



# Driving under the influence of cannabis, in a New South Wales rural area

*Craig Jones, Karen Freeman and Don Weatherburn*

*This study examined the prevalence of driving under the influence of cannabis (DUIC), and DUIC and alcohol together, in an area of Australia with a high number of young cannabis users. A telephone survey of 502 18-29 year olds on the North Coast of New South Wales revealed that, overall, 11.2 per cent of respondents had ever driven within an hour of using cannabis, and 7.4 per cent had done so in the previous 12 months. Among recent cannabis users, 43.1 per cent had ever driven within an hour of using cannabis and 28.5 per cent had done so in the previous 12 months. Among those who reported using cannabis weekly or more frequently in the previous 12 month, 53.8 per cent reported having driven under the influence of cannabis in their lifetime and 40.6 per cent reported this behaviour in the previous 12 months. While only 1.8 per cent of the sample had driven within an hour of using both cannabis and alcohol together in the previous 12 months, this constituted 6.9 per cent of all recent cannabis users, and 24.3 per cent of those who had driven under the influence of cannabis in the previous 12 months. The prevalence of DUIC alone, and in combination with alcohol, appears to be low among the population, but higher among those who regularly use cannabis. Results are discussed in terms of their implications for public health and education campaigns.*

## INTRODUCTION

It is illegal to use cannabis in all Australian States and Territories. Debate about the merits of cannabis prohibition usually focuses on whether the illegal status of cannabis is the best way of minimising the harm associated with the drug (Wodak, Reinerman & Cohen 2002). Advocates of prohibition have argued that one of the major acute harms is an increased risk of road trauma associated with driving under the influence of cannabis (DUIC), and they suggest that the lack of non-invasive techniques to test for cannabis intoxication at the roadside poses a major problem for those who wish to liberalise cannabis policy (Drummond 2002).

Researchers have not yet shown conclusively that DUIC is causally related to road accidents. Reviewers of laboratory-based and on-road driving studies generally agree that cannabis impairs driving-related psychomotor performance for at least an hour after intoxicating doses of cannabis have been consumed (Chesher 1991; 1995; European Monitoring Centre for Drugs and Drug Addiction 1999; Hall, Degenhardt & Lynskey 2001; Hall, Johnston & Donnelly 1999; Parliamentary Travelsafe Committee 1999; Smiley 1999; World Health Organisation 1997). Due to a number of confounding factors, however, it has been impossible for researchers to agree on the independent contribution of cannabis to road accidents.

Among other things, analyses have been hindered by the fact that about three-quarters of road accident victims found to have cannabinoids in their blood are also found to have intoxicating levels of alcohol (Hall, Johnston & Donnelly 1999). Evidence has also been limited because researchers have, until recently, only been measuring the presence of cannabis metabolites in the blood of deceased accident victims, rather than levels of THC, which is the psychoactive ingredient found in cannabis. The presence of cannabis metabolites does not necessarily indicate that the accident victim was intoxicated at the time of the accident. Recent evidence looking at levels of THC-only in the blood of accident victims has provided some support for the notion

that cannabis-intoxicated drivers may be at increased risk of road accident (Drummer, Caplehorn & Gerostamoulos 1999; Drummer & Gerostamoulos 1998; Swann 2000). On the other hand, these findings are based on relatively small samples of accident victims, and more large-scale studies have provided contradictory results (e.g. Longo et al. 2000). While the relationship between cannabis and accident risk are somewhat unclear, it is evident that consuming cannabis and alcohol together impairs psychomotor performance over and above the impairments caused by alcohol alone (Chesher 1995; Chesher et al. 1986; Drummer, Caplehorn & Gerostamoulos 1999; European Monitoring Centre for Drugs and Drug Addiction 1999; Ramaekers et al. 2000; Smiley 1999; World Health Organisation 1997).

