

# METHODS FOR “TRENDS IN DRUG-RELATED HOSPITAL SEPARATIONS IN AUSTRALIA, 1999–2018”

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## General note

Data on hospitalisations presented in the [online interactive visualisation](#) and reported in the [bulletin](#) were derived from the National Hospital Morbidity Database (NHMD) held by the Australian Institute of Health and Welfare (AIHW).

The National Hospital Morbidity Database (NHMD) is compiled from data supplied by the state and territory health authorities. It is a collection of electronic confidentialised summary records for separations (that is, [episodes of care](#)) in public and private hospitals in Australia. Separations for which the care type was reported as ‘newborn without qualified days’, and records for ‘posthumous organ procurement’ and ‘hospital boarders’ have been excluded. It should be noted that state of hospitalisation equals the state of usual residence, and that cross-border separations were not provided. For Tasmania, provision of data between 2010-11 and 2015-16 was limited. Estimates of drug-related hospitalisations for this period are likely to be underestimated as a consequence.

At the time of separation, a principal (i.e. main) diagnosis, and up to 99 additional diagnoses may be recorded. The data presented in this bulletin include only hospital separations where drugs were determined to be the principal reason for the hospital admission (i.e., identified in the principal diagnosis field).

Hospital separations are coded according to the World Health Organization’s (WHO) [International Statistical Classification of Diseases](#) (ICD) and Related Problems, [Australian Modification](#). The ICD 10th revision (ICD-10-AM) (National Centre for Classification in Health, 1998) was used to code data dating from 1999 to the present in South Australia (SA), Western Australia (WA), and Queensland (QLD). The remaining jurisdictions commenced using ICD-10-AM codes in 1998. Prior to this, the ICD 9th revision (ICD-9-CM) (National Coding Centre, 1996) was used to code hospital separations. Caution should be exacted in comparing diagnosis, procedure and external cause data over time, as the classifications and coding standards for these data can change. Drug involvement in presentation to hospital may be underreported or under-ascertained, and the coding system used does not necessarily allow identification of the specific drug involved in presentations (often instead the broader substance category e.g., ‘synthetic opioids’ rather than ‘fentanyl’).

Please refer to Chronicle of [ICD-10-AM/ACHI/ACS](#) First-Tenth Edition for information on changes in classifications and coding standards over time and ICD-10-AM editions.

**We have not included hospital separations where the principal diagnosis is related to tobacco or alcohol use, other unspecified drug use and fetal and perinatal conditions. It is important to note many drug-related hospitalisations involve more than one drug (including alcohol), and sometimes it is not possible to determine one substance as the primary drug leading to the hospital separation.**

Due to the different ways in which psychotic disorder and withdrawal codes are treated in the ICD-9 and ICD-10 coding structure, analyses presented in this bulletin include data from 1999/2000 to 2017/18 only. For trends in drug-related hospital separations from 1993-94 to 2017-18 that do not include psychotic disorder and withdrawal codes, please refer to our previous reports or contact the authors ([drugtrends@unsw.edu.au](mailto:drugtrends@unsw.edu.au)).

Results of the hospital separations analysis are presented as:

- **number of hospital separations**,
- **crude rate of hospital separations per 100,000 people**, calculated using the Australian Bureau of Statistics estimated resident population figures as at 30 June each year, and
- **age-standardised rate per 100,000 people**, calculated using the [Australian Standard Population](#) at 30 June 2001.

Age-standardised rates enable the comparison of rates over time and between populations of different age structures. The rates were calculated using the direct standardisation method as recommended by the Australian Bureau of Statistics (ABS) and AIHW in the report: AIHW (2011) [Principles on the use of direct age-standardisation in administrative data collections: for measuring the gap between Indigenous and non-Indigenous Australians](#). Cat. no. CSI 12. Canberra: AIHW.

In the [online interactive visualisation](#), data will not be displayed if age-standardised rate is selected for age group analysis.

