

Drug driving among injecting drug users in Sydney, Australia: prevalence, risk factors and risk perceptions

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ABSTRACT

Aims To examine the prevalence of drug driving, the prevalence of drug-related motor vehicle accidents, risk perceptions of drug driving and factors associated with drug driving among injecting drug users (IDU).

Design Cross-sectional survey.

Setting Sydney, Australia.

Participants Three hundred current IDU.

Findings Ninety-five per cent had driven a vehicle, 74% in the previous 12 months ('current drivers'). Eighty-seven per cent of life-time drivers reported having drug driven, and 88% of current drivers had drug driven in the previous 12 months. There were no significant sex differences in life-time or recent drug driving. The most common drugs used before driving in the preceding year were: cannabis, heroin, amphetamines and cocaine. A third of life-time drivers reported having had a drug driving accident, with males more likely to have done so, and 9% of current drivers reported a drug driving accident in the previous year. The most common drugs that had been used before the most recent drug driving accident were heroin, cannabis and alcohol. Alcohol was perceived to be the most dangerous substance for driving performance and cannabis the least dangerous. Recent drug drivers perceived drug driving to be less dangerous than non-drug drivers. Recent drug drivers had driven more frequently over the preceding 12 months, had significantly higher levels of dependence, higher frequency of drug use, more extensive polydrug use and were more likely to have used and/or injected a drug in a car in the previous 12 months.

Conclusions Drug driving and drug-related accidents are large-scale public health problems among IDU. These behaviours pose serious risks to IDU themselves and to the broader community.

KEYWORDS Accidents, driving, harm, IDU.

INTRODUCTION

Motor vehicle accidents are a major cause of morbidity and mortality around the world. Substance use appears to be a major contributor to vehicle accident trauma. Internationally, studies have reported alcohol in excess of legal limits in 10–50% of accident involved drivers, and of other drugs in 5–30% of cases [1–4]. The most commonly detected drugs among accident victims are: cannabis (3–23% of cases), benzodiazepines (2–15%), cocaine (4–11%), amphetamines (2–6%) and opioids (3–5%)

[2,3,5–7]. Multiple drug use is common in these studies, as is alcohol in combination with other drugs. Between 5 and 20% of killed or injured drivers have alcohol/drug combinations detected [2,6,7]. Population surveys indicate that, in a 12-month period, between 5 and 13% of drivers report having driven under the influence of alcohol and 2–4% under the influence of other drugs [8–11].

Recent evidence indicates that drug use in cars by injecting drug users (IDU) may be common. In a study examining injecting locations of Australian IDU, cars were the third most common place to inject, and the most

common public place [12]. Furthermore, approximately one in 20 fatal heroin overdoses in Australia occur in a motor vehicle [13]. Widespread use of drugs in cars presents frequent opportunities for drug driving. The potential impact of drug driving among IDU is illustrated by a recent longitudinal study of Italian IDU [14]. Death rates were 13 times those of the general population, with road accidents the third most common cause of death.

Despite their high-risk behaviours in other areas, and their frequent drug use, few published studies have examined drug driving specifically among general samples of IDU [15–17]. In the 1970s Blomberg & Preusser [17] examined self-reported heroin intoxicated driving among New York methadone maintenance patients. Almost all (95%) reported having ever driven within an hour of heroin use, and two-thirds reported this as a daily occurrence. Recently, Albery *et al.* [16] reported that a third of a sample of out-of-treatment illicit drug users in the United Kingdom had driven a vehicle in the preceding 12 months. In that period 82% had driven shortly after consuming illicit drugs, of which the most common were heroin and cannabis. A fifth reported having had an accident in the preceding year while driving under the influence of illicit drugs. In an exploratory study of driving among Australian IDU, Aitken *et al.* [15] reported that half of their sample had driven at least twice in the preceding week. Two-thirds of drivers reported having driven in the preceding week shortly after injecting drugs, and a third of drivers had injected a drug shortly before their most recent vehicle accident.

