BRIEFING NOTES PROVIDED TO STANDING COMMITTEE ON FAMILY AND COMMUNITY AFFAIRS INQUIRY INTO SUBSTANCE ABUSE IN AUSTRALIAN COMMUNITIES

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The Institute has carried out a series of studies on fatally injured drivers over the last 10 years, both in Victoria as well as NSW and Western Australia. The aims of the study were to establish the incidence and role of drugs other than alcohol in causing crashes.

These notes supplement the PowerPoint presentation to the committee given on September 23, 2002.

There is increasing interest throughout the world concerning the incidence of drugs in driving and in their contribution to road trauma specifically. The most common drugs (other than alcohol) found in fatally injured drivers have been cannabis, benzodiazepines, amphetamine-like stimulants and opioids. A number of reports have detailed the incidence of drugs in fatally injured drivers around the world (1-14). A number of jurisdictions have reported increases in the proportion of drivers using drugs (15-18). Preliminary data has also suggested similar trends in Australia (19, 20).

The most controversial aspect of the involvement of drugs in accident causation is that of cannabis. Previous reports of Australian drivers have relied on coroners' records in which forensic laboratories only measured the inactive form of cannabis (carboxy-Δ^9-THC). Following the use of cannabis, this species is present in blood for up to several days and therefore its presence cannot be used to imply recent use of cannabis, and therefore likely impairment. Since 1998, the Australian forensic laboratories used in the study have measured THC routinely in fatal road crashes.

The purpose of this study was to establish the incidence and extent to which drugs contributed to fatal motor vehicle accidents. This study presents the results of a 10-year research project involving a number of collaborating centred over three Australian States. In total 3398 drivers were included in this study (21).

Materials and Methods

The study population consisted of drivers killed in motor vehicle accidents in the three Australian states of Victoria (VIC), New South Wales (NSW) and Western Australia

(WA). In VIC these data were obtained from records kept at the Victorian Institute of Forensic Medicine and the State Coroner's Office at Southbank. Drivers were identified on the basis of records obtained from the Victorian Institute of Forensic Medicine. These cases included Victorian drivers killed in road crashes from 1990 to 1999.

In NSW, Coroner's case numbers and names of persons killed in motor vehicle accidents between January 1991 and March 1993, and from 1995 to 1999 were obtained from records kept at the Coroners' Courts in Glebe and at Westmead, Sydney. Drivers were identified on the basis of records obtained from the State Coroner's Office and included regional cases, except for cases accessed in 1995 and 1996 which only included the wider Sydney district.

In WA, information on drivers killed in motor vehicle crashes between 1990 and 1992 and from 1995 to end 1999 was obtained from records kept at the Perth Coroner's Office. Drivers were identified on the basis of records obtained from the toxicology section of the Chemistry Centre. These cases included all Western Australian drivers killed in road crashes in these periods. Ethics permission to conduct these WA studies was obtained from the Perth Coroners Office.

Drugs administered to the deceased as part of medical treatment were not included in the analysis. In most cases involving hospitalisation, cases were excluded from the study since often toxicology testing had either not been conducted at all, or was not conducted on relevant antemortem specimens.

Those cases classified as having died from natural causes or as a result of suicide, were excluded from the analysis. Cases were also excluded if there were long delays (>4 hours) from the crash to their death or a relevant specimen was not obtained in hospital within this time frame.

Summary of Main Outcomes

Incidences of alcohol and drugs

1. Number of driver fatalities studied were 3398 covering Victoria, NSW and WA from 1990-1999.
2. Incidence of alcohol (≥0.05%) in Victoria was 26.2 %
3. Incidence of alcohol in all three states was 29.1 %.
4. Incidence of drugs other than alcohol in Victoria was 28.2 %
5. Incidence of drugs in all three states was 26.7%
6. Incidence of cannabis in all three states was 13.5%, of which a little over half are confirmed positive to THC. The incidence of cannabis use was highest in motorcyclists at 22.2%.
7. Incidence of opiates in all three states was 4.9%
8. Incidence of stimulants in all three states was 4.1%. The incidence was highest in truck drivers at 23.0%.
9. Incidence of benzodiazepines in all three states was 4.1%.
10. The incidence of alcohol in all drivers declined from early 1990s to late 1990s, from 33.0% to 27.7%.

11. The incidence of drugs increased from early 1990s to late 1990s from 22.2% to 30.1%.

Crash Risk Analysis

12. Drivers positive to alcohol were six times more likely to be culpable than drug free drivers ($P<0.05$).
13. Drivers positive to any drug or drug combination were 1.7 times more likely to be culpable ($P<0.05$).
14. Drivers positive to psychoactive drugs of any type were 1.8 times more likely to be culpable ($P<0.05$).
15. Drivers positive to the active form of cannabis, Δ^9-tetrahydrocannabinol (THC) were significantly more likely to be culpable than drug free drivers, by a factor of 2.7.
16. This occurred at blood concentrations ranging from 1 to 100 ng/mL (median 10 ng/mL) for which impairment is expected from psychometric and other performance studies conducted on the drug.
17. Drivers positive to THC at 5 ng/mL or higher blood concentrations were 6.6 times more likely to be culpable than drug free drivers ($P<0.05$).
18. Drivers positive to alcohol and THC increased their culpability rate proportional to the individual effects of alcohol and THC. That is, THC increased the culpability rate over alcohol alone.
19. Drivers positive to stimulants alone had an increased culpability rate of 2.3 ($P>0.05$), but this increased substantially in truckers to 8.8 ($P<0.05$).
20. Drivers positive to benzodiazepines or opiates had slightly elevated culpability rates (1.3 and 1.4, respectively), but these were not significantly different.

