

Narrative review of the barriers and facilitators to chlamydia testing in general practice

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Supplementary Material

Summary of evidence and detailed summary of publications

Table S1. Summary of evidence for patient barriers

Barrier	Studies with a quantitative component				Studies with a qualitative component	
	RCT No. of studies (References)	Observational No. of studies (References)	Outcome	Effect size range	No. of studies (References)	Effect of barrier
Perceptions of being judged	0	2 (Zakher and Kang 2008) (Walker et al. 2013)	- Proportion citing fear of others finding out if testing sought - Proportion of women uncomfortable in asking their doctor for a test	10% 47%	6 (Pimenta et al. 2003a; Heritage and Jones 2008; Pavlin et al. 2008; Balfe and Brugha 2009; Balfe et al. 2010a; Balfe et al. 2010b; Hogan et al. 2010; Balfe and Brugha 2011)	Feelings of shame and embarrassment as a threat to an individual's identity were cited as reasons for delaying access to STI testing. Stigma was associated with a chlamydia diagnosis.
Poor knowledge	0	3 (Zakher and Kang 2008) (Mason 2005) (Burack 2000)	- Proportion reporting they had little to no knowledge of chlamydia - Proportion that had never heard of chlamydia - Proportion of men that did not know chlamydia was asymptomatic - Proportion aware of GPs providing sexual health advice	63.2% 20% 66% 74-81%	3 (Santer et al. 2003; Balfe et al. 2010a; Hogan et al. 2010)	Inadequate knowledge around risk and testing procedures prevented patients from seeking testing. Perceived risk was also lower in the absence of symptoms. Patients did not believe they were at risk despite having unprotected sex.
Accessibility to services	0	2 (Burack 2000) (Walker et al. 2013)	- Proportion that feel GPs would be helpful in accessing sexual matters/advice - Proportion that felt GPs were too busy to deal with their problems - Proportion citing cost as a barrier	68-76% 32-44% 42%	3 (Balfe and Brugha 2009; Balfe et al. 2010; Hogan et al. 2010)	Cost of GP services and time were prohibitive in seeking STI testing. Delayed testing also occurred where services were further away or had inconvenient opening hours.

	2010)	(Khan and Plummer 2008)	- Proportion of GPs finding STI printed materials inadequate/inappropriate	55%		
Fear of appearing discriminatory		5 (Hocking et al. 2008) (Khan et al. 2008b) (Thompson et al. 2008) (Temple-Smith et al. 1999) (Temple-Smith et al. 2008)	-Proportion finding it difficult to talk to patients about sexual health -Proportion citing religion/ethnicity of patient as a barrier -Proportion of GPs feeling uncomfortable in taking a sexual history -Proportion citing embarrassment as a barrier - Proportion of GPs that perceived the patient to be more embarrassed were less likely to take a sexual history than GPs who perceived the patient to not be embarrassed at all -Proportion of GPs who perceive patients to be embarrassed in an unrelated sexual health consult	18% 31% 23-86% 20.2% 10% vs 53%, p<0.001 57-58%	3 (Hinchliff et al. 2005; Hocking et al. 2008; Thompson et al. 2008)	GPs were strongly concerned about insulting or embarrassing a patient when offering a test. Some highlighted that sexual health could have moral issues, particularly around sexuality.

Table S3. Summary of evidence for general practice barriers

Barrier	Studies with a quantitative component				Studies with a qualitative component	
	RCT No. of studies (References)	Observational No. of studies (References)	Outcome	Effect size range	No. of studies (References)	Effect of barrier
Lack of time and competing demands	0	2 (Griffiths and Cuddigan 2002) (Thompson et al. 2008)	- Proportion citing reasons for infeasibility of testing because of time and workload - Proportion citing time as a barrier	57% 92%	5 (Armstrong et al. 2003; McNulty et al. 2004a; Senok et al. 2005; Thompson et al. 2008; Temple-Smith et al. 2012)	Nurses and other clinic staff did not have enough time to test or improve sexual health practices due to competing demands in the clinic. Difficulties were exacerbated when clinics were short-staffed.
Lack of knowledge and capacity	0	3 (Robertson and Williams 2005a; Robertson and Williams 2005b) (Thompson et al. 2008)	- Proportion of nurses not testing male patients because they lack confidence/knowledge - Proportion not testing because of lack of knowledge/training	91% 92.2%	3 (McNulty et al. 2004a; Robertson and Williams 2005a; Thompson et al. 2008)	Nurses lacked confidence in testing men, and would require training on how to do endourethral swabs. Being unaware of the epidemiology was also a barrier to testing. Lack of a formal practice protocol in sexual health issues also prevented nurses from testing.
Attitudes of practice staff	0	1 (Wallace et al. 2012)	- Proportion of citing not having support of colleagues having an impact on future offer behaviour	70.2%	3 (McNulty et al. 2008a; Temple-Smith et al. 2012; Wallace et al. 2012)	Low screening clinics had staff that were not engaging with testing practices, and were not considered youth-friendly. Approval from influential figures in the clinic was contingent on the impact on time, resources or funding.
Inadequate promotional materials	0	1 (Khan and Plummer 2008)	- Proportion of GPs finding STI printed materials were not available or at sufficient levels for clinics	21.5-23%	1 (Freeman et al. 2009)	Posters advertising chlamydia testing were often removed, because they offended other patients or wall space was at a premium. Leaflets were available but often not recognizable or embarrassed patients who had them.

