Australian Government
Australian Institute of Health and Welfare

AIHW

Opioid harm in Australia

and comparisons between Australia and Canada

AIHW

Opioid harm in Australia

and comparisons between Australia and Canada

The Australian Institute of Health and Welfare is a major national agency whose purpose is to create authoritative and accessible information and statistics that inform decisions and improve the health and welfare of all Australians.

A complete list of the Institute's publications is available from the Institute's website <www.aihw.gov.au>.

ISBN 978-1-76054-436-2 (PDF)
ISBN 978-1-76054-437-9 (Print)

Suggested citation

Australian Institute of Health and Welfare 2018. Opioid harm in Australia and comparisons between Australia and Canada. Cat. no. HSE 210. Canberra: AIHW.

Any enquiries relating to copyright or comments on this publication should be directed to:

Australian Institute of Health and Welfare
GPO Box 570
Canberra ACT 2601

Tel: (02) 6244 1000

Email: info@aihw.gov.au

Published by the Australian Institute of Health and Welfare.

Please note that there is the potential for minor revisions of data in this report.

Please check the online version at <www.aihw.gov.au> for any amendment.

Contents

Acknowledgments

Jennifer Kerrigan, Ruby Brooks and Lizzie Gorrell of the Population Health Unit of the Australian Institute of Health and Welfare (AIHW) wrote this report, under the guidance of Claire Sparke, Moira Hewitt and Lynelle Moon.

The comparisons with Canada were written in collaboration with Jennifer Frood and Tracy Johnson from the Canadian Institute for Health Information (CIHI).

Geoff Neideck and Matthew James from the AIHW reviewed this report, and Cathy Claydon, David Whitelaw, Dian Xu, Fiona Elliot, James Katte, Josh Sweeney, Karen Bishop, Kevin Monahan, Kristina Da Silva, Lachlan Facchini, Marissa Veld, Micaella Watson and Steve Glaznieks from the AIHW provided input and advice.

Suzanne Nielsen, Louisa Degenhardt, Chris Killick-Moran and staff from CIHI reviewed the report and provided valuable feedback.

Abbreviations

ABS	Australian Bureau of Statistics
ACIC	Australian Criminal Intelligence Commission
AIHW	Australian Institute of Health and Welfare
AOD	alcohol and other drug
AODTS NMDS	Alcohol and Other Drug Treatment Services National Minimum Data Set
ATC	Anatomical Therapeutic Chemical
CIHI	Canadian Institute for Health Information
DDD	defined daily dose
ED	emergency department
NCIS	National Coronial Information System
NDS	National Drug Strategy
NDSHS	National Drug Strategy Household Survey
NHMD	National Hospital Morbidity Database
NMD	National Mortality Database
NNAPEDC	National Non-admitted Patient Emergency Department Care
NOPSAD	National Opioid Pharmacotherapy Statistics Annual Data
NWDMP	National Wastewater Drug Monitoring Program
OECD	Organisation for Economic Co-operation and Development
OME	oral morphine equivalent
PBS	Pharmaceutical Benefits Scheme
TGA	Therapeutic Goods Administration
WHO	World Health Organization

Symbols

n.p.	not publishable because of small numbers, confidentiality or other concerns about the quality of the data
≈	no change

Summary

Locally and internationally, the rising use of opioids is a cause of concern. All opioids—including codeine—can be addictive and their use can result in dependence, accidental overdose, hospitalisation or death.

This report brings together information from a range of data sources to tell the national story of opioid use and its harmful effects. It is the first time that the AIHW has produced such a comprehensive report that presents current national data and trends on opioid use and harms in Australia. The report also presents findings from a collaboration between the AIHW and the Canadian Institute for Health Information (CIHI). This includes comparisons between ED presentations and hospitalisations in Australia and Canada, where possible, and discussion of the benefits and challenges of international collaboration.

In Australia in 2016–17, 3.1 million people had 1 or more prescriptions dispensed for opioids (most commonly for oxycodone); about 40,000 people used *Heroin*; and about 715,000 people used *Pain-killers/analgesics and pharmaceutical opioids* for illicit or non-medical purposes.

Opioid deaths and poisoning hospitalisations have increased in the last 10 years

Legal or pharmaceutical opioids (including codeine and oxycodone) are responsible for far more deaths and poisoning hospitalisations than illegal opioids (such as heroin). Every day in Australia, nearly 150 hospitalisations and 14 emergency department (ED) presentations involve opioid harm, and 3 people die from drug-induced deaths involving opioid use.

In 2016, the number of opioid deaths (1,119) was the highest number since the peak in 1999 (1,245 deaths). After 1999, the number of deaths fell to a low of 439 in 2006, then began to climb again.

In 2016, opioid deaths accounted for 62% of all drug-induced deaths. From 2007 to 2016, after adjusting for differences in the age structure of the population, the rate of opioid deaths increased by 62%, from 2.9 to 4.7 deaths per 100,000 population. The increase was driven by an increase in accidental opioid deaths and in pharmaceutical opioid deaths.

Similarly, from 2007–08 to 2016–17, after adjusting for age, the rate of hospitalisations per 100,000 population with a principal diagnosis (main reason for hospitalisation) of opioid poisoning increased by 25%, while the rate of hospitalisations with any diagnosis (all reasons for hospitalisation) of opioid poisoning increased by 38%.

Pharmaceutical opioids are responsible for more opioid deaths and poisoning hospitalisations than heroin

In 2016, the most commonly mentioned opioid in opioid deaths was *Naturally derived opioids* (for example, oxycodone, codeine and morphine), which was mentioned in 49% of opioid deaths.

Similarly, in 2016–17, hospitalisations with a principal diagnosis of opioid poisoning were more likely to involve pharmaceutical opioids than heroin or opium. The rate per 100,000 for those by *Naturally derived opioids* was more than twice as high as for those by *Heroin*.

More opioid prescriptions were dispensed but on average prescriptions were for lower doses and/or quantities

In 2016–17, 15.4 million opioid prescriptions were dispensed under the Pharmaceutical Benefits Scheme (PBS) to 3.1 million people.

The oral morphine equivalent (OME) is a measure of opioid use that adjusts for the difference in potency between different opioids. It converts the amount of each opioid dispensed to the amount of oral morphine that would be required to produce the same pain-relieving effect. After adjusting for differences in the age structure of the population, from 2012–13 to 2016–17, although there was a rise in the rate of prescriptions dispensed per 100,000 population and the number of people per 100,000 population receiving them (9% and 4% respectively), the OME stayed the same over the same period (989 to 987 OME mg per 1,000 population per day)—on average, the prescriptions dispensed were for lower doses and/or quantities.

Oxycodone and codeine most commonly dispensed opioids

Oxycodone was the most commonly dispensed prescription opioid in 2016–17, with 5.7 million prescriptions dispensed to 1.3 million people, followed by codeine (3.7 million prescriptions to 1.7 million people) and tramadol (2.7 million prescriptions to 600,000 people).

Similar to the results for all opioid prescriptions dispensed, on average prescriptions dispensed for oxycodone were for lower doses and/or quantities. After adjusting for differences in the age structure of the population over time, from 2012–13 to 2016–17 there was approximately a 30% rise in both the number of oxycodone prescriptions dispensed per 100,000 population and the number of people receiving them per 100,000 population, but the OME over the same period remained the same (338 to 340 OME mg for oxycodone per 1,000 population per day).

Higher rates of OME for opioids dispensed in *Inner regional* and *Outer regional* areas

After adjusting for differences in the age structure of the population, the total number of prescriptions dispensed per 100,000 population was highest for *Inner regional* areas (74,000 per 100,000 population) and lowest for *Very remote* areas (38,000 per 100,000 population). The rate of OME was also highest for *Inner regional* areas (1,374 OME mg per 1,000 population per day), followed closely by *Outer regional* areas (1,362 OME mg per 1,000 population per day). These rates of OMEs are 2 times higher than in *Very remote* areas, which at 645 OME mg per 1,000 population per day was the lowest of all areas.

1 in 10 Australians have ever used any type of opioid for illicit or non-medical purposes

In 2016, around 1 in 10 (11%) of Australians aged 14 and over had ever used at least 1 type of opioid for illicit or non-medical purposes; recent use (that is, use in the last 12 months) was much lower, at 3.7%. Most had used pharmaceutical opioids rather than illegal opioids, with 9.7% having ever used *Pain-killers/analgesics and pharmaceutical opioids*, compared with 1.3% who had ever used *Heroin*.

Of people who reported non-medical use of *Pain-killers/analgesics and pharmaceutical opioids*, 75% had used *Over-the-counter codeine products*, 40% had used *Prescription codeine products* and 17% had used *Oxycodone*.

Opioid use varies between Australia and Canada

Both Australia and Canada have government-funded pharmaceuticals. Overall, there was a downward trend in both countries in the total average opioid dosage (the defined daily dose or DDD) per 1,000 people, per day prescribed in the 5 years to 2016–17. However there were slight differences in the types of opioids prescribed, with the DDD rate for hydromorphone substantially higher in Canada, and the DDD rate for tramadol and buprenorphine higher in Australia. Both countries had a similar DDD rate for fentanyl.

Illicit use of fentanyl is more common in Canada than it is in Australia, while heroin use is comparatively higher in Australia than in Canada. The impact of this difference is that people using these different drugs—while they are all opioids—have different trajectories and contact with the acute care system. Fentanyl is more potent than heroin and has a greater potential to be lethal, meaning many users die before they can receive acute care.

Side effects from opioid use are responsible for the greatest number of hospitalisations in both Canada and Australia

Despite differences in the rates of hospital care in Australia and Canada for opioid harms—due in part to differences in systems and infrastructure for health services—there are similarities in the profiles of people most likely to receive hospital care for opioid harm.

In both Australia and Canada, the greatest volume of harm treated in hospitals came from side effects from opioid use. The age distribution for people hospitalised for this reason was similar in Australia and Canada, with rates of hospitalisation increasing with increasing age, reflecting the rates of prescription opioids in both countries.

1

Introduction

Opioid use and its associated harms is an issue of great public health interest, within Australia and internationally. Increasing opioid harm, related to both pharmaceutical and illegal opioids, has been reported in several countries, including the United States of America and Canada (CDC 2017; CIHI 2017b).

What are opioids?

Opioids are a group of pain-relieving drugs that work by interacting with the brain's opioid receptors and changing how they respond to pain stimuli. As well as relieving pain, opioids can produce euphoria (a sense of profound wellbeing).

Opioids can be grouped in several different ways. 'Strong' and 'weak' opioids are defined based on how much is needed to produce the desired pain-relieving effect, often in comparison with morphine. 'Strong' opioids are more potent, so a smaller amount is required to relieve pain compared with a 'weak' opioid. Hydromorphone and oxycodone are more potent than morphine, as is fentanyl, which is considered to be up to 100 times as potent as morphine (Chodoff & Domino 1965). More potent opioids are typically prescribed in smaller doses than morphine.

Opioids can also be grouped into pharmaceutical opioids and illegal opioids. It is important to note that pharmaceutical opioids can be misused or used illicitly (see 'Opioid use' later in this chapter).

Opioids include (Table 1.1):

- naturally derived opioids, which can be directly derived from—or synthesised using—opium poppies. These include:
  - the illegal opioids heroin and opium
  - the weak pharmaceutical opioid codeine
  - the strong pharmaceutical opioids oxycodone, buprenorphine and morphine
- synthetic opioids, which may be synthesised in a laboratory using chemicals not derived from the opium poppy. These include:
  - the weak pharmaceutical opioid tramadol
  - the strong pharmaceutical opioids pethidine, methadone, and fentanyl.

Terms used in this report

Opioid: a type of pain-relieving drug.

Pharmaceutical opioids: opioids available with a prescription for medical purposes.

Illegal opioids: opium and heroin.

Illicit opioid use: includes use of illegal opioids, and the misuse or non-medical use of pharmaceutical opioids.

Box 1.1 at the end of this chapter outlines how opioids have been classified in this report, which differs between data sources.

Table 1.1: Opioids, by strength relative to oral morphine, by type

	Strength	Strength relative to oral morphine	Type
Pharmaceutical opioids			
Codeine	Weak	**0.13**	Naturally derived opioids
Tramadol	Weak	**0.20–0.24**	Synthetic opioids
Pethidine[(a)]	Strong	**0.4**	Synthetic opioids
Tapentadol	Strong	**0.4**	Synthetic opioids
Morphine	Strong	**1.0–3.0**	Naturally derived opioids
Oxycodone	Strong	**1.5–3.0**	Naturally derived opioids
Methadone	Strong	**4.7–13.5**	Synthetic opioids (often reported separately)
Hydromorphone	Strong	**5–15**	Naturally derived opioids
Buprenorphine	Strong	**38.8–85.0**	Naturally derived opioids
Fentanyl	Strong	**100**	Synthetic opioids
Illegal opioids			
Opium	Weak	**0.1–0.2**	Naturally derived opioids (often reported separately)
Heroin	Strong	**10–15**	Naturally derived opioids (often reported separately)

(a) Pethidine ceased being subsidised by the Pharmaceutical Benefits Scheme (PBS) in 2012 so use is not included in the results of this report.

Notes

1. Based on milligrams of each opioid equivalent to 1 milligram of oral morphine.
2. Different preparations of each drug may equate to a different oral morphine equivalent; these are represented by a range.

Source: Gisev et al. 2018; Carnwath & Merrill 2002; UNODC 1953.

Pharmaceutical opioids

Pharmaceutical opioids can be obtained with a prescription from a health practitioner or used under their guidance in health-care settings. Before February 2018, it was also possible to obtain medicines containing low doses of codeine over the counter at pharmacies (that is, without a prescription). Pharmaceutical opioids may also be obtained through illicit means.

Pharmaceutical opioids can be effective for treating acute pain or cancer pain, though evidence to support their long-term use for chronic non-cancer pain is lacking (Currow et al. 2016).

General practitioners, specialist medical professionals, other doctors working in hospitals, and dental practitioners can prescribe pharmaceutical opioids. Some doctors are able to prescribe specialised pharmacotherapy opioids—including methadone or buprenorphine—which may be used to treat opioid dependence and manage the symptoms of withdrawal. Since 2010, some nurse practitioners have been able to prescribe pharmaceutical opioids (Department of Health 2017b; Department of Health 2010). Paramedics in ambulances can administer morphine—and in some states, fentanyl—to pre-hospital patients (ACT Ambulance Service 2010; Bendall et al. 2011).

The Therapeutic Goods Administration (TGA) must approve new drugs before they can be introduced into Australia. There are also clinical practice guidelines (RACGP 2017) and learning resources (NPS MedicineWise 2018) for how and when pharmaceutical opioids should be used. Additionally, each manufacturer provides the TGA with descriptions for the approved indications listed in the Australian Register of Therapeutic Goods. These indications vary by brand; are vague; and are not always consistent with current clinical guidelines (TGA 2018a). The TGA is currently reviewing a number of regulatory response options to combat prescription opioid misuse and harms (TGA 2018a, 2018b).

Illegal opioids

In Australia, it is illegal to manufacture, sell or possess opium and heroin.

Opium is derived from the white Indian poppy. It contains the chemicals morphine, codeine and thebaine and can be consumed in its raw form or processed to produce heroin or pharmaceutical opioids. Opium poppies are grown in Australia and other parts of the world for use in pharmaceutical opioids, but the sale and unregulated use of the raw form is illegal in Australia.

Heroin was used as a legally prescribed medical treatment in Australia throughout the 19th century, but was prohibited in Australia in 1953 (Gibson et al. 2003) and is restricted (a Schedule 9 substance) with no approved therapeutic use. The effects of heroin include drowsiness, shallow breathing, slow heart rate and slurred speech (Drug and Alcohol Services South Australia 2017).

In the 1990s, the price of high-purity heroin dropped, making the drug more readily available in Australia. In 2001, this increased availability was curtailed by a number of factors including lower profits, increased Australian law enforcement efforts and lower production in source countries (Degenhardt et al. 2004). This change in supply led to a reduction in heroin-related fatal and non-fatal overdoses (Roxburgh et al. 2013a; The Royal Australasian College of Physicians 2009).

Opioid use

Opioid use includes:

- legal use of pharmaceutical opioids
- illicit use, which includes use of illegal opioids, as well as misuse of pharmaceutical opioids.

Misuse of pharmaceutical drugs, including opioids, refers to:

- non-medical use (for example, taking over-the-counter or prescription-only drugs for non-therapeutic purposes) (Barrett et al. 2008)
- use for therapeutic purposes (including extra-medical use):
  - without a valid prescription
  - in a greater quantity or frequency than prescribed
  - in the context of iatrogenic dependence, which is a drug dependence that has developed following medical treatment.

There has been a growing trend of non-medical use of pharmaceutical drugs, broadly, in Australia (AIHW 2017d). In 2016, around 1 million Australians over the age of 14 had used a pharmaceutical drug for a non-medical purpose within the past year.

Opioids may be used for non-medical purposes to help manage withdrawal from illegal opioids, or to counter or enhance the effects of other illicit drugs (ACIC 2017).

Opioid harm

Opioid use can result in a number of different social- and health-related harms, ranging in severity.

Opioids can cause constipation; nausea and vomiting; sedation; and dizziness. These effects can occur with therapeutic use of pharmaceutical opioids, as well as with misuse of pharmaceutical opioids or the use of illegal opioids.

Opioid poisoning can be caused by a range of circumstances, including taking more than prescribed (or in a larger amount); combining opioids with other sedative substances; loss of tolerance; or a change in health status. Three key signs of opioid poisoning are unconsciousness; respiratory depression; and pinpoint pupils. Poisoning can result in ED treatment or hospitalisation and can lead to death.

Opioid dependence refers to a cluster of behavioural, cognitive and physical phenomena that can develop after repeated use of opioids (Australian Consortium for Classification Development 2017). These typically include a strong craving to use the substance; difficulties in controlling the use of opioid substances; continuing to use the substance despite the potential for harmful consequences; increased tolerance to the substance; physical withdrawal symptoms on cessation of use of the substance; and giving a higher priority to using the substance than to other obligations, such as work or study. Opioid dependence can relate to both pharmaceutical or illegal opioids: for example, iatrogenic dependence refers to the development of symptoms of dependence after the legitimate use of opioids prescribed by a medical professional (Hartman 2015).

Other opioid-related harms include injuries and deaths arising from violence to, or by, someone on opioids; negligent driving by someone on opioids; bloodborne viral infections (such as HIV and hepatitis C) from unsafe injecting practices; and social harms such as antisocial behaviour.

Burden from opioid use

Some of the health-related harms of opioid use can be quantified by burden of disease analysis, which measures the impact of different diseases or injuries on a population. It combines the burden of living with ill health (non-fatal burden) with the burden of dying prematurely (fatal burden).

In 2011, opioid use was responsible for 0.9% of the total burden of disease and injuries in Australia (AIHW 2018e). Most of the burden due to opioid use was due to *Accidental poisoning*, which accounted for 63% of the burden due to opioid use, and *Opioid dependence*, which accounted for 30%. A further 7.8% of the burden due to opioid use was from *Suicide and self-inflicted injuries* (AIHW 2018e).

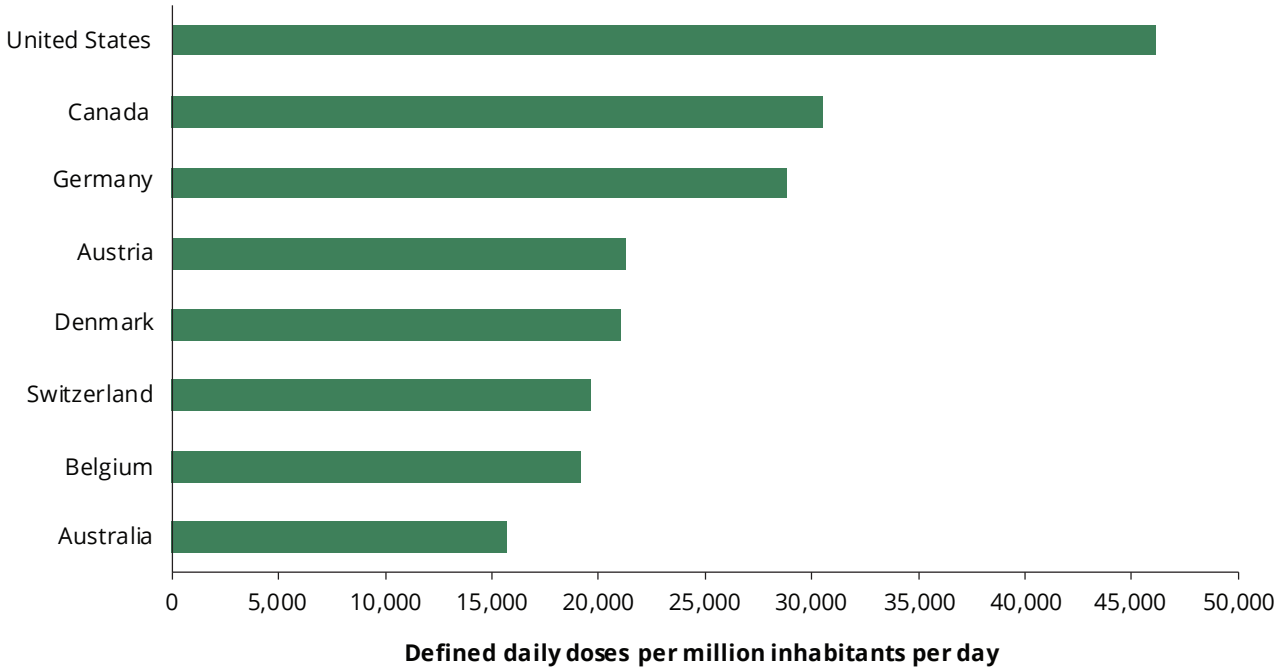
Opioid use was responsible for just over half (51%) of all *Accidental poisoning* burden, all *Opioid dependence* burden and 3% of *Suicide and self-inflicted injuries* burden (AIHW 2018e).

Opioid use and harm internationally

Issues related to opioid use and harm have been reported in several countries. Although complicated by underlying differences in health systems, data definitions, social context, populations and data availability, international comparisons of data are important. Such comparisons can aid in understanding how Australia performs compared with other countries, and effective approaches used by other countries that could be considered in Australia.

Licit opioid consumption can be measured using the defined daily dose (DDD) per capita, per day. This is a measure, per capita, of the assumed average doses of opioids for an adult, per day (see Box 2.1 for further information). Based on data from the International Narcotics Control Board, Australia has the 8th highest opioid consumption in DDDs per capita, per day, of 167 countries and territories (International Narcotics Control Board 2017). The United States ranks 1st, with around 46,100 DDDs per 1,000,000 population, followed by Canada, with around 30,600. Australia has around 15,700, which is more than either the United Kingdom (14,600) or New Zealand (11,500) (Figure 1.1).

Figure 1.1: Licit opioid consumption, defined daily doses per 1,000,000 population, countries and territories with highest consumption, 2014–16



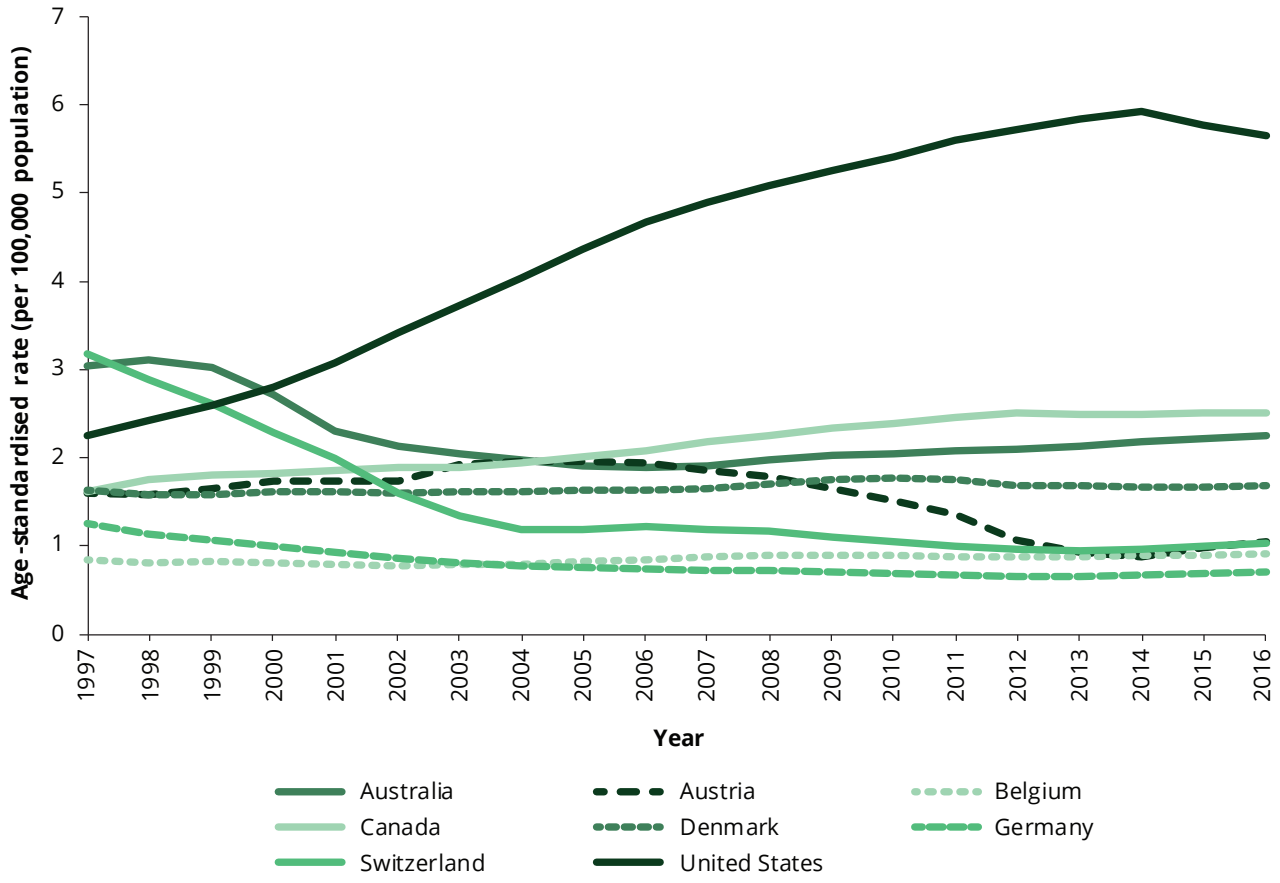
Note: Does not include buprenorphine.

Source: International Narcotics Control Board 2017.

The Global Burden of Disease Study compared mortality from opioid use disorders between 1997 and 2016 across 195 countries (Global Burden of Disease Collaborative Network 2017) (Figure 1.2). The study provides a useful tool for country comparisons using consistent or comparable methods for country estimates. It is important to note, however, that the Global Burden of Disease Study methods differ from those used in the Australian Burden of Disease Study and from Australian methods for identifying drug-induced deaths.

Among the countries shown in Figure 1.1, and based on data from the Global Burden of Disease Study, the age-standardised rate of deaths in 2016 was highest for the United States, which was around twice as high as the rates for Canada or Australia.

Figure 1.2: Age-standardised rates of deaths due to opioid-use disorders, selected countries, 1997 to 2016



Source: Global Burden of Disease Collaborative Network 2017.

What is the purpose of this report?

This report aims to bring together data from a range of sources to present a comprehensive description of opioid harm in Australia. It is the first time such a report has been produced by the AIHW and, although there are still data gaps, the report adds to the evidence base on opioid use and harms in Australia. It presents current national data and trends on prescription, non-medical and illicit use of opioids; opioid poisoning; and opioid dependence. This report also presents findings from a collaboration between the AIHW and the Canadian Institute for Health Information (CIHI), including high-level comparisons of prescription opioids; ED presentations and hospitalisations from opioid harms; and some of the issues explored and overcome in order to compare opioid harm in the 2 countries.

The classification of opioids varies between the data sources used in this report (Box 1.1), which should be borne in mind when comparing data from different sources.

Box 1.1: Classifications of opioids used in this report

In this report, data from the Pharmaceutical Benefits Scheme (PBS), used to report on dispensed prescriptions, are reported by active ingredients, such as oxycodone, codeine, fentanyl and so on.

Self-reported illicit and non-medical opioid-use data from the National Drug Strategy Household Survey (NDSHS) are reported in the following categories:

- *Heroin*
- *Pain-killers/analgesics and pharmaceutical opioids*, which includes over-the-counter codeine products; prescription codeine products; oxycodone; tramadol; morphine; fentanyl; gabapentinoids; and other prescription pain-killers/pain relievers and opioids
- *Methadone or buprenorphine*
- *All opioids*, which includes all of the above.

In 2016, there was a change in the survey to better capture non-medical use of opioids, which means the data for 2016 cannot be compared with data from previous years.

Data from the National Mortality Database (used to report on opioid deaths) are classified using the International Classification of Diseases, while data from the National Hospital Morbidity Database (used to report on opioid hospitalisations) are classified using the International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian modification. Data from both data sources are reported using the following categories in this report:

- *Opium*
- *Heroin*
- *Naturally derived opioids*, which includes codeine, morphine and oxycodone
- *Methadone*
- *Synthetic opioids*, which includes pethidine, fentanyl and tramadol
- *Other and unspecified opioids*.

Currently, the quality of Australian emergency department data does not enable analysis of which opioids are involved in *Opioid poisoning* presentations.

Data from the specialist Alcohol and Other Drug Treatment Services National Minimum Data Set (AODTS NMDS) and the National Opioid Pharmacotherapy Statistics Annual Data (NOPSAD) collection, which are used to report on treatment for opioid dependence, are classified using the Australian Standard Classification of Drugs of Concern, 2nd edition. Data from both data sources are reporting using variations of the following categories:

- *Codeine*
- *Morphine*
- *Buprenorphine*
- *Heroin*
- *Methadone*
- *Oxycodone*
- *Other opioids*, which includes fentanyl, pethidine and tramadol
- *Not stated/not reported*.

2

Use of opioids

Key findings

Opioid prescriptions dispensed

- In 2016–17, 15.4 million opioid prescriptions were dispensed under the Pharmaceutical Benefits Scheme (PBS) to 3.1 million people.
- Strong opioids (for example, morphine, oxycodone and fentanyl) accounted for 59% of all opioid prescriptions dispensed in 2016–17, of which oxycodone was the most commonly dispensed opioid prescription (37% of all opioid prescriptions dispensed).
- For all opioid prescriptions dispensed, and oxycodone in particular, while the rates of prescriptions dispensed increased, on average the prescriptions dispensed were for lower doses and/or quantities in 2016–17 compared with 2012–13, after adjusting for differences in the age structure of the population.
- Females were more likely to be prescribed an opioid than males, with 58% of all opioid prescriptions dispensed to females, and females accounting for 55% of individuals receiving 1 or more prescriptions in 2016–17.
- Opioid prescriptions were most common among those aged 65 and over, with 44% of prescriptions dispensed to people in this age group.
- After adjusting for age, the rate of OME was highest for *Inner regional* areas (1,374 OME mg per 1,000 population, per day), followed closely by *Outer regional* areas (1,362 OME mg per 1,000 population, per day). It was lowest for *Very remote* areas (645 OME mg per 1,000 population, per day).