The lack of conclusive ecological evidence does not eliminate the possibility that there is a significant, if as yet unmeasured, public health risk associated with DUIC. The methodological difficulties involved in measuring the role of cannabis in road accidents may be masking an authentic public health problem. A necessary, but not sufficient, condition of there being a public health problem associated with this behaviour, is that DUIC is widespread among the population, or at least among particular subgroups of the population. International evidence suggests that the prevalence of DUIC is relatively low in the general population but quite high among those who regularly use cannabis. Walsh and Mann (1999) conducted a representative population survey in Ontario, Canada, and found that while only 2 per cent of all drivers had driven within an hour of using cannabis in the preceding 12 months, 23 per cent of current cannabis users had done so.

Few Australian studies have attempted to estimate the prevalence of DUIC. The most recent National Drug Strategy (NDS) Household Survey estimated that 3.9 per cent of the Australian population aged 14 years and over had '[driven] a motor vehicle while under the influence of illegal drugs' in the preceding 12 months

(Australian Institute of Health and Welfare 2002). While the NDS surveys do not ask about cannabis specifically, this finding suggests that the prevalence of DUIC cannot be higher than 3.9 per cent. The only other Australian population study examining DUIC was conducted in Fremantle, Western Australia (WA) in 1996 (Mcleod et al. 1998). About 6 per cent of drivers in this study reported driving while feeling that their 'driving skills were effected [sic] by [cannabis]' in the previous 12 months, while 4.1 per cent had driven under the influence of cannabis and alcohol. Unfortunately, respondents in that study were required to provide a subjective assessment of whether their driving skills were impaired, and research suggests that many cannabis users believe that their ability to drive is not reduced by the intoxicating effects of cannabis (Aitken, Kerger & Crofts 2000; Lenne et al. 2001). This problem, coupled with the fact that unlicensed drivers were not interviewed, may have contributed to an inaccurate estimate of the prevalence of DUIC.

While the prevalence of DUIC appears to be low among the general population, Walsh and Mann's (1999) findings indicate that the behaviour may be more common among particular subgroups within the population. Australian research supports this notion. Mcleod and colleagues (1998) estimated that one quarter of all 18-24 year old male drivers had driven under the influence of cannabis at least once in the previous 12 months. Drivers in this age group are among those most at risk of road accident (Triggs & Smith 1996). DUIC also appears to be very common among heavy cannabis users in Australia. A sample of 67 18-25 year old regular cannabis users in Victoria reported that they frequently drove a motor vehicle after using cannabis (Lenne et al. 2001). Similarly, 90 per cent of a sample of 268 long-term heavy cannabis users interviewed on the North Coast of New South Wales (NSW) reported that they occasionally drove after using cannabis (Reilly et al. 1998). The prevalence of driving after using both cannabis and

alcohol together, however, appears to be quite low among cannabis users (Aitken, Kerger & Crofts 2000; Lenne et al. 2001).

One issue that has not yet been examined in Australian research is the likelihood that the population prevalence of DUIC is high in geographical locations where there are a large number of young cannabis users. The North Coast of NSW is one area in Australia reported to have high rates of cannabis use (Reilly et al. 1998); a claim supported by the fact that the Richmond-Tweed Statistical Division (SD)<sup>1</sup> has a rate of arrest for cannabis use or possession that is almost 2.5 times higher than the NSW average (NSW Bureau of Crime Statistics and Research 2001). To measure the rate of DUIC in this area a telephone survey of 502 18- to 29-year-olds was conducted in the Lismore Local Government Area (LGA). Lismore LGA is a part of the Richmond-Tweed SD, and includes the town of Nimbin (which is notorious in NSW for its cannabis law reform activities, such as the annual Nimbin Mardi Grass). The 18- to 29-year-old age range was chosen because it represents the group most likely to use cannabis (Australian Institute of Health and Welfare 2002), and also the group most at risk of road trauma (Triggs & Smith 1996). To avoid having respondents make a subjective assessment of their ability to drive under the influence of cannabis, they were asked to report the frequency of 'driving within an hour of using cannabis'.

