

This is the accepted version of the following article: Nguyen, Phuong L.T. and Bruno, Raimondo and Alati, Rosa and Lenton, Simon and Burns, Lucy and Dietze, Paul M. 2013. Self-reported recent testing and diagnosis for sexually transmitted infections among regular ecstasy users in Australia, 2011–2012. *Drug and Alcohol Review*. 33 (2): pp. 211-214, which has been published in final form at <http://doi.org/10.1111/dar.12105>

This is the accepted version of the following article: Nguyen, P. L. T., Bruno, R., Alati, R., Lenton, S., Burns, L., & Dietze, P. M. (2014). Self-reported recent testing and diagnosis for sexually transmitted infections among regular ecstasy users in Australia, 2011–2012. *Drug and Alcohol Review*, 33(2), 211-214. doi: 10.1111/dar.12105, which has been published in final form at <http://dx.doi.org/10.1111/dar.12105>.

Self-reported recent testing and diagnosis for sexually transmitted infections among regular ecstasy users in Australia, 2011-2012

Phuong Nguyen (BBiomedSci(Hon))¹, Raimondo Bruno (PhD)², Rosa Alati (PhD)³, Simon Lenton (PhD)⁴, Lucy Burns (PhD)⁵, Paul M Dietze (PhD)¹

¹ Centre for Population Health, Burnet Institute, Melbourne, Victoria, Australia

² School of Psychology, University of Tasmania, Hobart, Tasmania, Australia

³ Queensland Alcohol and Drug Research and Education Centre, University of Queensland, Herston, Queensland, Australia

⁴ National Drug Research Institute, Curtin University, Perth, Australia.

⁵ National Drug and Alcohol Research Centre, University of New South Wales, Sydney, New South Wales, Australia

Running head: Sexually transmitted infections and drug use

Article type: Brief report

Corresponding author:

Phuong Nguyen

Address: 85 Commercial Rd, Melbourne, VIC, Australia 3004

Email: phuong@burnet.edu.au

Tel: (03) 9282 2137 **Fax:** (03) 9282 2138

ABSTRACT

Background: Previous studies suggest that people who consume alcohol and drugs are at increased risk of Sexually Transmitted Infections (STIs). We examined the prevalence and predictors of self-reported STI testing and diagnosis among self-reported regular ecstasy users (REU). **Methods:** 955 REU from the 2011 and 2012 Ecstasy and Related Drugs Reporting System were included in the analysis. Bivariate and multivariate Poisson regression was used to identify predictors of recent STI testing and logistic regression was used to identify predictors of recent STI diagnosis. **Results:** Forty-four percent of REU reported having a recent STI test and five percent reported a recent diagnosis. Of the 421 REU who reported a recent test, 10% reported a recent STI diagnosis. In multivariable analysis, REU were more likely to report a recent STI test if they were female compared to males (RR=1.56; 95% CI=1.36-1.80), aged 25-29 years compared to 16-19 years (RR=1.34; 95% CI=1.05-1.72), and reported ≥ 2 casual sex partners compared to no casual partners (RR=1.48; 95% CI=1.01-2.14). REU reporting cannabis use in the past six months were 0.78 times less likely to report a recent STI test (95% CI=0.66-0.94). There were no significant predictors associated with STI diagnosis. **Conclusion:** Encouragingly, REU who reported having multiple casual partners in the past six months were more likely to report a recent test. However, younger REU aged 16-19 years were least likely to test suggesting health promotion need to be directed to this age group. Further research is required to explain the lower testing among cannabis users.

KEY WORDS: Ecstasy, Sexually transmitted infections, testing, drugs

BACKGROUND

Sexually transmitted infections (STIs) can cause significant morbidity among young people; untreated infections can lead to infertility, organ damage and cancers[1-4]. STI prevalence is increasing; for example chlamydia notifications increased from 130 notifications per 100,000 population in 2001 to 435 notifications per 100,000 population in 2011 [4]. The use of alcohol and other drugs can impair judgement which can lead to greater risk taking behaviours which subsequently put people at greater risk of STIs [5-7]. The aim of this paper is to identify demographic and behavioural predictors associated with self-reported STI testing and diagnosis among a sample of Australians who report regular ecstasy use.

