		
	Men	Women	*P*	Rural or regional	Metropolitan	*P*
Visited a general practitioner in previous 12 months						
	n = 1130	*n* = 2814		*n* = 3409	*n* = 528	
Yes	83.5% (943)	91.0% (2561)	< 0.01	88.9% (3032)	88.1% (465)	0.55
Attended this clinic before						
	n = 1061	*n* = 2807		*n* = 3336	*n* = 525	
Never	16.5% (175)	10.8% (303)	< 0.01	11.4% (381)	18.5% (97)	< 0.01
Yes, < 12 months ago	77.1% (818)	84.5% (2371)		83.0% (2770)	78.5% (412)	
Yes, ≥ 12 months ago	6.4% (68)	4.7% (133)		5.5% (185)	3.0% (16)	
Sexual health-related consultation†						
	n = 1129	*n* = 2761		*n* = 3357	*n* = 526	
STI symptoms or contact	4.2% (47)	6.1% (169)	< 0.01	4.7% (159)	10.8% (57)	< 0.01
Other sexual health reasons‡	2.9% (33)	13.9% (383)		10.8% (362)	9.9% (52)	
No	92.9% (1049)	80.0% (2209)		84.5% (2836)	79.3% (417)	
Previous chlamydia test						
	n = 1091	*n* = 2530		*n* = 3124	*n* = 490	
Yes, < 12 months ago	13.2% (144)	24.8% (628)	< 0.01	20.6% (642)	26.5% (130)	< 0.01
Yes, ≥ 12 months ago	10.8% (118)	23.2% (587)		20.3% (634)	14.3% (70)	
No	76.0% (829)	52.0% (1315)		59.2% (1848)	59.2% (290)	
Willing to have another chlamydia test in 12 months						
	n = 910	*n* = 2477		*n* = 2939	*n* = 443	
Yes	80.0% (728)	87.9% (2178)	< 0.01	85.1% (2500)	90.7% (402)	< 0.01
Attended clinic in same or contiguous postcode						
	n = 1175	*n* = 2867		*n* = 3499	*n* = 535	
Yes	81.6% (959)	83.7% (2399)	0.11	86.9% (3042)	57.8% (309)	< 0.01

STI = sexually transmissible infection. * Numbers do not add up to 4284 in all instances because of missing data. † If multiple reasons were given for attending, STI symptoms or contact were given preference over other sexual health reasons. ‡ Contraception, Pap smear, new partner and/or requesting an STI check. ◆

2 Chlamydia prevalence* in general practice clinic attenders and odds ratios for factors associated with chlamydia by sex†

