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Cannabis Related Deaths in Western Australia 1997 – 2001

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1. Introduction

Registration of deaths in Australia is the responsibility of registrars of births, deaths and marriages in each state and territory, who provide information from the medical certificate of cause of death to the Australian Bureau of Statistics (ABS) for coding and compilation of statistics on causes of death.

The ABS codes causes of death according to the rules specified in the International Statistical Classification of Diseases and Related Health Problems (ICD) produced by the World Health Organisation (WHO). The primary purpose of cause of death coding is to identify the underlying (primary) cause or circumstance of death. *"The underlying cause of death is defined as the disease or injury which initiated the train of morbid events leading directly to death. To be classified as a drug induced death, the coroner must state that the death was a direct result of drug use."*[1]

Prior to 1997 the underlying cause of death was the only cause of death information available from the ABS. With the introduction of the tenth revision of ICD (ICD-10) and the automated coding system for processing deaths registered, multiple causes of death became available from 1st January 1997.

Multiple causes of death allows identification of deaths where the use of drugs is not only the underlying cause of death but may also be a contributory factor. The ABS usually defines drug-induced deaths as those cases where the underlying cause of death is directly attributable to drug use. Deaths where drugs are a contributory cause, for example, deaths from motor vehicle accidents where drugs were mentioned as an extra cause of death, or deaths from medical conditions caused by long-term drug use would be excluded.

This paper expands the method outlined in the ABS report on drug-induced deaths[2] to examine deaths where cannabis is mentioned as an underlying and/or an extra cause of death. It attempts to answer the question *"What role, if any, does cannabis play as either an underlying or contributory cause of death?"*

This question can now be addressed as the ICD-10 system has the potential to provide a greater degree of detail about the extent that cannabis may be involved in mortality in this State. According to the ICD-10 system the approach of coding mental and behavioural disorders due to psychoactive substance use is that

> *"The main diagnosis should be classified, whenever possible, according to the substance or class of substances that has caused or contributed most to the presenting clinical syndrome. Other diagnoses should be coded when other psychoactive substances have been taken in intoxicating amounts ... or to the extent of causing harm ... dependence ... or other disorders."*[3]

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[1] Australian Bureau of Statistics. *Drug-induced deaths – a guide to ABS causes of death data.* ABS Catalogue No. 4809.0.55.001. Canberra, Australian Bureau of Statistics, 2002, 22.

[2] Australian Bureau of Statistics. *Drug-induced deaths – a guide to ABS causes of death data.* ABS Catalogue No. 4809.0.55.001. Canberra, Australian Bureau of Statistics, 2002.

[3] World Health Organisation. *ICD-10. International statistical classification of diseases and related health problems, tenth revision. Volume 1.* Geneva, World Health Organisation, 1992, 320.

The ABS has developed a definition of a drug induced death as being *"Any death where the underlying cause of death was due to:*

- *An acute episode of poisoning or toxicity to drugs. Included are deaths from accidental overdoses due to misuse of drugs, intentional self harm, assault and deaths undetermined as to intent.*
- *An acute condition caused by drug use where the deceased person was identified as drug dependent."*[4]

The definition of a "drug" refers to drugs, medicaments or biological substances which may be used for medicinal or therapeutic purposes or be used to produce a psychoactive effect. The term "drug" excludes alcohol, tobacco and volatile substances but includes the misuse of regulated licit pharmaceutical drugs, drugs that may be purchased without a prescription and illegal substances.

The multiple cause of death coding available through the ICD-10 system supports research into the contribution of specific drugs and also the circumstances where drug use is a contributory cause. Multiple cause coding can provide additional information about deaths not coded as drug induced but where drugs were reported in the coroner's certificate of the cause of death.

For instance, the ABS paper gives the example of a person who may have taken an overdose of methadone and died as a result of accidental drowning. In this example the underlying cause would be coded as accidental drowning and the multiple cause data would be used to provide information about the methadone overdose.

