Australian Government
Australian Institute of Criminology

ncpic
national cannabis prevention and information centre

research into practice
brief

research into practice brief 8 – may 2013

Attitudes and perceptions towards drug driving amongst a sample of cannabis using police detainees

Jason Payne, Josh Sweeney and Sarah Macgregor

Introduction

In 2004, Victoria became the first Australian jurisdiction to legislate the use of random roadside drug testing in an effort to combat drug driving, which has since been adopted by all other Australian jurisdictions. This was the first legislation of its kind in the world, and recognition not only of the technological advances and improvements in the reliability of testing equipment, but also the growing body of evidence supporting a need for action to prevent drug driving and its associated risks.

According to the most recent iteration of Australia's national population survey on drug and alcohol use – the National Drug Strategy Household Survey (NDSHS) – around one in five illicit drug users (18%) reported having recently (in the past 12 months) driven a motor vehicle while under the influence of illicit drugs (AIHW 2011). This is higher than the proportion of recent alcohol users who reported drink-driving (13%) and in population terms, this suggests that more than 60,000 Australians (3% of the overall population aged 14 years or older) drove a motor vehicle at least once in the past 12 months whilst affected by illicit drugs. Exactly how often they did so remains unknown.

Cannabis, not surprisingly, is of particular interest to police and law enforcement agencies in the drug driving debate since it is by far the most common illicit substance used by the Australian population (AIHW 2010) and in discrete studies of cannabis users alone, the regularity of drug driving is considerably high. According to one study conducted in New South Wales, as many as 78 per cent of regular cannabis users reported driving under the influence of cannabis at least once in the past 12 months, with 27 per cent having done so as frequently as once a week or more (Swift et al. 2010). Similarly, in an earlier study of police detainees, Adams (et al. 2008) found that 65 per cent who had driven a vehicle in the past 12 months did so after using drugs and/or alcohol, and of those detainees, 58 per cent reported driving at least once a week after using cannabis. This, combined with the comparatively high prevalence of use throughout the population makes cannabis the drug most likely to be implicated in a substantial proportion of drug driving incidents. Moreover, cannabis is typically first used at a comparatively young age and regular use typically commences at about the same time drivers are first learning or taking to the road unaccompanied. This temporal association may suggest an added level of risk – that cannabis drug driving may be concentrated among younger and potentially less experienced drivers.

Some laboratory and driver simulation studies have demonstrated a link between cannabis intoxication and impairment of driving skills (Kelly et al. 2002). Further, consumption of cannabis has been found to increase the risk of 'straddling barrier lines' and 'straddling solid lines' when driving (Papafotiou et al. 2005; Stough et al. 2006) and delaying driver reactions to unexpected traffic situations (Papafotiou et al. 2002).

Not surprisingly, therefore, driving under the influence of cannabis has also been linked to a sizable proportion of both non-fatal and fatal motor vehicle crashes (see e.g. Drummer et al. 2004), with post-mortem toxicological assessments having found cannabis in the blood stream of as many as one in 10 drivers killed in road fatalities in 1994 (Drummer 1994). Similarly, Elvik (2012) reviewed 66 six relevant studies that measured recent drug use via one of three methods: data on prescriptions, self-report data or toxicological analysis of blood or saliva samples, finding that the use of cannabis can moderately increase the risk of becoming involved in an accident, at any severity level, by 25 to 50 percent. However, the author noted that the associations found cannot be interpreted as causal relationships as most of the studies reviewed failed to adequately control for confounding factors (Elvik 2012).

Another meta-analysis reviewed nine studies that measured recent cannabis use either via toxicological analysis of blood samples or self-report data (Ashbridge et al. 2012). The authors found that the acute consumption of cannabis nearly doubled the risk of a driver being involved in a motor vehicle collision that resulted in either serious injury or death. However, it has been noted that among chronic cannabis users, THC can be detected in the bloodstream for more than 48 hours after cannabis is consumed, therefore there is debate over whether blood toxicology analysis is a reliable measure of recent cannabis use and/or impairment (Skopp & Potsch 2008; Karschner et al. 2009).

