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AODstats

Methods for the Victorian data maps

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AODstats Methods
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INTRODUCTION

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

METHODOLOGY

Secondary data analysis involves using data for purposes other than 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. As well as censuses and surveys, administrative data such as hospitalisation, mortality, road injury and assault data are widely used for secondary analysis. This type of data is 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 higher than could be achieved otherwise) and cost effectiveness; savings are made at most stages of the research process such as survey design, data collection, data entry and preparation.

However, there are also a number of limitations to consider before using these types of data, such as incomplete or missing data and inadequate coding. For example, the VicRoads data captures 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 on all injuries. Blood alcohol readings are not routinely performed by police at all accidents. Therefore a surrogate measure for alcohol-related road injury is warranted. Although surrogate measures provide an adequate solution, they are not perfect. There will inevitably be events that are missed where they should be included and, conversely, events included when they should not.

THE DATA

Nine data sources are used in AODstats, seven unit record datasets and two aggregated datasets. They include:

- Victorian emergency department presentations data from the Victorian Emergency Minimum Dataset (VEMD);
- Victorian hospital admissions data from the Victorian Hospital Admitted Episodes Data (VAED);
- Alcohol- and drug-related ambulance attendances from the Turning Point Ambo project;
- Alcohol and drug treatment services data (ADIS);
- Victorian mortality data 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);
- Directline counselling, information and referral service data.

Emergency department presentations (VEMD)

Data on presentations to Emergency Departments were obtained from the Victorian Emergency Minimum Dataset (VEMD). The VEMD is a database maintained by the Victorian Department of Health and contains detailed demographic, clinical and administrative information on all

presentations to Victorian public hospitals with 24-hour emergency departments. This includes a range of fields regarding the reason for each presentation (using ICD10 diagnoses), as well as age, sex, postcode and other variables. The ICD10 codes used for AODstats can be found in Tables 2, 3 and 4.

Hospital admissions (VAED)

Information on alcohol-related and drug-related hospital admissions were obtained from the Victorian Admitted Episodes Dataset (VAED). The VAED is a database maintained by the Victorian Department of Health and contains details of all acute hospital separations in Victoria including information on the cause of the admission (according to ICD coding), as well as the age, sex and resident local government area (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 (DH 2014). The ICD10 codes used for AODstats can be found in Tables 2, 3 and 4.

There was a policy change in Victoria between 11/12 and 12/13 for VAED data. Prior to this, care provided in the ED (continuous care for at least 4 hours in the ED) would also be counted as a VAED admission/separation. This could be causing an over-representation of cases or double counting. Therefore there will be a discontinuity in the trend data and data from 2012/13 onwards cannot be compared to data prior this policy change.

Ambulance attendances

The Ambo Project database is maintained by Turning Point. This is a database of alcohol and other drug related attendances by Ambulance Victoria. Data is available from 1998 (Dietze, Cvetkovski et al. 2000) for the Metropolitan Melbourne area. Victorian regional data has been coded from May 2011. The database contains information from the patient care records completed by the attending ambulance paramedics. Since 2006, Ambulance Victoria moved to an electronic system whereby ambulance paramedics are required to complete an electronic patient care record (ePCR) for every incident that they attend and for which they provide a service. These electronic records are downloaded onto VACIS®. The paper based PCRs and more recently the electronic format are coded and entered into a database by Turning Point. This database includes attendances for all types of drug involvement, including alcohol, illicit drugs and pharmaceutical drugs. An overview of the most recent Ambo Project report can be found here www.turningpoint.org.au/site/.../TP.ambocallout.fullreport.080514.pdf (Lloyd, Matthews et al. 2014).

The attribution of a substance being involved in the event is based on ambulance paramedic mention of the involvement of the substance, established through their clinical assessment, patient self-report or information provided by someone at the scene, with cases included if the immediate or very recent over- or inappropriate use of the substance directly contributed to the attendance (Lloyd, Matthews et al. 2014).

