

Cannabis use in 14 to 25 years old Australians 1998 to 2013

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- We investigate the change in life-time and past year use of cannabis in young Australians aged 14 to 25
- Using the Australian National Drug Strategy Household Survey years 1998 to 2013, we looked at lifetime and past year cannabis use, age of first use, frequency of use, as well as past year alcohol and tobacco use, physical health, and psychological distress
- There was a decrease in both lifetime and past year use of cannabis from 1998 to 2013.
- Males and older young adults were more likely to report having used cannabis in the last year
- Those who reported using cannabis in the past year were more likely to report poorer physical and mental health

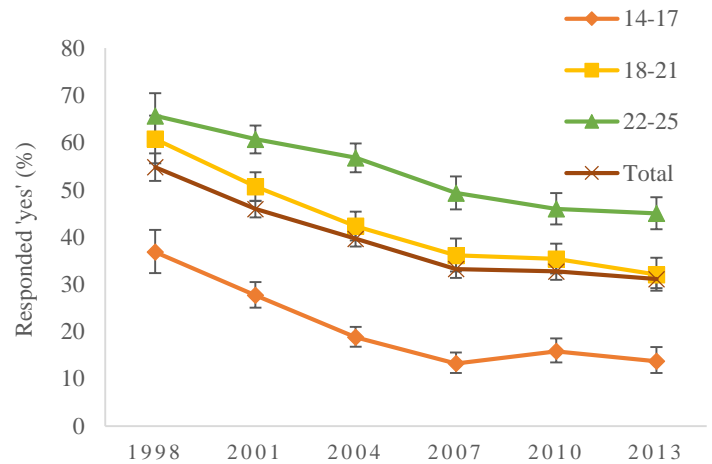


Figure 1 Prevalence of lifetime use of cannabis, 1998-2013, by age group

General rates of declining in drug use/cannabis use

International data suggests that rates of cannabis use have declined in young people over the last several decades in the USA and other developed countries (10, 11). Cannabis use trends in Australia have also declined across a population of 14-49 year olds, but use still remain highest for young people (5). Further, cannabis is often used with alcohol and tobacco in a pattern of polysubstance use that increases the risks of various poor psychosocial outcomes (12, 13). Reid and Colleagues (14) noted an increase in lifetime cannabis use among young Australians aged 14 to 19 in the National Drug Strategy Household Surveys of 1995 and 1998. Others have examined adolescent (ages 14 to 19) and young adult (ages 20 to 29) as broad age groups (5). In general, however, there have been limited investigations of changes in reported cannabis use among

Introduction

Cannabis remains one of the most commonly used illicit drugs, both in Australia and internationally (1, 2). Compared to other illegal drugs, the relatively low cost, easy access, low risk of overdose and perceived low risk of harm make cannabis an attractive option for users (3). Cannabis use is generally initiated in late adolescence, peaks in young adulthood, and is more common in males than females (4). For those who initiate cannabis use before the age of 16 years, there are risks of acute harm, increased susceptibility to abuse and dependence (4, 5), and higher rates of schizotypal personality disorder (6), anxiety, and depressive symptoms (4, 7). Concerns have also been expressed that cannabis can be a 'gateway' drug to the use of other harmful illicit substances such as cocaine and heroin, particularly when used in adolescence (8, 9).

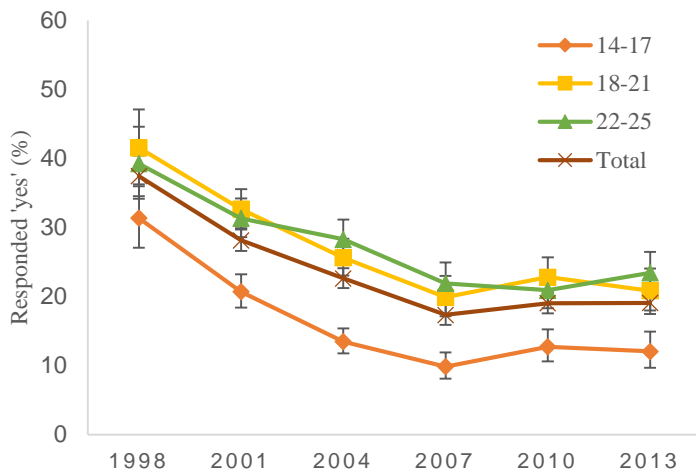


Figure 2 Prevalence of past year use of cannabis, 1998-2013, by age group

young Australians over a longer period 1998 to 2013 using available datasets.

