Testing and screening for chlamydia in general practice: a cross-sectional analysis

Allison Thomson,[1] Simon Morgan,[2] Kim Henderson,[2] Amanda Tapley,[2] Neil Spike,[3] John Scott,[2] Mieke van Driel,[4] Parker Magin[1,2]

Abstract

Objectives: Chlamydia screening is widely advocated. General practice registrars are an important stage of clinical behaviour development. This study aimed to determine rates of, and factors associated with, registrars' chlamydia testing including asymptomatic screening.

Methods: A cross-sectional analysis of data from Registrars Clinical Encounters in Training (ReCEnT), a cohort study of registrars' consultations. Registrars record details of 60 consecutive consultations in each GP-term of training. Outcome factors were chlamydia testing, asymptomatic screening and doctor-initiated screening.

Results: Testing occurred in 2.5% of 29,112 consultations (398 registrars) and in 5.8% of patients aged 15–25. Asymptomatic screening comprised 47.5% of chlamydia tests, and 55.6% of screening tests were doctor-initiated. Chlamydia testing was associated with female gender of doctor and patient, younger patient age, and patients new to doctor or practice. Asymptomatic screening was associated with practices where patients incur no fees, and in patients new to doctor or practice. Screening of female patients was more often doctor-initiated.

Conclusions: GP registrars screen for chlamydia disproportionately in younger females and new patients.

Implications: Our findings highlight potential opportunities to improve uptake of screening for chlamydia, including targeted education and training for registrars, campaigns targeting male patients, and addressing financial barriers to accessing screening services.

Key words: chlamydia, screening, general practice, reproductive health, graduate medical education

Genital tract chlamydia infections are an important public health issue worldwide. Chlamydia prevalence in the Australian community setting has been estimated at 5% of females younger than 25 years.[1] Infections frequently go unnoticed by the patient with 50–88% being asymptomatic.[2] Persistent infections have been associated with pelvic inflammatory disease (PID), ectopic pregnancy and tubal infertility in females; and epididymitis and epididymo-orchitis in males.[2]

There is ongoing debate about the benefits of chlamydia screening. Randomised-controlled trials (RCTs) have failed to consistently show a significant benefit from population-based screening programs in chlamydia-related morbidity.[3-6] Due to the sensitive nature of chlamydia screening and the difficulties with confirming a diagnosis of PID, RCTs have been difficult to perform and analyse.[3] But, chlamydia screening is widely and strongly advocated.[7-9] Furthermore, there is evidence that young women are happy to be tested for chlamydia and support annual testing.[10]

Australian research is under way to better assess the feasibility, acceptability, efficacy and cost-effectiveness of annual chlamydia testing among 16–29 year olds in the general practice setting.[11] General practice is the cornerstone of Australian primary care[12] and is the optimal setting for chlamydia screening. General practice is also where the majority of chlamydia diagnoses in Australia are made.[13]

Current Australian guidelines for chlamydia screening in general practice recommend annual testing of all sexually active people aged 15–29 and patients with a recent change in partner or reporting inconsistent condom use.[14] A study of Australian general practitioners (GPs) found that chlamydia testing was occurring in 0.32% of patient encounters overall; however, in an age group most relevant to screening (age 15–24), tests were being performed in 1.32% of encounters.[15] The same study found that GPs were more likely to order a chlamydia test if they were female, younger, working in a major city, working in a group practice and had graduated in Australia.[15] The patients more likely to be tested were aged 15–24 years, female, of Aboriginal and Torres Strait Islander background and new to the practice.[15]

Previous studies have attempted to examine opportunistic screening rates,[16,17] finding that 40–50% of tests were performed on asymptomatic patients. One study[16]

1. Discipline of General Practice, Faculty of Health and Medicine, University of Newcastle, New South Wales
2. General Practice Training Valley to Coast, New South Wales
3. Victorian Metropolitan Alliance
4. Discipline of General Practice, School of Medicine, The University of Queensland
Correspondence to: Dr Allison Thomson, Discipline of General Practice, Faculty of Health and Medicine, University of Newcastle, Newbolds Building, Cnr Frith and Gavey St, Mayfield, NSW 2304; e-mail: Allison.Thomson@newcastle.edu.au
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attempted to establish rates of doctor-initiated opportunistic screening for chlamydia, using co-ordering of chlamydia testing with Pap smears as the sole criterion for doctor-initiated screening. Although the associations of chlamydia testing in Australia are documented, there is no data around the associations of opportunistic screening or associations of doctor-initiated screening.

