Increasing the uptake of opportunistic chlamydia screening: a pilot study in general practice

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ABSTRACT

INTRODUCTION: Genitourinary *Chlamydia trachomatis* infection is common and associated with considerable personal and public health cost. Effective detection strategies are needed.

AIM: To assess feasibility of an opportunistic incentivised chlamydia screening programme in general practice over six months.

METHODS: This study was designed as a pilot for a randomised controlled trial in primary care. Three general practices were randomly allocated to intervention (two practices) and control groups. The intervention involved practice education, self-sample collection and practice incentives (funding and feedback) for a three-month 'active' intervention period. Feedback and education was discontinued during the second three-month period. Practice-specific nurse- or doctor-led strategies were developed for identifying, testing, treating and recalling male and female patients aged 16–24 years. The main outcome measure was the difference between the practices' chlamydia screening rates over the six months following introduction of the intervention, controlling for baseline rates from the previous year.

RESULTS: Chlamydia testing rates during the year prior to the intervention ranged from 2.9% to 7.0% of practice attendances by 16–24-year-olds. The intervention practices had higher rates of screening compared with the control practice ($p<0.001$) at three months, but both practices reverted to pre-intervention rates by six months. The nurse-led screening strategy was more effective (35% declining to 5.5% over six months) than the doctor-led strategy (15% declining to 1.6% over six months) ($p=0.04$).

DISCUSSION: Incentivised opportunistic chlamydia screening of 16–24-year-old patients attending their general practitioner with a programme involving practice education, feedback and self-sample collection can increase screening rates.

KEYWORDS: Primary health care; chlamydia; mass screening; randomized controlled trial

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Introduction

Chlamydia trachomatis is the most commonly-diagnosed bacterial sexually-transmitted disease and is a global public health problem.[1] Left untreated, chlamydia can have serious long-term sequelae including infertility, ectopic pregnancy and chronic pelvic pain.[2] Chlamydia can be passed from mother to baby at birth and, if untreated in pregnancy, increases rates of neonatal and maternal complications.[3] A high proportion of chlamydia infections are asymptomatic, so the majority of individuals go undiagnosed and therefore act as reservoirs for new infections.[4] Thus, syndromic treatment of symptomatic cases and their sexual contacts will not result in a drop in population prevalence.

Randomised controlled trials (RCTs) have demonstrated that selective testing and treatment of chlamydia in women can reduce the incidence

of pelvic inflammatory disease (PID),[5,6] demonstrating the individual benefit of diagnosing and treating chlamydia. However, a chlamydia control strategy that aims to test and treat the wider population is necessary to reduce the overall prevalence in the community. The US Preventive Services Task Force recommends screening of all sexually-active women 24 years and younger.[2] The challenge for any chlamydia control programme is not only to increase testing in the primary care environment, but also to engage with primary care.

The general practice setting is an obvious choice for opportunistic testing as a high proportion of under-25-year-olds attend in any one year (80% of females in Australia,[7] and 84% of females and 70% of males in New Zealand).[8] In 2007 the annual rate of chlamydia infection in New Zealand is estimated to be 714 per 100 000 which is over twice that of Australia (244.9/100 000). The highest rates occur in 15–19-year-olds with rates of 2887 and 6382 per 100 000 respectively for the Waikato and Bay of Plenty regions.[9] Despite these high rates of infection, good primary care systems and the availability of testing and treatment, there is currently no organised programme to reduce chlamydia in Australia or in New Zealand.[10,11]

The question still remains about how to achieve sustained control of the transmission of chlamydia. The aim of this study was to pilot an opportunistic chlamydia screening programme targeting males and females aged 16–24 years. The programme incorporates practice-specific screening strategies, incentives, and self-sample collection with feedback of testing rates over three months.

Methods

This study was approved by the Central Regional Ethics Committee in July 2006 (Ref. CEN/06/06/053), and carried out during 2007 in Wellington. Three primary care practices were invited to participate by letter of invitation followed by a phone call and face-to-face meeting. Written informed consent was obtained for participation. Eligibility criteria for practices included: located in Wellington and attended by at least 300, 16–24-year-old patients in the previous year. The three practices were selected based on location—Practice A was located in an outer city suburb, Practice B in the central city, and Practice C in an inner city suburb. All three of the invited practices were willing to participate, and were randomly allocated to the intervention (two practices) or control group (one practice), as determined by the flip of a coin.

