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AODstats

Methods for the Victorian data maps

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AODstats Methods
Document Version 11.0
Mar 2025

CONTENTS

INTRODUCTION

Turning Point is Australia's leading national addiction treatment, training and research centre, seeking to transform the way society provides treatment, specialist care and support for those affected by addiction. This work transforms lives, with over 100,000 Australians seeking support from Turning Point's skilled clinicians every year. Turning Point's research and health surveillance teams inform new cutting-edge treatments and shape health and social policy. The workforce training and education team equip frontline staff with skills and confidence to respond.

Alcohol and other drug stats (AODstats) is an interactive statistics and mapping website capturing information on harms related to alcohol and the use of illicit and pharmaceutical drugs in Victoria

This methods document describes the data, sources, and calculations that are presented in AODstats. It is intended as a reference for AODstats users who require background information when interpreting and presenting data and graphs sourced from AODstats.

METHODOLOGY

AODstats website (www.aodstats.org.au) presents alcohol and other drug-related primary and secondary data collected from a variety of data sources. Secondary data analysis involves using data for purposes other than what was originally intended when collected, such as re-analysing census or government survey data. These types of data are also referred to as 'available data' or 'indicator data'. Administrative data sets including hospitalisation data, mortality, road injury, and assault data are widely used for secondary analysis. Administrative data are based on routinely collected information for reporting and monitoring purposes. Although there are a multitude of sources for secondary data analysis, at present the focus of AODstats is largely administrative data.

There are several advantages to using secondary data. These include: population coverage, sample size (usually larger than could be achieved otherwise), and cost effectiveness, as savings are made at most stages of the research process such as survey design, data collection, data entry and preparation.

However, there are also several limitations to consider before using and interpreting secondary data, such as incomplete or missing data, and inadequate coding. For example, the VicRoads datasets capture information on road accidents involving all road users, including drivers, passengers of vehicles, and pedestrians. However, road injury data collated by VicRoads does not include a measure of alcohol involvement in all injuries, as blood alcohol concentration (BAC) readings are not performed by police at all accidents. A surrogate measure for alcohol-related road injury is therefore warranted. For example, high alcohol hours – explained in more detail later in this document – are used as the surrogate. Although surrogate measures can provide an adequate solution, they are not perfect. There will inevitably be events that are missed when they should be included and, conversely, events included when they should not. Ferris et al [1] demonstrated the utility of the surrogate HAH measure for determining changes in alcohol-related serious road injuries.

DATA SOURCES

Fourteen data sources, comprising six-unit record datasets and seven aggregated datasets, are used in AODstats. They include:

- Ambulance data from Ambulance Victoria
- Victorian hospital admissions data from the Victorian Hospital Admitted Episodes Data (VAED),

accessed from Victorian Department of Health and Human Services (DHHS);
- Alcohol and drug treatment services data (ADIS) from DHHS;
- Victorian Cause of Death Unit Record File (COD URF) from the Australian Coordinating Registry (ACR);
- Serious road injuries from the VicRoads Road Network Database (RNDB);
- Aggregated assault and family incident data derived from the Victoria Police Law Enforcement Assistance Program data (LEAP), accessed from Crime Stats Agency (CSA);
- DirectLine telephone service data from Turning Point;
- Counselling Online information from Turning Point;
- Needle and Syringe Program (NSP) data from DHHS;
- Opioid Replacement Therapy (ORT) data from DHHS;
- HIV, Hepatitis B, and Hepatitis C notifications from Burnet Institute;

Ambulance Data

The examination of alcohol- and other drug-related events attended by ambulance paramedics in Victoria is a collaborative project between Turning Point's NAMHSU team and Ambulance Victoria, and is funded by the Victorian Department of Health and Human Services. The annual report for the Ambo Project: Alcohol and Drug-Related Ambulance Attendances was previously published online [2] and is now incorporated into the AODstats online platform.

Ambulance Victoria (AV) is the Victorian Government enterprise charged with the state-wide role of ensuring that the people of Victoria receive the most appropriate response to personal and community medical emergencies, and medical transport. It is a critical link in Victoria's healthcare and emergency management systems. An overview of AV and their services is provided at https://www.ambulance.vic.gov.au/about-us/our-services/ [3].

In response to fatal heroin overdose increases in Victoria in the late 1990's, Turning Point established a project to examine non-fatal heroin overdose using ambulance service records, with data available from 1998 onwards for the Metropolitan Melbourne area [4]. Inclusion of alcohol, pharmaceutical drugs and illicit substances other than heroin expanded the reach of the research and the project has evolved into the National Ambulance Surveillance System (NASS), a unique Australian system for monitoring and mapping acute harms related to alcohol and other drug consumption [5]. Data for AODstats, sourced from NASS, are available from Metropolitan Melbourne and regional Victorian areas from 2012 onwards.

Hospital admissions (VAED)

Information on alcohol and drug-related hospital admissions are obtained from the Victorian Admitted Episodes Dataset (VAED). The VAED is a database maintained by the Victorian Department of Health and Human Services, and contains details of all acute hospital separations in Victoria including information on the cause of the admission (according to ICD-10 coding [6]), as well as the age, sex, and resident LGA of the admitted patient. The term 'acute hospitals' refers to public, private, and denominational hospitals, acute facilities in rehabilitation and extended care (sub-acute) facilities, day procedure centres, and designated acute psychiatric units in public hospitals. Residential care (nursing homes), hostels, supported residential services, and state managed psychiatric institutions are not included in the VAED. An overview of the VAED is provided at http://www.health.vic.gov.au/hdss/vaed [7]. The ICD-10 codes used for AODstats can be found in Tables 2, 3 and 4 (Sourced from [8, 9]).

Victorian Alcohol and Drug Collection (VADC)

Since 2018 the Victorian Alcohol and Drug Collection (VADC) has collected client level statistical information from alcohol and drug treatment services across the state [10]. The VADC replaced the Alcohol and Drug Information System (ADIS) which was used up to and including the 2017/18

financial year [10]. Drug treatment services with Victoria provide a range of assessment, treatment and support services to adults an young people who have alcohol and/or drug use problems, and to their families and carers [10]. The data presented in AODstats are derived from unit level data using both ADIS up to 2017/18 and VADC (from 2018/19) obtained from the Department of Health and Human Services. Note, due to clinics changing when they were ready, there is no clear-cut date as to when ADIS changed to VADC in the 2018/19 financial year, which means there are two datasets (ADIS and VADC) merged together for the year. Data from 2019/20 will be only from VADC.

The Service stream definitions included in AODstats can be found in Table 8.