In contrast to these study findings, earlier research has shown that cannabis-using drivers may, in fact, compensate for their intoxication by driving more slowly or taking fewer risks (Aitken et al. 2000; Lenne et al. 2001) while others have failed to demonstrate a difference in the actual motor vehicle crash experience of drug drivers compared with non-drug drivers (Jones, Donnelly, Swift & Weatherburn 2005).

Despite what remains a contentious debate about pharmacology, intoxication and the links to driving impairment, there is nevertheless a relatively high rate of self-reported drug driving among regular cannabis users that requires attention. Perhaps most concerning is the apparently relaxed attitude of cannabis users to the potential consequences of drug driving and the disregard for the potential legal consequences. Davey (et al. 2005) for example found that the illegality of drug driving had little significance as a deterrent effect for nearly all users who were interviewed, and that very few dependent users believed the drugs affected their driving ability. Admittedly, this study was conducted before roadside testing had been fully rolled out and it is not yet clear whether attitudes have started to shift.

Similarly in an earlier study of police detainees, Adams (et al. 2008) found that 68 per cent of detainees who had driven after using cannabis reported it as 'never' having an effect on their driving, while of those detainees who reported an effect, 15 per cent reported a positive effect on their driving. In particular, Swift (et al. 2010) found that the act of driving under the influence of cannabis was a normal and 'entrenched' behaviour among cannabis users, with only one half of respondents in their study believing it would increase their personal risk of a motor vehicle crash. Similar attitudes have been reported among cannabis users in other studies, with some users believing that cannabis use increases their level of caution while driving, thereby making them safer on the road (Aitken et al. 2000; Lenne et al. 2001).

This paper presents findings related to drug driving, derived from a sample of police detainees surveyed as part of the Australian Institute of Criminology's (AIC) Drug Use Monitoring in Australia (DUMA) program. DUMA operates at nine data collection sites nationally (Bankstown, Parramatta, Kings Cross, Brisbane, Southport, East Perth, Adelaide, Footscray and Darwin) and is Australia's only regular survey of offenders arrested and detained by the police (but not yet convicted). The program is comprised of two components – a voluntary self-report survey followed by urinalysis. The survey has both core and non-core components (known as addenda) which are subject-specific and designed to collect detailed information about topics of specific policy interest.

Specifically, key results of secondary analysis conducted using DUMA's 'drug driving' addendum from 2008 are presented. In the addendum, detainees were asked whether in the past 12 months they had driven a motor vehicle and, if so, how often they had done so after using a range of different illegal drugs, including cannabis. Perceptions about the illegal status of drug driving, in addition to questions about the perceived effect of cannabis on the impairment of driving skills were also asked. This 2008 drug driving addendum was the last iteration in a series of drug driving addenda since 2004 and is the most recently available information specific to drug driving that has not yet been analysed by the AIC.

It should be noted that like all surveys of its kind, the results from the DUMA study and addenda have a number of limitations which should be considered when interpreting the results. First, only those offenders who are detained by the police are eligible for interview. Other offenders who are apprehended but not detained (i.e., cautioned, warned or given a summons to appear in court) are not included in the DUMA sample. Second, as a self-report survey, the DUMA results are dependent upon the reliability and honesty of the detainees who participate. Further details about the DUMA program or research methodology can be found elsewhere (Makkai 1999).

Results

A total of 857 detainees completed the drug driving addendum as part of DUMA's third quarterly collection in 2008. Of these, 562 detainees (66%) reported having driven a motor vehicle at least once in the past 12 months, with almost half driving at the time of their arrest (n=241, 43%). In terms of frequency, the majority of those who had driven in the past 12 months reported driving at least once a week or more (n=446, 79%).

In terms of drug driving, two separate measures are presented. In the first, urinalysis test results were examined for those detainees who self-reported driving at the time of their arrest and, since DUMA only interviews detainees within 48 hours of being detained, a positive urinalysis result was taken as broadly indicative of driving under the influence of drugs at the time of being arrested by the police. Of the 241 detainees who reported driving at the time of their arrest, 192 provided a urine sample. Of these, 68 samples (35%) were positive to cannabis.