2. Method

Death records for Western Australia over the period 1997 to 2001 were extracted for where there was any mention of cannabis in the underlying cause of death and/or the multiple cause of death fields. The underlying and multiple causes of death for the selected cases were examined, where there was any mention of either:

- mental and behavioural disorders due to use of cannabinoids (ICD-10 codes F12.0 to F12.9); or
- poisoning by cannabis (T40.7).

A list of the codes and sub codes used for the major groupings to identify cases if cannabis had been mentioned as a multiple cause of death is contained in Appendix 1.

3. Results

3.1 ICD-10 codes

In the period 1997 to 2001 a total of 78 cases in Western Australia (WA) were identified where there was any mention in the cause of death or any extra cause of death field involving either ICD-10 codes F12.0 to F12.9 or T40.7 (Table 1).

When the underlying causes of death for these 78 cases were examined, it was found that two broad groupings accounted for nearly 80% of these deaths:

- accidental poisoning by and exposure to noxious substances was responsible for 32 deaths (41%); and
- mental and behavioural disorders due to psychoactive substance use were responsible for 28 deaths (36%).

[4] Australian Bureau of Statistics. *Drug-induced deaths – a guide to ABS causes of death data*. ABS Catalogue No. 4809.0.55.001. Canberra, Australian Bureau of Statistics, 2002, 2.

Cannabis was found to be responsible[5] for only two deaths over the study period, one in 1999 due to cannabis dependence syndrome (F12.2) and one in 2000 due to an unspecified mental and behavioural disorder (F12.9).

However, in relation to the total of 78 cases, cannabis was mentioned as an extra cause of death in the reamining 76 cases, with accidental poisoning by and exposure to noxious substances (X40-X49) mentioned 32 times, mental and behavioural disorders due to other psychoactive abuse (F10, F11, F13-F19) mentioned 26 times, intentional self harm (X60-X84) mentioned 8 times and transport accidents (V01-V99) mentioned 4 times.

There were 358 multiple causes of death associated with the 78 deaths selected, an average of 4.6 multiple codes per death. Cannabis related codes occurred 77 times (21.5%), whereas opioid related codes occurred 68 times (19%), other or unspecified drug codes occurred 136 times (38%) and non drug related codes occurred 77 times (21.5%) (Table 1).

3.2 Case narratives

The two cases where ABS coding attributed cannabis as being responsible for two deaths are examined in more detail to identify what role cannabis may have played as the cause of death.

Case 1: F12.2

In the 1999 case, which was coded as F12.2 (ie cannabis dependence syndrome), the Coroner found that *"... that the death occurred ... as a result of bronchopneumonia following combined drug effect"*.

The medical examination conducted as part of the coronial investigation included toxicological analysis. This detected the presence of codeine, oxycodone, carboxytetrahydrocannabinol, monoacetylmorphine, morphine and diazepam. Records of the investigations of the scene noted the deceased was found with a tourniquet around an upper arm. A used needle and syringe found with the deceased had traces of monoacetylmorphine, acetylcodeine and diacetylmorphine (heroin).

The toxicology report stated that the ratio of total/free morphine in the sample of mortuary admission blood was 4.1, ie it was most likely that death had occurred within a few hours following injection of heroin.

Therefore, it can be concluded that the various reports provided to the Coroner raised the strong presumption that in this case the major factor in the death had been the use of heroin. The role of cannabis would appear on the evidence to have been a minor contributing factor as a cause of death.

Case 2: F12.9

The 2000 case, which was coded as F12.9 (ie unspecified cannabis mental and behavioural disorder), the Coroner found that the death had occurred *"... as a result of aspiration of gastric contents ... with cannabis effect"*.

The medical examination noted that this person had an enlarged heart and liver the effect of which in conjunction with cannabis intoxication depressed the respiratory system and caused aspiration of the stomach contents.

Toxicological investigations detected only cannabis metabolites, ie carboxytetrahydrocannabinol at a level of 44 ug/litre and 2.8 ug/litre of tetrahydrocannabinol and detected a low level of opiates <0.3 mg/litre by immunoassay.

Statements gathered from witnesses noted that the deceased felt unwell in the early afternoon and then in the early evening had gone to a local hotel where he drank alcohol. He returned home later in the

[5] ie the underlying cause of death.

evening with a carton of 30 cans of beer and over the course of the next four hours with a friend had consumed at least eight cans of beer and smoked a number of cones of cannabis.

