DRUG TRENDS

Methods for "Trends in drug-induced deaths in Australia, 1997-2017"

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General notes

Data presented in the public online interactive visualisation and reported in the bulletin are provided by the Australian Bureau of Statistics (ABS) using data from the National Coronial Information System (NCIS). Changes in data coding and collection have occurred over the time period reported.

The ABS undertake a revision process for coroner-certified deaths over a 3-year period; accordingly, data for 2016 and 2017 are not final. These figures should be viewed in conjunction with the ABS Explanatory Notes.

In addition to the revision process, the ABS undertook further processing improvements from 2008 onwards. For both open and closed cases, the ABS increasingly use additional information from the NCIS (e.g. autopsy, police and toxicology reports) where available to apply more specific cause of death codes. These processing improvements are likely to have an impact on the number of drug-induced deaths reported from 2008 onwards.

Causes of death are coded according to the International Classification of Diseases and Related Health Problems, 10th Revision (hereafter 'ICD-10'). In 2014, the ABS implemented IRIS, an automatic system for coding multiple causes of death and selecting the underlying cause of death. The World Health Organization updates and coding practice changes associated with dependence syndromes as an underlying cause of death have also been implemented by ABS. Impacts on the data from 2013 onwards are described in more detail in the ABS Technical Note 1, Causes of Death Australia 2013. At the time of publication of this document, latest statistics on causes of death for Australia, including drug-induced deaths, are presented in the ABS publication Causes of Death, Australia, 2017 (cat. no. 3303.0).

It should also be noted that availability of additional information within the NCIS varies by jurisdiction; improvements to data collection are likely to be applied differentially across jurisdictions.

In our presentation of drug-induced deaths in Australia, results have been displayed as numbers of deaths and crude death rates per 100,000 people. Small numbers of deaths have been randomly assigned to protect the confidentiality of individuals. Zero values have not been affected by confidentialisation.

Terminology

Underlying cause of death (UCOD) is the disease or condition which initiated the sequence of events resulting in death. There can be only one underlying cause of death.

Associated causes of death (ACOD) are any other diseases or conditions that contributed to the death but were not the underlying cause and are listed on the death certificate.

Multiple causes of death (MCOD) include all causes (both underlying and associated causes), diseases and conditions reported on the death certificate. For deaths where the underlying cause was identified as an external cause (for example, injury or poisoning, etc.), multiple causes include circumstances of injury and the nature of injury as well as any other conditions reported on the death certificate.

Deaths are considered **'drug-induced deaths'** if they are directly attributable to drug use (e.g. drug toxicity/overdose is the underlying cause of death). They are considered **'drug-related deaths'** where drugs played a contributory role (i.e., listed as an associated cause of death) and the death was attributable to another cause (e.g. motor vehicle accident).

A Tabulation list of ICD-codes to identify causes of death attributable to drug-induced mortality was developed by the ABS based on a drug-induced death tabulation created by United States Centre for Disease Control and Prevention (CDC). We have adopted these codes for our definition of all drug-induced deaths (see below).

Pharmaceutical opioids is a group of opioids which comprises natural and semi-synthetic opioids (T40.2), methadone (T40.3) and synthetic opioids (T40.4).

Intent

As part of the coronial investigation of drug-related deaths, the coroner assigns the manner of intent to these deaths where there is sufficient information. The ICD-10 coding incorporates codes for the following categories of intent:

- **Accidental**, where the coroner determines the manner/intent of the injury or poisoning which led to death was accidental;
- **Intentional**, where the coroner determines that the manner/intent of the injury or poisoning which led to death was purposeful; and
- **Undetermined**, where there was insufficient information for the coroner to make a determination on the intent.

We have disaggregated by intent type where numbers are sufficient to protect confidentiality of individuals. By **all intents** we mean accidental, intentional or undetermined intent.

Coding of deaths

Drug-induced deaths

In accordance with ABS reporting, causes of drug-induced death presented in this report exclude accidents, homicides, and other causes indirectly related to drug use. We have also excluded newborn deaths associated with mother's drug use, and deaths related to tobacco (e.g., F17) or alcohol (e.g., F10).

