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Results from the online survey 'Getting Down To It'

Never Stand Still | Faculty of Arts and Social Sciences | National Centre in HIV Social Research

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Glossary

CI confidence interval

Cronbach's α a measurement of internal consistency or reliability of data

HIV human immunodeficiency virus

HPV human papilloma virus

M mean

NS non-significant

OR odds ratio

***p*-value** level of significance

SD standard deviation

SPSS a computer program used for statistical analysis in social sciences

STI sexually transmissible infection

***T*-test** statistical difference of the means of two groups

Statistics

The report uses advanced statistical methodology. For further details of these methods, we recommend the following online resource:

http://statistics.berkeley.edu/~stark/SticiGui/Text/gloss.htm

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Executive summary

While young people are at high risk of contracting sexually transmissible infections (STIs), rates of STI testing remain low in this population. This may reflect that, due to a lack of research on determinants of STI testing, approaches used to promote STI testing in young people have mainly focussed on raising awareness and increasing knowledge of STIs and have not comprehensively addressed the many complex individual and social factors that may influence young people's decision to test for STIs. To address the current gaps in research relating to STI testing and its determinants, the NSW STI Programs Unit commissioned the National Centre in HIV Social Research (NCHSR) to conduct a large-scale survey among young people in New South Wales, Australia, with the objective of strengthening the empirical evidence base regarding barriers to and facilitators of STI testing.

A cross-sectional, quantitative online study was conducted between May and October 2010 through the Internet-based research platform www.gettingdowntoit.net. A comprehensive questionnaire was developed to assess the situation and needs of young people in terms of STI testing and the prevalence and contribution of a wide range of sociodemographic, behavioural and psychosocial factors potentially influencing young people's STI testing. The survey recruited 1,658 eligible, sexually active young participants living in NSW of whom 1,100 provided complete data. Participants were on average aged 20.6 years (range 16–26 years). Among participants 60% were female and 40% were male; 71% reported being heterosexual and 29% non-heterosexual.

Half of the 1,100 sexually active participants had ever tested for STIs and/or HIV. Most of these participants (67%) had tested for both STIs and HIV and had tested in the last year (74%). Testing for STIs was more likely in older, female and non-heterosexual participants. STI testing was also related to having experienced STI-related symptoms and having had unprotected intercourse, reported by 41.5% and 66% of the participants, respectively.

Participants' STI-related knowledge was moderate. While participants perceived STIs as severe, their perceived vulnerability to STIs was low. Participants perceived substantial positive aspects (*pros*) of STI testing. Beyond benefits of treatment, *pros* of STI testing that were important from their perspective included taking responsibility for their health and starting a new relationship safely. Participants also perceived a range of negative aspects (*cons*) of STI testing, in particular that STI testing costs money and that STI testing facilities are not easy to locate. Various fears and worries related to STI testing were found, including fear of medical procedures, fear of negative staff attitudes and fear of parents' reactions. Furthermore, while a substantial proportion of participants reported that they would feel ashamed if they had an STI, many thought that the important people in their lives would support their decision to test for STIs.

Results indicate that key psychosocial determinants of STI testing in young people include perceived *cons* of STI testing, fears and worries regarding testing for STIs and subjective norms relating to STI testing. Perceived vulnerability to STIs, attitudes to STI testing, perceived *pros* of STI testing, STI-related shame and knowledge were found to be less associated with the decision to seek STI testing. These findings underline that there is no single magic bullet that can be used in social marketing campaigns or other interventions to promote STI testing in young people. Each of the assessed individual and social factors only explains a fraction of the variance in STI testing, which means that no real understanding of the reasons why young people test for STIs can be expected from research that focuses only on one or few factors. Both research and sexual health programs need to rely on more comprehensive appraisals of barriers to and facilitators of STI testing.

The current challenge for sexual health promotion is to effectively address the complex individual and social barriers that limit the uptake of testing for STIs among young people. Suggestions include using lay arguments to address young people's perceived *cons* of STI testings, addressing fears and worries that prevent some young people testing for STIs and strengthening norms relating to STI testing. Building on empirical evidence and appropriate theories of behaviour, sexual health promotion programs are needed that use innovative social marketing campaigns and behavioural change interventions tailored at individual, social and structural levels. Strengthening approaches that reflect contemporary theory, research and practice would considerably increase the impact and efficiency of programs to promote STI testing in young people as well as in other populations.

Introduction

Increased trends in STI notifications have been observed in young heterosexual people in many industrialised countries (WHO, 2010), including Australia (Australian Government Department of Health and Ageing, 2009 & 2010). Since STIs can negatively affect people's health particularly women's fertility, reducing the prevalence of STIs in young people is a public health priority (Australian Government Department of Health and Ageing, 2010). To reduce STI rates, programs targeting young people have been implemented that aim to increase awareness of STIs, and promote condom use, as well as STI testing and treatment. To date, however, rates of STI testing are reputedly low in young people (Kong, Guy and Hocking, 2011). This may reflect that, due to a lack of evidence-based understanding of determinants of STI testing, approaches used to promote STI testing in young people have not been able to comprehensively address the many complex factors that influence young people's decision to test for STIs. As stated by Balfe and Brugha (2009, p.1): *'In-depth understanding of the factors that prompt young adults to attend health services for sexually transmitted infection (STI) testing are needed to underpin sexual health programs'*.

Central to the current study is the idea that sexual health campaigns and interventions aimed at promoting STI testing in young people, would benefit from a more comprehensive understanding of barriers and facilitators influencing young people's decision to seek STI testing (Adam, de Wit, Bourne, Story, & Edwards, 2009). The current study was conducted among young people in the state of New South Wales (NSW), Australia, with the objective of reducing the current gap in research regarding determinants of testing for STIs as well as building evidence-based knowledge on a large array of individual and social factors that influence young people's decision to seek for STI testing that could be addressed by sexual health programs. This report presents findings of this study.

Background

To inform the development of the current study, the national and international literature on STIs published in the past ten years was searched through Pubmed and PsychInfo. The literature review identified 924 published papers and found that young people were the most frequently studied demographic group. Areas most frequently covered in research on STIs were the prevalence of STIs, followed by the prevalence of STI testing or screening, which was reported to be low (or sub-optimal) in most population groups at risk of contracting STIs. The literature review also indicated that only a small proportion of papers provided insights into the factors and influences that prompt individuals to seek STI testing. Of the 924 publications, only 165 publications directly (29 papers) or indirectly (136 papers) addressed determinants of STI testing; 60 of these 165 papers focussed on young people.

The contribution of sociodemographic and behavioural factors (e.g. age, gender, ethnicity, sexual risk taking, STI testing history, STI-related symptoms) to STI testing in young people has been investigated most. Research has also been conducted on the levels of STI-related knowledge among young people and on potential system barriers to STI testing (e.g. financial cost associated with STI testing, inconvenience of testing facilities, waiting time). While poor STI-related knowledge and systemic barriers are often presented as the reasons why the uptake of STI testing remains low, more complex social and psychological factors and influences that prompt or prevent young people to test for STI have been less studied. A small number of papers have explored the influence of individual-level factors such as 'perceived threat' relating to STIs, which included both perceived severity of STIs and perceived vulnerability to contracting an STI, the way young people evaluate '*pros* and *cons*' (or benefits and costs) associated

with testing for STIs to make up their mind, the way they perceive their ability to obtain an STI test and the way various events or circumstances (e.g. a partner who discovers they are infected) may operate as 'cues to action' and motivate people to seek STI testing. Specific 'fears and worries' have also been identified that seem to prevent some young people to test for STIs. Some interpersonal barriers to STI testing have also been investigated: judgemental and discriminatory behaviour on the part of staff and providers may, for instance, exist in some contexts towards some patients. Research has shown that societal barriers to and facilitators of STI testing operate: STIs are stigmatised infections and the stigma attached to STIs has been portrayed in the research as an important barrier that prevents some young people to seek STI testing. In such a context, perceived social support from family and friends can exert a positive influence on young people's decision to seek STI testing.

While the existing literature provides useful directions, data and evidence-based understanding of the prevalence and contribution of the many and multi-level factors to STI testing is, for several reasons, very limited and fragmented. Qualitative research has used participants' ability for introspection to explore the reasons why people test (or do not test) for STIs, but this research is mostly exploratory and conducted in small and selective samples. Quantitative research has attempted to more systematically assess the factors that influence STI testing, but the literature review clearly showed that most quantitative studies only investigate a limited set of factors using ad hoc measurement instruments. For this reason, while studies contribute to identifying correlates of STI testing, data are rarely sufficient to generate knowledge on key determinants or predictors of STI testing that should be addressed with priority in health promotion programs. Another important limitation of the literature reviewed is that, beyond the Health Belief Model (Abraham and Sheeran, 2005) that was used in a few studies on STI testing, most research of determinants of testing for STIs did not rely on any theoretical framework. A framework is clearly missing that would help research to capture the many and complex factors that influence STI testing and offer a comprehensive understanding of the way these factors operate, interact and influence young people's decision to test for STIs. A further limitation of the literature is that most research has been conducted among young people attending STI clinics and/or in very specific sub-groups of young people (eg. young people from rural areas, detention centres, cultural minority groups). More comprehensive data on larger and more diverse samples of young people recruited outside medical settings could provide new and valuable insights to both research and health promotion practice.