Hospitalisations involving side effects of pharmaceutical opioid use

- The rate of hospitalisations per 100,000 population almost doubled in the 10 years to 2016–17, after adjusting for age.
- Rates were higher for females than for males, for all age groups, in 2016–17.

Illicit and non-medical use of opioids

In 2016:

- for both lifetime and recent use, *Pain-killers/analgesics and pharmaceutical opioids* were the most common type of opioid used for illicit or non-medical purposes
- people in the lowest socioeconomic group were 1.8 times as likely to have recently used opioids for illicit or non-medical purposes as those in the highest.

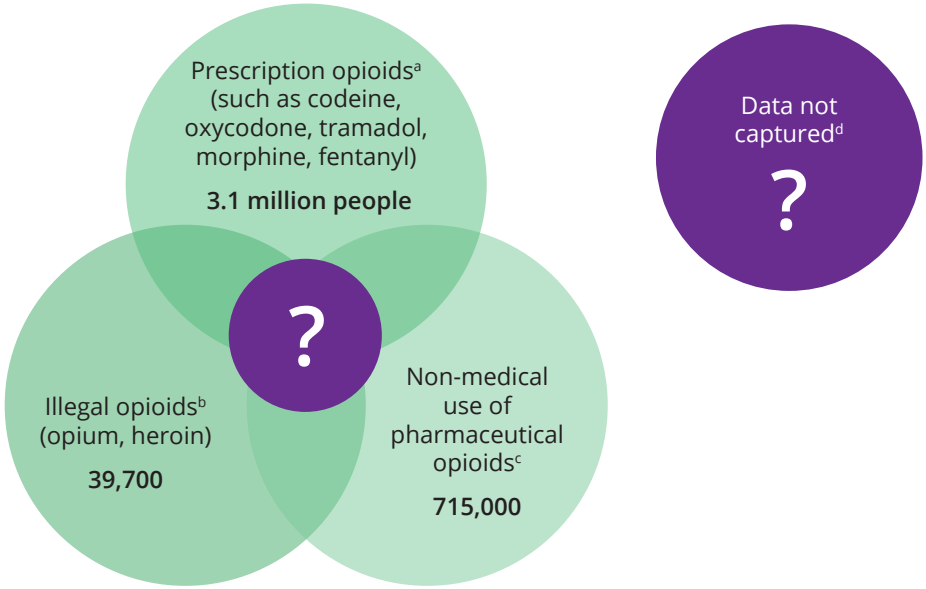
Between 2001 and 2013 there was:

- a 21% increase in the proportion of people using opioids for illicit or non-medical purposes over their lifetime, but no change in recent users
- a decline in the lifetime and recent use of *Heroin* (by 25% and 50%, respectively).

All opioids—including codeine—can lead to dependence, accidental overdose, hospitalisation or death. There have been recent rises in opioid prescriptions dispensed, and in the proportion of people using opioids for illicit or non-medical purposes (AIHW 2017d).

In Australia in 2016–17, 3.1 million people were dispensed a prescription opioid, and an estimated 735,000 people were using opioids for illicit or non-medical purposes—including approximately 715,000 people using pharmaceutical opioids and 39,700 using heroin. The extent of overlap between prescription opioid use and illicit and non-medical use is unknown, and all the data are missing for over-the-counter codeine supply and private prescriptions (Figure 2.1).

Figure 2.1: Number of people using opioids in Australia over 12 months, 2016



(a) Number of opioid prescriptions dispensed under the 2016–17 PBS.

(b) Illegal opioid use estimated from the 2016 National Drug Strategy Household Survey (NDSHS), based on self-reported use of heroin in the last 12 months (which may be an underestimate) (see Box 2.2).

(c) Non-medical opioid use estimated from the 2016 NDSHS, based on self-reported use of pain-killers/analgesics and pharmaceutical opioids in the last 12 months.

(d) 'Data not captured' include medical use of over-the-counter codeine; private prescription opioids; opioids from doctor bags; and opioids provided during a hospital admission in public hospitals and on discharge to patients in New South Wales and the Australian Capital Territory.

Information about the availability and use of opioids in Australia is captured in a number of ways, including in:

- Pharmaceutical Benefits Scheme (PBS) data, which record all prescriptions dispensed under the PBS
- the National Drug Strategy Household Survey (NDSHS), which collects self-reported information about the misuse of pharmaceuticals and other drugs
- the National Wastewater Drug Monitoring Program (NWDMP), which monitors consumption related to all types of drug use (legal, illicit and non-medical use).

This chapter discusses opioid use in Australia, drawing mainly on these 3 data sources. It also discusses side effects of pharmaceutical opioid use, as captured in the National Hospital Morbidity Database (NHMD).

Medical use of opioids

Prescription opioids

PBS data record all prescriptions dispensed under the PBS (Box 2.1). The PBS subsidises an estimated 80% of all prescription drugs dispensed in Australia (Monheit et al. 2016), so PBS data are a good indicator of the available supply of prescription pharmaceuticals. Data on over-the-counter medicines, such as some codeine-containing medicines which were available over the counter until February 2018, are not captured, as they are not part of the PBS (Department of Health 2016a).

Box 2.1: The Pharmaceutical Benefits Scheme and measures of opioid use

In Australia, most prescription pharmaceuticals are subsidised for all Australian Medicare cardholders under the PBS. Prescriptions that cost more than the co-payment threshold ($6.40 for concessional patients and $39.50 for general patients as of 1 January 2018) are subsidised, costing the patient only that threshold amount, while the government pays for the rest.

Trend data presented here for 2012–13 onwards include prescriptions that were priced under the PBS co-payment thresholds. Prior to 2012, prescriptions priced under the co-payment threshold were not captured in the PBS data (for example, codeine preparations supplied to general patients).

There are a number of different measures that can be used to understand patterns of opioid use, each of which has limitations.

The **number of opioid prescriptions dispensed** simply measures how many opioid prescriptions were supplied. It does not include prescriptions that were not dispensed or medications obtained without a prescription. It does not provide information about dosage or duration of treatment or about the number of people treated. **Rates of opioid prescriptions dispensed** (for example, the rate per 100,000 population) can be age-standardised to adjust for differences in the age structure of the population over time, or between population subgroups.

The **number of people dispensed opioids** refers to how many people in a given time period had 1 or more prescription opioids dispensed. This is useful for determining how many people are using opioids across a time period. It does not provide information about dosage or duration of treatment. The **rate of people prescriptions dispensed** (for example, per 100,000 population) can be age-standardised to adjust for differences in the age structure of the population over time, or between population subgroups.

The defined daily dose (DDD) is the dose of a particular drug that is assumed to be the average per day when used for its main indication in adults. The DDD can be used with data on the number of prescriptions dispensed and the mass of active drug in each prescription to calculate the **rate of DDD dispensed** (for example, per 1,000 population per day). For example, 10 DDDs per 1,000 population per day means that there were 10 DDDs of the drug dispensed per 1,000 population per day. However, the DDD for a drug may not match the recommended or prescribed dose. This may occur, for example, due to changes in the primary indication the drug is used for, or due to individualised dosing based on patient response. Because the DDD may differ from the recommended or prescribed dose, the rate of DDD dispensed may underestimate or overestimate true use.

continued

Box 2.1 (continued): The Pharmaceutical Benefits Scheme and measures of opioid use

The **rate of oral morphine equivalent (OME)** (for example, per 1,000 population per day) is a measure of opioid use that adjusts for the difference in potency between different opioids. Using data on the number of prescriptions dispensed, the mass of active drug in each prescription, and OME conversion factors, it converts the amount of each opioid dispensed to the amount of oral morphine that would be required to produce the same pain-relieving effect.

For more information on the PBS data see Appendix A. <Pharmaceutical Benefits Scheme data>.

How many opioids and what type of opioids are dispensed?

In 2016–17, 15.4 million opioid prescriptions were dispensed under the PBS (Table S2.1).

Oxycodone was the most commonly dispensed opioid, with 5.7 million prescriptions dispensed (a rate of 23,515 prescriptions dispensed per 100,000 population), followed by codeine (3.7 million prescriptions, or a rate of 15,216 prescriptions dispensed per 100,000 population) and tramadol (2.7 million prescriptions, or a rate of 11,147 prescriptions dispensed per 100,000 population) (Table S2.1; Figure 2.2).

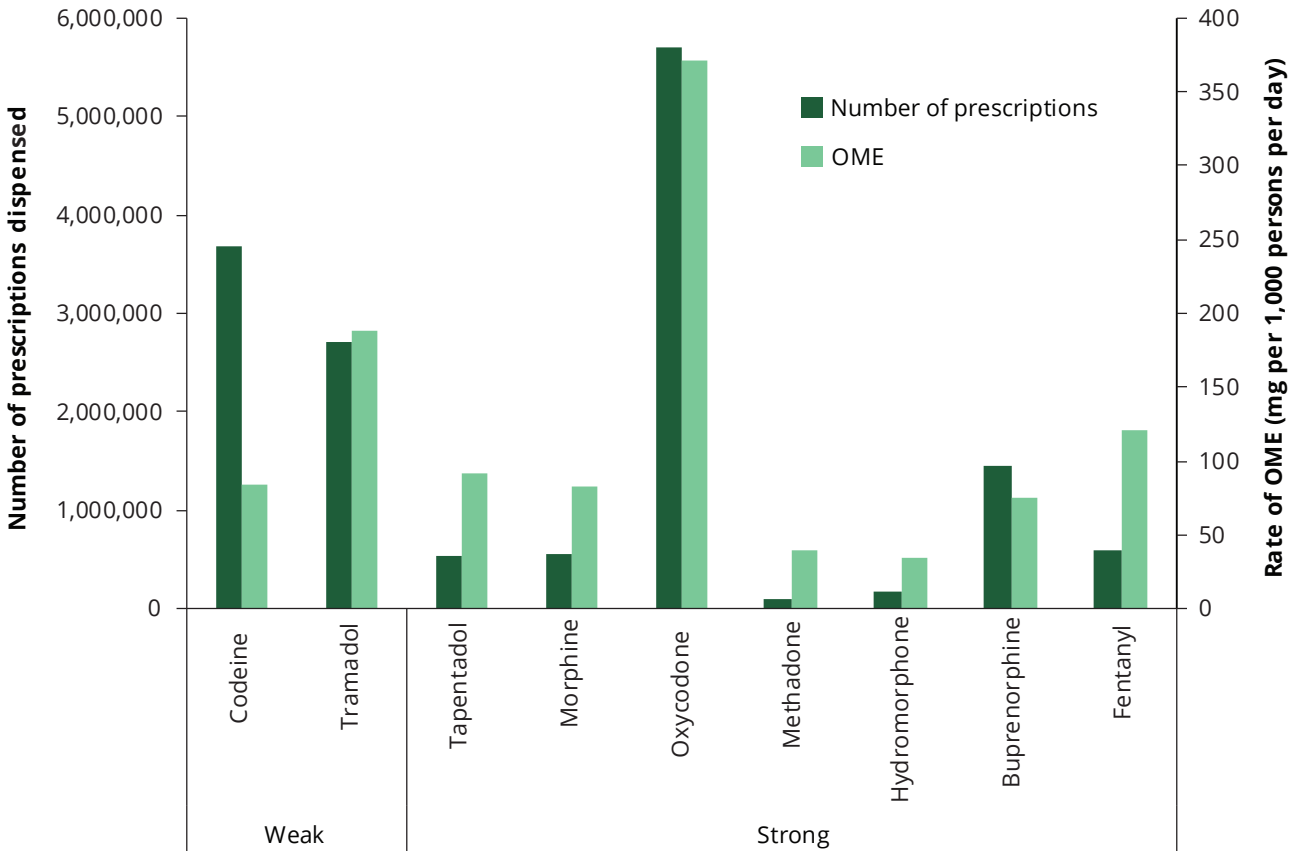
The 15.4 million opioid prescriptions dispensed in 2016–17 were dispensed to 3.1 million people. While oxycodone was the most commonly dispensed opioid, based on the number of prescriptions dispensed, more people were dispensed codeine (1.7 million people) than oxycodone (1.3 million people) (Table S2.2).

Oxycodone is considered a 'strong' opioid, while codeine and tramadol are 'weak' opioids (Table 1.1). Based on the number of prescriptions dispensed, strong opioids accounted for 59% of all opioid prescriptions dispensed in 2016–17. These data are for prescription opioids only, and do not include over-the-counter codeine, which was available when these data were collected and has been estimated to account for more than half of all codeine pack sales (Gisev et al. 2016).

For all opioids combined, there were 1,082 OME mg per 1,000 population, per day, dispensed in 2016–17. The most-used opioids, as measured by the rate of OME, were oxycodone (34% of all opioid OME), tramadol (17%) and fentanyl (11%) (Figure 2.2).

Strong opioids accounted for 75% of opioid use, as measured by the rate of OME. This is similar to the recent analysis of PBS data by Karanges et al. (2018), which found that, in 2015, strong opioids accounted for 78% of opioid use as measured by OME.

Figure 2.2: Number of prescriptions dispensed and rate of OME, by type and strength of opioid, 2016–17



Notes

1. Codeine and oxycodone include preparations in combination with other drugs.
2. Data not captured include over-the-counter opioids; private prescription opioids; opioids from doctor bags; and opioids provided during a hospital admission in public hospitals and on discharge to patients in New South Wales and the Australian Capital Territory.

Source: AIHW analysis of PBS data maintained by the Department of Health and sourced from the Department of Human Services; Table S2.1.

How do opioid prescriptions vary by age and sex?

In 2016–17, the rate of people dispensed opioid prescriptions increased with age, from 593 per 100,000 population among those under 15, to 26,102 per 100,000 population among those aged 65 and over (Table S2.6).

The rate of opioid prescriptions dispensed also increased with age, from 757 per 100,000 population among those under 15 to 182,691 per 100,000 population among those aged 65 and over. More than 4 in 10 (44%) opioid prescriptions were dispensed to people aged 65 and over (tables S2.3 and S2.5).

Females were more likely to be prescribed an opioid than males. After adjusting for differences in the age structure of the female and male populations, females were 1.1 times as likely as males to have had an opioid prescription dispensed (Table S2.6).

Around 3 in 5 (58%) of all opioid prescriptions dispensed in 2016–17 were dispensed to females and, on average, females who received an opioid prescription received 5.2 prescriptions over the 12 months, compared with 4.6 prescriptions for males who received an opioid prescription (tables S2.3 and S2.4).

Females were more likely than males to have an opioid prescription dispensed in every age group, except those under 15. The largest relative difference between females and males was at ages 15–24 and 25–34, when women were 1.3 times as likely as men to have been dispensed an opioid prescription (Table S2.3).

Similarly, there was a higher rate of opioid prescriptions dispensed per 100,000 population among females than males for every age group, except for those aged less than 15. The largest relative difference between females and males was at age 65 and over, when the rate of prescriptions dispensed among women was 1.5 times as high as the rate among men (Tables S2.3 and S2.5).

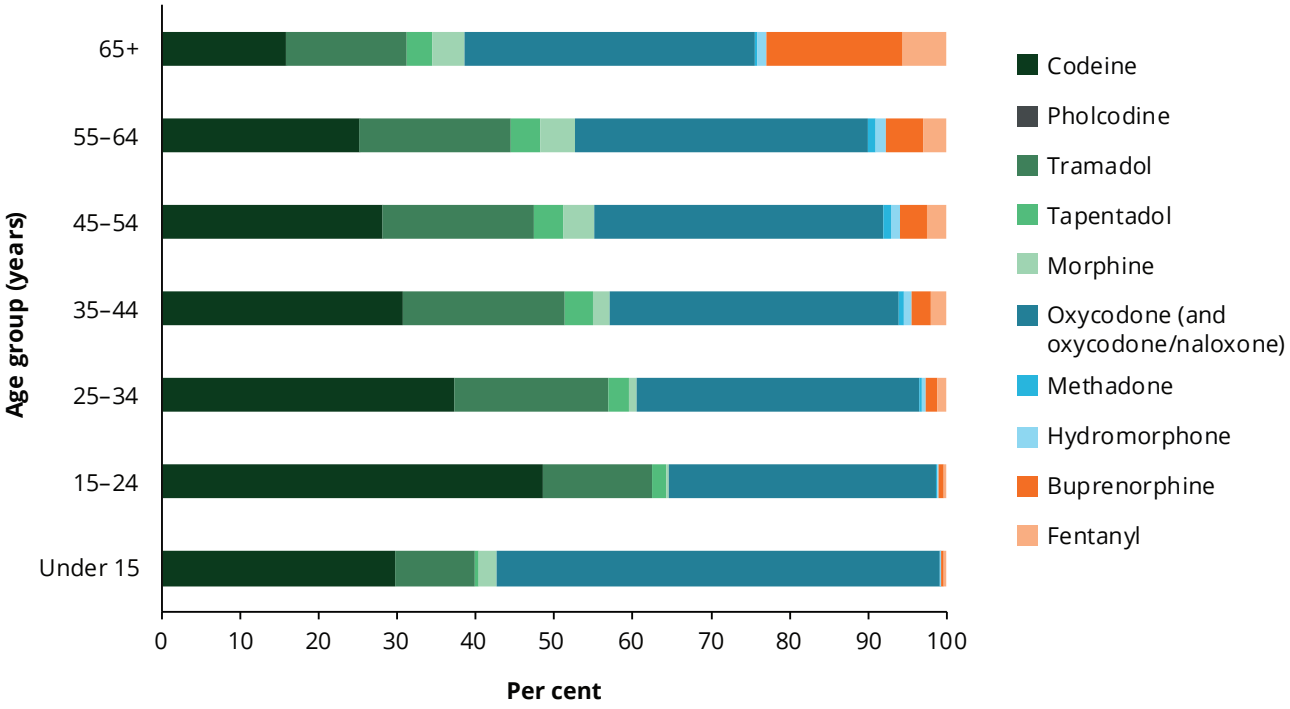
Women also have higher rates of arthritis than men, for which opioids may be prescribed, particularly among those aged 45 and over (AIHW 2018c).

Types of opioids prescribed by age

Based on the number of opioid prescriptions dispensed, codeine was the most commonly dispensed opioid among those aged 15–34, while oxycodone was the most common opioid dispensed to all other age groups. Oxycodone prescriptions accounted for a similar proportion (34–37%) of all prescriptions dispensed to each age group, except for those aged under 15 (57%).

As a proportion of all opioid prescriptions dispensed to an age group, codeine prescriptions decreased with increasing age, from 49% of prescriptions among those aged 15–24, to 16% of prescriptions among those aged 65 or over. The proportion that were other stronger opioids—such as fentanyl, morphine and buprenorphine—increased (Figure 2.3).

Figure 2.3: Proportion of prescription opioids dispensed to each age group, by type, 2016–17



Notes

1. Codeine and oxycodone include preparations in combination with other drugs.
2. Data not captured include over-the-counter opioids; private prescription opioids; opioids from doctor bags; and opioids provided during a hospital admission in public hospitals and on discharge to patients in New South Wales and the Australian Capital Territory.

Source: AIHW analysis of PBS data maintained by the Department of Health and sourced from the Department of Human Services; Table S2.3.

What changes are there over time in dispensed opioids?

After adjusting for differences in the age structure of the population between 2012–13 and 2016–17, the rate of prescriptions dispensed rose by 9%, from 53,683 to 58,278 per 100,000 population. While there was a 30% increase in the age-standardised rate of prescriptions dispensed for oxycodone, there were decreases in the rate for several other opioids. This included an 11% decrease for codeine, a 19% decrease for fentanyl, a 13% decrease for methadone and a 19% decrease for morphine (Table 2.1).

Compared with the rate of prescriptions dispensed, there was a smaller increase in the rate of people to whom opioids were dispensed, which rose by 4% between 2012–13 and 2016–17, after adjusting for age (Table 2.1). There was a 33% increase in the rate of people to whom oxycodone was dispensed, with decreases for most other opioids. This included a 10% decrease for codeine and a 25% decrease for fentanyl.

Over the same period, there was no change in the age-standardised rate of OME for all opioids (Table 2.1). Except for oxycodone, which is discussed below, the age-standardised rate of OME decreased for most individual opioids, including a 32% decrease for morphine, a 21% decrease for fentanyl, a 17% decrease for methadone and a 12% decrease for codeine. The effect of these decreases in rates of OME on the rate of total OME was offset by the increase in the rate of OME for tapentadol, a new drug added to the PBS in 2014 that was not available in 2012–13 but was available in 2016–17. Other research has found an increase in opioid prescriptions over time in Australia (Karanges et al. 2016), which is driven by an increased use of stronger opioids (Karanges et al. 2018).

As mentioned, oxycodone appeared to be driving the increase in the age-standardised rate of opioid prescriptions dispensed, rising 30% over the period (Table 2.1). However, the age-standardised OME mg per 1,000 population, per day, for oxycodone rose only 1%, indicating that lower doses and/or quantities of oxycodone are being prescribed per prescription in more recent years (Table 2.1).

This could be in response to increased awareness, among medical providers, of the risks and harms associated with opioid use. Recent research has found that opioids are no more effective than other non-opioid analgesics in the long-term treatment of chronic non-cancer pain (for example chronic low-back pain or osteoarthritis pain) (Chaparro et al. 2013; Krebs et al. 2018), or in the treatment of acute extremity pain (Chang et al. 2017).

Table 2.1: Change in the rate of opioid prescriptions dispensed, in the rate of people receiving opioids and in the rate of OME, 2012–13 to 2016–17

	Prescriptions per 100,000 population		People dispensed opioids per 100,000 population		OME mg per 1,000 population per day	
	Direction	% change	Direction	% change	Direction	% change
All opioids	↑	9%	↑	4%	≈	0%
Strong opioids	↑↑	21%	↑↑	30%	↑	2%
Oxycodone	↑↑	30%	↑↑	33%	≈	1%
Morphine	↓	-19%	↓	-11%	↓↓	-32%
Fentanyl	↓	-19%	↓↓	-25%	↓↓	-21%
Weak opioids	↓	-5%	↓	-7%	↓	-7%
Codeine	↓	-11%	↓	-10%	↓	-12%
Tramadol	↑	4%	≈	1%	↓	-5%

Notes

1. Rates are age-standardised to the 2001 Australian standard population.
2. Codeine and oxycodone include preparations in combination with other drugs.
3. Data not captured include over-the-counter opioids; private prescription opioids; opioids from doctor bags; and opioids provided during a hospital admission in public hospitals and on discharge to patients in New South Wales and the Australian Capital Territory.

Source: AIHW analysis of PBS data maintained by the Department of Health and sourced from the Department of Human Services; Table S2.1.

How do dispensed opioids vary by population groups?

Comparisons of prescription opioids being dispensed, by remoteness area and socioeconomic group, are based on the following data:

- age-standardised rates (to account for differences in the age structures)
- rate of prescriptions dispensed per 100,000 population (to adjust for differences in population size)
- OME mg per 1,000 population per day (to adjust for differences in population size and differences in dosage and/or quantity dispensed per prescription).

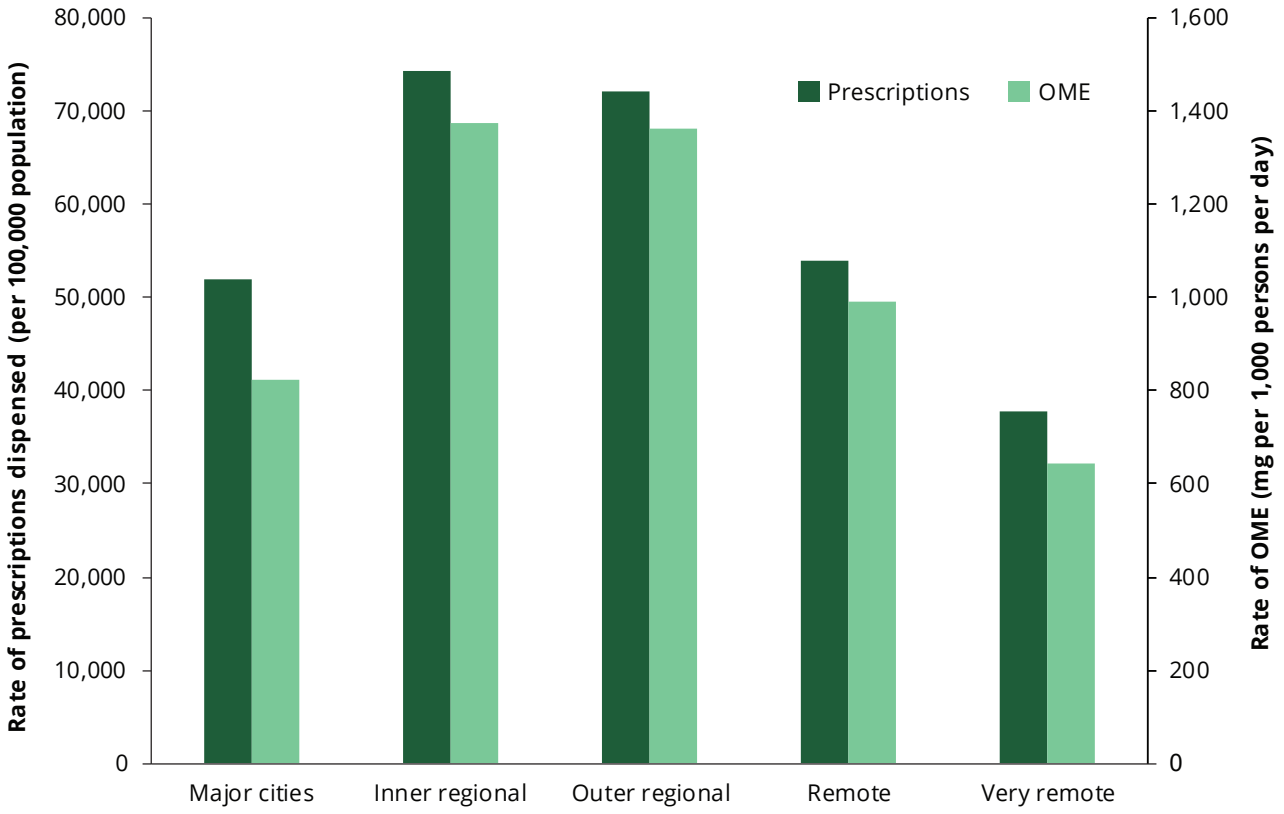
Remoteness

In 2016–17, the age-standardised rate of prescriptions dispensed was highest for *Inner regional* areas (74,246 per 100,000 population) and lowest for *Very remote* areas (37,717 per 100,000 population).

Similar to the rate of prescriptions dispensed, the rate of OME was highest in *Inner regional* areas (1,374 OME mg per 1,000 persons, per day) and lowest in *Very remote* areas (645 OME mg per 1,000 persons, per day). *Major cities* and *Remote* areas had similar rates of prescriptions dispensed (51,872 per 100,000 population and 53,991 per 100,000 population, respectively) but the rate of OME was higher in *Remote* areas (993 OME mg per 1,000 persons, per day) compared with *Major cities* (823 OME mg per 1,000 persons, per day). This indicates that the difference in use (as measured by OME mg per 1,000 persons, per day) between *Major cities* and *Remote* areas was not as much because of a difference in the rate of prescriptions dispensed but due to differences in the potency of opioids prescribed, the doses prescribed and/or the duration of prescribed treatment (Figure 2.4). The rate of disease burden in *Remote* areas is 1.3 times the rate in *Major cities* (AIHW 2016), which could result in higher rates of opioid use. Although the rate of disease burden in *Very remote* areas was the highest of all remoteness areas, the rate of OME was lowest. This may be indicative of barriers to accessing general practitioners and pharmacies by those living in *Very remote* areas.

Oxycodone had the highest prescription rates across all remoteness areas, followed by codeine and tramadol. In terms of the rate of OME, oxycodone was the highest across all remoteness areas, followed by tramadol and then fentanyl. While the rates of codeine prescriptions dispensed were much higher than the rates for fentanyl (between 5 to 8 times higher across remoteness areas), the rates of OME for fentanyl were higher than for codeine, across all remoteness areas (Table S2.7).

Figure 2.4: Rate of opioid prescriptions and rate of OME, by remoteness area, 2016–17



Notes

1. Rates are age-standardised to the 2001 Australian standard population.
2. Codeine and oxycodone include preparations in combination with other drugs.
3. Data not captured include over-the-counter opioids; private prescription opioids; opioids from doctor bags; and opioids provided during a hospital admission in public hospitals and on discharge to patients in New South Wales and the Australian Capital Territory.

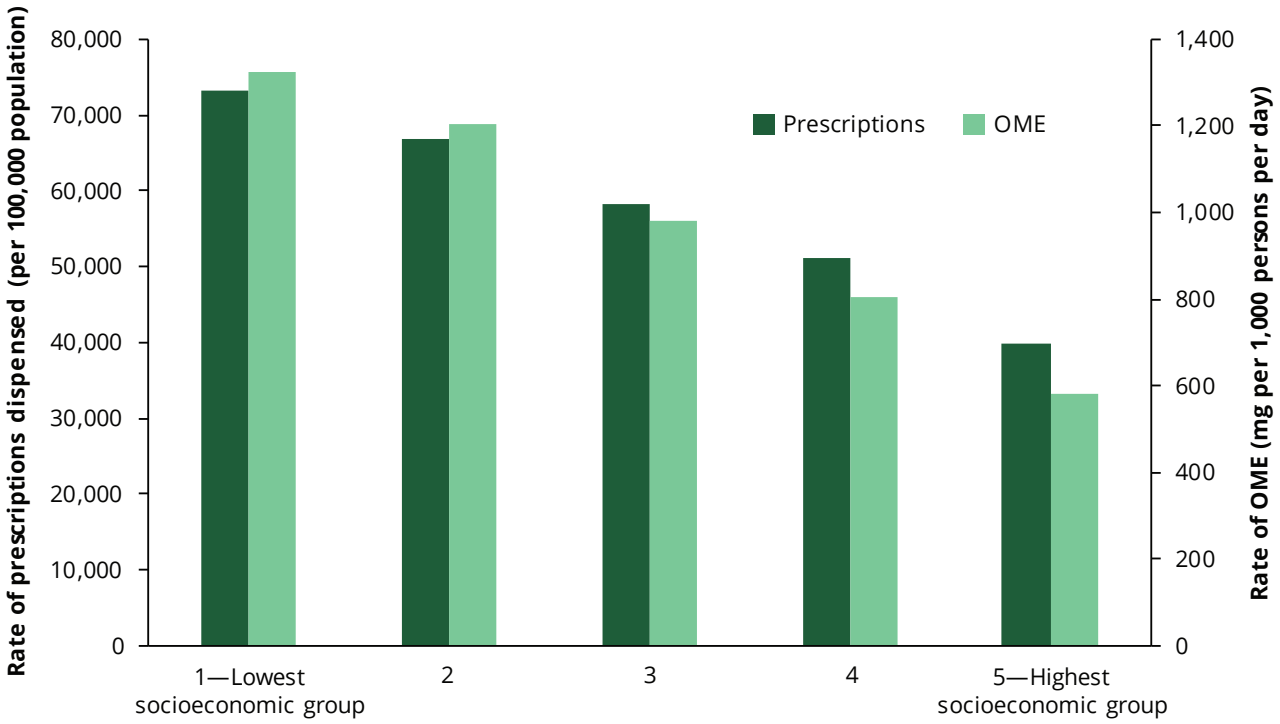
Source: AIHW analysis of PBS data maintained by the Department of Health and sourced from the Department of Human Services; Table S2.7.

