TASK FORCE ON DRUG ABUSE

Statistical Bulletin Number 1, May 1996

DRUG-RELATED TRAFFIC FATALITIES IN WESTERN AUSTRALIA

This is the inaugural issue in a new series of Statistical Bulletins that will be published on a regular basis to provide summaries of information garnered through surveys, drug data reporting systems and research projects to provide Western Australians with information about drug-related problems.

There is no single commonly accepted and understood term that covers all the substances discussed in this Bulletin. Some of the terms that are often used have a variety of interpretations and might also relate to other products or substances beyond those discussed here. We have therefore chosen to use the term *central nervous system (CNS)-acting*, although all the substances about which concern is expressed might more commonly be described as *mood-altering substances*.

In this State we have a high quality data system operated by the Chemistry Centre which underpins coronial investigations into the cause of traffic fatalities (and other sudden deaths). This Bulletin presents an analysis of information in relation to traffic fatalities, where drugs which are known to cause significant interference with the capabilities of a road user have been detected.

As much of the premature mortality involved young people, it is important that we broaden the community's understanding of the risks from the consumption of CNS-acting drugs and road trauma.

Introduction

Last year 209 people were killed as a result of traffic accidents in Western Australia (Table 1, page 1). As a community we devote substantial resources to prevent as well as ameliorate the consequences of road trauma. In addition, the pain and distress suffered by traffic accidents victims and their families cannot be measured in monetary terms

The magnitude of this harm is illustrated in the 1995 Annual Report the Traffic Board of WA, which stated: *"Each year approximately 36,000 road crashes are reported to or attended by police throughout Western Australia. The annual cost of these crashes to the community is estimated to exceed $1 billion"*.

The term *traffic fatality* as used in this Bulletin conforms with the standard meaning as determined by the Federal Office of Road Safety. In accordance with this meaning, the data presented refer to any individual killed, regardless of whether they were the driver of any motor vehicle (which includes motor cycles or bicycles), a passenger of any motor vehicle, or a pedestrian killed by a motor vehicle.

The information provided below is intended to inform not only decision-makers but also the community at large.

Readers should understand that it may be difficult to ascertain the extent to which any of the particular CNS-acting drugs detected by forensic analysis, either singly or in combination, contributed to a traffic fatality.[1]

It is also recognised that determination of driving impairment caused by cannabis solely by reference to carboxytetrahydrocannabinol (THCA) level, the major metabolite, may be confounded by the continuing presence of THCA which may persist in the blood at low levels for several weeks after use.[2]

Much of this bulletin is devoted to discussion of substances other than alcohol, as there is evidently a need for more public education in this area. This should, however, not imply any lack of concern about drink-driving.

Table 1: Annual traffic fatalities Western Australia, 1985 - 1995

Year	All fatalities	CNS acting drugs	
		n	%
1985	243	14	5.8
1986	228	15	6.6
1987	213	24	11.3
1988	230	25	10.9
1989	242	18	7.4
1990	196	37	18.9
1991	207	47	22.7
1992	200	38	19.0
1993	209	43	20.6
1994	211	64	30.8
1995	209	68	33.5

Source: Coroner's Court, Chemistry Centre

It is therefore not possible to determine how recent cannabis use has been, although it is reasonable to express concern at the likely extent of cannabis use, either alone or together with other substances, in those who drive and place themselves and others at risk.

It should also be noted that further research is required as to the residual effects of cannabis, alone or in conjunction with other CNS-acting drugs, on people required to perform complex tasks, such as operating machinery and driving motor vehicles

While the data summarised in this Bulletin may not conclusively support causality, there are grounds for serious concern because of a close association between increased levels of drug use and the ability to perform complex activities, such as driving motor vehicles and operating plant and equipment.[3]

The major findings are summarised on page 8. It is not possible in this short Bulletin to discuss all the implications, but the following conclusions may perhaps be drawn.

1) There is cause for serious concern about the use of any CNS-acting drugs in conjunction with driving.