Currently, no data are available on the chlamydia testing rates by GP registrars (trainees). This is important because vocational training is a crucial period for development of clinical behaviours and patterns of practice.[18]

In Australia in 2012, there were 3,909 GP registrars.[19] They function as independent clinicians (including for Medicare purposes) though they have recourse to advice and guidance from their clinical supervisors. Population health is one of the five domains of the general practice curriculum[20] and an understanding of health promotion screening is a defining characteristic of general practice. The Australian GP registrar cohort fits many of the predictors of greater likelihood of performing a chlamydia test: they are younger, more likely to be female, more likely to have graduated in Australia than overseas,[19] and are more likely to see patients who are new to the practice.[21] GP registrars have also been shown to see a higher proportion of younger patients[22] than their supervisors, and it is in younger patients that chlamydia screening is strongly advocated. It is, however, unknown if GP registrars actually perform regular chlamydia screening.

This study examined chlamydia testing by GP registrars, its prevalence and its characteristics (symptomatic testing versus screening and doctor-initiated versus patient-initiated screening) and aimed to establish associations of this testing.

Methods

This study took place within the Registrar Clinical Experiences in Training (ReCEnT) study.[23] ReCEnT is an ongoing multi-site cohort study of GP registrars' clinical encounters. It is conducted by four general practice regional training providers (RTPs) across four Australian states (New South Wales, Victoria, South Australia and Tasmania).

The methodology has been described in detail elsewhere.[23] Briefly, all GP registrars within the training program of the four RTPs undertake data collection once per six-month training term as part of their educational program. Informed voluntary consent is sought for their de-identified data to be used for research purposes.

Data collected includes demographic, education, work experience, and attitudinal data of participating doctors, as well as characteristics of the practice in which they are working. These parameters are recorded by each doctor, via a paper-based questionnaire each training term.

Participating registrars contemporaneously record the details of 60 consecutive clinical consultations per term on a paper-based encounter form. This number of consultations represents about one week of clinical work for registrars in the first term of training. Data collection is performed mid-way through their training term. As data collection is designed to reflect a 'normal' week of general practice, consultations in a specialised clinic, e.g. a vaccination or Pap smear clinic, are excluded.

The collected data encompasses four broad areas: patient demographics; patient reasons for encounter (the stated reason for the consultation in the patients' own words); diagnoses or problem formulation; and investigations/management. Investigations are linked to the problem formulations for which they are ordered. Problems managed and reason for encounter are coded according to the International Classification of Primary Care, second edition classification system (ICPC-2 PLUS).[24]

The analyses presented in this paper involve only consultations where the patient was aged 15 to 60 years.

Outcome Factors

Three main outcome factors were analysed: rates of chlamydia test ordering; proportions of chlamydia tests ordered as an asymptomatic screen; and proportions of screening tests that were initiated by the doctor.

Genital chlamydia testing

Encounters where a genital chlamydia test was ordered were compared to all other consultations.

As well as pathology tests specifically recorded as 'chlamydia test', pathology tests recorded as 'STD/STI screen' were deemed to include a genital chlamydia test. This is consistent with the Royal Australian College of General Practitioners[14,25] and Sexual Health Society of Victoria[7] (endorsed by both the Australasian Society for HIV Medicine and the Australasian Chapter of Sexual Health Medicine) guidelines. Guidelines from both organisations recommend including a chlamydia test as part of a basic asymptomatic sexually transmitted infection screen. Chlamydia tests for atypical pneumonia or other indications (non-genital) were excluded from analysis.

Asymptomatic screening

We defined asymptomatic screening as any genital chlamydia test that was performed on an asymptomatic patient without a clinical indicator. Cases of asymptomatic screening were determined by reviewing encounter forms where a chlamydia test or STI screen was ordered. A list of clinical indicators for a test requested for symptomatic investigation rather than screening was established, for example, vaginal discharge or itch (for full list see the supplementary material available online: Supplement 1). The patient-stated reason for encounter was thus considered in the context of the recorded problem/diagnosis to determine if the test was asymptomatic.

Encounters where a test for genital chlamydia was determined to be asymptomatic screening were compared to all other encounters where a genital chlamydia test was performed.

Doctor -initiated screening

Doctor-initiated screening was defined as a test done on an asymptomatic patient without a clinical indicator for genital chlamydia infection, where that test was initiated by the doctor rather than the patient. This was determined by considering the reason for encounter. If the reason for encounter (as stated by the patient and recorded by the doctor) did not include chlamydia check or STI/STD check, the screening was deemed to be initiated by the doctor.