Mortality Data

The confidential Cause of Death Unit Record File (COD URF) data file holds information on all deaths that occur for all residents, registered in Australia for a given reference year. Deaths are coded from death certificates compiled by the collective jurisdictional Registries of Birth, Deaths and Marriages, and State and Chief Coroners, using ICD10 codes for calendar years 1999 onwards. Up to and including 2007, the Australian Bureau of Statistics (ABS) was the Australian Coordinating Registry (ACR) for obtaining COD URF and since the 2008 calendar year, data have been obtained from the new ACR, the Queensland Registry of Births, Deaths and Marriages (BDM).

Deaths data and information about causes of death are released each year. However, the timeliness of deaths data should be considered given the processing cycle and revisions to the causes of death. Data are processed according to a reference year; all deaths that are received by the ABS for a reference year and within a specified period are captured and counted for that reference year. The scope of the reference year includes:

- deaths registered in the reference year and received by the ABS in the reference year
- deaths registered in the reference year and received by the ABS in the first quarter of the subsequent year
- deaths registered in the years prior to the reference year but not received by the ABS until the reference year or the first quarter of the subsequent year, provided that these records have not been included in any statistics from earlier periods [11].

The first release of the coded causes of death is referred to as the ‘preliminary’ version. In this version, deaths that were reported to the coroner but remain as an open case usually have a non-specific cause (unknown) cause of death. Following the release of the preliminary cause of death data, the cause of death for coroner-certified deaths are revised to ascertain a more specific cause of death for any subsequently closed coroner cases. This revision results in a ‘revised’ version of the cause of death data and is then followed by a ‘final’ version of cause of death data. For AODstats, final versions are used when available and preliminary versions are used for all other years where final versions are not yet available.

Drug information from the COD URF is determined from the underlying cause of death (UCOD) and associated cause of death ICD10 codes. The underlying cause of death is defined by the World Health Organization (WHO) as the disease or injury that initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury. Whilst many deaths will have contributing causes or associated causes (i.e. other diseases or conditions that contributed to the death), particularly those relating to alcohol and drugs, these were not the underlying cause. Analysis of both the underlying cause of death and contributing cause of death is important as it points to where interventions could be targeted.

In AODstats, all numbers are based on deaths of persons who usually resided in Victoria for the year in which the death was registered. For deaths, substances are determined by those where the substance induced the death (i.e. the substance caused the death) or if the substance is related to

the death (i.e. involved but not the total cause).

The ICD-10 codes used for deaths on AODstats can be found in Table 1,Table 2,Table 3, or Table 4 (Sourced from [12–15].

Serious Road Injury (SRI) data

The VicRoads Road Network Database (RNDB) is compiled from Victoria Police information. Forms completed by police detailing each crash, where (according to postcode) and when it occurred, persons involved, vehicles involved, and a description of the crash are entered into a police database. Please note that serious road injuries relate to all road users, not just drivers (pedestrians, passengers, cyclists etc.). This information is transferred weekly to the VicRoads RNDB. Additional information from these forms, not entered by police, is added to the RNDB by VicRoads. Data were obtained from VicRoads. Crashes were assigned to LGAs according to the recorded postcode of the location of the accident through the application of ABS census-derived conversion data.

Over time, there has been a change in the definition of a serious road injury (SRI). From 2009/10 onwards, an SRI has been defined as a fatality or an admission to hospital. Since 2009/10, police follow up with the hospital, and only those cases that are admitted are classified as an SRI. Prior to this, an SRI was defined as a fatality or transport to hospital. Therefore, AOD-stats users will notice a sizeable decrease in the number of SRIs between 2008/09 and 2009/10, largely attributable to this definition change. As well as this definition change, data may also be incomplete when an incident has not yet been approved by Victoria Police. This may be due to ongoing investigation or prosecution by the courts. Furthermore, an incident may not yet have been finalised and therefore cannot be processed by VicRoads due to incorrect and/or missing information. Finally, data may be incomplete when the incident record is returned to Victoria Police for amendment.[1]

SRI data were downloaded from VicRoads CrashStats (an online interactive statistics and mapping application for VicRoads RNDB road crashes) [16]. CrashStats updates this online data monthly and is downloaded from this link:
https://www.data.vic.gov.au/data/dataset/crash-stats-data-extract.

Law Enforcement Assistance Program (LEAP), Crime Statistics Agency (CSA)

The Victoria Police collate statistics on the number of reported incidents recorded for a variety of offence types on the Law Enforcement Assistance Program (LEAP), a computerised database established in 1993. Reported incidents of assault and family incidents (a measure of domestic violence) are recorded along with information on the location of the assault.

Data were obtained from Crime Statistics Agency (CSA), which collates statistics from the Victoria Police LEAP database. CSA conducts quality checks and processes the data before analysing the data to identify movements and potential trends. The resulting aggregated statistics are then signed off by the Chief Statistician, and crime statistics are released to the public every quarter via the CSA website. The datasets include: offences recorded, alleged offender incidents, victim reports, and family incidents. AODstats reports victim assaults and family incidents and is provided at an LGA level.

DirectLine, Turning Point

DirectLine (including Ice Advice and Pharmacotherapy Information) provides 24-hour telephone

[1] This information was provided by Victoria Police in a personal communication with VicRoads (February 2012)

counselling, information, and referral services for Victorians to discuss alcohol- and other drug-related issues. DirectLine is managed by HealthLink, a program of Turning Point. The NAMHSU@ TP team has access to data from July 1998 and conducts a variety of analyses for drug trend monitoring in Victoria.

Data were limited to valid DirectLine calls by removing all administrative, hoax, immediate hang up or wrong number calls, as defined by qualified counsellors. HealthLink manages several addiction-related health information and referral telephone support services and calls for these services were also excluded from analysis. Specifically, telephone calls for the YSASline, Drug and Alcohol Clinical Advisory Service (DACAS), Youth Campaign calls and Gambler's Help, from Tasmania or from the Northern Territory were excluded.

Counselling Online, Turning Point

Counselling Online provides 24-hour online counselling, information and referral services, which is easily accessible and anonymous, for all people in Australia. For AODstats, all numbers are based on services of persons who usually resided in Victoria for the year in which the service occurred.

Needle and Syringe Program, DHHS

The Needle and Syringe Program (NSP) data have been collated from the Australian NSP Survey. It is an annual cross-sectional survey of NSP attendees across Australia that forms the basis of human immunodeficiency virus (HIV) and hepatitis C (HCV) surveillance among people who inject drugs in Australia. Monitoring behavioural indices of risk, in addition to infection prevalence, the Australian NSP Survey provides important information for planning prevention and treatment and also supporting policies and services. Each year during the designated survey week, all clients who attend selected NSPs are asked to complete a brief, anonymous questionnaire and to provide a capillary blood sample for HIV and HCV antibody testing. The questionnaire collected data on demographic characteristics, injecting behaviours, sexual behaviours, and history of BBV testing, imprisonment, and drug treatment. For AODstats, only data regarding needle distribution and returns are reported.