2) It is vital to maintain the impetus on reducing the heavy toll from drink driving.

3) There is also significant cause for concern about driving following the use of cannabis and other CNS-acting drugs, whether alone or in combination.

4) In addition to Traffic Code enforcement issues, there is a need for public education on:

   - alcohol and driving;
   - cannabis use and driving; and
   - any use of either alcohol and cannabis in combination and driving.

5) There is the need for a special emphasis on preventive measures directed towards young adults in the 15-24 age group, especially young males.

Table 2: Quarterly traffic fatalities with one or more CNS-acting drugs detected July 1992 - December 1995

Year	Quarter	All drugs	Cannabis	
		n	n	%
1992	3	11	8	72.7
	4	14	5	35.7
1993	1	10	4	40.0
	2	10	5	50.0
	3	9	2	22.0
	4	12	6	50.0
1994	1	11	6	54.5
	2	14	4	28.6
	3	21	13	62.0
	4	18	7	38.0
1995	1	15	6	40.0
	2	17	9	53.0
	3	20	7	37.0
	4	16	10	62.0
Total		**197**	**92**	**47.0**

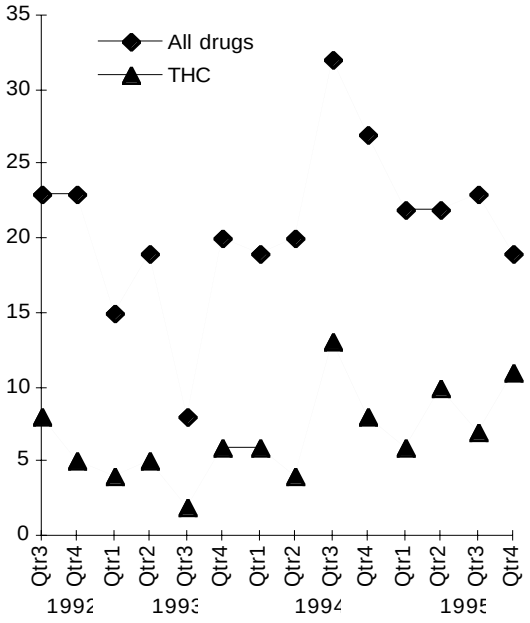
Source: Coroner's Court, Chemistry Centre
Note: CNS-acting = central nervous system-acting drugs

Table 3: Number of traffic fatalities with THCA detected July 1992 - December 1995

	10-14	15-19	20-24	25-29	30-34	35-39	40+	Missing	All ages
Males	1	20	32	9	11	2	2	4	81
Females	-	6	5	2	1	-	-	-	14
Persons	1	26	37	11	12	2	2	4	95

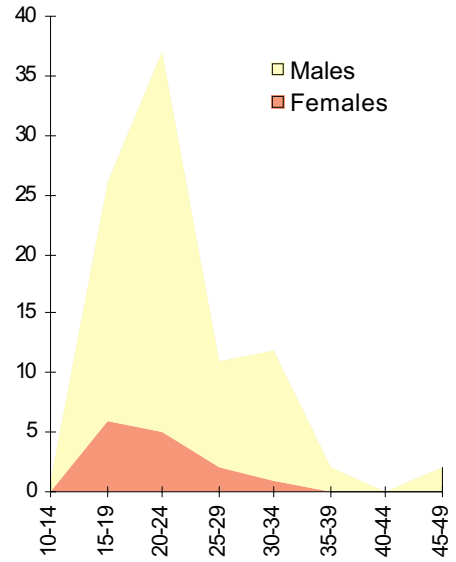
Source: Coroner's Court, Chemistry Centre
Note: THCA = carboxytetrahydrocannabinol

Figure 2: Quarterly traffic fatalities % all drugs and THCA detected July 1992 - December 1995



Source: Coroner's Court, Chemistry Centre

Figure 3: Frequency distribution of traffic fatalities (THCA detected) by sex and age group, July 1992 - December 1995



Source: Coroner's Court, Chemistry Centre

Commentary

There is an indication that CNS-acting drugs may have been having an increasing impact on traffic fatalities in this State. CNS-acting drugs include prescription drugs (eg anti-depressants, tranquillisers and sedatives) and illicit drugs (eg cannabis, psychostimulants and opioids).