Aims and scope

To address the current gaps in research regarding STI testing in young people and its determinants, an online cross sectional quantitative study was conducted by the NCHSR with the objective of recruiting a large sample of young (heterosexual) people aged from 16 to 26 years in NSW, Australia. The study aimed to increase understanding of the situation and needs of young people in terms of STI testing and to build the empirical evidence base regarding individual and social barriers to and facilitators of STI testing among young people.

The range of potential determinants of STI testing to be addressed in the current study was established by building on several bodies of research knowledge. First, the extensive review of the literature on STI testing determinants was used to generate

analytical categories of key determinants to be assessed in the current study. Since gaps in knowledge of determinants of STI testing were identified, the scope of factors to be investigated was expanded using previous research on barriers to and facilitators of HIV testing (Adam & de Wit, 2006; de Wit & Adam, 2008). Testing for STIs and testing for HIV are two health-related behaviours that hold similarities: the two tests are often conducted at the same time by the same provider, sometimes in response to the experience of symptoms that are often similar or because people engaged in unprotected sex. However, perceptions of HIV and of other STIs also differ, as do their individual, social and medical consequences. In addition to benefitting from previous research on barriers to and facilitators of HIV testing, the framework used in the current research to assess factors and processes that may influence young people's decision to seek STI testing more generally build on perspectives and theorizing in health psychology (de Wit & Stroebe, 2004; de Ridder & de Wit, 2006) and in sociology of health and illness (Adam & Herzlich, 1994).

The current study addresses the prevalence and contribution of four sets of potential determinants of STI testing in young people. The first set of determinants includes sociodemographic characteristics. The second set includes STI-related symptoms and sexual risk taking. A third set addresses individual level factors that can be addressed through health promotion programs and includes STI-related knowledge, perceived vulnerability to STIs, perceived severity of STIs, attitudes towards STI testing, perceived *pros* and perceived *cons* of STI testing and various fears and worries. For the perceived *pros* and *cons*, as well as fears and worries, a large set of specific aspects will be investigated, abstracted from available knowledge of these factors. The last set of factors includes STI-related shame, negative views of people with an STI and negative views attributed to others, as well as the subjective norms relating to testing for STIs.

The main objective of the study is to critically assess the idea that STI testing rates can simply be explained by a lack of adequate STI-related knowledge in people who have had unprotected sex and/or have experienced STI-related symptoms. The hypothesis is that insufficient STI knowledge is not the only or main reason why young people who had symptoms or who had unprotected sex do not seek STI testing. We posit that other important individual and social barriers may prevent young people testing for STIs. Young people may have a low perception of the threat associated with contracting an STI and may not hold positive attitudes towards STI testing; when contemplating the possibility of testing for STIs, young people may perceive more negative aspects ('perceived *cons*') than positive aspects ('perceived *pros*') to testing for STIs. Also, when young people evaluate whether they should test for STIs, they may take into account aspects that go beyond the potential benefits of medical treatment. Various fears and worries associated with STI testing and its consequences may prevent young people from getting tested. In particular, the negative views of people with an STI and the feelings of shame associated with having an STI and getting tested for STIs may prevent some individuals getting an STI test. Young people who contemplate the possibility of testing for STIs may also think that such a decision would not be supported by their peers. The present study will empirically test these hypotheses to provide new and comprehensive understandings of the various factors that may affect young people's decision to seek STI testing and that can be addressed in health promotion programs. The findings will be used to initiate a discussion on the possible translation of research knowledge on individual and social determinants of STI testing into health promotion practice.

Methods

Recruitment strategy

Participants in this study were recruited through the Internet research platform www.gettingdowntoit.net between May and October 2010. An advertising campaign on the social networking site Facebook was used as the main recruitment channel for the survey. Advertisements were only displayed to Facebook users aged between 16 and 26 years, who spoke English, and who lived within a radius of 80 kilometres of Sydney and nine other major towns in NSW (Albury, Coffs Harbour, Newcastle, Port Macquarie, Tamworth, Taree, Wagga Wagga, Wollongong and St Johns Park). The Facebook advertisement contained the following text: *'Take the quiz now! Answer questions about your sexuality and help researchers from UNSW to better understand the lives of young people in New South Wales'.* The advertisement intentionally did not refer explicitly to STIs to limit potential bias in the recruitment. To ensure recruitment of a diverse sample, specific visual advertisements and specific programming of Facebook advertisement settings were used to recruit participants who were male and female, aged 16–18 years and 19–26 years, living in Sydney, and living in country NSW.

In addition to the paid Facebook advertising campaign, a Facebook group was set up for the study. A Facebook Group is a page that is created within the Facebook social networking site which enables grouping people around a discussion topic or common interest. The study was also advertised through the website of The University of New South Wales (UNSW) and some printed flyers were distributed to students on the UNSW campus in Kensington, NSW.

Eligibility and sample characteristics

To be eligible for this study, male and female participants had to be 1) 16 to 26 years, 2) sexually active, 3) reside in NSW, Australia and 4) provide informed consent online. Of the 2,427 participants who accessed the online survey, 1,658 (68%) met the eligibility criteria. The sample included in the reported analyses consisted of 1,100 sexually active participants who provided complete data. These 1,100 participants represent 66% of the sample of 1,658 eligible participants.

Eighty percent of the 1,100 participants were recruited through the Facebook advertisement and 5% through the survey's Facebook group. Of participants who were not recruited through Facebook, some heard about the survey through the UNSW website (5%) or from a friend (6%). The other participants (4%) reported that they received an email about the survey or saw flyers advertising the survey on the UNSW campus.

The mean age of the 1,100 sexually active participants was 20.6 years (SD = 2.86, range 16–26 years) and the median age was 20.0 years (see Table 1). Around 40% of the participants were male and 38% reported living in metropolitan Sydney, 21% had a university degree, just over 70% identified as Anglo-Australians, and only 3.4% of participants reported being of Aboriginal or Torres Strait Islander descent. In terms of sexual identity, 71.5% of participants considered themselves as heterosexual and 28.5% were non-heterosexual participants who most of the time reported to be gay or bisexual.

Table 1: Characteristics of the 1,100 participants

Variables	Categories	*N*	%
Age	16–20 years	553	50.3
	21–26 years	547	49.7
Gender	Male	434	39.5
	Female	662	60.2
	Transgender	4	.4
Residence	Capital city	415	37.7
	Major regional centre or city	301	27.4
	Smaller city or town	306	27.8
	Rural or remote area	78	7.1
Education	No university degree	867	78.8
	University degree	233	21.2
Ethnic background	Anglo-Australian	771	72.5
	Other ethnic background	292	27.5
Sexual identity	Heterosexual	787	71.5
	Gay	105	9.5
	Bisexual	181	16.5
	Other	27	2.5

Measurement of variables

Participants took on average 49 minutes to complete the questionnaire. The comprehensive survey instrument collected information on ever being tested for STIs (including HIV), routinely testing for STIs, sexual risk taking and STI-related symptoms. The survey also contained 32 STI-related knowledge questions and robust, newly developed scales to measure the following individual and social variables: perceived vulnerability to STIs and perceived severity of STIs, attitudes to STI testing, perceived *pros* and *cons* of testing for STIs, fears and worries relating to testing for STIs, STI-related shame, negative views of people with an STI and negative views attributed to others of people with an STI, as well as subjective norms relating to STI testing.

Any testing for STIs

Participants were first asked if they had ever had an STI test. Participants specified if they had tested *'only for STIs', 'only for HIV'* or *'for both STIs and HIV'*. Depending on the answer, participants were routed to questions on STI testing and/or HIV testing. For STI testing as well as HIV testing, participants were asked to report when was the last time they tested, whether the test was self-initiated (yes/no), recommended by a health professional (yes/no) or a sexual partner (yes/no).

Routine testing for STIs

A newly developed 4-item scale was used to measure the extent to which testing for STIs was part of participants' health routine. For instance, participants were asked to indicate to what extent getting tested for STIs was something *'that [they] do on a regular basis'* and *'that [was] part of [their] routine'*. Participants provided their responses on a 5-point scale ranging from *'Totally agree'* to *'Totally disagree'*. The 4-item scale had a high internal consistency (Cronbach's $\alpha = .86$) and item scores were averaged. A higher score indicates a higher propensity to routinely test for STIs. Routine HIV testing was not measured, due to the low prevalence of HIV among heterosexual young people in Australia.

Experience of STI-related symptoms

Participants were asked in two successive questions whether they had ever experienced symptoms evocative of STIs or HIV. The first question aimed to assess the proportion of participants who had ever experienced STI-related symptoms: *'Have you ever had symptoms that you think might be an STI?'* Answering options were *'yes'*, *'no'* and *'don't know'*. The second question used the same format to assess whether participants ever had symptoms evocative of HIV: *'Have you ever had symptoms that you think might be HIV?'* Answering options were: *'yes'*, *'no'* and *'don't know'*. From answers provided to the two questions a dichotomous variable was created to capture whether participants ever had symptoms that they thought might be an STI and/or HIV (0 = no, 1 = yes).

Sexual risk taking

The sample included participants of both genders and diverse sexual orientations. In the questionnaire participants were asked to report if they had sex with a regular or casual male or female partner in the past six months. According to the answers provided, participants were routed to a specific set of questions appropriate to the gender of their partners (male or female) and types of intercourse (anal, vaginal or both). Participants were first asked how often they had unprotected intercourse with a regular male or female partner in the past six months and a dichotomous variable (0 = no, 1 = yes) was calculated from these data. When applicable, participants were also asked how often they engaged in unprotected intercourse with casual male or female partners in the last six months and a dichotomous variable (0 = no, 1 = yes) was calculated from these data. These two variables were merged in a single dichotomous variable *'having had unprotected intercourse with a casual or regular partner in the last six months'* (0 = no, 1 = yes).