It should be noted here that a positive urinalysis result is not a definitive test of whether a detainee had wilfully taken drugs and driven a motor vehicle, since cannabis, unlike most other drugs, can be detected for up to 30 days after last use (especially for regular or heavy binge users). Nevertheless, it is worth noting that of the 68 detainees who, by this measure, were drug driving at the time of their arrest, only six claimed they had not used cannabis in the past 48 hours. The remaining 62 detainees not only tested positive to cannabis, but also willingly self-reported using cannabis prior to their arrest; that is, 32 per cent of the 192 detainees who provided a urine sample and were driving at the time of their arrest.

The second measure of drug driving was derived using information self-reported by detainees about their history of drug driving in the past 12 months. In all, 159 detainees willingly self-reported having driven at least once in the past year after using cannabis. This equated to 28 per cent of those who had driven a motor vehicle at least once in the past 12 months and 19 per cent of all detainees who were interviewed, irrespective of whether they had driven in the last year.

An even higher prevalence of drug driving involving cannabis was found when assessing only those detainees who reported recent cannabis use in the past 12 months. For example, 479 detainees reported having used cannabis in the past 12 months. Of these, 33 per cent confirmed having driven under the influence of cannabis on at least one occasion. Among more recent users of cannabis (those who had used in the past 30 days) the prevalence of drug driving was higher (37%), but especially among those who were using cannabis more than three times a week on average in the past 30 days (51%).

Table 1: Prevalence of cannabis drug driving

	Drove after using cannabis		Did not drive after using cannabis	
	n	%	n	%
All detainees (n=857)	159	19	698	81
Recent cannabis users (past 12 months)	157(a)	33	322	67
Very recent cannabis users (past 30 days)	149	37	258	63
Less than once a week	13	13	88	87
1-3 times a week	32	31	70	69
More than three times a week	104	51	101	49

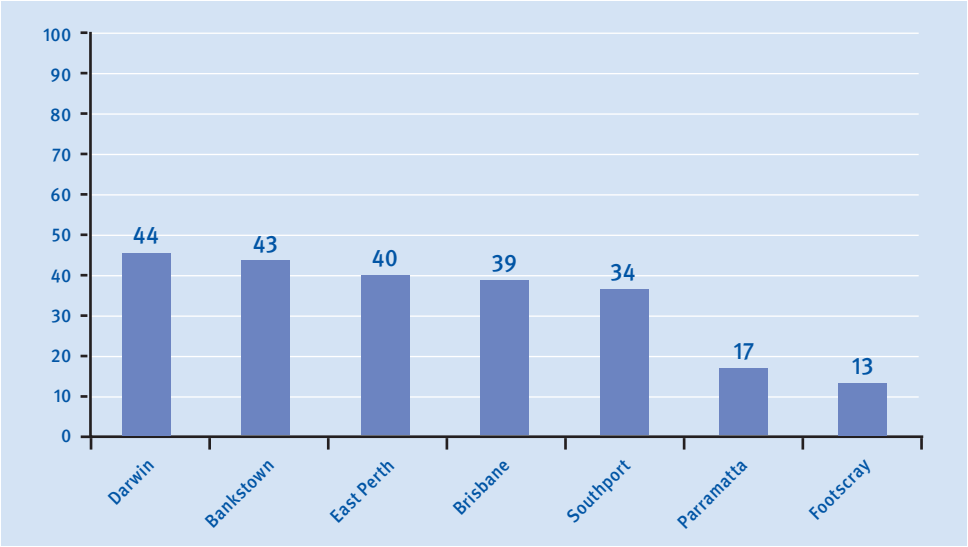
(a) Data excludes two cases where detainees reported driving under the influence of cannabis but did not answer earlier questions about past 12 month use of cannabis

Source: Australian Institute of Criminology DUMA program [Computer File]

Demographically, male detainees (20%) were more likely than female detainees (11%) to self-report a history of driving under the influence of cannabis – a finding that held true even when estimated only for those male and female detainees who had used cannabis in the past 30 days (39% vs. 24%). Analysis by age revealed relatively consistent results for detainees aged between 18 and 35 years, however older detainees aged 36 years or more were significantly less likely to drive after using cannabis even when estimated only for those who had used cannabis in the past 30 days.