Table S4. Summary of evidence for patient facilitators

Facilitator	Studies with a quantitative component				Studies with a qualitative component	
	RCT No. of studies (References)	Observational No. of studies (References)	Outcome	Effect size range	No. of studies (References)	Effect of facilitator
Normalisation of testing	0	2 (Zakher and Kang 2008) (Walker et al. 2013)	- Proportion comfortable being tested by GP - Proportion of women who thought annual chlamydia testing was a good idea	75.7% 88%	6 (Pimenta et al. 2003a; Santer et al. 2003; Heritage and Jones 2008; Pavlin et al. 2008; Balfe et al. 2010b; Hogan et al. 2010; Balfe and Brugha 2011)	Framed as a responsible choice around one's health would increase testing and reduce stigma; general practice was an acceptable place to be tested
Education	0	1 (Zakher and Kang 2008)	- Proportion wanting more education	49.4%	6 (Pimenta et al. 2003a; Santer et al. 2003; Heritage and Jones 2008; Pavlin et al. 2008; Hogan et al. 2010)	Adequate information was needed to make an informed choice, often through health care professionals or education campaigns
Access to testing and services	0	3 (Oakeshott et al. 2002; Brugha et al. 2011) (Morgan and Haar 2009) (Brugha et al. 2011)	- Proportion agreeing urine tests were acceptable - Absolute percentage difference between baseline and end of intervention of testing rates due to lower cost and services - Difference of proportions between those who have a test if offered and those that would take a test if patient was required to pay	95-96% 2.9%F / 1.2% M 25.5%	2 (Heritage and Jones 2008; Sutcliffe et al. 2011)	Urine testing was preferred over a swab because it was more comfortable and convenient, and less invasive.
Patient comfort with general practice	0	3 (Harris 2005; Brugha et al. 2011) (Saunders et al. 2012) (Brugha et al. 2011)	- Proportion finding testing in general practice acceptable - Proportion of men finding testing in general practice acceptable - Proportion preferring doctor / nurse to offer test	60.7%-70% 79.7% 75.6% / 79.1%	2 (Balfe et al. 2010b; Hogan et al. 2010)	Young people were comfortable with being testing in general practice, and wanted to be offered a test by a health care professional
Incentives	0	1 (Zenner et al. 2012)	- Increase in testing rates	0.67%	0	-

Table S5. Summary of evidence for GP facilitators

Facilitator	Studies with a quantitative component				Studies with a qualitative component	
	RCT No. of studies (References)	Observational No. of studies (References)	Outcome	Effect size range	No. of studies (References)	Effect of facilitator
Remembering to test/ Normalisation of testing	3 (Bilardi et al. 2010) (Bowden et al. 2008) (Walker et al. 2010) (Lawton et al. 2010)	7 (Wallace et al. 2012) (Merritt et al. 2007) (Bangor-Jones 2011) (Hocking et al. 2008) (Giles et al. 2009) (Sawleshwarkar et al. 2010) (Bennett et al. 2001)	<ul style="list-style-type: none"> - Proportion in agreement with normalising testing - Absolute difference in testing rates between baseline and late intervention - Association of testing in intervention compared to control using incentive payments - Association of testing in intervention compared to control using Pap smears - Association of testing in intervention compared to control using computer reminders - Proportion of diagnoses adhering to clinical guideline of testing asymptomatic patients - Proportion of GPs that would test if national guidelines/screening programme - Absolute increase in testing after intervention GP characteristics associated with testing: <ul style="list-style-type: none"> - Older, more experienced respondents - Younger, female GPs - Interest in STIs 	94% OR=2.1 OR=1.3 63% 12.1%	6 (Hinchliff et al. 2005; Ma and Clark 2005; Hocking et al. 2008; McNulty et al. 2008b; McNulty et al. 2010; Wallace et al. 2012)	Screening was driven by a practice champion, and sustained by time-saving methods that normalised testing within the practice, as well as support outside of the practice
Education/ Awareness/ Training	2 (Lawton et al. 2010) (McNulty et al. 2008b)	13 (Kalwij et al. 2012) (Doherty 2000; Hope et al. 2002; Rogstad and Henton 2004;	<ul style="list-style-type: none"> - Absolute increase in testing after intervention - Association of testing rates of females aged 16-24 after receiving educational workshops compared to baseline - Increase in screening coverage after receiving education - Proportion of GPs wanting more education/training 	OR=1.33 5.2-6.9% 28-90%	4 (Wray et al. 1998; McNulty et al. 2004a; Hinchliff et al. 2005; Hocking et al. 2008)	Education was instrumental to helping GPs identify the need for testing, and feel confident in offering a test or taking a sexual history, although this effect is not sustained.