Encounters where a doctor-initiated screen was ordered were compared only to encounters where other asymptomatic screens were ordered.

Reliability of ascertainment of asymptomatic versus symptomatic testing

To test the reliability of the methods of ascertaining 'asymptomatic screening' versus 'symptomatic investigation', the two chief-investigators (AT and PM) independently assessed 50 randomly selected encounters and inter-rater agreement was determined.

Independent variables

Independent variables were examined in the categories of doctor, patient, practice and consultation factors. Registrar/doctor factors were: age, gender, training term, training pathway enrolled in (general or rural; rural pathway registrars train exclusively in rural locations), place of qualification (Australia/international) and full-time/part-time status. Patient factors were: age, gender and Aboriginal and Torres Strait Islander status. Practice factors included: rurality, number of GPs working at practice and if the practice routinely bulk bills (i.e. there is no financial cost to the patient for the consultation). Practice postcode was used to define the Australian Standard Geographical Classification-Remoteness Area (ASGC-RA) classification[26] (the degree of rurality) of the doctor's work location. Consultation factors were: duration, new patient to the practice or new patient to the doctor.

This study took place when prevailing guidelines recommended chlamydia testing for people aged 15–25, with an emphasis on females. Patient age was included as a categorical variable with age-groups, reflecting this recommended testing age. Subsequently, the guidelines have been extended to a wider age range (15–29) and to include males.

Statistical analysis

This is a cross-sectional analysis of data from the longitudinal ReCEnT study.

Analysis of chlamydia testing rates and associations of testing was performed on six rounds of data from 2010 to 2012. Analysis of asymptomatic (versus symptomatic) screening and doctor-initiated (versus patient-initiated) screening was performed on five rounds of data from 2010 to 2012 (as data from one round did not enable determination of asymptomatic and doctor-initiated testing).

Univariate analyses were performed using chi square or Mann-Whitney as appropriate. All variables with a p value <0.2 were included in multivariate analysis. For all outcomes, logistic regression has been used within a generalised estimating equations framework to account for clustering of consultations within registrars. Inter-rater reliability of 'asymptomatic screen' versus 'symptomatic test' was calculated using Cohen's kappa.

The ReCEnT project has approval from the University of Newcastle Human Research Ethics Committee. Reference # H-2009-0323.

Results

There were 29,112 consultations by 398 individual registrars. The response rate was 94.7%. Table 1 shows characteristics of the registrars enrolled in this study. Results are presented as both the number of individual registrars in the study, and the registrar rounds. This reflects some registrars participating in multiple rounds of data collection. Of the 398 doctors, 273 (68.6%) were female. The registrars practised in locations across ASGC-RA[26] codes 1 to 5 reflecting major cities, inner regional, outer regional, remote and very remote practice locations. Registrar ages ranged from 22 to 60 years, with mean 33.5 years (95%CI 33.0-33.9). The majority were enrolled in the general (rather than rural) training pathway, worked full-time and had qualified as a doctor in Australia. Characteristics of patients are also presented in Table 1.

Cohen's kappa

The Cohen's kappa for inter-rater agreement in ascertaining 'opportunistic screening' versus 'symptomatic testing' was 0.87 (95%CI 0.74-1.0), indicating excellent agreement.[27]

Genital chlamydia testing rates

A chlamydia test was ordered in 2.5% (95%CI 2.34-2.71) of consultations in the age group 15–60 years. This equated to 733 individual tests. The testing rate in the age group of 15–25-year-olds was higher at 5.8% (402/6981) of encounters (7.1% in females and 3.0% in males). In the current recommended screening age group of 15–29, the testing rate was 5.5% (95%CI 5.1-6.0). Unadjusted and adjusted predictors of a patient having a chlamydia test are presented in Table 2.

All characteristics associated with the patient having a chlamydia test can be found in Supplement 2, available online.

Characteristics of registrars: Significant univariate associations between registrars and ordering a chlamydia test were: female gender of doctor, general training pathway (compared to rural pathway), qualified as a doctor in Australia and younger age of registrar (Table 2). In multivariate analysis, only female gender of doctor remained a significant association.

Characteristics of patients and consultations: Significant associations between patients or consultations and the ordering of a chlamydia test were: patient female gender, age group 15–25 years, new patient to doctor, new patient to the practice and longer consultation. All these associations remained significant in the multivariate analysis.