Finally, the extent to which police detainees reported driving under the influence of cannabis varied by geographic location, although it is important to note that these differences were likely to be influenced by the differential rates of cannabis use at each data collection site. Nevertheless, when estimated only for very recent users of cannabis (in the past 30 days) the data showed that drug driving was most prevalent in Darwin (44%), Bankstown (43%), East Perth (40%), Brisbane (39%) and Adelaide (38%), and least prevalent in Footscray (13%) and Parramatta (17%).

Figure 1: Prevalence of cannabis drug driving among recent cannabis users, by site

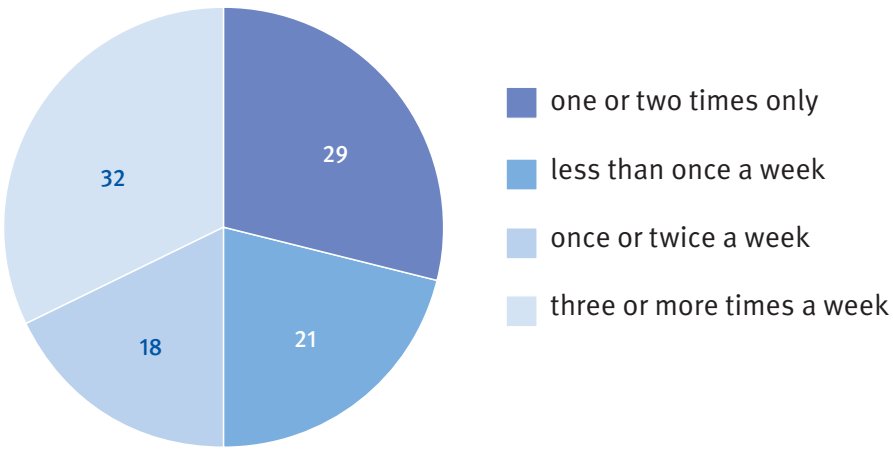


Note: Data is for detainees who reported cannabis use in the past 30 days
Source: Australian Institute of Criminology DUMA program [Computer File]

Frequency of self-reported driving under the influence of cannabis

Of the 159 detainees who self-reported driving under the influence of cannabis in the past 12 months, 18 per cent reported doing so once or twice a week on average, while a further 32 per cent reported doing so three or more times a week. Combined, these data suggest that half of those who report driving under the influence of cannabis did so on at least a weekly basis. The remaining 79 detainees (50%) reported driving under the influence of cannabis once or twice only in the past 12 months (29%) or more than once or twice but less than weekly (21%). As a proportion of all DUMA detainees, these results suggest that nearly one in ten (9%) were driving under the influence of cannabis at least once a week or more in the past 12 months. This increases to 16 per cent when estimated only for those detainees who had used cannabis in the past 12 months, or 19 per cent of those who were using cannabis as recently as the past 30 days.

Figure 2: Frequency of cannabis drug driving



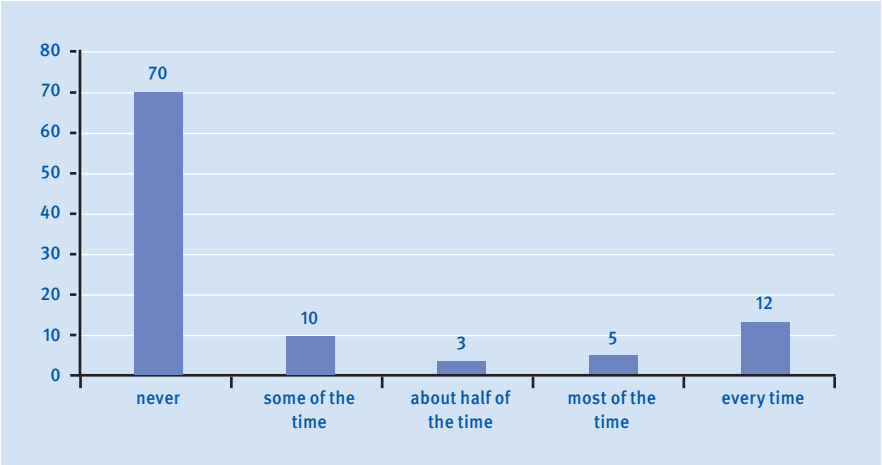
Source: Australian Institute of Criminology DUMA program [Computer File]