Socioeconomic areas

In 2016–17, people living in the lowest socioeconomic areas had the highest rates of opioid prescriptions dispensed and of OME, and these decreased as the socioeconomic status of the area increased. Similar to people in *Remote* areas, the rate of disease burden is 1.5 times higher for those in the lowest socioeconomic group, compared with those in the highest socioeconomic group (AIHW 2016)—increased disease burden could contribute to increased rates of opioid use.

In the lowest socioeconomic group, there were 73,275 opioid prescriptions dispensed per 100,000 population and 1,325 OME mg of opioids dispensed per 1,000 persons, per day—compared with 39,767 opioid prescriptions dispensed per 100,000 population and 581 OME mg of opioids dispensed per 1,000 persons, per day, in the highest socioeconomic group (Figure 2.5).

Figure 2.5: Rate of opioid prescriptions and rate of OME, by socioeconomic group, 2016–17



Notes

1. Rates are age-standardised to the 2001 Australian standard population.
2. Codeine and oxycodone include preparations in combination with other drugs.
3. Data not captured includes over-the-counter opioids; private prescription opioids; opioids from doctor bags; and opioids provided during a hospital admission in public hospitals and on discharge to patients in New South Wales and the Australian Capital Territory.

Source: AIHW analysis of PBS data maintained by the Department of Health and sourced from the Department of Human Services; Table S2.8.

Opioids not captured by the PBS

Not all opioids available in Australia are covered by the PBS. Some opioids are sold via private prescription and, until 1 February 2018, codeine was available over-the-counter at pharmacies without a prescription. Almost 28 million packs of codeine were sold in Australia in 2013, and more than half were over-the-counter (Gisev et al. 2016) and accounted for an estimated 37% of all opioid purchases (Degenhardt et al. 2016).

This analysis of PBS prescription data found that there were 3.7 million prescriptions dispensed for codeine in 2016–17.

An analysis of PBS prescription data and opioid sales data (Gisev et al. 2018) found that, in 2014, about 12% of prescription-only opioid utilisation (measured as OME) was not captured by the PBS and that this rose to 18% of opioid utilisation when over-the-counter codeine was included.

Some opioids that are no longer subsidised by the PBS but are still registered for sale in Australia (for example, pethidine and dextropropoxyphen) continue to be sold under private prescription, although use has been declining (Gisev et al. 2018).

Other opioids are registered and available for sale before being subsidised by the PBS, with high demand even when no PBS subsidy is available. For example, 32% of tapentadol sales in 2014 were under private prescription, as it only came onto the PBS on June 1 2014 (Gisev et al. 2018).

Note that drugs used in the Opiate Dependence Treatment Program are provided under section 100 of the *National Health Act 1953* and have been excluded from the analysis, as script-level data are not available for this program.

Reasons for opioid prescriptions in general practice

Based on data from the Bettering the Evaluation and Care of Health study, in 2015–16, 7.6% of total prescriptions in general practice were for opioids, with a prescribing rate of 4.0 per 100 problems managed (Britt et al. 2016b), up from 3.7 per 100 problems managed in 2010–11 (Harrison et al. 2012).

The prescribing rate of oxycodone rose from 0.6 per 100 problems managed in 2006–07 to 0.9 in 2015–16 (Britt et al. 2016a). When extrapolated nationally, this was estimated to be an additional 1.2 million oxycodone prescriptions (for any number of repeats) written by general practitioners in 2015–16, compared with in 2006–07 (Britt et al. 2016a).

In 2010–11, 44% of opioids prescribed were for chronic non-cancer conditions (such as back problems, osteoarthritis and generalised multisite pain). Close to three-quarters (73%) of generalised multisite pain managements involved prescription of an opioid.

More recent evidence has found that opioids are no more effective than non-opioid analgesics in the long-term treatment of chronic non-cancer pain (for example chronic low back pain or osteoarthritis pain) (Chaparro et al. 2013; Krebs et al. 2018). Further research is warranted to see if the change in evidence results in a change in prescribing practices.

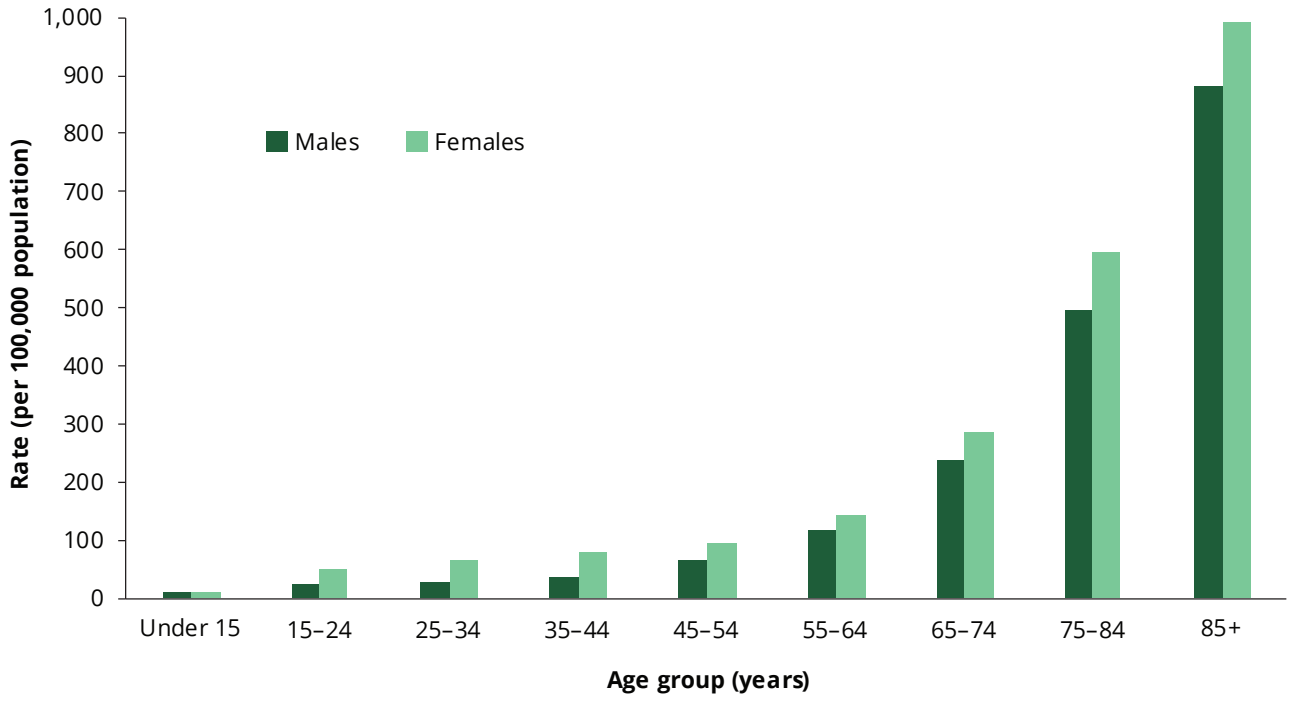
Hospitalisations involving side effects of pharmaceutical opioid use

In addition to the harms associated with illicit or non-medical use of opioids, harm can also occur when correct substances are properly administered. These are known as side effects of pharmaceutical use and include allergic reactions, hypersensitivity, idiosyncratic reactions, interactions of drugs (when each drug is the correct substance properly administered) and similar situations primarily involving proper use of drugs.

If a hospitalised person has a diagnosis that is caused by the side effects of pharmaceutical opioid use, this is recorded by the clinician and recorded in the administrative data (for more information, see Box 3.2 and Appendix A).

In 2016–17, there were 27,435 hospitalisations—or 75 per day—where a side effect of pharmaceutical opioid use was indicated (Table S2.9). For both females and males, rates increased, with increasing age, to be highest among those aged 85 and over (Figure 2.6). Rates of side effects of pharmaceutical opioid use were higher among females than males, for every age group.

Figure 2.6: Rate of hospitalisations related to side effects of pharmaceutical opioid use, by age group, by sex, 2016–17



Notes

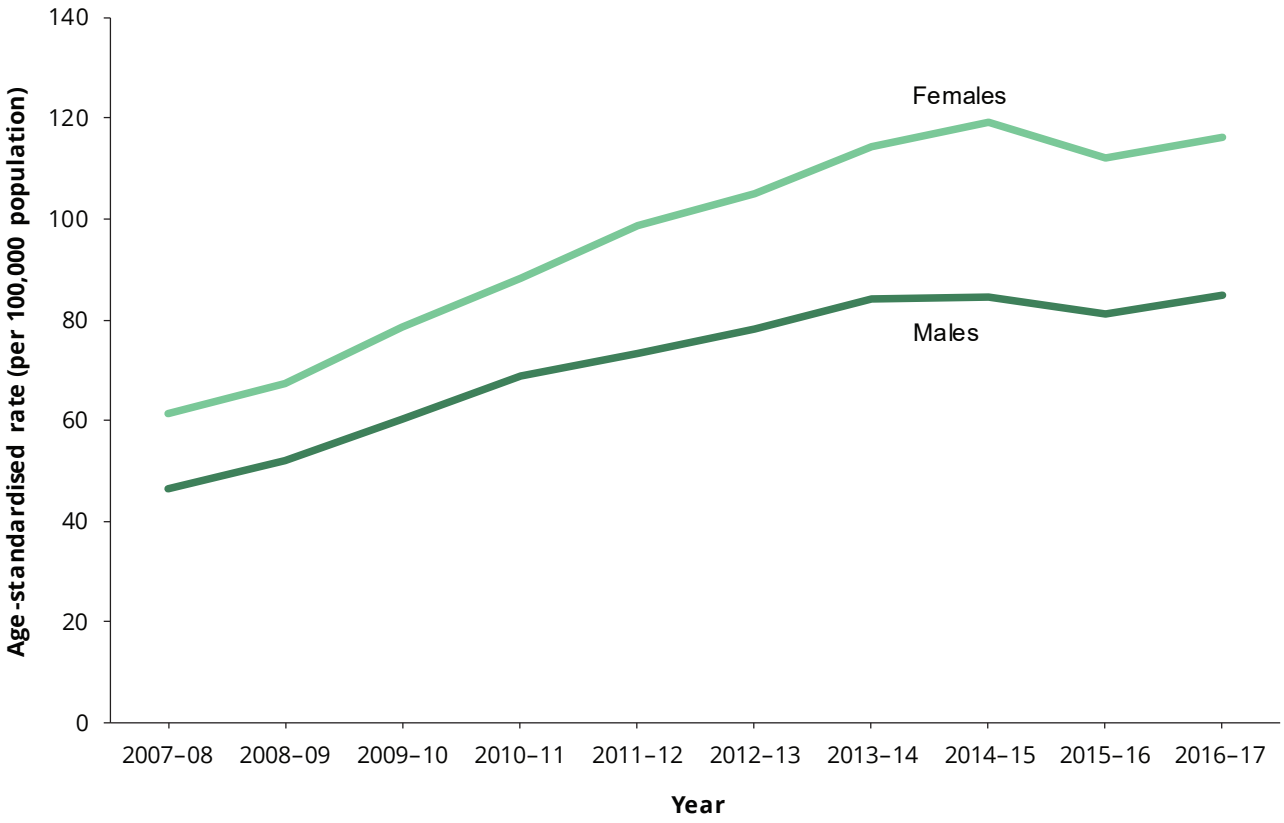
1. Side effects of pharmaceutical opioid use, classified according to International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian modification (ICD-10-AM) 9th edn. as external cause code Y45.0.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and for *Posthumous organ procurement*, have been excluded.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S2.9.

Between 2007–08 and 2016–17, the age-standardised rate of hospitalisations with mention of side effects of pharmaceutical opioid use almost doubled, from 54.1 per 100,000 population to 101.0 per 100,000 population (Table S2.9). The age-standardised rate of hospitalisations levelled off between 2013–14 and 2016–17. The increase was similar among males and females, but rates were consistently higher among females than among males (Figure 2.7).

The recent levelling in hospitalisations for side effects of pharmaceutical opioid use could partially be explained by the PBS data presented earlier, where between 2012–13 and 2016–17, the age-standardised rate of OME doses per 1,000 persons, per day, remained the same for all opioids and increased by 2% for strong opioids (Table 2.1).

Figure 2.7: Age-standardised rate of hospitalisations related to side effects of pharmaceutical opioid use, by sex, 2007–2008 to 2016–17



Notes

1. Side effects of pharmaceutical opioid use classified according to ICD-10-AM (9th edn for 2015–16 and 2016–17 and earlier editions for 2007–08 to 2014–15) as external cause code Y45.0.
2. Hospitalisations for which the care type was reported as *Newborn*, with no qualified days, and records for *Hospital boarders* and for *Posthumous organ procurement* have been excluded.
3. Rates are age-standardised to the 2001 Australian standard population.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S2.10.

The 5 most common principal diagnoses with a mention of the side effects of pharmaceutical opioid use were:

1. constipation (ICD-10-AM code K59.0)
2. primary bilateral osteoarthritis of the knee (M17.1)
3. nausea and vomiting (R11)
4. other primary osteoporosis of the hip (M16.1)
5. single delivery by caesarean section (O82) (Table S2.11).

All of these diagnoses are either known side effects of opioid use or underlying reasons why opioids may have been used.

The data do not capture information on the severity of the side effects or side effects that do not involve—or occur during—hospitalisation.

Illicit and non-medical use of opioids

In Australia, opioids are some of the most commonly used pharmaceuticals for non-medical purposes. The data in this section come from the National Drug Strategy Household Survey (NDSHS), which collects information about the misuse of pharmaceuticals and other drugs, including pharmaceutical opioids and heroin (Box 2.2).

The results presented here are based on self-reported illicit and non-medical use of opioids, which are reported by the following categories:

- *Heroin*
- *Pain-killers/analgesics and pharmaceutical opioids*
- *Methadone or buprenorphine*
- *All opioids*.

Results are presented for recent use (use in the last 12 months) unless otherwise specified.

This information does not relate to use of opioids for genuine medical purposes. For more information on the scope of the data, see Appendix A.

Box 2.2: The National Drug Strategy Household Survey

The National Drug Strategy Household Survey series uses a household-based survey sample, so people who were homeless or institutionalised were not included in the survey. The survey captures information on drug-use patterns, attitudes and behaviours.

Survey respondents are asked about illicit use of drugs (for example heroin or opium) and non-medical use of pharmaceuticals (for example oxycodone, codeine or fentanyl). All data in this section therefore relate to illicit and non-medical use only.

Results from the NDSHS are based on self-reported data and people may not accurately report information relating to illicit drug use, as these activities are illegal. In addition, the exclusion of persons from non-private dwellings, institutional settings, homeless people and the difficulty in reaching marginalised persons, are also likely to affect the estimates. These factors mean that results relating to illicit drugs are likely to underestimate actual prevalence.

Recent use refers to use of opioids in the last 12 months, while **lifetime use** refers to having ever used opioids.

This report includes data from surveys conducted in 2001, 2004, 2007, 2010, 2013 and 2016.

Analyses are based on the population aged 14 and over (unless specified), as this allows consistent comparison of 2013 data with earlier data.

In 2016 there was a change in the survey to better capture non-medical use of opioids, and this means the data for 2016 cannot be compared with data from previous years.

For more information, see Appendix A.

Source: AIHW 2017c.

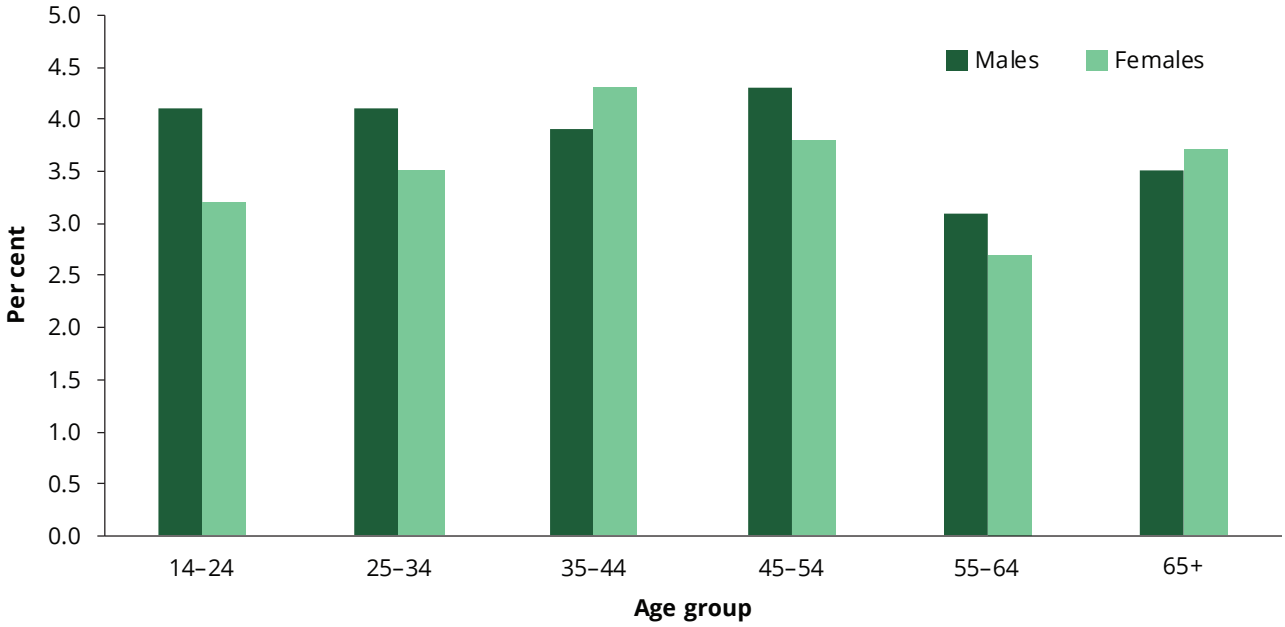
Who uses opioids for illicit or non-medical purposes?

In 2016, 10.5% of respondents aged 14 and over had used any type of opioid for illicit or non-medical purposes in their lifetime and 3.7% had done so recently. Recent non-medical use of *Pain-killers/ analgesics and pharmaceutical opioids* (3.6%) was more common than recent illicit use of *Heroin* (0.2%) or recent non-medical use of *Methadone or buprenorphine* (0.1%) (Table S2.12).

In 2016, the percentage of the population reporting recent illicit or non-medical use of opioids was similar for males and females across all age groups (Figure 2.8).

Previous AIHW research has shown that most heroin users in Australia use heroin for the first time in their early twenties (AIHW 2017c). However, there is an ageing cohort of injecting drug users (which is influenced by heroin use), with an average age of 36 in 2013, compared with 27 in 2001 (AIHW 2017c).

Figure 2.8: Illicit use of opioids in the last 12 months, by age group, by sex, 2016



Notes

1. For 2016, all opioids includes *Heroin*; *Pain-killers/analgesics and pharmaceutical opioids* (only includes over-the-counter products containing codeine); and *Methadone or buprenorphine*.
2. Refers to people aged 14 and over.

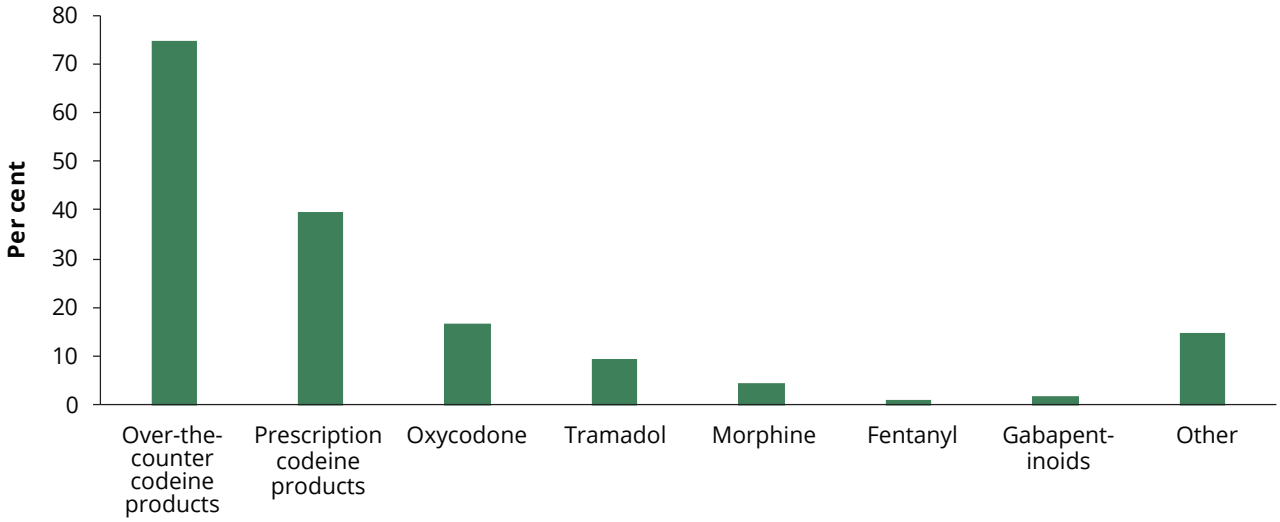
Source: National Drug Strategy Household Survey 2016; Table S2.13.

What types of opioids were recently used for illicit or non-medical purposes?

In 2016, pharmaceutical opioids, in particular over-the-counter codeine products, were the most common type of opioids used for illicit or non-medical purposes. Based on self-reports from the NDSHS, 2.5% of all people aged 14 and over had used *Over-the-counter codeine products* for non-medical purposes, followed by 1.3% who had used *Prescription codeine products* for non-medical purposes (AIHW 2017d).

Of people who had reported non-medical use of *Pain-killers/analgesics and pharmaceutical opioids*, 75% reported non-medical use of *Over-the-counter codeine products*, followed by 40% for *Prescription codeine products* and 17% for *Oxycodone* (Figure 2.9). Some respondents reported using more than 1 type of opioid, so proportions do not add to 100%.

Figure 2.9: Types of pain-killers/analgesics and pharmaceutical opioids used for non-medical purposes in the previous 12 months, 2016



Notes

1. Recent users refers to those who have reported use of *Pain-killers/analgesics and pharmaceutical opioids* in the last 12 months.
2. Refers to people aged 14 and over.

Source: AIHW 2017c; Table S2.14.

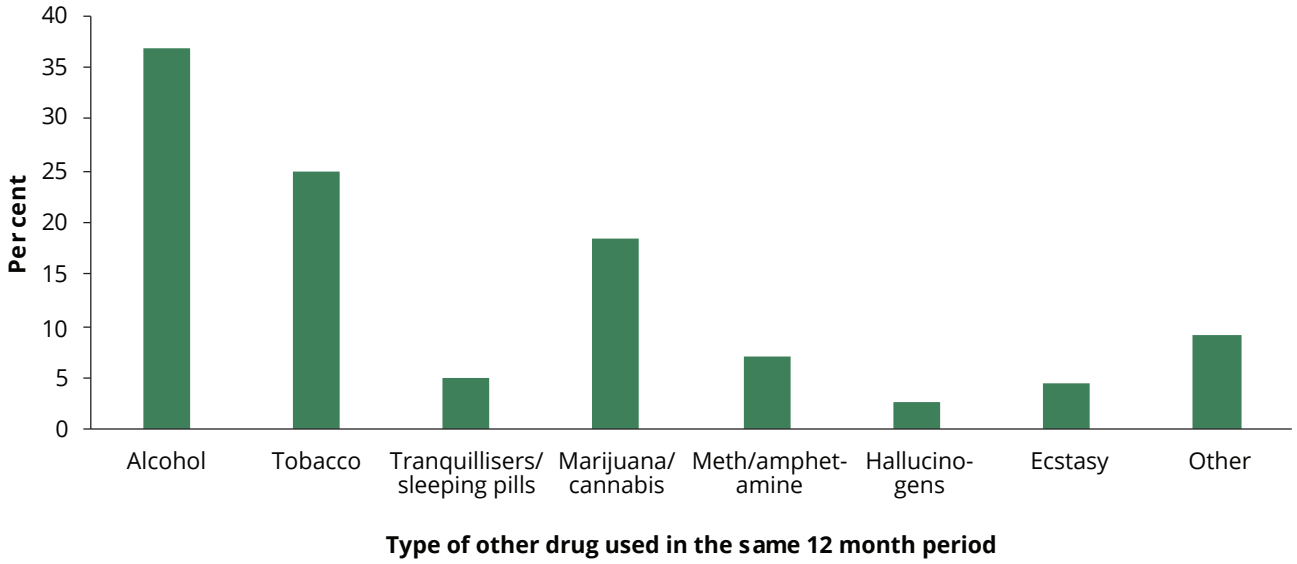
How do people obtain opioids?

In 2016, of people who had recently used *Pain-killers/analgesics and pharmaceutical opioids* for non-medical purposes, about half (52%) usually obtained them by purchasing over-the-counter pharmaceutical drugs at a pharmacy and about 1 in 5 obtained them with a medical prescription or by doctor-shopping (AIHW 2017c).

What other substances do opioid misusers use?

Of people who reported non-medical use of *Pain-killers/analgesics and pharmaceutical opioids*, 37% also used *Alcohol* in the same 12 month period, 25% used *Tobacco* and 18% used *Marijuana/cannabis* (Figure 2.10).

Figure 2.10: Types of other drugs used in the same 12 months, among recent users of pain-killers/analgesics and pharmaceutical opioids for non-medical purposes, 2016



Notes

1. 'Recent users' refers to those who have reported use of pain-killers and opioids in the last 12 months.
2. Refers to people aged 14 and over.

Source: AIHW 2017c; Table S2.15.

Has illicit and non-medical use of opioids changed over time?

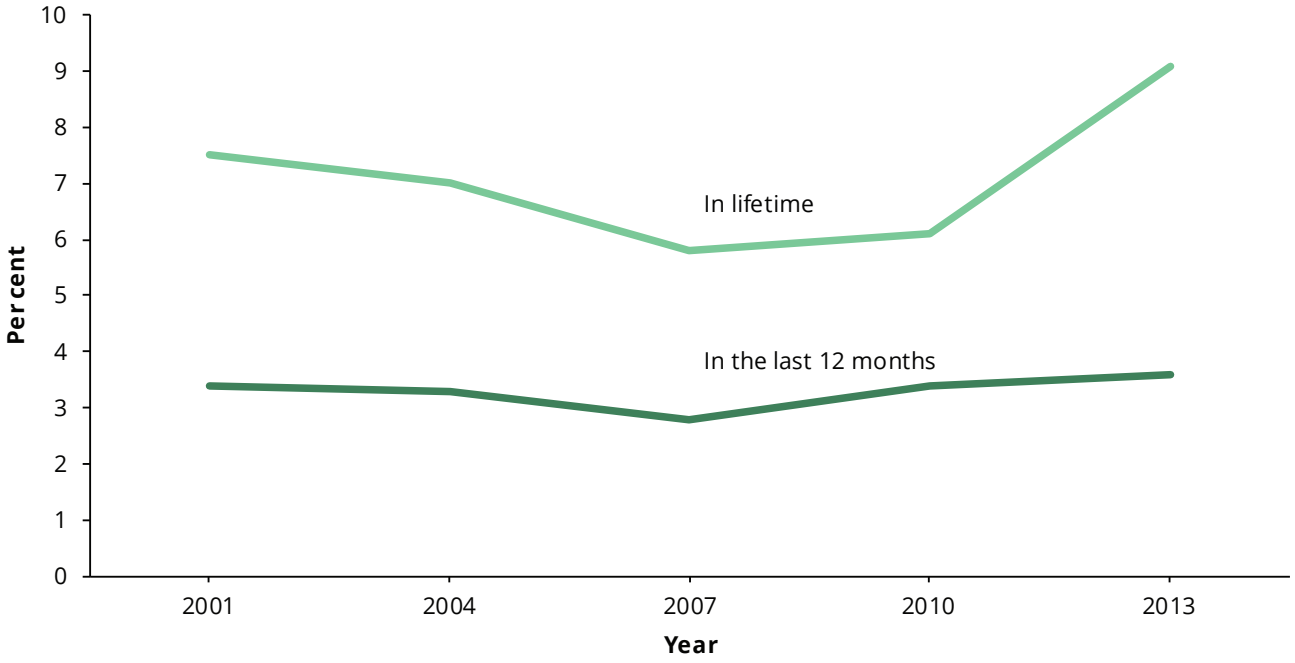
Due to the change in the survey instrument between 2013 and 2016, time trends are only possible for 2001 to 2013, as data for 2016 cannot be compared with data from earlier surveys (see Appendix A).

Between 2001 and 2007, lifetime and recent illicit or non-medical use of opioids declined. From 2007 to 2013, there were increases in both lifetime and recent use for people aged 14 or over (by 57% and 29%, respectively) (Figure 2.11; Table S2.16). The greater change in lifetime use could be explained by many people trying opioids for illicit or non-medical purposes, but only some of these people continuing illicit or non-medical opioid use over an extended period.

The pattern for non-medical use of *Pain-killers/analgesics and pharmaceutical opioids* was similar to illicit and non-medical use of all opioids. There was a 25% increase in lifetime non-medical use between 2001 and 2013, (from 6.7% to 8.4%), while there was no change for recent non-medical use (Table S2.16). This was also the case for *Methadone or buprenorphine*, where there was a 33% increase in lifetime use but no change in recent use (Table S2.16).

By contrast, between 2001 and 2013, both lifetime and recent illicit use of *Heroin* fell (by 25% and 50%, respectively) (Table S2.16).

Figure 2.11: Lifetime and recent illicit use of opioids, 2001 to 2013



Note: For 2001 to 2013, all opioids includes *Heroin*; *Pain-killers/analgesics and pharmaceutical opioids* (including non-opioid and codeine-containing over-the-counter products); and *Methadone or buprenorphine*.

Source: AIHW 2017c; Table S2.16.