STI-related knowledge

STI-related knowledge was measured using 32 questions developed in collaboration with clinicians at the Sydney Sexual Health Centre. The questions addressed aspects of knowledge that is critical for the effective management of STIs and that also addressed issues that are often misunderstood by patients visiting sexual health clinics.

The questions covered four broad areas: knowledge of symptoms, knowledge of transmission, knowledge of consequences and knowledge of treatments. For each of these four areas of knowledge, questions were asked for six specific STIs (chlamydia, gonorrhoea, syphilis, herpes, HPV, and HIV) and for STIs in general. All knowledge questions could be answered as either *'true'*, *'false'* or *'don't know'*.

The value '1' was attributed to all correct answers and the value '0' was attributed to incorrect or *'don't know'* answers. A knowledge score was calculated by adding all values and dividing the total by 3.2 to obtain a score with a theoretical score range of 0 to 10. In addition to a general score of STI knowledge, sub-scores were also calculated for knowledge of symptoms, transmission, consequences of having an STI and treatments, as well as for knowledge of each specific STI.

Perceived vulnerability towards STIs

Perceived vulnerability was measured with seven items. The first item asked about the likelihood of becoming infected with an STI in general (e.g. *'Considering your own behaviour and what you know about STIs, what do you think your chances are of contracting an STI?'*). For this question, responses were given on a 5-point scale, ranging from (1) *'Very low chance'* to (5) *'Very high chance'*. The other six items asked about participants' perceived likelihood of being infected with a specific STI (i.e. chlamydia, gonorrhoea, syphilis, herpes, HPV and HIV); responses were given on a 5-point scale, ranging from (1) *'Very low likelihood'* to (5) *'Very high likelihood'*. Internal consistency of the items was very good (Cronbach's $\alpha = .96$) and item scores were averaged. A higher score indicates a higher level of perceived vulnerability towards contracting an STI.

Perceived severity of STIs

Perceived severity was also measured with seven items. Similar to perceived vulnerability, six items asked participants to indicate how serious it would be if they contracted a specific STI (i.e. chlamydia, gonorrhoea, syphilis, herpes, HPV and HIV), and one item asked to indicate how serious it would be to contract an STI in general (e.g. *'It would be serious for me if I would contract an STI'*). Responses were given on a 5-point scale, ranging from (1) *'Totally disagree'* to (5) *'Totally agree'*. The internal consistency of items was high (Cronbach's $\alpha = .93$) and item scores were averaged. A higher score indicates a higher level of perceived severity.

Attitudes to STI testing

Participants were asked to indicate to what extent they agreed or disagreed with four adjectives (e.g. *'beneficial'*) to evaluate testing for STIs. Responses were given on a 5-point scale, ranging from (1) *'Totally disagree'* to (5) *'Totally agree'*. The scale had a good internal consistency (Cronbach's $\alpha = .75$) and item scores were averaged. A higher score indicates a more positive attitude towards testing for STIs.

Perceived *pros* of STI testing

Perceived *pros* were assessed using 10 items. Participants were asked to rate how much they agreed with positive statements about being tested for STIs (e.g. *'Testing makes you feel more responsible for your own health'; 'Testing allows you to benefit from adequate treatments in case of infection'* and *'Testing helps to put new relationships on the right track'*). Responses were provided on a 5-point scale ranging from (1) *'Totally disagree'* to (5) *'Totally agree'*. The internal consistency of the items was high (Cronbach's $\alpha = .90$) and item scores were averaged. A higher score indicates a higher level of perceived *pros* of testing for STIs.

Perceived *cons* of STI testing

The perceived *cons* scale also consisted of 10 items. Participants were asked to rate how much they agreed with negative statements about being tested for STIs (e.g. *'Getting tested is expensive'; 'It's not easy to know where to go to get an STI test'*). Responses were given on a 5-point scale, ranging from (1) *'Totally disagree'* to (5) *'Totally agree'*. Internal consistency of the items was good (Cronbach's $\alpha = .76$) and item scores were averaged. A higher score indicates a higher level of perceived *cons* of testing for STIs.

Fears and worries relating to STI testing

Fears and worries were assessed with an 8-item scale. Participants were asked to imagine that they were considering testing for STIs and indicate the extent to which they would experience various fears and worries such as loss of reputation, worries about medical procedures, worries related to service providers, in particular negative attitudes of staff in STI testing facilities, worries of staff disclosing private information to others, and fears regarding the reaction of various significant others (e.g. *'I would be worried about my parents' reaction'*. Responses were given on a 5-point scale that ranged from (1) *'Totally disagree'* to (5) *'Totally agree'*. The internal consistency of items was high (Cronbach's $\alpha = .85$) and item scores were averaged. A higher score indicates a higher level of fears and worries regarding testing for STIs.

STI-related shame

A 5-item scale was used to ask participants what they would think of themselves if they were to have an STI (e.g., *'If I would get an STI, I would only have myself to blame'*). Responses were given on a 5-point Likert scale (1 = *'Totally disagree'*, 5 = *'Totally agree'*). Internal consistency of the five items was good (Cronbach's $\alpha = .80$) and item scores were averaged. A higher score indicates a higher level of STI-related shame.

Negative views of people with an STI

A 5-item scale was used to ask participants what they think of people who have an STI (e.g., *'What do you think of people your age who get an STI? They have only themselves to blame'*). Responses were given on a 5-point Likert scale (1 = *'Totally disagree'*, 5 = *'Totally agree'*). Internal consistency of the five items was very good (Cronbach's $\alpha = .87$) and item scores were averaged. A higher score indicates a more negative view of people with an STI.

Attributed negative views of people with an STI

A 5-item scale measured how participants perceived how other people would judge someone who has an STI (e.g., *'What do you think people in general would think about people your age who get an STI? They have only themselves to blame'*). Responses were given on a 5-point Likert scale (1 = *'Totally disagree'*, 5 = *'Totally agree'*). Internal consistency of the five items was very good (Cronbach's $\alpha = .93$) and item scores were averaged. A higher score indicates a more negative view of people with an STI attributed to others.

Subjective norms of STI testing

Subjective norms were measured with a scale consisting of four items, including *'People I know believe that getting tested for STIs is something...'*, with responses given on a 5-point scale ranging from 1 = *'I definitely shouldn't do'* to 5 = *'I definitely should do'*. The same question was repeated for three other social referents: *'My close friends'; 'My main sexual partner'* and *'My family members and relatives'*. The internal consistency of the scale was high (Cronbach's $\alpha = .86$) and items were averaged. A higher score indicates subjective norms that are more supportive of STI testing.

Statistical analyses

The analyses consisted of first describing the prevalence of ever being tested for an STI, testing routinely for STIs, experiencing STI-related symptoms and reporting sexual risk taking. Univariate analysis (Chi-square tests) and multivariate analyses (logistic regression models) were then conducted to assess significant differences in the prevalence of STI testing, testing routinely for STIs, STI-related symptoms and sexual risk taking according to sociodemographic characteristics, including age (16 to 20 years versus 21 to 26 years), gender (male versus female) education (no university degree versus university degree), ethnic background (Anglo-Australian versus other background) and sexual identity (heterosexual versus gay, bisexual and other non-heterosexuals).

Average scores were calculated for STI-related knowledge, perceived vulnerability to STIs and perceived severity of STIs, attitudes to STI testing, perceived *pros* and *cons* of STI testing, fears and worries regarding testing for STIs, STI-related shame, negative views of people with an STI, negative views (attributed to others) of people with an STI, and subjective norms relating to testing for STIs. *T*-tests were used to assess potential univariate differences in mean scores in these psychosocial factors according to age, gender, education, ethnic background and sexual identity and multivariate linear regression analyses were used to assess the independent contribution of each sociodemographic variable.

Associations of psychosocial factors with ever being tested for STIs, including HIV (dichotomous variable, 0 = no; 1 = yes) were assessed using univariate logistic regression analyses. Nagelkerke R^2 was calculated to estimate the percentage of variance in STI testing explained by each correlate. A multivariate logistic regression analysis was conducted to assess the independent contribution of each psychosocial factor to STI testing, over and above other factors and sexual risk taking, STI-related symptoms and sociodemographic control variables (i.e. age, gender, education, ethnic background, and sexual identity).

All analyses were conducted using SPSS (version 18).

Results

STI testing behaviours and sociodemographic correlates

Any testing for STIs

Of the 1,100 sexually active participants, 52% had ever tested for STIs or HIV, while 48% had never tested. Of the 569 participants who had ever tested, 67% had tested for both STIs and HIV, while 26.5% and 7% had tested for either STIs or HIV only, respectively.

In univariate analyses, testing for STIs was found to be lower among participants aged 16 to 20 years compared to participants aged 21 to 26 years (37.4% versus 66.2%, $p < .001$); STI testing prevalence reached 80% among the oldest participants aged 26 years. Testing for STIs was also found to be more frequent in females than in males (57% versus 43%, $p < .001$) and was more frequent among participants who had a university degree than participants who did not (63% versus 49%, $p < .001$). No significant differences were observed according to ethnic background or sexual identity. In a multivariate analysis (see Table 2), testing for STIs was associated with older age and being a female. An association was also found with sexual identity, suggesting that uptake of testing was lower among heterosexual participants than among gay, bisexual and other non-heterosexual participants. No association was observed between testing for STIs and educational or ethnic background.