By gender, the results suggest that male detainees drove while under the influence of drugs more frequently than their female counterparts, although the sample size was too small to identify whether these differences were statistically significant. Similarly, small sample sizes restricted detailed statistical analysis by age, although preliminary results suggested that older detainees were those most frequently driving under the influence of cannabis with as many as 65 per cent doing so at least once a week or more. It appears, therefore, that while older cannabis users are the least likely to drive while intoxicated, those that do, tend to be more frequent in their drug driving behaviour.

Perceptions of the impact of cannabis intoxication on driving ability

Detainees were asked two questions about the perceived effect of cannabis intoxication on their driving. First, all detainees who self-reported driving under the influence of cannabis (n=159) were asked to indicate how many occasions their driving had been 'affected' by cannabis. The term 'affected' was self-defined and the vast majority (n=109, 70%) reported that cannabis had never affected their driving. Of the remaining 30 per cent, 10 per cent (n=15) reported that cannabis had only affected their driving some of the time, nine per cent reported being affected about half or most of the time, while 12 per cent reported being affected all of the time. These findings mirror previous research on the perceived effects of drink-driving, with an earlier study finding that among a sample of repeat drink drivers, the majority believed that alcohol did not impair their driving (Featherston, Lenton & Cercarelli 2002).

Figure 3: Self-perceived effect of cannabis use on driving skills*



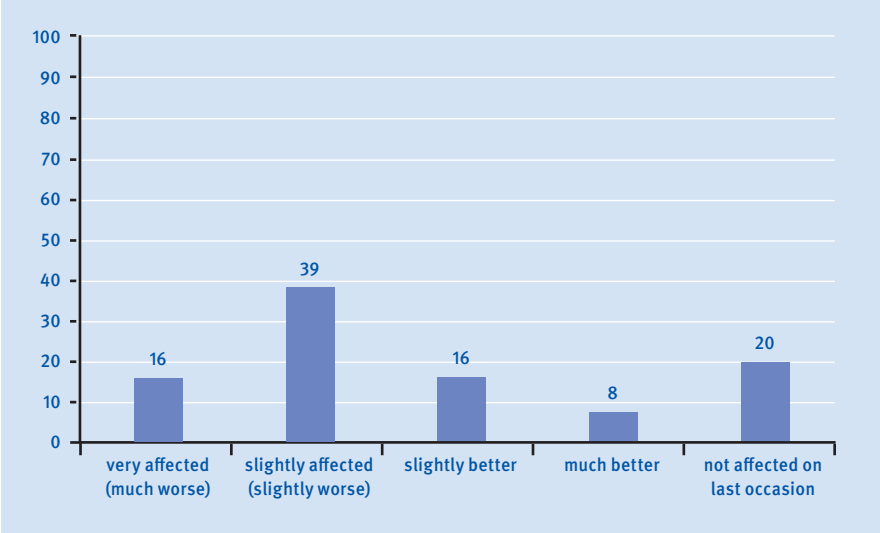
Source: Australian Institute of Criminology DUMA program [Computer File]
*Note: Of those detainees who self-reported driving under the influence of cannabis

Second, for those who reported having been affected by cannabis on any occasion (n=49, 30%), a supplementary question was asked specifically about the most recent incident and whether on that occasion cannabis improved or worsened their driving ability. It was found that:

- twenty seven detainees (55%) reported that cannabis impaired their driving on the last occasion, though the majority believed that the impairment was only slight (n=19);
- twelve detainees (24%) reported that cannabis actually improved their driving, either slightly (n=8) or a lot (n=4); and
- ten detainees (20%) reported that, at least on the last occasion, their driving was unaffected. This is despite having earlier reported that their driving was affected some of the time in the past 12 months.