	Men					Women				
	Prevalence (95% CI)	Number/ total	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	*P*	Prevalence (95% CI)	Number/ total	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	*P*
Age										
16–19 years	4.7% (1.9%–7.5%)	14/298	Ref	Ref		8.0% (5.9%–10.0%)	59/742	Ref	Ref	
20–24 years	6.6% (4.3%–9.0%)	35/527	1.44 (0.76–2.74)	1.05 (0.50–2.21)	0.90	5.2% (3.7%–6.6%)	59/1145	0.63 (0.43–0.92)	0.81 (0.54–1.23)	0.32
25–29 years	3.7% (2.1%–5.3%)	16/432	0.78 (0.37–1.63)	0.74 (0.30–1.79)	0.50	1.2% (0.6%–1.9%)	14/1140	0.14 (0.08–0.26)	0.23 (0.12–0.44)	< 0.01
State										
Victoria	5.3% (3.5%–7.1%)	31/585	Ref			4.2% (2.8%–5.6%)	56/1331	Ref		
New South Wales	5.4% (3.0%–7.7%)	23/428	1.01 (0.58–1.77)			4.5% (3.1%–5.9%)	47/1044	1.05 (0.69–1.62)		
Queensland	5.1% (1.9%–8.3%)	9/177	0.96 (0.45–2.05)			5.1% (3.7%–6.6%)	26/505	1.22 (0.73–2.04)		
South Australia	3.0% (0.0%–6.7%)	2/67	0.55 (0.13–2.35)			2.0% (0.3%–3.8%)	3/147	0.46 (0.14–1.56)		
Location										
Rural or regional	5.5% (4.2%–6.9%)	59/1066	2.12 (0.84–5.36)			4.5% (3.7%–5.4%)	120/2658	1.34 (0.70–2.54)		
Metropolitan	2.7% (0.6%–4.8%)	5/186	Ref			3.3% (0.84%–5.8%)	12/362	Ref		
Aboriginal and/or Torres Strait Islander										
Yes	4.7% (0.0%–9.4%)	3/64	Ref			6.3% (2.8%–9.7%)	11/176	Ref		
No	5.1% (3.8%–6.4%)	56/1103	1.09 (0.33–3.57)			4.2% (3.4%–5.1%)	113/2674	0.67 (0.35–1.28)		
Country of birth										
Australia	5.3% (4.0%–6.6%)	58/1100	Ref			4.5% (3.7%–5.3%)	121/2693	Ref		
Other	1.3% (0.0%–3.9%)	1/78	0.23 (0.03–1.71)			2.9% (0.0%–5.8%)	5/175	0.64 (0.26–1.61)		
Level of education										
High school	5.4% (3.9%–6.9%)	47/877	Ref			5.1% (4.0%–6.1%)	99/1956	Ref		
Trade or diploma	4.1% (1.1%–7.2%)	8/195	0.76 (0.35–1.63)			3.8% (2.0%–5.6%)	19/499	0.73 (0.44–1.21)		
Tertiary	3.0% (0.0%–6.0%)	3/99	0.55 (0.17–1.81)			1.7% (0.4%–3.0%)	7/408	0.33 (0.15–0.72)		
Number of partners in previous 12 months‡										
0 or 1	2.0% (0.8%–3.1%)	12/609	Ref	Ref		2.4% (1.7%–3.1%)	48/2007	Ref	Ref	
2	5.6% (1.9%–9.3%)	11/196	3.00 (1.30–6.94)	2.43 (0.94–6.27)	0.07	7.5% (4.9%–10.1%)	31/413	3.35 (2.10–5.35)	2.59 (1.59–4.23)	< 0.01
⩾ 3	10.9% (6.9%–15.0%)	34/311	6.28 (3.16–12.48)	5.11 (2.35–11.08)	< 0.01	10.8% (7.2%–14.4%)	42/388	5.02 (3.25–7.74)	3.58 (2.26–5.68)	< 0.01
Same-sex partner ever										
No	4.8% (3.5%–6.2%)	52/1080	Ref			4.4% (3.5%–5.2%)	112/2551	Ref		
Yes	7.0% (0.0%–14.0%)	3/43	1.48 (0.44–4.95)			3.8% (0.9%–6.7%)	10/262	0.86 (0.45–1.67)		
Sexual health-related consultation§										
STI symptoms or contact	17.0% (2.8%–31.2%)	8/47	4.92 (2.04–11.84)	2.33 (0.86–6.37)	0.10	9.5% (5.1%–13.8%)	16/169	2.64 (1.51–4.64)	1.68 (0.91–3.11)	0.10
Other sexual health reasons¶	9.1% (0.0%–18.5%)	3/33	2.22 (0.65–7.65)	1.78 (0.48–6.67)	0.39	5.2% (2.9%–7.5%)	20/383	1.39 (0.84–2.29)	1.19 (0.70–2.01)	0.52
No	4.3% (3.0%–5.6%)	45/1049	Ref	Ref		3.8% (3.0%–4.7%)	85/2209	Ref	Ref	

2 Chlamydia prevalence* in general practice clinic attenders and odds ratios for factors associated with chlamydia by sex† (continued)