Results indicate that most participants had recently tested for STIs and/or HIV. Of the 530 participants who had ever tested for STIs, a quarter (23%) had tested in the three months prior to the survey, half had tested in the preceding six months (49%) and three-quarters (74%) had tested in the preceding year. Similarly, of the 418 participants who had ever tested for HIV, 21% had tested in the three months prior to the survey, 44.5% in the preceding six months and 70% in the preceding year.

Responses to the multiple choice question on the initiation of testing indicated that getting tested for STIs and/or for HIV was mostly self-initiated. Eighty-two percent of participants who had ever been tested for STIs indicated that they requested the test themselves. A third (34%) indicated that the test was recommended by a health professional and 15% indicated that a sexual partner advised them to test for STIs. Similar results were found for HIV testing: 68% of tested participants requested the test themselves, 37% followed the recommendation of a health professional and 8% were advised to test by a sexual partner.

Routine testing for STIs

The mean score for routine testing for STIs was below the midpoint of the response scale (M = 2.50, SD = 1.14, range 1–5), with only a quarter of participants agreeing with statements indicating that testing for STIs was part of their routine. In univariate analyses, routine testing for STIs was found to be significantly associated with being 21 to 26 years ($p < .001$), being a female ($p < .001$), and being non-heterosexual ($p < .001$) and was marginally significantly associated with reporting a non Anglo-Australian background ($p = .06$). No association was observed between routine testing and level of education. These results were confirmed in a multivariate analysis (see Table 3). Routine testing for STIs was found to be independently associated with being older, being a woman, and being non-heterosexual and was marginally significantly associated with reporting a non Anglo-Australian ethnic background.

Table 2: Correlates of any testing for STIs[1]

Variables	Categories	Adjusted *OR* (95% CI)	*p*-value
Age	16–20 years	Reference	
	21–26 years	3.42 (2.60–4.49)	< .001
Gender	Male	Reference	
	Female	2.10 (1.61–2.74)	< .001
Education	No university degree	Reference	
	University degree	1.24 (.89–1.73)	NS
Ethnic background	Anglo-Australian	Reference	
	Other	.99 (.74–1.33)	NS
Sexual identity	Heterosexual	Reference	
	Gay, bisexual and other	1.35 (1.01–1.80)	< .05

1 Multivariate logistic regression model. Nagelkerke R^2 = .15; *OR* = odds ratio; CI = confidence interval; NS = non significant

Table 3: Correlates of routine testing for STIs[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	.17	5.42	< .001
Gender	Male	Reference		
	Female	.11	3.76	< .001
Education	No university degree	Reference		
	University degree	-.01	-.44	NS
Ethnic background	Anglo-Australian	Reference		
	Other	.06	1.86	< .10
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	.12	4.14	< .001

1 Multivariate linear regression model. Adjusted R^2 = .05; NS = non significant

Barriers to and facilitators of STI testing

Experience of STI-related symptoms

Of the 1,100 sexually active participants, 643 (41.5%) reported having ever experienced symptoms characteristic of STIs and/or HIV. In univariate analyses, experience of STI-related symptoms was associated with age, education and sexual identity. Experiencing symptoms was more frequent among participants aged 21 to 26 years than among participants aged 16 to 20 years (46.1% versus 37.1%, $p < .01$), participants with a university degree more often reported symptoms than participants with lower levels of education (48.9% versus 39.6%, $p = .01$) and gay, bisexual and

other non-heterosexual participants more often reported having had symptoms than heterosexual participants (46.3% versus 39.6%, $p < .05$). No differences were observed according to gender or ethnic background. In a multivariate analysis (see Table 4), experiencing symptoms was independently associated with being aged 21 to 26 years, being a female, having a university degree and being non-heterosexual.

In a univariate analysis, having ever experienced symptoms of STIs (including HIV), was found to be statistically significantly associated with testing for STIs. Participants who ever had STI-related symptoms were three times more likely to have tested than participants who never experienced such symptoms (OR = 3.18 [2.47–4.09], $p < .001$). Experiencing STI-related symptoms explained 10% of the variance in STI testing.

Table 4: Correlates of experiencing STI-related symptoms[1]

Variables	Categories	Adjusted *OR* (95% CI)	*p*-value
Age	16–20 years	Reference	
	21–26 years	1.35 (1.04–1.75)	< .05
Gender	Male	Reference	
	Female	1.32 (1.02–1.70)	< .05
Education	No university degree	Reference	
	University degree	1.37 (1.00–1.88)	< .05
Ethnic background	Anglo-Australian	Reference	
	Other	1.00 (.76–1.32)	NS
Sexual identity	Heterosexual	Reference	
	Gay, bisexual and other	1.33 (1.01–1.75)	< .05

1 Multivariate logistic regression model. Nagelkerke $R^2 = .03$; *OR* = odds ratio; CI = confidence interval; NS = non significant

Sexual risk taking

Of the 1,100 sexually active participants, 730 (66%) reported having had unprotected intercourse in the past six months with regular or casual partners. In univariate analyses, having had unprotected intercourse in the past six months was found to be associated with age; the frequency of unprotected intercourse was lower among participants aged 16 to 20 years than among participants aged 21 to 26 years (62% versus 71%, $p = .001$). Reports of unprotected intercourse were also more frequent in female than in male participants (69% versus 63%, $p < .05$) and were more frequent in heterosexual than in gay, bisexual and other non-heterosexual participants (69% versus 60%, $p < .01$). No significant differences were observed according to education or ethnic background. In a multivariate analysis (see Table 5), having had unprotected intercourse remained associated with being 21 to 26 years, female and heterosexual.

In a univariate analysis, testing for STIs was found to be significantly associated with sexual risk taking. Participants who had had unprotected intercourse were two and a half times more likely to have tested for STIs than participants who did not report unprotected intercourse (OR = 2.55 [1.97–3.30], $p < .001$) and sexual risk taking explained 6% of the variance in testing for STIs.

Table 5: Correlates of having had unprotected intercourse[1]

Variables	Categories	Adjusted *OR* (95% CI)	*p*-value
Age	16–20 years	Reference	
	21–26 years	1.59 (1.21–2.09)	.001
Gender	Male	Reference	
	Female	1.35 (1.04–1.76)	< .05
Education	No university degree	Reference	
	University degree	.86 (.61–1.20)	NS
Ethnic background	Anglo-Australian	Reference	
	Other	.89 (.67–1.20)	NS
Sexual identity	Heterosexual	Reference	
	Gay, bisexual and other	.67 (.51–.98)	< .01

1 Multivariate regression model. Nagelkerke R^2 = .03; *OR* = odds ratio; CI = confidence interval; NS = non significant

STI knowledge

Participants' overall STI-knowledge score was moderate (M = 5.68, SD = 2.04, range 0–10). In univariate analyses, STI knowledge was found to vary according to gender, education, ethnic background and sexual identity. On average, female participants had higher levels of STI knowledge than male participants (M = 5.91 versus M = 5.32, $p < .001$), participants who had a university degree had higher levels of knowledge than participants who did not have a university degree (M = 6.04 versus M = 5.58, $p < .05$), participants with an Anglo-Australian background had better STI knowledge than participants with other ethnic backgrounds (M = 5.77 versus M = 5.42, $p < .05$) and heterosexual participants were marginally significantly more likely to have lower levels of STI knowledge than non-heterosexual participants (M = 5.61 versus M = 5.87, $p < .1$). No association was observed between age and STI knowledge. In a multivariate analysis (see Table 6), overall STI knowledge was significantly independently associated with being older, being a female, and not being heterosexual. The association between STI knowledge and ethnic background became marginally statistically significant.

Table 6: Correlates of overall STI knowledge[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	.171	5.421	< .001
Gender	Male	Reference		
	Female	.113	3.759	< .001
Education	No university degree	Reference		
	University degree	-.014	-.437	NS
Ethnic background	Anglo-Australian	Reference		
	Other	.056	1.855	< .10
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	.124	4.143	< .001

1 Multivariate linear regression model. Adjusted R^2 = .05; NS = non significant

Levels of knowledge differed according to the type of STI (see Table 7). Participants had fair levels of knowledge of STIs in general and of chlamydia. Levels of knowledge of herpes and HIV were moderate and significantly lower than knowledge of chlamydia. Knowledge was average for gonorrhoea, syphilis and HPV and significantly lower than knowledge of STIs in general and knowledge of chlamydia, herpes and HIV. Levels of knowledge also differed according to areas of knowledge (see Table 8). Knowledge regarding symptoms, transmission and treatment was significantly higher than knowledge regarding the consequences of having an STI.

In a univariate analysis, testing for STIs was found to be significantly associated with higher levels of overall STI knowledge (OR = 1.18 [1.11–1.25], $p < .001$) and STI knowledge explained 4% of the variance in testing for STIs.