		<p>Hocking et al. 2008; Khan et al. 2008a; Thompson et al. 2008; Khan and Schofield 2009)</p> <p>(Khan et al. 2006) (Bailey et al. 2008) (Richards and Pattman 2008) (Wray et al. 1998) (Temple-Smith et al. 1999)</p>	<ul style="list-style-type: none"> - Association of testing rates and postgraduate education in STIs - Increase in testing numbers after education - Proportion of GPs who promoted opportunistic testing after attending education course - Increase in test score after receiving education - Proportion of GPs with STI education who were less likely to find the first consultation to be a barrier to taking a sexual history 	<p>OR=2.0-2.1 82 70% 7% 30% vs 45%, p<0.001</p>		
Incentives	<p>2 (Bilardi et al. 2010) (Lawton et al. 2010)</p>	<p>3 (Sohal et al. 2008) (Pimenta et al. 2003b) (Hocking et al. 2008) (Kalwij et al. 2012)</p>	<ul style="list-style-type: none"> - Association of testing in intervention compared to control using incentive payments - Absolute increase in testing after intervention - Absolute increase in testing after local-enhanced services offered - Coverage in screened areas after pilot introduced with incentives - Proportion of GPs who favoured incentives - Average coverage increase in Lambeth / Southwark after intervention introduced using incentives and outreach 	<p>OR=0.9 12.1% 3% 39-50% 83% 5.2% / 6.9%</p>	<p>3 (Perkins et al. 2003; Ma and Clark 2005; Hocking et al. 2008)</p>	<p>Remuneration was necessary to implement testing but the optimal payment structure was not clear.</p>

OR = odds ratio

Table S6. Summary of evidence for general practice facilitators

Facilitator	Studies with a quantitative component				Studies with a qualitative component	
	RCT No. of studies (References)	Observational No. of studies (References)	Outcome	Effect size range	No. of studies (References)	Effect of facilitator
Nurses & use of practice staff	1 (Lawton et al. 2010)	3 (Robertson and Williams 2005a) (Griffiths and Cuddigan 2002) (Wallace et al. 2012)	- Absolute difference in testing rates by nurses - Proportion of nurses regularly using a chlamydia care pathway - Proportion of nurses that think screening is necessary - Proportion in agreement with normalising testing	30% 62% 49% 94%	5 (Perkins et al. 2003; Markham et al. 2005; McNulty et al. 2008a; McNulty et al. 2010; Morgan et al. 2012)	Using a whole-team approach to testing reduced pressures on GPs and empowered other staff members to take on a leading role
Increased education/ Awareness/ Training	1 (Armstrong et al. 2003)	2 (Doherty 2000; Thompson et al. 2008)	- Proportion of nurses wanting more education/training - Increase in testing in intervention clinic with health adviser - Proportion of tests done by nurses in intervention clinic	53.8-86% 120% 70%	3 (McNulty et al. 2004a; Senok et al. 2005; Thompson et al. 2008)	Staff who had more training and education recognised the need to test and participate in a screening program
Supportive infrastructure	0	3 (Kalwij et al. 2012) (Wallace et al. 2012) (Morgan et al. 2012) (Penney et al. 2005)	- Total testing coverage in two regions with an external support system - Proportion of staff perceiving whole-surgery sign-up to make offering a test easier - Change in testing after a clinical guideline was implemented - Proportion of testing in young people in region exposed to intervention compared to control	24.5-35.6% 94% 0% 14% vs 34%; p<0.0001	8 (Griffiths and Cuddigan 2002; Armstrong et al. 2003; Perkins et al. 2003; McNulty et al. 2004a; Ma and Clark 2005; McNulty et al. 2008a; Freeman et al. 2009; McNulty et al. 2010)	Promotional materials and testing kits reduced pressures on staff, and recording systems and computer prompts served as reminders to test. An external coordinator/adviser provided support to enable easier screening. Incorporation of testing into existing practices facilitated an increase in testing.