Underlying cause of death (UCOD):

D52.1 – Drug-induced folate deficiency anaemia;

D59.0 – Drug-induced haemolytic anaemia;

D59.2 – Drug-induced nonautoimmune haemolytic anaemia;

D61.1 – Drug-induced aplastic anaemia;

D64.2 – Secondary sideroblastic anaemia due to drugs and toxins;

E06.4 – Drug-induced thyroiditis;

E16.0 – Drug-induced hypoglycaemia without coma;

E23.1 – Drug-induced hypopituitarism;

E24.2 – Drug-induced Cushing's syndrome;

E27.3 – Drug-induced adrenocortical insufficiency;

E66.1 – Drug-induced obesity;

F11.0-F11.5 – Use of opioids causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis

F11.7-F11.9 – Use of opioid causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders.

F12.0-F12.5 – Use of cannabis causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis

F12.7-F12.9 – Use of cannabis causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders.

F13.0-F13.5 – Use of sedative or hypnotics causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis

F13.7-F13.9 – Use of sedative or hypnotics causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders.

F14.0-F14.5 – Use of cocaine causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis

F14.7-F14.9 – Use of cocaine causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders.

F15.0-F15.5 – Use of caffeine causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis

F15.7-F15.9 – Use of caffeine causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders.

F16.0-F16.5 – Use of hallucinogens causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis

F16.7-F16.9 – Use of hallucinogens causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders.

F18.0-F18.5 – Use of volatile solvents causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis

F18.7-F18.9 – Use of volatile solvents causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders.

F19.0-F19.5 – Use of multiple drugs and other psychoactive substances causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis

F19.7-F19.9 – Use of multiple drugs and other psychoactive substances causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders.

G21.1 – Other drug-induced secondary Parkinsonism;

G24.0 – Drug-induced dystonia;

G25.1 – Drug-induced tremor;

G25.4 – Drug-induced chorea;

G25.6 – Drug-induced tics and other tics of organic origin;

G44.4 – Drug-induced headache, not elsewhere classified;

G62.0 – Drug-induced polyneuropathy;

G72.0 – Drug-induced myopathy;

I95.2 – Hypotension due to drugs;

J70.2 – Acute drug-induced interstitial lung disorders;

J70.3 – Chronic drug-induced interstitial lung disorders;

J70.4 – Drug-induced interstitial lung disorder, unspecified;

L10.5 – Drug-induced pemphigus;

L27.0 – Generalized skin eruption due to drugs and medicaments;

L27.1 – Localized skin eruption due to drugs and medicaments;

M10.2 – Drug-induced gout;

M32.0 – Drug-induced systemic lupus erythematosus;

M80.4 – Drug-induced osteoporosis with pathological fracture;

M81.4 – Drug-induced osteoporosis;

M83.5 – Other drug-induced osteomalacia in adults;

M87.1 – Osteonecrosis due to drugs;

R78.1 – Finding of opiate drug in blood;

R78.2 – Finding of cocaine in blood;

R78.3 – Finding of hallucinogen in blood;

R78.4 – Finding of other drugs of addictive potential in blood;

R78.5 – Finding of psychotropic drug in blood;

X40-X44 – Accidental poisoning by and exposure to drugs, medicaments and biological substances;

X60-X64 – Intentional self-poisoning (suicide) by and exposure to drugs, medicaments and biological substances;

X85 – Assault (homicide) by drugs, medicaments and biological substances; and

Y10-Y14 – Poisoning by and exposure to drugs, medicaments and biological substances, undetermined intent.

Where possible, we have disaggregated drug-induced deaths by intent type, as identified by the below combinations of UCOD with ACOD.

Intent	UCOD		ACOD
Accidental	X40-X44		any
	Drug-induced deaths*	with	X40-X44
Intentional	X60-X64		any
	Drug-induced deaths*	with	X60-X64
Undetermined	Y10-Y14		any
	Drug-induced deaths*	with	Y10-Y14
All intents	Drug-induced deaths*		

*Appendix 2 in Causes of Death, Australia, 2017 (cat. no. 3303.0). Deaths related to tobacco (ICD-10 – F17) or alcohol (ICD-10 – F10) have been excluded from the analysis.

Drug-induced deaths by drug class and drug type
The following ICD-10 codes were used to identify any drug-induced death where each drug type listed in the first column was considered a contributory cause of death (e.g., drug-induced death involving benzodiazepines, drug-induced death involving antidepressants). Note here that in some cases we have looked at the broader drug class (e.g., drug-induced deaths involving opioids) and then the specific types of substances within that class (e.g., drug-induced deaths involving methadone, drug-induced deaths involving heroin).