Counts less than 10 have been suppressed to protect confidentiality.

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## Terminology

Terminology used in this bulletin aligns with terminology used by AIHW in the report [Drug related hospitalisations](#) to describe findings from the NHMD.

An **admitted patient** is a patient who undergoes a hospital's formal admission process to receive treatment and/or care.

A **hospital separation** (also called hospitalisation) refers to a completed episode of admitted patient's care in a hospital ending with discharge, death, transfer or a portion of a hospital stay beginning or ending in a change to another type of care. There can be more than one hospital separation for each patient and separations can be either same-day (hospital admission and separation happen on the same day) or overnight (hospital admission and separation happen on a different date).

Each NHMD separation record includes one principal diagnosis and up to 99 additional diagnoses.

The **principal diagnosis** is defined as the diagnosis established after study to be chiefly responsible for occasioning the patient's episode of admitted patient care. Additional diagnoses are conditions or complaints that either coexists with the principal diagnosis or develop during the episode of care and affect patient's management.

A **drug-related hospital separation** refers to hospital care with selected principal diagnoses of substance-use disorder or harm due to selected substances. Hospital separations where the diagnosis of drug-related harm or disorder is additional to the principal diagnosis, such as problems related to certain chronic conditions, have been excluded and, as aforementioned, separations where alcohol or tobacco comprise the principal diagnosis are not included.

## Coding of hospital separations

### All drug-related hospital separations

The following ICD-10-AM codes were used to examine trends in drug-related hospital separations from 1999-00 to 2017-18.

Drug type	Examples of drugs commonly assigned to ICD-10-AM category	ICD-10-AM
<b>Opioids</b>		F11.0–F11.9, T40.0–T40.4, T40.6
Opium		T40.0
Heroin		T40.1
Natural and semi-synthetic opioids	Oxycodone, Morphine, Codeine	T40.2
Methadone		T40.3
Synthetic opioids	Fentanyl, Tramadol, Pethidine	T40.4
Other and unspecified opioids		T40.6
<b>Non-opioid analgesics</b>	Paracetamol, Ibuprofen, Aspirin	F55.2, T39.0–T39.9, N14.0
4-Aminophenol derivatives	Paracetamol	T39.1
<b>Antiepileptic, sedative-hypnotic and antiparkinsonism drugs</b>	Barbiturates, Pregabalin, Benzodiazepines, Ketamine	F13.0*–F13.9*, T41.2*, T42.0–T42.8
Benzodiazepines	Benzodiazepines	T42.4
<b>Cannabinoids</b>	Cannabis, Cannabis derivatives	F12.0–F12.9, T40.7
<b>Hallucinogens</b>	LSD	F16.0*–F16.9*, T40.8–T40.9
<b>Cocaine</b>		F14.0–F14.9, T40.5
<b>Amphetamines and other stimulants</b>	Methamphetamine, MDMA, Caffeine	F15.0*–F15.9*, T43.6*
<b>Antidepressants</b>	Sertraline, Citalopram, Venlafaxine, Fluoxetine, Mirtazepine, Fluvoxamine, Paroxetine, Duloxetine	F55.0, T43.0–T43.2
<b>Antipsychotics and neuroleptics</b>	Quetiapine, Olanzapine, Risperidone	T43.3–T43.5
<b>Volatile solvents</b>	Petroleum products, nitrogen oxides	F18.0–F18.9, T52.0–T52.9, T53.0–T53.9, T59.0, T59.8
<b>Multiple drug use</b>		F19.0–F19.9

