

Benzodiazepine use and harms among police detainees in Australia

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This paper investigates self-reported prevalence, patterns and potential harms of benzodiazepine use in a sample of adult police detainees, using data from the Drug Use Monitoring in Australia (DUMA) program for the period 1999 to 2005. Of the sample, 15 percent had used illegal benzodiazepines in the previous 12 months, and around 13 percent had used prescribed benzodiazepines in the previous fortnight. The extent of self-reported benzodiazepine dependence was much lower than that for heroin, and similar to that for amphetamines. There is evidence of use of benzodiazepines in conjunction with other drugs, particularly heroin and amphetamines, which indicates a greater risk of harms, notably heroin overdose. Although these are preliminary findings only, they point to the value of further analysis to reveal more complex patterns of behaviour and use. For the relatively small number of people in contact with the criminal justice system whose only illegal drug use is of benzodiazepines, the results suggest the need to ensure that they have access to the treatment and other interventions available to the much larger group who use and are dependent on multiple drugs, notably heroin and amphetamines.

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Director

Benzodiazepines, which are frequently prescribed for the treatment of a range of anxiety conditions and for insomnia, can be associated with dependence and a range of other harms related to recreational and other misuse. The extent of concern about non-medical use of these drugs can be gauged from a recent report from the Victorian Parliament Drugs and Crime Prevention Committee (VDCPC) into the misuse of benzodiazepines and other forms of pharmaceutical drugs in Victoria (VDCPC 2006).

The report noted that between 1999 and 2003 the number of benzodiazepine prescriptions in Australia decreased. Nevertheless, in 2004, 1.1 percent of males and 1.0 percent of females had used tranquillisers/sleeping pills for non-medical purposes in the previous 12 months, most frequently those aged from 20 to 29 years (AIHW 2005). In addition, the Illicit Drugs Reporting System (IDRS), which monitors drug use among groups of injecting drug users (IDU) in cities, showed that, in 2005, 66 percent of respondents had used legal and/or illegal benzodiazepines (43% legal, 40% illegal) in the preceding six months, and eight percent had injected benzodiazepines (Stafford et al. 2006). It should be noted, however, that this group is not representative of all IDU.

The harms associated with benzodiazepine use include dependence, with one study finding that approximately one-quarter of heroin users who also used benzodiazepines displayed some degree of benzodiazepine dependence (Ross, Darke & Hall 1997). Benzodiazepines are also present in about half to two-thirds of drug deaths, either in motor vehicle accidents where they are the most

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prevalent prescription drug, or in combination with other depressants such as opiates and/or alcohol (VDCPC 2006). Heroin users frequently use benzodiazepines, either as a supplement or as an alternative in times of scarcity, but the combination of heroin and benzodiazepine use, particularly when alcohol is also being consumed, is a key factor in heroin overdose (Darke & Zador 1996; Gerostamoulous, Staikos & Drummer 2000).

There are a number of problems associated with the injection of preparations not intended for injection including injecting the talc in tablets, which can give rise to chronic inflammatory granulomas in the lung. Temazepam was formerly available in liquid filled capsules (gel caps) which were highly sought after for injecting, but could result in significant vascular damage. As a result of concern about these harms among IDU, temazepam gel caps were removed from the market in 2004 (Breen et al. 2004).

Reasons for the misuse of benzodiazepines include dependence, self-medication, dealing with withdrawal from other drugs, drug substitution, enhancement of other drug use, and use as a street currency. Benzodiazepines can be accessed through doctor shopping, theft, fraud and/or forgery of prescriptions (VDCPC 2006).

Much of the research into benzodiazepine misuse has been conducted with IDUs or methadone patients. This analysis investigates the prevalence of legal and illegal benzodiazepine use and harms in male and female police detainees, using self-report data from quarterly data collections in four sites over seven years. Although not necessarily representative of all offenders, DUMA is the best national data on offenders' drug use and can be usefully compared with data on general population and prisoner use.

Method

The data presented in this paper are from the DUMA program (see Makkai 1999 for details) for 1999 to 2005 (28 quarters) in the sites of Bankstown and Parramatta (New South Wales), Southport (Queensland) and East Perth (Western Australia). Only self-report data from detainees 18 years and over have been included.