Over the period 1985 - 1995 there was an increase in the proportion of traffic fatalities involving CNS-acting drugs. In 1985 out of 243 fatalities CNS-acting drugs were detected in 14 cases (6%). By 1995, out of 209 fatalities, 68 cases (32%) involved CNS-acting drugs (Table 1, page 1; Figure 1, page 3).

The widespread use of marijuana reported in community-based prevalence surveys may suggest a perception that this drug is of low harm in respect to driving. Therefore it is incumbent on policy makers to initiate public education programs and other measures to ensure that young adults intoxicated after using cannabis do not drive.

The test used to determine the presence of cannabis is by an analytical method by means of solvent extraction, conversion to a derivative and analysis by gas chromatography mass spectroscopy, by targeting carboxytetra-hydrocannabinol (THCA), the drug's major metabolite.

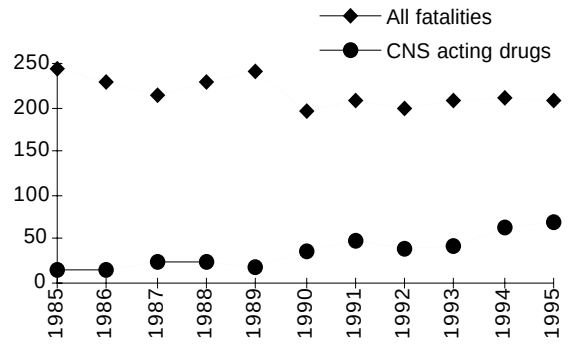
Similarly, while much discussion focusses on cannabis because of its high prevalence, there are clear concerns about opioids (although a significant proportion of that detected may be codeine from compound analgesics) and psychostimulants.

July 1992 - December 1995

From July 1992 to December 1995, the period for which detailed information is available, there was a total of 197 fatalities where CNS-acting drugs (including alcohol) were identified, of which 95, nearly half, involved THCA (Table 2, page 2). Of the 95 cannabis fatalities, 52% involved THCA and alcohol, 12% involved THCA and other drugs (excluding alcohol) and 28% involved THCA alone (Table 2, page 2).

This information indicates that over the 42 month period there has been an overall increase in the proportion of cases where THCA was detected in all fatalities involving CNS-acting drugs. This increase was particularly noticeable since the September

Figure 1: Annual traffic fatalities Western Australia, 1985-1995



Source: Coroner's Court, Chemistry Centre

1994 quarter. By the December 1995 quarter nearly 6 out every 10 traffic fatalities where CNS-acting drugs were detected involved cannabis (Figure 2, page 3).

It is unclear whether this increase reflects increased consumption by cannabis users. However, it would seem changes in sampling procedures are unlikely to be a significant reason.

Prior to mid 1993 the presence of THCA was usually only ascertained if urine samples were available, or if an investigating officer had specifically requested an analysis for the presence of the drug. The Chemistry Centre has suggested that prior to the introduction of testing for THCA as a standardised procedure in mid 1993, approximately 20% of cases where THCA was likely to have been present were not examined.

There are a number of findings in relation to the 95 traffic fatalities that occurred in this State over the 42 month period from July 1992 to December 1995 where THCA was detected (Table 3, page 2):

- there was a preponderance of males, accounting for 85% of these fatalities;
- these deaths largely involved persons in the 15 to 24 year age range;
- by class of vehicle occupant, 42 (44%) were motor vehicle drivers, 16 (17%) were motor cycle riders, 26 (27%) were passengers, and 9 (10%) were pedestrians (with 2 (2%) unknown cases).

There was a difference in the frequency of distribution of age groups according to sex. Female fatalities peaked in the 15-19 age group whereas male fatalities peaked in the 20-24 age group (Figure 3, page 3).