	Men					Women				
	Prevalence (95% CI)	Number/ total	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	*P*	Prevalence (95% CI)	Number/ total	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	*P*
Previous chlamydia test										
No	5.1% (3.6%–6.5%)	42/829	Ref			4.8% (3.8%–5.8%)	63/1315	Ref		
Yes, < 12 months ago	6.3% (2.1%–10.4%)	9/144	1.26 (0.60–2.66)			4.3% (2.3%–6.3%)	27/628	0.90 (0.56–1.43)		
Yes, ⩾ 12 months ago	5.1% (0.7%–9.5%)	6/118	1.00 (0.42–2.42)			3.7% (2.5%–5.0%)	22/587	0.77 (0.47–1.27)		
Previous chlamydia diagnosis										
No	4.6% (3.4%–5.7%)	54/1186	Ref	Ref		4.1% (3.3%–4.9%)	113/2776	Ref	Ref	
Yes, < 12 months ago	25.8% (8.3%–43.3%)	8/31	7.35 (3.06–17.61)	4.35 (1.52–12.41)	< 0.01	18.9% (8.2%–29.6%)	14/74	5.43 (2.93–10.07)	3.13 (1.62–6.06)	< 0.01
Yes, ⩾ 12 months ago	5.1% (0.0%–11.8%)	2/39	1.13 (0.27–4.84)	0.51 (0.06–3.96)	0.52	2.4% (0.0%–4.7%)	4/170	0.57 (0.21–1.56)	0.62 (0.22–1.74)	0.37
Concurrency (two or more overlapping partnerships)										
No	3.8% (2.6%–5.0%)	35/921	Ref			3.7% (2.9%–4.5%)	93/2510	Ref		
Yes	10.1% (5.8%–14.4%)	23/228	2.84 (1.64–4.91)			9.6% (6.2%–13.1%)	33/342	2.80 (1.84–4.25)		
Condom use with most recent partner**										
Consistent	2.1% (0.6%–3.7%)	8/373	Ref	Ref		4.4% (2.9%–5.9%)	35/797	Ref		
Inconsistent	6.9% (5.0%–8.7%)	47/686	3.36 (1.57–7.18)	2.90 (1.31–6.40)	< 0.01	4.5% (3.5%–5.6%)	87/1916	1.03 (0.69–1.55)		
Duration of most recent partnership										
⩾ 5 years	1.3% (0.0%–3.0%)	2/159	Ref			0.9% (0.2%–1.7%)	6/632	Ref		
3–4 years	3.1% (0.2%–6.0%)	4/129	2.46 (0.44–13.76)			1.3% (0.2%–2.4%)	5/392	1.36 (0.41–4.48)		
1–2 years	2.3% (0.0%–4.5%)	4/175	1.86 (0.33–10.36)			4.8% (2.6%–6.9%)	23/483	5.25 (2.12–13.01)		
6–12 months	9.8% (4.6%–15.1%)	12/122	8.78 (1.91–40.34)			5.5% (2.8%–8.1%)	13/238	6.07 (2.28–16.19)		
< 6 months	7.7% (4.7%–10.8%)	28/362	6.65 (1.56–28.37)			9.2% (7.0%–11.5%)	66/714	10.74 (4.61–25.00)		
Antibiotic use in previous 3 months										
No	5.2% (3.8%–6.7%)	44/839	Ref			4.6% (3.5%–5.6%)	96/2095	Ref		
Yes	4.5% (1.2%–7.7%)	10/224	0.84 (0.42–1.71)			3.7% (2.3%–5.1%)	23/624	0.79 (0.49–1.26)		
Visited a general practitioner in previous 12 months										
No	4.8% (2.0%–7.7%)	9/187	Ref			5.1% (2.5%–7.8%)	13/253	Ref		
Yes	5.1% (3.5%–6.7%)	48/943	1.07 (0.51–2.22)			4.3% (3.4%–5.2%)	110/2561	0.82 (0.46–1.49)		
Attended clinic in same or contiguous postcode										
No	6.9% (2.7%–11.2%)	15/216	Ref			3.6% (1.7%–5.6%)	17/468	Ref		
Yes	4.6% (3.3%–5.9%)	44/959	0.64 (0.34–1.20)			4.5% (3.7%–5.4%)	109/2399	1.24 (0.73–2.10)		