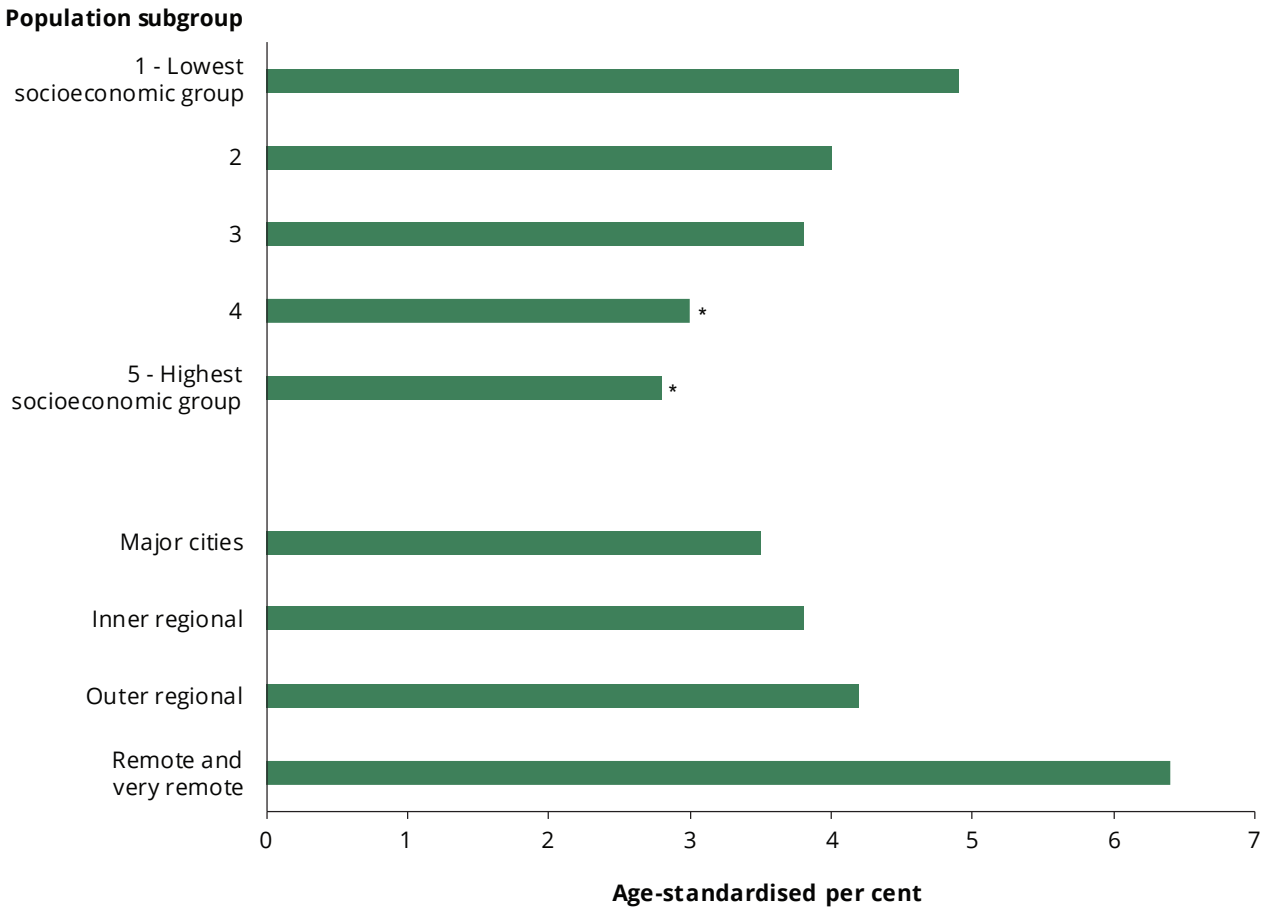
Does illicit and non-medical opioid use differ by population group?

In 2016, those in the lowest socioeconomic group were 1.8 times as likely to have used opioids for illicit or non-medical purposes in the last 12 months as those in the highest group (4.9% compared with 2.8%, respectively) (Figure 2.12; Table S2.17).

This was also the case for use of *Pain-killers/analgesics and pharmaceutical opioids*: 4.8% of people in the lowest socioeconomic group reported use, compared with 2.6% of people in the highest group (AIHW 2017d).

In 2016, there was no difference by remoteness area in recent use of all opioids (Figure 2.12, Table S2.17). However, use of *Pain-killers/analgesics and pharmaceutical opioids* was twice as high in *Remote and very remote* areas (6.6%) as in *Major cities* (3.3%) (AIHW 2017d).

Figure 2.12: Age-standardised illicit opioid use in the last 12 months, by population subgroup, 2016



* Indicates a significant difference when compared with the lowest socioeconomic group.

Notes

1. For 2016, all opioids includes *Heroin*; *Pain-killers/analgesics and pharmaceutical opioids* (only includes over-the-counter products containing codeine); and *Methadone or buprenorphine*.
2. Percentage is age-standardised to the 2001 Australian standard population.
3. Refers to people aged 14 and over.

Source: AIHW 2017c; Table S2.17.

Wastewater consumption monitoring

The National Wastewater Drug Monitoring Program (NWDMP) is used to monitor population-level consumption of different pharmaceutical and illicit substances. It captures information on 3 opioids (oxycodone, fentanyl and heroin) (Box 2.3), but cannot differentiate between prescribed and non-prescribed use, or differentiate between a small number of people using a large amount of a substance, or a large number of people using a small amount of a substance.

Box 2.3: The National Wastewater Drug Monitoring Program

In 2017, the Australian Government initiated the NWDMP to establish an objective evidence base on illicit drug use and the level of use of a number of legitimate substances.

After substances are consumed (for example, swallowed or injected), they are excreted by the body in either the same chemical form or as a metabolite (a chemically modified form), which ultimately ends up in sewer systems and at wastewater treatment plants. The NWDMP monitors drug use by measuring the amounts of these excreted substances in wastewater samples from wastewater treatment plants. Data are then analysed to produce population-weighted averages and per capita consumption.

A total of 45 wastewater treatment plants were monitored in December 2017, covering about 54% of the Australian population, from all states and territories, capital cities and regional areas (ACIC 2018).

Do levels of wastewater opioids differ by area?

The pharmaceutical opioids measured in wastewater (oxycodone and fentanyl) indicated that consumption in regional areas was at least twice as high as in capital cities, on average, between August 2016 and December 2017. Oxycodone average consumption was twice as high in regional areas, with approximately 8 doses per 1,000 people per day, compared with approximately 4 in capital cities. Fentanyl average consumption was more than double in regional areas, with 9 doses per 1,000 people per day, compared with approximately 4 doses per 1,000 people per day in capital cities (ACIC 2018).

By contrast, heroin consumption was higher in capital cities, compared with regional areas. In capital cities, the average consumption of heroin was approximately 6 doses per 1,000 people per day, compared with approximately 2 doses per 1,000 people per day in regional areas (ACIC 2018).

3

Opioid poisoning

Key findings:

ED and hospital care for opioid poisoning

In 2016–17:

- there were 4,232 ED presentations, or 11.6 per day, for opioid poisoning
- there were 9,636 hospitalisations, or 26 per day, with opioid poisoning as any diagnosis (of which 4,234 had opioid poisoning as the principal diagnosis)
- men aged 35–44 experienced the highest rate of ED presentations for opioid poisoning and of hospitalisations with a principal diagnosis of opioid poisoning, while females aged 15–24 experienced the highest rate of hospitalisations with any diagnosis of opioid poisoning
- pharmaceutical opioids were responsible for more opioid poisoning hospitalisations than illegal opioids:
  - hospitalisations with a principal diagnosis of poisoning by *Naturally derived opioids* (for example, oxycodone, codeine and morphine) were the most common by opioid type, with the rate more than twice as high as for *Heroin* poisoning, which was the next most common (9.1 per 100,000 population, compared with 3.4 per 100,000 population)
- intentional self-poisoning hospitalisations from opioids were more common than accidental poisoning: 1.2 times as high among hospitalisations with a principal diagnosis of opioid poisoning, and almost twice as high where opioid poisoning was any diagnosis
- by population subgroup:
  - the rate of ED presentations and hospitalisations with a principal diagnosis of opioid poisonings was twice as high in the lowest socioeconomic group, compared with the highest (after adjusting for age)
  - the rate of hospitalisations with a principal diagnosis of opioid poisoning was highest among people living in *Inner regional* areas (18.9 per 100,000 population, after adjusting for age), closely followed by people living in *Outer regional* areas (18.2 per 100,000 population, after adjusting for age).

Between 2007–08 and 2016–17:

- hospitalisations with a principal diagnosis of opioid poisoning increased by 25% (from 14.1 to 17.6 per 100,000 population, after adjusting for age). There were overall increases in the age-standardised rates of opioid poisoning for *Synthetic opioids*, *Heroin* and *Naturally derived opioids*.

Opioid deaths

In 2016:

- opioid deaths accounted for 62% of all drug-induced deaths and 0.7% of all deaths
- opioid deaths were most common for males, at age 35–44, and for accidental intent
- *Naturally derived opioids* (for example, oxycodone, codeine and morphine) was the most commonly mentioned type of opioid in opioid deaths for all age groups.

Opioid deaths increased by all measures over the 10 years to 2016. After adjusting for age:

- the rate of opioid deaths approximately doubled
- accidental opioid deaths more than doubled
- deaths where *Synthetic opioids* were mentioned increased, to be 10 times as high as in 2007.

Opioid poisonings involve improper, rather than proper, use of opioids (Australian Consortium for Classification Development 2017). These include:

- when the wrong opioid drug is given or taken in error
- suicide and homicide where an opioid is used as the poison
- adverse effects when prescribed drugs are taken in combination with self-prescribed opioid drugs
- intoxication from non-medical and/or excess consumption of opioids.

Opioid poisoning includes poisonings by *Opium*; *Heroin*; *Naturally derived opioids* (for example, codeine, morphine and oxycodone); *Methadone*; *Synthetic opioids* (for example, fentanyl and tramadol); and *Other and unspecified opioids* (the term used when the type of opioid is unclear, unknown or not elsewhere classified).

Opioid poisoning can result in significant harm, including respiratory failure, aspiration, hypothermia and death. Understanding of the magnitude and changes in ED presentations, hospitalisations, and opioid deaths related to opioid poisoning is imperative to create effective interventions to prevent opioid poisoning.

For more information on the classification of opioid poisoning in the data sources used in this chapter, see Appendix A. Additional data are available in the online supplementary tables to this report <https://www.aihw.gov.au/reports/illicit-use-of-drugs/opioid-harm-in-australia/data>.

ED and hospital care for opioid poisoning

Opioid poisoning can require care in an ED or hospital admission. Poisonings are not always related to 1 drug alone: they can also arise from 2 or more drugs in combination. In these instances, only 1 drug is able to be listed as the principal diagnosis. For hospitalisations data, other drug poisoning codes are available in the additional diagnosis field so it is possible to determine how many hospitalisations involve opioid poisoning, regardless of whether it is the principal diagnosis or an additional diagnosis. However, in the ED data, there is no reliable additional diagnosis field, and this results in an undercount of all ED presentations related to opioids.

The key terms related to ED and hospital care are presented in boxes 3.1 and 3.2.

Box 3.1: Key terms related to emergency department care

The AIHW National Non-admitted Patient Emergency Department Care Database (NNAPEDC) has episode-level records for most persons presenting to public EDs in Australia. (For more information, see Appendix A).

An **emergency department presentation** occurs following the arrival of the patient at the ED, and is the earliest occasion of being registered clinically or triaged.

The **principal diagnosis** is the diagnosis established at the conclusion of the patient's attendance in an ED to be mainly responsible for occasioning the attendance. The quality of the information provided for ED principal diagnosis data has not been fully assessed. As a result, these data should be interpreted with caution.

While there are fields for additional diagnoses, provision of these data is currently limited. There are no fields for external causes.

The **episode end status** indicates the status of the patient at the end of the non-admitted patient ED service episode:

- Admitted to this hospital
- Non-admitted—departed without being admitted or referred to another hospital
- Non-admitted—referred to another hospital for admission
- Did not wait to be attended by a health-care professional
- Left at own risk after being attended by a health-care professional but before the non-admitted patient ED service episode was completed
- Died in ED as a non-admitted patient
- Dead on arrival
- Registered, advised of another health-care service, and left the ED without being attended by a health-care professional.

The **arrival mode—transport** indicates the mode of transport by which the patient arrived at the ED:

- *Ambulance:* includes ambulance, air ambulance or helicopter rescue
- *Police or correctional services vehicle*
- *Other*: includes arriving by private transport, public transport, community transport, taxi or walking in to the ED.

Source: AIHW 2017b.

Box 3.2: Key terms related to hospital care

The AIHW National Hospital Morbidity Database (NHMD) has episode-level records for admitted patients from essentially all public and private hospitals in Australia.

A **hospital separation** is a completed episode of admitted hospital care ending with discharge, death or transfer—or a portion of a hospital stay starting or ending in a change to another type of care (for example, from acute care to rehabilitation). In this report, hospital separations are referred to as **hospitalisations**.

Hospitalisations data do not include episodes of non-admitted patient care in outpatient clinics or EDs. Patients in these settings might be admitted subsequently, with the care provided to them as admitted patients being included in the NHMD.

The **principal diagnosis** is the diagnosis established, after study, to be chiefly responsible for occasioning the patient's episode of admitted patient care.

An **additional diagnosis** is a condition or complaint that either coexists with the principal diagnosis or arises during the episode of care (reported if the condition affects patient management).

In this report, **any diagnosis** is used to refer to hospitalisations that have the diagnosis of interest as either the principal and/or an additional diagnosis.

An **external cause** is the environmental event, circumstance or condition that was the cause of injury, poisoning or adverse event.

Sources: AIHW 2017a; Australian Consortium for Classification Development 2017.

Who receives ED and hospital care for opioid poisoning?

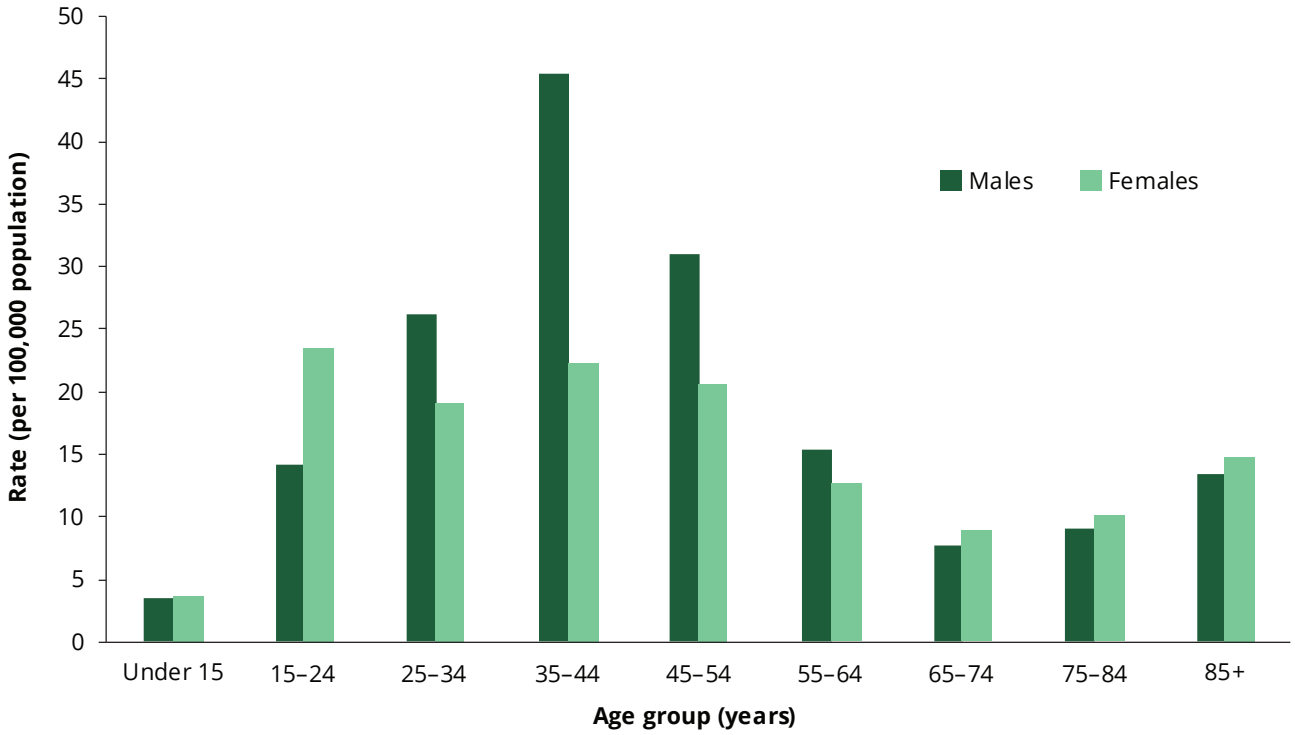
In 2016–17, the majority (83%) of the 5,112 opioid-related ED presentations were for opioid poisoning. There were 4,232 ED presentations (17.5 presentations per 100,000 population) with a principal diagnosis of opioid poisoning—12 per day (Table S3.1). The rate of ED presentations was 1.3 times as high for males as for females (19.7 and 15.3 per 100,000 population, respectively). It should be noted, however, that ED principal diagnosis data quality has not been fully assessed and does not capture external cause codes, which allow identification of adverse effects of therapeutic use.

Over the same period, there were 9,636 hospitalisations (or 39.8 hospitalisations per 100,000 population) with opioid poisoning as any diagnosis (Table S3.2). Of these, 4,234 hospitalisations (17.5 per 100,000 population) had opioid poisoning as the principal diagnosis—12 per day. Where opioid poisoning was the principal diagnosis, the rate of hospitalisations was slightly higher among males than females (18.4 and 16.6 per 100,000 population, respectively). However, where opioid poisoning was any diagnosis, the rate among females was 1.2 times as high as that among males (43.8 and 35.8 per 100,000 population, respectively).

In 2016–17, where opioid poisoning was an additional diagnosis, the top 5 principal diagnoses were other types of poisoning, most commonly by *4-Aminophenol derivatives*, which includes paracetamol. When poisoning by *4-Aminophenol derivatives* was the principal diagnosis and there was an additional diagnosis of opioid poisoning, there were 2.3 times as many hospitalisations for females than males. This reflects higher total numbers of hospitalisations with poisoning by *4-Aminophenol derivatives* for females than for males.

Men aged 35–44 experienced the highest rate of both ED presentations and hospitalisations with a principal diagnosis of opioid poisoning (45.5 per 100,000 population and 39.3 per 100,000 population, respectively) (figures 3.1 and 3.2). Females aged 15–24 experienced the highest rate of hospitalisations for any diagnosis of opioid poisoning (73.5 per 100,000 population) (Figure 3.2).

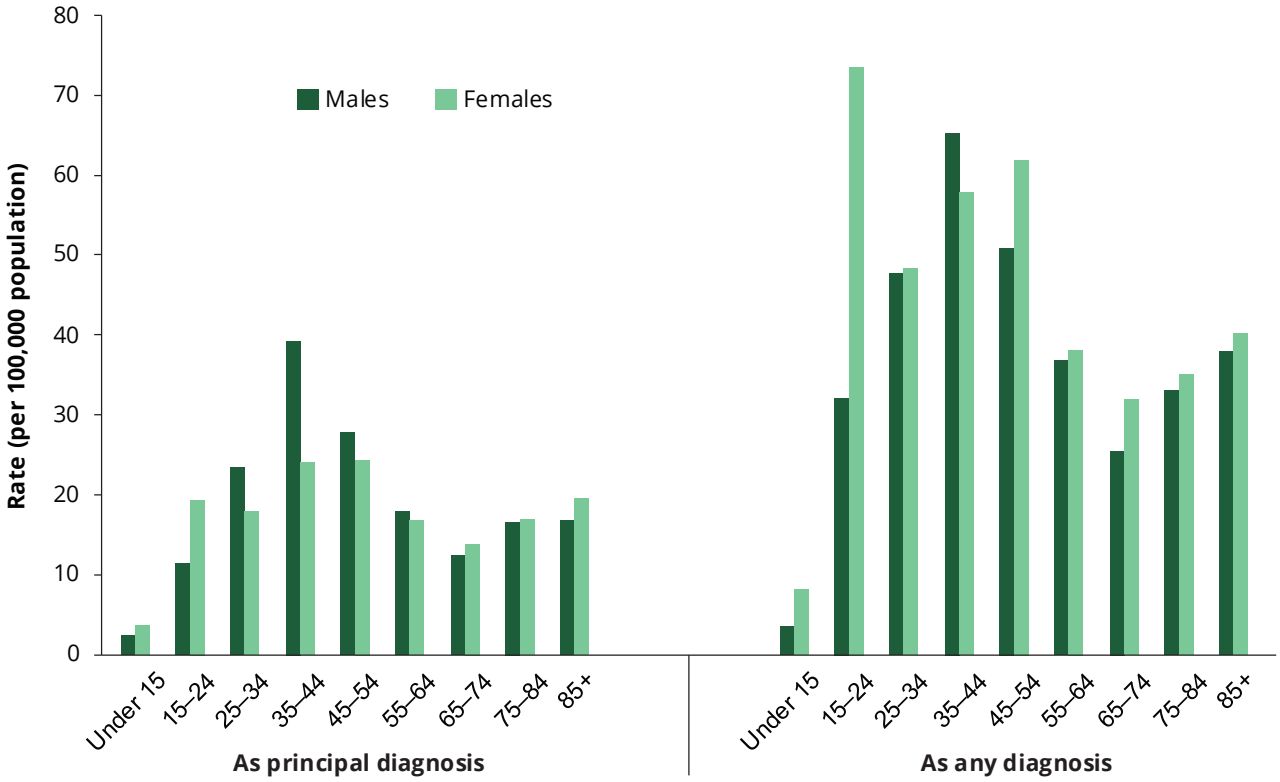
Figure 3.1: Rate of opioid poisoning emergency department presentations, by age group, by sex, 2016–17



Note: Opioid poisoning classified according to International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian Modification (ICD-10-AM) (6th, 7th, 8th and 9th edns) diagnosis codes T40.0–T40.4 and T40.6, and Systematized Nomenclature of Medicine—Clinical Terms—Australian version, Emergency Department Reference Set (SNOMED CT-AU EDRS) codes 11196001, 242828004 and 297199006.

Source: AIHW analysis of the National Non-admitted Patient Emergency Department Care Database; Table S3.1.

Figure 3.2: Rate of opioid poisoning hospitalisations, by diagnosis position, by age group, by sex, 2016–17



Notes

1. Opioid poisoning classified according to ICD-10-AM 9th edn diagnosis codes T40.0–T40.4 and T40.6.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S3.2.

How urgent are ED presentations for opioid poisoning?

Triage categories are used to determine how quickly treatment is required for a person presenting to the ED (Box 3.3).

Box 3.3: Triage category definition

The triage category indicates the urgency of the patient's need for medical and nursing care. It is usually assigned by an experienced registered nurse or medical practitioner at, or shortly after, the time of presentation to the ED. The triage category assigned is in response to the question: *This patient should wait for medical assessment and treatment no longer than…?*

The Australasian Triage Scale has 5 categories—as defined in the *National health data dictionary*, version 16 (AIHW 2012)—that incorporate the time by which the patient should receive care. These categories are:

- *Resuscitation*: immediate (within seconds)
- *Emergency*: within 10 minutes
- *Urgent*: within 30 minutes
- *Semi-Urgent*: within 60 minutes
- *Non-Urgent*: within 120 minutes.

Proportion seen on time is based on the triage category and is the proportion of presentations for which the waiting time from presentation at the ED to commencement of clinical care was within the time specified in the definition of the triage category, usually represented as a percentage.

Source: AIHW 2017b.

As previously mentioned, the quality of the information provided for ED principal diagnosis data has not been fully assessed, and this should be taken into account when interpreting triage data for a particular diagnosis.

In 2016–17, 41% of opioid poisoning ED presentations were assigned to the triage category *Urgent* (Table S3.3).

Opioid poisoning		All ED presentations
12%	assigned to *Resuscitation*	0.7%
39%	assigned to *Emergency*	12.5%
41%	assigned to *Urgent*	36.8%
7.4%	assigned to *Semi-urgent*	40.7%
0.4%	assigned to *Non-urgent*	9.3%

A much higher proportion of opioid poisoning ED presentations were triaged as *Resuscitation* or *Emergency* than for all ED presentations combined.

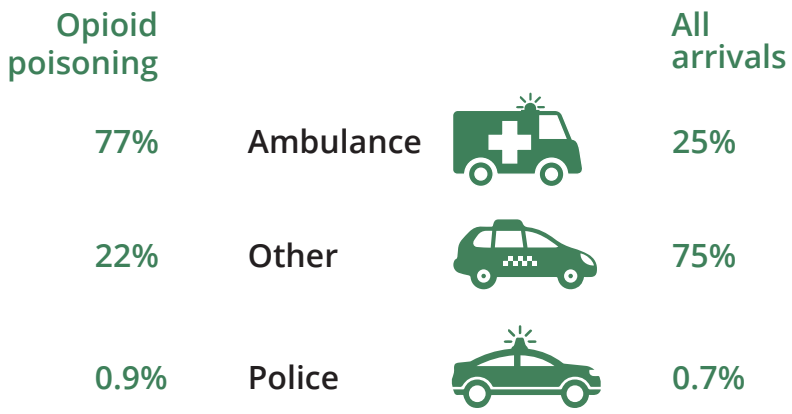
The majority (77%) of all opioid poisoning presentations were categorised as *Seen on time*, with the highest proportion of those *Seen on time* occurring in the *Resuscitation* triage category (99.4%), and generally decreasing with decreasing urgency (Table S3.4).

How do opioid poisoning patients arrive at and leave the ED or hospital?

Arrivals

The most common way for people to arrive at the ED for opioid poisoning was by ambulance. (For arrival mode definitions, see Box 3.1). Around three-quarters (77%) of these presentations arrived in an ambulance, compared with 25% of all ED presentations combined (AIHW 2017b). Almost one-quarter (22%) arrived by another form of transport (which includes walking, private transport, public transport, community transport and taxis) and 0.9% of presentations arrived in a police or correctional services vehicle (Table S3.5).

How do opioid poisoning patients arrive at the emergency department?



National ambulance data (excluding South Australia and Western Australia) from Turning Point (unpublished) showed that for a single snapshot month in December 2016:

- 1.3% of attendances were heroin-related (3.5 per 100,000 persons)
- 2.5% of attendances involved other opioids (excluding codeine) (6.2 per 100,000 persons)
- 54.4% of heroin-related attendances were for overdose (that is, where response to naloxone was observed).

Note that data for ambulance attendances for opioids are based only on cases where alcohol and other drugs, mental health, and/or self-harm is a major contributor to the attendance. Rates were calculated using the ABS quarterly estimated resident population data for each state and territory as at December 2016.

Departures

Just over half (56%) of poisoning ED presentations were admitted to the same hospital they had presented at, higher than for all ED presentations (31%) (AIHW 2017b). (For episode end definitions, see Box 3.1). Another 38% left the ED without being admitted; 4.4% left the ED at their own risk after seeing a health professional, but before the commencement of clinical care, and less than 0.1% did not wait to see a health professional (Table S3.6).

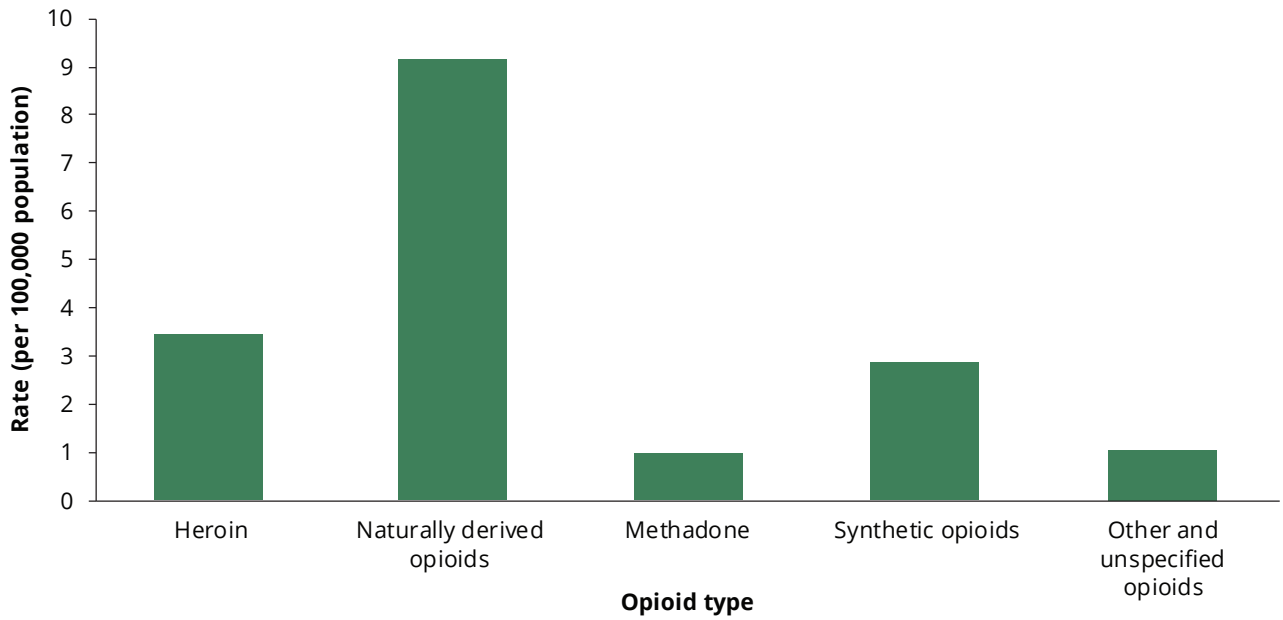
Most hospitalisations with a principal diagnosis of opioid poisoning ended with *Discharge to the patient's usual residence, own accommodation, or a welfare institution* (77%), followed by *Leaving against medical advice/Discharge at own risk* (7.9%), and *Discharge/transfer to an(other) acute hospital* (6.9%) (Table S3.23).

Which opioids are most commonly responsible for poisonings?

The quality of ED data currently does not enable opioid poisoning ED presentations to be analysed by opioid type. However, this can be done for hospitalisations.

Overall, opioid poisoning hospitalisations were more likely to be a result of pharmaceutical opioids (that is, *Naturally derived opioids*, *Synthetic opioids* and *Methadone*) than illegal opioids (*Heroin* and *Opium*). In 2016–17, of hospitalisations with a principal diagnosis of opioid poisoning, the highest rate was for a principal diagnosis of poisoning by *Naturally derived opioids* (for example, oxycodone, codeine and morphine) (9.1 per 100,000 population)—which was more than twice as high as for *Heroin* poisoning, which was the next most common (3.4 per 100,000 population) (Figure 3.3).

Figure 3.3: Rate of hospitalisations with opioid poisoning as principal diagnosis, by opioid type, 2016–17



Notes

1. Opioid poisoning classified according to ICD-10-AM 9th edn diagnosis code T40.1 for *Heroin*, T40.2 for *Naturally derived opioids*, T40.3 for *Methadone*, T40.4 for *Synthetic opioids*, and T40.6 for *Other and unspecified opioids*.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S3.2.

Are most opioid poisonings accidental or intentional?

External cause codes provide information about the intent of opioid poisonings. As external causes are not provided to the NNAPEDC, it is not possible to present an analysis of intentional opioid self-poisoning versus accidental opioid poisoning and opioid poisoning of undetermined intent for ED presentations. However, this can be done for hospitalisations.

Accidental poisonings occur when there is an accidental overdose of a drug (when the wrong drug is given or taken in error; or when the drug is taken inadvertently)—while intentional self-poisonings occur when the poisoning is purposely self-inflicted. Where the intent is unspecified, unstated or cannot be determined, poisonings are considered to be of undetermined intent.