Overall these data indicated that 70 per cent of cannabis users who self-reported driving under the influence of cannabis believed that their driving skills were not affected (either positively or negatively) on the last occasion (see Figure 3). Of the remaining 30 per cent who reported that their driving had been affected by cannabis, 55 per cent conceded that their driving was negatively affected on the last occasion (see Figure 4). Overall therefore, only 16 per cent of all cannabis drug drivers self-report their driving to have been negatively affected.

Figure 4: Nature of self-perceived effect of cannabis use on driving skills (last occasion)



Source: Australian Institute of Criminology DUMA program [Computer File]

Drug driving and links to other risky driving behaviour

Despite the frequency of drug driving and the relaxed attitudes of cannabis users to the potential risks, the debate about the relationship between cannabis intoxication and driving impairment remains contested. One dimension of this debate, although largely overlooked, is the extent to which drug drivers may engage in other risky driving activities that, though not directly connected to their intoxication, nevertheless warrant special consideration by law enforcement and policy makers.

In DUMA's drug driving addendum, police detainees were asked whether they had ever failed to stop their vehicle when requested by the police. One in three cannabis drug drivers (35%) reported having done so at least once and this was significantly higher than for those who had not recently driven under the influence of cannabis in the past 12 months (18%). This finding held true even after controlling for gender, age and recent cannabis use. In other words, even among recent cannabis users of the same age and gender, those who drove after using cannabis in the past 12 months were more likely than those who hadn't to have had a history of failing to stop when requested by the police. Similarly, when asked whether they would fail to stop in the future, 18 per cent of cannabis drug drivers said they would, compared with only nine per cent of recent cannabis users who were not drug drivers.

The prevalence of drink driving was also measured as part of the DUMA's drug driving addendum. Analysis showed that cannabis drug drivers (50%) were significantly more likely than cannabis users who were not drug drivers (21%) to also report drink driving in the past 12 months.

This apparent correlation between drug driving and other risky driving behaviours should not be interpreted as evidence of causation. It is not proof, for instance, that being intoxicated or under the influence of cannabis at the time of driving increases the likelihood of also engaging in alternate risky driving behaviours, although this might occur. Instead, these data suggest that those who engage in drug driving may also be generically more likely, whether at the same time or at other times, to be involved in other risky driving practices which make them potentially more dangerous on the road. Just as those who park illegally in disabled parking spaces are more likely to attract police action for other legal matters than those parked legally (according to a UK study; see Chenery, Henshaw & Pease 1999), drug drivers may be more prone to engage in risky driving practices. This may explain why during autopsies, cannabis is found in as many as one in ten road fatality victims (Drummer 1994), but why in other non-experimental studies, intoxication could not be linked to driving impairment.

Discussion

The findings from this study reinforces that drug driving, and in particular driving after the use of cannabis, is an ongoing concern to law enforcement and other criminal justice policy makers and practitioners. Relatively high rates of recent drug use were found among those who were driving at the time of their arrest (35%) as well as relatively high rates of self-reported cannabis drug driving among all police detainees (19%), the majority of whom admitted drug driving at least once a week, and often more frequently. However, the perceptions and beliefs held by cannabis users about its impact on their driving ability, as well as its links with other risky driving activities, are perhaps the most important findings in this study. It confirms earlier research that those who use cannabis and drive tend to believe that their intoxication has little or no effect on their driving ability.

The fact that cannabis drug drivers were also more likely in this study to report other risky driving behaviours, such as drink driving and failing to stop when requested by the police, suggests that drug driving is unlikely to be an isolated practice in this group but instead, one that occurs largely within the context of other risk-taking behaviours. The key policy implications of the findings from this paper are outlined below.