Detailed summary of publications

Table S7. Summary of publications with a qualitative component

Reference	Subjects	Study Design	Findings
Wallace et al. 2012	12 doctors, nurses and receptionists	Interviews structured around Theory of Planned Behaviour	Barriers included lack of resources, and lack of time in initial consult and contact tracing. Presenting with sexual health related issues such as contraception made it easier to offer a test. Opportunistic testing was approved by the clinic if there was an influential person that supported it.
McNulty et al. 2010	Staff from high, medium and low testing practices	25 focus groups and 12 interviews using purposive sampling	Screening was normalised in higher testing clinics where most staff had a personal belief in the importance of screening ('whole team' approach). Low testing clinics considered screening to be a low priority where it was not included in the Quality Outcomes Framework targets and did not see the benefits of testing. Many were not comfortable in raising chlamydia in opportunistic consults.
McNulty et al. 2008a	9 NCSP co-ordinators	Semi-structured interviews, used purposive sampling	An interpretative phenomenological thematic analysis found that higher screening clinics had a practice champion who would drive process and maintain motivation in the clinic, and testing was normalized in the clinic. Time-saving strategies included computer reminders, test kits at reception, and youth clinics. Other strategies included a greater profile, financial incentives and targets, and ongoing training of general practice staff.
McNulty et al. 2004b	Staff from 12 high and low testing general practices	Focus groups	Low testing practices knew little about the epidemiology of chlamydia and few were aware of its asymptomatic presentation and many did not know how to take a diagnostic specimen. High testing practices had a GP or nurse who completed specialist training, were more aware of signs and symptoms and always considered it in differential diagnosis.
McNulty et al. 2004a	Staff from 12/15 high and low testing general practices	Focus groups	Barriers included lack of evidence of benefits of testing, lack of knowledge of when and how to take specimens, and lack of time, difficulty in raising issue in unrelated consult. Some facilitators were suggested including linking tests to pap smears, developing sexual health/family planning clinics or having family planning nurses, established policy and the use of non-invasive testing
Freeman et al. 2009	Staff from 25 general practices with high and low screening	Focus groups	Reasons for not using National Chlamydia Screening Programme promotional materials included competing campaigns, offensive to some older people; fear of it becoming part of the scenery. The leaflets were good but there was a fear of stigmatizing patients, and it needs to be translated and discreet, reception in high-screening clinic gave to patients to read over while waiting.
Ma and Clark 2005	12 interviews – staff from health clinics and public health groups	Semi-structured interviews using purposive sampling	It was found that key stakeholders agreed that chlamydia screening is feasible in general practice, where there would be greater population coverage. Time and workload for clinicians could be reduced by self-collected vulval swabs or urine tests. Incentives for screening may encourage uptake but will add to the cost of screening.
Hocking et al. 2008	21/70 interviews	Semi-structured interviews	GPs were supportive of screening. Barriers were identified around the administrative side of screening of workload, time and cost. Additionally, lack of knowledge, discomfort for GP and patient, and lack of communication skills were cited as barriers. Facilitators included education of GPs and the public, financial incentives, national screening program, and mechanisms for recall and reminders.
Perkins et al. 2003	13 GPs, 14 practice nurses, 15 practice receptionists, 11 practice managers	Interviews	GPs wanted receptionists involved to save time but there were concerns about privacy and qualifications in answering questions. Some GPs were not comfortable with sexual health and did not implement testing. Preferred management of positive cases and partner notification to be handled by GUM clinics because of lack of skills and diagnostic facilities. Participants were uncertain as to why screening targeted young women and not men.
Thompson et al.	7 GPs/10 PNs	Semi-structured interviews	Barriers included a lack of formal practice protocol, time, training and knowledge. There were perceptions that female GPs