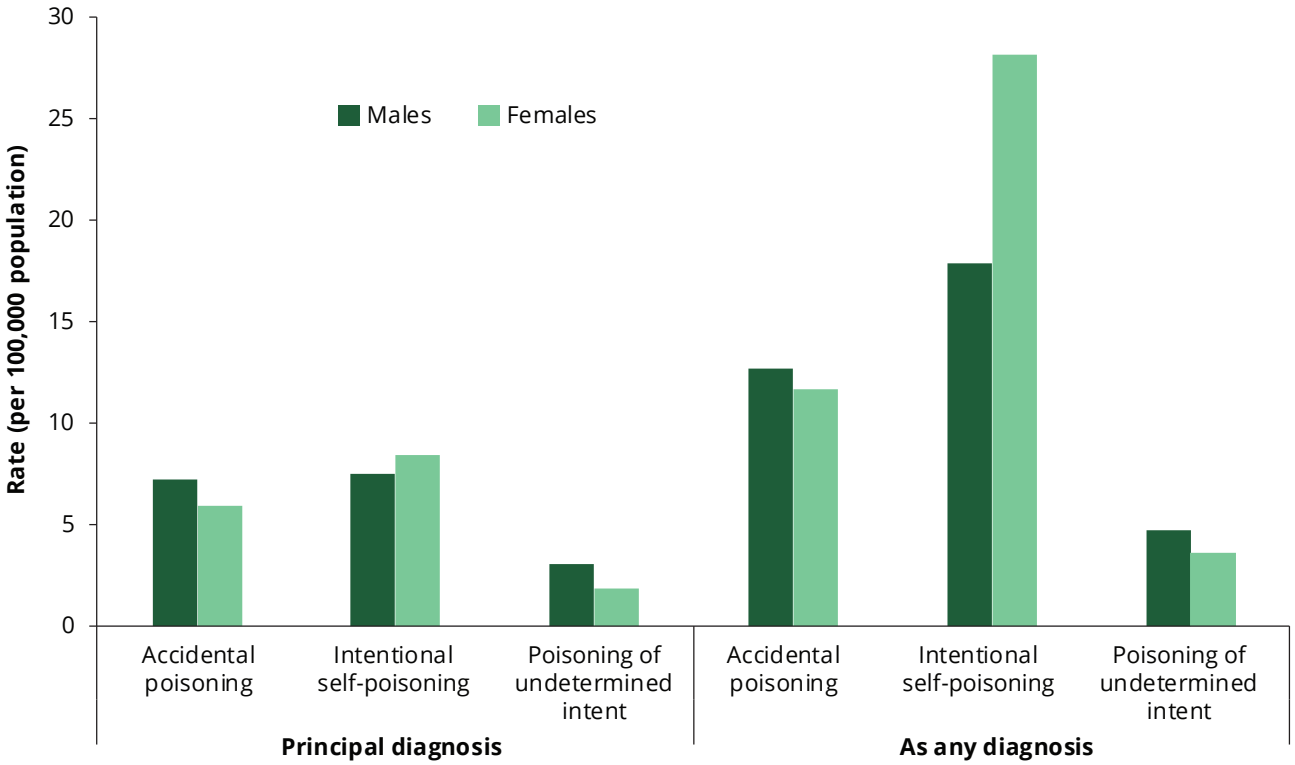
In 2016–17, based on principal diagnosis, intentional opioid self-poisoning hospitalisations were slightly more common (8.0 per 100,000 population) than accidental opioid poisoning hospitalisations (6.6 per 100,000 population) (Table S3.7).

The rate of intentional opioid self-poisoning hospitalisations was higher among females than males (8.4 and 7.5 per 100,000 population, respectively), while the rate of accidental opioid poisoning hospitalisations was higher among males than females (7.2 and 5.9 per 100,000 population, respectively) (Figure 3.4).

Based on principal diagnosis, most intentional opioid self-poisonings were by *Naturally derived opioids*, followed by *Synthetic opioids* and *Heroin*. Most accidental poisonings were by *Naturally derived opioids*, followed by *Heroin* and *Synthetic opioids* (Table S3.7).

Where opioid poisoning was any diagnosis, the rate of intentional opioid self-poisonings was almost twice as high as that for accidental poisonings (23.1 per 100,000 population, compared with 12.2 per 100,000 population) (Table S3.8). Rates of accidental poisonings were similar among males and females (12.7 per 100,000 males, compared with 11.6 per 100,000 females) while the rate of intentional self-poisonings among females was 1.6 times as high as that among males (28.2 per 100,000 females compared with 17.9 per 100,000 males) (Figure 3.4).

Figure 3.4: Rate of opioid poisoning hospitalisations, by diagnosis position, by intent, by sex, 2016–17



Notes

1. Opioid poisoning classified according to ICD-10-AM (9th edn) diagnosis codes T40.0–T40.4 and T40.6. Intent classified as external cause code X42 for accidental poisoning, X62 for intentional self-poisoning and Y12 for poisoning of undetermined intent.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days and records for *Hospital boarders* and *Posthumous organ procurement* have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.

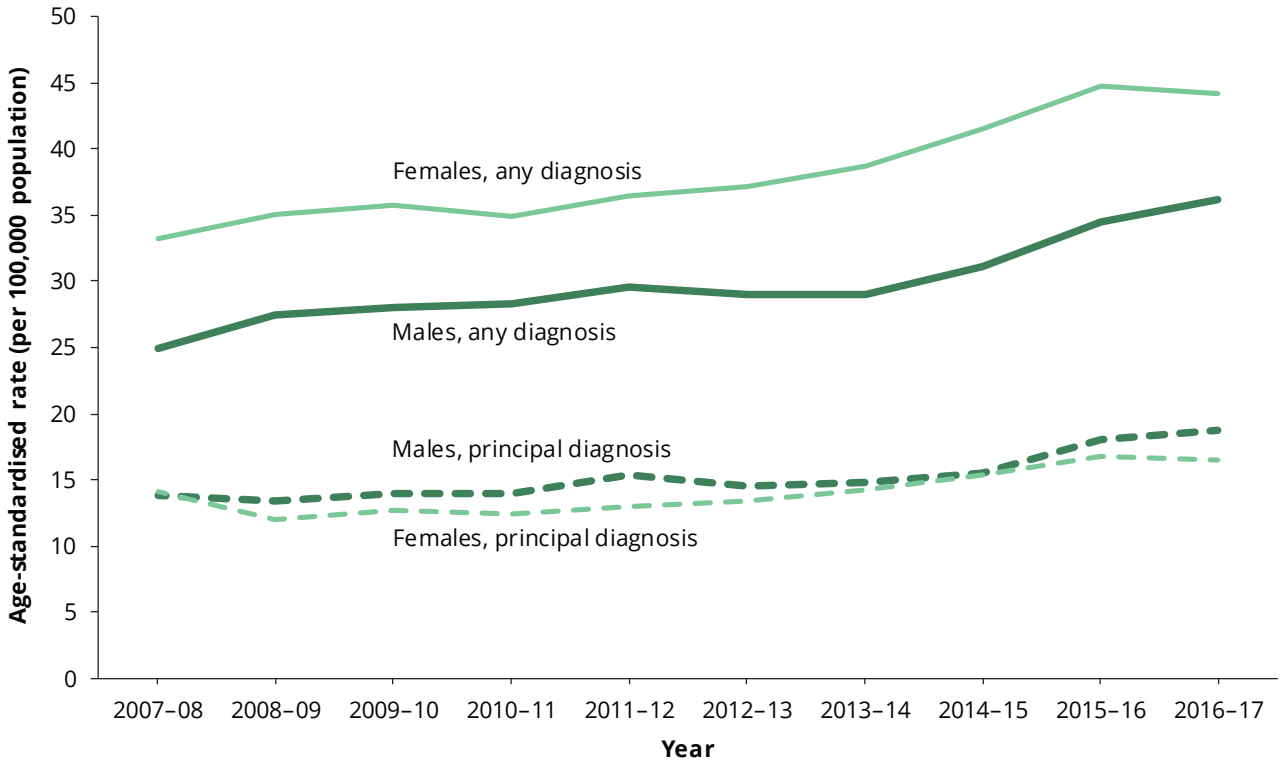
Source: AIHW analysis of the National Hospital Morbidity Database; tables S3.7 and S3.8.

Have hospitalisations for opioid poisoning changed over time?

Over the 10 years from 2007–08 to 2016–17, the age-standardised rate of hospitalisations with a principal diagnosis of opioid poisoning increased by 25%, from 14.1 to 17.6 hospitalisations per 100,000 population (Table S3.9). The rate was higher among males than females from 2008–09 onwards, as was the increase in rates over the period. There was a 35% increase among males, from 13.9 to 18.7 per 100,000 population, compared with a 17% increase among females, from 14.2 to 16.6 per 100,000 population (Figure 3.5).

Over the same period, the age-standardised rate of hospitalisations with any diagnosis of opioid poisoning increased by 38%, from 29.0 to 40.1 per 100,000 population (Table S3.9). The rate of hospitalisations with opioid poisoning as any diagnosis was consistently higher among females than males (Figure 3.5).

Figure 3.5: Age-standardised rate of opioid poisoning hospitalisations, by diagnosis position, by sex, 2007–08 to 2016–17



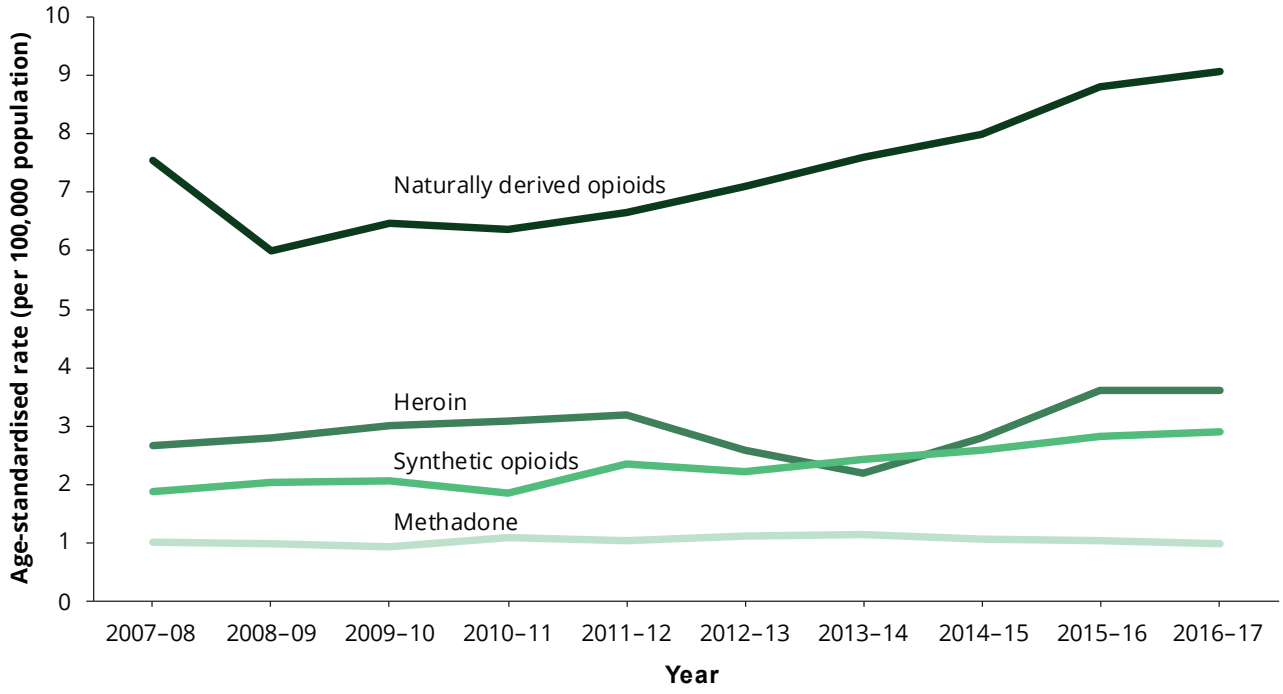
Notes

1. Opioid poisoning classified according to ICD-10-AM (9th edn for 2015–16 and 2016–17; earlier editions for 2007–08 to 2014–15) diagnosis codes T40.0–T40.4 and T40.6.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.
4. Rates are age-standardised to the 2001 Australian standard population.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S3.9.

The increase in hospitalisations over the 10 years from 2007–08 to 2016–17 was mostly driven by increases in the numbers of hospitalisations for poisoning by pharmaceutical opioids (Table S3.9). After adjusting for age, there were overall increases in the rates of opioid poisoning involving *Synthetic opioids* (a 56% increase), *Heroin* (a 35% increase) and *Naturally derived opioids* (a 20% increase). The rate of *Heroin* poisonings declined between 2011–12 and 2013–14 before rising again (Figure 3.6).

Figure 3.6: Age-standardised rate of hospitalisations with opioid poisoning as principal diagnosis, by opioid type, 2007–08 to 2016–17



Notes

1. Opioid poisoning classified according to ICD-10-AM (9th edn for 2015–16 and 2016–17, earlier editions for 2007–08 to 2014–15) diagnosis code T40.1 for *Heroin*, T40.2 for *Naturally derived opioids*, T40.3 for *Methadone* and T40.4 for *Synthetic opioids*.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.
4. Rates are age-standardised to the 2001 Australian standard population.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S3.9.

Does ED and hospital care for opioid poisoning differ by population group?

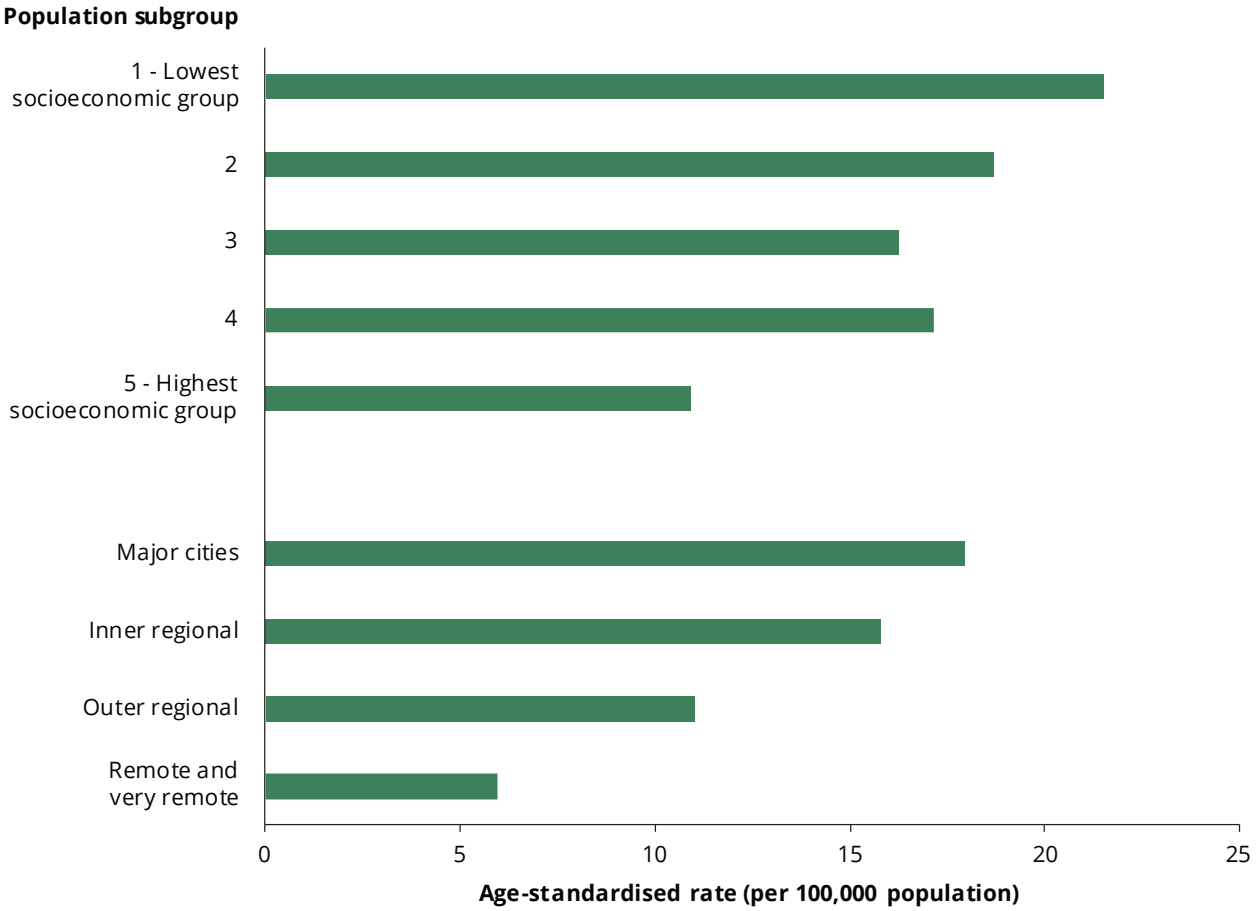
After adjusting for age, the rate of ED presentations for opioid poisoning was highest among people living in *Major cities* (18.0 per 100,000 population) and lowest among those living in in *Remote and very remote* areas (6.0 per 100,000 population) (Figure 3.7). As the NNAPEDC coverage of emergency occasions of service in *Very remote* areas was estimated to be only 18% in 2014–15, compared with 100% for *Major cities* (AIHW 2017b), the actual number of emergency occasions of service for opioid poisoning in *Very remote* areas in 2016–17 is likely to be much higher than the number of ED presentations captured in the NNAPEDC.

In 2016–17, regional areas had the highest age-standardised rates of hospitalisations with opioid poisoning as the principal diagnosis. The age-standardised rate was highest for people living in *Inner regional* areas (18.9 per 100,000 population), closely followed by people living in *Outer regional* areas (18.2 per 100,000 population) (Figure 3.8). The age standardised rate was lowest for people living in *Remote and very remote* areas (13.7 per 100,000 population). For hospitalisations with opioid poisoning as any diagnosis, the highest age-standardised rate was for people living in *Outer regional* areas (Table S3.12).

Rates of ED presentations for opioid poisoning were twice as high among those in the lowest socioeconomic group (21.5 per 100,000 population), compared with those in the highest socioeconomic group (11.0 per 100,000 population) (Figure 3.7).

Similarly, the age-standardised rate of hospitalisations with opioid poisoning as the principal diagnosis followed a clear socioeconomic gradient: the rate among people in the lowest socioeconomic group (22.1 per 100,000 population) was twice as high as the rate among people in the highest group (11.3 per 100,000 population) (Figure 3.8). The age-standardised rate of hospitalisations with opioid poisoning as any diagnosis followed the same pattern (Table S3.12).

Figure 3.7: Age-standardised rate of opioid poisoning emergency department presentations, by population subgroup, 2016–17

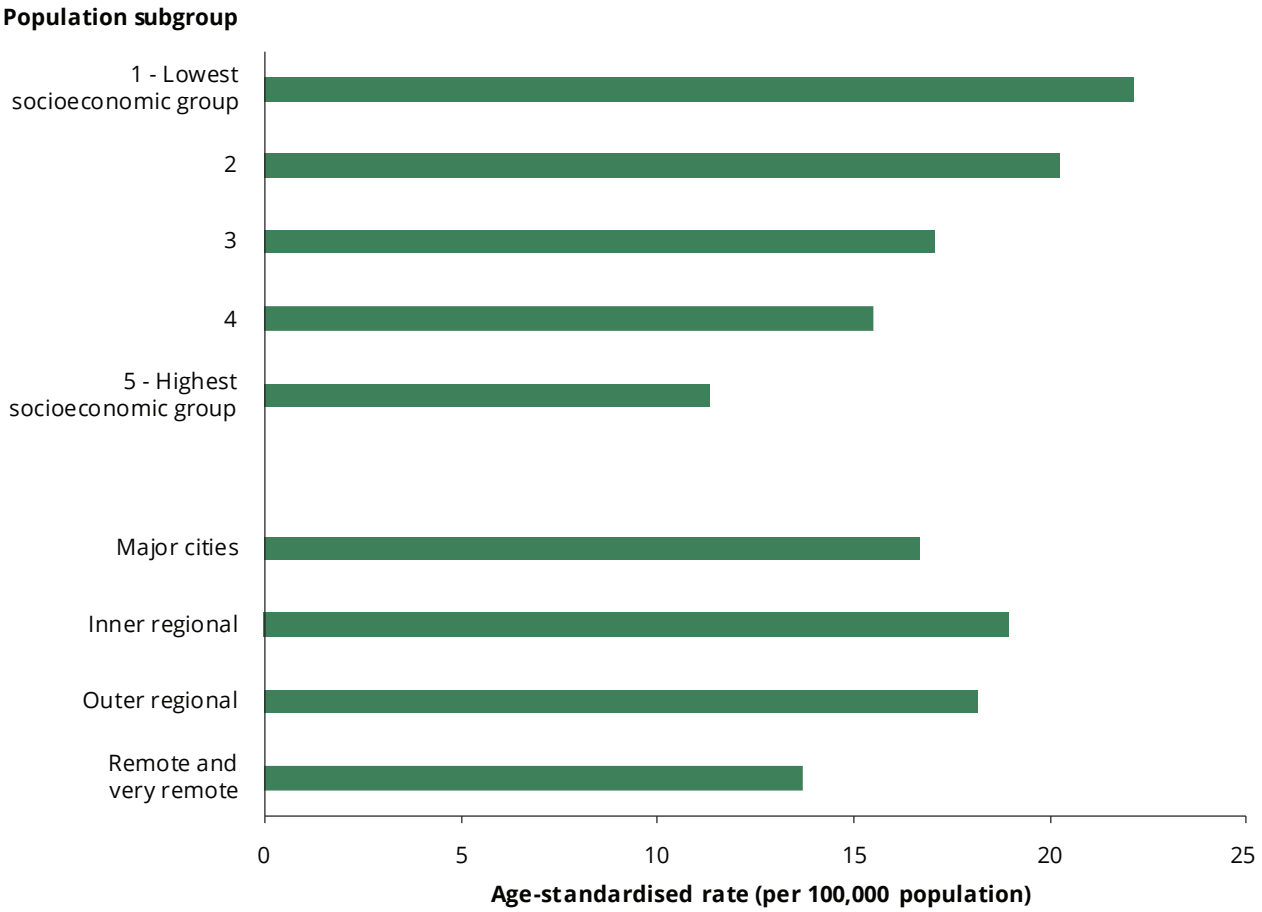


Notes

1. Opioid poisoning classified according to ICD-10-AM (6th, 7th, 8th and 9th edns) diagnosis codes T40.0–T40.4 and T40.6, and SNOMED CT-AU EDRS codes 11196001, 242828004 and 297199006.
2. Rates are age-standardised to the 2001 Australian standard population.
3. See Appendix A for classification of socioeconomic groups and remoteness areas.

Source: AIHW analysis of the National Non-admitted Patient Emergency Department Care Database 2016–17; tables S3.10 and S3.11.

Figure 3.8: Age-standardised rate of hospitalisations with opioid poisoning as principal diagnosis, by population subgroup, 2016–17



Notes

1. Opioid poisoning classified according to ICD-10-AM (9th edn) diagnosis codes T40.0–T40.4 and T40.6.
2. Hospitalisations for which the care type was reported as *Newborn*, with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.
4. Rates are age-standardised to the 2001 Australian standard population.
5. See Appendix A for classification of socioeconomic groups and remoteness areas.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S3.12.

Opioid deaths

While opioid deaths include deaths due to causes other than opioid poisoning (see 'Box 3.4: Defining opioid deaths'), the vast majority (more than 97%) are due to opioid poisoning, so this information is included in this chapter.

Box 3.4: Defining opioid deaths

The National Mortality Database (NMD) has information on the **underlying cause** of death—the disease or condition which initiated the sequence of events resulting in death—and **associated causes** of death (any other diseases or conditions that contributed to the death but were not the underlying cause).

Causes of death are coded by the ABS using information supplied by the state and territory Registrars of Births, Deaths and Marriages. This includes information about the cause of death supplied by the medical practitioner certifying the death, or by a coroner. Deaths are generally reported to a coroner when the person died unexpectedly and the cause of death is unknown; when the person died in a violent or unnatural manner; when the person died during or as a result of an anaesthetic; when the person was 'held in care' or in custody immediately before they died; or when the identity of the person was unknown.

In this report, the term **opioid deaths** relates to drug-induced deaths that involve a mention of opioids. The term 'drug-induced' is based on the ABS definition of drug-induced deaths and relates to those deaths where the underlying cause of death is considered to be directly attributable to drug use. This underlying cause may or may not be an injury (also known as an 'external cause', such as poisoning, which relates to more than 97% of all opioid deaths in this report)—or may be other drug-induced causes. For a full list of opioid death causes included see *Causes of death, Australia, 2016* (ABS 2017).

For more information about the classification of opioid deaths in the NMD, see Appendix A.

How many opioid deaths are there?

In 2016, the number of opioid deaths (1,119) was the highest since the peak in 1999 (1,245 deaths) (Table S3.13). After 1999, the number of deaths fell to a low in 2006, then began to climb again. After adjusting for age, the rate of opioid deaths was lower than in 1999, with a rate of 4.7 per 100,000 population, compared with 6.5 per 100,000 population (Table S3.13).

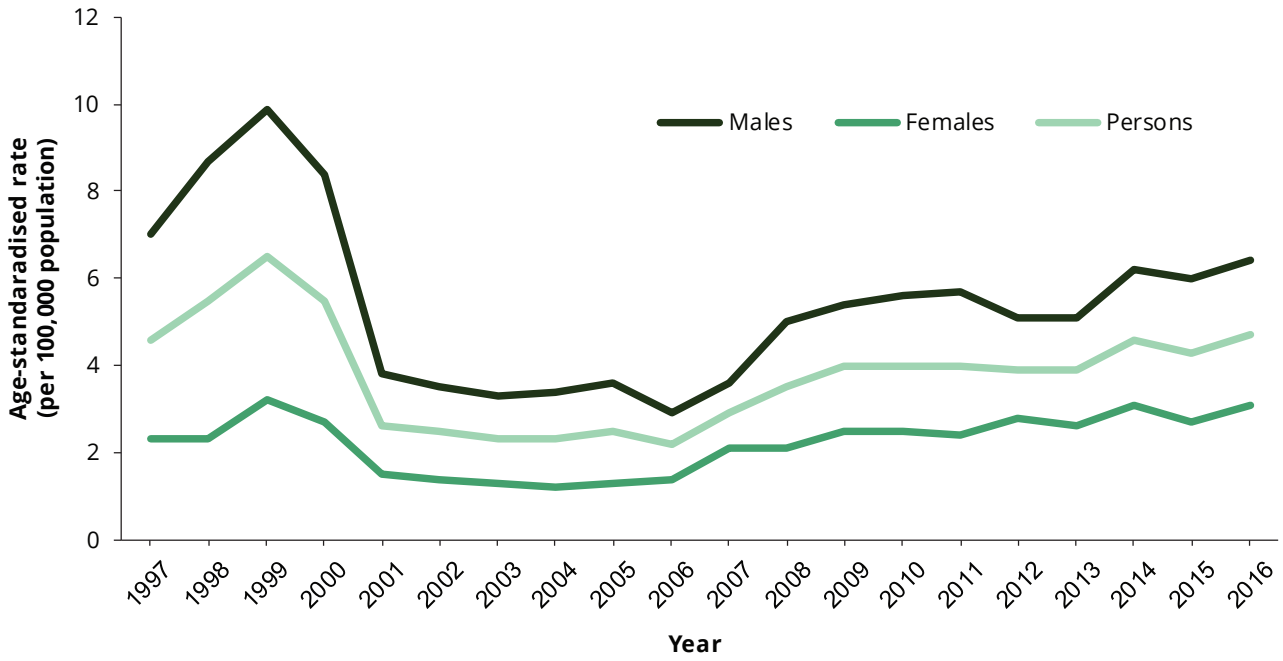
Opioids were mentioned in 62% of the 1,808 drug-induced deaths in 2016. The proportion of drug-induced deaths that involved opioids increased substantially over the decade to 2016, from 54% in 2007 (Table S3.14).

Of the 158,504 deaths from all causes in 2016, opioid deaths accounted for 0.7%. People who died from opioids were much younger—the median age at death for opioid deaths was 38 compared with 81 years for all deaths.

How have opioid deaths changed over time?

In the 10 years from 2007 to 2016, the number of opioid deaths nearly doubled—from 591 to 1,119. There has been a steady increase in both the number of opioid deaths and the opioid death rate since 2007. After adjusting for age, the death rate increased by 62% from 2.9 to 4.7 deaths per 100,000 population over the 10-year period to 2016, but was still lower than it was in 1999 (6.5 deaths per 100,000 population) (Figure 3.9). For all years from 1997 to 2016, males experienced higher opioid death rates than females.

Figure 3.9: Age-standardised rate of opioid deaths, by sex, 1997 to 2016



Notes

1. Rates are age-standardised to the 2001 Australian standard population.
2. Data are based on year of registration of death, and are 'preliminary' for 2016 and 2015, and 'revised' for 2014, due to ongoing coronial investigations (and causes of death in these years are subject to change).
3. Includes only those deaths, considered to be drug-induced, where opioids are mentioned. The ICD-10 codes used to determine opioid deaths are heroin (T40.1), naturally derived opioids (T40.2), methadone (T40.3), synthetic opioids (T40.4) and other and unspecified opioids (T40.6). Accidents, homicides and other causes that are not directly related to drug use are excluded, as are newborn deaths associated with mother's drug use. For more information on the causes included for drug-induced deaths, see *Causes of death, Australia, 2016* (ABS 2017).

Source: AIHW National Mortality Database; Table S3.13.