Opioid Replacement therapy, DHHS via AIHW

Opioid Replacement Therapy (ORT) data are collated from the Victorian Opioid Pharmacotherapy Program. Methadone and buprenorphine are used in the treatment of opioid dependence. These data are no longer included in AODstats as AIHW provide national data here:

https://www.aihw.gov.au/reports/alcohol-other-drug-treatment-services/national-opioid-pharmacotherapy-statistics/data

HIV, Hepatitis B and C, Burnet Institute

The communicable diseases, epidemiology and surveillance program at Burnet Institute collects HIV, Hepatitis B and Hepatitis C data. The Victorian Department of Health provides this data and therefore is no longer reported on AODstats. The data can be found here:

https://www.health.vic.gov.au/infectious-diseases/interactive-infectious-disease-reports

DRUG CATEGORIES

The following drug categories are included on our site:

1. Alcohol: Indicates case of alcohol involvement (intoxication for Ambulance data), with or without other drug/substance involved.
2. Alcohol Only: Although other drugs cannot be absolutely ruled out in 'alcohol only'

attendances, data indicates that the presentation was caused by alcohol and, as far as could be determined; no other substances were involved – Only available for Ambulance data

3. Amphetamines (Any): Indicates case where any amphetamine was involved.
4. Amphetamines (Crystal): Indicates case where crystal methamphetamine or 'ice' was involved. This category is a subset of Amphetamines (Any).
5. Analgesics: Indicates case where pain relief medications were involved, such as aspirin or paracetamol.
6. Antidepressants: Indicates cases where an antidepressant was involved, such as citalopram or sertraline.
7. Antipsychotics: Indicates cases where an antipsychotic was involved, such as amisulpride or quetiapine.
8. Benzodiazepines: Indicates case where a benzodiazepine was involved, such as alprazolam or diazepam.
9. Cannabis: Indicates case where cannabis or hashish was involved.
10. GHB (Gamma-hydroxybutyrate): Indicates case where GHB was involved.
11. Hallucinogens: Indicates case where a hallucinogen was involved, including LSD or mushrooms.
12. Heroin: Indicates case where any heroin was involved.
13. Heroin Overdose (responded to naloxone): Indicates case where heroin was involved in attendance and a positive response to the administration of naloxone was recorded.
14. Illicit Drugs (Any): Indicates case where any illicit drug was primarily involved in the event, including heroin, opioids, amphetamines, cannabis, stimulants, GHB, hallucinogens, inhalants, synthetic cannabis, or other illicit drugs not explicitly mentioned. It cannot be ruled out that other substances were not present.
15. Inhalants: Indicates case where any volatile substance, inhalant or solvent was involved, such as chrome or petrol.
16. Opioids: Indicates case where an opioid was involved, including opioid analgesics such as morphine or oxycodone.
17. Other Sedatives: Indicates case where a sedative (excluding opioids and benzodiazepines) was involved in the event, such as ketamine.
18. Other Stimulants (excluding amphetamines): Indicates case where a stimulant was involved, including cocaine or ecstasy.
19. Pharmaceutical Drugs (Any): Indicates case where a prescription or pharmaceutical drug was primarily involved in the event, including antidepressants, antipsychotics, benzodiazepines, analgesics, sedatives, pharmacotherapy, steroids or other medications (prescribed or non-prescribed) not explicitly mentioned. It cannot be ruled out that other substances were not present.
20. Pharmacotherapy: Indicates case where synthetic opioids were involved such as those used in ORT, including methadone and buprenorphine.

DATA EXTRACTION AND TRANSFORMATION

Some of the datasets obtained required further transformation prior to analysis.

Cases resulting from high-risk alcohol and other drug consumption were extracted from the overall datasets through the following procedure:

1. Ambulance data are manually coded for alcohol and other drugs
2. Hospital admissions containing alcohol- or drug-related ICD-10 diagnosis codes, as the primary diagnosis, were extracted from VAED.
3. Fatalities involving alcohol or drugs were extracted from Cause of Death (COD) Unit Record Files (URF) using ICD-10 codes for substance induced deaths and substance related deaths.
4. Alcohol hours were applied to Serious Road injury data, using available time stamps, to determine alcohol harms

Determination of AOD-related ambulance events

Specialist NAMHSU@Turning Point project staff manually code for the drugs and substances involved in the event. A case is determined to be AOD-related if the immediate or recent over or inappropriate use of a substance or medication is assessed as significant to the reason for paramedic attendance. Chronic use of a substance alone is not sufficient for inclusion in the analysis. More specific details of these methods can be found here: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0228316 [5].

Estimation of substance induced and substance related deaths

ICD-10. ICD-10 codes are assigned to all conditions listed on a death certificate, and rules are applied to determine the underlying cause of death. According to the World Health Organisation (WHO), the underlying cause of death is the disease or injury that initiated the chain of events leading directly to death. Multiple causes of death include all conditions recorded on the death certificate, including both underlying and associated causes. For AODstats, ICD-10 codes were used at both the underlying (UCOD) and multiple cause of death (MCOD) levels to classify drug-related fatalities. Further details on the ICD-10 codes used can be found in the methods document.

Alcohol Induced Deaths

Alcohol-induced causes exclude accidents, homicides, and other causes indirectly related to alcohol use. This category also excludes newborn deaths associated with maternal alcohol use.

Table 1: Causes of death attributable to alcohol-induced mortality include ICD-10 codes

ICD 10	Disease	ICD 10	Disease
E24.4	Alcohol-induced pseudo-Cushing's syndrome	K70	Alcoholic liver disease
F10	Mental and behavioural disorders due to alcohol use	K85.2	Alcohol-induced acute pancreatitis
G31.2	Degeneration of nervous system due to alcohol	K86.0	Alcohol-induced chronic pancreatitis
G62.1	Alcoholic polyneuropathy	X45	Accidental poisoning by and exposure to alcohol
G72.1	Alcoholic myopathy	X65	Intentional self-poisoning by and exposure to alcohol
I42.6	Alcoholic cardiomyopathy	Y15	Poisoning by and exposure to alcohol, undetermined intent.
K29.2	Alcoholic gastritis		

Source: [12–14]

Alcohol-related Deaths

The following criteria were used where meeting any one of the below resulted in inclusion for alcohol-related deaths.

Table 2: Criteria for determining alcohol-related deaths

Criterion 1	There was an alcohol-related underlying cause of death of: • accidental poisoning by and exposure to alcohol (X45) or • intentional self-poisoning by and exposure to alcohol (X65) or • poisoning by and exposure to alcohol, undetermined intent (Y15)
OR	
Criterion 2	• there was an injury-related cause of death (S00–T75; T79) and • there was an injury-related external cause of death (V01–Y36) anywhere in the record and • there was an in-scope alcohol-related diagnosis as a cause of death (F10.0, F10.1, F10.2, R78.0, Z72.1)
OR	
Criterion 3	• there was an in-scope alcohol-related injury diagnosis as a cause of death (T51.0, T51.9) and • there was an injury-related external cause of death (V01–Y36) anywhere in the record
OR	
Criterion 4	• there was an injury-related cause of death (S00–T75; T79) and • there was an in-scope alcohol-related associated cause of death (X45, X65, Y15).