\*ICD-10-AM code starting with the characters

## Opioid-related hospital separations

The following ICD-10-AM codes were used to examine trends in opioid-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
<i>Poisoning by narcotics and psychodysleptics:</i>		
Poisoning	Opium poisoning	T40.0
Poisoning	Heroin poisoning	T40.1
Poisoning	Natural and semi-synthetic	T40.2
Poisoning	Methadone poisoning	T40.3
Poisoning	Other synthetic narcotics poisoning	T40.4
Poisoning	Other and unspecified narcotics poisoning	T40.6
<i>Mental and behavioural disorders due to use of opioids:</i>		
Acute intoxication	Acute intoxication	F11.0
Harmful use	Harmful use	F11.1
Dependence	Dependence syndrome	F11.2
Withdrawal	Withdrawal state	F11.3
Withdrawal	Withdrawal state with delirium	F11.4
Psychotic disorder	Psychotic disorder	F11.5
Other	Amnesic syndrome	F11.6
Psychotic disorder	Residual and late-onset psychotic disorder	F11.7
Other	Other mental and behavioural disorders	F11.8
Other	Unspecified mental and behavioural disorder	F11.9

## Non-opioid analgesic-related hospital separations

The following ICD-10-AM codes were used to examine trends in non-opioid analgesic-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
Harmful use	Harmful use of nondependence-producing substances: analgesics	F55.2
	<i>Poisoning by nonopioid analgesics, antipyretics and antirheumatics:</i>	
Poisoning	Salicylates	T39.0
Poisoning	4-Aminophenol derivatives	T39.1
Poisoning	Other nonsteroidal anti-inflammatory drugs [NSAID]	T39.3
Poisoning	Antirheumatics, not elsewhere classified	T39.4
Poisoning	Other nonopioid analgesics and antipyretics, not elsewhere classified	T39.8
Poisoning	Nonopioid analgesic, antipyretic and antirheumatic, unspecified	T39.9
Other	Drug- and heavy-metal-induced tubulo-interstitial and tubular conditions: analgesic nephropathy	N14.0

## Antiepileptic, sedative-hypnotic and antiparkinsonism drug-related hospital separations

The following ICD-10-AM codes were used to examine trends in antiepileptic, sedative-hypnotic and antiparkinsonism drug-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
Poisoning	Poisoning by other and unspecified general anaesthetics	T41.2*
	<i>Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs:</i>	
	Hydantoin derivatives	T42.0
Poisoning	Iminostilbenes	T42.1
Poisoning	Succinimides and oxazolidinediones	T42.2
Poisoning	Barbiturates	T42.3
Poisoning	Benzodiazepines	T42.4
Poisoning	Mixed antiepileptics, not elsewhere classified	T42.5
Poisoning	Other antiepileptic and sedative-hypnotic drugs	T42.6
Poisoning	Antiepileptic and sedative-hypnotic drugs, unspecified	T42.7
Poisoning	Antiparkinsonism drugs and other central muscle-tone depressants	T42.8
	<i>Mental and behavioural disorders due to use of sedatives or hypnotics:</i>	
Acute intoxication	Acute intoxication	F13.0*
Harmful use	Harmful use	F13.1*
Dependence	Dependence syndrome	F13.2*
Withdrawal	Withdrawal state	F13.3*
Withdrawal	Withdrawal state with delirium	F13.4*
Psychotic disorder	Psychotic disorder	F13.5*
Other	Amnesic syndrome	F13.6*
Psychotic disorder	Residual and late-onset psychotic disorder	F13.7*
Other	Other mental and behavioural disorders	F13.8*
Other	Unspecified mental and behavioural disorder	F13.9*

\*ICD-10-AM code starting with the characters

## Cannabinoid-related hospital separations

The following ICD-10-AM codes were used to examine trends in cannabinoid-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
Poisoning	Poisoning by narcotics and psychodysleptics: Cannabis (derivatives)	T40.7
<i>Mental and behavioural disorders due to use of cannabinoids:</i>		
Acute intoxication	Acute intoxication	F12.0
Harmful use	Harmful use	F12.1
Dependence	Dependence syndrome	F12.2
Withdrawal	Withdrawal state	F12.3
Withdrawal	Withdrawal state with delirium	F12.4
Psychotic disorder	Psychotic disorder	F12.5
Other	Amnesic syndrome	F12.6
Psychotic disorder	Residual and late-onset psychotic disorder	F12.7
Other	Other mental and behavioural disorders	F12.8
Other	Unspecified mental and behavioural disorder	F12.9