METHODS

Up to 100 participants from the Ecstasy and Related Drug Reporting System (EDRS) from the eight Australian capital cities were recruited in 2011 and 2012 for a one hour face-to-face interview comprising questions on drug use, sexual behaviour and health. Eligible participants reported regular ecstasy use (defined as use on at least six occasions) in the past six months, were aged 16 years or older and had resided in their capital city for at least 12 months prior to interview. Ethical approval was obtained from each jurisdiction. Two key outcomes were examined, reports of recent STI testing and STI diagnosis (within the past 12 months). For the latter outcome (recent STI diagnosis), only regular ecstasy users (REU) who reported a recent STI test were included. Surveys were excluded if, in 2012, participants indicated they had participated in previous year to retain unique observations[8]. Further details of the EDRS study have been reported elsewhere[9].

Bivariate and multivariable Poisson regression with robust error variance were used to identify factors associated with recent STI testing (reported as risk ratios). Bivariate and multivariable logistic regression models were used to identify factors associated with recent STI diagnosis (reported as odds ratios) among REU who reported a recent test. Multivariable models included all predictor variables selected for analysis. Variables included in the analysis were gender, age, sexual orientation, income, employment, that have been shown to be related to testing rates or diagnosis along with sex risk behaviours (number of casual, defined as anyone who is not a regular partner, sex partners in the past six months, number of times they had sex with a casual partner under the influence of drugs in the past six months) and different types of drugs used in the past six months (stimulants, cannabis, opioids, benzodiazepines, other pharmaceuticals and hallucinogens)[2, 7, 10, 11].

RESULTS

Nine hundred and fifty five REU were included in the analysis; 44% reported having a recent STI test (in the 12 months prior to interview) and 5% reported a recent diagnosis.

In multivariable analysis, factors associated with reporting a recent STI test included being female, being aged 25-29 years (compared to being aged 16-19 years), and reporting ≥ 2 casual sex partners in the past six months (compared to no casual sex partners reported). REU reporting cannabis use in the past six months were less likely to report a recent STI test compared to those who did not report cannabis use.

Of the 421 REU who reported a recent STI test, 10% reported a recent STI diagnosis. There were no significant associations between any of the predictor variables and STI diagnosis among those tested recently in bivariate or multivariable analysis.

Discussion

In our study, 44% of REU reported a recent STI test and were more likely to report a recent STI test if they were female, aged 25-29 years, reported two or more casual sex partners in the past six months and if they did not report using cannabis in the past six months. However, we found no significant associations between predictor variables and STI diagnosis among those who reported a recent STI test.

While questions about specific STIs were asked in the questionnaire, they were poorly completed (n=177) and therefore we were not able to ascertain which STI REU were tested for. There are no comparable data available for overall STI testing in the Australian population. However, the rate of testing among females (57%) was comparable to female cervical screening rates (primarily for HPV) in the general population (57%)[3], suggesting female REU were comparable to the broader female population to some extent. Males reported a testing rate of 38%, much higher than that found in the general population for chlamydia testing in 2008[12]. The finding that female REU were more likely to report an STI test compared to males may derive from more frequent health seeking behaviour among females (thereby providing general practitioners more opportunities to offer a test[13, 14]) or the fact that testing recommendations related to STIs such as cervical cancer screening are female-targeted [3].

REU aged 25-29 years were more likely to report a recent STI test compared to REU aged 16-19 years. This may reflect a lack of knowledge about STIs among young people aged under 20 years, which is commonly reported [15, 16]. This suggests the need for targeting education efforts towards younger people. Indeed, early education is important to prevent significant disease sequelae such as infertility or cancer that progress from long-term untreated infections[3, 17].

Reporting two or more casual sex partners in the past six months was associated with more frequent reports of STI testing, consistent with findings in the wider population, in spite of the differences in temporality of the testing (past 12 months) and sex partners (past six months) questions[18].

