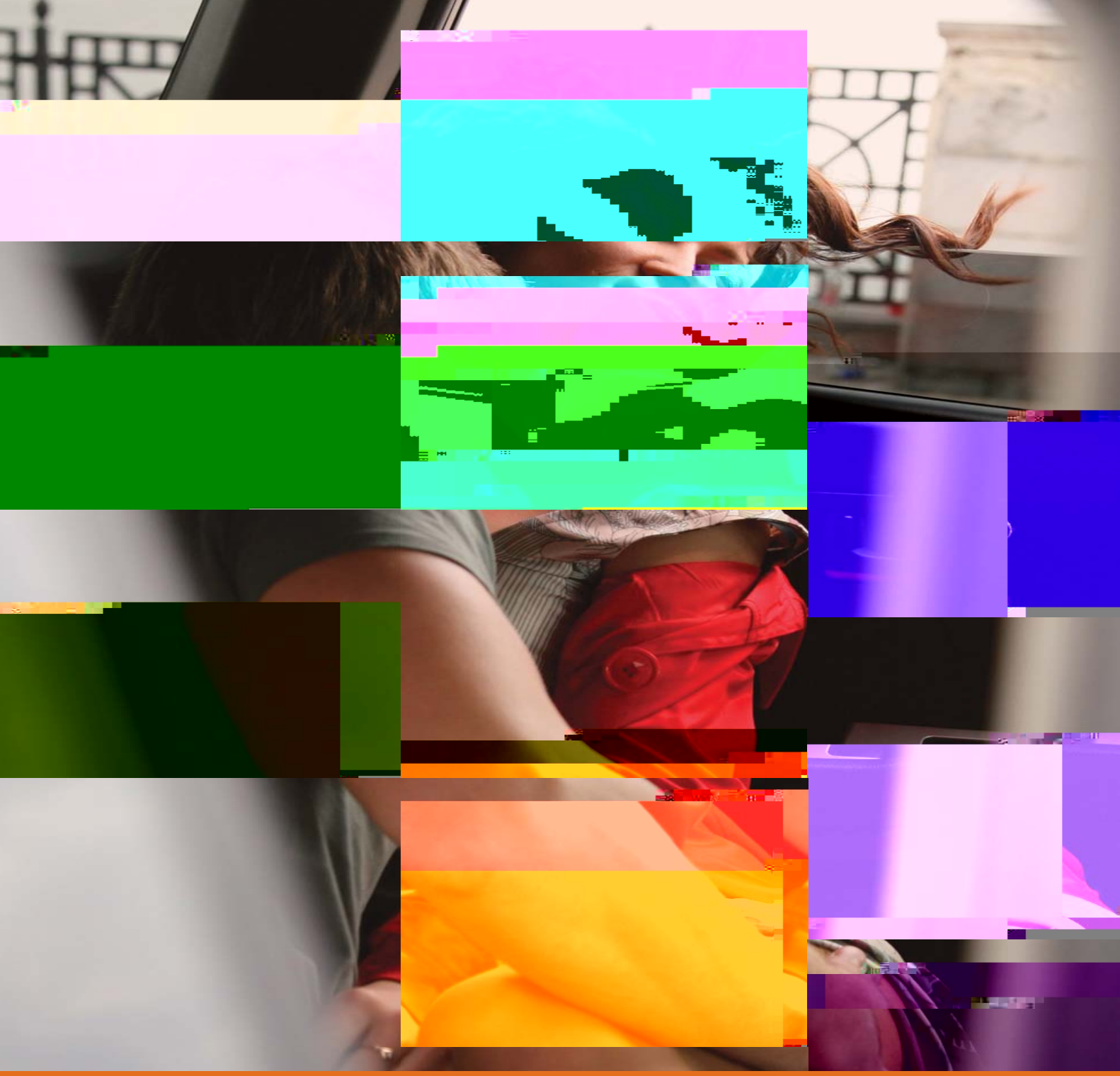

MONOGRAPH 2/2011

Understanding barriers to STI testing among young people:

results from the online survey ‘Getting Down To It’

Copies of this monograph or any other publications from this project may be obtained by contacting:

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Contents

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

List of tables

While young people are at high risk of contracting serisk

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 [illegible] 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

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 and 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 waTI S 1 S nCN0 J 0 j .5 w 4 .ingmanc

The value '1' was attributed to all correct answers and the value '0' was attributed to incorrect or [illegible] 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. [illegible]). For this question, responses were given on a 5-point scale, ranging from (1) [illegible] to (5) [illegible]. 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) [illegible] to (5) [illegible]. Internal consistency of the items was very good (Cronbach's α = .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. [illegible]). Responses were given on a 5-point scale, ranging from (1) [illegible] to (5) [illegible]. The internal consistency of items was high (Cronbach's α = .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. [illegible]) to evaluate testing for STIs. Responses were given on a 5-point scale, ranging from (1) [illegible] to (5) [illegible]. The scale had a good internal consistency (Cronbach's α = .75) and item scores were averaged. A higher score indicates a more positive attitude towards testing for STIs.