There are three categories of alcohol-related ambulance attendances: (1) alcohol mentions, (2) alcohol intoxication with other drugs, and (3) alcohol (intoxication) only. Although other drugs cannot be absolutely ruled out in 'alcohol only' attendances, case data indicates that the attendance was caused by alcohol and as far as could be determined no other substances were involved in the presentation. The alcohol mentions category includes those cases where alcohol was mentioned as being involved but may or may not be the primary reason for attendance and may not have contributed to the ambulance attendance. AODstats provides information on any alcohol intoxication associated with an attendance, alcohol-only intoxication, as well as alcohol

intoxication with other drugs (categories two and three).

Drug-related attendances include cases where illicit or prescription drugs were primarily involved in the event, but it cannot be ruled out that other substances were not present.

There are several months of missing data over the ten years. Where this is the case, numbers are imputed for the missing months based on the same month in the year prior and after, taking the average of the two.

Alcohol and Drug Information system (ADIS)

The Victorian Department of Health funds community-based agencies to provide specialist alcohol and drug treatment services across the state. The collection of client information is a mandatory requirement. In 1996, an interim version of a new system for collection of this information, called the Alcohol and Drug Information System (ADIS) was established, pending the development of a final version of ADIS (implemented from 2000- 01). The data presented in AODstats are derived from ADIS-contributing specialist drug and alcohol agencies (including community health centres) in Victoria. Unit level data were obtained from the Department of Health.

Mortality Data

The confidential Cause of Death Unit Record File (COD URF) data file holds information on all deaths that occur in all residents. 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. Prior to 2007, the Australian Bureau of Statistics (ABS) was the Australian Coordinating Registry (ACR) for obtaining COD URF and since 2007 (i.e. 2008 calendar year), data is obtained from Queensland Registry of Births, Deaths and Marriages (BDM, the ACR for COD URF).

In AODstats, all numbers are based on deaths of persons who usually reside in Victoria for the year in which the death occurred. To estimate numbers of deaths relating to drug use, aetiological fractions (AFs) were applied to all alcohol and illicit drug-related deaths (as per (English, Holman et al. 1995)) unless specified otherwise. Pharmaceutical drug-related deaths were not able to be presented for AODstats due to very small numbers. From 1999 to 2004, amendments for alcohol that drew on the Australian Institute of Health and Welfare (AIHW) relative risk updates and re-weighted estimates on the drinking population were incorporated into the data (Ridolfo and Stevenson 2001).

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 LGA) and when it occurred, who was involved, vehicles involved and a description of the crash are entered into a police database. 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. Where needed, 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.

It is important to note that in December 2005, Victoria Police implemented a new application called the Traffic Incident System (TIS). The TIS is used to record details of road crashes and is the source of the data that is available in the crash statistics. This new system has resulted in a discontinuity in the data series. Victoria Police have advised that data from 2006 onwards are not comparable to previous years' data when undertaking time-series trend analysis.

In addition to a system change there has also been a change in the definition of a serious road injury. From 2009-10 onwards, an SRI is not defined as a fatality or transport to hospital. Rather it

is a fatality or an admission to hospital. Police now follow up with the hospital and only those cases that are admitted are classified as an SRI. The reader will note a large decrease between 2008-09 and 2009-10 in the number or SRIs and it is largely attributable to this definition change. As well as 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. Also, an incident may not yet have been finalised therefore cannot be processed by VicRoads due to incorrect and/or missing information. Finally, data may be incomplete when the incident record has been returned to Victoria Police for amendment.[1] Please note that serious road injuries relate to all road users not just drivers (pedestrians, passengers, cyclists etc.).

Up to 2011/12 financial year, SRI data was obtained directly from the VicRaods RNDB for use in AOD stats. As of the 2012/13 financial year, SRI data was downloaded from VicRoads CrashStats (an online interactive statistics and mapping application for road crashes) (VicRoads 2013) . Therefore, there may be a discontinuity in the trend data from the 2012/13 financial year.