Source:[12, 15]

Drug Induced Death

Drug-induced causes exclude accidents, homicides, and other causes indirectly related to drug use. Also excluded are newborn deaths associated with mother's drug use.

Table 3: Cause of death attributed to drug-induced mortality include ICD-10 codes

ICD 10	Disease	ICD 10	Disease
D52.1	Drug-induced folate deficiency anaemia	G21.1	Other drug-induced secondary Parkinsonism
D59.0	Drug-induced haemolytic anaemia	G24.0	Drug-induced dystonia
D59.2	Drug-induced nonautoimmune haemolytic anaemia	G25.1	Drug-induced tremor
D61.1	Drug-induced aplastic anaemia	G25.4	Drug-induced chorea
D64.2	Secondary sideroblastic anaemia due to drugs and toxins	G25.6	Drug-induced tics and other tics of organic origin
E06.4	Drug-induced thyroiditis	G44.4	Drug-induced headache, not elsewhere

			classified
E16.0	Drug-induced hypoglycaemia without coma	G62.0	Drug-induced polyneuropathy
E23.1	Drug-induced hypopituitarism	G72.0	Drug-induced myopathy
E24.2	Drug-induced Cushing's syndrome	I95.2	Hypotension due to drugs
E27.3	Drug-induced adrenocortical insufficiency	J70.2	Acute drug-induced interstitial lung disorders
E66.1	Drug-induced obesity	J70.3	Chronic drug-induced interstitial lung disorders
F11.0-F11.5	Use of opioids causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis	J70.4	Drug-induced interstitial lung disorder, unspecified
F11.7-F11.9	Use of opioid causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders	K85.3	Drug-induced acute pancreatitis
F12.0-F12.5	Use of cannabis causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis	L10.5	Drug-induced pemphigus
F12.7-F12.9	Use of cannabis causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders	L27.0	Generalized skin eruption due to drugs and medicaments
F13.0-F13.5	Use of sedative or hypnotics causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis	L27.1	Localized skin eruption due to drugs and medicaments
F13.7-F13.9	Use of sedative or hypnotics causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders	M10.2	Drug-induced gout
F14.0-F14.5	Use of cocaine causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis	M32.0	Drug-induced systemic lupus erythematosus
F14.7-F14.9	Use of cocaine causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders	M34.2	Systemic sclerosis induced by drug and chemical
F15.0-F15.5	Use of caffeine causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis	M80.4	Drug-induced osteoporosis with pathological fracture
F15.7-F15.9	Use of caffeine causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders	M81.4	Drug-induced osteoporosis
F16.0-F16.5	Use of hallucinogens causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis	M83.5	Other drug-induced osteomalacia in adults
F16.7-F16.9	Use of hallucinogens causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders	M87.1	Osteonecrosis due to drugs

F18.0-F18.5	Use of volatile solvents causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis	X40-X44	Accidental poisoning by and exposure to drugs, medicaments and biological substances
F18.7-F18.9	Use of volatile solvents causing late onset psychosis, other mental and behavioural disorders and unspecified behavioural disorders	X60-X64	Intentional self-poisoning (suicide) by and exposure to drugs, medicaments and biological substances
F19.0-F19.5	Use of multiple drugs and other psychoactive substances causing intoxication, harmful use (abuse), dependence, withdrawal or psychosis	X85	Assault (homicide) by drugs, medicaments and biological substances
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	Y10-Y14	Poisoning by and exposure to drugs, medicaments and biological substances, undetermined intent

Source: [12–14]

Drug Induced deaths by Drug Type

Causes of death attributable to substances are drug induced deaths where a specific ICD-10 code is also present at the multiple causes of death level.

Table 4: Drug Induced deaths by substance type

Drug Type	ICD 10	Disease
Analgesic	**UCOD:** Drug-induced death & **MCOD:** T390, T391, T392, T393, T394, T395, T397, T398, T399	Poisoning by nonopioid analgesics, antipyretics and antirheumatics – including Salicylates, 4-Aminophenol derivatives, Pyrazolone derivatives, Other nonsteroidal anti-inflammatory drugs [NSAID], Antirheumatics and Other nonopioid analgesics and antipyretics.
Antidepressant	**UCOD:** Drug-induced death & **MCOD:** T430, T431, T432	Poisoning by psychotropic drugs – including Tricyclic and tetracyclic antidepressants, Monoamine-oxidase-inhibitor antidepressants and Other and unspecified antidepressants.
Antipsychotic	**UCOD:** Drug-induced death & **MCOD:** T433, T434, T435	Poisoning by psychotropic drugs – including Phenothiazine antipsychotics and neuroleptics, Butyrophenone and thioxanthene neuroleptics and Other and unspecified antipsychotics and neuroleptics.
Benzodizepine	**UCOD:** Drug-induced death & **MCOD:** T424	Poisoning by Benzodiazepines
Cannabis	**UCOD:** Drug-induced death & **MCOD:** F120, F121, F122, F123, F124, F125, F126, F127, F128, F129, T407	Mental and behavioural disorders due to use of cannabinoids, Poisoning by Cannabis (derivatives)
Hallucinogen	**UCOD:** Drug-induced death & **MCOD:** F160, F161, F162, F163, F164, F165, F166, F167, F168, F169, T408, T409	Mental and behavioural disorders due to use of hallucinogens

Heroin	**UCOD:** Drug-induced death & **MCOD:** T401	Poisoning by Heroin
Inhalant	**UCOD:** Drug-induced death & **MCOD:** F180, F181, F182, F183, F184, F185, F186, F187, F188, F189 T52, T520, T521, T522, T523, T524, T528, T529, T53, T530, T531, T532, T533, T534, T535, T536, T537, T539, T590, T598, X46, X66	Mental and behavioural disorders due to use of volatile solvents, Toxic effects of organic solvents, Toxic effect of halogen derivatives of aliphatic and aromatic hydrocarbons, Toxic effect of Nitrogen oxides and Other specified gases, fumes and vapours, Accidental poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours, Intentional self-poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours.
Opioid (excl heroin and pharmacotherapy)	**UCOD:** Drug-induced death & **MCOD:** F110, F111, F112, F113, F114, F115, F116, F117, F118, F119, T400, T402, T404, T406	Mental and behavioural disorders due to use of opioids, Poisoning by narcotics and psychdysleptics – including opium, Other opioids, Other synthetic narcotics and Other and unspecified narcotics
Pharmacotherapy	**UCOD:** Drug-induced death & **MCOD:** T403	Poisoning by Methadone
Sedative	**UCOD:** Drug-induced death & **MCOD:** F130, F131, F132, F133, F134, F135, F136, F137, F138, F139, T42, T420, T421, T422, T423, T425, T426, T427, T428	Mental and behavioural disorders due to use of sedatives or hypnotics, Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs (excluding benzodiazepines)
Stimulant	**UCOD:** Drug-induced death & **MCOD:** F140, F141, F142, F143, F144, F145, F146, F147, F148, F149, F150, F151, F152, F153, F154, F155, F156, F157, F158, F159, T405, T436	Mental and behavioural disorders due to use of cocaine, Mental and behavioural disorders due to use of other stimulants, including caffeine, Poisoning by Cocaine or Psychostimulants with abuse potential