While a great deal of work has been conducted on factors associated with drink driving, relatively little work has been conducted on those associated with drug driving [18]. Factors relating to driving under the influence of drugs or alcohol fall broadly into the domains of demographic characteristics, drug use patterns and psychosocial functioning [18]. As would be expected, given drug use demographics, drug driving using illicit drugs is associated with younger drivers [1,3,8]. The relationship of drug driving to gender is equivocal. In the majority of studies males are more likely to report drug driving, and to be found positive for drugs at accidents or at arrest [11,18]. However, other studies have found no gender differences in drug driving [3,8]. Heavier alcohol use has been associated consistently with drink driving [19,20], and there is tentative evidence relating frequency of cannabis use to driving under the influence of cannabis [18]. Among IDU, however, a recent study reported no significant relationship between drug use or dependence and drug driving [16]. Drink driving has been related to lower socio-economic status and to unemployment [18]. Finally, a number of psychological characteristics have been associated with driving under the influence of drugs or alcohol. Specific factors include antisocial behaviours,

low impulse control, aggression and depression [18,21,22].

The above data indicate that the driving behaviour of IDU is a public health issue worthy of exploration. The current study aimed to examine the prevalence of drug driving among a large, geographically diverse sample of Sydney IDU, and the circumstances associated with such behaviours. In particular, the study aimed to ascertain the role of different drug classes in drug driving and in road accidents among IDU, the frequency of being a passenger of a drug driver and IDU risk perceptions of the dangers of driving after having used various drugs. In addition, the study aimed to ascertain factors associated with drug driving, including demographic characteristics, drug use patterns, driving behaviours and psychopathology. The latter comprised general distress (GHQ 12) [23], antisocial personality disorder (ASPD) and borderline personality disorder (BPD). These two personality disorders were examined as both have strong components of impulsivity, are highly prevalent among IDU and have been related to higher levels of risk-taking behaviour in other domains [24,25].

Specifically, the study aims were:

- 1 To examine the prevalence and frequency of drug driving among IDU;
- 2 To examine the prevalence of drug-related motor vehicle accidents among IDU;
- 3 To determine risk perceptions of drug driving among IDU; and
- 4 To ascertain factors that are associated with drug driving.

METHOD

Procedure

All respondents were volunteers who were paid A\$20 for participation in the study. Payment of participants broadens the sample among a hidden population to those who might not otherwise participate. Recruitment took place from April to November 2002, by means of advertisements placed in needle exchanges, local newspapers, word of mouth and entrants to inner city therapeutic communities. Approximately equal numbers of subjects were recruited from sites in the inner (<2 km from the city centre), middle (approximately 10 km) and outer (>30 km) regions of metropolitan Sydney. A geographically diverse sample was recruited in order to obtain possible variations in the 'need to drive', e.g. access to public transport, distance to facilities/services.

Respondents were directed to the researcher via reception staff at the agency or contacted the researchers by telephone. Upon presentation the respondent was screened for eligibility to be interviewed for the study. To

be eligible for participation the respondent had to be aged 18 or over and to have injected a drug in the previous 6 months. All respondents were guaranteed that any information they provided would be kept strictly confidential and anonymous. All interviews were conducted by a member of the research team (E.K., S.D.) and took approximately 30 minutes to complete.

Structured interview

Subjects were administered a structured interview. Sections addressed demographics, drug use history, current drug use, frequency of drug use and drug injection in cars. The Severity of Dependence Scale (SDS) [26] was used to measure current dependence on the main drug of choice. Psychological distress was measured by the 12-item version of the General Health Questionnaire (GHQ-12) [23]. Scores range from 0 to 12, with higher scores indicative of higher levels of psychological distress, and a score of 2 or more indicative of 'caseness'. *International Classification of Diseases* 10th edition (ICD-10) diagnoses of BPD were screened for using the composite international diagnostic interview (CIDI) [27], and *Diagnostic and Statistical Manual* 4th edition (DSM-IV) diagnoses of ASPD were obtained using a modified version of the Diagnostic Interview Schedule [28,29]. As was noted above, the latter two diagnoses were measured, as antisocial behaviours, poor self-control and sensation seeking have been associated with drug driving [18].

A specialized section on driving was designed. Respondents were asked about their driving histories, driver's licence histories and frequency of driving over the previous 12 months. Respondents were asked whether they had ever driven a vehicle soon after (within an hour) having used various drugs ('drug driving'), and the period since this last occurred. Specifically, respondents were asked about driving within an hour of the use of: heroin, other opiates, amphetamines, cocaine, hallucinogens, benzodiazepines, cannabis, inhalants and alcohol (three or more drinks within 1 hour of driving). Drug driving while intoxicated with methadone was included under the category 'other opiates'. For those in enrolled in a maintenance treatment, this did not include normal daily dose, as evidence indicates that this does not impair psychomotor performance [30,31]. Questions were asked separately on whether the person had ever driven intoxicated for each separate substance. Data on ever having driven on every possible drug combination at any time in a subject's life was deemed too difficult to obtain, and likely to be of poor reliability.