The current study

Given adolescence is the peak period of experimentation and the early adult years the highest peak of cannabis use (4), it is important understand how cannabis use among young Australians has changed over time in terms of lifetime and, past-year use including the frequency and quantity of cannabis used. First exposure to cannabis use is common during school years (ages 14 to 17), while patterns of heaviest cannabis use are likely to occur during late adolescence (ages 18 to 21) and early adulthood (ages 22 to 25) (14). If, and how these patterns have changed over time in each of these specific age groups can provide insight into the optimal time for prevention and intervention of problematic cannabis use. Further, while gender differences have consistently noted that males are more likely to use cannabis, particularly in young adulthood (3, 4), it is of interest whether these differences exist for both lifetime and past year use. Finally, because of concerns about the association between cannabis use and poorer physical and mental health (7, 14), it is important to explore these relationships in a population sample of young Australians in relation to their past year cannabis use, and its relation to self-rated physical health and psychological distress.

This paper uses data from the 1998, 2001, 2004, 2007, 2010 and 2013 Household Surveys to examine differences in reported lifetime and past year use of cannabis, as well as associations between cannabis use and self-rated health scores and psychological distress in the most recent survey.

Method

Sample

The samples were drawn from tri-annual consecutive National Drug Strategy Household Surveys (NDSHS) conducted in 1998, 2001, 2004, 2010 and 2013. The NDSHS is conducted in all Australian States and territories, with an overall sample size of over 20,000 at each survey point (except for 1998 where $n = 10,340$). The current study included respondents aged 14-25 years of age. The sample size of this age group and demographic statistics, including age, gender, and socioeconomic index are available by contacting the authors. There were no meaningful changes in the gender, age, area of residence, socio-economic status, or country of birth across the surveys.

Measures

Cannabis

Lifetime use of cannabis was assessed from 2001 to 2013 using the item 'Have you ever used Marijuana (or Cannabis)?' (yes/no). In 1998 the wording of this item was slightly different 'Have you ever *tried* marijuana (or cannabis)?' Respondents were also asked to indicate their age when they first used cannabis (surveys 2001-2013).

Past year use was assessed with the item 'Have you used cannabis in the past 12 months?' (yes/no).

Frequency of cannabis use was assessed by asking those who had indicated that they had used 'In the last 12 months, how often did you use marijuana (or cannabis)?' ('Every day' to 'Once or twice a year') (2001-2013 surveys).

Other items

Past year tobacco use was assessed with the item 'How often do you *now* smoke cigarettes, pipes or other tobacco products?' ('Daily' to 'Not at all, but I have smoked in the last 12 months' were coded as 'Have used tobacco in the last year')

Past year alcohol use was assessed with the item 'Have you had an alcoholic drink of any kind in the last 12 months?' (yes/no).