Table Notes: UCOD – underlying/primary cause of death; MCOD – multiple causes of death. Source: [12–14]

Wholly (or partially) attributable alcohol- and/or drug-related hospitalisations

Using VAED data, admissions with a 'primary' diagnosis wholly (or partially) attributable to alcohol and or drugs were used for AODstats. This method considers all those diagnostic fields for each hospital admission coded as a primary diagnosis. That is, all codes were inspected for the existence of at least one diagnosis wholly (or partially) attributable to alcohol and/or drugs that was also considered to be a primary diagnosis (i.e. "P" in diagnostic field). Primary diagnoses are applied if they required 'commencement, alteration or adjustment of therapeutic treatment', 'diagnostic

procedures', or 'increased clinical care and/or monitoring'[2]. Lists of the diagnoses considered to be wholly (or partially) attributable to alcohol and/or drugs are provided in Table 2, Table 3 and Table 4.

TABLE 5: DISEASE CONDITIONS WHICH ARE BY DEFINITION ALCOHOL-RELATED

ICD 10	Disease	ICD 10	Disease
E24.4	Alcohol-induced pseudo-Cushing's syndrome	K85.2	Alcohol-induced acute pancreatitis
E52	Niacin deficiency (pellagra)	K86.0	Alcohol-induced chronic pancreatitis
F10	Mental and behavioural disorders due to use of alcohol	O35.4	Maternal care for (suspected) damage to foetus from alcohol
F10.0	Acute intoxication	P04.3	Foetus and newborn affected by maternal use of alcohol
F10.1	Harmful use	Q860	Fetal alcohol syndrome (dysmorphic)
F10.10	Alcohol abuse, uncomplicated	R78.0	Finding of alcohol in blood
F10.12	Alcohol abuse with intoxication	T51	Toxic effect of alcohol
F10.14	Alcohol abuse with alcohol-induced mood disorder	T51.0	Toxic effect of ethanol
F10.15	Alcohol abuse with alcohol-induced psychotic disorder	T51.1	Toxic effect of methanol
F10.18	Alcohol abuse with other alcohol-induced disorders	T51.8	Toxic effect of other alcohols
F10.19	Alcohol abuse with unspecified alcohol-induced disorder	T51.9	Toxic effect of unspecified alcohol
F10.2	Dependence syndrome	X45	Accidental poisoning by and exposure to alcohol
F10.3	Withdrawal state	X65	Intentional self-poisoning by and exposure to alcohol
F10.4	Withdrawal state with delirium	Y15	Poisoning by and exposure to alcohol, undetermined intent
F10.5	Psychotic disorder	Y90	Evidence of alcohol involvement determined by blood alcohol level
F10.6	Amnesic syndrome	Y90.0	Blood alcohol level of less than 20 mg/100 ml
F10.7	Residual and late-onset psychotic disorder	Y90.1	Blood alcohol level of 20-39 mg/100 ml
F10.8	Other mental and behavioural disorders	Y90.2	Blood alcohol level of 40-59 mg/100 ml
F10.9	Unspecified mental and behavioural disorders	Y90.3	Blood alcohol level of 60-79 mg/100 ml
G31.2	Degeneration of nervous system due to alcohol	Y90.4	Blood alcohol level of 80-99 mg/100 ml
G62.1	Alcoholic polyneuropathy	Y90.5	Blood alcohol level of 100-119 mg/100 ml
G72.1	Alcoholic myopathy	Y90.6	Blood alcohol level of 120-199 mg/100 ml
I42.6	Alcoholic cardiomyopathy	Y90.7	Blood alcohol level of 200-239 mg/100 ml
K29.2	Alcoholic gastritis	Y90.8	Blood alcohol level of 240 mg/100 ml or more
K29.20	Alcoholic gastritis without hemorrhage	Y90.9	Presence of alcohol in blood, level not specified
K29.21	Alcoholic gastritis with hemorrhage	Y91	Evidence of alcohol involvement determined by level of intoxication
K70	Alcoholic liver disease	Y91.0	Mild alcohol intoxication
K70.0	Alcoholic fatty liver	Y91.1	Moderate alcohol intoxication
K70.1	Alcoholic hepatitis	Y91.2	Severe alcohol intoxication
K70.2	Alcoholic fibrosis and sclerosis of liver	Y91.3	Very severe alcohol intoxication
K70.3	Alcoholic cirrhosis of liver	Y91.9	Alcohol involvement, not otherwise specified
K70.4	Alcoholic hepatic failure	Z71.4	Counselling and surveillance for alcohol use disorder
K70.9	Alcoholic liver disease, unspecified	Z72.1	Problems related to lifestyle: Alcohol use

[2] Source: [17]