Nevertheless, our analysis is limited by the fact that we did not collect information on other types of relationships for analysis (i.e. concurrent relationships, sex work). Few variations were evident in testing behaviour as a function of the use of different drugs, with the exception of reduced testing among those who reported recent cannabis use. This effect of cannabis use was independent of other behaviours such as the reported number of casual sex partners and needs further investigation.

While our findings present an encouraging picture of STI testing among REU, further work is needed to better understand testing rates and diagnoses according the variety of STIs. Further work is also needed to understand the relationship between reported cannabis use and less frequent testing to determine whether those REU who use cannabis should be targeted for intervention.

Acknowledgements The Ecstasy and Related Drugs Reporting System (EDRS) is funded by the Australian Government Department of Health and Aging (AGDH&A) and coordinated by the National Drug and Alcohol Research Centre, University of New South Wales. The authors would like to acknowledge the researchers who collected the data and thank the participants who volunteered their time. The authors gratefully acknowledge the contribution to this work of the Victorian Operational Infrastructure Support Program received by the Burnet Institute. SL is supported by funding from the Australian Government under the Substance Misuse Prevention and Service Improvement Grants Fund through his employment at The National Drug Research Institute at Curtin University. RA is supported by an Australian National Health and Medical Research Council Career Development Fellowship Level 2 (APP1012485). PD is supported by an Australian Research Council Future Fellowship.

References

- [1] Bearinger LH, Sieving RE, Ferguson J, Sharma V. Global perspectives on the sexual and reproductive health of adolescents: patterns, prevention, and potential. *Lancet*. 2007;369(9568):1220-31.
- [2] DOHA. National Notifiable Diseases Surveillance System. Available at <http://www9.health.gov.au/cda/Source/CDA-index.cfm>. Accessed 13 Nov, 2012.
- [3] Australian Institute of Health and Welfare. Cervical screening in Australia 2010-2011. Canberra: Australian Institute of Health and Welfare, 2013.
- [4] Australian Bureau of Statistics. Sexually Transmissible infections. 2012 [cited 2013 July 2]; Available from: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features10Jun+2012#Intro>.
- [5] Bellis MA, Hughes K, Calafat A, Juan M, Ramon A, Rodriguez JA, et al. Sexual uses of alcohol and drugs and the associated health risks: A cross sectional study of young people in nine European cities. *BMC Public Health*. 2008;8.
- [6] Jenkinson R, Lim M, Bowring A, Dietze P, Hellard M. Young risk takers: alcohol, illicit drugs and sexual practices among a sample of music festival attendees. 38th Annual Meeting of Kettil Bruun Society; Stavanger, Norway 2012.
- [7] Lim M, Hellard M, Aitken C, Hocking J. Sexual-risk behaviour, self-perceived risk and knowledge of sexually transmissible infections among young Australians attending a music festival. *Sexual Health*. 2007;4(1):51-6.
- [8] Horyniak D, Dietze P, Degenhardt L, Higgs P, McIlwraith F, Alati R, et al. The relationship between age and risky injecting behaviours among a sample of Australian people who inject drugs. *Drug and Alcohol Dependence*. 2013. Epub 2013 May 9.
- [9] National Drug & Alcohol Research Centre. The Ecstasy and Related Drugs Reporting System (EDRS). 2013 [cited 2013 July 23]; Available from: <http://ndarc.med.unsw.edu.au/project/ecstasy-and-related-drugs-reporting-system-edrs>.
- [10] Williams H, Davidson S. Improving adolescent sexual and reproductive health. A view from Australia: learning from world's best practice. *Sexual Health*. 2004;1(2):95-105.
- [11] Grulich AE, de Visser RO, Smith AMA, Risse CE, Richters J. Sex in Australia: Sexually transmissible infection and blood-borne virus history in a representative sample of adults. *Australian and New Zealand Journal of Public Health*. 2003;27(2):234-41.
- [12] Kong F, Guy R, Hocking J, Merritt T, Pirotta M, Heal C, et al. Australian general practitioner chlamydia testing rates among young people. *Medical Journal of Australia*. 2011;195(5):249-52.
- [13] Sawleshwarkar S, Harrison C, Britt H, Mindel A. Chlamydia testing in general practice in Australia. *Sexual Health*. 2010;7(4):484-90.
- [14] Bowring A, Gouillou M, Guy R, Kong F, Hocking J, Pirotta M, et al. Missed opportunities- low levels of chlamydia retesting at Australian general practices, 2008-2009. *Sexually Transmitted Infections*. 2012;88(5):330-4.
- [15] Agius P, Pitts M, Smith A, Mitchell A. Human Papillomavirus and cervical cancer: Gardasil vaccination status and knowledge amongst a nationally representative sample of Australian secondary school students. *Vaccine*. 2010;28(27):4416-22.
- [16] Agius P, Pitts M, Smith A, Mitchell A. Sexual behaviour and related knowledge among a representative sample of secondary school students between 1997 and 2008. *Health promotion practice*. 2010;34(5):476-7.
- [17] Paavonen J, Eggert-Kruse W. Chlamydia trachomatis: Impact on human reproduction. *Human Reproduction Update*. 1999;5(5):433-47.