2008			were more involved with sexual health, and that high-risk populations was not attending their practice. Moral and cultural issues were also cited obstructions to sexual health promotion. Staff reported being unsure of the uptake of leaflets or promotional materials.
Hinchliff et al. 2005	22 GPs (9 women, 13 men – aged 34-57)	In-depth interviews	Difficulty in discussing sexual health with patients who are non-heterosexual, related to GP attitudes and awareness towards same-sex relationships, due to lack of knowledge around same-sex lifestyles, practices and terminology. Facilitators to improving communication included education and training for GPs and having a non-discriminatory policy for their practice.
Temple-Smith et al. 2012	12 practices	Semi-structured interviews	Results from interviews were not presented separately from quantitative practice assessment. Little change had been made to clinics at 2 month follow-up after introduction of a practice specific chlamydia testing pathway. Observed barriers included time and a lack of youth-friendly practices.
Markham et al. 2005	5 key informants of general practice and sexual health training	Interviews	Results from interviews were not presented separately from quantitative survey results, no distinction made other than commentary on nurses. It was stated that nurses in general practice would be able to provide level 1 provision of sexual health services.
Pavlin et al. 2008	24 women aged 16-25	In-depth, face-to-face semi-structured interviews	Women wanted to be offered the test if risk was based on age, not personal sexual history as it was not something they felt comfortable sharing with their GP. It was found that normalising testing by framing it as a public health issue was important to reducing stigma. Many responded that they would initially feel embarrassment and shame but relief once diagnosed and treated.
Pimenta et al. 2003a	16 930 women aged 15-24 attending services including general practice	In-depth interviews for programme evaluation	All respondents had unprotected sex with one or more partner but expected negative results. Stigma around STIs created concerns about accessing treatment. There was a reluctance to tell a partner because of feeling dirty, ashamed, and suspicions about origin. The experience of screening had heightened their awareness about chlamydia, and need to practise safer sex, and was constructive as they felt they were safeguarding their own health.
Hogan et al. 2010	36/51 men and women aged 15-24	Semi-structured interviews using Theory of Planned Behaviour framework	Majority had positive attitudes towards chlamydia screening, and felt that being offered a test was easier than asking for one even if it was a non sexual health related consult, particularly if presented with a non-judgmental attitude and barriers were minimised. Half of the participants believed that doctors and nurses wanted them to be screened for their health but the other half were unsure as they had never discussed it before with the GP.
Balfe et al. 2010b	35 women aged 18-29	Semi-structured interviews	Screening was seen as a threat to their identity, particularly if the respondent was younger or lower socio-economic background, for fear of being stigmatised. However, if screening was offered, most would accept when it was presented as normal practice, and part of responsible activity. There was a preference for testing offers from healthcare professions, not receptionists.
Balfe and Brugha 2011	30 young people; 21 females, 9 males	Interviews using Goffman's framework	Four concerns emerged – STD test seeking is stigmatized, the individual needs to manage perceptions while accessing information about testing, accessing healthcare settings that allowed an individual to manage outsider perceptions, and that identity influences testing and treatment seeking activities.
Balfe and Brugha 2009	30 young people; 21 females, 9 males	Semi-structured interviews	STI test seeking was influenced by four reasons – transitional moment in relationship, unprotected sex with casual partner, symptoms of infection, or required to do so by employer. Participants delayed testing because of stigma, lack of urgency, cost, or feeling they were not at risk. Facilitators included responsibility and the protection of future health.
Balfe et al. 2010a	35 women aged 18-29	Qual – semi-structured interviews using Goffman's stigma framework	Chlamydia was strongly associated with stigma, and those who were irresponsible and promiscuous were at risk of the infection. Those who saw themselves as responsible were not considered to be at risk. Not being tested was regarded as a positive activity that reinforced identity as 'good' while avoiding negative social consequences.
Sutcliffe et al. 2011	49 participants aged 16-43 (29 women, 20 men)	Semi-structured interviews	GP was considered easier to access than GUM services. Participants expected to receive leaflets or verbal information but received none about diagnosis and felt that GP avoided discussing sexual health matters with them. Participants did want to attend GP because of convenience, access and pre-existing relationship but preferred GUM for 'specialists' and high levels of satisfaction about information, tests, and advice

Robertson and Williams 2005b	7 practice nurses	Semi-structured interviews	Barriers to testing men for chlamydia included lack of confidence and knowledge on how to do endourethral swabs, lack of time prevented partner notification, not enough training and funding.
Senok et al. 2005	3 general practices from varying levels of deprivation	Interviews with GPs, PNs and admin staff	GPs found it difficult to change focus of consult to chlamydia screening as it felt inappropriate (especially if it was during a mental health consult). There were concerns about time to raise chlamydia issue, particularly if short-staffed. Nurses who were trained found it was beneficial and had a broader value to their everyday practice.
Pimenta et al. 2003b	2 healthcare authorities in the UK	25 interviews & ~400 self-completed questionnaires	In the absence of symptoms, patients were not motivated to seek out testing. Factors that influenced the decision to accept screening were that the participant was potentially at risk of infection, possible long-term effect on fertility and that chlamydia was easily treated. All women interviewed found urine testing acceptable, but some were not comfortable with reception handing out leaflets.
Santer et al. 2003	20 females aged 15-31 – mix of positive and negative tests	Individual interviews using a framework approach	Women perceived themselves to be at low risk of chlamydia because it was not thought of as common, felt that sexual history was low risk, and because they had no symptoms. The offer of screening was welcomed because of importance of preventing infertility, and the ease of testing and treatment. Participants stressed that adequate information was required in order to make an informed decision about whether or not to accept the test.
Heritage and Jones 2008	18 young people aged 16-18 recruited from general practice and school	2 focus groups & 2 individual interviews	General practice was seen as an acceptable place for opportunistic chlamydia testing but was not sure if their peers attended. Participants had concerns about using receptionists because of the lack of privacy and embarrassment, preferred to be offered test by GP. Participants were aware that the GP's time was limited, and were split on whether the testing offer would dissuade people from re-attending.
Wray et al. 1998	13 GPs	Evaluation of STD workshops post course surveys	Participants were more comfortable in taking sexual history, more likely to actively take a sexual history as part of routine practice – would assist them in better clinical examination and ordering of diagnostic tests and planning management of illness, improve confidence in information provision to their patients about STDs, greater awareness of referral resources