Results

Patterns of legal and illegal use of benzodiazepines and associated characteristics

There are two self-report measures of benzodiazepine use in the DUMA questionnaire. The first asks respondents if they had used any prescription or over the counter medications in the previous week (1999–2000) or fortnight (2001–2005). Detainees can name four drugs, and if any of these are benzodiazepines it is considered that they were used legally. It is made clear to the detainee that prescription medicine must have been prescribed for them by a doctor.

The second measure asks if they have ever tried illegal benzodiazepines, how old they were when they first tried illegal benzodiazepines and whether they had used the drug during the past 12 months, 30 days or 48 hours.

Detainees are informed that illegal use refers to the use of benzodiazepines that have not been prescribed specifically to them.

The prevalence of legal and illegal use of benzodiazepine can be seen in the first four rows of Table 1, which are overlapping categories. This shows that women were more likely than men to have used benzodiazepines in every category.

Analysis of the major benzodiazepines prescribed shows that diazepam and alprazolam prescription in this population increased over the seven years of the study, while prescription of flunitrazepam and temazepam decreased. Use of oxazepam remained essentially stable.

While the time frame for the use of benzodiazepines is slightly different for legal and illegal use (7–14 versus 30 days), both are sufficient to gain a measure of recent use. The last four rows of Table 1 categorise legal and illegal use into independent categories.

This analysis shows that the majority of detainees had not used benzodiazepines in the previous month, either legally or illegally. Women were more likely than men to have used benzodiazepines in all categories, and both men and women were slightly more likely to have used legal than illegal benzodiazepines.

Table 1: Benzodiazepine use by gender (percent)

	Male	Female	Total
Prescribed benzodiazepines in the past 1–2 weeks*	11	18	13
Ever used illegal benzodiazepines*	26	32	27
Used illegal benzodiazepines in the past 12 months*	14	19	15
Used illegal benzodiazepines in the past 30 days*	9	13	9
Legal and illegal benzodiazepine use in previous months*			
None	84	75	82
Legal only	8	12	9
Illegal only	5	7	5
Legal and illegal use	4	6	4

* Statistically significant at $p < .01$; $n = 12,835$

Figures may not total 100 due to rounding

Source: AIC, DUMA collection 1999–2005 [computer file]

Table 2 shows some clear trends in a number of detainee characteristics in relation to benzodiazepine use. Compared with others, users of both legal and illegal benzodiazepines were more likely to have lived on the streets in the past 30 days, less likely to have been in full-time work, more likely to have received illegal income, more likely to have used heroin and/or (methyl)amphetamines in the past

30 days, and more likely to have been arrested or imprisoned in the previous year. Non-users and users of only legal benzodiazepines tended to be older and to have had more education than users of illegal benzodiazepines.

Illegal benzodiazepine and other illicit drug use

Table 2 shows that the majority of illegal users of benzodiazepines had also used

heroin and/or amphetamines during the same period. This raises the suggestion that illegal benzodiazepine use is likely to be part of a pattern of generalised illicit drug use. To investigate this, poly-use of heroin, amphetamines and illegal benzodiazepines during the past 12 months was examined.

Among those who had used at least one of these drugs in the past 12 months, amphetamines were the most commonly used (41% males; 47% females). Heroin was less frequently used (23% males; 33% females) while benzodiazepines were the least used (13% males; 19% females). There were significant overlaps between the three drug types among users. Amphetamines were the first drug tried, at an average age of 18.7 years, followed by benzodiazepines at an average age of 19.1 years and heroin at an average age of 19.5 years.

The overlapping use of these three drugs is addressed in Table 3 in which eight independent categories of single and multiple illicit drug use are described.

It should be noted that what is described as combinations of drugs in Table 3 does not imply that more than one drug was used at the same time, only that the respondent reported having used more than one drug in the 12 months preceding the survey.

Women were more likely than men to be users of all three drugs. There was a tendency for a greater proportion of women than men to be users of heroin either alone or with other drugs, and for a greater proportion of men than women to use amphetamines either alone or with benzodiazepines.