While an arbitrary limit, a 1-hour time limit was understood easily by participants, is a reasonable period in which to study drug affected driving and has been utilized previously [17]. Clearly, it would not be feasible to

ask different time-frames for each drug (particularly when multiple drugs are involved), and it is not clear how different periods for each drug would be defined. The alcohol limit was based upon drink driving laws in NSW and the rest of Australia, where the legal blood alcohol concentration (BAC) limit for driving is 0.05 g/100 ml. This equates to the drink limits set in the study, and to drink driving campaigns. Those respondents who reported drug driving in the preceding year were asked their main reason for doing so. Questions were also asked about the presence of passengers while drug driving.

Respondents were asked if they had ever had a vehicle accident, and whether they had ever had an accident while driving under the influence of drugs. Alcohol may have been reported in relation to an accident, but the person had to have used other drugs for the accident to be considered a *drug* driving accident. Respondents were asked how many drug driving accidents they had had as a driver, whether they or another person had been injured in any of these accidents, if anyone was admitted to hospital and whether anyone had died. Respondents were asked what drug(s) they had used shortly before their most recent drug driving accident. Questions were also asked about the respondent's frequency of being a passenger of a drug driver and involvement in accidents as a passenger in a vehicle driven by a drug driver.

Respondents were asked how dangerous they think it is for someone to drive if intoxicated with individual drug classes. Level of danger was rated according to a Likert scale ranging from 1 (not dangerous) to 4 (very dangerous). Respondents were also asked how likely they thought it was that they would be caught for driving after having used illicit drugs.

Statistical analyses

T-tests were used for continuous data. Where distributions were highly skewed, medians were reported. For dichotomous categorical variables odds ratios (OR) and 95% confidence intervals (CI) were reported. Chi square analyses were reported for non-dichotomous categorical variables. All analyses were conducted using SPSS (version 11.0) [32].

RESULTS

Sample characteristics

The sample consisted of 300 regular IDU, recruited from the inner (34%), middle (33%) and outer (33%) areas of Sydney (Table 1). The mean age of subjects was in the early 30s, with the majority being male and unemployed. Approximately half (47%) were not enrolled into any form of drug treatment. Those who were enrolled in a

treatment programme had been so for a median of 14 months (range 0.25–288 months). The most common treatment modality was methadone maintenance (44%). Life-time and recent prison histories were common among both genders. There were high rates of psychopathology, as evidenced by GHQ 12 scores and ASPD and BPD diagnoses.

Two-thirds of the sample nominated heroin (and other opioids) as their current drug of choice, but life-time and recent polydrug use was extensive. Forty-four per cent of subjects had injected drugs on a daily basis over the preceding month (not in treatment 60%, current treatment 31%). The most commonly used psychotropic drug classes over the preceding 6 months were: heroin (87%), cannabis (78%), alcohol (63%), other opioids (63%), cocaine (57%) and benzodiazepines (56%).

Ninety-five per cent of respondents had used drugs in a car, and 86% had done so in the previous 12 months.

The most common drugs used in a car in the preceding year were: heroin (61%, weekly basis 23%), cannabis (49%, 17%), alcohol (35%, 11%), cocaine (35%, 8%), amphetamines (30%, 6%) and benzodiazepines (24%, 7%). Two-thirds (66%) had injected a drug in a car in the past year (66%), with males and females equally likely to have done so (65% versus 66%).

Driving history

Nearly all (95%) the sample had driven a vehicle, with more males than females having done so (Table 2). Seventy-four per cent had driven in the previous 12 months, and were classified as 'current drivers'. There was no difference between the proportions of male and female current drivers, or in the driving frequencies of males and females. Current drivers had a mean age of 31.3 years (SD 7.8, range 18–52 years), and did not

Table 1 Demographic characteristics and drug use histories.