## METHOD AND RESULTS

Telephone interviews were conducted using random digit dialling over an 11-day period in December 2001, by ACNielsen, a market research company. A total of 22,399 phone calls were made to achieve the final sample of 502 respondents. Excluding calls where no contact was made, business numbers, people outside the age range of the study, and other associated reasons for exclusion, a total of 938 potential respondents (in the 18-29 age group) were contacted, giving a response rate of 54 per cent. Respondents were asked about their

lifetime and past year consumption of cannabis, their lifetime and past year frequency of driving within an hour of using cannabis, and whether they had driven within an hour of using both cannabis and alcohol in the previous 12 months.

Fifty-six per cent of the sample were female, 22 per cent were aged 18-19, 44 per cent were aged 20-24, and 34 per cent were aged 25-29. Unweighted prevalence estimates are presented throughout and the associated 95 per cent confidence intervals (C.I.) are reported for the main outcome variables. The difference between weighted and unweighted estimates was between 1 and 2 percentage points for all analyses. Overall, 58.4 per cent (n=293; 95% C.I. = 53.9-62.7) of the sample reported that they had used cannabis at least once in their lifetime and 25.9 per cent indicated that they had used cannabis at least once in the last 12 months (n=130; 95% C.I. = 22.2-30.0). Fifty per cent (n=65; 95% C.I. = 41.2-58.8) of those who had used cannabis in the previous 12 months had done so weekly or more frequently. Table 1 shows the reported rates of lifetime and past year DUI, and the proportion reporting driving under the influence of both cannabis and alcohol in the previous 12 months.

### TOTAL SAMPLE

Overall, 11.2 per cent of the sample reported having driven within an hour of using cannabis at least once in their lifetime and 7.4 per cent had done so in the previous 12 months. Males (15.0%)

were more likely than females (8.2%) to have driven within an hour of using cannabis in their lifetime ( $\chi^2 = 5.8$ ,  $df = 1$ ,  $p < 0.05$ ) and in the last 12 months (10.5% and 5.0% for males and females respectively;  $\chi^2 = 6.1$ ,  $df = 1$ ,  $p < 0.05$ ). The difference between the proportion of 18-24 (10.0%) and 25-29 year olds (13.5%) reporting that they had driven under the influence of cannabis in their lifetime was not significant ( $\chi^2 = 1.4$ ,  $df = 1$ ,  $p = 0.24$ ). Similarly, there was no significant difference between the proportion of 18-24 (7.3%) and 25-29 year olds (7.6%) reporting DUI in the last 12 months ( $\chi^2 < 1$ ). Overall, 1.8 per cent of the sample had driven within an hour of using both cannabis and alcohol in the previous 12 months.

### CURRENT CANNABIS USERS

Among the 130 respondents who had used cannabis in the previous 12 months, 43.1 per cent had driven within an hour of using cannabis and 28.5 per cent had done so in the previous 12 months. Of those who reported DUI in the previous 12 months, 37.8 per cent (n=14; 95% C.I. = 22.9-55.2) had done so weekly or more frequently. Not surprisingly, weekly users (53.8%) were more likely than those who had used less than weekly (32.3%) to have driven under the influence of cannabis in their lifetime ( $\chi^2 = 6.1$ ,  $df = 1$ ,  $p < 0.05$ ), and in the previous 12 months (40.6% and 16.9% respectively;  $\chi^2 = 8.9$ ,  $df = 1$ ,  $p < 0.01$ ). The difference between the proportion of males (47.1%) and females (38.3%) reporting DUI in their lifetime was not significant ( $\chi^2 = 1.0$ ,  $df = 1$ ,  $p = 0.31$ ), nor

was there a significant difference between males (32.8%) and females (23.7%) reporting DUI in the previous 12 months ( $\chi^2 = 1.3$ ,  $df = 1$ ,  $p = 0.25$ ). The difference between the proportion of 18-24 (39.3%) and 25-29 year olds (50.0%) reporting DUI in their lifetime was not significant ( $\chi^2 = 1.4$ ,  $df = 1$ ,  $p = 0.24$ ), nor was there a difference between the proportions reporting DUI in the last 12 months (28.9% and 28.3% for 18-24 and 25-29 year olds respectively;  $\chi^2 < 1$ ). Although the overall number reporting that they had driven under the influence of cannabis and alcohol was low in terms of raw numbers (n=9), this constitutes 6.9 per cent of all current users and 24.3 per cent (95% C.I. = 12.4-41.6) of those who had driven under the influence of cannabis in the previous 12 months.