OR = odds ratio. Ref = reference category. STI = sexually transmissible infection. * Proportion who tested positive among those tested at participating clinics. † Results have accounted for clustering. ‡ Opposite sex partners only. § If multiple reasons were given for attending, STI symptoms or contact were given preference over other sexual health reasons. ¶ Contraception, Pap smear, new partner and/or requesting an STI check. ** Consistent use is defined as using condoms always or most of the time; inconsistent use is defined as using condoms never, infrequently or sometimes. ◆

(17.8%) reported three or more partners in the previous 12 months, and 43 of 1123 men (3.8%) and 262 of 2813 women (9.3%) reported having ever had a same-sex partner.

Health care use and reasons for attending clinic

Participants' health care access patterns and reasons for clinic attendance are shown in Box 1. Women were more likely than men to have attended the same clinic in the previous 12 months (84.5% v 77.1%; $P < 0.01$) and more likely to be attending for a sexual health-related reason (20.0% [552/2761] v 7.1% [80/1129]; $P < 0.01$). The proportion of women who could recall ever being tested for chlamydia was twice that for men (48.0% [1215/2530] v 24.0% [262/1091]; $P < 0.01$). The proportion of participants attending a local clinic (ie, in the same or contiguous postcode) was higher in rural and regional towns than in metropolitan clinics (86.9% v 57.8%; $P < 0.01$).

Prevalence of chlamydia

Chlamydia prevalence, by demographic characteristics, sexual behaviour and health care use variables, and by sex, is shown in Box 2. There were 197 cases of chlamydia: an overall prevalence of 4.6% (95% CI, 3.9%–5.3%). The ICC for chlamydia prevalence within clusters or metropolitan clinics was 0.004.

Prevalence was 5.8% (14/240; 95% CI, 2.9%–8.8%) among those reporting Aboriginal and/or Torres Strait Islander background and similar between men (5.2% [65/1257]; 95% CI, 3.9%–6.4%) and women (4.4% [132/3027]; 95% CI, 3.5%–5.2%) ($P = 0.25$). Prevalence was slightly higher in participants from rural and regional areas (4.8% [179/3724]; 95% CI, 4.0%–5.6%) than among those from metropolitan areas (3.1% [17/548]; 95% CI, 1.5%–4.7%) ($P = 0.08$). Participants from metropolitan areas reported a greater number of partners in the previous 12 months ($P < 0.01$) and were more likely to report concurrency ($P < 0.01$) (data not shown).

Among women, prevalence was highest in 16–19-year-olds (8.0%), but among men prevalence was highest in 20–24-year-olds (6.6%). Prevalence was high among those reporting STI symptoms or contact with a partner who had an STI — 17.0% in men and 9.5% in women. However, 73.4% of infections (130/177) were in participants presenting for a non-sexual health-related consultation, with a prevalence of 4.0% (95% CI, 3.2%–4.8% [130/3258]) in this group; 83.8% of participants (3258/3890) had attended for non-sexual health reasons.

Factors associated with chlamydia

In multivariable analyses for men (Box 2), the odds of chlamydia were significantly increased for an increasing number of partners in the previous 12 months (AOR for three or more partners, 5.11), chlamydia diagnosis in the previous 12 months (AOR, 4.35) and inconsistent condom use with the most recent partner (AOR, 2.90). Concurrency and duration of partnerships were highly correlated with number of partners; number of partners had the strongest association with chlamydia and was included in the model.