Variable	Males (n = 190)	Females (n = 110)	People (n = 300)
Age (years)	33.1	29.6	31.8
Education (years)	9.8	9.7	9.8
Unemployed (%)	81	70	77
Treatment status (%)			
None	52	37	47
Methadone	37	56	44
Buprenorphine	7	3	6
Residential rehabilitation	2	4	3
Detoxification	1	0	1
Narcotics Anonymous	1	1	1
Drug of choice (%)			
Heroin	70	61	67
Cannabis	12	16	14
Cocaine	9	16	11
Amphetamines	7	6	7
Others	2	1	1
Prison history (%)			
Ever	65	51	60
12 months	30	20	26
Psychopathology			
GHQ score	4.6	5.2	4.8
ASPD (%)	65	53	61
BPD (%)	31	54	39
Drug use history			
1st intoxicated (year)	13.8	13.7	13.7
1st injection (year)	19.8	18.8	19.4
Daily injector (last month) (%)	42	51	44
SDS score	8.2	9.7	8.8
No. drug classes used (ever)	8.9	8.8	8.9
No. drug classes used (6 months)	5.9	5.9	5.9
No. drug classes injected (ever)	3.8	3.7	3.8
No. drug classes injected (6 months)	2.3	2.3	2.3

Table 2 Driving history of IDU.

Variable	Males (n = 190)	Females (n = 110)	Total (n = 300)	Comparisons
Ever driven (%)	97	92	95	OR 3.30, CI 1.08–10.10
Driven in previous 12 mths (%)	73	75	74	Not significant
Ever had licence (%)	65	52	60	OR 1.71, CI 1.06–2.75
Current licence (%)	27	16	23	OR 2.01, CI 1.09–3.69
Driven unlicensed (12 months) (%)	50	66	55	OR 0.52, CI 0.32–0.84
Driving frequency (12 months) (%)				
Not driven	27	25	23	Not significant
Less than weekly	38	47	43	
Weekly	14	16	16	
Daily	21	13	19	

Note: Males = referent category for odds ratios.

differ significantly in age from those who had not driven in the previous 12 months.

Although the majority of the sample had driven, only 60% had ever had a driver's licence, with males more likely to have ever had a licence. Less than one-quarter of the sample had a current licence, again with males more likely to be licensed. Significantly more females had driven unlicensed in the previous 12 months.

Drug driving history

Eighty-seven per cent of those who had ever driven reported having driven soon after using drugs, representing 83% of the total sample (Table 3). Among current drivers, 88% had driven soon after using drugs in the previous 12 months and 59% had drug driven in the preceding month. There were no significant sex differences in life-time or recent drug driving. Among current drivers, the most common drugs used before driving in the preceding year were: cannabis (57%), heroin (56%), amphetamines (34%), cocaine (33%) and other opioids (32%).

Twenty per cent of current drivers had drug driven at least weekly over the preceding 12 months, with no sex differences (males 21%, females 18%). Specifically, 22% reported frequent driving soon after using heroin, and 21% reported having driven soon after using cannabis. Other drugs related to frequent drug driving were other opioids (14%), amphetamines (9%) and cocaine (9%). The most common reasons given by current drivers for drug driving were: to get home after 'scoring drugs' (28%), to get around (26%), to give others a lift (11%) and to 'score drugs' (11%).

Carrying passengers while drug driving was reported by the majority of life-time drivers (88%). Seventy-seven per cent of current drivers had drug driven with passengers during the previous 12 months, and 50% had done

Table 3 Drug driving histories of IDU by drug class.

Drug	Ever† (n = 286) %	12 months* (n = 222) %	> = Weekly* %
Cannabis	74	57	21
Heroin	71	56	22
Amphetamines	53	34	9
Alcohol‡	51	27	5
Other opioids	41	32	14
Cocaine	39	33	9
Benzodiazepines	32	25	5
Hallucinogens	24	5	1
Inhalants	5	1	0
Any drug	87	88	20

†Ever driven; *current drivers; ‡ = three drinks within 2 hours of driving.

so in the preceding month. Friends were the most common passenger (65% of current drivers), followed by a partner (37%), a stranger (14%), children (13%) and other family members (12%).