Benzodiazepines were used in combination with heroin and amphetamines by almost eight percent of all users: 11 percent of women and seven percent of men. A further five percent used benzodiazepines in conjunction with either amphetamines or heroin. Very few users in this group

Table 2: Detainee characteristics by benzodiazepine use (percent)

	Not used	Legal use only	Illegal use only	Legal and illegal use	Total
Demographics					
Mean age (years)*	29	31	27	28	29
Less than yr 10 education*	47	51	57	52	48
Lived on streets past 30 days*	5	6	10	13	5
Income measures					
Govt. benefits past 30 days*	55	80	77	86	60
Full time work past 30 days*	30	11	11	7	26
Illegal income past 30 days*	17	29	48	61	22
Illicit drug use past 30 days					
Used heroin*	11	37	58	64	18
Used amphetamines*	26	40	59	66	31
Criminal behaviour					
In prison past 12 months*	12	19	24	24	14
Arrested in past 12 months*	48	61	70	73	51
Total (n)	(10,542)	(1,088)	(678)	(527)	(12,835)

* Statistically significant at $p < .01$; $n = 12,835$

Source: AIC, DUMA collection 1999–2005 [computer file]

Table 3: Use of amphetamines, heroin and illegal benzodiazepines as individual drugs and combinations by gender*

	n	Male %	Female %	Total %
No use	6,154	50	40	48
Amphetamines only	2,969	23	22	23
Amphetamines & heroin	1,044	8	10	8
Amphetamines, heroin & benzo	1,015	7	11	8
Heroin only	780	6	8	6
Amphetamines & benzo	428	3	3	3
Heroin & benzo	311	2	4	2
Benzodiazepines only	130	1	1	1

* Statistically significant at $p < .01$; $n = 12,835$

Figures may not total 100 due to rounding

Source: AIC, DUMA collection 1999–2005 [computer file]

(1%) used illegal benzodiazepines as their only illicit drug, although it is possible that illicit drugs not named here were used.

In other words, illegal benzodiazepines were used by fewer than 20 percent of female and 15 percent of male detainees in the previous 12 months; usually in the context of concurrent heroin and/or amphetamine use. To further explore the link between illegal benzodiazepine use and other illicit drug use, the characteristics of illegal benzodiazepine users were compared with users of illegal heroin and/or amphetamines.

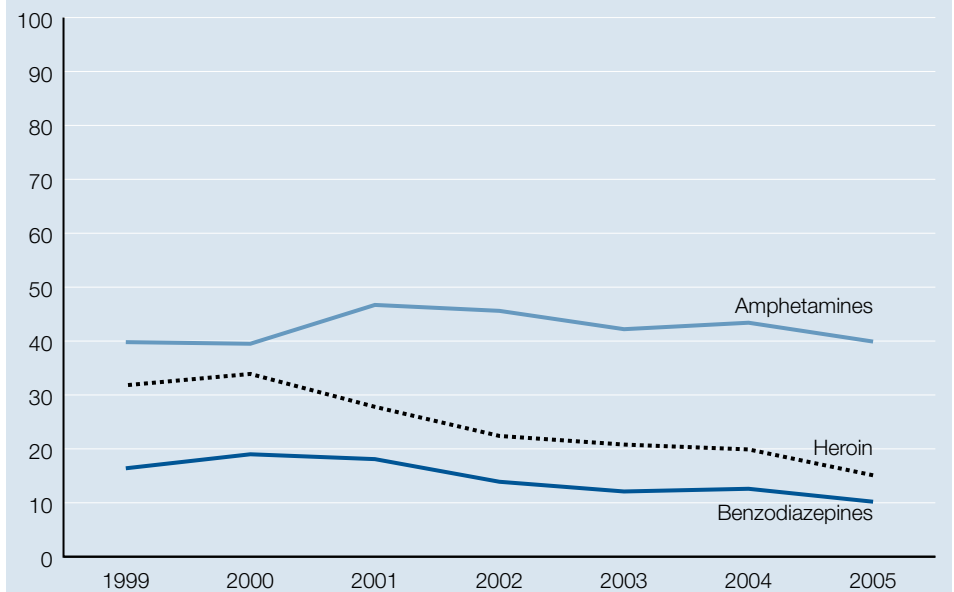
Non-users of these three drugs, and benzodiazepine-only users were, on average, the oldest respondents. The average ages of others were within a limited range, from 26.5 years for users of heroin with benzodiazepines, to 28.8 years for amphetamine-only users.