Law Enforcement Assistance Program (LEAP)

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 Victoria Police. All LEAP data were assigned to LGAs according to the relevant recorded postcode, through application of ABS census-derived conversion data until 2007-08, after which data is provided in LGA categories. Data on the location of assault and the victim's residential LGA for family incidents are used herein. Victim's residence for assault may be included in future editions.

DirectLine, Turning Point

DirectLine provides 24-hour telephone 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 Population Health Research 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. HealthLink manages several addiction-related health information and referral telephone support services in Victoria and for other states and territories 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.

Postcode is not reliably collected in Directline (approximately 30% are missing) making extraction of data by LGA unfeasible. Therefore Directline data is only presented at a State level in AODstats.

Data extraction and transformation

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

Cases of admission to hospital resulting from high-risk alcohol consumption were extracted from the overall datasets through the following procedure:

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

1. Hospital admissions containing these alcohol-related diagnosis codes as the primary diagnosis were extracted from VAED.

2. In addition to the codes used by English et al., (English, Holman et al. 1995) a proportion of the cases coded I50 in ICD-10 (heart failure) were extracted and recoded as hypertension cases, following the method used in the Victorian Burden of Disease Study (DHS 1999).

Estimation of aetiological fractions (AF)

The AF provides an estimate of the likelihood that the case was caused by high-risk consumption of alcohol. An AF of 1.00 means that the case was definitely caused by high-risk alcohol consumption (for example, alcohol cardiomyopathy).

The mortality data used AF to estimate the alcohol-caused harm. AF used in AODstats were based on the methods and results of the large meta-analysis conducted by English and colleagues (English, Holman et al. 1995). The AF calculated by English et al. (English, Holman et al. 1995) use low risk drinking (see table below for definition) as the basis for comparison. The AF estimate the risk of a particular disease or condition for those drinking at hazardous and harmful levels compared with those who drink at low risk levels. In their update of the English et al.'s (English, Holman et al. 1995) work, the Australian Institute of Health and Welfare (AIHW) estimated AF in which abstinence is the basis for comparison (Ridolfo and Stevenson 2001). The AIHW AF estimate the risk of a particular disease or condition for those who drink alcohol at any level, compared with those who do not drink at all.

English et al. (English, Holman et al. 1995) used low risk drinking as the base for comparison because they argued that policy in Australia is directed towards encouraging responsible drinking rather than abstinence, so that estimates using abstinence as the base would not be so useful for policy makers. The English et al. (English, Holman et al. 1995) AF estimates, however, do not take abstinence into account at all. It can be argued that the comparison of most use to policy makers is between those persons who drink at harmful or hazardous levels, and those who either abstain or drink at low risk levels.

Within AODstats, the AF based on indirect methods of estimation were re-estimated using abstinence and low risk drinking as the basis for comparison. The AF used estimate the risk of a particular disease or condition for those drinking at hazardous and harmful levels compared with those who abstain or drink at low risk levels (Table 1).

Table 1 Classification of alcohol intake levels according to NHMRC guidelines

Alcohol intake level	**Standard drinks per day (1 standard drink = 10 g alcohol)**	
	Males	**Females**
'Abstinence'	0-0.25	0-0.25
Low risk	0.26-4.00	0.26-2.00
Hazardous	4.01-6.00	2.01-4.00
Harmful	6.01+	5.01+