Intervention

Prior to the start of data collection, the research team worked with practices in the intervention group over a six-week period to identify ways to best achieve the goal of testing all 16–24-year-old patients attending for any reason. This method was based on the 'systems approach' used by Shafer to increase screening rates, and involved engaging the practice in the implementation of the programme, assembling a team to champion the project, identifying the gap between best practice and current practice, and regular monitoring and feedback of progress over the trial period.[12] Sexual histories were not taken prior to offering screening. Practices were encouraged to develop a system for identifying appointments for patients in the age-group at the beginning of the day. Verbal scripts were developed for use by practice staff in offering chlamydia screening tests. Females were offered self-taken swab or urine tests, while males were offered urine tests. A brief instruction sheet was provided for females as a guide to obtaining a vaginal swab. The active intervention phase ran for three months once opportunistic screening began at intervention practices. During this phase, practices were provided with regular feedback at face-to-face meetings with the programme team about their screening rates. During the second three months of the study (post-active intervention phase), the practices received no feedback, and no contact or meetings with the programme team.

The financial incentive provided to intervention practices included a payment equivalent to two-tenths of a nurse's time over six months (paid in two instalments over six months) to ensure the programme was adequately resourced. All general practices in the study region can claim for an already existent payment for a consultation (NZ$11 for a short consultation and NZ$40 for

a long consultation) relating to sexual health in the under–25-year-olds. The control practice was able to claim for this, but only the intervention practices were reminded to claim.

Intervention practices were asked to contact patients about their results in the usual way (either by telephone or in writing) and to offer Azithromycin 1g stat as first-line treatment for positive tests. Partner treatment was also recommended. A recall system was put in place to offer a repeat test at three months for patients who tested positive for chlamydia and at one year for patients who tested negative. All chlamydia testing took place at an ISO15189 accredited medical laboratory using the COBAS TaqMan v2.0 PCR test. This test has high sensitivity and specificity for the detection of chlamydia from clinician or self-obtained specimens.[13] Laboratory results for patients tested during the study period were fed back to requesting practices in the normal way (electronically).

Outcome measures

Data collection ran for six months from the start of the intervention. The primary outcome was change in rate of chlamydia testing in the intervention practices compared with the control practice over six months (including active and post-active phases of the intervention). Monthly test rates were calculated by taking laboratory testing data as the numerator, and practice consultations by 16–24-year-old patients during the assessment period as the denominator. Data on gender, age and ethnicity were also provided by WIPA (now Compass Health) who routinely collect practice consultation data for their members. All data were de-identified so that no identifying patient details were provided to the research team. As consultation and testing rates were collected electronically and automatically, there

WHAT GAP THIS FILLS

What we already know: *Chlamydia trachomatis* is the most commonly-diagnosed bacterial sexually-transmitted infection in New Zealand and worldwide, and is responsible for considerable personal and public health cost. There is a lack of evidence for effective chlamydia control programmes.

What this study adds: Opportunistic screening in primary care can be significantly increased by the use of incentives, practice education and feedback of screening rates.

Figure 1. Percentage of 16–24-year-olds screened for chlamydia in intervention compared with control practices before, during and after the intervention

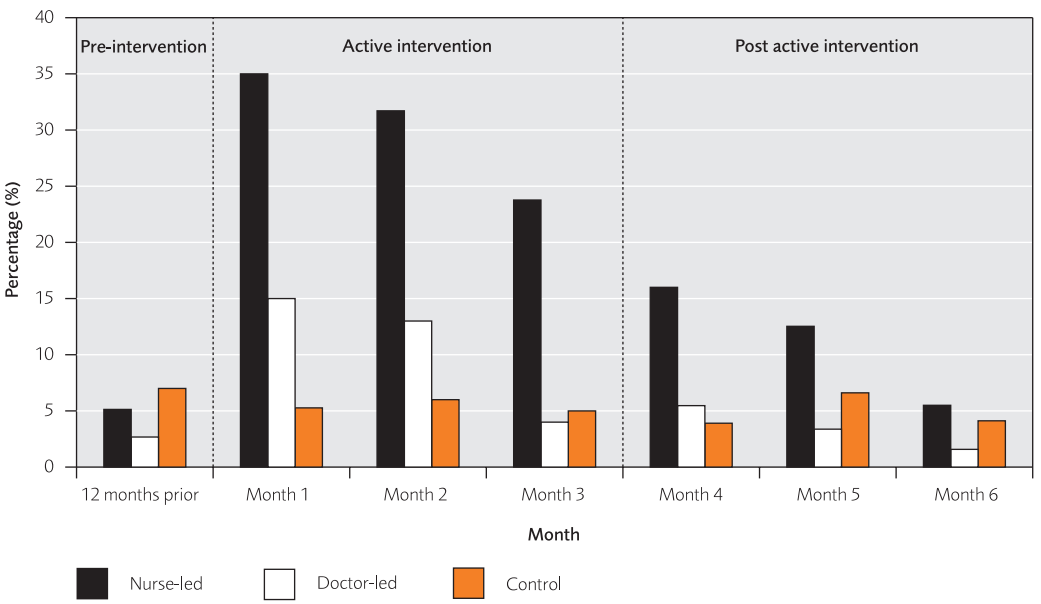

Table 1. Number and characteristics of 16–24-year-old patients attending study practices during the study period