Table 7: Levels of knowledge according to type of STIs

Statistics	Mean	Median	SD
STIs in general	7.09	7.50	2.38
Chlamydia	7.01	7.50	3.09
Herpes	5.68	5.00	2.51
HIV	5.64	6.25	2.40
Gonorrhoea	5.00	5.00	3.47
Syphilis	4.81	5.00	2.96
HPV	4.56	5.00	3.44

All scores range 0–10. SD = standard deviation

Table 8: Levels of knowledge according to area of knowledge

Statistics	Mean	Median	SD
Symptoms	5.84	6.25	2.26
Transmission	6.00	6.25	2.19
Consequences	5.00	5.00	2.55
Treatment	5.88	6.25	2.76

All scores range 0–10. SD = standard deviation

Perceived vulnerability to STIs and perceived severity of STIs

The notion of perceived threat, which refers to perceived vulnerability to and severity of STIs, is a key component of the Health Belief Model. Perceived vulnerability is the individual's perceived risk of an illness or disease while perceived severity is a person's belief of how serious the disease is. The level of perceived health threat is assumed to provide the motivation to act. According to health psychology theory, young people would be more likely to test for STIs if they consider themselves at risk of becoming infected with an STI and/or when they perceive STIs to be a serious threat to their health.

On average, perceived vulnerability to contracting an STI was low (M = 1.8, SD = .92, range 1–5), while perceived severity of STIs was high (M = 4.6, SD = .70, range 1–5). In univariate analyses perceived vulnerability was found to vary according to gender, with a higher level of perceived vulnerability among female than male participants (M = 1.79 versus M = 1.68, $p < .05$). No association was observed between perceived vulnerability and age, education, ethnic background or sexual identity. In a multivariate analysis, perceived vulnerability was positively associated

with being female and negatively associated with being non-heterosexual suggesting that non-heterosexual participants feel less vulnerable towards STIs than heterosexual participants (see Table 9).

Univariate analyses showed that perceived severity significantly differed according to gender and sexual identity; perceived severity was higher in female than male participants (M = 4.64 versus M = 4.53, $p < .05$) and in heterosexual than gay, bisexual and other non-heterosexual participants (M = 4.63 versus M = 4.51, $p < .05$). No significant association was found between perceived severity and age, education or ethnic background. In a multivariate analysis, perceived severity was found to be positively associated with being a female and negatively associated with being non-heterosexual (see Table 10).

No significant univariate association was observed between perceived severity and STI testing. Testing for STIs was, however, found to be significantly associated with perceived vulnerability towards STIs, with higher uptake of STI testing among participants with higher level of perceived vulnerability (OR = 1.24 [1.09–1.42], $p = .001$). Perceived vulnerability explained 1% of the variance in testing for STIs.

Table 9: Correlates of perceived vulnerability to STIs[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	-.055	-1.704	NS
Gender	Male	Reference		
	Female	.070	2.279	< .05
Education	No university degree	Reference		
	University degree	-.017	-.511	NS
Ethnic background	Anglo-Australian	Reference		
	Other	-.048	-1.545	NS
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	-.071	-2.320	< .05

1 Multivariate linear regression model. Adjusted $R^2 = .01$; NS = non significant

Table 10: Correlates of perceived severity of STIs[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	-.055	-1.704	NS
Gender	Male	Reference		
	Female	.070	2.279	< .05
Education	No university degree	Reference		
	University degree	-.017	-.511	NS
Ethnic background	Anglo-Australian	Reference		
	Other	-.048	-1.545	NS
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	-.071	-2.320	< .05

1 Multivariate linear regression model. Adjusted $R^2 = .01$; NS = non significant

Attitudes to STI testing

The average score of attitudes towards STI testing was high (M = 4.44, SD = .64, range 1–5). In univariate analyses, holding more positive attitudes to STI testing was associated with gender and sexual identity. Female participants held more positive attitudes to STI testing than male participants (M = 4.47 versus M = 4.40, $p = .05$) and gay, bisexual and other non-heterosexual participants held more positive attitudes to testing for STIs than heterosexual participants (M = 4.53 versus M = 4.40, $p = .001$). No differences were observed according to age, education or ethnic background. In a multivariate analysis, holding positive attitudes to STI testing remained associated with sexual identity, but the association with gender became marginally statistically significant (see Table 11).

In a univariate analysis, holding positive attitudes towards STI testing was found to be associated with having ever tested for STIs (OR = 2.29 [1.82–2.88], $p < .001$) and attitudes were found to explain 7% of the variance in STI testing.

Table 11: Correlates of attitudes to STI testing[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	.007	.229	NS
Gender	Male	Reference		
	Female	.057	1.850	< .10
Education	No university degree	Reference		
	University degree	.021	.647	NS
Ethnic background	Anglo-Australian	Reference		
	Other	-.001	-.022	NS
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	.101	3.287	.001

1 Multivariate linear regression model. Adjusted $R^2 = .01$; NS = non significant

Perceived *pros* and *cons* of STI testing

According to the Health Belief Model, individuals evaluate a recommended action by considering the *pros* and *cons* of the health behaviour: the behaviour is more likely to be performed if the perceived *pros* outweigh the perceived *cons*. Participants had a high level of perceived *pros* (M = 4.31, SD = .60, range 1–5) regarding STI testing, while perception of *cons* associated with STI testing was around the mid-point of the scale (M = 2.82, SD = .68, range 1–5).

In univariate analyses, perceiving more *pros* of STI testing was associated with gender and sexual identity; perceived *pros* were higher in female than male participants (M = 4.40 versus M = 4.19, $p = <.001$) and non-heterosexual participants had a higher perception of *pros* than heterosexual participants (M = 4.37 versus M = 4.29, $p < .05$). No association was observed between perceived *pros* of STI testing and age, education or ethnic background. These results were confirmed in a multivariate analysis; perceiving more *pros* of STI testing was found to be independently associated with being a female and with being non-heterosexual (see Table 12).

Univariate analyses showed that perceived *cons* differed by age and ethnic background. Participants aged 16 to 20 years perceived more *cons* of STI testing than participants aged 21 to 26 years (M = 2.88 versus M = 2.76, $p < .01$) and perceived *cons* were lower among participants with an Anglo-Australian background than among participants with a non Anglo-Australian background (M = 2.78 versus M = 2.91, $p < .01$). No association was observed between perceived *cons* and gender, education or sexual identity. These results were confirmed in a multivariate analysis; younger age and non Anglo-Australian background were found to be independently associated with more perceived *cons* of STI testing (see Table 13).

In a univariate analysis, perceived *pros* of STI testing were found to be positively associated with STI testing, with higher levels of testing among participants with higher levels of perceived *pros* (OR = 2.24 [1.80–2.78], $p < .001$). Perceived *pros* explained 7% of the variance in STI testing. Similarly, perceived *cons* of STI testing were found to be negatively associated with STI testing in a univariate analysis, with lower levels of STI testing among participants with higher levels of perceived *cons*

Table 12: Correlates of perceived *pros* of STI testing[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	.038	1.207	NS
Gender	Male	Reference		
	Female	.183	6.042	<.001
Education	No university degree	Reference		
	University degree	.039	1.195	NS
Ethnic background	Anglo-Australian	Reference		
	Other	-.024	-.796	NS
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	.067	2.219	.027

1 Multivariate linear regression model. Adjusted R^2 = .035; NS = non significant

Table 13: Correlates of perceived *cons* of STI testing[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	-.086	-2.653	< .01
Gender	Male	Reference		
	Female	-.039	-1.272	NS
Education	No university degree	Reference		
	University degree	-.025	-.754	NS
Ethnic background	Anglo-Australian	Reference		
	Other	.093	3.014	< .01
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	-.003	-.111	NS

1 Multivariate linear regression model. Adjusted R^2 = .01; NS = non significant

(OR = .44 [.36–.54], $p < .001$). Perceived *cons* explained 9% of the variance in STI testing. When entered simultaneously in a logistic regression model (see Table 14), both perceived *pros* and perceived *cons* remained statistically significantly associated with STI testing and taken together perceived *pros* and perceived *cons* explained 12.5% of the variance in STI testing.

Additional analyses were conducted to assess the prevalence of specific perceived *pros* and *cons* of STI testing and their individual association with testing for STIs. Mean scores for specific perceived *pros* of STI testing ranged from 3.89 to 4.46 (see Table 15). Each specific perceived *pro* was significantly associated with testing

Table 14: Association of perceived *pros* and *cons* with testing for STIs[1]

Variable	Univariate analysis		Multivariate analysis[2]	
	***OR* (95% CI)**	***p*-value**	**Adjusted *OR* (95% CI)**	***p*-value**
Perceived pros	2.24 (1.80–2.78)	< .001	1.89 (1.52–2.35)	< .001
Perceived cons	.44 (.36–.54)	< .001	.50 (.41–.61)	< .001

1 Logistic regression models. *OR* = odds ratio; CI = confidence interval. 2 Nagelkerke R^2 = .125

Table 15: Prevalence of specific *pros* and their association with STI testing

Perceived pros	Prevalence		Association with testing for STIs[1]			
			Univariate analysis		Multivariate analysis[2]	
	Mean	**SD**	***OR* (95% CI)**	***p*-value**	**Adjusted *OR* (95% CI)**	***p*-value**
Testing gives several advantages	4.27	.89	1.44 (1.25–1.66)	< .001	1.12 (.94–1.34)	NS
Testing helps to protect one's fertility	4.30	.86	1.43 (1.23–1.65)	< .001	1.04 (.86–1.25)	NS
Testing is a way to know how good your sexual health is	4.40	.82	1.41 (1.21–1.64)	< .001	.95 (.77–1.16)	NS
Testing gives peace of mind	4.46	.80	1.61 (1.37–1.89)	< .001	1.20 (.97–1.49)	< .10
Testing helps to put new relationships on the right track	3.89	1.00	1.43 (1.27–1.62)	< .001	1.20 (1.04–1.38)	< .05
Testing helps to look after one's health	4.45	.78	1.52 (1.29–1.79)	< .001	.98 (.76–1.27)	NS
There are benefits in testing because you receive information and advice at the same time	4.27	.83	1.31 (1.13–1.51)	< .001	.83 (.67–1.03)	< .10
Testing prevents from passing potential STIs to your partner(s)	4.34	.96	1.30 (1.15–1.48)	< .001	.98 (.83–1.14)	NS
Testing allows you to benefit from adequate treatments in case of infection	4.44	.75	1.77 (1.50–2.10)	< .001	1.29 (1.00–1.67)	< .05
Testing makes you feel more responsible for your own health	4.34	.80	1.78 (1.52–2.09)	< .001	1.38 (1.09–1.75)	< .01