Proportion and associations of a chlamydia test being ordered as an asymptomatic screen: A chlamydia test was ordered as an asymptomatic screen rather than a test for symptoms in 47.5% (95%CI 43.2-51.9) of chlamydia tests. Associations of an ordered chlamydia test being an asymptomatic screen are presented in Table 3. Significant associations of ordering an asymptomatic screening test for chlamydia were: younger doctor age, new patient to practice, new patient to doctor and practices that routinely bulk bill.

Proportion and associations of a doctor initiating an asymptomatic screen: An asymptomatic screening test for chlamydia was initiated by the doctor rather than the patient in 55.6% (95%CI 49.2-61.9) of all asymptomatic screens. Associations of a doctor as opposed to the patient initiating an asymptomatic screen for chlamydia are presented in Table 3. Female patients were much more likely than male patients to be screened asymptomatically on the doctor's initiative (rather than the patient's initiative).

Conclusions

Summary of findings

GP registrars in Australia are performing chlamydia testing in 2.5% of encounters with patients aged 15–60 years, and in 5.8% of 15–25 year olds. Rates were higher in female patients than in males. The likelihood of a registrar ordering a chlamydia test was associated with female gender of the doctor

(OR=1.7) and the patient being new to the doctor or surgery.

We found that about half of all tests were for screening purposes. Chlamydia tests by registrars working in routinely bulk-billing practices were more than twice as likely to be an opportunistic screen, rather than for symptoms. New patients to either the practice or doctor were found to be more likely to be tested for screening purposes. More than half the opportunistic screening tests were found to be initiated by the doctor. Doctor-initiated screening was more likely for female patients.

Table 1: Participating doctor and patient characteristics.

Doctor Characteristic	All Trainee Rounds 829[a,b]	All Individual Trainees[c] 397
Gender		
Male	276 (33.3%)	125 (31.5%)
Female	553 (66.7%)	272 (68.5%)
Age[d]		
<35	510 (63.2%)	
35-44	222 (27.5%)	
45-54	67 (8.3%)	
55+	8 (1.0%)	
Training Term		
1	333 (40.2%)	
2	288 (34.7%)	
3	156 (18.8%)	
4	52 (6.3%)	
Part-time/full-time status		
Part time (<8 sessions[e] per week)	174 (21.3%)	
Full Time (8+ sessions per week)	642 (78.7%)	
Place of primary medical qualification		
Australia	589 (71.7%)	287 (72.3%)
International	232 (28.3%)	106 (26.7%)
Training Pathway		
General	639 (77.4%)	308 (77.6%)
Rural	187 (22.6 %)	89 (22.4%)
Remoteness Area classification		
Major City	453 (54.8%)	
Inner Regional	275 (33.3%)	
Outer Regional	87 (10.5%)	
Remote	8 (1.0%)	
Very Remote	4 (0.5%)	
Patient Characteristics		**All ReCEnT encounters 29,112[f]**
Gender		
Male		10,042 (35%)
Female		18,745 (65%)
Age		
15-25		6,677 (23 %)
26-30		3,351 (12%)
31-45		9,736 (33%)
46-60		9,348 (32%)
Aboriginal and Torres Strait Islander		306 (1.1%)

a. Totals may not add up to 829 due to missing data

b. Percentages may not add exactly to 100% due to rounding

c. As age, term, part-time/full-time status and RA classification change in each round these are not presented for individual trainees.

d. Age at start of round.

e. A session equals a half day in clinical practice.

f. Totals may not add up to 29112 due to missing data.

Interpretation of findings and comparison with previous literature

We found differences in the rate of chlamydia testing compared to other published Australian studies.[15,28] Kong et al.[28] found a higher rate of 8.9% of 16–29-year-old patients when looking at population-level data. Sawleshwarkar et al.[15] found a lower rate of 0.32% of general practice encounters (all ages) using similar contemporaneous recording but different means of ascertainment of chlamydia testing. Due to these methodological differences, it is not possible to directly compare our rates with other studies.

Associations of chlamydia testing in our study were similar to previous published findings with female gender of doctor and patient, and patient age,[15,17] associated with higher testing rates. Also similar to previous studies,[15,29] we found that patients new to the practice or doctor were more likely to be tested for chlamydia. It has been suggested this may be due to patients' preference for relative anonymity regarding sexual health issues.[29,30] A novel finding in our results was that new patients were more likely to be opportunistically screened, not just symptomatically tested. While anonymity may play a role here, doctors may be more likely to check on preventative health measures in new patients.