Characteristic	Intervention				Control	
	Practice A Nurse-led		Practice B Doctor-led		Practice C (usual care)	
	n	%	n	%	n	%
All patients	**756**		**712**		**936**	
Females	508	67.2	500	70.2	613	65.5
Males	248	32.8	212	29.8	323	34.5
Age-band						
16–19 years	363	48.0	107	15.0	344	36.8
20–24 years	393	52.0	605	85.0	592	63.2
Ethnic group						
New Zealand European	362	47.9	514	72.2	688	73.5
Maori	266	35.2	20	2.8	53	5.7
Pacific	60	7.9	7	1.0	4	0.4
Asian	25	3.3	35	4.9	58	6.2
Other/not known	43	5.7	136	19.1	133	14.2

was no risk of assessor bias. Data relating to test results were obtained from the laboratory.

Analysis

To assess the differences in changes in chlamydia screening rates over time between the intervention and control practices (proportion tested), a regression model was used including baseline rates as a covariate. Analyses were also controlled for gender proportions in each practice and screening rates from the previous year. Percentages screened each month at each practice were arc-sine transformed to better satisfy the assumptions of normality. Two hypotheses were tested using contrasts. One a priori analysis assessed whether there was an effect of the intervention in general compared with no intervention, and a post hoc analysis assessed whether there was a significant difference in effect between the nurse-led and the doctor-led model intervention practices. A p-value of <0.05 was taken to be statistically significant. Analyses were conducted using the statistical programme SAS v9.0.

Results

Table 1 shows the number and characteristics of patients attending the three practices during the six-month study period. Practices had similar proportions of male and female patients. Practice A had a similar age distribution but a higher proportion of patients of ethnicities other than New Zealand European (including 35.2% Maori) than the other practices. One intervention practice (A) chose to have the screening offered by both the practice nurses and doctors with a 'nurse champion' while the second intervention practice (B) chose to offer chlamydia screening during the consultation with the doctor and not to involve the nurses. Table 2 depicts the different approaches adopted by the two intervention practices. Both practices had five meetings with members of the programme team prior to data collection (to establish the intervention strategy) and five meetings during the data collection period (including visits to provide feedback on testing rates).

All three practices had similar rates of testing for chlamydia during the year prior to the study, ranging from 2.9% to 7.0%. Table 3 presents the percentage of patients tested at each of the three practices over time. The intervention practices had significantly higher screening rates following the intervention than the control practice ($p<0.001$), with the nurse-led approach significantly more effective than the doctor-led ap-

Table 2. Description of intervention programme components

Components		Nurse-led intervention Practice A	Doctor-led intervention Practice B	Control (usual care) Practice C
Provided by the programme team	Funding	$11 payment* $400 study participation fee *plus* equivalent 2/10ths practice nurse time paid for six months	$11 payment* $400 study participation fee *plus* equivalent 2/10ths practice nurse time paid for six months	$11 payment* $400 study participation fee
	Documentation	22-page study manual customised for practice, covering all relevant aspects of chlamydia testing and treatment	22-page study manual customised for practice, covering all relevant aspects of chlamydia testing and treatment	Best practice chlamydia management guidelines (four pages) posted to practice
	Feedback	Feedback on testing rates provided to practice team during the active intervention phase (four face-to-face meetings in weeks 2, 4, 6 and 10)	Feedback on testing rates provided to practice team during active intervention phase (two face-to-face meetings in weeks 5 and 7; emailed feedback in weeks 9 and 11)	
Practice-specific systems developed in consultation with programme team	Method used to identify eligible patients	Systematic identification of eligible patients by nurse at start of day, sometimes utilised Medtech† alerts	Opportunistic identification of eligible patients by doctor during day	'Usual practice'
	Information for patients about testing	Posters placed in waiting room and clinical rooms GP and nurses used brief 'script' to offer tests One page pamphlet of information about chlamydia offered	GP used brief 'script' to offer tests One page pamphlet of information about chlamydia offered	
	Sample collection	*Females*: urine; self-collected swab (instruction sheet offered), clinician swab with cervical smears *Males*: urine	*Females*: urine; clinician swab with cervical smears *Males*: urine	
	Notification of results and treatment	Patients asked to phone for results; positives phoned by nurse Invited partners to attend for treatment	Sent letter to patients regardless of whether result positive or negative Invited partners to attend for treatment	
	Recall of patients tested	Aim to send letter to recall patients *Positive* chlamydia—recall entered into Medtech for three months *Negative* chlamydia—recall entered into Medtech for 12 months	Aim to send letter to recall patients *Positive* chlamydia—recall entered into Medtech for three months *Negative* chlamydia—recall entered into Medtech for 12 months	