Key implications for law enforcement and courts

- drug driving is unlikely to be an isolated practice but instead, one that occurs largely within the context of other risky driving behaviours
- those who drive under the influence of cannabis tend to believe that their intoxication has little or no effect on their driving ability
- raising awareness of the risks of drug driving by incorporating such information into learner driver and road safety training programs may help to modify perceptions of the effects of drug driving and subsequent risk-taking behaviours
- the identification and subsequent prosecution of cannabis drug drivers by police/courts may present an opportunity for brief intervention/education in the same way as is currently available for drink drivers
- driver safety programs mandated by courts during sentencing may be of significant utility in minimising both drug driving and other dangerous driving amongst this group of generically risky driving offenders

References

Ashbridge, M., Hayden, JA. & Cartwright, JL. (2012). *Acute cannabis consumption and motor vehicle collision risk: systematic review of observational studies and meta-analysis. BMJ:* 344 -536. *Available at:* http://www.bmj.com/content/344/bmj.e536

Adams, K., Smith, L. & Hind, N. (2008). Drug driving among police detainees in Australia. *Trends and Issues Series 357*. Canberra: Australian Institute of Criminology.

Aitken, C., Kerger, M. & Crofts, N. (2000). Drivers who use illicit drugs: Behaviour and perceived risks. *Drugs Education Prevention & Policy 7*, 39-50.

Australian Institute of Health and Welfare (AIHW). (2011). *2010 National Drug Strategy Household Survey Report*. Drug Statistics Series no. 25. Available at: http://www.aihw.gov.au/publication-detail/?id=32212254712&tab=2

Boorman, M. & Owens, K. (2009). The Victorian legislative framework for the random testing drivers at the roadside for the presence of illicit drugs: An evaluation of the characteristics of drivers detected from 2004 to 2006. *Traffic Injury Prevention 10*, 16-22.

Chenery, S., Henshaw, C. & Pease, K. (1999). *Illegal parking in disabled bays: A means of offender targeting*. Policing and Reducing Crime Briefing Note 1/99. London: Home Office.

Connor, J., Norton, R., Ameratunga, S., & Jackson, R. (2004). The contribution of alcohol to serious car crash injuries. *Epidemiology 15*, 337-344.

Darke, S., Kelly, E. & Ross, J. (2004). Drug driving among injecting drug users in Sydney, Australia: Prevalence, risk factors and risk perceptions. *Addiction 99*, 175-185.

Davey, J.D., Davies, A., French, N., Williams, C.K., & Lang, C.P. (2005). Drug driving from a user's perspective. *Drugs: Education, Prevention & Policy 12*, 61-70.

Doecke, S. & Grigo, J. (2011). *Annual performance indicators of enforced driver behaviours in South Australia, 2009*. Adelaide: Centre for Automotive Safety Research. Available at: http://casr.adelaide.edu.au/casrpubfile/1062/CASR084.pdf

Drummer, O.H. (1994). *Drugs in drivers killed in Australian road traffic accidents: The use of responsibility analysis to investigate the contribution of drugs to fatal accidents*. Melbourne: Monash University, Victorian Institute of Forensic Pathology, Institute of Forensic Medicine.

Drummer, O.H., Gerostamoulos, J., Batziris, H., Chu, M., Caplehorn, J., Robertson, M.D., & Swann, P. (2004). The involvement of drugs in drivers of motor vehicles killed in Australian road traffic crashes. *Accident Analysis and Prevention 36*, 239-248.

Elvik, R. (2012). Risk of road accident associated with the use of drugs: A systematic review and meta-analysis of evidence from epidemiological studies. *Accident Analysis and Prevention,* 1-9. Available at: http://www.sciencedirect.com/science/article/pii/S0001457512002412

Featherston, J., Lenton, S. & Cercarelli, R. (2002). *The repeat drink drivers study.* Perth: The National Drug Research Institute, Curtain University of Technology, Perth. pp. 180.