Other drug driving data

The Institute has been involved in a number of other studies to investigate the role of drugs in crash risk.

Victoria Police using the provisions of the Road Safety Act (1985) amendments of 2000 apprehend drivers suspected of driving while impaired by drugs. These drivers have been subject to a standardised sobriety assessment by trained officers. In the first 200 cases analysed the incidence of drugs is over 96%. These comprise cannabis (30%), opioids such as morphine (heroin) and methadone (43%), benzodiazepines (Valium and related drugs) (64%) and amphetamines (8%).

These data are similar to incidences of drugs found in drug impaired drivers apprehended in the USA and Europe.

Injured drivers and pedestrians taken to the Alfred hospital have had their blood analysed for drug content. Preliminary data on almost 400 cases show similar drugs to those found in fatally-injured drivers and in drug-impaired drivers. The incidences of benzodiazepines, amphetamines, cannabis (as THC) and opioids are 9.5%, 4.9%, 8.5% and 8.0%, respectively.

Overall Conclusions

These data show a large range of psychoactive drugs produce an increase in crash risk. This is particularly significant for drivers positive to recent use of cannabis (THC detected in blood) and to drivers using two or more psychoactive drugs. The cannabis effects on risk are concentration dependent and produce increases in crash risk similar to alcohol over 0.1 gram/100 mL.

With a current incidence in drivers of cannabis of some 16% and overall of psyhoactive drugs of some 28% the impact on road trauma is significant. Estimates suggest at least 8% of drivers are driving whilst impaired. This compares to alcohol positive drivers of some 26% nationally. The concomitant use of alcohol produces further significant increases in crash risk.

All of the drugs mentioned in this briefing to the committee (particularly cannabis, strong stimulants and benzodiazepines) have the potential to impair a range of skills required for safe driving including hand-eye coordination, reaction times, divided attention tasks, vigilance and cognitive functions. This includes cannabis when THC is present. The performance decrements associated with this drug has been well documented and occurs at the concentrations found in most of the THC-positive drivers detected in these studies. Their presence in drivers in concentrations relevant to their pharmacological effects is likely to produce some reduction in performance. Risk analysis confirms many of these observations, although it is relatively insensitive technique to establish performance decrement and crash risk.

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Table 1. Incidences of alcohol and drugs

Drug Group	% Total Driver Population
Drug and Alcohol Negative	(50.1)
Alcohol Positive <0.05	3.7
Alcohol Positive ≥0.05	29.1
Drug and Alcohol positive	9.6
All Drugs	26.7
All Psychoactive Drugs	23.5
Cannabis	13.5
Opioids	4.9
Stimulants	4.1
Benzodiazepines	4.1
Other psychoactive drugs	2.7
Non psychoactive drugs	6.2

Table 2. Prevalence of Alcohol and Drugs in Drivers by Year

Drug Group	1990-1993 % Total Driver Population	1994-96 % Total Driver Population	1997-99 % Total Driver Population
Drug and Alcohol Negative	50.9	51.6	48.7
Alcohol Positive <0.05%	3.3	4.1	3.7
Alcohol Positive ≥0.05%	33.0	26.9	27.7
Drug and Alcohol positive	9.0	8.9	9.8
All Drugs[1]	22.2	26.6	30.1
All Psychoactive Drugs	20.0	22.8	26.7
Cannabis	10.9	13.5	15.6
Opioids	3.4	4.1	6.6
Stimulants	3.6	3.5	4.8
Benzodiazepines	3.4	3.8	4.7
Other psychoactive drugs	2.1	3.0	3.0
Non psychoactive drugs	3.9	7.5	7.0

[1] all psychoactive drugs plus non-psychoactive drugs

Table 3. Statistical Summary of Cannabis Data Using Logistic Model

Parameter	Point estimate (OR)	95% Confidence Limits
Drug and alcohol free	1.0	-
All Drugs[1]	1.7*	1.3-2.2
THC-only[2]	2.7*	1.02-7.0
THC-only[2] ((≥5 ng/mL) in all drivers	6.6*	1.5-28
THC plus BAC (≥0.01 g%) vs BAC in all drivers[3]	2.9*	1.1-7.7
THC plus BAC (≥0.01 g%) vs BAC in motor cyclists[3]	2.4	0.5-12

1 any cases involving a detected drug (alcohol interactions considered), 2 no other drugs or alcohol present in case, 3 no other drugs present, * Indicates significant difference at α=0.05 level.

Table 4. Statistical Summary of Drug Data Using Logistic Model

Parameter	Point estimate (OR)	95% Confidence Limits
Drug and alcohol free	1.0	-
All Psychoactive drugs[3]	1.80*	1.3-2.4
Psychotropics plus BAC (≥0.05 g%) vs BAC	1.70*	1.3-2.3
Stimulants (all drivers)[1]	2.27	0.9-5.6
Stimulants (truckers)[1,3]	8.83*	1.00-78
Benzodiazepines[1]	1.27	0.5-3.3
Opiates[1]	1.41	0.7-2.9
Other psychoactive drugs[1]	3.78*	1.3-11
Miscellaneous drugs[1]	1.47	0.8-2.7

[1] no other drugs or alcohol present in case,
[2] any cases involving a detected drug (alcohol interactions considered),