Tables S8a and S8b. Summary of publications with a quantitative component

Table S8a. Summary of publications using a random controlled trial design

Reference	Subjects	Study Design	Key Findings
Lawton et al. 2010	3 General practices	RCT – 2 intervention- one nurse led, one doctor led; one control	Practices in the intervention developed verbal scripts, were given regular feedback, reminded to claim financial incentives and used recall system for patients. Interventions had higher rates of screening during but reverted to pre-intervention levels at 6 months; nurse-led intervention was more effective (35%) than doctor-led (15%, p=0.04)
Bilardi et al. 2010	12/145 GP clinics	Cluster RCT – Intervention clinics received \$5AUD payment per test, control received no payment	Increases in both control (6.2% to 8.8%, p=0.1) and intervention (11.5% to 13.4%, p=0.4) were non-significant. Identified barriers to testing from post trial questionnaire – lack of time, difficulty in remembering to offer test, patients' lack of education and awareness. Many GPs forgot to offer testing and the \$5 payment as trial progressed. Facilitators were also identified – financial incentives, patient education or awareness about testing, and computer prompts/reminders to test
Armstrong et al. 2003	2 health centres	RCT – intervention centre had health adviser provide support and training for 6 months	Testing increased by 120% intervention centre and 11% in control centre; positivity decreased from 10% to 7% in intervention but remained steady at 5% in control. Increase was 11% in 15-19 yr olds, 43% in 20-24 yr olds, and 46% in 25+ in intervention centre, 70% of tests were offered by nurse. More 15-19 yr olds saw GP rather than nurse (83%), while 62% of 20-24 yr olds saw GP; partner notification not documented or briefly noted. Testing was accommodated into existing practices, not new screening systems.
McNulty et al. 2008b	82 general practices (42 intervention, 40 control)	Prospective cluster RCT	Within clusters, practices were randomized to intervention (workshops on chlamydia) or control (workshops on urinary symptoms); half were randomized to receive modified laboratory request forms. Intervention workshops submitted 33% more chlamydia specimens in 16-24 year olds (OR=1.33 95%CI: 1.10-1.60) and was sustained at 10 months, positivity rate did not change. Modified forms with key messages distributed 2 months after workshops did not affect testing rates (p=0.91).
Bowden et al. 2008	36 general practices	Cluster RCT	Chlamydia screening rate in women aged 16-39 in intervention practices was 6.9%, compared to 4.5% in control (Adjusted OR=2.1). When asked during Pap smear consultation, the screening rate was 54.1% (34.8% in control).
Walker et al. 2010	68/323 clinics	Cluster RCT	Intervention clinics received computer reminders when females 16-24 years old were in for a general practice consult. Testing increased in both control (8.8% to 10.6%, p<0.01) and intervention groups (8.3% to 12.2%, p<0.01), a 27% greater increase in intervention (OR=1.3, 95%CI: 1.1, 1.4) arm.