TABLE 6: DISEASE CONDITIONS WHICH ARE BY DEFINITION ILLICIT DRUG-RELATED

ICD10	Disease	AODstats sub-category of drug
F12.0 – F12.9	Mental and behavioural disorders due to use of Cannabinoids	Cannabis
T40.7	Poisoning by Cannabis	Cannabis
F13.01 – F13.91	Mental and behavioural disorders due to use of Gamma hydroxybutyrate	GHB
T41.21	Poisoning by Gamma hydroxybutyrate	GHB
F16.0 – F16.9	Mental and behavioural disorders due to use of Hallucinogens	Hallucinogens
R78.3	Finding of hallucinogen in blood	Hallucinogens
T40.8	Poisoning by LSD	Hallucinogens
T40.9	Poisoning by Other and unspecified psychodysleptics [hallucinogens]	Hallucinogens
T40.1	Poisoning by Heroin (AF=1)	Heroin
F18.0 – F18.9	Mental and behavioural disorders due to use of Volatile solvents	Inhalants
T41.0	Poisoning by Inhaled anaesthetics	Inhalants
T51.2	Toxic effects of 2-Propanol	Inhalants
T51.3	Toxic effects of fusel oil	Inhalants
T52 – T52.9	Toxic effects of organic solvents	Inhalants
T53 – T53.9	Toxic effects of halogen derivatives of aliphatic and aromatic hydrocarbons	Inhalants
T59.0	Toxic effect of Nitrogen oxides	Inhalants
T59.8	Toxic effect of Other specified gases, fumes and vapours	Inhalants
X46	Accidental poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours	Inhalants
X66	Intentional self-poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours	Inhalants
Y16	Poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapour, undetermined intent	Inhalants
F15.01 – F15.91	Mental and behavioural disorders due to use of methylamphetamine (AF=1)	Methamphetamine
T43.61	Psychostimulants with potential for use disorder, methylamphetamine (AF=1)	Methamphetamine
F11.0 – F11.9	Mental and behavioural disorders due to use of opioids	Opioids
R78.1	Finding of opiate drug in blood	Opioids
T40.0	Poisoning by Opium	Opioids
T40.2	Poisoning by Other opioids	Opioids
T40.4	Poisoning by Other synthetic narcotics	Opioids
T40.6	Poisoning by Other and unspecified narcotics	Opioids
F14.0 – F14.9	Mental and behavioural disorders due to use of cocaine	Stimulants
F15.0 – F15.9	Mental and behavioural disorders due to use of other stimulants, including caffeine	Stimulants
F15.00 – F15.90	Mental and behavioural disorders due to unspecified stimulants	Stimulants
F15.02 – F15.92	Mental and behavioural disorders due to use of methylenedioxy methamphetamine (ecstasy)	Stimulants
F15.09 – F15.99	Mental and behavioural disorders due to use of other specified stimulants	Stimulants
R78.2	Finding of cocaine in blood	Stimulants
T40.5	Poisoning by narcotics and psychodysleptics [hallucinogens]: Cocaine	Stimulants
T43.6 -	Poisoning by psychotropic drugs [psychostimulants] with potential for use disorder	Stimulants
T43.60	Poisoning by unspecified psychostimulants	Stimulants
T43.63	Poisoning by methylphenidate	Stimulants
T43.69	Poisoning by other psychostimulants	Stimulants
O35.5	Maternal care for (suspected) damage to foetus by drug (drug addiction)	Other Illicit
P04.4	Fetus and newborn affected by maternal use of drugs of addiction	Other Illicit
R78.4	Finding of other drugs of addictive potential in blood	Other Illicit
X42	Accidental poisoning by and exposure to narcotics and psychodysleptics (hallucinogens), not elsewhere classified	Other Illicit
X62	Intentional self-poisoning by and exposure to narcotics and psychodysleptic (hallucinogens), not elsewhere classified	Other Illicit

Y12	Poisoning by and exposure to narcotics and psychodysleptics (hallucinogens), not elsewhere classified, undetermined intent	Other Illicit
Z72.2	Problems related to lifestyle: Drug use	Other illicit

TABLE 7: DISEASE CONDITIONS WHICH ARE BY DEFINITION PHARMACEUTICAL DRUG-RELATED

ICD10	Disease	AODstats sub-category of drug
N14.0	Analgesic nephropathy	Analgesics
F55.2	Harmful use of nondependence-producing substance, analgesics	Analgesics
T39 – T39.9	Poisoning by non-opioid analgesics, antipyretics and antirheumatics.	Analgesics
X40	Accidental poisoning by and exposure to non-opioid analgesics, antipyretics and antirheumatics	Analgesics
X60	Intentional self-poisoning by and exposure to non-opioid analgesics, antipyretics and antirheumatics	Analgesics
Y10	Poisoning by and exposure to non-opioid analgesics, antipyretics and antirheumatics, undetermined intent	Analgesics
F55.0	Harmful use of nondependence-producing substance, antidepressants	Antidepressants
T43.0 – T43.2	Poisoning by antidepressants (Including Tricyclic and tetracyclic antidepressants, Monoamine-oxidase-inhibitor antidepressants, Other and unspecified antidepressant	Antidepressants
T43.3 – T43.59	Poisoning by antipsychotics (Including phenothiazine antipsychotics and neuroleptics, butyrophenone and thiothixene neuroleptics, other and unspecified antipsychotics and neuroleptics, unspecified antipsychotics and neuroleptics, other antipsychotics and neuroleptics)	Antipsychotics
T42.4	Poisoning by benzodiazepines	Benzodiazepines
F13.0 – F13.9	Mental and behavioural disorders due to use of sedatives or hypnotics.	Sedatives
F13.00 – F13.90	Mental and behavioural disorders due to use Unspecified sedative or hypnotic	Sedatives
F13.09 – F13.99	Mental and behavioural disorders due to use of Other specified sedative or hypnotic	Sedatives
T41.0 – T41.20	Poisoning by anaesthetics and therapeutic gases	Sedatives
T41.22 – T41.5	Poisoning by anaesthetics and therapeutic gases	Sedatives
T42.0 – T42.3	Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs.	Sedatives
T42.5 – T42.8	Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs.	Sedatives
T40.3	Poisoning by Methadone	Pharmacotherapy
F55	Harmful use of nondependence-producing substances	Other pharmaceutical
F55.1	Harmful use of laxatives	Other pharmaceutical
F55.3 – F55.9	Harmful use of antacids or vitamins, steroids or hormones, specific herbal or folk remedies, other substances or unspecified non-dependence producing substances	Other pharmaceutical
R78.5	Finding of psychotropic drug in blood	Other pharmaceutical
R78.6	Finding of steroid agent in blood	Other pharmaceutical
T36.0 – T36.9	Poisoning by systemic antibiotics.	Other pharmaceutical
T37.0 – T37.9	Poisoning by other systemic anti-infectives and antiparasitics.	Other pharmaceutical
T38.0 – T38.9	Poisoning by hormones and their synthetic substitutes and antagonists	Other pharmaceutical
T43	Poisoning by psychotropic drugs, not elsewhere classified	Other pharmaceutical
T43.8 – T43.9	Poisoning by psychotropic drugs, other or unspecified	Other pharmaceutical
T44 – T44.99	Poisoning by drugs primarily affecting the autonomic nervous system	Other pharmaceutical
T45 – T45.9	Poisoning by primarily systemic and haematological agents	Other pharmaceutical
T46 – T46.99	Poisoning by agents primarily affecting the cardiovascular system	Other pharmaceutical
T47 – T47.9	Poisoning by agents primarily affecting the gastrointestinal system	Other pharmaceutical