Psychological distress was assessed in the 2004-2013 surveys using the 10-item Kessler Psychological Distress Scale (Andrews & Slade, 2001), which provides a measure of depressive and anxious symptoms in the last month (e.g., In the past 4 weeks, about how often did you feel hopeless? (5-point Likert scale, $\alpha = .86$)). Scores on this scale were divided into four categories: : low (10-15); moderate (16-

Table 1. Descriptive use of cannabis, years 1998-2013

		1998		2001		2004		2007		2010		2013	
			95% CI		95% CI		95% CI		95% CI		95% CI		95% CI
Ever used cannabis (%)	14-17	36.84	(32.40, 41.51)	27.71	(25.10, 30.48)	18.81	(16.82, 20.98)	13.27	(11.24, 15.59)	15.84	(13.46, 18.56)	13.75	(11.25, 16.71)
	18-21	60.77	(55.60, 65.71)	50.69	(47.63, 53.75)	42.32	(39.3, 45.39)	36.13	(32.70, 39.71)	35.37	(32.29, 38.59)	32.05	(28.64, 35.66)
	22-25	65.68	(60.54, 70.48)	60.71	(57.72, 63.63)	56.79	(53.71, 59.82)	49.35	(45.86, 52.85)	45.98	(42.68, 49.31)	45.03	(41.66, 48.45)
	All ages	54.81	(51.87, 57.71)	45.94	(44.20, 47.69)	39.65	(37.98, 41.35)	33.24	(31.37, 35.16)	32.75	(30.97, 34.58)	31.11	(29.19, 33.09)
	Male	56.78	(52.49, 60.96)	47.74	(45.16, 50.34)	40.27	(37.73, 42.86)	33.46	(30.67, 36.37)	33.12	(30.49, 35.85)	33.07	(30.19, 29.02)
	Female	52.81	(48.82, 56.76)	44.06	(41.76, 46.38)	39.02	(36.88, 41.20)	33	(30.58, 35.53)	32.35	(30.01, 34.79)	29.02	(26.57, 31.59)
Used cannabis in the last 12 months (%)	14-17	31.39	(27.11, 36.01)	20.72	(18.42, 23.23)	13.49	(11.79, 15.40)	9.86	(8.14, 11.91)	12.75	(10.60, 15.27)	12.08	(9.72, 14.92)
	18-21	41.58	(36.26, 47.11)	32.69	(29.93, 35.58)	25.64	(23.05, 28.41)	19.92	(17.17, 22.99)	22.83	(20.20, 25.69)	20.87	(18.01, 24.06)
	22-25	39.27	(34.18, 44.61)	31.34	(28.61, 34.21)	28.31	(25.63, 31.15)	21.93	(19.19, 24.94)	20.92	(18.33, 23.77)	23.45	(20.68, 26.47)
	All ages	37.46	(34.56, 40.45)	28.16	(26.62, 29.74)	22.64	(21.23, 24.12)	17.37	(15.90, 18.96)	19.05	(17.58, 20.61)	19.09	(17.48, 20.81)
	Male	42.13	(37.69, 46.70)	31.95	(29.60, 34.40)	25.72	(23.49, 28.08)	19.44	(17.15, 21.95)	20.64	(18.45, 23.02)	21.77	(19.29, 24.47)
	Female	32.7	(29.23, 36.38)	24.2	(22.31, 26.20)	19.46	(17.76, 21.25)	15.18	(13.41, 17.13)	17.35	(15.45, 19.43)	16.23	(14.31, 18.36)
	Monthly	15	(11.50, 19.32)	13.44	(11.37, 15.82)	12.44	(10.24, 15.03)	15.44	(12.28, 19.24)	15.1	(12.17, 18.58)	14.64	(11.49, 18.46)
	Less than monthly	46.41	(41.19, 51.72)	51.62	(48.37, 54.87)	54.45	(50.82, 58.04)	57.59	(52.79, 62.25)	58.93	(54.53, 63.19)	55.85	(50.93, 60.66)

21), high (22-29), and very high (30-50) levels of psychological distress (15-17).

To assess general health respondents were asked to respond to the item 'In general, would you say your health is ...' (1 'Excellent' to 5 'Poor').

Procedure

Each of the NDSHSs were approved by the Australian Institute of Health and Welfare Health Ethics Committee. Access to the survey data was approved by the Australian Social Science Data Archive and The University Human Research Ethics Committee.