Accident history

Fifty-nine per cent of life-time drivers reported having had a vehicle accident (Table 4). Males were significantly more likely to have had a vehicle accident. A third of drivers (32%) reported having had a drug driving accident, again with males more likely to have done so. Nine per cent of current drivers reported having had a drug driving accident in the previous year, with no gender difference. As noted in the method, accidents which involved alcohol alone were not considered drug driving accidents for the purposes of this study.

Fifteen per cent of drivers reported having been injured in an accident while drug driving. Eight per

Table 4 Accident history of IDU drivers.

Variable	Males (n = 190)	Females (n = 110)	Total (n = 300)	Comparisons
Accident (%):				
Ever*	64	49	59	OR 1.91, CI 1.17–3.13
12 months**	15	19	17	Not significant
Drug driving accident (%):				
Ever*	36	24	32	OR 1.78, CI 1.03–3.08
12 months**	9	10	9	Not significant
Been injured in a drug driving accident (%)*	17	10	15	Not significant
Others injured in a drug driving accident (%)*	11	4	8	Not significant
Someone hospitalised after drug driving accident (%)*	14	8	12	Not significant
Death resulting from drug driving accident (%)*	1	1	1	Not significant

*Of those who have ever driven (n = 285). **Of those who have driven in previous 12 mths (n = 222). Note: Males = referent category for odds ratios.

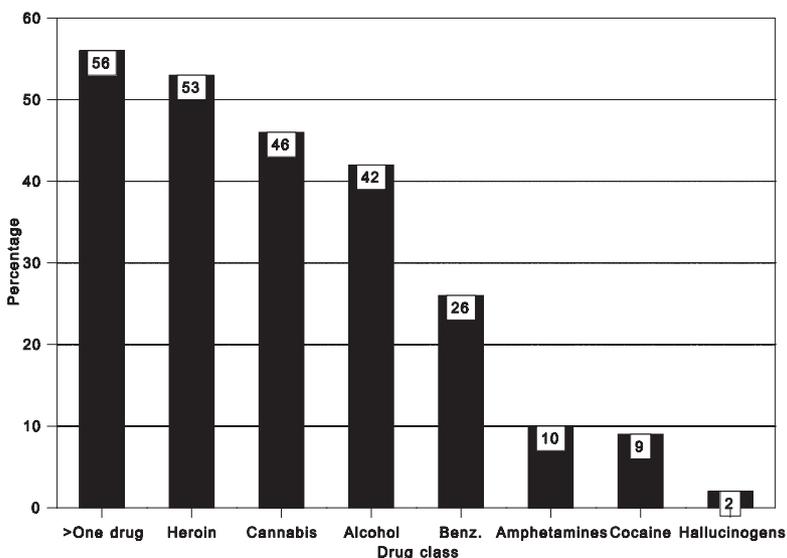


Figure 1 Drugs involved in most recent drug driving accidents of IDU

cent reported that another person had been injured in an accident in which the respondent was drug driving. One per cent of drivers reported that someone had been killed in a vehicle accident in which the respondent was drug driving. The most common drugs that had been used before the most recent drug driving accident were heroin (53%), cannabis (46%) and alcohol (42%) (Fig. 1). The mean number of drugs involved in the last drug driving accident was 2.1 (SD 1.1, range 1–5). Sixty-six per cent of those reporting a drug driving accident reported using two or more drugs prior to the accident, 28% reported using three or more drugs and 12% reported using four or more drugs. The most commonly co-occurring drugs at the most recent intoxicated accident were: heroin/cannabis (21%), cannabis/alcohol (20%), heroin/alcohol (18%), heroin/benzodiazepines (12%) and cannabis/benzodiazepines (12%).

Experience as a passenger of a drug driver

Eighty nine per cent of the sample had been a passenger of a drug driver, with almost a third (30%) having done so at least weekly over the previous 12 months. Forty-two per cent of respondents had been involved in a vehicle accident while being driven by a drug-intoxicated driver, 12% in the previous 12 months. Thus, 47% of those who had been a passenger of a drug driver had been involved in an accident, and 17% of those who had been a passenger of a drug driver in the preceding year had been involved in an accident in that period.