Perceived *pros* of STI testing

Perceived [illegible] were assessed using 10 items. Participants were asked to rate how much they agreed with positive statements about being tested for STIs (e.g. [illegible]). Responses were provided on a 5-point scale ranging from (1) [illegible] to (5) [illegible]. The internal consistency of the items was high (Cronbach's α = .90) and item scores were averaged. A higher score indicates a higher level of perceived [illegible] of testing for STIs.

Perceived *cons* of STI testing

The perceived[illegible] 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. [illegible]). Responses were given on a 5-point scale, ranging from (1) [illegible] to (5) [illegible]. Internal consistency of the items was good (Cronbach's α = .76) and item scores were averaged. A higher score indicates a higher level of perceived[illegible] 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. [illegible]). Responses were given on a 5-point scale that ranged from (1) [illegible] to (5) [illegible]. The internal consistency of items was high (Cronbach's α = .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., [illegible]). Responses were given on a 5-point Likert scale (1 = [illegible], 5 = [illegible]). Internal consistency of the five items was good (Cronbach's α = .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., [illegible]). Responses were given on a 5-point Likert scale (1 = [illegible], 5 = [illegible]). Internal consistency of the five items was very good (Cronbach's α = .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., [illegible]). Responses were given on a 5-point Likert scale (1 = [illegible], 5 = [illegible]). Internal consistency of the five items was very good (Cronbach's α = .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 [illegible] f...', with responses given on a 5-point scale ranging from 1 = [illegible] to 5 = [illegible]. The same question was repeated for three other social referents: [illegible]; [illegible] and [illegible]. The internal consistency of the scale was high (Cronbach's α = .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 [illegible] and [illegible] 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. -tests were used to assess potential univariate TD.0258 Twa9 Tn8314 0 T;D[othosepsycho social , educatio
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As sociusiows of sycho socialfracoars(with ever being tested for STIs, including HIV.)Tj0 -1.1429 TD.0258 Tw(ndihoptoosus

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

v

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, < .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, < .05), participants with an Anglo-Australian background had better STI knowledge than participants with other ethnic backgrounds (M = 5.77 versus M = 5.42, < .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, < .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.

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], < .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, < .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, < .05) and in heterosexual than gay, bisexual and other non-heterosexual participants (M = 4.63 versus M = 4.51, < .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], = .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, = .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, = .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

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

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

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						

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, < .001), fears and worries were higher in female than in male participants (M = 3.11 versus M = 2.97, < .05),

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

	Prevalence	Association with testing for STIs

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, < .001). Heterosexual participants held more negative views of people with an STI than gay or bisexual participants (M = 1.92 versus M = 1.7, < .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, = .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, < .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], = .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], < .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], < .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, = .05), while subjective norms were more positive in females compared to males (M = 3.51 versus M = 3.39, < .05) and in non-

heterosexual participants compared to heterosexual participants (M = 3.62 versus M = 3.40, < .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], < .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 and 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 of STI testing (adjusted OR = .57 [.43–.73], < .001), fears and worries regarding STI testing (adjusted OR = .83 [.70–.1.00], < .05) and subjective norms relating to STI testing (adjusted OR = 1.44 [1.18–1.76], < .001). Perceived 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 

7% of the variance in STI testing. More detailed analyses indicate that young people go beyond benefits of treatments in appraising the [illegible] of STI testing and their lay perspective on important [illegible] of STI testing includes [illegible]. Perceived [illegible] 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 [illegible] and [illegible] explained 12.5% of the variance in STI testing. In the full multivariate model however only perceived [illegible] remained statistically significantly associated with STI testing. Additional analyses conducted on perceived [illegible] 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 [illegible] of STI testing (7%), and perceived [illegible] 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 [illegible] 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 [illegible] 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 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 associated with testing for STIs; the 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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