In multivariable analyses for women (Box 2), the odds of chlamydia were significantly increased for an increasing number of partners in the previous 12 months (AOR for two partners, 2.59; AOR for 3 or more partners, 3.58) and chlamydia diagnosis in the previous 12 months (AOR, 3.13). The odds were decreased significantly for 25–29-year-olds relative to 16–19-year-olds (AOR, 0.23). Education was highly correlated with age; age had the strongest association with chlamydia and was included in the model. As in men, number of partners was highly correlated with concurrency and duration of partnership, but had a stronger association and was included in the model.

Discussion

We found that 4.6% of sexually experienced 16–29-year-old men and women attending general practice clinics tested positive for chlamydia. Prevalence was similar between the sexes, highlighting the importance of including men in chlamydia control strategies. Notably, 73% of infections were diagnosed in patients attending for a non-sexual health reason. If only symptomatic patients and those reporting contact with a partner who had an STI were tested, these cases would be missed; this emphasises the need to offer testing to all young people. In conjunction with our high response rate of 70%, 87% of participants in rural and regional towns were attending a local general practice, showing that young adults in these areas are likely to agree to testing at their local clinic if asked.

The strengths of this study are the large sample size, high response rate, and large number of men tested. However, there are limitations. First, selection bias cannot be ruled out despite the high response rate, as the sexual practices of non-responders and responders could not be compared. Second, participants were recruited from general practice and not from the general population. Conducting a population-based survey of chlamydia prevalence is extremely challenging, partly due to the choice of sampling frame and the generally low response rates.[12] However, given our high response rate and the fact that 64% of men and 86% of women aged 16–29 years attend a general practice for their own health each year,[9] recruiting from every general practice in each town provides a quasi-population approach to estimating prevalence. Third, as it was a largely rural and regional sample, the demographics of the study population differed from the most recent Australian census data;[13] participants were more likely to be Australian born and more likely to be Aboriginal and/or Torres Strait Islander. Fourth, we investigated several risk factors for their association with chlamydia, raising issues of statistical multiplicity. However, these variables have been found to be associated with chlamydia and were pre-specified in our analysis plan. Finally, only 29% of participants were men, but this reflects the attendance patterns at the clinics; Medicare data on general practitioner consultations show twice as many consultations for women annually than for men in this age group.[14]

Our estimated prevalence of 4.4% among young women is consistent with previous findings for a similar sample of women.[15] However, our prevalence of 5.2% among young men is higher than the 3.7% reported for a similar sample of men from urban areas.[16] It is possible that prevalence in men is higher in rural areas than metropolitan areas due to reduced access to health care.[17] Our study provides weak evidence of a higher prevalence in rural and regional areas versus metropolitan areas that is not explained by differences in sexual behaviour (ie, number of partners in previous 12 months and concurrency).

In women, prevalence was highest among 16–19-year-olds and lowest among 25–29-year-olds. In men, prevalence was highest in 20–24-year-olds and still high in 25–29-year-olds. This probably reflects sexual mixing as men are often up to 5 years older than their female partners.[18] Measures of risky sexual behaviour such as multiple partners in the previous 12 months, concurrency and a partnership of short duration were all strongly associated with chlamydia, but multivariable modelling showed that number of partners in the previous 12 months was the most important. Designing the content of a sexual behaviour survey can be difficult,[19] but our data show that a question about number of partners should be included.

Most testing and diagnosis of chlamydia in Australia takes place in general practice. When asked, GPs say that testing should be their responsibility,[20] yet testing rates for young adults are low, particularly among young men (3.7% in men, 12.5% in women).[9] It has been suggested that young people, particularly those in rural areas, do not wish to discuss sexual health issues with GPs because of privacy concerns and will not seek testing.[17,21] However, our data show that initiating a discussion about testing with a patient may often be sufficient to overcome these concerns.

Chlamydia prevalence is high in young men and women attending general practice clinics, particularly in rural and regional areas. The current practice of testing mainly those with STI symptoms and those who have had contact with a partner who has an STI would have missed three-quarters of chlamydia infections among our study participants. However, young people were generally amenable to testing when asked, suggesting that testing offered by GPs would reach most young adults.

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