1 Logistic regression models. 2 Nagelkerke R^2 = .09. *OR* = odds ratio; CI = confidence interval; SD = standard deviation; NS = non significant

for STIs in univariate analyses. In a multivariate analysis, only three specific perceived *pros* remained significantly associated with testing for STIs: *'Testing for STIs makes you feel more responsible for your own health'; 'Testing for STIs allows you to benefit from adequate treatments in case of infection'* and *'Testing for STIs helps to put new relationships on the right track'*. Two other perceived *pros* were marginally associated with testing for STIs: *'Testing for STIs gives peace of mind'* and *'There are benefits in testing for STIs because you receive information and advice at the same time'*.

Mean scores for each perceived *con* of STI testing ranged from 2.18 to 3.92 (see Table 16). Except for one perceived *con* that reflected the perception that STI testing procedures are intrusive and painful, all perceived *cons* were significantly associated with lower levels of STI testing. In multivariate analysis however only two perceived *cons* were significantly associated with lower levels of STI testing: '*Getting tested for STIs is expensive*' and '*It's not easy to know where to go to get an STI test*'.

Table 16: Prevalence of specific *cons* and their association with STI testing

Perceived cons	Prevalence		Association with testing for STIs[1]			
			Univariate analysis		Multivariate analysis[2]	
	Mean	SD	*OR* (95% CI)	*p*-value	Adjusted *OR* (95% CI)	*p*-value
Testing could negatively affect your relationship	2.94	1.28	.86 (.78–.93)	.001	1.00 (.88–1.13)	NS
Testing is very time consuming	2.67	1.08	.74 (.66–.83)	< .001	1.05 (.91–1.22)	NS
Testing is expensive	2.59	1.13	.59 (.53–.66)	< .001	.65 (.56–.75)	< .001
It's not easy to know where to get a test	2.71	1.37	.68 (.62–.75)	< .001	.78 (.70–.87)	< .001
There are many disadvantages in getting tested	2.18	1.18	.73 (.66–.81)	.001	.90 (.79–1.02)	< .10
Testing could make your sexual partner angry with you	2.74	1.27	.85 (.77–.93)	.001	.94 (.83–1.07)	NS
Some of the testing procedures are intrusive and painful	3.22	1.03	.90 (.80–1.01)	< .1	1.13 (.98–1.30)	< .10
Confidentiality is problematic in testing facilities	2.43	1.19	.79 (.71–.88)	< .001	.98 (.86–1.11)	NS
Testing is stressful when you think about the possible consequences of being infected	3.92	1.01	.88 (.78–1.00)	< .05	.98 (.85–1.12)	NS
Testing facilities do not have suitable opening hours	2.80	.99	.77 (.69–.88)	< .001	1.00 (.86–1.16)	NS

1 Logistic regression models. 2 Nagelkerke R^2 = .15. *OR* = odds ratio; CI = confidence interval; SD = standard deviation; NS = non significant

Fears and worries regarding STI testing

According to the literature on STIs, various fears and worries may prevent people from getting tested for STIs. Participants' overall level of fears and worries towards testing for STIs was above the midpoint of the scale (M = 3.05, SD = 1.02, range 1–5). In univariate analyses, fears and worries were found to be significantly associated with age, gender, education and ethnic background. Levels of fears and worries were higher among participants aged 16 to 20 years than among participants aged 21 to 26 years (M = 3.21 versus M = 2.89, $p < .001$), fears and worries were higher in female than in male participants (M = 3.11 versus M = 2.97, $p < .05$), participants who attended university had lower levels of fears and worries than participants with a lower level of education (M = 2.93 versus M = 3.09, $p < .05$) and participants with a non Anglo-Australian background had higher levels of fears and worries than participants with an Anglo-Australian background (M = 3.21 versus M = 3.00, $p < .01$). No significant difference was observed according to sexual identity. In a multivariate analysis, fears and worries were found to be significantly associated with younger age, being female and reporting a non Anglo-Australian background (see Table 17). No significant association was observed with education or sexual identity.

In a univariate analysis, fears and worries were found to be significantly associated with STI testing. Higher levels of fears and worries were found to be associated with lower uptake of STI testing (OR = .63 [.56–.71], $p < .001$), and fears and worries explained around 7% of the variance in STI testing.

Some variations were observed in terms of the prevalence of specific types of fears and worries and their association with STI testing (see Table 18). Fear of parents' and partner's reactions were most frequently identified in this sample of young people. Univariate and multivariate analyses were conducted to assess the contribution of specific fears and worries to testing for STIs (see Table 18). In univariate analyses, all types of fears and worries were significantly associated with lower uptake of STI testing. In multivariate analysis, fears that were found to be detrimental to STI testing were fear of medical procedures, fear of negative staff attitudes and fear of parents' reactions. In addition, participants who had ever been tested had more concerns about respect of confidentiality by staff than participants who were not tested for STIs.

Table 17: Correlates of fears and worries regarding STI testing[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	-.151	-4.735	.000
Gender	Male	Reference		
	Female	.059	1.960	.050
Education	No university degree	Reference		
	University degree	-.034	-1.052	NS
Ethnic background	Anglo-Australian	Reference		
	Other	.102	3.322	.001
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	-.018	-.605	NS

1 Multivariate linear regression model. Adjusted $R^2 = .04$; NS = non significant

Table 18: Prevalence of fears and worries and their association with STI testing[1]

	Prevalence		Association with testing for STIs			
			Univariate analysis		Multivariate analysis	
	Mean	SD	*OR* (95% CI)	*p*-value	Adjusted *OR* (95% CI)	*p*-value
Talking with a doctor about my sexual behaviour	2.71	1.45	.76 (.70–.83)	< .001	.95 (.85–1.07)	NS
The medical procedures involved in testing	2.97	1.45	.68 (.62–.74)	< .001	.71 (.63–.79)	< .001
My parents' reaction	3.61	1.46	.75 (.69–.82)	< .001	.79 (.69–.89)	< .001
My partners' reaction	3.65	1.38	.84 (.77–.91)	< .001	1.05 (.92–1.18)	NS
Other people's reaction	3.41	1.39	.80 (.74–.88)	< .001	.99 (.85–1.15)	NS
Losing my reputation	2.96	1.50	.85 (.78–.92)	< .001	1.05 (.93–1.18)	NS
Negative attitudes of staff in testing facilities	2.74	1.49	.82 (.76–.89)	< .001	.87 (.77–.99)	< .05
Testing staff talking about or giving out information about me	2.39	1.39	.91 (.84–1.00)	< .05	1.22 (1.08–1.39)	< .01

1 Univariate and multivariate logistic regression models. *OR* = odds ratio; CI = confidence interval; SD = standard deviation; NS = non significant

STI-related shame and (attributed) negative views of people with an STI

Getting tested for STIs is often associated with an idea of sexual promiscuity which may elicit STI-related shame, negative views of people with an STI, or negative views attributed to others. Among participants, STI-related shame was above the mid-point of the scale (M = 3.17, SD = 1.03, range 1–5), indicating that a substantial proportion of young participants believe they would experience feelings of shame if they had an STI. In univariate analyses STI-related shame was marginally significantly associated with gender, with higher levels of shame in females than in males (M = 3.22 versus M = 3.11, $p = .06$), and was also marginally significantly associated with ethnic background, with higher levels of STI-related shame among participants reporting a non-Anglo-Australian background than among Anglo-Australian participants (M = 3.28 versus M = 3.15, $p = .06$). No association was observed with age, education or sexual identity. These associations were confirmed in a multivariate analysis (see Table 19); only 1% of the variance in STI-related shame was explained.

Table 19: Correlates of STI-related shame[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	-.050	-1.558	NS
Gender	Male	Reference		
	Female	.058	1.887	.06
Education	No university degree	Reference		
	University degree	-.005	-.167	NS
Ethnic background	Anglo-Australian	Reference		
	Other	.060	1.938	.05
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	.020	.645	NS

1 Multivariate linear regression model. Adjusted $R^2 = .01$; NS = non significant

Participants' negative views of people with an STI were found be to lower than the mid-point of the scale and lower than STI-related shame (M = 1.94, SD = .91, range 1–5), which suggests that only a minority of participants have negative opinions of other people with an STI. In univariate analyses, holding negative views of people with an STI was associated with gender and sexual identity and was marginally significantly associated with ethnic background. Female participants held less negative views of people with an STI than male participants (M = 1.80 versus M = 1.99, $p < .001$). Heterosexual participants held more negative views of people with an STI than gay or bisexual participants (M = 1.92 versus M = 1.7, $p < .05$). Participants reporting a non-Anglo-Australian background tended to hold more negative views of people with an STI than with an Anglo-Australian background (M = 1.96 versus M = 1.85, $p = .06$). No association was observed between holding negative views of people with an STI and age or education. In multivariate analysis, all associations observed in univariate analysis were significant (see Table 20), but gender, ethnic background and sexual identity explained only 2% of variance in negative views of people with an STI.