[18] Sacks-Davis R, Gold J, Aitken C, Hellard M. Home-based chlamydia testing of young people attending a musical festival- who will pee and post? BMC Public Health.10:376.

Table 1. Factors associated with recent STI testing among REU, 2011-2012

		n (%)	% tested	Bivariate		Multivariable	
				RR	95% CI	RR	95% CI
Total		955 (100)	44				
Gender	Male	639 (67)	38	1.00		1.00	
	Female	316 (33)	57	1.49*	1.30-1.71	1.56*	1.36-1.80
Sexual orientation	Heterosexual	843 (88)	43	1.00		1.00	
	Non-heterosexual	112 (12)	55	1.29*	1.07-1.55	1.10	0.90-1.34
Age group (years)	16-19	192 (20)	36	1.00		1.00	
	20-24	436 (46)	46	1.25*	1.01-1.55	1.21	0.98-1.49
	25-29	179 (19)	49	1.35*	1.06-1.71	1.34*	1.05-1.72
	30+	148 (16)	45	1.24	0.96-1.61	1.28	0.99-1.67
Employment	No	304 (32)	47	1.00		1.00	
	Yes	651 (68)	43	0.93	0.80-1.08	0.92	0.79-1.08
Weekly income	≤\$400	492 (52)	44	1.00		1.00	
	>\$400	463 (48)	45	1.03	0.90-1.19	1.00	0.86-1.17
Number of casual sex partners, past six months[^]	None	300 (31)	37	1.00		1.00	
	One	149 (16)	34	0.93	0.71-1.21	0.95	0.64-1.41
	2+	506 (53)	52	1.40*	1.18-1.66	1.48*	1.01-2.14
Number of times had sex with casual partner under the influence of drugs, past six months[^]	None	351 (37)	38	1.00		1.00	
	One	57 (6)	44	1.17	0.84-1.61	1.11	0.72-1.70
	2-5	287 (30)	48	1.29*	1.08-1.54	1.01	0.70-1.44
	6+	260 (27)	49	1.31*	1.09-1.57	1.00	0.70-1.42
Used stimulants other than ecstasy[~]	No	141 (15)	38	1.00		1.00	
	Yes	814 (85)	45	1.19	0.95-1.48	1.15	0.91-1.44
Used Cannabis[~]	No	152 (16)	54	1.00		1.00	
	Yes	803 (84)	43	0.79*	0.67-0.93	0.78*	0.66-0.94
Used Opioids[~]	No	753 (79)	43	1.00		1.00	
	Yes	202 (21)	49	1.14	0.96-1.34	1.13	0.96-1.34
Used Benzodiazepines[~]	No	600 (63)	42	1.00		1.00	
	Yes	355 (37)	49	1.16*	1.01-1.34	1.10	0.94-1.27
Used other pharmaceuticals[~]	No	851 (89)	43	1.00		1.00	
	Yes	104 (11)	52	1.19	0.98-1.46	1.06	0.86-1.31
Used Hallucinogens[~]	No	464 (49)	42	1.00		1.00	
	Yes	491 (51)	46	1.09	0.94-1.26	1.11	0.96-1.28
Hazardous alcohol drinking^{^^}	No	89 (9)	44	1.00		1.00	
	Yes	866 (91)	44	1.01	0.79-1.30	1.06	0.83-1.35