### DISCUSSION

The present results are consistent with both international and previous Australian studies finding the overall prevalence of driving under the influence of cannabis to be quite low among the population as a whole, but relatively high among those who regularly use cannabis (Aitken, Kerger & Crofts 2000; Lenne et al. 2001; Mcleod et al. 1998; Reilly et al. 1998; Walsh & Mann 1999). Similarly, as in previous studies, the prevalence of driving while affected by both cannabis and alcohol was very low among this sample, although a significant proportion of those who had driven while intoxicated by cannabis also reported driving after consuming both cannabis and alcohol together.

These findings are inconsistent with some of the results of Mcleod et al. (1998). It will be recalled that they found 25 per cent of 18-24 year old male drivers in WA to have driven under the influence of cannabis in the previous 12 months. The corresponding proportion of all 18-29 year old males reporting DUI in the present study was 10.5 per cent, and this did not vary as a function of age. Some, but not all, of this disparity may be explained by differences in data

**Table 1: Proportion of all respondents and current cannabis users reporting DUI in their lifetime, in the past year, and in combination with alcohol in the past year**

|                                       | Total sample (n=502)<br>% (95% C.I.) | Current users* (n=130)<br>% (95% C.I.) | No. |
|---------------------------------------|--------------------------------------|--|-----|
| Ever DUI                              | 11.2 (8.6 – 14.3)                    | 43.1 (34.5 – 52.0)                     | 56  |
| Past year DUI                         | 7.4 (5.3 – 10.1)                     | 28.5 (21.1 – 37.2)                     | 37  |
| Past year DUI<br>cannabis and alcohol | 1.8 (0.9 – 3.5)                      | 6.9 (3.4 – 13.1)                       | 9   |

\* A current user is defined here as having used cannabis in the previous 12 months.

collection methods between the studies. While Mcleod et al. dropped surveys at randomly selected households, and participants anonymously posted the completed forms back to the researchers, we used a telephone survey. Previous telephone surveys have tended to produce lower figures than those estimated by written household surveys (Jones & Weatherburn 2001; Weatherburn, Jones & Donnelly in press). Part of this difference may also be explained by regional variation in cannabis use and associated drug-driving behaviour between NSW and WA. It is more likely, however, that most of the inconsistency between the two studies is the result of applying age and gender weights to a relatively small sample of young male respondents in the WA study (n=14). Unweighted, the WA results suggest that 12.5 per cent of 18-24 year old male drivers had driven under the influence of cannabis in the preceding 12 months. This new estimate is more consistent with the results reported here.

Although the results of the present study do not suggest that driving under the influence of cannabis is widespread, even in a geographical location with very high rates of cannabis use, they do support previous research in showing that heavy cannabis users regularly drive while intoxicated by cannabis. This finding suggests that there may be value in education and public health campaigns warning against the possible risks involved with DUIC. Such campaigns should be targeted at people who regularly use cannabis. The present findings also suggest that the prevalence of DUIC is sufficiently widespread among certain populations to encourage continued research into the causal relationship between cannabis use and road accidents.