For all NDSHS, households were randomly selected using a multi-stage stratified design based on statistical local areas (18), with oversampling for small geographical locations. Data were predominately obtained through a 'drop and collect' method (60-100%). Self-completion questionnaires were delivered to, and then collected from, households. If collection was not possible a pre-paid, pre-addressed envelope was provided and a follow-up reminder telephone call was made. For the 1998, 2001, 2004 and 2007 surveys, data collection was augmented by face-to-face interviews and/or Computer-Assisted Telephone Interviews (CATI). For all methods the respondent was the household member who was aged at least 14 or older (1998-2001) or 12 years or older (2004-2013) next to have a birthday. Signed parent/guardian consent was obtained for persons under 15 years of age. Across all survey years, response rates ranged from 46-56% (see Table 1). Further information on design and methods of the NDSHS can be

found elsewhere (1, 19). Weights were applied to the data based on geographic stratum to address any potential disparity arising from the survey design or its implementation, and to align the samples with the Australian population.

Statistical Design

All analyses were performed in either Stata 13 using the svy command (20). The svy command was used to account for the complex survey design. Prevalence of lifetime and past year cannabis use in survey years between 1998 and 2013 were compared using corrected chi-squared analysis. Binary logistic regression was used to determine differences in rates of use across gender and age groups. Changes in the age of first use between 2001 and 2013 were compared using independent sample t-tests. Lifetime and past year cannabis use were regressed on age group, gender and survey years in two binary logistic regressions. Psychological distress and self-rated health were regressed on past year cannabis use, gender, age group and survey year in two ordinal logistic regressions. To account for the role of common polydrug use triangles, further ordinal logistic regressions assessed psychological distress and self-related health relationships with past year cannabis use, after controlling for past year alcohol and tobacco use, gender, age group and survey year.

Results

Prevalence of cannabis use

Table 1 presents the proportion of respondents who reported having ever used cannabis, and having used cannabis in the past year, by age group and gender.

For the total sample, lifetime cannabis use decreased significantly from 54.8% in 1998 to 31.1% in 2013 [$\chi^2(5) = 404.81, p < .001$]. Binary logistic regression indicated that there was no significant difference in lifetime use by gender, OR = .98, 95% CI [.93, 1.04], $p = .483$. Compared to respondents aged 14-17, respondents aged 18-21 and 22-25 were more likely to have lifetime cannabis use, OR = 3.04, 95% CI [2.82, 3.27], $p < .001$ and OR = 4.80, 95% CI [4.46, 5.16], $p < .001$ respectively.

The proportion of young people who had used cannabis in the last year use was also significantly lower in 2013 (18.82% of respondents) than 1998 (36.24%) [$\chi^2(5) = 370.94, p < .001$]. Binary logistic regression indicated males were more likely to have used cannabis in the last year than were females, OR = 1.26, 95% CI [1.19, 1.34], $p < .001$. There were also age-group differences for past year cannabis use. Compared to respondents aged 14-17, respondents aged 18-21 and 22-25 were more likely to have used marijuana in the last year, OR = 1.90, 95% CI [1.76, 2.07], $p < .001$ and OR = 1.81, 95% CI [1.68, 1.97], $p < .001$ respectively.

Age of first use

Across the entire sample, the reported mean age of first use of cannabis use increased across surveys from 15.8

years in 2001 to 16.8 years in 2013 ($t[3211] = -5.34, p < .001$). The reported mean age of first use was significantly lower for males in the 2013 survey ($M = 16.72$) compared to 2001 ($M = 15.51$) ($t[1871] = -10.11, p < .001$). Similarly, the reported mean age of first use was significantly lower for females in the 2013 survey ($M = 15.64$) compared to 2001 ($M = 16.83$) ($t[1458] = -9.09, p < .001$).

Frequency

Chi-square tests indicated that, for respondents who had used marijuana in the last 12 months, there were no significant changes in the reported frequency of marijuana use between 1998 and 2013 [$\chi^2(16) = 52.27$ ns].