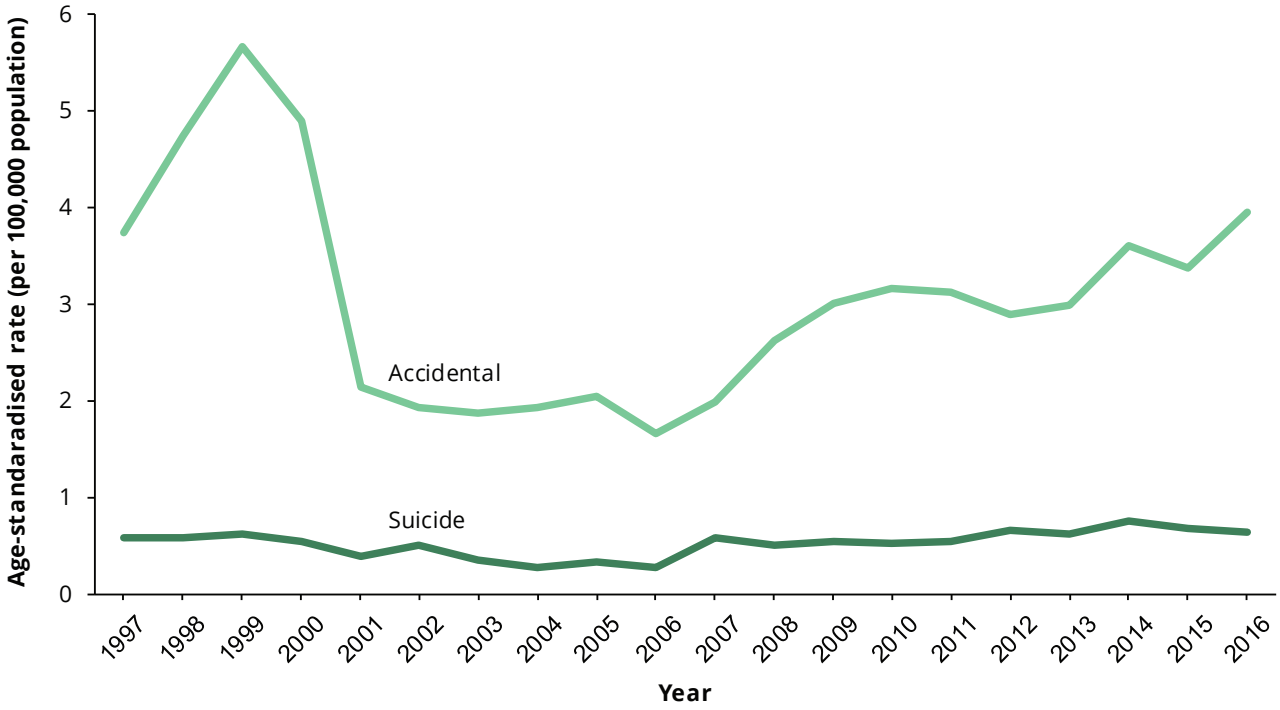
Intent over time

As with to hospitalisations, the intent of the poisoning event that lead to death is also important. Accidental opioid poisoning deaths are cases where no harm was intended; suicide deaths are where self-harm was intended. Deaths can also be of undetermined intent (where there is not enough information to specify intent) or due to other causes, which are grouped together in this report as other causes.

In 2016, the vast majority of opioid deaths were accidental (83%), followed by 14% from suicide and 3% due to other causes (including those of undetermined intent) (Table S3.15). Stratifying deaths between 1997 and 2016 by intent shows the increase in opioid deaths to be largely driven by accidental opioid deaths. The accidental opioid death rate was at least 3 times as high as the opioid suicide rate between 2007 and 2016; in 2016, it was 6 times as high (Figure 3.10).

In 2016, after adjusting for age, the rate of accidental opioid deaths was 2.0 times as high as in 2007 and the rate of suicide was 1.1 times as high as in 2007. However, the underlying number of opioid suicides is low (fewer than 20), so changes should be interpreted with caution.

Figure 3.10: Age-standardised rate of opioid deaths, by intent, 1997 to 2016



Notes

1. Rates are age-standardised to the 2001 Australian standard population.
2. Data are based on year of registration of death, and are 'preliminary' for 2016 and 2015, and 'revised' for 2014, due to ongoing coronial investigations (and causes of death in these years are subject to change).
3. Includes only those deaths. considered to be drug-induced. where opioids are mentioned. The ICD-10 codes used to determine opioid deaths are heroin (T40.1), naturally derived opioids (T40.2), methadone (T40.3), synthetic opioids (T40.4) and other and unspecified opioids (T40.6). Accidents, homicides and other causes that are not directly related to drug use are excluded, as are newborn deaths associated with mother's drug use. For more information on the causes included for drug-induced deaths, see *Causes of death, Australia, 2016* (ABS 2017).
4. The ICD-10 codes used to determine intent are X42–X44 for accidental and X62–X64 for suicide.

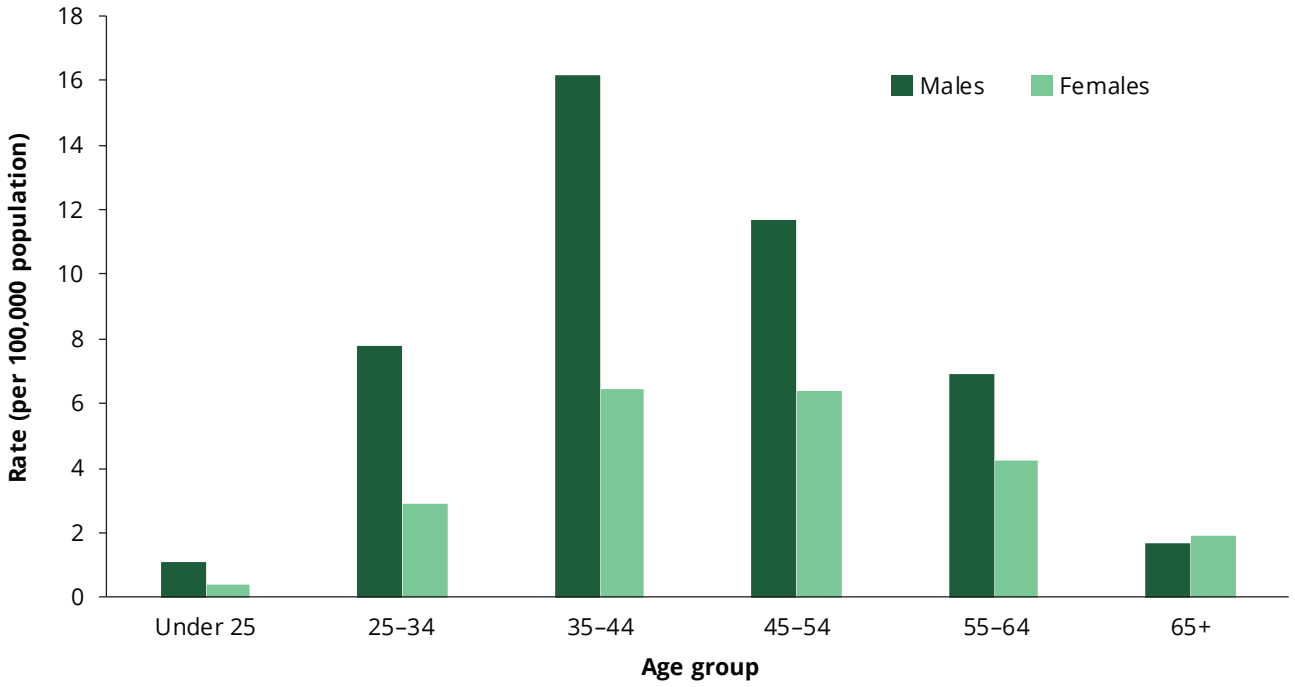
Source: AIHW National Mortality Database; Table S3.15.

How do opioid deaths differ by age and sex?

In 2016, there were more opioid deaths among males than females and after adjusting for age, the rate of opioid deaths was 2.1 times as high for males as females—6.4 compared with 3.1 deaths per 100,000 population (Table S3.13).

For both males and females, the rate of death increased with age to age 35–44 (at 16 deaths per 100,000 population for males and 6.5 for females) and then subsequently declined (Figure 3.11). Rates of death were consistently higher among males than females, except for at age 65 and over, where the rate was slightly higher among females.

Figure 3.11: Rate of opioid deaths, by age group, by sex, 2016



Notes

1. Data are based on year of registration of death, and are 'preliminary' for 2016 due to ongoing coronial investigations (and causes of death in this year are subject to change).
2. Includes only those deaths, considered to be drug-induced, where opioids are mentioned. The ICD-10 codes used to determine opioid deaths are heroin (T40.1), naturally derived opioids (T40.2), methadone (T40.3), synthetic opioids (T40.4) and other and unspecified opioids (T40.6). Accidents, homicides and other causes that are not directly related to drug use are excluded, as are newborn deaths associated with mother's drug use. For more information on the causes included for drug-induced deaths, see *Causes of death, Australia, 2016* (ABS 2017).

Source: AIHW National Mortality Database; Table S3.16.

Intent by age and sex

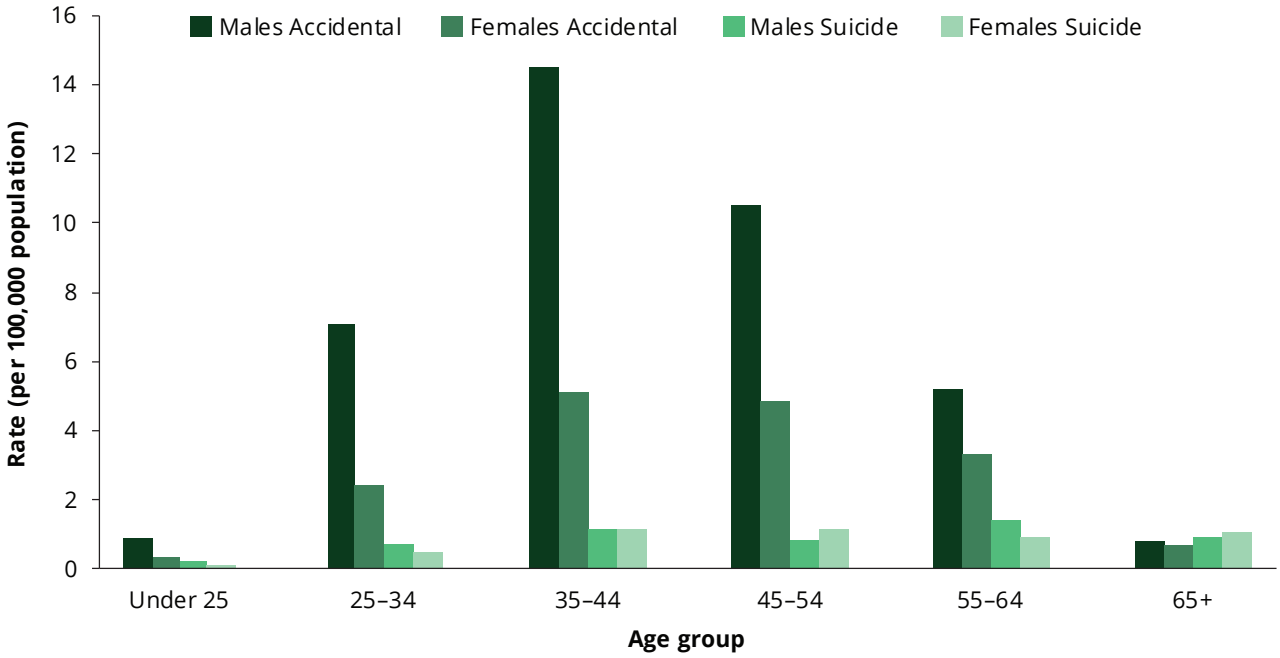
The greatest difference by sex in the rate of suicides involving opioids was seen in younger people, for whom the rate of suicide was twice as high among males aged 25 and under, compared with their female counterparts (Figure 3.12; Table S3.17). Young males have a higher rate of suicide by all methods combined, compared with young females (ABS 2017).

Accidental opioid deaths are more common than opioid suicide overall; only among those aged 65 and over are opioid suicides slightly more common than accidental opioid deaths. In other age groups, the rates of accidental opioid deaths were between 3 and 9 times higher than the rates of opioid suicides (Table S3.17).

For those aged under 45, the rate of accidental opioid deaths for males in 2016 was almost 3 times as high as the rate for females; and for the 45–54 age group, it was twice as high as the rate for females (Table S3.17).

For those aged 65 and over, the rates were much more similar for males and females (Figure 3.12; Table S3.17).

Figure 3.12: Rate of opioid deaths, by intent, by age group, by sex, 2016



Notes

1. The ICD-10 codes used to determine intent are X42–X44 for accidental deaths and X62–X64 for suicide.
2. Data are based on year of registration of death, and are 'preliminary' for 2016, due to ongoing coronial investigations (and causes of death in this year are subject to change).
3. Includes only those deaths, considered to be drug-induced, where opioids are mentioned. The ICD-10 codes used to determine opioid deaths are heroin (T40.1), naturally derived opioids (T40.2), methadone (T40.3), synthetic opioids (T40.4) and other and unspecified opioids (T40.6). Accidents, homicides and other causes that are not directly related to drug use are excluded, as are newborn deaths associated with mother's drug use. For more information on the causes included for drug-induced deaths, see *Causes of death, Australia, 2016* (ABS 2017).

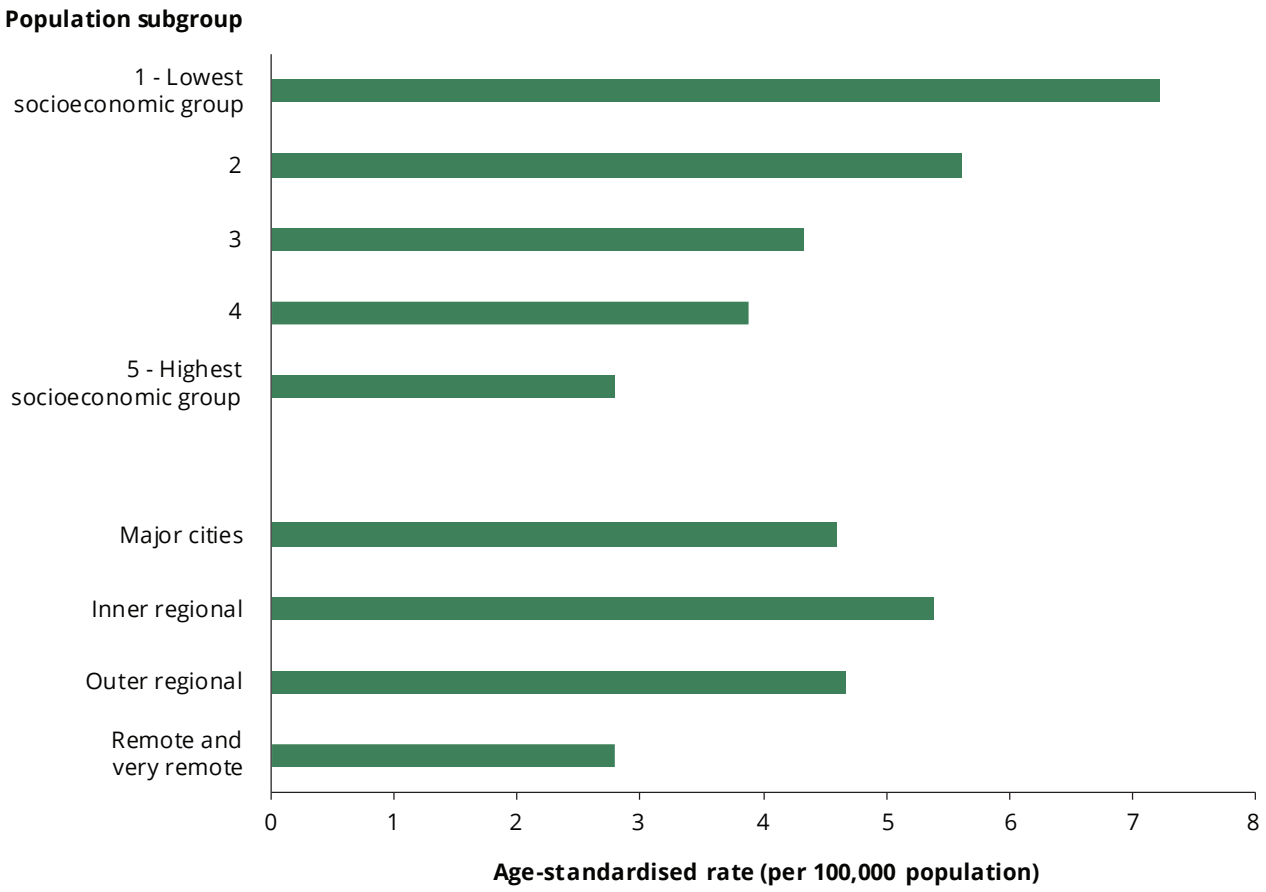
Source: AIHW National Mortality Database; Table S3.17.

Do opioid deaths differ by population group?

In 2016, after adjusting for age, rates of opioid deaths were 2.6 times as high for those in the lowest socioeconomic group as for those in the highest socioeconomic group (Figure 3.13, Table S3.18).

Regional areas had the highest rates of opioid deaths in 2016; after adjusting for age, the highest rate was 5.4 per 100,000 population in *Inner regional* areas, followed by *Outer regional* areas (Table S3.18). The lowest rate was 2.8 per 100,000 population in *Remote and very remote* areas (Figure 3.13). Note that rates for *Remote and very remote* areas are based on a low (<20) number of deaths.

Figure 3.13: Age-standardised rate of opioid deaths, by population subgroup, 2016



Notes

1. Rates are age-standardised to the 2001 Australian standard population.
2. See Appendix A for classification of socioeconomic groups and remoteness areas.
3. Data are based on year of registration of death, and are preliminary for 2016, due to ongoing coronial investigations (and causes of death in this year are subject to change).
4. Includes only those deaths, considered to be drug-induced, where opioids are mentioned. The ICD-10 codes used to determine opioid deaths are heroin (T40.1), naturally derived opioids (T40.2), methadone (T40.3), synthetic opioids (T40.4) and other and unspecified opioids (T40.6). Accidents, homicides and other causes that are not directly related to drug use are excluded, as are newborn deaths associated with mother's drug use. For more information on the causes included for drug-induced deaths, see *Causes of death, Australia, 2016* (ABS 2017).

Source: AIHW National Mortality Database; Table S3.18.

Which opioids are involved in opioid deaths?

Opioid deaths may have 1 or more types of opioid mentioned as partly or wholly responsible for the death (see Box 3.5 for more information on the different types of opioids).

Box 3.5 Types of opioids responsible for poisoning

Opioid deaths are those considered to be drug-induced that also have a mention of opioids (see Box 3.4 for more information). In this report there are 6 opioid poisoning groups used to determine opioid deaths, representing both illegal drugs and pharmaceutical opioids. They are:

- *Opium*
- *Heroin*
- *Naturally derived opioids* (for example, codeine, morphine and oxycodone)
- *Methadone*
- *Synthetic opioids* (for example, fentanyl and tramadol)
- *Other and unspecified* (used when type of opioid is unclear or unknown).

Due to the way opioid poisonings are grouped to allow consistent comparisons, it is impossible to determine which deaths had mentions of some specific opioids of interest (for example, fentanyl or codeine), as they will come under a category which also includes other types of opioids.

For more information about the classification of opioid deaths in the NMD, see Appendix A.

In 2016, opioid deaths were more commonly the result of pharmaceutical opioids use, compared with illegal opioids use. Overall, there were more than 900 mentions of different pharmaceutical opioids compared with 361 for *Heroin*. In 2016, the most commonly mentioned opioid group in opioid deaths was *Naturally derived opioids* (for example, oxycodone, codeine, morphine) (550 deaths), followed by *Heroin*, which was mentioned in 361 deaths. After adjusting for age, the death rate for *Naturally derived opioids* was 2.3 per 100,000 population and 1.6 per 100,000 population for Heroin (Table S3.19).

Trends by type of opioid mentioned

For *Heroin* and *Naturally derived opioids*, the highest number of opioid deaths in the last 20 years occurred in 1999, as a result of high heroin use in the late 1990s. The category *Naturally derived opioids* includes morphine, which is a metabolite of heroin (see Appendix A for more details).

There was a sharp decline in deaths with a mention of *Heroin* and/or *Naturally derived opioids* after 1999 and then a period where there was little change (Figure 3.14).

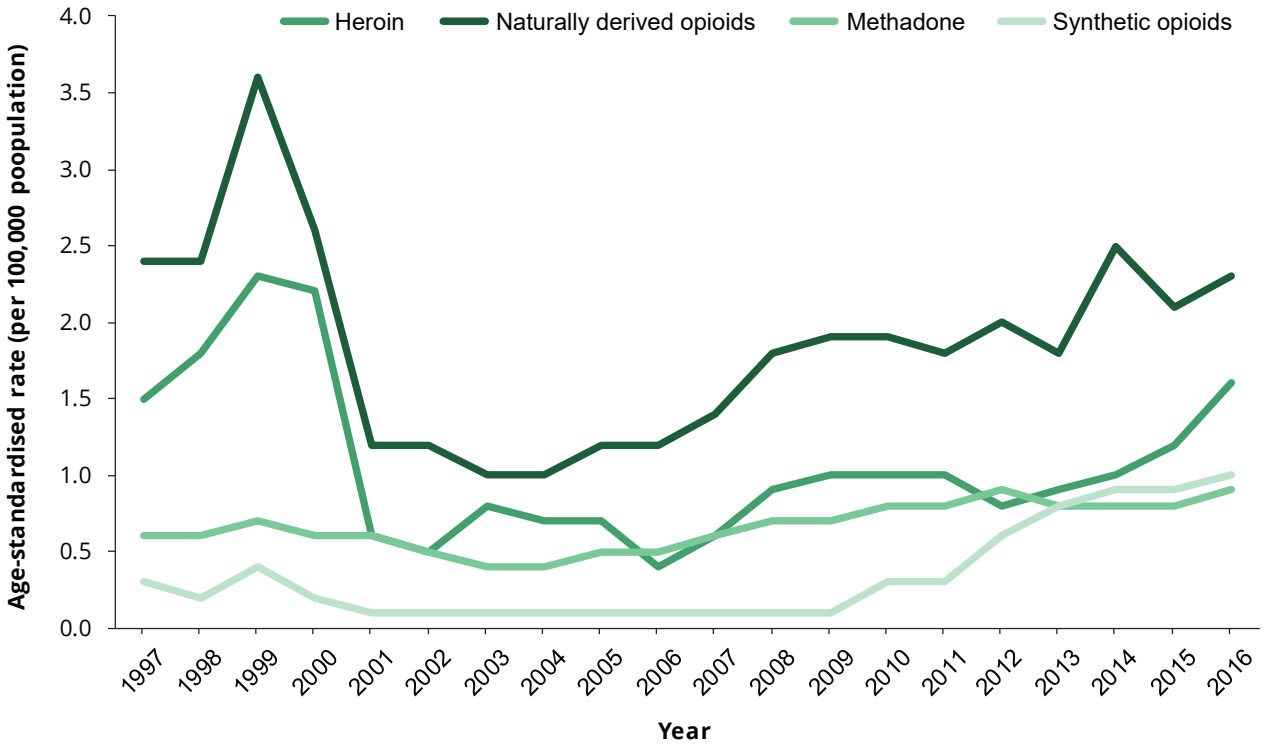
More recently, there has been a substantial increase in deaths where *Synthetic opioids* are mentioned, with death rates 10 times as high as in 2016, compared with 2007—rising from 0.1 to 1.0 deaths per 100,000 population. Rates have also risen for deaths where *Heroin* and/or *Naturally derived opioids* are mentioned over this period (rising by 2.7 and 1.6 times, respectively) (Figure 3.14).

The increase since 2007 in rates of opioid deaths mentioning *Synthetic opioids* is likely to have been driven by fentanyl. Pethidine has not been on the PBS for several years and prescriptions for tramadol have remained steady since 2003, while fentanyl prescriptions have increased substantially since 2006 (Penington Institute 2017).

England, Wales and Canada have also shown recent increases in deaths from *Synthetic opioids*, in particular fentanyl. Between 2016 and 2017, there was a 29% rise in deaths cause by fentanyl in England and Wales (The Guardian 2018) and in Canada, the number of deaths involving fentanyl or fentanyl analogues more than doubled (Public Health Agency of Canada 2018).

The National Coronial Information System (NCIS) records toxicology information for deaths reported to a coroner. An NCIS report commissioned by the Australian Broadcasting Corporation's *Background briefing* (ABC 2017) found that, in the 6 years to 2016, of the deaths that were reported to a coroner, almost 500 deaths mentioned fentanyl. It should be noted that the methods used in that report for identifying deaths involving fentanyl are different to those used in this report for identifying drug-induced deaths.

Figure 3.14: Age-standardised rate of opioid deaths, by type of opioid mentioned, 1997 to 2016



Notes

1. Rates are age-standardised to the 2001 Australian standard population.
2. Data are based on year of registration of death, and are 'preliminary' for 2016 and 2015, and 'revised' for 2014, due to ongoing coronial investigations (and causes of death in these years are subject to change).
3. Includes only those deaths, considered to be drug-induced, where opioids are mentioned. The ICD-10 codes used to determine opioid deaths are heroin (T40.1), naturally derived opioids (T40.2), methadone (T40.3), synthetic opioids (T40.4) and other and unspecified opioids (T40.6). Accidents, homicides and other causes that are not directly related to drug use are excluded, as are newborn deaths associated with mother's drug use. For more information on the causes included for drug-induced deaths, see *Causes of death, Australia, 2016* (ABS 2017).

Source: AIHW National Mortality Database; Table S3.19.

Opioids mentioned by age

In 2016, *Naturally derived opioids* (including codeine, morphine and oxycodone) were most commonly mentioned in opioid deaths for all age groups. *Heroin* was the second most commonly mentioned opioid for all ages, except for those aged 65 and over (Table S3.20).

For deaths at ages 65 and over, *Synthetic opioids* (including fentanyl and tramadol) was the second most commonly mentioned opioid type after *Naturally derived opioids*. For deaths of those aged 25–34, *Naturally derived opioids* was followed by *Heroin*, then *Synthetic opioids* (Table S3.20).

The highest number of opioid deaths was for the 35–44 age group, for all types of opioids mentioned.

There were very few deaths for the categories *Opium* and *Other and unspecified opioids*; of these, most occurred among people aged 45 and over.

Opioids mentioned by intent

In 2016, pharmaceutical opioids were more commonly mentioned in both accidental and suicide opioid deaths, than illegal opioids (*Heroin* and *Opium*).

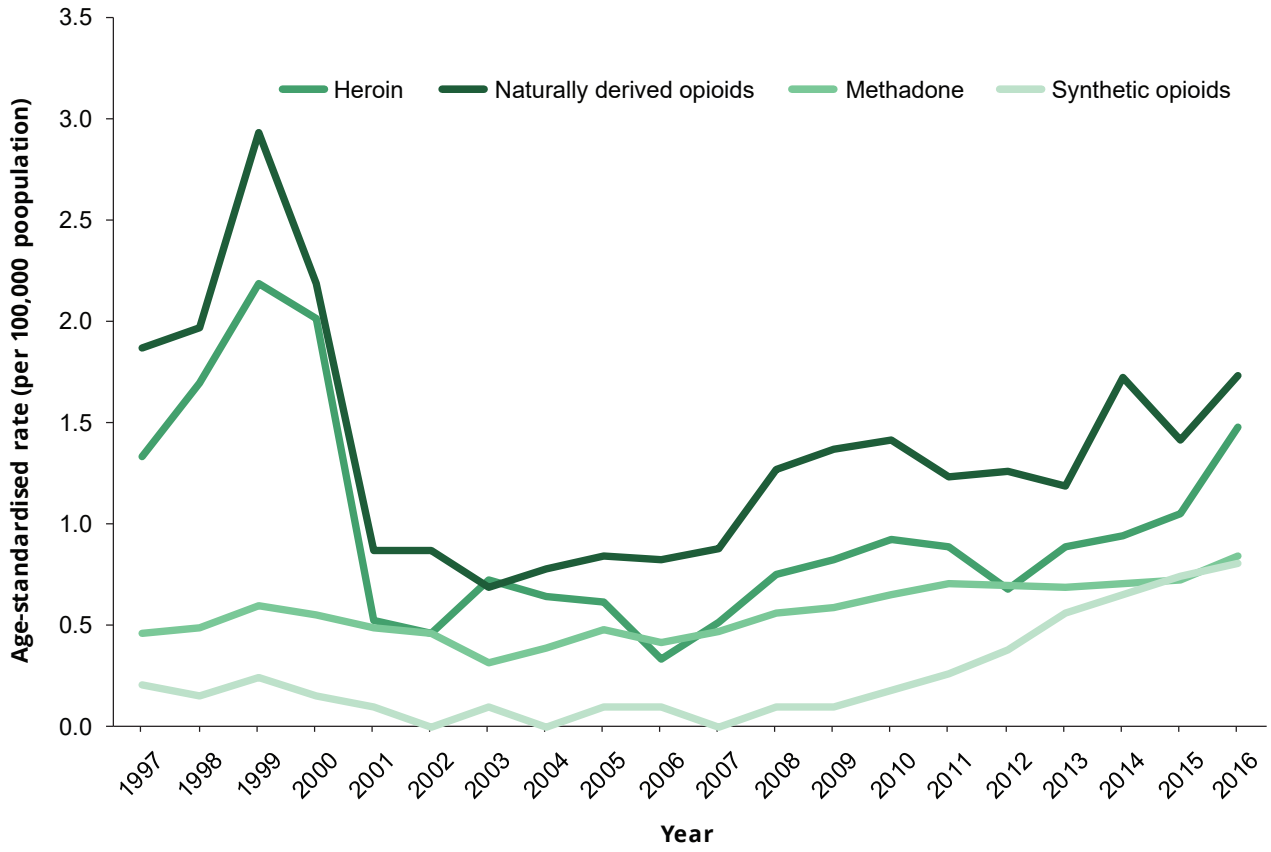
Opioid deaths were mostly accidental for all types of opioids. Accidental opioid deaths most commonly involved *Naturally derived opioids* (mentioned in 411 deaths, or 1.7 deaths per 100,000 population), followed by *Heroin* (mentioned in 343 deaths, or 1.5 deaths per 100,000 population). Of all deaths with mention of *Heroin*, 96% were accidental, while 78% of all *Naturally derived opioids* deaths were accidental. (Table S3.21).

In 2016, suicides involving opioids most commonly mentioned *Naturally derived opioids* (118 deaths, or 21% of deaths with *Naturally derived opioids* mentioned) and *Synthetic opioids* (38 deaths, or 16% of deaths with *Synthetic opioids* mentioned) (Table S3.21).

In the 10 years to 2016, there were large increases in accidental opioid deaths, mostly mentioning pharmaceutical opioids. Overall, the rate was 2 times higher in 2016 compared with 2007. The highest relative rate increase was for accidental opioid deaths where *Synthetic opioids* are mentioned—20 times as high as in 2007 (although still relatively low death rates, with an absolute rate increase of 0.76 deaths per 100,000 population). The next greatest increase was for *Heroin* (2.9 times as high), followed by *Naturally derived opioids* (2.0 times as high), and *Methadone* (1.8 times as high) (Figure 3.15).

As mentioned earlier, the increase in accidental deaths for *Synthetic opioids* (includes fentanyl and tramadol) is likely to be due to fentanyl. The rise in accidental deaths began immediately after fentanyl was rescheduled, on the PBS, to be subsidised for use for non-cancer pain. Fentanyl is a strong opioid, 100 times as potent as morphine (Chodoff & Domino 1965), and therefore a very small amount can cause poisoning or death. The PBS data presented in Chapter 2 covered the period from 2012–13 onwards and showed a decrease in both the rate of fentanyl prescriptions and in the rate of OME over the period. Other analysis has shown that there was a 4-fold increase in fentanyl use (measured as DDD per 1,000 persons, per day) between 2006 and 2011 (Karanges et al. 2016).