## REFERENCES

- Aitken, C., Kerger, M. & Crofts, N. 2000, 'Drivers who use illicit drugs: Behaviour and perceived risks', *Drugs: Education, Prevention and Policy*, vol. 7, no. 1, pp. 39-50.
- Australian Institute of Health and Welfare 2002, *2001 National Drug Strategy Household Survey: First Results*, Drug Statistics Series no. 9, Australian Institute of Health and Welfare, Canberra.
- Chesher, G. B. 1991, 'The scientific basis for our drink-driving laws: Why we can't approach cannabis and prescribed drugs in the same way', *Current Affairs Bulletin*, vol. 68, no. 1, pp. 4-11.
- Chesher, G. B. 1995, 'Cannabis and road safety: An outline of the research studies to examine the effects of cannabis on driving skills and on actual driving performance', in *Inquiry into the Effects of Drugs (Other than Alcohol) on Road Safety in Victoria*, ed. R. S. C. Victorian Parliament, Melbourne, pp. 67-96.
- Chesher, G. B., Dauncey, H., Crawford, J. & Horn, K. 1986, *The Interaction Between Alcohol and Marijuana: A Dose-Dependent Study of the Effects on Human Moods and Performance Skills*, Department of Transport, Federal Office of Road Safety, Canberra.
- Drummer, O. H., Coplehorn, J. R. M. & Gerostamoulos, J. 1999, *The Incidence of Drugs in Drivers Killed in New South Wales Road Traffic Accidents 1997 & 1998*, Victorian Institute of Forensic Medicine, Melbourne.
- Drummer, O. H. & Gerostamoulos, J. 1998, *Drugs in Drivers Killed in New South Wales Road Traffic Accidents: The Use of Responsibility Analysis to Investigate the Contribution of Drugs to Fatal Accidents*, Victorian Institute of Forensic Medicine, Melbourne.
- Drummond, C. 2002, 'Cannabis control: Costs outweigh the benefits - Against', *British Medical Journal*, vol. 324, pp. 107-108.
- European Monitoring Centre for Drugs and Drug Addiction 1999, *Literature Review on the Relation Between Drug Use, Impaired Driving and Traffic Accidents*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.
- Hall, W., Degenhardt, L. & Lynskey, M. 2001, *The Health and Psychological Effects of Cannabis Use (2nd Edition)*, Monograph Series no. 44, Commonwealth Department of Health and Ageing, Canberra.
- Hall, W., Johnston, L. & Donnelly, N. 1999, 'Epidemiology of cannabis use and its consequences', in *The Health Effects of Cannabis*, eds H. Kalant, W. Corrigall, W. Hall & R. G. Smart, Centre for Addiction and Mental Health, Toronto, pp. 71-125.
- Jones, C. & Weatherburn, D. 2001, *Reducing cannabis consumption*, Crime and Justice Bulletin no. 60, NSW Bureau of Crime Statistics and Research, Sydney.
- Lenne, M. G., Fry, C., Dietze, P. & Rumbold, G. 2001, 'Attitudes and experiences of people who use cannabis and drive: Implications for drugs and driving legislation in Victoria, Australia', *Drugs: Education, Prevention and Policy*, vol. 8, no. 4, pp. 307-313.
- Longo, M. C., Hunter, C. E., Lokan, R. J., White, J. M. & White, M. A. 2000, 'The prevalence of alcohol, cannabinoids, benzodiazepines and stimulants amongst injured drivers and their role in driver culpability. Part II: The relationship between drug prevalence and drug concentration, and driver culpability', *Accident Analysis and Prevention*, vol. 32, pp. 623-632.
- Mcleod, R., Stevens, M., Stockwell, T. & Phillips, M. 1998, *Drug use and driving in Western Australia: A survey of attitudes, beliefs and behaviours*, National Centre for Research into the Prevention of Drug Abuse, Perth.
- NSW Bureau of Crime Statistics and Research 2001, *New South Wales Criminal Courts Statistics 2000*, Statistical Report Series, NSW Bureau of Crime Statistics and Research, Sydney.

Parliamentary Travelsafe Committee 1999, *Drug Driving in Queensland*, Report no. 29, Legislative Assembly of Queensland, Brisbane.

Ramaekers, J. G., Lamers, C. T. J., Robbe, H. W. J. & O'Hanlon, J. 2000, *Low Doses of Marijuana and Alcohol Severely Impair Driving When Taken Together*, paper presented at the Proceedings of the 15th International Council on Alcohol, Drugs and Traffic Safety, Stockholm, 21-26 May 2000.

Reilly, D., Didcott, P., Swift, W. & Hall, W. 1998, 'Long-term cannabis use: Characteristics of users in an Australian rural area', *Addiction*, vol. 93, no. 6, pp. 837-846.