T48 – T48.7	Poisoning by agents primarily affecting acting on smooth and skeletal muscles and the respiratory system	Other pharmaceutical
T49 – T49.9	Poisoning by topical agents primarily affecting skin and mucous membrane and by opthalmological, otorhinolaryngological and dental drugs.	Other pharmaceutical
T50 – T50.99	Poisoning by diuretics and other and unspecified drugs, medicaments and biological substances	Other pharmaceutical
X41	Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs	Other pharmaceutical
X43	Accidental poisoning by and exposure to other drugs acting on the autonomic nervous system	Other pharmaceutical
X44	Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances	Other pharmaceutical
X61	Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs	Other pharmaceutical
X63	Intentional self-poisoning by and exposure to other drugs acting on the autonomic nervous system	Other pharmaceutical
X64	Intentional self-poisoning by and exposure to other and unspecified drugs, medicaments and biological substances	Other pharmaceutical
Y11	Poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, undetermined intent	Other pharmaceutical
Y13	Poisoning by and exposure to other drugs acting on the autonomic nervous system, undetermined intent	Other pharmaceutical
Y14	Poisoning by and exposure to other and unspecified drugs, medicaments and biological substances, undetermined intent	Other pharmaceutical

Victorian Alcohol and drug collection (VADC)

The spectrum of community-based and residential treatment option for people with alcohol and drug-related harms are categorised into the following service streams:

TABLE 8: VADC SERVICE STREAM DEFINITIONS

Service Stream	Description
Counselling	Counselling services incorporate face-to-face, online and telephone services for individuals and, in some instances, their families, as well as group counselling and day programs. Counselling can range from a brief intervention or single session to extended periods of one-to-one engagement or group work.
Non-residential withdrawal	Non-residential withdrawal services support people to safely withdraw from alcohol and other drug dependence in community settings, in coordination with medical services such as hospitals and general practitioners.
Residential withdrawal	Residential withdrawal services support clients to safely withdraw from alcohol and other drug dependence in a supervised residential or hospital facility. These services support people with complex needs or those whose family and accommodation circumstances are less stable and unsuited to non-residential withdrawal.
Therapeutic day rehabilitation	Therapeutic day rehabilitation is a non-residential treatment option that offers an intensive structured program over a period of weeks, which includes both counselling and a range of other elements designed to build life skills and promote general wellbeing, such as financial management and nutrition
Residential rehabilitation	Residential rehabilitation provides a safe and supportive environment for people who are not able to reduce or overcome their drug use issues through other programs. Residential rehabilitation works to address underlying issues

	leading to their drug use, providing a range of interventions, such as individual and group counselling with an emphasis on mutual self-help and peer community, and supported reintegration into the community.
Care recovery & coordination	For people with complex needs, care and recovery coordination is available to support people to navigate treatment and access appropriate services. It also supports a person to plan for exit from treatment and to access other services that can assist with health and wellbeing needs such as housing, training, education and employment, or other support that can help prevent relapse
Ante & Post-natal support	Provide specialist clinical services to pregnant women and their infants. The services include medical care, counselling, assessment, support and withdrawal services to women affected by complex substance use. As well as alcohol dependence, and assessment and care of infants exposed to AOD during pregnancy.
Bridging support	Provide bridging support in the form of regular contact which aims to support client engagement, retention, motivation and stability while clients wait for assessment and treatment
Brief intervention (incl. single sessions with family)	Provide brief interventions in the form of education and advice that aims to achieve a short-term reduction in harm associated with AOD use. This may include crisis intervention, harm reduction measures, relapse prevention planning, and support for co-occurring issues, such as mental health If appropriate, intake providers can provide brief interventions or single session therapy for families and significant others and refer to counselling services where this need is identified.
Client education program	The Victorian Government funds a number of agencies to provide targeted information, education and awareness around safer drug use. Providing drug users, peer workers and other harm reduction workers with access to information and training better equips them to manage and respond to problematic drug use. Providing a range of educational material and information specifically tailored to illicit drug users can help reduce fatal overdoses and risky drug taking behaviours that result in significant harm for individuals and the wider community.
Comprehensive assessment	The assessment function supports client pathways to all Victorian services, inclusive of youth, adult, residential and non-residential, Aboriginal, state and commonwealth-funded AOD services. Person-centred treatment is a governing principle in the delivery of assessment services. Comprehensive assessment continues to consider the full potential needs of each client (not just the services available within the treatment provider conducting the assessment).
Day program (Youth)	Youth services offer treatment and support to vulnerable young people who are aged 12 to 25 years, and their friends and family, to help address their alcohol and other drug use issues. The approach integrates a range of other services including mental health, education, health, housing, and child protection and family services
Follow up	Make follow-up contact with standard clients at three and 12 months post-treatment exit to: • track progress of recovery post-treatment

	• support re-engagement with AOD treatment services or other supports, where appropriate.
Intake	The catchment-based intake function provides local knowledge to support client pathways to all Victorian AOD services, inclusive of youth, adult, residential and non-residential, Aboriginal, state and commonwealth-funded AOD services. Intake services assist people to navigate the AOD service system and engage proactively with treatment providers on behalf of, and in partnership with, AOD clients and their families
Outdoor therapy (Youth)	Youth services offer treatment and support to vulnerable young people who are aged 12 to 25 years, and their friends and family, to help address their alcohol and other drug use issues. The approach integrates a range of other services including mental health, education, health, housing, and child protection and family services
Outreach	A number of services provide outreach and community engagement as part of their response to problematic drug use in their community. Mobile drug safety workers and overdose response workers support NSP outlets and emergency services in dealing with overdose, providing education on harm reduction and treatment pathways for drug users. Harm reduction outreach programs proactively engage with vulnerable people experiencing harm from AOD who are not engaged with mainstream health, social support or AOD treatment services. Often these vulnerable people are homeless with minimal social support. Outreach workers provide sterile injecting equipment, information, education and referral to a range of health and social services.
Residential pre-admission engagement	Preparing individuals for the withdrawal process includes informing them about the facility, program, withdrawal process and expectations. This also includes initial screening for suitability for the service and the needs of each individual. Support strategies should be in place while individuals await admission. Preparation contributes to building rapport between individuals and treatment staff, which in turn leads to improved engagement and better outcomes. Preparation includes telephone and face-to-face interactions. Services must: • ensure that individuals understand the treatment process and purpose and are provided with sufficient information about withdrawal and are enabled to make a considered and informed decision about engaging in this treatment • ensure that individuals requiring a different AOD/health service are actively assisted to make this link through referral processes such as written referral and/or arranged telephone appointments • develop with the individual, a plan that seeks to address their needs whilst awaiting admission and during treatment. Support is provided to individuals before, during and after withdrawal.
Supported accommodation	AOD supported accommodation program supports young people who are in need of accommodation and wish to remain abstinent after completing AOD withdrawal

Source: [18]

Alcohol-related serious road injuries

Alcohol intoxication is a major contributing factor to road accidents in Victoria. However, no data source is currently available in Victoria that directly measures alcohol involvement in road injuries apart from fatal crashes. To provide improved understanding of alcohol involvement in road injuries, Rumbold et al. [19] examined a number of surrogate measures of alcohol involvement in road crashes. The rate of serious road injuries (those resulting in fatalities or hospital emergency department presentations) occurring in 'high alcohol hours' based on time of day and day of week was selected as the most appropriate surrogate measure of alcohol involvement. In the case of high alcohol hours, this corresponds to the period in which most drink-driving takes place. Research has shown that, in high alcohol hours, 38 per cent of drivers admitted to hospital or killed as a result of a crash had a Blood Alcohol Concentration [20] in excess of 0.05 per cent. This compares with four per cent in low alcohol hours [21]. The high alcohol hours used herein are based on updated work conducted at Monash University Accident Research Centre [18] and are listed in Table 6. Serious road crashes occurring during these high alcohol hours are referred to as 'alcohol-related serious road injury' in AODstats. Data based on time of day were extracted from the road crash data from VicRoads assigned to Victorian LGAs based on location of accident.