Between 40 and 60 percent of the sample had not received any post-Year 10 formal education, with benzodiazepine-only users being the least likely, and non-users the most likely, to have done so. Approximately 50 percent of other illicit drug users had not proceeded beyond Year 10 at school.

There was some variation in the proportion of the sample who had no fixed address, ranging from 3.3 percent of non-users to 12.2 percent of those who used heroin with benzodiazepines. Benzodiazepine-only users were in the middle of the range at 6.9 percent. There were no clear patterns in the variation.

Income measures for the previous 30 days showed that non-users were less likely to have received government benefits and more likely to have been in full-time work than illicit drug users. Users of all three drugs were the least likely to have been in full-time work and the most likely to have received illegal income, while users of amphetamines-only were the most likely of these to have been in full-time work. Benzodiazepine-only users were in the mid-range of drug users in

Figure 1: Use of heroin, amphetamines and illegal benzodiazepines 1999–2005 (percent)



n=12,835

Source: AIC, DUMA collection 1999–2005 [computer file]

terms of full-time work but were the least likely to have received illegal income.

Non-users were the least likely to have been arrested or imprisoned in the previous 12 months, while users of all three drugs were the most likely, with three-quarters having been previously arrested. Users of amphetamines-only were the least likely of the illicit drug users to have been arrested or imprisoned. Benzodiazepine-only users were in the mid-range of drug users.

In conclusion, it seems that the small group of detainees who had used only illegal benzodiazepines had some similar characteristics to other illicit drug users. The few distinctive characteristics were being older, being least likely to have received illegal income and being least likely to have completed any post-Year 10 education.

Patterns of first offence

Most detainees were charged with three or fewer offences. Charges were assigned to eight categories based on the Australian Standard Offence Classification scheme (ABS 1997). The rank ordering of first offences was similar

for all illicit drug users: property offences and breaches were the first and second most common categories (except in the case of amphetamine-only users where the order was reversed). The proportions detained for each offence type varied, however, with users of heroin, either alone or in combination with other drugs, much more likely to have been charged with property offences than non-heroin users. Benzodiazepine-only users were in the mid-range for both property offences and breaches.

Patterns of illicit drug use over time

Some literature suggests that benzodiazepine use is associated with heroin use, either to potentiate it or to complement it when it becomes less available (Degenhardt et al. 2005). If this were the case, patterns in the use of benzodiazepines over time could thus be expected to either mirror or be inversely related to patterns of heroin use. This is explored in Figure 1, in which the measures of drug use overlap.

Heroin use rose between 1999 and 2000 to a high of 33.9 percent and then declined to 15.1 percent in 2005.

Benzodiazepine use followed the same general pattern with an increase between 1999 and 2000 to 19 percent, and then a decline to 10.2 percent. Amphetamine use increased between 1999 and 2001 to a high of 46.7 percent and then started a gradual decline to 2005, although use between 2003 and 2004 remained almost stable.

Self-reported dependence

Respondents were asked whether they had felt they needed or were dependent on particular drugs in the previous 12 months. Approximately one in four (26.6%) illegal benzodiazepine users had felt dependent on benzodiazepines; 61.8 percent of heroin users had felt dependent on heroin and 25.6 percent of amphetamine users had felt dependent on amphetamines.

Injecting

Almost one in five (18.7%) of those who had used illegal benzodiazepines during the past 12 months had injected them. The average number of injections during the past 30 days was 6.9 (median 1) ranging from 0 to 300. It is not possible to tell what proportion of users had injected legally obtained benzodiazepine because of differing time frames. Figures show that some non-users and some users of only legal benzodiazepines in the previous week/fortnight self-reported injecting benzodiazepines in the previous 12 months.