The mean score of attributed negative views of people with an STI was around the midpoint of the scale (M = 3.06, SD = 1.21, range 1–5), indicating that about half the participants believe that people in general have negative views about someone with an STI. In univariate analyses, attributing negative views of people with an STI to others was only associated with age, with higher levels of attributed negative views of people with STIs among participants aged 16 to 20 years than those 21 to 26 years (M = 3.15 versus M = 2.97, $p < .05$). No association was observed with gender, education, ethnic background or sexual identity. In a multivariate analysis (see Table 21), the association between attributing negative views of people with an STI to others and age became marginally significant after controlling for gender, education, ethnic background and sexual identity.

In univariate analyses (see Table 22) testing for STIs was found to be negatively associated with STI-related shame (OR = .83 [.73–.93], $p = .001$), with lower uptake of STI testing among participants reporting higher levels of STI-related shame. STI-related shame explained 1% of variance in STI testing in univariate analysis. Testing for STIs was also found to be negatively associated with holding negative views of people with an STI (OR = .86 [.75–.99], $p < .05$), with lower uptake of STI testing among participants holding negative views about people with an STI. Negative views of people with STIs explained less than 1% of variance in STI testing. No association was observed between STI testing and attributing negative views of people with an STI to others.

Table 20: Correlates of negative views of people with an STI[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	.039	1.229	NS
Gender	Male	Reference		
	Female	-.110	-3.598	< .001
Education	No university degree	Reference		
	University degree	-.056	-1.710	< .10
Ethnic background	Anglo-Australian	Reference		
	Other	.063	2.041	<.05
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	-.080	-2.636	< .01

1 Multivariate linear regression model. Adjusted $R^2 = .02$; NS = non significant

Table 21: Correlates of attributed negative views of people with an STI[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	-.062	-1.903	<.10
Gender	Male	Reference		
	Female	-.002	-.053	NS
Education	No university degree	Reference		
	University degree	-.032	-.967	NS
Ethnic background	Anglo-Australian	Reference		
	Other	.017	.543	NS
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	.083	.037	NS

1 Multivariate linear regression model. Adjusted R^2 = .01; NS = non significant

Table 22: Association of STI-related shame and (attributed) negative views of people with an STI with STI testing[1]

Variable	Univariate analysis		Multivariate analysis	
	OR (95% CI)	*p*-value	Adjusted *OR* (95% CI)	*p*-value
STI-related shame	.83 (.73–.93)	.001	.84 (.75–.96)	< .01
Negative views of people with an STI	.86 (.75–.99)	< .05	.91 (.78–1.06)	NS
Attributed negative views of people with an STI	.96 (.87–1.05)	NS	1.01 (.91–1.13)	NS

1 Logistic regression models. *OR* = odds ratio; CI = confidence interval; NS = non significant

When STI-related shame, holding negative views of people with an STI and attributing negative views of people with an STI to others were entered in a multivariate regression model (see Table 22), only STI-related shame remained negatively associated with testing for STIs (adjusted OR = .84 [.75–.96], $p < .01$); STI-related shame explained 1% of variance in STI testing over and above the other variables.

Subjective norms of STI testing

Anticipating other people's reactions before adopting a given behaviour is a common human tendency. Subjective norms have a major influence on people's behaviours and this is especially the case among young people. In this study subjective norms refer to participants' perception of whether other people who are important to them would support their testing for STIs.

Subjective norms were above the midpoint of the scale (M = 3.46, SD = .82, range 1–5), indicating that participants think that on average people they know were somewhat in favour of testing. In univariate analyses, subjective norms were associated with age, gender and sexual identity. Subjective norms were less positive among participants aged 16 to 20 years than among participants aged 21 to 26 years (M = 3.41 versus M = 3.62, $p = .05$), while subjective norms were more positive in females compared to males (M = 3.51 versus M = 3.39, $p < .05$) and in non-

heterosexual participants compared to heterosexual participants (M = 3.62 versus M = 3.40, $p < .001$). In a multivariate analysis, all associations observed in univariate analyses remained significant (see Table 23) and 2% of the variance in subjective norms was explained.

In a univariate analysis, subjective norms were significantly associated with testing for STIs (OR = 1.67 [1.43–1.96], $p < .001$). Participants who perceived more favourable views in people important to them were more likely to have tested for STIs compared

Table 23: Correlates of subjective norms of STI testing[1]

Variables	Categories	Beta	*t*	*p*-value
Age	16–20 years	Reference		
	21–26 years	.080	2.495	< .05
Gender	Male	Reference		
	Female	.068	2.222	< .05
Education	No university degree	Reference		
	University degree	-.016	-.500	NS
Ethnic background	Anglo-Australian	Reference		
	Other	-.039	-1.269	NS
Sexual identity	Heterosexual	Reference		
	Gay, bisexual and other	.121	3.976	< .001

1 Multivariate linear regression model. Adjusted $R^2 = .02$; NS = non significant

to participants who perceived less favourable views in those people important to them, and subjective norms explained 5% of the variance in STI testing.

Towards a comprehensive framework of barriers to and facilitators of STI testing

In the univariate analyses previously presented in this report, STI testing was found to be significantly associated with age, gender, sexual identity, STI-related symptoms and sexual risk taking. Univariate associations were also observed between STI testing and STI-related knowledge, perceived vulnerability to STIs, attitudes to testing for STIs, perceived *pros* and *cons* of testing for STIs, fears and worries regarding STI testing, STI-related shame and subjective norms relating to STI testing (see Table 24).

Multivariate logistic regression analysis was used to assess independent contributions of the psychosocial factors, over and above STI-related symptoms and sexual risk taking and controlling for sociodemographic characteristics (i.e. age, gender and sexual identity). In this multivariate analysis (see Table 24), three psychosocial factors remained independently significantly associated with testing for STIs: perceived *cons* of STI testing (adjusted OR = .57 [.43–.73], $p < .001$), fears and worries regarding STI testing (adjusted OR = .83 [.70–.1.00], $p < .05$) and subjective norms relating to STI testing (adjusted OR = 1.44 [1.18–1.76], $p < .001$). Perceived *cons* and fears and worries were negatively associated with testing for STIs, while subjective norms were positively associated. The (positive) association between STI testing and attitudes towards testing was marginally significant. No association was found between testing for STIs and levels of STI-related knowledge, perceived vulnerability to STIs,

Table 24: Multivariate associations of psychosocial factors with STI testing[1]

Dimensions	Association with testing for STIs			
	Univariate analysis		Multivariate analysis[2]	
	OR (95% CI)	*p*-value	Adjusted *OR* (95% CI)	*p*-value
Psychosocial factors				
STI-related knowledge	1.18 (1.11–1.25)	< .001	1.06 (.98–1.14)	NS
Perceived vulnerability to STIs	1.24 (1.09–1.42)	.001	1.06 (.89–1.25)	NS
Attitudes regarding STI testing	2.29 (1.82–2.88)	< .001	1.31 (.97–1.79)	< .10
Perceived pros of STI testing	2.24 (1.80–2.78)	< .001	1.23 (.93–1.64)	NS
Perceived cons of STI testing	.44 (.36–.54)	< .001	.57 (.43–.73)	< .001
Fears and worries regarding STI testing	.63 (.56–.71)	< .001	.83 (.70–.1.00)	< .05
STI-related shame	.83 (.73–.93)	.001	.92 (.78–1.06)	NS
Subjective norms regarding STI testing	1.67 (1.43–1.96)	< .001	1.44 (1.18–1.76)	< .001
Control variables				
Age	3.27 (2.56–4.19)	< .001	3.18 (2.35–4.31)	< .001
Gender	1.79 (1.40–2.28)	< .001	1.93 (1.42–2,61)	< .001
Education	1.76 (1.31–2.37)	< .001	1.14 (.79–1.66)	NS
Ethnic background	1.08 (.83–1.42)	NS	1.32 (.89–1.71)	NS
Sexual identity	1.24 (.96–1.62)	NS	1.24 (.90–1.71)	NS
Sexual risk-taking	2.55 (1.97–3.30)	< .001	2.15 (1.58–2.93)	< .001
STI-related symptoms	3.18 (2.47–4.09)	< .001	2.72 (2.01–3.69)	< .001

1 Logistic regression models. 2 Nagelkerke R^2 = .36. *OR* = odds ratio; CI = confidence interval; NS = non significant

perceived *pros* of STI testing and STI-related shame, suggesting some mediation effects between variables. The model explained 36% of the variance in testing for STIs.

Discussion

The survey recruited a sample of 1,100 sexually experienced participants aged between 16 and 26 years living in NSW, Australia. The sample was large and diverse in terms of gender, age, education, ethnic background and sexual identity, which provided valuable insight into the situation and needs around STI testing of young people in NSW, including specific population subgroups.