Source: (English et al. 1995), p.61

The main difference between the various approaches to AF is in the case of ischemic heart disease. There is a significant body of evidence which suggests that moderate alcohol intake has a protective effect against ischemic heart disease. This protective effect appears to be fully realised within low drinking levels, and it appears that increased alcohol intake does not lead to any additional benefit. AF which use abstinence as the base for comparison will therefore have a value assigned for ischemic heart disease (the value will be negative, as it will represent the proportion of cases of ischemic heart disease avoided through consumption of alcohol). The AF used herein do not include a value for ischemic heart disease because low risk drinking and abstinence are used as the base for comparison. AF were re-estimated for the following conditions: oropharyngeal cancer, oesophageal cancer, liver cancer, laryngeal cancer, breast cancer, hypertension, supraventricular arrhythmias, cholelithiasis, low birth weight, psoriasis, stroke and fall injuries. For breast cancer, stroke and fall injuries, the updated relative risk estimates in the recent AIHW meta-analysis were used (Ridolfo and Stevenson 2001). For the other conditions, relative risks from the English et al. (1995) meta-analysis were used. The AF were updated using the estimates of prevalence of low risk, hazardous and harmful alcohol consumption calculated by AIHW based on data from the 1995 Australian National Health Survey. These are estimates for Australia. There are no reliable recent estimates relating specifically to Victoria (Ridolfo and Stevenson 2001).

Wholly attributable alcohol-related hospitalisations

Applying an AF to diagnostic codes allows all conditions relating to alcohol to be considered. However, the application of an AF can only be reliably applied to the 'principal' diagnosis on admission. This excludes those diagnoses that contributed to the admission but were not the principal. However, it captures events such as assaults, falls and accidents that are partially alcohol-related and this is a major strength. A major critique of the AF method is the focus on the principal diagnosis only, which may lead to an underestimation of alcohol attributable harms when utilising this approach.

Wholly attributable alcohol-related hospitalisations represents an alternative measure to the AF method described above using VAED data, admissions with a 'primary' diagnoses wholly attributable to alcohol. 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 attributable to alcohol that was also considered to be a primary diagnosis. Primary diagnoses are applied if they required 'commencement, alteration or adjustment of therapeutic treatment', 'diagnostic procedures' or 'increased clinical care and/or monitoring'.[2] A list of the diagnoses considered to be wholly attributable to alcohol is provided in Table 2. This list is the same as that compiled by Rehm (2011) where there were multiple primary alcohol diagnoses identified, only one was counted per hospital separation (admission).

[2] Source: Victorian Additions to the Australian Coding Standards, Department of Human Services

Table 2 Disease conditions which are by definition alcohol-caused (alcohol - attributable fraction = 1)

ICD 10[3]	Disease
E24.4	Alcohol-induced pseudo-Cushing's syndrome
F10	Mental and behavioural disorders due to use of alcohol
F10.0	Acute intoxication
F10.1	Harmful use
F10.2	Dependence syndrome
F10.3	Withdrawal state
F10.4	Withdrawal state with delirium
F10.5	Psychotic disorder
F10.6	Amnesic syndrome
F10.7	Residual and late-onset psychotic disorder
F10.8	Other mental and behavioural disorders
F10.9	Unspecified mental and behavioural disorder
G31.2	Degeneration of nervous system due to alcohol
G62.1	Alcoholic polyneuropathy
G72.1	Alcoholic myopathy
I42.6	Alcoholic cardiomyopathy
K29.2	Alcoholic gastritis
K70	Alcoholic liver disease
K70.0	Alcoholic fatty liver
K70.1	Alcoholic hepatitis
K70.2	Alcoholic fibrosis and sclerosis of liver
K70.3	Alcoholic cirrhosis of liver
K70.4	Alcoholic hepatic failure
K70.9	Alcoholic liver disease, unspecified
K86.0	Alcohol-induced chronic pancreatitis
O35.4	Maternal care for (suspected) damage to foetus from alcohol
P04.3	Foetus and newborn affected by maternal use of alcohol
Q86.0	Foetal alcohol syndrome (dysmorphic)
R78.0	Finding of alcohol in blood
T51	Toxic effect of alcohol
T51.0	Ethanol
T51.1	Methanol
X45	Accidental poisoning by and exposure to alcohol
X65	Intentional self-poisoning by and exposure to alcohol
Y15	Poisoning by and exposure to alcohol, undetermined intent
Y90	Evidence of alcohol involvement determined by blood alcohol level
Z72.1	Problems related to lifestyle alcohol use