Physical and mental health

After controlling for survey year, gender, age, and past year alcohol and tobacco use, ordinal logistic regression showed a significant association between past year cannabis use and self-rated health scores. Respondents who had used cannabis in the last 12 months were 1.43 times more likely to rate their health poorly [$\chi^2(19) = 429.29, p < .001$; CI = 1.31, 1.56].

As shown in Table 2, there was a significant association between past year cannabis use and psychological distress [$\chi^2(16) = 567.68, p < .001$], after controlling for gender, age group and survey year. Further, respondents who had used cannabis in the last 12 months were 1.46 times more likely

Table 2. Parameter estimates and associated 95% confidence intervals from logistic regressions.

	Self-rated physical health		Psychological distress (K10)	
	OR	95% CI	OR	95% CI
Male	0.76***	(0.72, 0.81)	0.55***	(0.51, 0.59)
Age group (Ref: 14-17)				
18-21	1.14***	(1.06, 1.22)	0.73***	(0.67, 0.80)
22-25	1.14***	(1.06, 1.22)	0.64***	(0.58, 0.70)
Survey year (Ref: 1998)			Survey year (Ref: 2004)	
2001	0.51***	(0.46, 0.58)	--	
2004	0.92	(0.84, 1.01)	--	--
2007	0.75***	(0.67, 0.83)	0.94	(0.85, 1.03)
2010	0.76***	(0.69, 0.84)	1.01	(0.92, 1.11)
2013	0.67***	(0.58, 0.74)	1.11	(0.99, 1.22)
Used alcohol in the past year	0.85*	(0.73, 0.99)	1.11	(0.91, 1.37)
Used tobacco in the last year	1.74***	(1.61, 1.88)	1.40***	(1.29, 1.52)
Used cannabis in the last year	1.54***	(1.45, 1.64)	1.58***	(1.45, 1.72)

* $p < .05$; ** $p < .01$; *** $p < .001$

to have higher psychological distress rankings [$\chi^2(18) = 284.40, p < .001; CI = 1.29, 1.65$].

Discussion

In household surveys of drug use in a stratified random sample of Australian young people, aged 14 to 25 there was a significant decrease in both reported lifetime and past-year cannabis use. The former declined from 54.8% in 1998, to 31.1% in 2013. This decrease occurred among males and females but young men were still more likely to report having used cannabis in the past year in all surveys. Age of first use appears to have increased over time. Similar declines in cannabis use have been reported in young people in the US (10). Past year use was more common in young people aged 18 to 25 compared to the younger age group in the current study, however the substantial increase from 12% of 14 to 17 year olds to 32% of 18 to 21 year olds ever using cannabis indicates younger age groups should remain an important focus for early interventions targeting cannabis.

In line with other evidence (14, 21), after controlling for common concurrent substances alcohol and tobacco (13), young people who had used cannabis in the last year were more likely to rate their health more poorly, and had higher levels of psychological distress, than peers who had not done so. It is difficult to make causal attributions for this association due to the cross sectional nature of the data and differences in the timeframes of the measures used (cannabis in past year, psychological distress in the past month; and current physical health), however cohort analyses have suggested that weekly or more frequent use of cannabis predict future increased risk for mental health issues (7). The associations between cannabis use and poor mental and physical health may be explained by other risk factors such as lower levels of education, other illicit drug use, truancy and financial problems (21). Future research should include these considerations.

There are limitations to stratified random sample data on drug use. All information is based on self-report data; it is possible that drug use, quantities and frequency of use do not accurately reflect use, particularly the use of substances that are

illegal, such as cannabis. Moreover, household recruitment excludes young people without a permanent residence, presumably facing disadvantage, which has been associated with increased cannabis use, and as such actual rates of cannabis use may be higher (22).

These limitations notwithstanding, our analysis indicates that there has been a significant reduction in the population in lifetime and past year use of marijuana among young Australians. Among young people who do use cannabis, self-reported physical and mental health are poorer and need to be addressed.

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