Of the 1,100 sexually active participants, half (52%) had ever been tested for STIs and/or HIV. Most of these tested participants (67%) had been tested for both STIs and HIV and typically had tested in the past year (74%). Testing for STIs was found to be more likely in older, female and non-heterosexual participants. As expected, STI testing was also related to experiencing STI-related symptoms and engaging in unprotected intercourse. Of the 1,100 participants, 41.5% had ever experienced STI-related symptoms. In a univariate analysis, experiencing STI-related symptoms explained 10% of the variance in STI testing, and STI-related symptoms remained significantly associated with STI testing in the full multivariate model that included all psychosocial and control variables of interest. Having had unprotected intercourse in the six months prior to the survey, a practice reported by 66% of the participants, explained 6% of the variance in STI testing in a univariate analysis and remained associated with STI testing in the full multivariate model.

The objective of the current study was to empirically assess the prevalence and contribution of individual and social factors influencing STI-testing behaviours that can be addressed by social marketing campaigns and other behavioural interventions. The first step in this analysis consisted of critically assessing the widely held idea that poor STI-related knowledge is a main reason why STI testing remains insufficient among young people. STI-related knowledge was moderate among participants (M = 5.68, range 0–10). Participants' level of knowledge was the highest for chlamydia and lowest for gonorrhoea. Knowledge of the consequences of having an STI was also quite poor. While overall STI-related knowledge explained 4% of the variance in STI testing in univariate, STI-related knowledge was not found to be associated to STI testing in the full multivariate model. This indicates that the contribution of knowledge to STI testing may be overestimated by research and health promotion practice, at the expense of other barriers to and facilitators of STI testing.

The study also assessed the influence of perceived threat on STI testing. Results indicate that most participants considered having an STI as a (relatively) serious condition, but few participants considered themselves to be personally vulnerable to STIs. No association was observed between perceived severity and STI testing, but higher perceived vulnerability was associated with having tested for STIs. The variance in STI testing explained by perceived vulnerability was, however, minimal in a univariate analysis (1%) and the association between perceived vulnerability and STI testing disappeared in the full multivariate model.

Contrary to what was hypothesised, most young people held positive attitudes to STI testing. Attitudes towards STI testing were found to be significantly associated with testing for STIs in a univariate analysis and explained 7% of variance in STI testing. However, the association between attitudes and STI testing disappeared in the full multivariate model.

The weighting of specific *pros* and *cons* of STI testing was found to be pivotal in young people's decision to test for STI. Participants had a moderately high perception of *pros* of STI testing and a relatively low perception of *cons* of STI testing. Perceived *pros* were found to be statistically significantly positively associated with STI testing in a univariate analysis and explained

7% of the variance in STI testing. More detailed analyses indicate that young people go beyond benefits of treatments in appraising the *pros* of STI testing and their lay perspective on important *pros* of STI testing includes *'feeling more responsible for one's health'* and *'putting a new relationship in the right track'*. Perceived *cons* were found to be statistically significantly negatively associated with STI testing in a univariate analysis and explained 9% of the variance in STI testing. Taken together perceived *pros* and *cons* explained 12.5% of the variance in STI testing. In the full multivariate model however only perceived *cons* remained statistically significantly associated with STI testing. Additional analyses conducted on perceived *cons* indicate that uptake of STI testing is in particular limited by participants' perceptions that testing is expensive and by their apparent difficulty to locate services where they could have STI testing.

Results confirmed that various fears and worries regarding STI testing prevailed among participants and fears and worries explained around 7% of the variance in STI testing in a univariate analysis. Specific fears that were found to be negatively associated with STI testing were fear of medical procedures, fear of negative staff attitudes and fear of parents' reactions. The association between fears and worries and STI testing remained statistically significant in the full multivariate model. These findings indicate that fears and worries are important to understand barriers to STI testing in young people.

The results also contribute to a better understanding of the influence of STI-related stigma on STI testing. A substantial proportion of young people believe they would experience feelings of shame if they had an STI and that other people have negative views about someone with an STI. Conversely, only a minority of participants had negative opinions of other people with an STI. In univariate analyses, a statistically significant negative association was found between testing for STIs and STI-related shame as well as negative views of people with an STI. These results suggest that feelings of shame and negative views of people with an STI may prevent some young people from seeking STI testing. In a multivariate model, no association between negative views of people with an STI and STI testing was found over and above shame. Shame explained only 1% of the variance in STI testing and in the full multivariate model no significant association was found between shame and STI testing.

Results also indicate that subjective norms play an important role in the adoption of health-related behaviours in young people. Contrary to what was hypothesised, results indicate that most participants believe that important people around them held favourable views regarding their testing for STIs. In a univariate analysis subjective norms were positively associated with STI testing and explained 5% of the variance in STI testing. Subjective norms also remained significantly associated with STI testing in the full multivariate model.

The findings of the survey contribute to strengthening the evidence-based determinants of STI testing in young people. Most published research on STIs investigates only a limited set of barriers to STI testing, which are consequently often presented as main reasons why young people do not test for STIs. This research shows that, beyond STI-related knowledge and system-level barriers, there are many complex individual and social factors that influence young people's decision to seek STI testing. The findings underline that it is important to achieve a comprehensive understanding of the barriers to and facilitators of STI testing to clearly distinguish between the prevalence of a given factor, the univariate contribution of a factor and a more robust understanding of its relative importance compared to other potential barriers to and facilitators of STI testing.

In the current survey between 1% and 9% of the variance in STI testing was explained in univariate analyses by perceived vulnerability to STIs (1%), STI-related shame (1%), negative views of people with an STI (1%), STI-related knowledge (4%), subjective norms relating to STI testing (5%), attitudes to STI testing (7%), fears and worries regarding STI testing (7%), perceived *pros* of STI testing (7%), and perceived *cons* of STI testing (9%). None of the factors explaining less than 5% of the variance in STI testing in univariate analyses was associated with testing for STIs in the full multivariate model. Of the factors that explained 5% or more of the variance in STI testing in univariate analyses all, except attitudes to STI testing and perceived *pros* of STI testing, remained significantly associated with STI testing in the full multivariate model.

These data help to prioritise efforts in terms of health promotion. The factors that remained significantly associated in the full multivariate model (namely perceived *cons* of STI testing, fears and worries and subjective norms relating to STI testing) are those that should be addressed with priority by campaigns and interventions to promote STI testing in young people in NSW.

The survey has some limitations. Since participants were recruited online the sample cannot be considered representative of the population of sexually active young people aged 16 to 26 years living in NSW. The length of the questionnaire may also have introduced some bias. Another limitation is that the study had a cross-sectional design and no causal relationships could be derived from correlations between uptake of STI testing and its potential determinants. Prospective studies are needed to validate the framework presented in this report. In spite of these limitations, the study provides one of the largest and most comprehensive datasets and evidence-based approaches regarding STI testing and its determinants among young people in NSW, Australia and elsewhere.

Conclusions and recommendations

Young people in this survey often engage in unprotected sex, and half of them have tested for STIs. Testing in this sample is higher than rates previously reported in young people in Australia (Kong, Guy and Hocking, 2011). More data are needed to understand whether this higher level of testing in young people in NSW is due to a recruitment bias or if it reflects emerging trends in sexual health routine in this population. Beyond providing data on the frequency of testing, the main contribution of the current study is to offer an understanding of the prevalence and contribution of a large array of barriers to and facilitators of STI testing among young people. This assessment contributed not only to identifying but also to prioritizing determinants of testing for STIs that need to be addressed by health promotion programs.

Beyond STI-related knowledge and system level barriers, many complex individual and social factors influence young people's decision to seeking STI testing. Key psychosocial factors associated with STI testing were perceived *cons* of STI testing, fears and worries regarding STI testing and subjective norms relating to STI testing. Other factors that may exert less influence on the decision to seek STI testing included perceived vulnerability to STIs, attitudes to STI testing, STI-related shame and STI-related knowledge. Each of the assessed individual and social factors only explains a fraction of the variance in STI testing, which means that no real understanding of the reasons why young people test for STIs can be expected from research that focuses only on one or few factors. Both research and sexual health promotion programs need to rely on more comprehensive appraisals of barriers to and facilitators of STI testing.

The weak association that was found between STI knowledge and STI testing should not be understood as an indication that information about STIs is unimportant. STI knowledge may not play a key role because the level of STI knowledge is already fair in the surveyed population. This situation would change if sexual health programs were to stop informing young people on STIs. Also information remains necessary for new generations of young people who become sexually active. For these reasons sexual health programs need to continue strengthening STI-related knowledge in young people.

Beyond promoting awareness and increasing knowledge, the current challenge for sexual health promotion programs is to address other, more complex individual and social barriers that may limit the uptake of testing for STIs.

Some suggestions to address key barriers to STI testing in young people that can be derived from this study include:

- Interventions need to address young people's evaluation of the *cons* associated with testing for STIs; the *cons* that appeared the most important to address are perceptions that STI testing is expensive and that testing facilities are difficult to locate;
- Interventions need to address the fears and worries that prevent some young people to request an STI test, including fear of parents' reaction, fear of staff attitudes and fear of medical procedures involved in STI testing; and
- Positive norms around testing need to be strengthened to create a good basis on which health promotion can build.

Other aspects that were found to be less pivotal but that could be addressed by health promotion programs include:

- Increasing perceptions of personal risk of contracting an STI; and
- Reducing shame associated with contracting and being tested for STIs.

Building on empirical evidence and appropriate theories of behaviour, sexual health promotion programs are needed to address the barriers identified in this research, using innovative social marketing campaigns and behavioural change interventions tailored at individual, social and structural levels. Strengthening this type of approach that reflects contemporary theory, research and practice would considerably increase the impact and efficiency of programs to promote STI testing in young people as well as in other populations.

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