[^] Casual sex partners refer to anyone who is not a regular partner.

[~]used drugs in the past six months

^{^^}AuditC scores ≥5 are considered hazardous.

*significant p<0.05

Table 2. Factors associated with recent STI diagnosis among REU who recently tested, 2011-2012

		n (%)	% diagnosed	Bivariate		Multivariable	
				RR	95% CI	RR	95% CI
Total		421 (100)	10				
Gender	Male	241 (57)	11	1.00		1.00	
	Female	180 (43)	9	0.86	0.45-1.64	0.81	0.41-1.60
Sexual orientation	Heterosexual	360 (86)	10	1.00		1.00	
	Non-heterosexual	61 (15)	13	1.40	0.62-3.19	1.44	0.58-3.57
Age group (years)	16-19	70 (17)	13	1.00		1.00	
	20-24	197 (47)	12	0.90	0.39-2.04	0.86	0.36-2.05
	25-29	88 (21)	8	0.59	0.21-1.66	0.62	0.20-1.91
	30+	66 (16)	6	0.44	0.13-1.50	0.41	0.11-1.55
Employment	No	141 (33)	9	1.00		1.00	
	Yes	280 (67)	11	1.18	0.60-2.34	1.47	0.67-3.21
Weekly income	≤\$400	212 (50)	11	1.00		1.00	
	>\$400	209 (50)	10	0.87	0.46-1.64	0.79	0.37-1.68
Number of casual sex partners, past six months[^]	None	111 (26)	6	1.00		1.00	
	One	51 (12)	4	0.61	0.12-3.03	0.46	0.05-4.13
	2+	259 (62)	13	2.25	0.96-5.23	2.34	0.41-13.35
Number of times had sex with casual partner under the influence of drugs, past six months[^]	None	132 (31)	7	1.00		1.00	
	One	24 (6)	17	2.73	0.77-9.72	2.42	0.35-16.56
	2-5	139 (33)	9	1.29	0.53-3.17	0.73	0.14-3.87
	6+	126 (30)	14	2.28	0.98-5.28	1.21	0.23-6.24
Used stimulants other than ecstasy[~]	No	54 (13)	9	1.00		1.00	
	Yes	367 (87)	10	1.13	0.43-3.01	1.13	0.38-3.32
Used Cannabis[~]	No	82 (19)	12	1.00		1.00	
	Yes	339 (81)	10	0.78	0.37-1.64	0.63	0.26-1.52
Used Opioids[~]	No	324 (77)	10	1.00		1.00	
	Yes	97 (23)	11	1.17	0.56-2.41	1.26	0.57-2.78
Used Benzodiazepines[~]	No	250 (59)	11	1.00		1.00	
	Yes	171 (41)	9	0.76	0.39-1.47	0.75	0.37-1.53
Used other pharmaceuticals[~]	No	367 (87)	10	1.00		1.00	
	Yes	54 (13)	11	1.11	0.45-2.78	1.07	0.40-2.84
Used Hallucinogens[~]	No	197 (47)	10	1.00		1.00	
	Yes	224 (53)	10	1.01	0.54-1.91	0.99	0.47-2.05
Hazardous alcohol drinking^{^^}	No	39 (9)	10	1.00		1.00	
	Yes	382 (91)	10	0.99	0.34-2.95	1.03	0.31-3.45

[^] Casual sex partners refer to anyone who is not a regular partner.

[~]used drugs in the past six months

^{^^}AuditC scores ≥5 are considered hazardous.