It is unclear whether these patterns reflect different life cycle influences for the sexes. There were a number of findings in relation to THCA levels in females (Table 4, page 4) and males (Table 5, page 5):

- about 15% of both males and females had low THCA levels of 10 ug/L or less;
- 41% of males and 57% of females had moderate THCA levels, of between 10 - 29 ug/L; and
- there was a greater proportion of males with high THCA levels, of 30 ug/L and over, compared to females.

There is an indication that the heaviest THCA levels involved males in the 15-24 age range. In the 15-19 and 20-24 age groups where THCA was present, 55% and 31% of fatalities respectively involved readings in the range of 30 ug/L and over (Table 5, page 5). The impact of these levels on the 15-19 year old age group in relation to the driving impairment warrants further investigation.

The difference between the sexes in the frequency of THCA levels is illustrated in Figure 4 (page 5). There were only 4 (29%) females with readings in the range of 30 ug/L and over, compared to the 35 (43%) of male fatalities with levels in the range of high THCA readings.

Table 4: Frequency distribution of female THCA levels by age group in traffic fatalities, July 1992 - December 1995

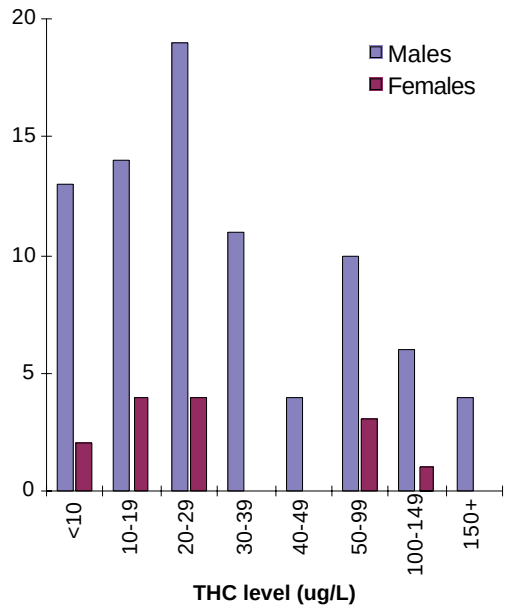
THCA (ug/L)	10-14	15-19	20-24	25-29	30-34	35-39	40+	All ages
<10	-	-	2	-	-	-	-	2
10-19		1	1	1	1	-	-	4
20-29	-	2	1	1	-	-	-	4
30-39	-	-	-	-	-	-	-	-
40-49	-	-	-	-	-	-	-	-
50-99	-	2	1	-	-	-	-	3
100-149	-	1	-	-	-	-	-	1
150+	-	-	-	-	-	-	-	-
Total	-	6	5	2	1	-	-	14

Source: Coroner's Court, Chemistry Centre

The existence of levels of alcohol in many of these fatalities also raises the possibility of interactive effects of intoxication from both alcohol and THCA.[4] A breakdown of the blood alcohol concentration (BAC) levels by THCA levels in relation to the 95 fatalities where THCA was detected is contained in Table 6 (page 6). These findings include:

- 11 (73%) female fatalities had BAC readings below 0.08;
- 4 (27%) female fatalities had BAC levels greater than 0.15, the legal threshold for the more serious offence of driving under the influence;
- 36 (45%) of male fatalities had BAC readings below 0.08; and
- 28 (35%) of male fatalities had elevated BAC levels greater than 0.15.

Figure 4: Frequency distribution by sex of THCA levels in traffic fatalities July 1992 - December 1995



Source: Coroner's Court, Chemistry Centre

The distribution of BAC readings by sex (Figure 5, page 7) pinpoints a pattern of heavy alcohol use by young males. A number of surveys have consistently pinpointed high rates of high risk alcohol consumption by young adults, and this is expected to be reflected in traffic fatalities.[5]

A breakdown of the 95 THCA-related fatalities by class of accident indicates that nearly two-thirds involved individuals who were drivers and just over one-quarter were passengers (Table 7, page 6).