The finding that asymptomatic testing represented about half of all chlamydia tests is consistent with earlier evidence surrounding asymptomatic positive chlamydia tests.[17] A recent Australian study examining reasons for testing in general practice also found similar rates of opportunistic screening with 50.1% of tests in their study performed on asymptomatic patients.[16] The same paper found doctor-initiated screening (23.8%) to be slightly higher than in our study (19% of all chlamydia tests). However, the studies are not directly comparable, due to methodological differences. Our study used a more robust method of ascertaining doctor-initiated screening tests than ascertainment based purely on co-ordering with a Pap smear. We also were able to establish associations of chlamydia testing, screening and doctor-initiated screening. To our knowledge, this is first time associations of doctor-initiated chlamydia screening, as opposed to simple rates, have been presented.

The strong association of female patients with doctor-initiated rather than patient-initiated screening is likely to reflect opportune

Table 2: Predictors of the patient having a chlamydia test.

		Univariate		Adjusted	
Variable	**Class**	**OR (95% CI)**	**P**	**OR (95% CI)**	**P**
Doctor gender	Female	2.10 (1.68-2.63)	<.0001	1.70 (1.33-2.17)	<.0001
Pathway enrolled in	Rural	0.72 (0.56-0.93)	0.0117	0.95 (0.67-1.36)	0.7989
Qualified as a doctor in Australia	Yes	1.30 (1.02-1.66)	0.0375	0.99 (0.75-1.31)	0.9553
Doctor works fulltime	Yes	0.84 (0.65-1.08)	0.1698	0.95 (0.73-1.24)	0.7248
Worked at the practice previously	Yes	0.85 (0.69-1.06)	0.1433	1.04 (0.82-1.31)	0.7667
Patients age (years)	26 to <=30	0.66 (0.54-0.80)	<.0001	0.66 (0.54-0.81)	<.0001
Referent: age 15-25	31 to <=45	0.25 (0.20-0.30)	<.0001	0.25 (0.20-0.32)	<.0001
	46 to <=60	0.08 (0.06-0.10)	<.0001	0.06 (0.04-0.09)	<.0001
Patient gender	Female	1.89 (1.56-2.28)	<.0001	1.68 (1.37-2.05)	<.0001
Seen doctor previously	New patient to practice	1.42 (1.21-1.66)	<.0001	1.44 (1.21-1.73)	<.0001
	New patient to doctor	2.27 (1.73-2.96)	<.0001	1.75 (1.32-2.31)	<.0001
Rurality	Inner regional	0.85 (0.69-1.04)	0.1180	0.96 (0.76-1.23)	0.7683
Referent: Major City	Outer regional	0.58 (0.41-0.83)	0.0026	0.79 (0.50-1.24)	0.3059
	Remote and Very Remote	1.59 (0.89-2.84)	0.1190	1.67 (0.89-3.14)	0.1119
Doctor age (years)		0.97 (0.96-0.99)	0.0010	0.98 (0.96-1.00)	0.1139
Duration of consultation (hours)		10.8 (7.86-15.0)	<.0001	12.6 (8.83-18.0)	<.0001

Table 3: Associations of Opportunistic Screening tests.