Risk perceptions

Alcohol was perceived to be the most dangerous substance for driving performance, believed to be 'very dangerous' by 84% of respondents. Other drugs in

order of perceived danger were: hallucinogens (71%), benzodiazepines (68%), heroin (58%), other opioids (47%), inhalants (45%), cocaine (37%), amphetamines (31%) and cannabis (18%). There was no significant difference between danger rating scores for alcohol and hallucinogens. Alcohol was perceived to be significantly more dangerous than benzodiazepines (3.83 versus 3.66, $t_{277} = 4.6$, $P < 0.001$), the third most dangerous drug and heroin (3.83 versus 3.47, $t_{294} = 8.5$, $P < 0.001$), the fourth most dangerous drug. In contrast, cannabis, with the lowest risk score (2.31, SD = 1.06, range 1–4) was perceived to be significantly less dangerous than amphetamines (2.31 versus 2.83, $t_{272} = 7.6$, $P < 0.001$), the second least dangerous drug.

There were differences in the perceived danger associated with particular drugs according to whether or not the respondent had drug driven in the previous 12 months. Generally, recent drug drivers perceived drug driving to be less dangerous than non-drug drivers. Recent drug drivers reported a significantly lower level of danger than non-drug drivers for heroin (3.38 versus 3.64, $t_{297} = 3.3$, $P < 0.05$), opioids (3.18 versus 3.49, $t_{273} = 2.8$, $P < 0.05$), cocaine (2.91 versus 3.23, $t_{278} = 2.6$, $P < 0.05$) and cannabis (2.16 versus 2.57, $t_{289} = 3.2$, $P < 0.05$).

Forty-two per cent of the sample thought it likely they would be caught if they drug drove, with no significant sex differences in this perception. Recent drug drivers believed they were less likely to be caught for drug driving than non-drug drivers (35% versus 54%, OR 2.17, CI 1.34–3.52). The most commonly perceived reason for getting caught were: erratic driving (28%), random breath testing (22%), being involved in an accident (16%) and if police knew you were a drug user (13%).

Factors associated with drug driving

As noted in the introduction, while equivocal, previous studies have associated drug driving with the broad domains of demographics, drug use, driving behaviours and psychosocial functioning [18]. In order to examine factors associated with recent drug driving, recent drug drivers were compared to non-drug drivers on demographic characteristics (age, sex, treatment status, geographical region), driving frequency, drug use (SDS, injection frequency, frequency of use of drug of choice, polydrug use, drug use in cars) and psychopathology (GHQ, ASPD, BPD) (Table 5). While the evidence is equivocal, both age and gender have been related to both drink and drug driving [18]. It is essential to compare the driving frequencies of drug drivers and other partici-

pants, as more frequent driving presents more frequent opportunities for drug driving to occur. A comparison of treatment status is also necessary, due to the overall reductions in drug use associated with treatment. As noted above, geographical region constitutes a proxy for 'need to drive' in a geographically widespread city such as Sydney. As in previous work [16], drug use frequency and drug dependence of drug drivers and others were compared. As discussed above, polydrug use is a strong feature of vehicle accidents and deaths [2,6,7]. The use of drugs in cars provides represents a high-risk situation for drug driving. Finally, recent drug drivers and other participants were compared on both ASPD and BPD, two diagnoses associated strongly with impulsivity and anti-social behaviours. GHQ scores provide a measure of overall distress which may relate to drug use and therefore to drug driving.

There were no significant differences in age, gender or employment status between drug drivers and others. There were also no differences between drug-drivers and non-drug-drivers in the proportions who had been enrolled in drug treatment for the entire 12-month period. Drug drivers were also not differentiated according to geographical region, with high proportions of IDU drug drivers in the inner, middle and outer areas of Sydney. Drug drivers had, however, driven significantly more frequently over the preceding 12 months than non-drug drivers. Forty-nine per cent of drug-drivers had driven at least weekly, compared to 17% of non-drug drivers.

There were also differences between drug drivers and other IDU according to their drug use patterns. Drug drivers had significantly higher levels of dependence on their drug of choice, higher frequency of use of their drug of choice and more extensive polydrug use. Drug drivers were also significantly more likely to have used a drug in a car and to have injected a drug in a car in the previous 12 months. There were no differences between drug drivers and non-drug drivers in injecting frequency or in any of the measures of psychopathology.