On the basis of this information there is a need for further investigation of the patterns of THCA use in relation to passengers, as our data found that half of passengers were aged less than 20 years. Drink driving data indicates similar BAC levels occur in young drivers where passengers have been killed.

Recent research from the Netherlands has highlighted the significance of concurrent alcohol and cannabis use, concluding that *"the combined effects on drivers' performance could well be greater than the sum of either drug acting separately"*.[6]

Preventive campaigns will need, therefore, to address this aspect of the interactive effect of cannabis in association with other CNS-acting drugs, especially alcohol.

The information obtained from this research indicates particular concern about male drug use patterns, as indicated in Figure 6 (page 7). Given the significant number of young adult males who have both elevated THCA (ie greater than 10 ug/L) and BAC levels, preventive campaigns and enforcement measures need to be targeted at this specific group.[7]

The recently released report of the Victorian Drug Advisory Council recommended that *"research should be funded to establish a test for short-lived metabolites of cannabis products in*

Continued on page 7

Table 5: Frequency distribution of male THCA levels by age group in traffic fatalities, July 1992 - December 1995

THCA (ug/L)	10-14	15-19	20-24	25-29	30-34	35-39	40+	Missing	All ages
<10	-	3	6	1	2	-	-	1	13
10-19	-	3	6	2	3	-	-	-	14
20-29	-	3	10	2	1	-	1	2	19
30-39	1	4	3	1	1	1	-	-	11
40-49	-	1	3	-	-	-	-	-	4
50-99	-	5	1	-	3	1	-	-	10
100-149	-	-	3	2	1	-	-	-	6
150+	-	1	-	1	-	-	1	1	4
Total	1	20	32	9	11	2	2	4	81

Source: Coroner's Court, Chemistry Centre

Table 6: Frequency distribution of THCA levels by BAC levels in traffic fatalities July 1992 - December 1995

	Blood alcohol concentration									
THC ug/L	**0-0.03**	**0.04-0.07**	**0.08-0.11**	**0.12-0.15**	**0.16-0.19**	**0.20-0.23**	**0.24-0.27**	**0.28-0.31**	**>0.32**	**Total**
Females										
<10	2	-	-	-	-	-	-	-	-	2
10-19	3	-	-	-	1	1	-	-	-	5
20-29	3	-	-	-	-	1	-	-	-	4
30-39	-	-	-	-	-	-	-	-	-	-
40-49	-	-	-	-	-	-	-	-	-	-
50-99	2	-	-	-	1	-	-	-	-	3
100-149	1	-	-	-	-	-	-	-	-	1
150+		-	-	-	-	-	-	-	-	-
All females	**11**	**-**	**-**	**-**	**2**	**2**	**-**	**-**	**-**	**15**
Males										
<10	6	-	2	1	1	2	-	-	-	12
10-19	6	1	-	2	3	2	-	-	-	14
20-29	9	-	1	2	3	3	1	-	-	19
30-39	8	-	-	-	2	-	-	1	-	11
40-49	1	-	2	1	-	-	-	-	-	4
50-99	3	-	1	2	2	1	-	1	-	10
100-149	1	-	-	-	1	3	-	1	-	6
150+	1	-	-	2	-	1	-	-	-	4
All males	**35**	**1**	**6**	**10**	**12**	**12**	**1**	**3**	**-**	**80**
Persons										
<10	8	-	2	1	1	2	-	-	-	14
10-19	9	1	-	2	4	3	-	-	-	19
20-29	12	-	1	2	3	4	1	-	-	23
30-39	8	-	-	-	2	-	-	1	-	11
40-49	1	-	2	1	-	-	-	-	-	4
50-99	5	-	1	2	3	1	-	1	-	13
100-149	2	-	-	-	1	3	-	1	-	7
150+	1	-	-	2	-	1	-	-	-	4
All persons	**46**	**1**	**6**	**10**	**14**	**14**	**1**	**3**	**-**	**95**