[3] ICD (international classification of disease) is published by the World Health Organisation, with Australian amendments carried out by the National Centre for Classification in Health (Sydney). It is a "system of categories to which morbid entities are assigned according to established criteria". It is also the classification used in cause of death coding in Australia. (The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM), Australian Classification of Health Interventions (ACHI) and Australian Coding Standards (ACS) NCCH (2000). ICD-10-AM: Tabular List of Diseases. Canberra, National Centre for Classification in Health, Commonwealth of Australia.

Table 3 Disease conditions which are by definition illicit drug-caused

ICD10	Disease
F11.0 – F11.9	Mental and behavioural disorders due to use of opioids
F12.0 – F12.9	Mental and behavioural disorders due to use of cannabinoids.
F14.0 – F14.9	Mental and behavioural disorders due to use of cocaine.
F15.0 – F15.9	Mental and behavioural disorders due to use of other stimulants, including caffeine.
F16.0 – F16.9	Mental and behavioural disorders due to use of hallucinogens.
F18.0 – F18.9	Mental and behavioural disorders due to use of volatile solvents.
O355	Maternal care for (suspected) damage to foetus by drug (drug addiction).
P044	Foetus and newborn affected by maternal use of drugs of addiction (includes cocaine, heroin, amphetamines).
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 in blood.
R78.5	Finding of psychotropic drug in blood.
R78.6	Finding of steroid agent in blood.
T40.0	Poisoning by narcotics and psychodysleptics [hallucinogens] Opium.
T40.1	Poisoning by narcotics and psychodysleptics [hallucinogens] Heroin.
T40.5	Poisoning by narcotics and psychodysleptics [hallucinogens] Cocaine.
T40.7	Poisoning by narcotics and psychodysleptics [hallucinogens] Cannabis.
T40.8	Poisoning by narcotics and psychodysleptics [hallucinogens] LSD.
T40.9	Poisoning by narcotics and psychodysleptics [hallucinogens] Hallucinogens (mescaline, psilocin, psilocybine).
T43.6	Poisoning by psychotropic drugs Psychostimulants with potential for use disorder.
X42.0	Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified (Incl: cannabis (derivatives0, cocaine, codeine, heroin, lysergide [LSD], mescaline, methadone, morphine, opium (alkaloids)).
X46	Accidental poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapour (Incl: benzene and homologues, carbon tetrachloride [tetrachloromethane], chlorofluorocardons, petroleum (derivatives)).
X62	Intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified (Incl: cannabis (derivatives), cocaine, codeine, heroin, lysergide [LSD], mescaline, methadone, morphine, opium (alkaloids)).
X66	Intentional self-poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours (Incl: benzene and homologues, carbon tetrachloride [tetrachloromethane], chlorofluorocarbons, petroleum (derivatives)).
Y12	Poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified, undetermined intent (Incl: cannabis (derivatives), cocaine, codeine, heroin, lysergide [LSD], mescaline, methadone, morphine, opium (alkaloids)).
Y16	Poisoning by and exposure to organis solvents and halogenated hydrocarbons and their vapour, undetermined intent (Incl: benzene and homologues, carbon

	tetrachloride [tetrachloromethane], chlorofluorocardons, petroleum (derivatives)).
Z72.2	Problems related to lifestyle drug use (Excl: abuse of non-dependence-producing substances (F55), drug dependence (F11-F16, F19.-) with common fourth character .2).