Table S8b. Publications using an observational study design

Reference	Subjects	Study Design	Key Findings
Santer et al. 2000	1496 women aged under 35	Observational study	36% of women who were attending for contraception or pap smear were offered a chlamydia test, Odds of chlamydia decreased by 30% per year increase in age, better predictor than number of partners.
Harris 2005	81/115 patients	Prospective opportunistic cohort study	70% accepted an offer of a chlamydia test in a sexual-health related consult such as pap smears, contraception and new patient checks (excluded those who were symptomatic).
Morgan and Haar 2009	49 general practices (20 intervention)	Observational intervention	Intervention practices received additional funding to offer free sexual health consultations, resulting in a sustained increase in testing and higher positivity rates 8.7% (5.9% in controls, $p < 0.01$).
Sohal et al. 2008	32/51 local-enhanced service general practices	Observational, descriptive study	Development of a local-enhanced service with STI training and resources in 2004. Increase in chlamydia testing by 1/3 occurred prior to local-enhanced service; clinics that were not involved had <1% of diagnoses
Merritt et al. 2007	152 general practices	Uncontrolled Intervention	Intervention resources and strategies to increase chlamydia testing annually in all sexually active young people developed by 10 GPs resulted in modest increase in testing, but not sustained.
Pimenta et al. 2003a	16 930 women aged 15-24	Opportunistic screening programme	Prevalence was highest in those 20 and under but remained high in the 20-24 year olds. General practice clinics had a lower prevalence than other healthcare settings but had the highest service utilisation.
Pimenta et al. 2003b	2 healthcare authorities	Opportunistic screening program for 35 000	In the 2 healthcare authorities, testing was offered to 66% and 45% of those eligible, acceptance was 76% and 84%, respectively; 20% of those who declined had been tested previously.
Kalwij et al. 2012	94 General practices in 2 boroughs	Retrospective service evaluation	Evaluation of intervention using financial incentives and education outreach support. Average screening coverage increased from 5.1% to 10.4% and 5.7% to 12.6% over 3 years, including increases in men.
Bailey et al. 2008	31/57 GPs	Audit of attendees	GPs who attended STI Foundation course had a post-course increase in chlamydia testing but was not sustained in the subsequent 3-6 months
Robertson and Williams 2005b	33/46 nurses	Postal survey	Majority do not examine male genitalia (90.9%), and never test men for chlamydia (55%). 85% do not see partner notification as part of their role but 88% advise partners should be tested/treated.
Robertson and Williams 2005a	33/46 practice nurses	Postal survey	Majority were aware of clinical care pathway for chlamydia (94%) and were using it (62%). While most found it easy to use (90%), only 22% reported any training on how to use it.
Hocking et al. 2006	252/421 GPs	Postal survey	Many GPs are not aware of key risk factors (38%) or appropriate testing protocols such as urine testing (23%) or testing asymptomatic 16-25 year old women (28%)
Wallace et al. 2012	Staff from 85 general practices	Survey	Respondents were unable to identify the national screening target, most chlamydia tests were offered in conjunction with sexual health related issues, barriers related to practice resources.
Penney et al. 2005	263 GPs, nurses and registrars	Clinical audit & questionnaire	One region was exposed to a multifactorial health demonstration project and compared to an unexposed region with similar characteristics. Little difference was found between the two regions.
Temple-Smith et al. 1999	444/520 GPs	Survey	Only 1/3 of GPs would take a sexual history for patients presenting for non-STI consults. GPs who completed a continuing medical education course on STDs were less likely to face barriers to taking a sexual history
Khan et al. 2008a	409 GPs (45.4%)	Postal survey	GPs reported having STI leaflets/pamphlets in clinics (49%), posters (21%), giving verbal advice (83%) and providing printed materials (67%).
Khan and Plummer 2008	409/900 GPs	Cross-sectional postal survey	55% considered STI materials inadequate/inappropriate; 23% said none were available in clinic; 22% said didn't know where to get them or not enough were produced
Khan et al. 2008b	409/900 GPs	Postal questionnaire	More GPs were comfortable with low-risk patients (69-72%) than marginalised patients (40-46%). More comfortable GPs were more proactive with marginalised patients; less comfortable GPs reported constraints in patient STI care

Khan et al. 2006	409/1020 GPs	Cross-sectional survey	GPs would offer a test to women/men <25 yrs (76%/65%); GPs who had training in STIs more likely to offer test to young men (OR=2.02) or women at time of Pap smear (OR=2.11)
Khan et al. 2007	409/1020 GPs	Cross-sectional survey	Less than 10% took a sexual history for young people or heterosexual because of lack of time (55%), and patient discomfort (49%); 19% indicated further training could improve their practice
Walker et al. 2013	872/1116 women – 67 positive, 805 negative	Questionnaire	Most women felt anxious about their test result (75%) but women with positive results were less likely to be concerned about future effect of positive result and partner's reaction, but more likely to discuss diagnosis with others than those who always tested negative.
Lusk et al. 2009	76 doctors from GP and emergency	Survey	Asked after attending an STI education session, only 4.3% of GP and 6.9% of ED doctors correctly interpreted the meaning of First Void Urine
Saunders et al. 2012	411 men aged 18-35	Survey using computer-assisted techniques	75% had seen GP in last year; but few had had previously been tested for STIs and HIV (28.7% and 19.8%); young men preferred healthcare settings over non-health settings to access testing.
Doherty 2000	132 GPs and practice nurses (48% response)	Survey	Clients of genitourinary medicine (GUM) and family planning (FP) clinics were also surveyed. Over half of STI diagnoses were made in GP but few GPs (18%) and nurses (15%) were trained in testing and treatment.
Burack 2000	1045/1280 teenagers aged 13-15	Survey	Most knew of sexual health services offered by GPs (68%), and felt their advice would be helpful (75%). There were concerns around confidentiality (58%), and GPs not having time or skills to deal with their problems (30%)
Brugha et al. 2011	6085 respondents aged 18-29	Cross-sectional survey	90% found urine-based testing to be acceptable in healthcare settings, fewer would accept if payment was required; preferred to be tested in traditional healthcare settings by doctor or nurse.
Zakher and Kang 2008	185/263 students aged 16-25	Survey	Most were comfortable with opportunistic testing (76%), reasons for not getting tested included not feeling at risk (65%) and not comfortable discussing sexual health issues with GPs (38%).
Markham et al. 2005	295/374 GP trainers in the UK	Self-completed survey	All were offering 'Level 1' services but many were not aware of the National Strategy for Sexual Health & HIV (86%); 82% would be willing to implement the Strategy with appropriate training and resources.
Temple-Smith et al. 2008	576/2001 GPs	Postal survey	Most GPs were aware of high rates of chlamydia in 20-24 year olds but less than half knew about 15-19 year olds, many did not ask about sexual history because they thought the patient would be embarrassed.
Rogstad and Henton 2004	88/155 GPs	Questionnaire	55% were aware of the National Strategy for Sexual Health and HIV's existence, 71% felt confident in giving STI prevention advice but 30% of them did not feel they had adequate training to do so.
Griffiths and Cuddigan 2002	75/84 practices 130/307 GPs 72/152 nurses	Postal survey to determine clinical practices	42% of GPs report testing 1-4x/month (nurses [54%]), majority are using appropriate swab; 69% [49%] felt screening for chlamydia was necessary but 22% [43%] felt that a screening process was not feasible
Thompson et al. 2008	120/248 GPs 52/111 practice nurses	Postal survey	GPs were more likely to engage in sexual promotion when the consult was related. Education was the most cited barrier by nurses while time was the greatest barrier for GPs.
Hope et al. 2002	117/233 GPs	Postal survey	88% offered Level 1 general care; 10% wanted to offer Level 2; 2/3 felt they had the right amount of involvement with GUM care; half had attended GUM training in the previous 12 months
Wray et al. 1998	Pre (n=27) and post (n=13) GPs	Pre and post course surveys	Evaluation of continuing medical education, scores were not significantly different between pre- (66%) and post-course (73%)
Khan and Schofield 2009	409/900 GPs	Postal survey	82% of GPs extended consult time to deal with moderate-severe psychological distressed STI patients, and 49% refer to counsellor
Giles et al. 2009	2165/3100 GPs	Postal survey	Less than 10% of GPs tested for chlamydia; older GPs/20yrs of clinical practice more likely to screen for Ct (OR=1.87/1.79)
Bennett et al. 2001	172/388 primary health care providers	Postal survey	GPs identified fewer correct symptoms and sequelae than sexual health doctors, were less likely to test for chlamydia unless they were very interested in STI management, and less likely to screen for co-infection.