## Hallucinogen-related hospital separations

The following ICD-10-AM codes were used to examine trends in hallucinogen-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
<i>Poisoning by narcotics and psychodysleptics [hallucinogens]:</i>		
Poisoning	Lysergide [LSD]	T40.8
Poisoning	Other and unspecified psychodysleptics [hallucinogens]	T40.9
<i>Mental and behavioural disorders due to use of hallucinogens:</i>		
Acute intoxication	Acute intoxication	F16.0*
Harmful use	Harmful use	F16.1*
Dependence	Dependence syndrome	F16.2*
Withdrawal	Withdrawal state	F16.3*
Withdrawal	Withdrawal state with delirium	F16.4*
Psychotic disorder	Psychotic disorder	F16.5*
Other	Amnesic syndrome	F16.6*
Psychotic disorder	Residual and late-onset psychotic disorder	F16.7*
Other	Other mental and behavioural disorders	F16.8*
Other	Unspecified mental and behavioural disorder	F16.9*

\*ICD-10-AM code starting with the characters



## Cocaine-related hospital separations

The following ICD-10-AM codes were used to examine trends in cocaine-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
Poisoning	Poisoning by narcotics and psychodysleptics: Cocaine	T40.5
<i>Mental and behavioural disorders due to use of cocaine:</i>		
Acute intoxication	Acute intoxication	F14.0
Harmful use	Harmful use	F14.1
Dependence	Dependence syndrome	F14.2
Withdrawal	Withdrawal state	F14.3
Withdrawal	Withdrawal state with delirium	F14.4
Psychotic disorder	Psychotic disorder	F14.5
Other	Amnesic syndrome	F14.6
Psychotic disorder	Residual and late-onset psychotic disorder	F14.7
Other	Other mental and behavioural disorders	F14.8
Other	Unspecified mental and behavioural disorder	F14.9

## Amphetamine and other stimulant-related hospital separations

The following ICD-10-AM codes were used to examine trends in amphetamine and other stimulant-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
Poisoning	Poisoning by psychostimulants (excluding cocaine)	T43.6*
<i>Mental and behavioural disorders due to use of other stimulants, including caffeine:</i>		
Acute intoxication	Acute intoxication	F15.0*
Harmful use	Harmful use	F15.1*
Dependence	Dependence syndrome	F15.2*
Withdrawal	Withdrawal state	F15.3*
Withdrawal	Withdrawal state with delirium	F15.4*
Psychotic disorder	Psychotic disorder	F15.5*
Other	Amnesic syndrome	F15.6*
Psychotic disorder	Residual and late-onset psychotic disorder	F15.7*
Other	Other mental and behavioural disorders	F15.8*
Other	Unspecified mental and behavioural disorder	F15.9*

\*ICD-10-AM code starting with the characters

## Antidepressant, antipsychotic and neuroleptic-related hospital separations

The following ICD-10-AM codes were used to examine trends in antidepressant, antipsychotic and neuroleptic-related hospital separations from 1999-00 to 2017-

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
<b>Antidepressants</b>		
Harmful use	Harmful use of nondependence-producing substances: antidepressants	F55.0
<i>Poisoning by psychotropic drugs, not elsewhere classified:</i>		
Poisoning	Tricyclic and tetracyclic antidepressants	T43.0
Poisoning	Monoamine-oxidase-inhibitor antidepressants	T43.1
Poisoning	Other and unspecified antidepressants	T43.2
<b>Antipsychotics and neuroleptics</b>		
<i>Poisoning by psychotropic drugs, not elsewhere classified:</i>		
Poisoning	Phenothiazine antipsychotics and neuroleptics	T43.3
Poisoning	Butyrophenone and thioxanthene neuroleptics	T43.4
Poisoning	Other and unspecified antipsychotics and neuroleptics	T43.5