* Available to all practices in the study region, payment can be claimed from the District Health Board for a short sexual health consult

† Medtech is a computerised patient management system used in many general practices in New Zealand.

proach (p=0.04). Screening rates declined at both intervention practices after the three months of the active intervention, with rates returning to baseline by the end of the six-month period (Figure 1). Screening rates tended to be similar for males and females at practice A, but were lower for males at practice B during the three months of active intervention (Table 4).

In the 12 months prior to the intervention, the overall rate of chlamydia infection detected at the three study practices (intervention and control) was 10.5% (23/219). Practice A had the highest proportion of chlamydia-positive cases detected at baseline with 20.3% (13/64), Practice B detected chlamydia in 14.8% (4/27) of patients tested, and the control practice detected chlamy-

Table 3. Number (percent) of attendances of 16–24-year-olds where screening for chlamydia occurred in intervention compared with control practices

Time	Nurse-led intervention (A)		Doctor-led intervention (B)		A vs B	Control practice (C)		Intervention vs Control
	n/N*	%	n/N	%		n/N	%	
Pre-intervention								
Previous 12-months	66/1304	5.1	27/924	2.9		137/1952	7.0	
Active intervention								
Month 1	52/148	35.1	18/120	15.0		11/209	5.3	
Month 2	39/123	31.7	12/92	13.0		10/171	5.8	
Month 3	31/130	23.8	6/143	4.2		8/156	5.1	
Post active intervention								
Month 4	20/125	16.0	6/112	5.4		5/127	3.9	
Month 5	13/103	12.6	4/115	3.5		9/133	6.8	
Month 6	7/127	5.5	2/127	1.6		6/140	4.3	
P-value†					0.04			<0.001

* Number of tests/number of attendances (%)

† Regression analysis of change over time controlling for pre-intervention rate and proportion of males and females tested

Table 4. Percentage of attendances of 16–24-year-old males and females where screening for chlamydia occurred at intervention and control practices

Time	Nurse-led intervention (A)		Doctor-led intervention (B)		A vs B	Control practice (C)		Intervention vs Control
	n/N*	%	n/N	%		n/N	%	
Pre-intervention								
Previous 12-months	66/1304	5.1	27/924	2.9		137/1952	7.0	
Active intervention								
Month 1	52/148	35.1	18/120	15.0		11/209	5.3	
Month 2	39/123	31.7	12/92	13.0		10/171	5.8	
Month 3	31/130	23.8	6/143	4.2		8/156	5.1	
Post active intervention								
Month 4	20/125	16.0	6/112	5.4		5/127	3.9	
Month 5	13/103	12.6	4/115	3.5		9/133	6.8	
Month 6	7/127	5.5	2/127	1.6		6/140	4.3	
P-value†					0.04			<0.001

* Number of tests/number of attendances (%)

† Regression analysis of change over time controlling for pre-intervention rate and proportion of males and females tested

dia in 4.8% of those tested (6/128). During the three-month study intervention period, the overall proportion of patients testing positive for chlamydia was 8.0% (15/187) across the three study practices. At intervention Practice A, 10.7% of individuals screened for chlamydia tested positive (13/122) during the three-month active intervention, two males and 10 females (gender was not recorded for one case). At intervention Practice B, only one female tested positive of 36 tested (2.8%). Likewise, at the control practice, chlamydia was detected in only one female of 29 tested (3.4%) during the three-month active intervention.

Discussion

This pilot study found that the three-month intervention programme comprising practice education, practice-specific screening strategies, self-sample collection, incentives and face-to-face feedback on screening rates significantly increased the proportion of 16–24-year-old patients screened for chlamydia over six months.

The rates of testing in the intervention practices over three months (Practice A, 30.4%; Practice B, 10.1%) compare favourably with those of the United Kingdom (UK) screening programme which had an average uptake of 9.5% by December 2008. There was a return to pre-intervention screening rates by the end of the six-month data-monitoring period. Interaction with the programme team and feedback of testing rates ceased at the end of three months, which coincided with the gradual fall-off in rates back to baseline testing rates at six months. Comments from participating practice staff at the end of the six months indicated that they stopped offering tests because the study had stopped. This suggests that, as well as incentives, being part of a broader programme may assist in maintaining higher levels of screening in general practice.