Drug class and type	Examples of drugs commonly assigned to ICD-10 category	UCOD		ACOD
ANTIEPILEPTIC, SEDATIVE-HYPNOTIC AND ANTIPARKINSONISM DRUGS		Drug-induced deaths*	with	T42.0-T42.8
Benzodiazepines	Alprazolam, Diazepam, Oxazepam, Clonazepam, Clozapine, Temazepam, Oxazepam	Drug-induced deaths*	with	T42.4
Antiepileptic and sedative-hypnotic drugs, unspecified	Pregabalin	Drug-induced deaths*	with	T42.7
OPIOIDS		Drug-induced deaths*	with	T40.0-T40.4, T40.6
		F11		any
Heroin	Heroin	Drug-induced deaths*	with	T40.1
Natural and semi-synthetic opioids	Oxycodone, Morphine, Codeine	Drug-induced deaths*	with	T40.2
Methadone	Methadone	Drug-induced deaths*	with	T40.3
Synthetic opioids	Fentanyl, Tramadol, Pethidine	Drug-induced deaths*	with	T40.4
AMPHETAMINES		Drug-induced deaths*	with	T43.6
		F15		any
ANTIDEPRESSANTS		Drug-induced deaths*	with	T43.0-T43.2
Other and unspecified antidepressants	Sertraline, Citalopram, Venlafaxine, Fluoxetine, Mirtazepine, Fluvoxamine, Paroxetine, Duloxetine, Bupropion	Drug-induced deaths*	with	T43.2
ANTIPSYCHOTICS AND NEUROLEPTICS		Drug-induced deaths*	with	T43.3-T43.5
Other and unspecified antipsychotics	Quetiapine, Olanzapine, Antipsychotic, Risperidone	Drug-induced deaths*	with	T43.5
NON-OPIOID ANALGESICS, ANTIPYRETICS AND ANTIRHEUMATICS		Drug-induced deaths*	with	T39.0-T39.9
4-Aminophenol derivatives	Paracetamol	Drug-induced deaths*	with	T39.1
ALCOHOL		Drug-induced deaths*	with	T51
CANNABIS DERIVATIVES		Drug-induced deaths*	with	T40.7
		F12		any
COCAINE		Drug-induced deaths*	with	T40.5
		F14		any

*Appendix 2 in Causes of Death, Australia, 2017 (cat. no. 3303.0). Deaths related to tobacco (ICD-10 – F17) or alcohol (ICD-10 – F10) have been excluded from the analysis.

Opioid-induced deaths

The following ICD-10 codes have been used to extract and examine deaths where opioid toxicity was considered to be the underlying cause of death - 'Opioid-induced deaths'.

Cause of death	UCOD		ACOD
All opioid-induced deaths			
Accidental	F11 OR F19	with	(X42 OR X44) AND (T40.0-T40.4 OR T40.6)
	X42 OR X44	with	T40.0-T40.4 OR T40.6
Intentional	F11 OR F19	with	(X62 OR X64) AND (T40.0-T40.4 OR T40.6)
	X62 OR X64	with	T40.0-T40.4 OR T40.6
Undetermined	F11 OR F19	with	(Y12 OR Y14) AND (T40.0-T40.4 OR T40.6)
	Y12 OR Y14	with	T40.0-T40.4 OR T40.6
All intents	F11 OR F19	with	(X42, X44, X62, X64, Y12 OR Y14) AND (T40.0-T40.4 OR T40.6)
	X42, X44, X62, X64, Y12 OR Y14	with	T40.0-T40.4 OR T40.6

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Opioid-induced deaths by opioid type

Cause of death	UCOD		ACOD
Heroin (T40.1)			
Accidental	F11, F19, X42 OR X44	with	T40.1
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.1
Opium (T40.0)			
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.0
Natural and semi-synthetic opioids* (include morphine, oxycodone and codeine) (T40.2)			
Accidental	F11, F19, X42 OR X44	with	T40.2
Intentional	X62 OR X64	with	T40.2
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.2
Methadone* (T40.3)			
Accidental	F11, F19, X42 OR X44	with	T40.3
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.3
Synthetic opioids* (include pethidine, tramadol, fentanyl) (T40.4)			
Accidental	F11, F19, X42 OR X44	with	T40.4
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.4
Other and unspecified opioids (analgesics NEC) (T40.6)			
Accidental	F11, F19, X42 OR X44	with	T40.6
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.6