## Volatile solvent-related hospital separations

The following ICD-10-AM codes were used to examine trends in volatile solvent-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
<i>Toxic effect of organic solvents:</i>		
Poisoning	Petroleum products	T52.0
Poisoning	Benzene	T52.1
Poisoning	Homologues of benzene	T52.2
Poisoning	Glycols	T52.3
Poisoning	Ketones	T52.4
Poisoning	Other organic solvents	T52.8
Poisoning	Organic solvent, unspecified	T52.9
<i>Toxic effect of halogen derivatives of aliphatic and aromatic hydrocarbons:</i>		
Poisoning	Carbon tetrachloride	T53.0
Poisoning	Chloroform	T53.1
Poisoning	Trichloroethylene	T53.2
Poisoning	Tetrachloroethylene	T53.3
Poisoning	Dichloromethane	T53.4
Poisoning	Chlorofluorocarbons	T53.5
Poisoning	Other halogen derivatives of aliphatic hydrocarbons	T53.6
Poisoning	Other halogen derivatives of aromatic hydrocarbons	T53.7
Poisoning	Halogen derivative of aliphatic and aromatic hydrocarbons, unspecified	T53.9
<i>Toxic effect of other gases, fumes and vapours:</i>		
Poisoning	Nitrogen oxides	T59.0
Poisoning	Other specified gases, fumes and vapours	T59.8
<i>Mental and behavioural disorders due to use of volatile solvents:</i>		
Acute intoxication	Acute intoxication	F18.0
Harmful use	Harmful use	F18.1
Dependence	Dependence syndrome	F18.2
Withdrawal	Withdrawal state	F18.3
Withdrawal	Withdrawal state with delirium	F18.4
Psychotic disorder	Psychotic disorder	F18.5
Other	Amnesic syndrome	F18.6
Psychotic disorder	Residual and late-onset psychotic disorder	F18.7
Other	Other mental and behavioural disorders	F18.8
Other	Unspecified mental and behavioural disorder	F18.9

## Multiple drug use-related hospital separations

The following ICD-10-AM codes were used to examine trends in multiple drug use-related hospital separations from 1999-00 to 2017-18.

Diagnosis category	ICD-10 diagnosis	ICD-10-AM
<i>Mental and behavioural disorders due to multiple drug use and use of psychoactive substances:</i>		
Acute intoxication	Acute intoxication	F19.0
Harmful use	Harmful use	F19.1
Dependence	Dependence syndrome	F19.2
Withdrawal	Withdrawal state	F19.3
Withdrawal	Withdrawal state with delirium	F19.4
Psychotic disorder	Psychotic disorder	F19.5
Other	Amnesic syndrome	F19.6
Psychotic disorder	Residual and late-onset psychotic disorder	F19.7
Other	Other mental and behavioural disorders	F19.8
Other	Unspecified mental and behavioural disorder	F19.9

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## Related Links

Data visualisations: [https://drugtrends.shinyapps.io/hospitalisations\\_2018](https://drugtrends.shinyapps.io/hospitalisations_2018)

- Methods document: <https://ndarc.med.unsw.edu.au/resource/trends-drug-related-hospitalisations-australia-1999-2018>
- For more information on NDARC research, go to: <http://ndarc.med.unsw.edu.au/>
- For more information about the AIHW and NHMD, go to: <https://www.aihw.gov.au/>
- For more information on ICD coding go to: <http://www.who.int/classifications/icd/en/>  
<https://www.ihsa.gov.au/what-we-do/icd-10-am-achi-acs-current-edition>
- For more research from the Drug Trends program go to: <https://ndarc.med.unsw.edu.au/program/drug-trends>

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