DISCUSSION

Drug driving was highly prevalent, with nine out of 10 of life-time drivers having drug driven, and a similar proportion of current drivers having done so in the preceding year. By comparison, only 2–4% of the driving population in Australia and elsewhere report drug use prior to driving in a 12-month period [8–11]. These high rates are consistent with those reported by Albery *et al.* [16] in the United Kingdom and Aitken *et al.* [15] in Australia. Importantly, there were no gender differences for drug driving prevalence. While the overall extent of drug driving is worrying, the frequency of these behaviours is fur-

Table 5 Factors associated with recent drug driving.

Variable	Drug drivers (n = 195)	Other drivers (n = 27)	Comparisons
Demographics			
Age (years)	31.4	31.1	Not significant
Sex (% male)	64	53	Not significant
Unemployed (%)	74	82	Not significant
Enrolled in treatment entire 12 mths (%)	31	40	Not significant
Geographical region (%)			
Inner	33	30	Not significant
Middle	38	37	
Outer	29	33	
Driving frequency (%)			
<Monthly	33	77	$\chi^2_5 = 22.4, P < 0.001$
1/Month to <weekly	18	7	
> = Weekly (<once/day)	23	7	
Daily	26	10	
Drug use			
SDS	9.3	6.5	$t_{220} = 3.8, P < 0.001$
Injecting frequency (previous month) (%)			
< = Weekly	31	44	Not significant
>Weekly (<once/day)	23	30	
> = Once/day	47	27	
Drug of choice use frequency (6 months) (days)	111.8	83.9	$t_{220} = 2.0, P < 0.05$
No. drug classes (6 months)	6.3	5.3	$t_{220} = 3.0, P < 0.05$
Used a drug in a car (12 months)	94	73	OR 5.45, CI 2.01–14.80
Injected a drug in a car (12 months)	76	47	OR 3.53, CI 1.60–7.76
Psychopathology			
GHQ-12	4.8	4.1	Not significant
ASPD (%)	63	63	
BPD (%)	42	30	

ther cause for concern. A fifth of current drivers reported weekly drug driving over the preceding year. The risks of drug driving were not restricted to the respondents themselves, with the carrying of passengers being common. Most commonly passengers were friends or partners, although a substantial proportion reported having driven children while drug driving.

The drugs used most commonly prior to driving were heroin and cannabis, which is consistent with the overall drug use patterns of the sample. However, substantial proportions reported driving after having used amphetamines, other opioids, cocaine, alcohol and benzodiazepines. The range of drugs reported in drug driving clearly reflects the broad polydrug use of the sample. It is important to note that this study focused explicitly on drug driving, with alcohol use only recorded only when other drugs were involved. As such, the study does not attempt to provide an overall measure of intoxicated driving *per se* among IDU. The major reasons given for drug driving were prosaic, revolving around driving to obtain drugs, or driving home after having obtained and used them. Overall, the drug driving of these IDU appeared cir-

cumstantial and logistical, rather than a deliberate policy on their behalf.

The overall prevalence of driving should be borne in mind when considering the levels of drug driving among this sample. Almost all had driven a vehicle at some time, three-quarters had driven a vehicle in the preceding year, and over a third had driven on a weekly basis in that period. Unlicensed driving was common. These figures are far in excess of those reported in the Albery *et al.* [16] study conducted in the United Kingdom, where geographical distances covered are likely to be substantially less, with less need to drive. The figures from this study are more akin to those reported in the Melbourne-based study of Aitken *et al.* [15].

The driving of IDU, intoxicated or otherwise, might be of little public health interest if they were rarely involved in accidents. This does not appear to be the case. Nearly a fifth of current drivers had been involved in an accident in the preceding 12 months. In comparison, it is estimated that approximately 1% of drivers are involved in a traffic accident in a 12-month period [33]. Drug intoxication appears to play a major role in these accidents. A third of

life-time drivers had had a drug driving accident, and one in 10 current drivers had done so in the preceding 12 months. While males and females were equally likely to drug drive, males were more likely to have had a drug driving accident. The rate of drug involved accidents is far higher than that reported by Albery *et al.* [16] in the United Kingdom. Again, this may well reflect the vastly larger distances involved in traveling in Australia compared to smaller countries, and perhaps better access to public transport in the United Kingdom.