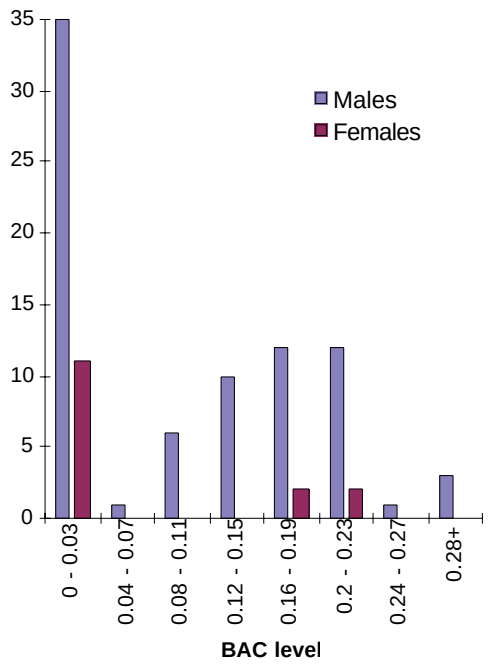
Source: Coroner's Court, Chemistry Centre

Table 7: Number of traffic fatalities with THCA detected by age and class of accident July 1992 - December 1995

Class	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**Missing**	**Total**	**%**
Driver	-	8	19	4	8	-	-	1	2	42	44.2
Motor cycle	-	2	8	2	3	1	-	-	-	16	16.8
Passenger	1	12	6	2	1	1	-	1	2	26	27.4
Pedestrian	-	4	3	2	-	-	-	-	-	9	9.5
Unknown	-	-	1	1	-	-	-	-	-	2	2.1
Total	**1**	**26**	**37**	**11**	**12**	**2**	**-**	**2**	**4**	**95**	**100.0**

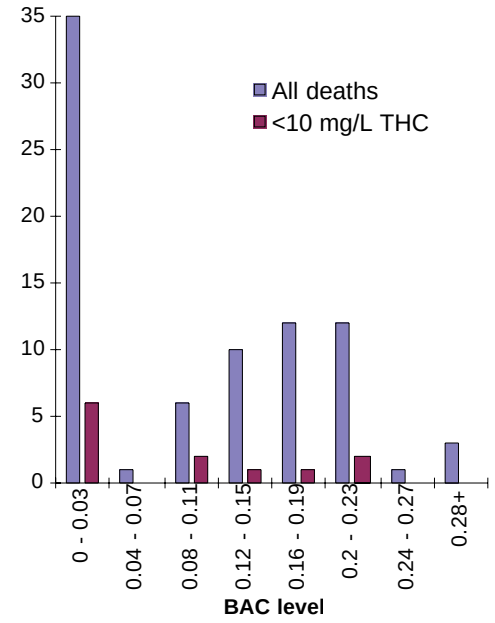
Source: Coroner's Court, Chemistry Centre

Figure 5: Frequency distribution of traffic fatalities (THCA detected) by sex and BAC levels, July 1992 - December 1995



Source: Coroner's Court, Chemistry Centre

Figure 6: Frequency distribution of male THCA levels by BAC levels in traffic fatalities, July 1992 - December 1995



Source: Coroner's Court, Chemistry Centre

saliva or breath, to allow, in due course, the introduction of road side testing for cannabis and in a manner comparable to alcohol breath testing".

This would indeed be a welcome development. There are, however, peculiar difficulties posed in relation to detection of THCA, as the presence of the drug is most reliably detected through analysis of blood specimens.[8] Unfortunately, there is at present no certainty that a simple test can be developed in the near future.

References

[1] Cf Drummer OH. *The use of responsibility analysis to investigate the contribution of drugs to driver road deaths in Western Australia.* VIFP Report No. 0494. Melbourne, Victorian Institute of Forensic Pathology, Department of Forensic Medicine, Monash University, 1994; Drummer OH. *Drugs in drivers killed in Australian road traffic accidents.* VIFP Report No. 0594. Melbourne, Victorian Institute of Forensic Pathology, Department of Forensic Medicine, Monash University, 1994.