Hall, W., Dagenhardt, L. & Lynskey, M. (2000). *The health and psychological effects of cannabis use*. University of New South Wales Monograph No. 44. Sydney: National Drug and Alcohol Research Centre. Available at: http://www.health.gov.au/internet/main/publishing.nsf/Content/5A648B4BA51D4891CA25703400033ED6/$File/mono44.pdf

Henderson, M. (1994). *The effects of drugs on driving : A literature review*. Rosebery, NSW: Roads and Traffic Authority, Road Safety Bureau.

Jones, C., Donnelly, N., Swift, W., & Weatherburn, D. (2005). *Driving under the influence of cannabis: The problem and potential countermeasures*. Crime and Justice Bulletin No 87. Sydney: Bureau of Crime Statistics and Research.

Karschner, E., Schwilke, E., Lowe, R., Darwin, W., Pope, H., Herning, R., Cadet, J. & Huestis, M. (2009). Do tetrahydrocannabinol concentrations indicate recent use in chronic cannabis users? *Addiction 104*, 2041-2048.

Kelly, E., Darke, S. & Ross, J. (2002). *Drug use and driving: Epidemiology, impairment, risk factors and risk perceptions*. NDARC Technical Report No. 153. Sydney: National Drug and Alcohol Research Centre.

Lenne, M.G., Fry, C.L., 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 & Policy 8*, 307-313.

Liu, Y. & Ho, C. (2010). Effects of different blood alcohol concentrations and post-alcohol impairment on driving behaviour and task performance. *Traffic Injury and Prevention 11*, 334-341.

Papafotiou, K., Stough, C. & Nathan, P. (2002). *Detection of cannabis-induced impairments with sobriety testing*. Hawthorn: Swinburne University.

Papafotiou, K., Carter, J. & Stough, C. (2005). The relationship between performance on the standardised field sobriety tests, driving performance and the level of D9-tetrahydrocannabinol (THC) in blood. *Forensic Science International 155*, 172-178.

Prichard, J., Matthews, A., Bruno, R., Rayment, K., & James, H. (2010). Detouring civil liberties? Drug-driving laws in Australia. *Griffith Law Review 19*, 330-349.

Ross, J., Campbell, G., Degenhardt, L., & Dillon, P. (2007). *Driving and clubbing in Sydney: A study of drug use and risk among nightclub attendees*. NDARC Technical Report No. 289. Sydney: National Drug and Alcohol Research Centre.

Skopp, G. & Potsch, L. (2008). Cannabinoid concentrations in Spot Serum Samples 24-48 hours after discontinuation of cannabis smoking. *Journal of Analytical Toxicology 32*, 160-164.

Stough, C., Boorman, M., Ogden, E., & Papafotiou, K. (2006). *An evaluation of the Standardised Field Sobriety Tests for the detection of impairment associated with cannabis with and without alcohol*. NDLERF Monograph Series No. 17. Payneham: National Drug Law Enforcement Research Fund. Available at: http://www.ndlerf.gov.au/pub/Monograph_17.pdf

Sweeney, J. & Payne, J. (forthcoming). *Drug use monitoring in Australia: 2009 and 2010 annual report on drug use among police detainees*. Monitoring Report. Canberra: Australian Institute of Criminology.

Sweeney, J. & Payne, J. (2011). *Poly drug use among police detainees*. Trends & Issues in Crime and Criminal Justice no. 425. Canberra: Australian Institute of Criminology.

Swift, W., Jones, J. & Donnelly, N. (2010). Cannabis use while driving: A descriptive study of Australian cannabis users. *Drugs: Education, Prevention & Policy 17*, 573-586.

Verstraete, A.G. & Raes, E. (Eds.). (2006). *Rosita-2 Project: Final Report*. Belgium: Ghent University Department of Clinical Biology, Microbiology and Immunology.

Woolley, J.E. & Baldock, M.R.J. (2009). *Review of Western Australian drug driving laws*. Adelaide: Centre for Automotive Safety Research. Available at: http://casr.adelaide.edu.au/casrpubfile/778/CASR064.pdf