TABLE 9: HIGH ALCOHOL HOURS USED IN THE SELECTION OF ALCOHOL-RELATED ROAD CRASH CASES IN METROPOLITAN AND NON-METROPOLITAN AREAS OF VICTORIA

Metropolitan areas			Non-metropolitan areas		
Sun 6 pm	To	Mon 6 am	Sun 6 pm	To	Mon 6 am
Mon 8 pm	To	Tue 6 am	Mon 8 pm	To	Tue 4 am
Tue 6 pm	To	Wed 4 am	Tue 6 pm	To	Wed 4 am
Wed 6 pm	To	Thu 6 am	Wed 6 pm	To	Thu 4 am
Thu 6 pm	To	Fri 6 am	Thu 6 pm	To	Fri 6 am
Fri 4 pm	To	Sat 8 am	Fri 6 pm	To	Sat 8 am
Sat 4 pm	To	Sun 8 am	Sat 4 pm	To	Sun 10am

Source: [22]

Assaults during high alcohol hours

Data relating to incidents of assault were obtained, via CSA from the Victoria Police Law Enforcement Assistance Program (LEAP) database. The 'alcohol' flag in these data is deemed not reliable by Victoria Police, and therefore is not a viable option to determine alcohol involvement in assaults. As such, a surrogate measure for assaults occurring in high alcohol hours was adopted. These high alcohol hours were defined on the basis of information collected in Geelong as part of the Evaluation of the Geelong Local Industry Accord Project [23]. This information showed that assault offences in which alcohol was involved were more likely to occur in late evening and early

morning hours. On the basis of this data, Rumbold et al. [24] identified three categories of assault as follows:

- **High alcohol hour (HAH) assaults** - Fridays or Saturdays between 8 pm and 6 am. Alcohol involvement was noted in 65 per cent of these assaults.
- **Medium alcohol hour (MAH) assaults** - Sunday through Thursday, between 8 pm and 6 am. In 54 per cent of such assaults, alcohol involvement was noted.
- **Low alcohol hour (LAH) assaults** - on all days between 6 am and 8 pm. Only 22.5 per cent of the assaults that occurred during this period were noted to have alcohol involvement.

Assault cases extracted from the LEAP dataset were assigned high, medium or low alcohol hours based on time stamp and assigned to Victorian LGAs on the basis of the recorded postcode of location of the incident.

Data analysis

Software

Microsoft Excel, SPSS and STATA are software programs used for data cleaning, analysis, and extraction for AODstats.

- SPSS supports statistical analysis of data. It allows for in-depth data access and preparation, analytical reporting, graphics, and modelling [25].
- STATA is a complete integrated statistical software package, providing the user with everything they need for data analysis, data management, and graphics [26].

Tableau (v2021.1.1) [27] is the mapping software program used to produce user-friendly interactive maps and visualisations. Allowing users to explore and analyse alcohol and other drug related harms in the Victorian.

Rates per 100,000 population

In order to correct for variation in population size between areas (local government areas for example), the data were transformed into rates per 100,000 population, using the estimated resident population for that area. Population rates for AODstats were calculated several ways as described below. These are crude rates, age-specific rates and age and gender-standardised rates.

Rates are calculated using the most recent Australian Bureau of Statistics (ABS) estimated resident population (ERP) data. For a calendar year the ERP used is mid-year of the same year (taken at June – e.g. 2015 data uses June 2015 ERP). For a financial year the EPR used is mid-year of the beginning of the financial year (e.g. 2014-15 data uses June 2014 ERP).

Crude rates

Population rates were calculated for each of the datasets included in the series, using the average of the formula detailed below:

$$\textbf{Crude Rate} = \frac{of events(hospitalications, deaths, etc)}{population(LGA, State)} \times 100{,}000$$

Where $events_i$ and $population_i$ are the number of events and the population, respectively, in the ith year.

Crude rates are calculated for the total population, males and females (where numbers permit). A number of areas included have a small number of cases and therefore, to protect individual

confidentiality, data are not reported where an area has numbers less than five.

Furthermore, rates based on small numbers can produce unstable results. For instance, small numbers and small population can produce larger than expected results. Where rates appear unduly high, low, or show rapid change, please consider the actual raw number, as it may be small and distort interpretation.

For AODstats visualisations and download sheets, rates for Total and Male/Female populations are crude rates using mid-year ERP.

Age-specific rates

Age-specific rates are rates relating specifically to a certain age group. For each age group they have been calculated as the number of the event in that age group divided by the mid-year estimated resident population for that age-group as detailed in the formula below:

$$\mathbf{r}_i = d_i / p_i$$

where r_i is the age-specific rate for age groups i, d_i is the number of events for that age group i, and p_i is the mid-year estimated resident population for age group i.

Please note that age rates reported in AODstats visualisations and download sheets are age-specific rates. Age-specific rates allow for adjustment of population size across different areas and age groups; however, they do not adjust for other certain demographic attributes (specifically sex) within different geographical areas.

Age and Gender standardised rates

Rates reported on the AODstats population pyramid visualisations are age and gender-standardised (i.e. standardised rates).

From a public health perspective there are advantages to standardising for age and/or sex, as it allows comparisons across areas to be made more accurately. However, from a policy perspective, knowing what is impacting the rates is equally important. Given that age and gender are key contributors to alcohol harms and use, if an area has more men and younger people, this information is important for policy and services to be aware.

Population estimates

ABS estimated resident population (ERP) on age, sex, and statistical local areas is used throughout, estimated at 30 June for all years. For financial year data, e.g. 2011/12, 2011 ERP data is used.

Local Government Area (LGA) Location

The LGA location is dependent upon the indicator. Some indicators provide event location and some provide residential location. Table 10 outlines which indicators are represented by event location or residential location in AODstats.

TABLE 10: LGA LOCATION BY INDICATOR

Indicator	LGA Location
Ambulance attendance	Event
Hospital admission	Residential
ADIS treatment service	Residential
DirectLine	Residential

Counselling Online	Residential
Assaults	Event
Family Violence	Event
Serious Road Injury	Event
Deaths	Residential

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