*Pharmaceutical opioids

Opioid-induced deaths where other drugs were reported as being a contributory cause

Cause of death	UCOD with ACOD	with	Additional ACOD
All opioid-induced deaths where below drugs were reported as being a contributory cause:			
Benzodiazepines	All opioid-induced deaths	AND	T42.4
Alcohol	All opioid-induced deaths	AND	R78.0, T51, X45 OR Y15
Antipsychotics	All opioid-induced deaths	AND	T43.3, T43.4 OR T43.5
Antidepressants	All opioid-induced deaths	AND	T43.0, T43.1 OR T43.2
4-Aminophenol derivatives (Paracetamol)	All opioid-induced deaths	AND	T39.1
Amphetamines	All opioid-induced deaths	AND	T43.6*
Antiepileptic and sedative-hypnotic drugs, unspecified (e.g., pregabalin)	All opioid-induced deaths	AND	T42.7*

*Note these findings are not displayed in the online data visualisation.

Exclusive opioid-induced deaths

Cause of death	UCOD		ACOD		
Opioid-induced deaths involving illicit opioids only – Heroin and/or opium					
Accidental	F11, F19, X42 OR X44	with	T40.0 OR T40.1	NOT	T40.2-T40.4, T40.6
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.0 OR T40.1	NOT	T40.2-T40.4, T40.6
Opioid-induced deaths involving pharmaceutical opioids only*					
Accidental	F11, F19, X42 OR X44	with	T40.2-T40.4	NOT	T40.0, T40.1, T40.6
Intentional	X62 OR X64	with	T40.2-T40.4	NOT	T40.0, T40.1, T40.6
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.2-T40.4	NOT	T40.0, T40.1, T40.6
Opioid-induced deaths involving illicit opioids and pharmaceutical opioids*					
Accidental	F11, F19, X42 OR X44	with	T40.0 OR T40.1	AND	(T40.2-T40.4)
Intentional	X62 OR X64	with	T40.0 OR T40.1	AND	(T40.2-T40.4)
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.0 OR T40.1	AND	(T40.2-T40.4)
Opioid-induced deaths involving other and unspecified opioids					
Accidental	F11, F19, X42 OR X44	with	T40.6		
All intents	F11, F19, X42, X44, X62, X64, Y12 OR Y14	with	T40.6		

*Pharmaceutical opioids include natural and semi-synthetic opioids (T40.2), methadone (T40.3) and synthetic opioids (T40.4)

Amphetamine-induced deaths

ICD-10 uses the terminology "amphetamine" to refer to the drug class that includes "methamphetamine", as well as MDMA (ecstasy) and pharmaceutical stimulant. We use consistent terminology when presenting the data. The following ICD-10 codes have been used to examine deaths where amphetamine toxicity was considered to be the underlying cause of death – 'amphetamine-induced deaths'.

Cause of death	UCOD		ACOD
Accidental	F15	with	X41
	X41	with	T43.6
All intents	F15	with	X41, X61 OR Y11
	X41, X61 OR Y11	with	T43.6

Cocaine-induced deaths

The following ICD-10 codes have been used to examine deaths where cocaine toxicity was considered to be the underlying cause of death – 'cocaine-induced deaths'.

Cause of death	UCOD		ACOD
Accidental	F14	with	X42
	X42	with	T40.5
All intents	F14	with	X42, X62 OR Y12
	X42, X62 OR Y12	with	T40.5

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Recommended citation

Chrzanowska, A., Dobbins, T., Degenhardt, L. & Peacock, A. (2019). Methods for "Trends in drug-induced deaths in Australia, 1997-2017". Drug Trends Bulletin Series. Sydney: National Drug and Alcohol Research Centre, UNSW Sydney.

Related Links

- Data visualisations: https://drugtrends.shinyapps.io/deaths_2017/
- Methods document: https://ndarc.med.unsw.edu.au/resource/trends-drug-induced-deaths-australia-1997-2017
- For more information on NDARC research, go to: http://ndarc.med.unsw.edu.au/
- For more information about the ABS, go to: http://www.abs.gov.au
- For more information on ICD coding go to: http://www.who.int/classifications/icd/en/
- For more research from the Drug Trends program go to: https://ndarc.med.unsw.edu.au/program/drug-trends

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