Discussion

Benzodiazepines are commonly prescribed for a range of anxiety and associated disorders, but are often diverted for non-medical purposes. Considerable harm can be associated with their misuse, but little is known about this in populations other than IDU. This paper investigated self-reported prevalence, patterns of use and potential harms of benzodiazepine use in a sample of police detainees. The data were

gathered between 1999 and 2005. Of the total sample of almost 13,000 respondents (83.2% male), around 13 percent had used prescribed benzodiazepines in the previous week/fortnight, most commonly diazepam, although temazepam, oxazepam, flunitrazepam and alprazolam were also commonly used. Use of prescribed diazepam and alprazolam increased over the period, temazepam and flunitrazepam decreased and oxazepam remained relatively stable. This may reflect reduced prescription of flunitrazepam because of concerns about its use as a 'date rape' drug (Dobbin 1997) and the removal from the market in 2004 of temazepam gel caps because of vascular damage incurred by injecting that preparation (VDCPC 2006).

Almost 18 percent of the DUMA sample had used benzodiazepines in the previous month and 15 percent had used illegal benzodiazepines in the previous 12 months. The majority of illegal benzodiazepine users had also used heroin and/or amphetamines in the same time frame. Benzodiazepine use was marginally more likely to be found in combination with amphetamines than with heroin. Figure 1 shows that the pattern of illicit benzodiazepine use over time was similar to that of heroin but different from amphetamine use.

Female detainees were more likely to have used most drugs than male detainees, and more commonly used benzodiazepines and heroin and combinations including heroin, than did men, who more commonly used amphetamines. Benzodiazepine users were similar to other illicit drug users on a range of social and criminal history variables as well as the nature of the most serious offence with which they were charged. Respondents who used all three illicit drugs in the same year tended to be the most socially disadvantaged.

It can be said that, in general, some of the concerns expressed in the

literature about non-medical use of benzodiazepines have been illustrated in this study. DUMA data showed high rates of legal and illegal use of benzodiazepines among detainees and the distinction between the two was somewhat blurred. Benzodiazepine use was associated with a range of harms, not least dependence, as well as the potential for overdose when used in combination with opiates.

The extent of self-reported benzodiazepine dependence was much lower than that for heroin, and similar to that for amphetamines. While one in five respondents had injected benzodiazepines, some of this may have been with prescribed benzodiazepines. The potential for overdose associated with use of combinations of depressants such as heroin, alcohol and benzodiazepines was clearly present but could not be quantified.

Illegal benzodiazepines were used more generally than just with heroin, however, and their use may be a marker of broader illicit drug use. The characteristics of illegal benzodiazepine users were similar to those of other illicit drug users. Data to show the extent to which benzodiazepines may also have been used as self-medication, to deal with anxiety and other conditions associated with marginal lifestyles, are not available from DUMA.

Injection of benzodiazepines can be associated with serious health problems – including the risk of blood-borne viruses – and the extent of injection, despite the removal of temazepam gel caps and associated user education, is worrying. Comparable data, for example from IDRS, are not available, so it is not known whether those injecting have similarities in terms of their characteristics and criminal involvement.

While there is a multitude of ways in which information about the harms associated with non-medical benzodiazepine use is made available to users, health professionals and the

general community (VDCPC 2006), there are few good evaluations of such programs (Loxley et al. 2004). There is, as the VDCPC claims, a need to review current provisions and uptake of educational programs which target groups such as people who misuse benzodiazepines.

Finally, the prevalence of benzodiazepine use among women is cause for concern, although perhaps not surprising. Women in the criminal justice system tend to be more heavily involved with drugs than men and problematic drug use is often linked to victimisation, mental health problems, drug and alcohol abuse among family members, and delinquency (Johnson 2004). Early intervention in the community, particularly with high risk families, is needed to reduce social disadvantage and harmful drug and alcohol use, and to minimise the transmission of harmful drug and alcohol use and offending to further generations (Johnson 2004).

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References

All URLs were correct at April 2007

- Australian Bureau of Statistics (ABS) 1997. *Australian standard offence classification*. ABS cat. no. 1234.0. Canberra: ABS. <http://www.abs.gov.au/ausstats/abs@.nsf/cat/1234.0>
- Australian Institute of Health and Welfare (AIHW) 2005. 2004 National Drug Strategy household survey: detailed findings. *Drug statistics series* no. 13. Canberra: AIHW. <http://www.aihw.gov.au/publications/index.cfm/title/10190>
- Breen C et al. 2004. The effects of restricting publicly subsidized temazepam capsules on benzodiazepine use among injecting drug users in Australia. *Medical journal of Australia* 181(6): 300–305
- Darke S & Zador D 1996. Fatal heroin 'overdose': a review. *Addiction* 91(12): 1,765–1,772
- Degenhardt L et al. 2005. Effects of a sustained heroin shortage in three Australian states. *Addiction* 100(7) 908–920
- Dobbin M 1997. *Flunitrazepam (Rohypnol, Hypnodorm)*. Melbourne: Victorian Department of Human Services