In this case it is difficult to attribute cannabis as being the major factor in the death of an individual with underlying health problems. These health problems may well be a result of an apparent history of regular alcohol and cannabis use at the upper levels of consumption. For instance, there is recent evidence that individuals with established coronary artery disease and those with multiple coronary risk factors are at a much greater risk of myocardial infarctions.[6]

This case illustrates the need for coronial investigations to have access to information about the health status of those who have a history of alcohol and illicit drug abuse.

Table 1
Number of deaths with any mention of cannabis in the cause of death fields by broad groups of underlying causes of death, WA, 1997-2001

ICD-10 codes	Broad groupings based on underlying cause of death			Multiple causes of death				
		n	%	Cannabis	Opioids	Other/ unspec drugs	Other causes	Total
F12	Mental & behavioural disorders due to cannabis	2	2.6	1	1	1	4	7
F10,F11, F13-F19	Mental & behavioural disorders due to other psychoactive substance abuse	26	33.3	26	27	56	15	124
G40-G47	Episodic & paroxysmal disorders	1	1.3	1	0	0	0	1
K70-K77	Diseases of the liver	1	1.3	1	0	3	2	6
V01-V99	Transport accidents	4	5.1	3	0	4	13	20
W65-W74	Accidental drowning & submersion	1	1.3	1	1	2	1	5
X00-X09	Exposure to smoke, fire & flames	1	1.3	1	0	3	1	5
X40-X49	Accidental poisoning by & exposure to noxious substances	32	41.0	33	31	51	27	142
X60-X84	Intentional self harm	8	10.2	8	8	15	9	40
X85-Y09	Assault	2	2.6	2	0	1	5	8
	Total	**78**	**100.0**	**77**	**68**	**136**	**77**	**358**

[6] Mittleman MA, Lewis RA, Maclure M, Sherwood JB, Muller JE. "Triggering myocardial infarction by marijuana." *Circulation*. 2001; 103: 2805-2809.

Appendix 1: Causes of death by ICD 10 codes

Mental and behavioural disorders due to psychoactive substance abuse (F10-F19)

F10.2 Mental & behavioural disorders due to due to use of alcohol – dependence syndrome

F11.2 Mental & behavioural disorders due to the use of opioids – dependence syndrome

F12.2 Mental & behavioural disorders due to the use of cannabinoids – dependence syndrome

F12.9 Mental & behavioural disorders due to the use of cannabinoids – unspecified mental and behavioural disorder

F19.2 Mental & behavioural disorders due to multiple drug use and use of other psychoactive substances – dependence syndrome

Episodic and paroxysmal disorders (G40-G47)

G40.9 Epilepsy

Diseases of the liver (K70-K77)

K70.3 Alcoholic cirrhosis of liver

Poisoning by drugs, medicaments and biological substances (T36-T50)

T40.7 Cannabis (derivatives)

Motorcycle rider injured in transport accident (V20-V29)

V23.4 Motorcycle rider injured in accident

Car occupant injured in transport accident (V40-V49)

V48.5 Car occupant injured in non-collision transport accident – driver injured in traffic accident

Other land transport accidents (V80-V89)

V89.2 Person injured in unspecified motor vehicle accident, traffic

Accidental drowning and submersion (W65-W74)

W65. Drowning and submersion in bath tub

Exposure to smoke, fire and flames (X00-X09)

X08. Exposure to specified smoke/fire/flames

Accidental poisoning by and exposure to noxious substances (X40-X49)

X42. Accidental poisoning by and exposure to narcotics and psychodysleptics (hallucinogens), not elsewhere classified

X44. Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances

X47. Accidental poisoning by and exposure to other gases and vapours

Intentional self harm (X60-X84)

X64. Intentional self poisoning by and exposure to other and unspecified drugs, medicaments and biological substances

X67. Intentional self poisoning by and exposure to other gases and vapours

X70. Intentional self harm by hanging, strangulation and suffocation

Assault (X85-Y09)

X99. Assault by sharp object

Y04. Assault by bodily force