Figure 3.15: Age-standardised rate of accidental opioid deaths, by type of opioid mentioned, 1997 to 2016



Notes

1. Rates are age-standardised to the 2001 Australian standard population.
2. Data are based on year of registration of death, are preliminary for 2016 and 2015, and revised for 2014, due to ongoing coronial investigations (and causes of death in these years are subject to change).
3. Includes only those deaths, considered to be drug-induced, where opioids are mentioned. The ICD-10 codes used to determine opioid deaths are heroin (T40.1), naturally derived opioids (T40.2), methadone (T40.3), synthetic opioids (T40.4) and other and unspecified opioids (T40.6). Accidents, homicides and other causes that are not directly related to drug use are excluded, as are newborn deaths associated with mother's drug use. For more information on the causes included for drug-induced deaths, see *Causes of death, Australia, 2016* (ABS 2017).
4. The ICD-10 codes used to determine intent are X42–X44 for accidental and X62–X64 for suicide.

Source: AIHW National Mortality Database; Table S3.22.

4 Opioid dependence

Key findings:

ED and hospital care for opioid dependence

In 2016–17:

- there were 566 ED presentations, or 1.5 per day, for opioid dependence
- there were 16,903 hospitalisations, or 46 per day, with opioid dependence as any diagnosis (of which 3,722 had opioid poisoning as the principal diagnosis)
- just over half (54%) of opioid dependence-related ED presentations arrived by 'other' forms of transport (including walking, private transport, public transport, community transport and taxis), while 41% arrived via ambulance
- men aged 35–44 experienced the highest rates of ED presentations, hospitalisations with a principal diagnosis and hospitalisations with any diagnosis of opioid dependence
- the rate of ED presentations for opioid dependence followed a clear socioeconomic gradient: highest for those in the lowest socioeconomic group (after adjusting for age). There was no clear pattern for hospitalisations
- the rate of ED presentations for dependence was highest in *Outer regional* areas, while for hospitalisations it was highest in *Major cities*.

Between 2007–08 and 2016–17:

- after adjusting for age, the rate of hospitalisations with a principal diagnosis of opioid dependence remained fairly stable.

Treatment services

- Heroin was the most common opioid drug of dependence among those seeking alcohol and other drug (AOD) treatment services or opioid pharmacotherapy treatment: 38% of pharmacotherapy episodes and 61% of opioid-related AOD closed treatment episodes.
- Two-thirds of people seeking AOD treatment services for opioids or opioid pharmacotherapy treatment were male.

Of those receiving AOD treatment services:

- closed treatment episodes where *Heroin* was the principal drug of concern decreased by 36% between 2007–08 and 2016–17
- closed treatment episodes for *Codeine* doubled (from 628 to 1233) and tripled for *Oxycodone* (from 305 to 911) between 2007–08 and 2016–17.

Of those receiving opioid pharmacotherapy in June 2017:

- 38% reported *Heroin* as their opioid drug of dependence, followed by *Oxycodone* (5.2%), *Morphine* (4.3%), *Codeine* (4.2%) and *Methadone* (4.1%)
- the median age across all pharmacotherapy types was 42 years.

Opioid dependence is a mental and behavioural disorder and refers to a group of behavioural, cognitive and physiological phenomena that develop after repeated opioid use (Australian Consortium for Classification Development 2017). These generally include:

- a strong desire to take the drug
- difficulties in controlling its use
- persistence in its use despite harmful consequences
- a higher priority given to drug use than to other activities and obligations
- increased tolerance
- sometimes a physical withdrawal state.

Care and treatment for opioid dependence is provided in a number of settings, including EDs, hospitals, general practices, specialised treatment services and pharmacies.

For more information on the classification of opioid dependence in the data sources used in this chapter, see Appendix A. Additional data are available in the online supplementary tables to this report <https://www.aihw.gov.au/reports/illicit-use-of-drugs/opioid-harm-in-australia/data>.

ED and hospital care for opioid dependence

This section provides information on care for opioid dependence provided in EDs and hospitals. Boxes 3.1 to 3.3 define the key terms related to ED and hospital care.

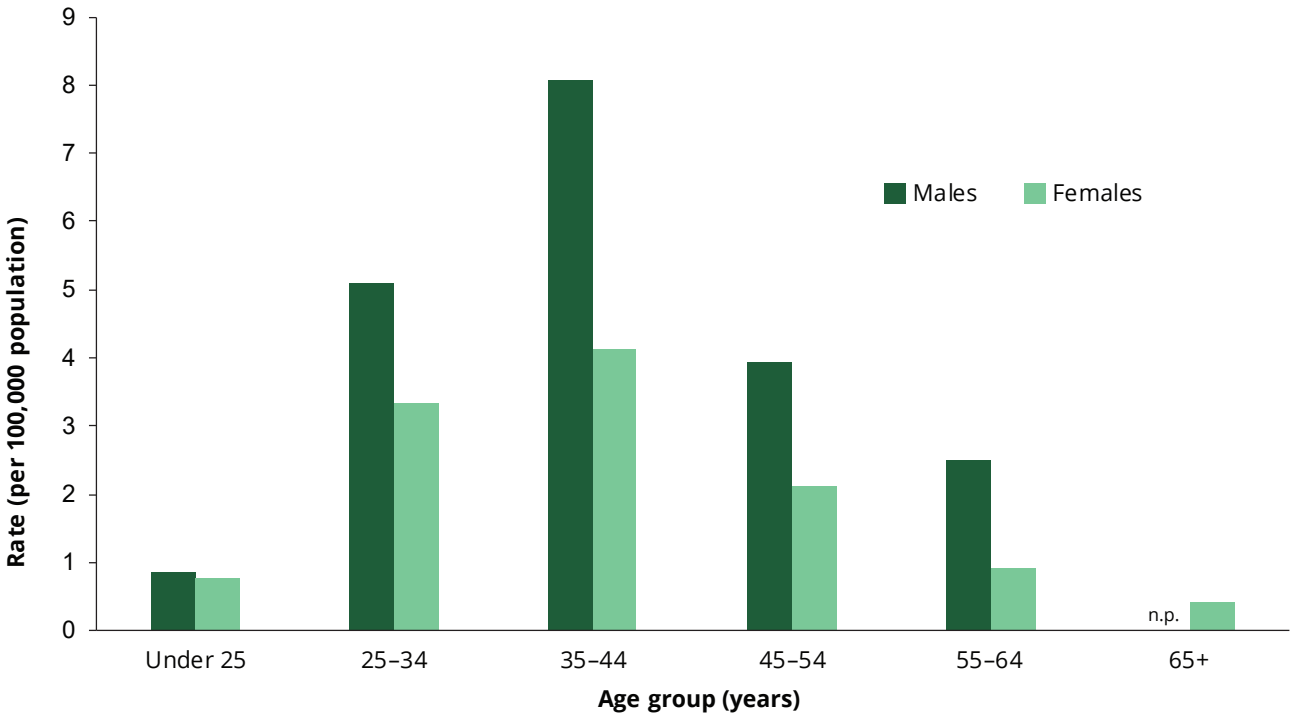
Who receives ED and hospital care for opioid dependence?

In 2016–17, there were at least 566 ED presentations related to opioid dependence: 1.5 presentations per day, or a rate of 2.3 presentations per 100,000 population (Table S4.1). Dependence presentations accounted for 11% of all opioid-related ED presentations in 2016–17. Overall, the total rate of opioid dependence ED presentations was almost twice as high among males as among females (3.0 and 1.7 per 100,000 population, respectively).

In 2016–17, there were also 16,903 hospitalisations with any diagnosis of opioid dependence: 46 hospitalisations per day, or a rate of 69.8 hospitalisations per 100,000 population. Of these, 3,722 were hospitalisations with a principal diagnosis of opioid dependence (15.4 per 100,000 population) (Table S4.2).

Men aged 35–44 experienced the highest rate of ED presentations for opioid dependence (8.1 per 100,000 population); of hospitalisations with a principal diagnosis of opioid dependence (47.3 per 100,000 population); and of hospitalisations with any diagnosis of opioid dependence (193.0 per 100,000 population), compared with males and females of other age groups (figures 4.1 and 4.2).

Figure 4.1: Rate of opioid dependence emergency department presentations, by age group, by sex, 2016–17

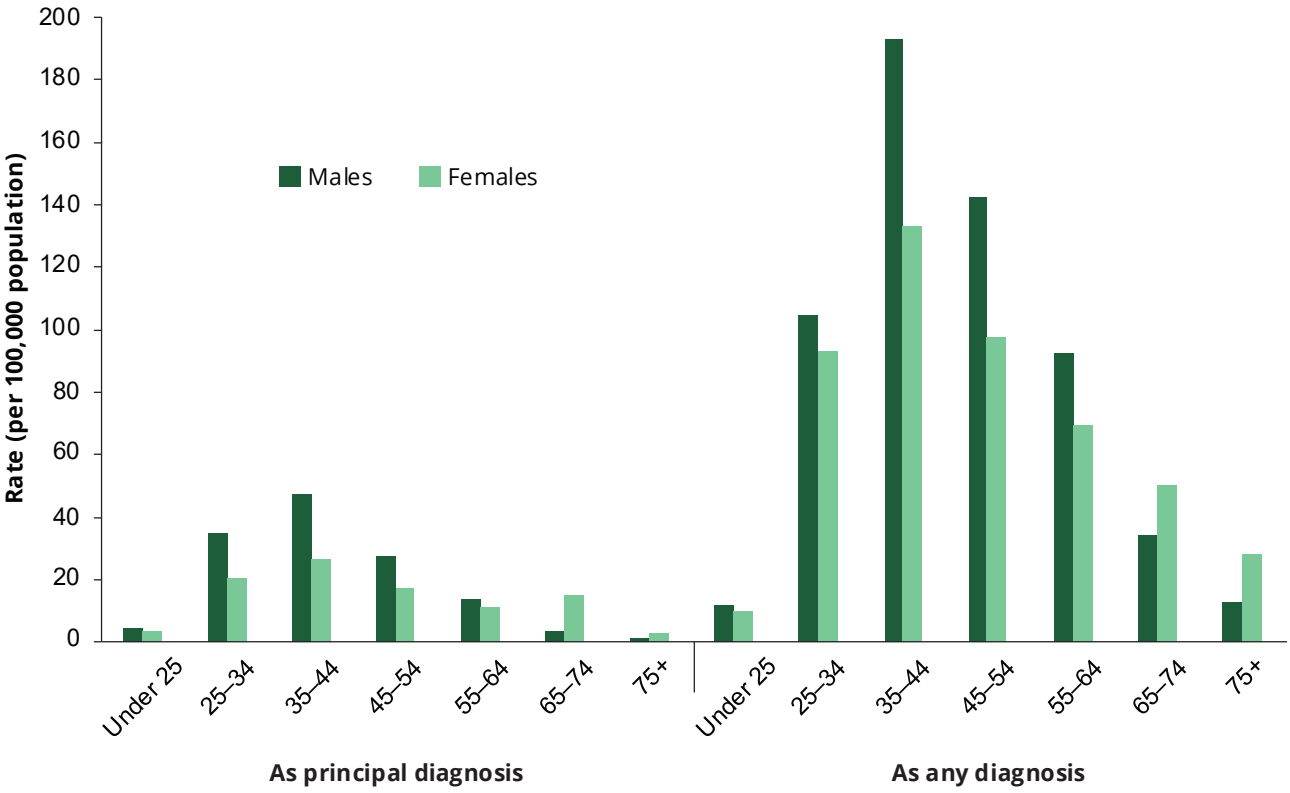


n.p. not published due to small event numbers not supporting the calculation of a reliable crude rate

Note: Opioid dependence classified according to ICD-10-AM (6th, 7th, 8th and 9th edns) diagnosis codes F11.2–F11.4, and SNOMED CT-AU EDRS code 231477003.

Source: AIHW analysis of the National Non-admitted Patient Emergency Department Care Database; Table S4.1.

Figure 4.2: Rate of opioid dependence hospitalisations, by diagnosis position, by age group, by sex, 2016–17



Notes

1. Opioid dependence classified according to ICD-10-AM (9th edn) diagnosis codes F11.2–F11.4.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S4.2.

How urgent are ED presentations for opioid dependence?

As previously mentioned, the quality of the information provided for ED principal diagnosis data has not been fully assessed; this should be taken into account when interpreting triage data for a particular diagnosis.

ED presentations for opioid dependence were triaged into less urgent categories compared with those for opioid poisoning. Of all ED presentations for opioid dependence in 2016–17, the majority (40%) were triaged as *Urgent*.

Opioid dependence		All ED presentations
2.3%	assigned to *Resuscitation*	0.73%
13%	assigned to *Emergency*	12.5%
40%	assigned to *Urgent*	36.8%
32%	assigned to *Semi-urgent*	40.7%
13%	assigned to *Non-urgent*	9.3%

In 2016–17, 68% of all opioid dependence presentations were classified as *Seen on time*. The proportion of dependence presentations classified as *Seen on time* was highest for the *Resuscitation* triage category (100%), followed by *Emergency* (78%), *Non-urgent* (69%) *Semi-Urgent* (68%) and *Urgent* (63%).

How do opioid dependence patients arrive at and leave the ED or hospital?

Just over half (54%) of opioid dependence-related ED presentations arrived by 'other' forms of transport (including walking, private transport, public transport, community transport and taxis), slightly lower than the proportion for all ED attendances (75%) (Table S3.5) (AIHW 2017b). Another 41% arrived via ambulance, air ambulance or helicopter rescue service, and 4.6% arrived via police or correctional service vehicle.

How do opioid dependence patients arrive at the emergency department?

Opioid dependence			All arrivals
41%	Ambulance		25%
54%	Other		75%
4.6%	Police		0.7%

Around three-quarters (69%) of dependence presentations left the ED without being admitted or were referred to another hospital; 25% were admitted to the same hospital they had presented at; and 4.1% left at their own risk after being attended by a health-care professional.

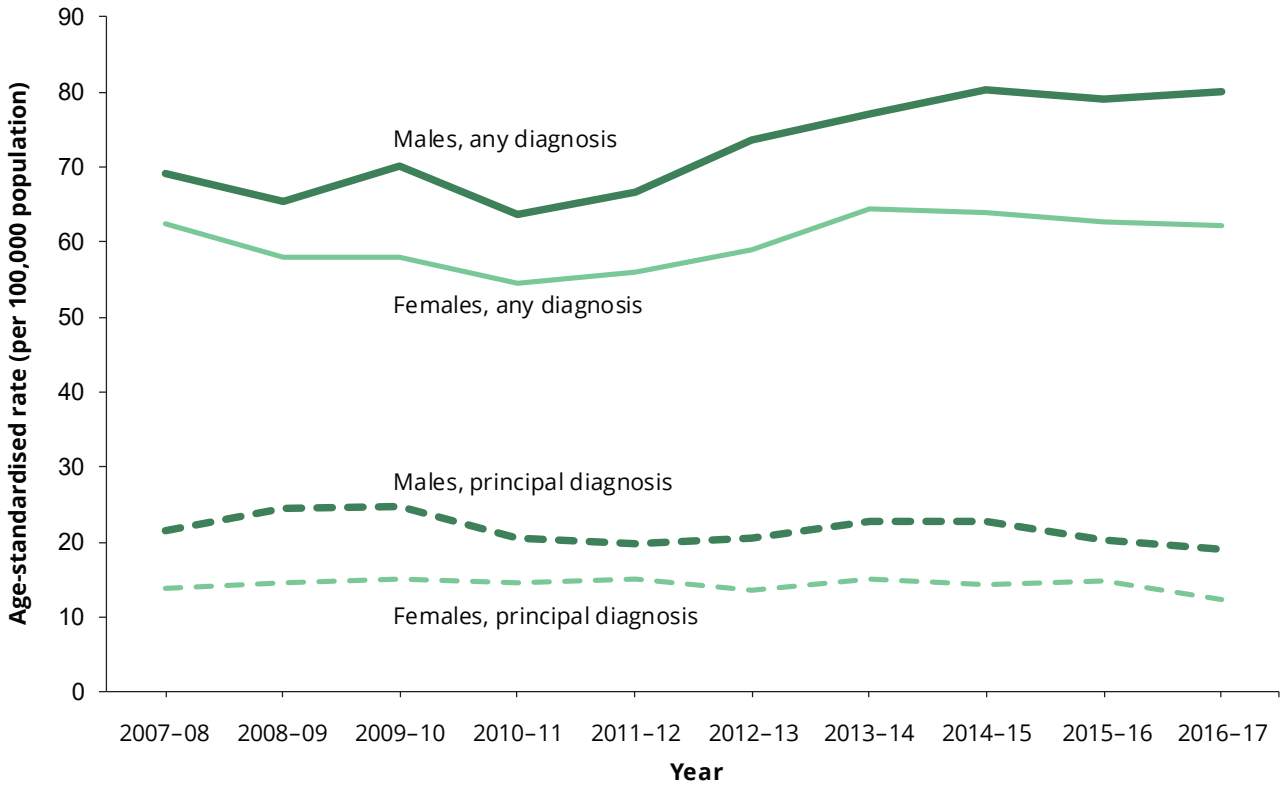
Most hospitalisations with a principal diagnosis of opioid dependence ended with *Discharge to the patient's usual residence, own accommodation, or a welfare institution* (86%), followed by those *Leaving against medical advice/Discharge at own risk* (11%) (Table S4.11).

Have hospitalisations for opioid dependence changed over time?

After adjusting for age, the rate for hospitalisations with opioid dependence as principal diagnosis was slightly lower in 2016–17 (15.7 per 100,000 population) than in 2007–08 (17.7 per 100,000 population) (Table S4.3). Rates were consistently higher among males than females (Figure 4.3).

When all diagnoses of opioid dependence are included, age-standardised rates for males and females were relatively similar in 2007–08. After that they diverged, as rates for males rose (from 69.0 in 2007–08 to 80.0 per 100,000 population in 2016–17) while those for females remained relatively stable (at 62.4 in 2007–08 and 62.3 per 100,000 population in 2016–17) (Figure 4.3).

Figure 4.3: Age-standardised rate of opioid dependence hospitalisations, by diagnosis position, by sex, 2007–08 to 2016–17



Notes

1. Opioid dependence classified according to ICD-10-AM (9th edn for 2015–16 and 2016–17, earlier editions for 2007–08 to 2014–15) diagnosis codes F11.2–F11.4.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.
4. Rates are age-standardised to the 2001 Australian standard population.

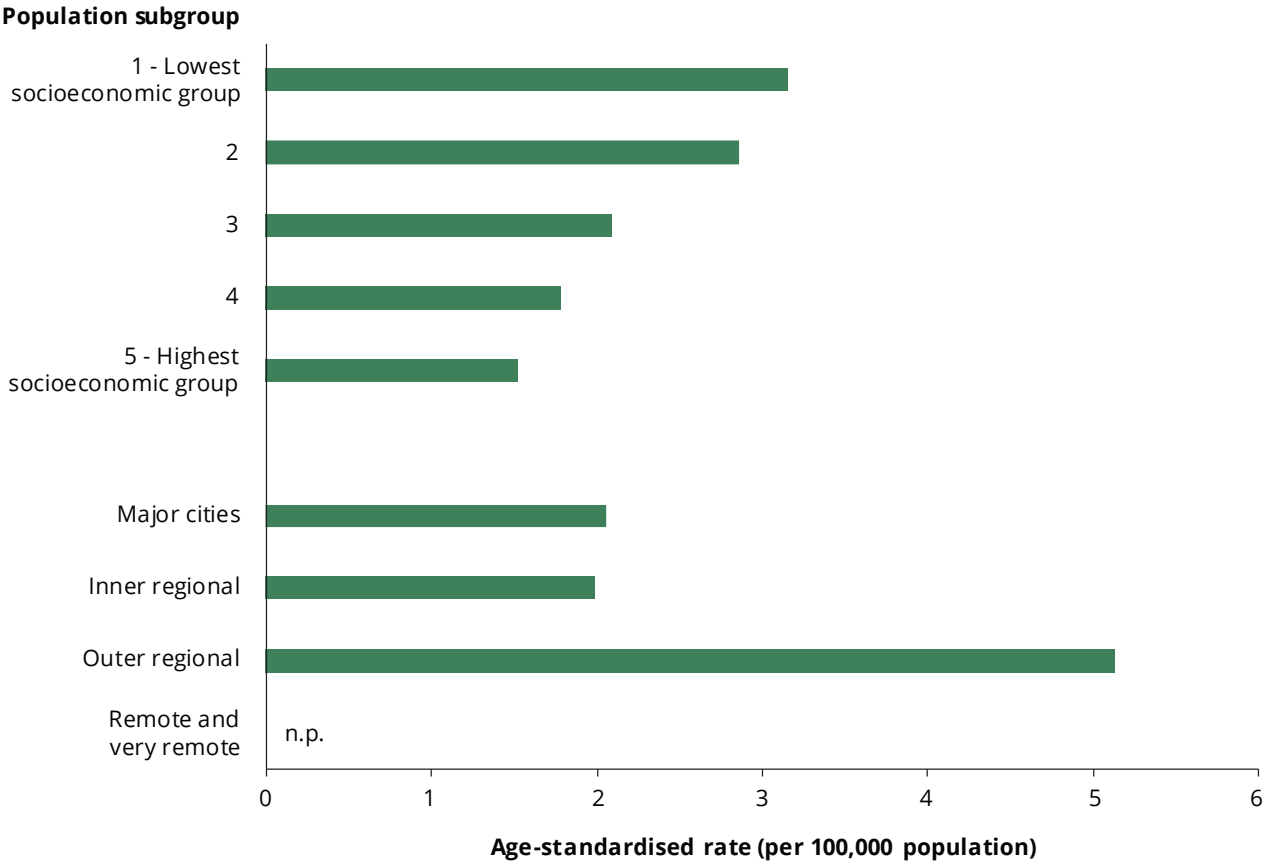
Source: AIHW analysis of the National Hospital Morbidity Database; Table S4.3.

Does ED and hospital care for opioid dependence differ by population group?

In 2016–17, after adjusting for age, people living in *Outer regional* areas had the highest rate of ED presentations for opioid dependence (5.1 per 100,000 population). Rates were similar for people living in *Major cities* (2.1 per 100,000 population) and *Inner regional* areas (2.0 per 100,000 population). The number of ED presentations for opioid dependence in *Remote and very remote* areas did not support the calculation of a reliable age-standardised rate (Figure 4.4). As the NNAPEDC coverage of emergency occasions of service in *Very remote* areas was estimated to be only 18% in 2014–15, compared with 100% for *Major cities* (AIHW 2017b), the actual number of emergency occasions of service for opioid dependence in *Very remote* areas in 2016–17 is likely to be much higher than the number of ED presentations captured in the NNAPEDC.

In 2016–17, after adjusting for differences in age structure, the rate of hospitalisations with opioid dependence as the principal diagnosis was highest for people living in *Major cities* (17.4 per 100,000 population), followed by people living in *Inner regional* areas (12.2), *Outer regional* areas (6.8) and *Remote and very remote* areas (4.4) (Figure 4.5). A similar pattern occurred for hospitalisations with opioid dependence as any diagnosis (Table S4.4).

Figure 4.4: Age-standardised rate of opioid dependence emergency department presentations, by population subgroup, 2016–17



n.p. not published due to small event numbers not supporting the calculation of a reliable age-standardised rate

Notes

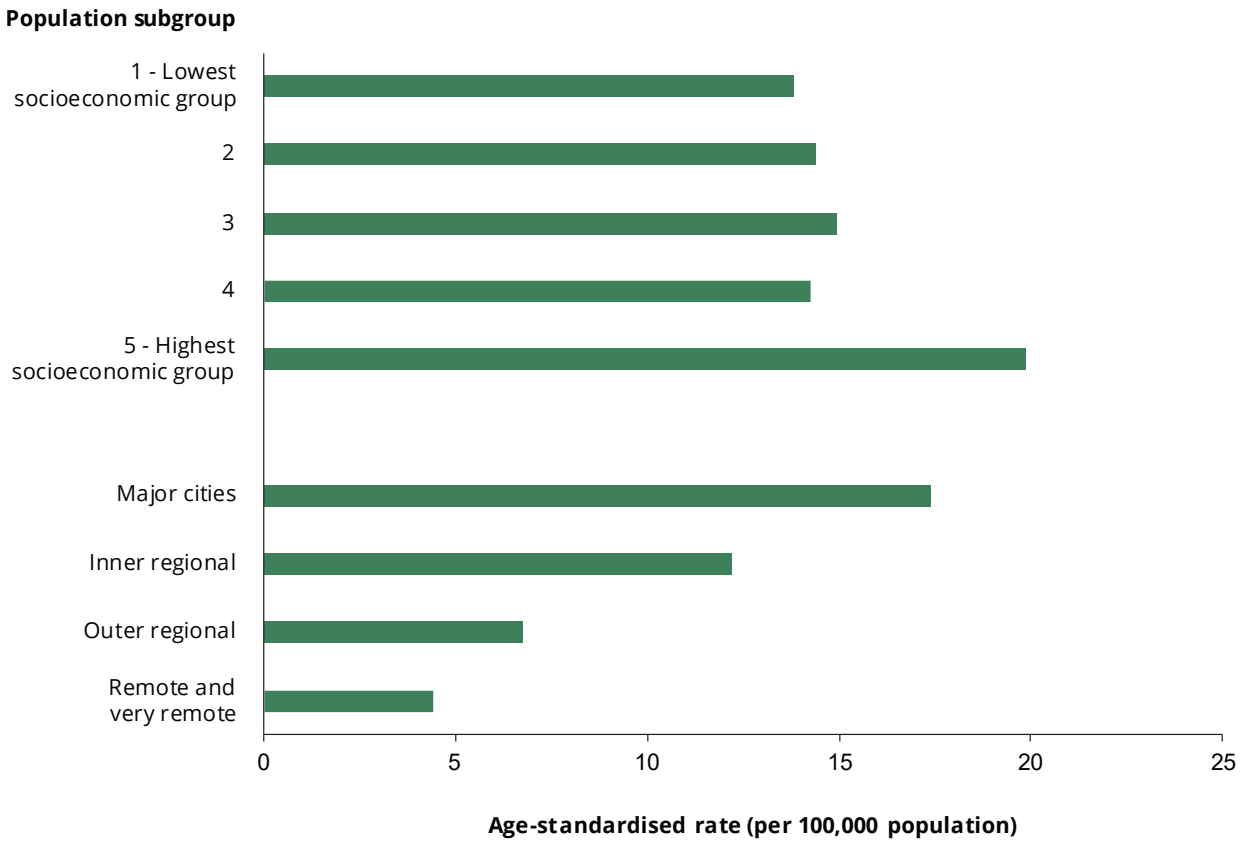
1. Opioid dependence classified according to ICD-10-AM (6th, 7th, 8th and 9th edns) diagnosis codes F11.2–F11.4, and SNOMED CT-AU EDRS code 231477003.
2. Rates are age-standardised to the 2001 Australian standard population.
3. See Appendix A for classification of socioeconomic groups and remoteness areas.

Source: AIHW analysis of the National Non-admitted Patient Emergency Department Care Database; tables S3.10 and S3.11.

By socioeconomic group, and after adjusting for age, the rate of ED presentations for opioid dependence followed a gradient—highest for those in the lowest socioeconomic group (3.2 per 100,000 population), and lowest for those in the highest socioeconomic group (1.5 per 100,000 population) (Figure 4.4).

By contrast, the rate of hospitalisations with opioid dependence did not follow a clear socioeconomic gradient. Where opioid dependence was the principal diagnosis, it was highest among those in the highest socioeconomic group (19.9 per 100,000 population) and lowest for those in the lowest socioeconomic group (13.8 per 100,000 population) (Figure 4.5). However, where opioid dependence was any diagnosis, the rate of hospitalisations was highest among those in the lowest socioeconomic group (85.2 per 100,000 population) and lowest among those in the highest socioeconomic group (58.7 per 100,000 population) (Table S4.4).

Figure 4.5: Age-standardised rate of hospitalisations with opioid dependence as principal diagnosis, by population subgroup, 2016–17



Notes

1. Opioid dependence classified according to ICD-10-AM 9th edn diagnosis codes F11.2–F11.4.
2. Hospitalisations for which the care type was reported as *Newborn*, with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.
4. Rates are age-standardised to the 2001 Australian standard population.
5. See Appendix A for classification of socioeconomic groups and remoteness areas.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S4.4.

Specialised treatment services for dependence

Specialised treatment services provide a range of treatments for clients who use, misuse or are dependent on opioids, including counselling; information and education; rehabilitation support and case management; withdrawal management; and/or pharmacotherapy (Box 4.1).

Box 4.1: Alcohol and other drug (AOD) treatment services definitions

Alcohol and other drug (AOD) treatment services across Australia provide a broad range of treatment services and support to people using drugs, and to their families and friends. The Alcohol and Other Drug Treatment Services National Minimum Data Set (AODTS NMDS) provides information about publicly-funded AOD treatment service agencies; the people they treat; and the treatment provided (AIHW 2018b).

People may seek AOD treatment services due to the problematic use of 1 or more drugs. For most people, however, there is 1 drug that is of most concern for them, and therefore the focus of the treatment they receive. This is referred to as their **principal drug of concern**. Clients can also report other drugs of concern (referred to as **additional drugs of concern**).

In the AODTS NMDS, treatment is reported as the number of **closed treatment episodes** (those that have ended) in 1 year, or the **number of clients** who have sought treatment in a year, as more than 1 episode of care can be provided to each client.

For more information on the AODTS NMDS, see Appendix A.

Source: AIHW 2018b.

In 2016–17, 8.2% of all AOD treatment services had opioids listed as the principal drug of concern—a total of 16,428 closed treatment episodes (AIHW 2018b). These treatment episodes were provided to 10,596 clients. The average number of episodes of care per client was 1.6 per client.

Use of more than 1 treatment episode per year was uncommon. In 2016–17, the majority (71%) of clients received 1 treatment episode, and a further 18% received 2 treatment episodes (Table S4.9). The remaining 11% of clients received 3 or more episodes in the year, with 3% receiving 5 or more.

Men were somewhat more likely to receive treatment in 2016–17, accounting for 64% of clients (and 63% of closed treatment episodes) where opioids were the principal drug of concern (Table S4.5). This was consistent over time and with treatment for other drug types (AIHW 2018b).

What were the principal drugs of concern?

In 2016–17, *Heroin* was the 4th most common principal drug of concern and accounted for 5% of all AOD closed treatment episodes (AIHW 2018b). It was also the most common opioid reported for both males and females as a principal drug of concern accounting for 61% (9,988) of closed treatment episodes where an opioid was the principal drug of concern. The median age of clients receiving treatment for *Heroin* as the principal drug of concern was 42 years, 9 years higher than for all AOD treatment clients.

The next most common opioid principal drug of concern was *Methadone* (9.2%), followed by *Codeine* (7.5%) (Table S4.6).

In 2016–17, when opioids were the principal drug of concern, the most common other drugs used were *Amphetamines* (21%), *Cannabis* (19%), *Nicotine* (16%) and *Benzodiazepines* (12%) (Table S4.10).

How have treatment services changed over time?

In the 10 years to 2016–17, the number of all AOD closed treatment episodes increased by 30% (AIHW 2018b). However, over the same period there was a 21% decline in the number of closed treatment episodes where opioids were the principal drug of concern. This is mainly due to the decrease in closed treatment episodes where *Heroin* was the principal drug of concern, which decreased by 36% between 2007–08 and 2016–17 (from 15,571 to 9,988 closed treatment episodes). By contrast, for the pharmaceutical opioids *Codeine* and *Oxycodone*, there was a substantial increase in closed treatment episodes over the same period. Treatment episodes doubled for *Codeine* (from 628 to 1,233), and for *Oxycodone* they tripled (from 305 to 911); however, overall, they only account for a small proportion of closed opioid treatment episodes.