Mason 2005	429/1383 men aged over 16	Self-administered questionnaire	Men had limited knowledge, many did not know about asymptomatic nature of STIs. Preferred receiving information from GPs but were reluctant users of general practice.
Hocking et al. 2008	255/600 GPs	Self-administered questionnaire	Barriers to screening identified included time constraints, lack of recall/reminder system, and lack of support for partner notification. Facilitators included national guidelines and incentive payments
Oakeshott et al. 2002	1216 newly pregnant women	Prevalence survey and questionnaire	Women are willing to have a chlamydia test during pregnancy but prefer urine because it is less invasive. Prevalence was 8.6% in women less than 25, 14.3% in teenagers
Richards and Pattman 2008	153/324 doctors and nurses	Postal survey	86% had consulted the handbook since attending STI Foundation course; 88% offered chlamydia testing to asymptomatic patients, 77% promoted testing as part of the national chlamydia screening programme
Bangor-Jones 2011	202/486 cases	Retrospective telephone audit	Data from the state surveillance system was audited to determine GP compliance with guidelines. Opportunistic screening was conducted in 63% of chlamydia diagnoses but only 29% discussed partner notification.
Morgan et al. 2012	Waikato District Health Board	Retrospective analysis of surveillance data	Prior to primary care guideline implementation, testing was 23% in 15-24 year old women. Testing increased during implementation but was not sustained. Discussions highlighted the role of nurses in testing and treatment.
Temple-Smith et al. 2012	12 practices	Administration of an audit tool	Little change had been made to clinics at 2 month follow-up. Observed barriers included a lack of time and a lack of youth-friendly practices. Practices with a manager were better equipped to implement changes.
Sawleshwarkar et al. 2010	6890 GPs with 100 encounters	Retrospective analysis from 2000-2007	Rate of testing was higher in females (4.2 per 1000) than males (2.0). GPs were more likely to test if they are female, younger, fewer sessions per week, and work in a practice with 5+ GPs.
Zenner et al. 2012	84 Primary care trusts (PCTs)	Retrospective matched case – control study	Financial incentives were evaluated in PCTs that used them compared to those that did not. Voucher schemes were more effective (2.4%) than prize draws (0.2%) at increasing coverage but had no effect on positivity rate.
Senok et al. 2005	3 general practices with 476/600 women	Screening feasibility study comparing opportunistic, postal, and usual practice	Uptake was higher in opportunistic (60%, n=15) than postal screening (22%, n=23) in women under 20, but no difference in women over 20. Most offers by GPs were during non-gynaecological illnesses, but most offers PNs were during consults for contraception or cervical smears.
Walker et al. 2013	872/1116 women; recruited from primary care clinics	Questionnaire completed at the end of 12 month incidence study	Women who tested positive were less concerned with future health effects (61% vs 81%, p<0.01) or partner's reaction (62% vs 79%, p<0.01) than women who tested negative. Barriers identified included time (46%), cost (42%), discomfort with asking for a test (47%) but 88% thought annual testing was a good idea.

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