Table 4 Disease conditions which are by definition pharmaceutical drug-caused

F13.0 – F13.9	Mental and behavioural disorders due to use of sedatives or hypnotics.
T36.0 – T36.9	Poisoning by systemic antibiotics.
T37.0 – T37.5	Poisoning by other systemic anti-infectives and antiparasitics.
T37.8 – T37.9	Poisoning by other systemic anti-infectives and antiparasitics.
T38.0 – T38.9	Poisoning by hormones and their synthetic substitutes and antagonists.
T39.0 – T39.4	Poisoning by non-opioid analgesics, antipyretics and antirheumatics.
T39.8 – T39.9	Poisoning by non-opioid analgesics, antipyretics and antirheumatics.
T40.2 – T40.4	Poisoning by narcotics and psychodysleptics
T42.0 – T42.8	Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs.
T43.0 – T43.5	Poisoning by psychotropic drugs.
T43.8 – T43.9	Poisoning by psychotropic drugs.
T44.0 – T44.9	Poisoning by drugs primarily affecting the autonomic nervous system.
T45.0 – T45.9	Poisoning by primarily systemic and haematological agents.
T46.0 – T46.9	Poisoning by agents primarily affecting the cardiovascular system.
T47.0 – T47.9	Poisoning by agents primarily affecting the gastrointestinal system.
T48.0 – T48.7	Poisoning by agents primarily affecting acting on smooth and skeletal muscles and the respiratory system.
T49.0 – T49.9	Poisoning by topical agents primarily affecting skin and mucous membrane and by opthalmological, otorhinolaryngological and dental drugs.
T50.0 – T50.9	Poisoning by diuretics and other and unspecified drugs, medicaments and biological substances.
X40	Accidental poisoning by and exposure to non-opioid analgesics, antipyretics and antirheumatics (Incl: 4-aminophenol derivatives, nonsteroidal anti-inflammatory drugs [NSAID], pyrazolone derivatives, salicylates).
X41	Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs (Incl: antidepressants, barbiturates, hydantoin derivatives, iminostilbenes, methaqualone, compounds, neuroleptics, psychostimulants, succinimides and oxazolidinediones, tranquilizers)
X43	Accidental poisoning by and exposure to other drugs acting on the autonomic nervous system (Incl: parasympatholytics and spasmolytics, parasympathomimetics, sympatholytics, sympathomimetics).
X44	Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances (Incl: agents primarily acting on smooth and skeletal muscles and the respiratory system, anaesthetics, drugs affecting the cardiovascular system, gastrointestinal system, hormones and synthetic substitutes, systemic and haematological agents, systemic antibiotics and other anti-infectives, therapeutic gases, topical preparations, vaccines, water-balance agents).
X60	Intentional self-poisoning by and exposure to non-opioid analgesics, antipyretics and antirheumatics (Incl: 4-aminophenol derivatives, nonsteroidal anti-inflammatory drugs [NSAID], pyrazolone derivatives, salicylates).
X61	Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs (Incl: antidepressants, barbiturates, hydantoin derivatives, iminostilbenes, methaqualone, compounds, neuroleptics, psychostimulants, succinimides and oxazolidinediones, tranquilizers).
X63	Intentional self-poisoning by and exposure to other drugs acting on the autonomic nervous system (Incl: parasympatholytics and spasmolytics, parasympathomimetics, sympatholytics, sympathomimetics).
X64"	Intentional self-poisoning by and exposure to other and unspecified drugs,