Past research has also demonstrated that using a 'practice champion' may be effective.[14] The present study showed that the screening strategy led by a practice nurse champion was significantly more effective than the doctor-led strategy, although this may have been due to other characteristics of the practices involved. Financial incentives, combined with practice education and feedback of testing rates, have contributed to the increased testing rates seen in this study. Incentives were also used in a UK screening pilot study in Wirral and Portsmouth in which 50% uptake of chlamydia testing by the eligible female population was achieved.[15] General practitioners received a fee-for-service for chlamydia testing in the pilot and 60% of positives were detected through this setting.[16] Incentives were also a component of an Australian randomised controlled trial designed to increase chlamydia testing in women presenting for Pap smears. This study found that women had a twofold greater chance of being tested in the intervention arm (6.9% vs 4.5% in the control).[17] The initial aim of the UK National Chlamydia Screening Programme (NCSP) was to achieve the modest target of offering testing to 15% of all 15–24-year-olds.[18] The NCSP began roll-out in 2003 with the expectation of full national participation by all primary care trusts by the end of 2007; however targets have not yet been met.[19]

The challenge for any chlamydia control programme is not only to increase testing in the primary care environment, but also to engage with primary care. It has been suggested that the lack of engagement with general practitioners in the NCSP might be explained by the absence of any incentives.[20–23] The relative failure of past or existing screening programmes to reduce the prevalence of chlamydia may also be related in part to the failure to screen males, as well as factors such as failure to treat partners.[24]

Although males appear to have lower rates of chlamydia infection compared to females, it seems logical to screen and treat males to reduce the prevalence of chlamydia morbidity in females.[24,25] A strength of the present study was that testing was offered to all males and females in the eligible age group regardless of sexual activity. Doctors in this study supported this approach suggesting it was less threatening,

A strength of the present study was that testing was offered to all males and females in the eligible age group regardless of sexual activity. Doctors in this study supported this approach suggesting it was less threatening, and 'normalised' testing

and 'normalised' testing. This is consistent with qualitative research that concluded that women did not want a sexual history taken and preferred tests to be offered based on age rather than sexual history.[26,27] Rates of screening in this study were similar for males and females, suggesting that this approach was accepted by both genders and was particularly effective in reaching males (43% tested in month 1 at Practice A). The UK screening programme had achieved 4.5% coverage of males as of 2008.[19]

The use of self-sample collection in the practice may also have increased acceptance rates, particularly for females who prefer self-collection to traditional (more invasive) clinician-obtained methods.[19]

Detection of chlamydia cases in the present study was significantly lower for intervention practices during the three-month active intervention period (8.9%) compared with baseline (18.7%, $p<0.05$), but did not differ for the control practice. This is consistent with the dilution that occurs by testing all patients rather than those who are symptomatic or considered by a practitioner to be high-risk.

A limitation of this pilot study was the inclusion of only three practices and the short time frame of the intervention period, thereby limiting generalisability of results beyond the study. Testing rates may be underestimated in the present study, as the data-matching method used to calculate testing rates did not exclude individuals seen twice (by both the doctor and nurse) on the same day, potentially inflating the denominator. Furthermore, offering testing to all in the age group is likely to have diluted the 'proportion tested' as those who had never been sexually active are likely to have declined screening but were still included in the denominator. The consultation data received did not allow determination of the number of repeat visits by patients during the time period who were not re-offered a chlamydia test for legitimate reasons (e.g. they were returning for chlamydia treatment, or had just recently been seen and tested). Recent debate led by Low has questioned the validity of the NCSP as it is not backed by rigorous scientific evidence that screening causes a reduction in illness caused by chlamydia and therefore opportunistic chlamydia testing does not fulfil the requirements for a screening programme.[28]

A randomised controlled trial with a longer active intervention phase is needed to assess whether the gains shown in this study can be achieved in other practices and sustained beyond three months. A concurrent public health promotional programme similar to those for mammography and cervical screening to promote regular testing may help to both 'normalise' and promote testing within the wider community.

We suggest there is an opportunity for countries such as Australia that are in the process of instigating chlamydia screening in primary care to use an experimental model in the roll-out of their programme. Effectiveness, sustainability and ultimately cost-effectiveness can then be assessed. Effectiveness should include rates of uptake of chlamydia testing as well as assessment of the impact of screening on illnesses associated with chlamydia infection such as PID and ectopic pregnancy.

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