[2] Baselt RC, Cravey RH. *Disposition of toxic drugs and chemicals in man.* (4th edition) Foster city, CA, Chemical Toxicology Institute, 1995

[3] Parliament, Victoria, Road Safety Committee. *The effects of drugs (other than alcohol) on road safety. First report incorporating collected papers.* Melbourne, Government Printer, 1995.

[4] Drummer O. *Drug use in fatal traffic accidents.* Paper presented at the Third International Conference on Injury Prevention and Control, Melbourne, 18-22 February 1996.

[5] Western Australian Task Force on Drug Abuse. *Protecting the community: the report of the Task Force on Drug Abuse, Vol. 2.* Perth, Ministry of Premier and Cabinet, 1995.

[6] Robbe HWJ. *Influence of marijuana on driving.* Maastricht, Institute for Human Psychopharmacology, University of Limburg, 1994, 176.

[7] Sugrue M et al. "Evaluation of the prevalence of drug and alcohol abuse in motor vehicle trauma in South Western Sydney". *Australian & New Zealand Journal of Survey*; 1995, 65, 853-6.

[8] Campbell NT. *Cannabis and driving offences - is there a case for a prescribed level?* Paper presented at WA police seminar 1989 (unpublished).

This issue was edited by Greg Swensen and produced by Susan Jones at the Task Force on Drug Abuse. The author may be contacted by email ***gswensen@highway1.com.au***.

We acknowledge the assistance given by Neil Campbell, Chief of the Forensic Science Laboratory and the Perth Coroner's Office.

The Task Force on Drug Abuse is in the Ministry of Premier and Cabinet and is located at Albert Facey House, 469 Wellington Street, Perth, Western Australia, 6000. Tel: 09 264 8244, Fax: 09 322 6546.

SUMMARY OF CNS-ACTING DRUGS AND ROAD FATALITIES, JULY 1992 - DECEMBER 1995

In the period July 1992 - December 1995 there were 197 traffic fatalities involving CNS-acting drugs, for which the most frequent CNS- acting drugs identified, either alone or in combination were:

- alcohol in 97 (49.2%) cases;
- cannabis in 95 (48.2%)cases;
- opioids in 46 (23.4%) cases (excluding opioids attributed to the admission to hospital); and
- psychostimulants in 22 (11.2%) cases.

Alcohol

Alcohol was detected in 97 cases:

- 7 (7.2%) involved alcohol alone;
- 49 (50.5%) involved alcohol and cannabis;
- 34 (35.1%) involved alcohol and other drugs (except cannabis); and
- 7 (7.2%) involved alcohol, cannabis and other drugs.

Cannabis

Cannabis was detected in 95 cases:

- 27 (28.4%) involved cannabis alone;
- 49 (51.6%) involved cannabis and alcohol; and
- 11 (11.6%) involved cannabis and other drugs (except alcohol).

Sex

Out of the 95 fatalities where cannabis was detected, 81 (85.3%) were males and 14 (14.7%) were females.

Age groups

These fatalities mostly involved young adults, in the 15-19 and 20-24 age groups; with the greatest number of female fatalities occurring in the 15-19 age group and the greatest number of male fatalities occurring in the 20-24 age group.

THCA levels

There was a pattern of lower levels of cannabis in females as compared to males. In relation to the presence of THCA at a level of less than 20 mg/L or less:

- 6 (42.9%) of the 14 female fatalities involved this range, and
- 27 (33.3%) of the 81 male fatalities involved THCA at or below this level.

Alcohol levels

There was a pattern of lower levels of blood alcohol concentrations (BACs) recorded for females compared to males:

- 35 (43.8%) of male BACs occurred in the range of less than 0.04%, and
- 11 (73.3%) of female BACs occurred in the 0.04% or lower range.

There was a clustering of male fatalities with BACs above the legal limit - with 34 (42.5%) of all male fatalities with BAC results in the range 0.08% to 0.23%.