Smiley, A. 1999, 'Marijuana: On-road and driving simulator studies', in *The Health Effects of Cannabis*, eds H. Kalant, W. Corrigall, W. Hall & R. G. Smart, Centre for Addiction and Mental Health, Toronto, pp. 173-191.

Swann, P. 2000, *The Real Risk of Being Killed When Driving Whilst Impaired by Cannabis*, paper presented at the 15th International Conference on Alcohol, Drugs and Traffic Safety, Stockholm, 21-26 May 2000.

Triggs, T. J. & Smith, K. B. 1996, *Young Driver Research Program: Digest of Reports and Principal Findings of the Research*, Report no. CR 164, Federal Office of Road Safety, Canberra.

Walsh, G. W. & Mann, R. E. 1999, 'On the high road: Driving under the influence of cannabis in Ontario', *Canadian Journal of Public Health*, vol. 90, no. 4, pp. 260-263.

Weatherburn, D., Jones, C. & Donnelly, N. in press, 'Prohibition and cannabis use in Australia: A survey of 18 to 29-year-olds', *Australian and New Zealand Journal of Criminology*, vol. 36, no. 1.

Wodak, A., Reinarman, C. & Cohen, P. 2002, 'Cannabis control: Costs outweigh the benefits - For', *British Medical Journal*, vol. 324, pp. 105-106.

World Health Organisation 1997, *Cannabis: A Health Perspective and Research Agenda*, no. WHO/MSA/PSA/97.4, Division of Mental Health and Prevention of Substance Abuse, World Health Organisation.

## NOTE

- 1 The Richmond-Tweed SD includes Ballina, Byron Bay, Kyogle, Lismore, Richmond Valley and Tweed Local Government Areas.

## ***OTHER TITLES IN THIS SERIES***

---

- No.40 Are the Courts becoming more lenient? Recent trends in convictions & penalties in NSW Higher and Local Courts
- No.41 Cannabis and Crime: Treatment Programs for Adolescent Cannabis Use
- No.42 Predicting Violence Against Women: The 1996 Women's Safety Survey
- No.43 Crime Against International Tourists
- No.44 Public Perception of Neighbourhood Crime in New South Wales
- No.45 The Effect of Arrest on Indigenous Employment Prospects
- No.46 Heroin harm minimisation: Do we really have to choose between law enforcement and treatment
- No.47 Predicting Women's Responses to Violence: The 1996 Women's Safety Survey
- No.48 Performance Indicators for Drug Law Enforcement
- No.49 Drug Use Among Police Detainees
- No.50 New South Wales Drug Court Evaluation: Program and Participant Profiles
- No.51 Community Survey of Willingness to Receive Stolen Goods
- No.52 New South Wales Drug Court: Monitoring Report
- No.53 New South Wales Drug Court Evaluation: Interim Report on Health and Well-Being of Participants
- No.54 What Causes Crime?
- No.55 The Scope for Reducing Indigenous Imprisonment Rates
- No.56 The Problem of Mobile Phone Theft
- No.57 Firearms and Violent Crime in New South Wales
- No.58 Does Prohibition Deter Cannabis Use?
- No.59 The Australian Heroin Drought and its Implications for Drug Policy
- No.60 Reducing Cannabis Consumption
- No.61 Preventing Corruption in Drug Law Enforcement
- No.62 Trends in Sentencing in the New South Wales Criminal Courts: 1999-2000
- No.63 Do targeted arrests reduce crime?
- No.64 Law enforcement's Role in a Harm Reduction Regime
- No.65 Multiple drug use among police detainees
- No.66 Hung juries and aborted trials: An analysis of their prevalence, predictors and effects
- No.67 Crime increases in perspective: The regional dispersion of crime in NSW, 2001
- No.68 Absconding on bail
- No.69 Reducing Juvenile Crime: Conferencing versus Court
- No.70 Recent trends in recorded crime and police activity in Cabramatta
- No. 71 What lies behind the growth in fraud?
- No. 72 Drug use monitoring of police detainees in New South Wales: The first two years
- No. 73 The impact of abolishing short prison sentences
- No. 74 Unemployment duration, schooling and property crime