Predictors of a screen versus test for symptoms					
		Univariate		Adjusted	
Variable	**class**	**OR (95% CI)**	**P**	**OR (95% CI)**	**P**
Does the practice routinely bulk-bill	Yes	2.36 (1.44-3.86)	0.0006	2.69 (1.61-4.49)	0.0001
Patients age (years)	26 to <=30	1.48 (0.97-2.28)	0.0722	1.54 (0.99-2.40)	0.0577
Referent: age 15-25	31 to <=45	0.88 (0.55-1.41)	0.5999	0.85 (0.51-1.41)	0.5207
	46 to <=60	0.62 (0.29-1.32)	0.2152	0.74 (0.33-1.66)	0.4710
Seen doctor previously	New patient to practice	1.87 (1.30-2.69)	0.0008	1.89 (1.28-2.80)	0.0015
	New patient to doctor	2.41 (1.27-4.58)	0.0071	2.16 (1.13-4.13)	0.0198
Doctor age (years)		0.97 (0.94-1.00)	0.0397	0.96 (0.93-0.99)	0.0169
Predictors of the screening test being initiated by the trainee					
		Univariate		Adjusted	
Variable	**class**	**OR (95% CI)**	**P**	**OR (95% CI)**	**P**
Training term/post	Term 2	1.04 (0.51-2.08)	0.9233	1.14 (0.50-2.59)	0.7491
Referent: Term 1	Term 3	1.80 (0.93-3.49)	0.0814	2.16 (0.83-5.63)	0.1142
	Term 4	0.59 (0.19-1.82)	0.3638	1.18 (0.37-3.69)	0.7814
Doctor gender	Female	4.72 (2.09-10.6)	0.0002	1.68 (0.61-4.63)	0.3174
Patients age (years)	26 to <=30	0.77 (0.42-1.42)	0.4093	0.58 (0.31-1.08)	0.0858
Referent: age 15-25	31 to <=45	1.09 (0.49-2.43)	0.8270	1.25 (0.55-2.85)	0.5894
	46 to <=60	0.07 (0.01-0.58)	0.0138	0.18 (0.02-2.20)	0.1816
Seen doctor previously	New patient to practice	0.63 (0.34-1.18)	0.1517	0.70 (0.32-1.52)	0.3701
	New patient to doctor	0.30 (0.13-0.73)	0.0073	0.39 (0.14-1.10)	0.0740
Patient gender	Female	13.4 (5.89-30.6)	<.0001	6.76 (2.72-16.8)	<.0001
Duration of consultation (hours)		5.29 (0.72-39.0)	0.1020	7.69 (0.78-76.0)	0.0810

consultations where Pap smears or oral contraception are discussed and the topic of sexual health may be easier for the doctor to initiate.

Higher rates of asymptomatic screening for genital chlamydia were also associated with practices that routinely bulk bill. This is an interesting and novel finding; it may reflect greater access to care for the age group recommended for screening. Patients in the targeted screening age group have been documented as finding out-of-pocket costs a barrier to chlamydia screening,[10] and our results suggest this has an impact on health service access.

Strengths and limitations

Our study of 29,112 encounters had good statistical power for the analysis of all genital chlamydia tests. Furthermore, there were adequate numbers of both chlamydia and opportunistic screening tests to detect associations of ordering an opportunistic screen, and the doctor initiating the screen.

The external validity of this study is strong. The response rate of GP registrars in the ReCEnT study is 94.7%.This is a singularly high response rate in studies of GPs.[31] Data collection takes place across a range of rural and urban locations with locations from major cities through to remote or very remote included in data collection.

The data collection tool was not designed for the purpose of determining asymptomatic screening and, as such, the study was limited by assumptions regarding asymptomatic screening and doctor-initiated screening. However, the investigators employed a strong rationale in their methodology to determine these outcome factors and inter-rater agreement (κ=0.87) of assignment as asymptomatic screening versus symptomatic testing was high.

Another limitation of our study is the assumption that STD/STI screen included a chlamydia test. Although this is the recommendation, we can't be certain that a chlamydia test was ordered in every STD/STI screen.

Implications for training and policy

Initiating asymptomatic screening is a vital skill in general practice. Registrars in this study were asymptomatically screening for chlamydia, however, higher screening rates would further reduce the spread of chlamydia infections in the community.

In our study, female registrars carried out the majority of both testing and screening. Possible contributing factors for lower rates by male registrars include female colleagues or practice nurses performing Pap smear tests and opportunistically discussing and ordering tests during these consultations. However, chlamydia screening remains an important issue for male registrars and further education on this topic could particularly target strategies for training male registrars to increase their chlamydia screening rates.

Male patients were found to be less likely to be both tested and screened. Previous general practice-based guidelines on chlamydia screening advocated testing all females, but only high-risk males. These guidelines were current during the study period.[25] The Australian guidelines for preventative activities in general practice[14] have recently been changed to include recommendations to screen both genders, annually. Training around the benefits of screening males may increase their rates of screening. Public awareness campaigns targeting male patients, or clinical software reminders, may further target this group.

Current research[11] is under way to determine how to improve screening rates. Our novel finding regarding billing procedures and screening rates suggests that policy makers should consider financial barriers to patients – particularly younger patients – accessing chlamydia screening.

Implications for future research

Given current guidelines for chlamydia screening, future research should focus on interventions to increase screening, in particular doctor-initiated screening. Interventions subject to investigation should take our findings into account, especially concerning male registrars, male patients and the patient's financial context.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Supplementary File 1: Rules for data checking for opportunistic screening for chlamydia.

Supplementary File 2: Characteristics associated with the patient having had a chlamydia test.