Not surprisingly, given the extent of heroin use among the sample, heroin was the drug most commonly associated with the most recent drug driving accident. The next most commonly reported drugs were cannabis and alcohol, both present in nearly a half of drug driving accidents. The patterns of drug involvement in accidents reported by this sample reflects their overall drug consumption patterns, and their general patterns of drug driving. In this, they diverge from the broader toxicology of road accidents in which, after alcohol, cannabis and benzodiazepines predominate [3,5–7,18]. The polydrug use of the sample is also reflected in their drug driving accident histories, with an average of two drug classes having been used prior to the most recent drug driving accident. Importantly, a large proportion of the drug driving accidents resulted in injury, to themselves and/or others.

Three major groups of risk factors were associated with drug driving. Drug drivers had higher levels of dependence on their drug of choice, had used their drug of choice more frequently and had more extensive polydrug use. Overall, the pattern is of a heavily dependent polydrug user. These results differ from those of Albery *et al.* [16], who found no relationship between frequency of drug driving and frequency of drug use or severity of dependence. The second major factor was frequency of driving, with more frequent drivers being more likely to engage in drug driving. Taken together, the picture of a drug driving IDU is of a heavy polydrug user who is driving frequently. Finally, the circumstances of drug use appear relevant. Consistent with previous work [12], the injection and use of drugs in cars was common. Such a high prevalence of drug use in cars provides frequent opportunity for drug driving, as demonstrated by the strong relationship between drug use in cars and drug driving.

It is important to examine what was *not* associated with drug driving. There were no demographic differences between drug drivers and other IDU in age, sex or employment status, although males were more likely to have accidents. Treatment status was not associated with drug driving. The beneficial effects of treatment *per se* on many forms of harm do not appear to extend to driving behaviours. However, it should be borne in mind that this

study was a study of the driving behaviours of *current* IDU, with entrance criteria requiring all participants to have injected drugs recently. As such, IDU enrolled in treatment who had not injected in the preceding 6 months did not participate in this study. Levels of drug driving also did not significantly differ by geographical region. This is a ubiquitous behaviour among IDU that was not restricted to the outer regions. Finally, psychopathology was not associated with drug driving. In particular, diagnoses of BPD and ASPD, both of which contain heavy elements of impulsivity and are associated with risky behaviours, did *not* predict drug driving. Drug driving does not appear to arise from psychopathology, but from drug use and circumstantial factors.

The risks associated with drug driving were not restricted to the driving behaviours of the respondents themselves. In the preceding year, nearly three-quarters of the sample had been a passenger of a drug affected driver, and a third had done so on at least a weekly basis. Passengers of drug affected drivers appeared to be at high risk of being involved in accidents. Nearly half of respondents had been involved in an accident while being driven by a drug driver, and one in eight had done so in the preceding year. It is clear that IDU are at great risk of accident exposure while being driven by their drug-using peers, over and above the risk involved in relation to their own driving.

It should be noted that the drug driving and accident histories in this study were based upon self-report. However, the self-reported drug use and criminal behaviours of injecting drug users has been demonstrated repeatedly to be of high validity and reliability under research conditions that guarantee confidentiality and anonymity [34]. Furthermore, as with other risk behaviours such as needle sharing, there is no alternative to self-report for drug driving histories. Police records, for example, would be restricted to formal charges, rather than to drug driving or accidents generally.

IDU made clear distinctions between the perceived dangers different drugs posed for driving. Alcohol was rated as the most dangerous substance for driving, and was considered as dangerous as hallucinogens. Heroin, which this study has demonstrated to be widely involved in drug driving accidents, was rated as only the fourth most dangerous drug for driving. A clear distinction was made between psychostimulants, hallucinogens and sedative drugs (alcohol, benzodiazepines, opioids). Cannabis was perceived to be the least dangerous drug to drive on.

There were differences in risk perceptions that related to drug driving status. IDU who had recently driven after having used a drug rated drug driving as less dangerous than those who had not done so. These data, suggesting IDU drug drivers regard their behaviours as less danger-

ous than others, are consistent with the results of Albery *et al.* [16] among UK illicit drug users, and similar results have been reported among drink drivers [35]. Recent drug drivers also rated the risk of getting caught as significantly lower than did non-drug drivers.

In summary, the current study indicates that drug driving and drug-related road accidents are large-scale public health problems among IDU. Such behaviours pose serious risks to IDU themselves, and to the broader community. It is clear that drug driving is a harm associated with drug use, and has become so widespread that it is almost a 'normal' activity among this group. Given the extent of the problem, drug driving warrants further attention.

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