Gerostamoulos J, Staikos V & Drummer OH 2000. Heroin-related deaths in Victoria: a review of cases for 1997 and 1998. *Drug and alcohol dependence* 61: 123–128

Johnson H 2004. Key findings from the drug use careers of female offenders study. *Trends & issues in crime and criminal justice* no. 289. <http://www.aic.gov.au/publications/tandi2/tandi289.html>

Loxley W et al. 2004. *The prevention of substance use, risk and harm in Australia: a review of the evidence*. Canberra: Department of Health and Ageing. [http://www.health.gov.au/internet/wcms/publishing.nsf/content/health-pubhlth-publicat-document-mono_prevention-cnt.htm/\\$file/mo_prevention.pdf](http://www.health.gov.au/internet/wcms/publishing.nsf/content/health-pubhlth-publicat-document-mono_prevention-cnt.htm/$file/mo_prevention.pdf)

Makkai T 1999. *Drug use monitoring in Australia (DUMA): a brief description*. Research and public policy series no. 21. Canberra: Australian Institute of Criminology. <http://www.aic.gov.au/publications/rpp/21/index.html>

Ross J, Darke S & Hall W 1997. Transitions between routes of benzodiazepine administration among heroin users in Sydney. *Addiction* 95(12): 1,785–1,793

Stafford J et al. 2006. Australian drug trends 2005: findings from the Illicit Drug Reporting System (IDRS). *NDARC monograph* no. 59. Sydney: National Drug and Alcohol Research Centre, University of New South Wales

Victoria. Parliament. Drugs and Crime Prevention Committee (VDCPC) 2006. *Inquiry into the misuse/abuse of benzodiazepines and other forms of pharmaceutical drugs in Victoria: interim report*. Melbourne: VDCPC. http://www.parliament.vic.gov.au/dpcp_new/inquiries/pharmaceuticalmisuse/DCPC-Report_Benzo_2006-08-24.pdf

For a full list of publications from the DUMA program, see <http://www.aic.gov.au/research/duma/>

Additional recent references on benzodiazepine use in Australia from the CINCH database

- Australasian Centre for Policing Research 2004. *Testing drivers for drugs other than alcohol at the kerbside: current issues*. Adelaide: ACPR
- Baker A et al. 2005. Brief cognitive behavioural interventions for regular amphetamine users: a step in the right direction. *Addiction* 100: 367–378
- Darke S et al. 2007. Changes in the use of medical services and prescription drugs among heroin users over two years. *Drug and alcohol review* 26(2): 153–159

Dietze P et al. 2004. *The course and consequences of the heroin shortage in Victoria*. NDARC technical report no. 206. Sydney: NDARC

Drug and Alcohol Services South Australia 2006. *Royal Adelaide Hospital emergency department Designer Drug Early Warning System (D2EWS): 12-month technical report*. Research monograph no. 19. Parkside SA: DASSA

Harrison A et al. 2004. *The course and consequences of the heroin shortage in South Australia*. NDARC technical report no. 205. Sydney: NDARC

Johnson H 2006. Drug use by incarcerated women offenders. *Drug and alcohol review* 25(5): 433–437

Kelly E, Darke S & Ross J 2004. A review of drug use and driving: epidemiology, impairment, risk factors and risk perceptions. *Drug and alcohol review* 23(3): 319–344

Mouzos J & Smith L 2006. Drug use among police detainees, 2005. *Trends & issues in crime and criminal justice* no. 319

Mouzos J, Smith L & Hind N 2006. *Drug use monitoring in Australia: 2005 annual report on drug use among police detainees*. Research and public policy series no. 72. Canberra: Australian Institute of Criminology

Thein H, Maher L & Dore G 2004. Drug use trends among injecting drug users (IDU): findings from the Australian Needle and Syringe Program (NSP) Survey, 1999–2003. *Drug trends bulletin* Oct