	medicaments and biological substances (Incl: agents primarily acting on smooth and skeletal muscles and the respiratory system, anaesthetics, drugs affecting the cardiovascular system, gastrointestinal system, hormones and synthetic substitutes, systemic and haematological agents, systemic antibiotics and other anti-infectives, therapeutic gases, topical preparations, vaccines, water-balance agents).
Y10	Poisoning by and exposure to non-opioid analgesics, antipyretics and antirheumatics, undetermined intent (Incl: 4-aminophenol derivatives, nonsteroidal anti-inflammatory drugs [NSAID], pyrazolone derivatives, salicylates).
Y11	Poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, undetermined intent (Incl: antidepressants, barbiturates, hydantoin derivatives, iminostilbenes, methaqualone, compounds, neuroleptics, psychostimulants, succinimides and oxazolidinediones, tranquilizers).
Y13	Poisoning by and exposure to other drugs acting on the autonomic nervous system, undetermined intent (Incl: parasympatholytics and spasmolytics, parasympathomimetics, sympatholytics, sympathomimetics).
Y14	Poisoning by and exposure to other and unspecified drugs, medicaments and biological substances, undetermined intent (Incl: agents primarily acting on smooth and skeletal muscles and the respiratory system, anaesthetics, drugs affecting the cardiovascular system, gastrointestinal system, hormones and synthetic substitutes, systemic and haematological agents, systemic antibiotics and other anti-infectives, therapeutic gases, topical preparations, vaccines, water-balance agents).

Alcohol-related serious road injuries

Alcohol intoxication is a major contributing factor to road accidents in Victoria. However there is no data source 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. (1997) 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 (VicHealth Centre for Tobacco Control 2004) in excess of 0.05 per cent. This compares with four per cent in low alcohol hours (Cavallo and Cameron 1992). The high alcohol hours used herein are based on updated work conducted at Monash University Accident Research Centre (Gantzer 1995) and are listed in Table 5. 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 5 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: (Gantzer 1995)

Assaults during high alcohol hours

Data relating to incidents of assault were obtained 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. 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 (Rumbold, Malpass et al. 1998). 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. (1998) identified three categories of assault as follows:

High alcohol hour assaults (HAH) - Fridays or Saturdays between 8 pm and 6 am. Alcohol involvement was noted in 65 per cent of these incidents.

Medium alcohol hour assaults (MAH) - Sunday through Thursday, between 8 pm and 6 am. In 54 per cent of such assaults, alcohol involvement was noted.

Low alcohol hour assaults (LAH) - 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 occurring in high alcohol hours were extracted from the LEAP dataset and then assigned to Victorian LGAs on the basis of the recorded postcode of location of the incident, up until 2007/08, when LGA was provided.

DATA ANALYSIS

Rates per 10,000 population

In order to correct for variation in population size between LGAs, the data were transformed into rates per 10,000 population, using the estimated resident population for that LGA. Population rates were calculated for each of the datasets included in the series, this calculation is detailed below.

$$\text{Crude rate} = \frac{\text{\# of events (hospitalisations, deaths, serious road injury, etc.)}}{\text{population (LGA, region, state)}} \times 10{,}000$$

Rates are calculated for the total population, males, females and those aged 15 to 24 years (where numbers permit). A number of LGAs included have a small number of cases, therefore to protect individual confidentiality, data is 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.

Please note that rates reported in AODstats are crude rates. Crude rates allow for adjustment of population size across different areas; however they do not adjust for certain demographic attributes specifically age and sex. 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 and policy and services need to be aware.

Confidence intervals (95% CI)

Confidence intervals for rates were calculated using the exact method based on the Poisson distribution (Dobson, Kuulasmaa et al. 1991, Buchan 2004). Where confidence intervals do not overlap, this can be broadly interpreted as indicating a statistically significant difference. Throughout AODstats these differences are termed significant.

Exact Poisson confidence intervals for:

$$LL = \frac{\left(\chi^2_{\frac{\alpha}{2},2d} \right)}{2e}$$

$$UL = \frac{\left(\chi^2_{1-\frac{\alpha}{2},2(d+1)} \right)}{2e}$$

Where:
d = number of events (e.g. deaths)
e = exposure (e.g. population size)
α = 1-confidence interval, e.g. if confidence interval is 95%, α = 0.05

X^2 α,ν is the $(100*\alpha)^{th}$ chi-square centile with ν degrees of freedom

LL = lower limit
UL = upper limit

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.

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