Over the 10-year period, where an opioid was the principal drug of concern, the proportion of episodes for males has remained the same, and the median age of a person for each episode has risen from 31 to 37 years—noting this will be influenced by clients who have received multiple episodes of treatment in a year (Table S4.12).

Opioid pharmacotherapy

Opioid pharmacotherapy (Box 4.2) treatment—also known as opioid substitution therapy or opioid agonist therapy or medication-assisted therapy—is 1 of the main treatment types used for opioid drug dependence. It involves providing a consistent oral or sublingual dose of a legally obtained, longer-lasting opioid (methadone, buprenorphine or buprenorphine-naloxone). Clients receive pharmacotherapy treatment for a range of opioid drugs (both prescribed and illegal) to reduce withdrawal symptoms and cravings and to provide positive health gains. This treatment type is captured for a particular day (a snapshot) in the National Opioid Pharmacotherapy Statistics Annual Data (NOPSAD) collection.

On a snapshot day in 2017, nearly 50,000 people in Australia (20 per 10,000 population) received opioid pharmacotherapy treatment.

Box 4.2: Opioid pharmacotherapy definitions

The National Opioid Pharmacotherapy Statistics Annual Data (NOPSAD) collection is a set of jurisdictional data that provides information on a snapshot day in June 2017 (with the exception of Western Australia where data were collected on a snapshot day in May) about:

- clients accessing pharmacotherapy for the treatment of opioid dependence
- prescribers participating in the delivery of pharmacotherapy treatment
- dosing sites providing pharmacotherapy drugs to clients.

In Australia, 3 medications are registered for long-term maintenance treatment for opioid-dependent people:

- methadone
- buprenorphine
- buprenorphine-naloxone.

For more information on the NOPSAD, see Appendix A.

Source: AIHW 2018f.

The median age of clients was 42, and almost two-thirds (66%) of clients in 2017 were aged 30–49. The proportion of clients aged under 30 has declined each year since 2006 (28% of clients in 2006, falling to 7% of clients in 2017) (AIHW 2018f).

The number of clients aged 60 years and over continued to increase slowly, from 223 (1% of total clients) in 2008 to 3,192 in 2017 (6% of total clients) (AIHW 2018f).

There is an ageing cohort in opioid pharmacotherapy treatment, consistent with the pattern observed in other drug treatment services (AIHW 2018f). This may be due to:

- methadone treatment being available in Australia for more than 40 years
- an ageing cohort of opioid dependant users
- pharmacotherapy treatment reducing the risk of premature death, resulting in some clients remaining in treatment for decades
- clients seeking treatment for the first time at an older age.

Clients receive pharmacotherapy treatment for a range of opioid drugs. These include illegal opioids (such as heroin), and pharmaceutical opioids available by prescription (such as oxycodone), over-the-counter (such as codeine-paracetamol combinations) or through illicit means. Opioids in the form of codeine and codeine combinations were still available over the counter on the snapshot day in 2017. Data for opioid drug of dependence should be used with caution due to the high proportion of clients with 'Not stated/not reported' as their opioid drug of dependence (38% of clients in 2017).

Nationally in 2017, 38% of clients reported heroin as their opioid drug of dependence. Oxycodone (5%) was the next most commonly reported drug of dependence, followed by morphine, codeine and methadone (all 4%) (AIHW 2018f).

Both the number of people (49,792) and the rate of people (20 clients per 10,000 population) receiving pharmacotherapy treatment have remained relatively stable since 2010.

5

Other mental and behavioural harms due to use of opioids

Key findings:

In 2016–17:

- there were 314 ED presentations (0.9 per day) and 608 hospitalisations (1.7 per day) with a principal diagnosis of other mental and behavioural disorders due to use of opioids
- males had a higher rate than females of ED presentations and hospitalisations for other mental and behavioural disorders due to use of opioids
- the 35–44 age group had the highest rate for both ED presentations and hospitalisations from other mental and behavioural disorders due to use of opioids.

Opioid use can have other harmful effects, besides poisoning and dependence. These include other mental and behavioural disorders due to use of opioids.

In this report, other mental and behavioural disorders refers to a range of mental and behavioural disorders due to use of opioids, excluding opioid dependence and opioid withdrawal. It includes acute intoxication by opioids; harmful use of opioids; psychotic disorder due to use of opioids; amnesic syndrome due to use of opioids; and residual and late-onset psychotic disorder due to use of opioids.

These conditions are not responsible for as great a proportion of hospitalisations as poisoning and dependence, discussed in Chapters 3 and 4; however, as with any mental health problems, many of these mental and behavioural disorders affect all areas of life and have a lifelong impact on the individual.

For more information on the classification of other mental and behavioural disorders due to use of opioids in the NNAPEDC and NHMD, see Appendix A.

ED and hospital care for other mental and behavioural disorders due to use of opioids

This section provides information on care for other mental and behavioural disorders due to use of opioids provided in EDs and hospitals. Boxes 3.1 to 3.3 define the key terms related to ED and hospital care.

Who receives ED and hospital care for other harms?

In 2016–17, there were at least 314 ED presentations for other mental and behavioural disorders due to use of opioids—0.9 presentations per day, or a rate of 1.3 presentations per 100,000 population. These presentations accounted for 6.1% of all opioid-related ED presentations in 2016–17 (Table S5.1).

Over the same period, there were 4,469 hospitalisations (or 18.5 per 100,000 population) with any diagnosis of other mental and behavioural disorders due to use of opioids. Of these, there were 608 hospitalisations (or 2.5 per 100,000 population) with a principal diagnosis of other mental and behavioural disorders due to use of opioids (Table S5.2).

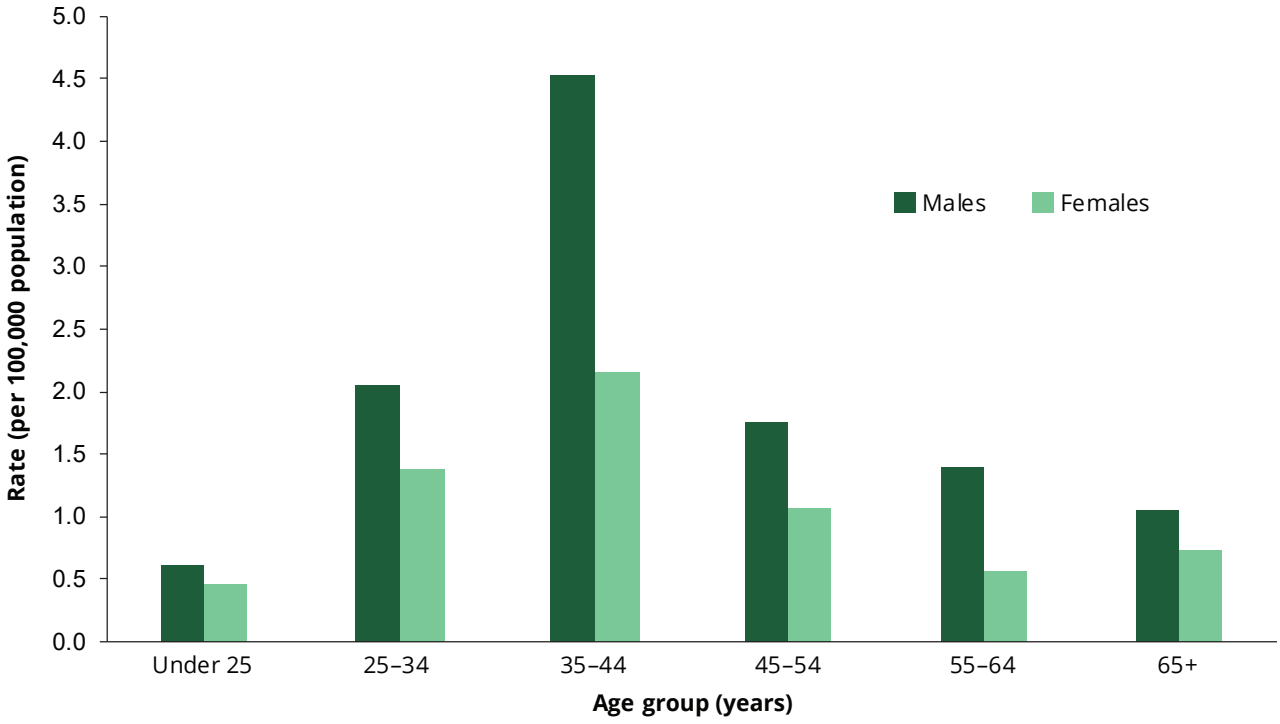
Overall, rates were higher for males than females for ED presentations for other mental and behavioural disorders due to use of opioids (1.6 and 1.0 per 100,000 population, respectively) as well as hospitalisations with other mental and behavioural disorders due to use of opioids as the principal diagnosis (3.3 per 100,000 population compared with 1.7) and as any diagnosis (23.2 per 100,000 population compared with 13.8).

Men aged 35–44 years had the highest rates of ED presentations for other mental and behavioural disorders due to use of opioids and hospitalisations with other mental and behavioural disorders due to use of opioids as principal diagnosis and as any diagnosis (figures 5.1 and 5.2).

From 2007–08 to 2016–17, the age-standardised rate of hospitalisations with other mental and behavioural disorders due to use of opioids as any diagnosis increased by 82% for males and by 72% for females. Hospitalisations with other mental and behavioural disorders due to use of opioids as the principal diagnosis increased by 62% for males and by 41% for females (Table S5.3).

Information is not presented by remoteness areas or socioeconomic groups for other mental and behavioural disorders due to use of opioids, due to small numbers.

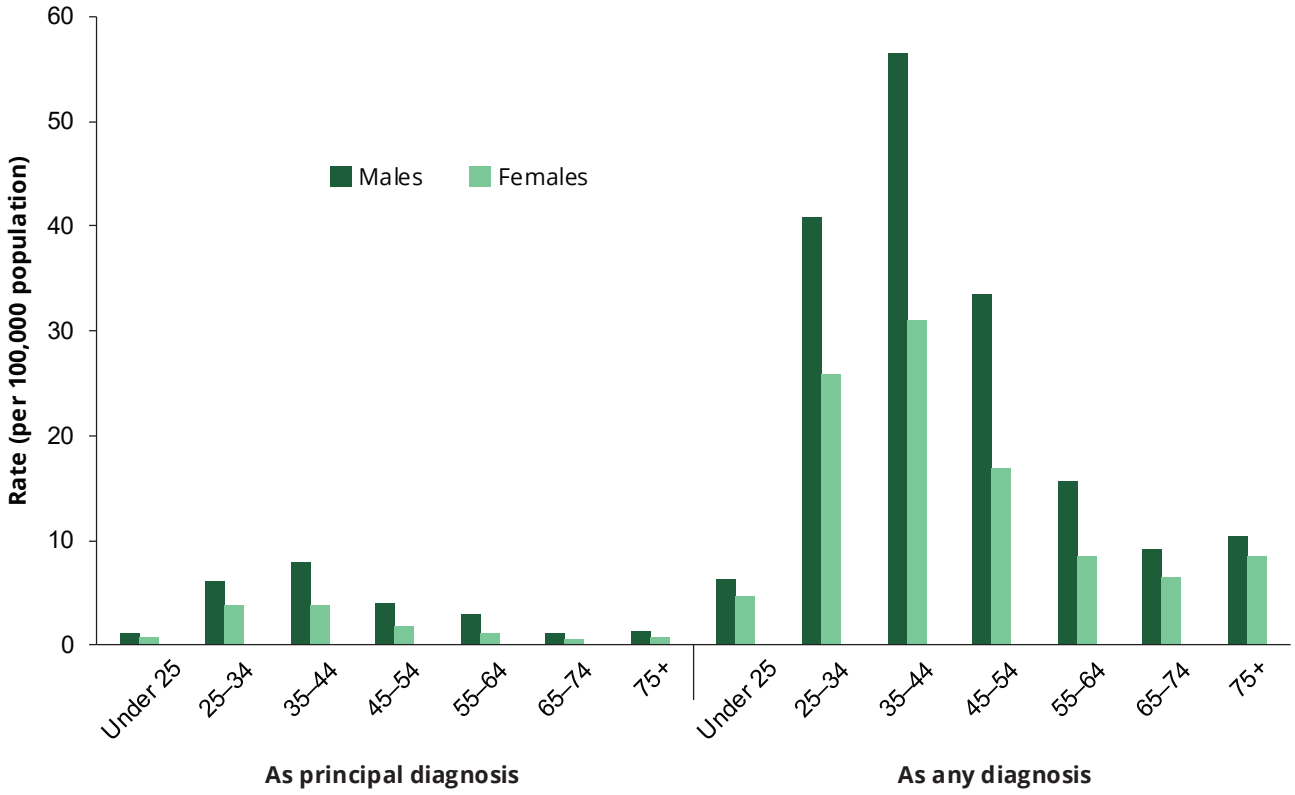
Figure 5.1: Rate of other mental and behavioural disorders due to use of opioids emergency department presentations, by age group, by sex, 2016–17



Note: Other mental and behavioural disorders due to use of opioids classified according to ICD-10-AM (6th, 7th, 8th and 9th edns) diagnosis codes F11.0–F11.1 and F11.5–F11.7.

Source: AIHW analysis of the National Non-Admitted Patient Emergency Department Care Database.

Figure 5.2: Rate of hospitalisations for other mental and behavioural disorders due to use of opioids, by diagnosis position, by age group, by sex, 2016–17



Notes

1. Other mental and behavioural harms due to use of opioids classified according to ICD-10-AM (9th edn) diagnosis codes F11.0–F11.1 and F11.5–F11.7.
2. Hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, have been excluded.
3. Hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* have been excluded.

Source: AIHW analysis of the National Hospital Morbidity Database; Table S4.2.

How urgent are ED presentations for other mental and behavioural disorders due to use of opioids?

As previously mentioned, the quality of the information provided for ED principal diagnosis data has not been fully assessed, and this should be taken into account when interpreting triage data for a particular diagnosis.

Nearly 1 in 2 (49%) ED presentations for other mental and behavioural disorders due to use of opioids were assigned the *Urgent* triage category.

Opioid metal and behavioural disorders		All ED presentations
8.0%	assigned to *Resuscitation*	0.73%
23%	assigned to *Emergency*	12.5%
49%	assigned to *Urgent*	36.8%
19%	assigned to *Semi-urgent*	40.7%

In 2016–17, 78% of ED presentations for other mental and behavioural disorders due to use of opioids were categorised as *Seen on time*. The proportion categorised as *Seen on time* was highest in the *Resuscitation* and *Emergency* triage categories (100% and 82% respectively), followed by *Semi urgent* (81%), and *Urgent* (72%) (tables S3.3 and S3.4).

How do other mental and behavioural disorders due to use of opioids patients arrive at and leave the ED or hospital?

The majority of ED presentations for other mental and behavioural disorders due to use of opioids arrived at ED by ambulance (75%). A further 24% arrived via 'other' forms of transport (including walking, private transport, public transport, community transport and taxis).

The majority (54%) left without being admitted to hospital; 41% were admitted to the same hospital they had presented at; and 4.5% left at their own risk after being attended by a health-care professional.

Most hospitalisations with a principal diagnosis of other mental and behavioural disorders due to use of opioids ended with *Discharge to the patient's usual residence, own accommodation, or a welfare institution* (81%), followed by *Leaving against medical advice/Discharge at own risk* (7.4%) (Table S5.4).

6

Opioid harms in Australia and Canada

Representatives from the Canadian Institute for Health Information (CIHI) and the AIHW have worked together to produce comparable estimates of opioid use and harms in each country. This topic was selected for this project as opioids are a class of drugs causing concern in both Canada and Australia and impacting most of the developed world. The goal of the collaboration was to explore the value of international comparison for opioids, to understand the comparability of different data holdings and to learn the differences and similarities between the 2 countries.

Why are we comparing Australia and Canada?

Canada and Australia are natural countries for comparison, as they have similar demographic profiles; health-care systems (mostly public) which function similarly; single-source data stewards for hospital and emergency department data (CIHI and AIHW); and common data coding systems (ICD-10) (Table 6.1).

Table 6.1: Canadian and Australian demographic measures

	Canada	Australia
Sex (% female)	50%	50%
Life expectancy at birth	81.9	82.3
Median age	42.2	38.7
Population aged 25–54 (workforce)	40%	41%
Population living in urban areas	82%	90%
Health expenditure (% gross domestic product)	10%	10%
Privately funded health-care	33%	30%

Sources: ABS 2018; AIHW 2018d; CIHI 2017a; Statistics Canada 2018.

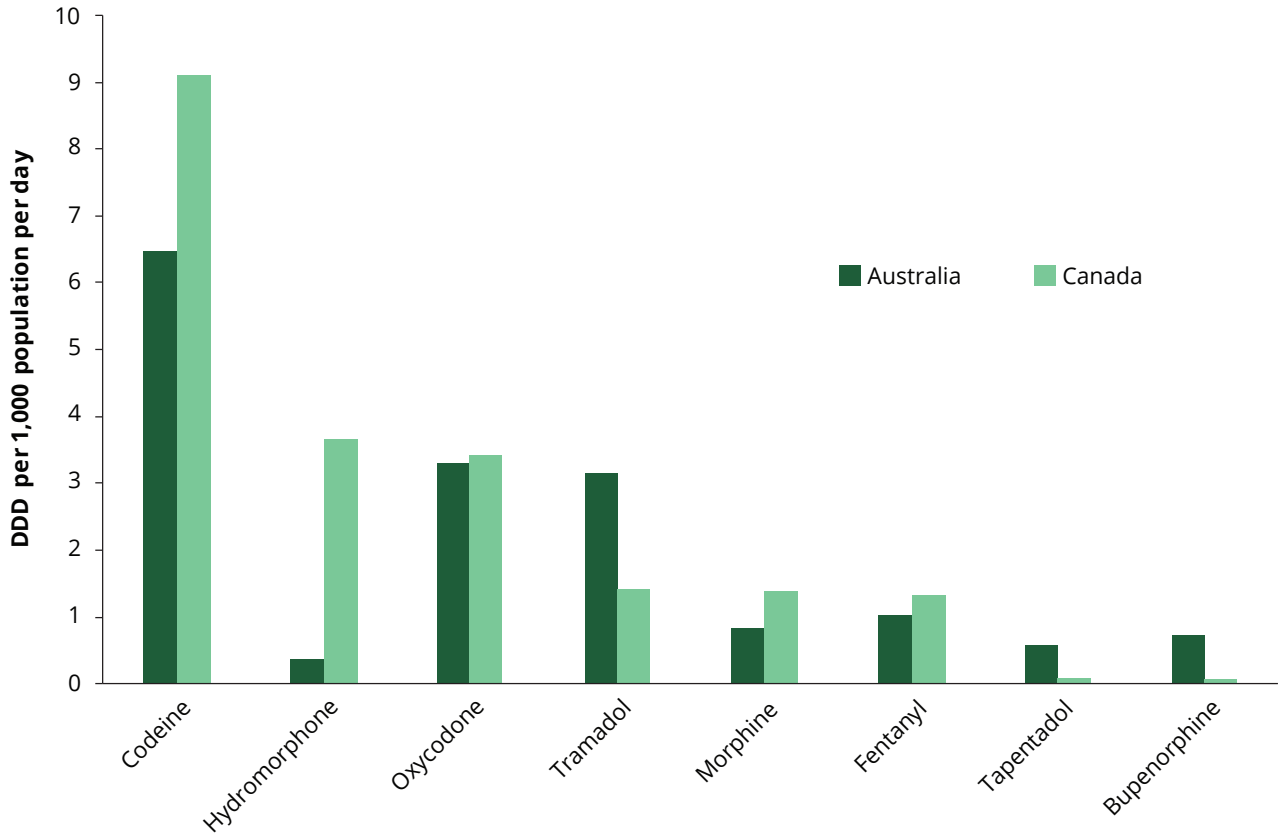
How comparable is the availability and use of opioids in Australia and Canada?

Although both Australia and Canada have opioid-use problems stemming from both licit (prescribed medications) and illicit use, the specific types of opioids involved are not always the same. Understanding these differences is an important step in interpreting differences in opioid harms and where care is sought.

In recent years, both Australia and Canada have initiated campaigns targeting medical doctors, to encourage responsible opioid prescribing. Overall, there was a downward trend in prescribed opioid use in both Canada and Australia (per defined daily doses) in the 5 years prior to 2016–17. There are differences in the types of opioids prescribed, with hydromorphone playing a larger role in Canadian prescribing, while tramadol and buprenorphine are more common in Australia (Figure 6.1).

Naturally derived opioids, such as oxycodone, codeine and morphine, are the most commonly documented drugs related to opioid poisoning hospitalisation in both Canada and Australia.

Figure 6.1: Number of defined daily doses dispensed (DDD) per 1,000 people, per day, Canada and Australia, 2017



Sources:

Canada: Prepared using data from CompuScript, IQVIA,

Australia: AIHW analysis of PBS data maintained by the Department of Health and sourced from the Department of Human Services; Table S6.

A more revealing comparison between the 2 countries involves the role of illicit drugs. Heroin has a more prominent history in Australia than in Canada, and remains a proportionally larger source of opioid harm. Heroin use and harms in Australia peaked in the late 1990s, when death rates were the highest recorded in that country. While heroin use and deaths have decreased substantially since then, there is still an ageing population of entrenched heroin users (Degenhardt et al. 2004). Today in Australia, while heroin use is low (compared with other opioids), it is still higher than in Canada and remains of concern as a source of opioid harm.

In Canada, illicit use of fentanyl is more common than it is in Australia. The most recent estimate of seized controlled substances in Canada (January to March 2018) ranks fentanyl as the most commonly detected opioid seized (Government of Canada 2018b). In British Columbia (BC), the BC Centre for Disease Control reports that 4 of 5 drugs being used in safe injection sites tested positive for fentanyl and 3 of 5 overdose deaths were due to drugs containing fentanyl (BC Centre for Disease Control 2017). Fentanyl is often 'cut' into other drugs unbeknownst to the user, leading to trials of fentanyl testing in Canadian safe injection sites. In Australia, fentanyl does not even rank as a separate category in published Australian drug seizures reporting, with heroin accounting for 95% of opioid seizures (ACIC 2017).

The impact of this difference in patterns of opioid drugs is that users have different trajectories and contact with the hospital system and their care requires different strategies. Fentanyl is more potent than heroin and has a greater potential to be lethal, meaning many users die before they can receive acute care (Latimer et al. 2016). For example, a Canadian study on opioid overdose deaths found that people who overdosed had had repeat visits to EDs (and were thus counted as high users) in the 6 months prior to their death (Otterslatter 2018). Additional information from that work tells us that, for 85% of people who died of an overdose, emergency services (911) was not called (either because they were alone when they overdosed or were afraid of repercussions) (BC Centre for Disease Control 2017).

We also know that many poisoning cases result in death outside of the hospital system. As a result, interventions in Canada have focused on the prevention of overdose rather than treatment of addiction. Naloxone, an antidote for opioid poisoning, has been used by medical professionals to counteract opioid overdoses. It is effective when used by properly trained bystanders and/or opioid users (Clark et al. 2014). It is now more readily available to those in need in Canada—with many overdose prevention sites receiving funding for volunteers to reverse overdoses using naloxone and oxygen.

How comparable are ED and hospital admitted patient care data for Australia and Canada?

ED and hospital admitted patient care data

To account for differences in the age structure between countries, Australian and Canadian data for ED presentations and hospitalisations were age-standardised to the Organisation for Economic Co-operation and Development (OECD) population. Despite this, there remained large differences in the rates of ED and hospital care in Australia and Canada for opioid harms. This was thoroughly explored by both the CIHI and AIHW teams and some key differences surfaced that may impact rates:

- Collection of diagnosis information in ED data in Australia is relatively new; the quality of the principal diagnosis has not been fully assessed, and while there are fields for additional diagnoses, provision of these data is currently limited. There are no fields for external causes.
- In Australia, admission rates from ED to hospital are higher than in Canada overall. In Canada, 20% of patients with opioid harm treated in the ED are admitted to inpatient care (CIHI 2018); in Australia this proportion is much higher (53%). While this could reflect differing needs for care, it could also be influenced by possible differences in admission practices between countries. In Canada, patients who come to an ED and are held for observation remain, administratively, ED patients. In Australia, patients requiring observation to be assessed or diagnosed may be admitted to hospital.
- In general, while both countries use the same diagnostic coding (ICD-10), health-care systems may have different drivers that impact how and what diagnosis information is recorded. For example, certain safety and quality information or diagnoses may be required to be recorded by clinicians for 1 country but not the other. In Canada there is no directive beyond direction within ICD-10 coding manuals, and there can be subjective interpretation. It is impossible to fully assess the impact this may have.

See 'Appendix A: Comparability of Australian and Canadian data' for more information.

Due to the data differences in ED presentations, rates are presented for consideration but no further comparison has been made. The hospital admissions data are more meaningfully comparable and are explored below (Table 6.2).

How to compare hospital admitted patient care data

Both the Australian and Canadian administrative hospital datasets have diagnosis information recorded as codes using modifications of the International Classification of Diseases 10th Revision (ICD-10). Each diagnosis code is associated with a diagnosis type and is either a main condition or another condition. Every episode of admitted patient care has only 1 main condition; however, each country uses a different name and definition for the main condition. In Australia, **principal diagnosis** is used, and **most responsible diagnosis** is used in Canada.

In the Australian data, the 'principal diagnosis' is the diagnosis established, after study, to be chiefly responsible for occasioning the patient's episode of admitted patient care. In the Canadian data, the 'most responsible diagnosis' is the diagnosis or condition that can be described as being most responsible for the patient's stay in a facility. While the definitions appear similar, the Australian definition is based on reason for admission, while the Canadian definition is based on resource use (Quan et al. 2014). This difference means that, if the same episode of admitted patient care were to occur in Australia and Canada, it may be represented differently in the administrative hospital datasets, as shown in Box 6.1. This has implications when comparing data between the countries.

In order to provide more comparable estimates between countries and capture all diagnoses that affect patient management, other diagnosis fields were also included in the analysis. For the Australian data, the 'additional diagnosis' field was included (an 'additional diagnosis' is a condition or complaint that either coexists with the principal diagnosis or arises during the episode of care (reported if the condition affects patient management). (See Box 3.2). For the Canadian data, 'pre-admit comorbidity' and 'post-admit comorbidity' were included (these are conditions that coexist at the time of admission or develop subsequently, and either significantly affect the treatment received; require treatment beyond maintenance of the pre existing condition; or increase the length of stay by at least 24 hours). For the Canadian data, 'secondary diagnoses' (conditions which a patient may or may not have received treatment for, and which did not satisfy the requirements for comorbidity) were excluded.

Australian data are presented as a range, from 'principal diagnosis' only to 'any diagnosis' (that is, principal diagnosis and additional diagnosis). Canadian data are presented as a single number which includes 'most responsible diagnosis', 'pre-admit comorbidity' and 'post-admit comorbidity'.

Both countries have similar coding standards and directives, but there remains potential for differences in interpretation of those standards.

Box 6.1: Scenario comparing coding of a hospitalisation in Australia and Canada

A person is admitted to hospital with respiratory failure and requires resuscitation and respiratory ventilation. After testing, it is determined that the respiratory failure was due to an overdose of oxycodone related to mismanagement of their prescribed medication. The person is on a ventilator for 5 days and in hospital for a further 3 days recovering before being discharged. They also have liver disease which affected their care.

In the Australian dataset (coded using ICD-10-AM), the episode of care would be coded as follows:

- Principal diagnosis: poisoning by *Naturally derived opioids* with an external cause of accidental opioid poisoning
- Additional diagnosis: respiratory failure
- Additional diagnosis: liver disease.

In the Canadian dataset (coded using ICD-10-CA), the episode of care would be coded as follows:

- Most responsible diagnosis: respiratory failure
- Pre-admit comorbidity: poisoning by *Naturally derived opioids* with an external cause of accidental opioid poisoning
- Pre-admit comorbidity: liver disease.

Table 6.2: Comparison of age-standardised rates of Australian and Canadian emergency department and hospital presentations, 2016–17

	Age-standardised rate (per 100,000 population)[a]			
Type of harm (diagnosis)	Canadian ED presentations	Australian ED presentations	Canadian hospitalisations	Australian hospitalisations
Accidental poisoning	38.0[b]		9.8[b]	6.6–12.2
Undetermined intent		17.7[c]		2.5–4.2
Intentional poisoning	10.5		4.7	8.1–23.4
Opioid use disorder	39.3	2.4	17.4	15.5–70.7
Side effects from opioid use	17.8	-	26.8	112.9
Other harm	30.9	1.3	8.6	2.5–18.7

(a) Rates are age-standardised to the 2010 OECD standard population.

(b) Poisoning of unknown intent is included in accidental poisoning in Canada.

(c) Australian ED poisonings presentations cannot be disaggregated by intent.

Note: Canadian data are presented as a single number which includes *Most responsible diagnosis*, *Pre-admit comorbidity* and *Post-admit comorbidity*. Australian hospitalisation data are presented as a range from *Principal diagnosis* only to *Any diagnosis* (that is, principal diagnosis and additional diagnosis). See 'Appendix A: Comparability of Australian and Canadian data' for further information.

Sources:

Canada: National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information and National Non-admitted Patient Emergency Department Care Database, 2016–2017; CIHI 2018.

Australia: AIHW analysis of the National Hospital Morbidity Database; and the National Non-admitted Patient Emergency Department Care Database; Table S6.

Side effects from opioid use

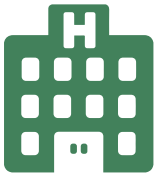
The term 'side effects of pharmaceutical opioid use' is only used with respect to medically prescribed opioids which have been used as directed. This reason for admission to hospital may have less severe impact for the patient (relative to dependence syndrome or poisoning) but has the highest rate of hospital stays and more impact on the health-care system.

The age and sex profile for these hospitalisations was similar in Australia and Canada: more common in females; increasing rates of hospitalisation with increasing age; and reflecting the rates of prescription opioids in both countries.

Poisoning

The most common opioid type responsible for poisoning hospitalisations was *Naturally derived opioids* (for example, codeine, oxycodone and morphine) in both Australia and Canada. But the types of opioid varied thereafter, mainly reflecting the differences in illicit use discussed above. *Heroin* featured higher among opioid poisoning hospitalisations in Australia and *Other and unspecified opioids* were more common in Canada.

The most common **opioid types** responsible for poisoning hospitalisations in Australia and Canada



1. Natural opioids

2. Synthetic opioids

3. Heroin

1. Natural opioids

2. Other and unspecified opioids

3. Synthetic opioids

There were also similarities in the **profiles of people** hospitalised for opioid poisoning

Males in both countries are more likely to be hospitalised for **accidental opioid poisoning** than females.

52%

54%

Females in both countries were more likely to be hospitalised for **intentional poisoning** than males.

61%

58%

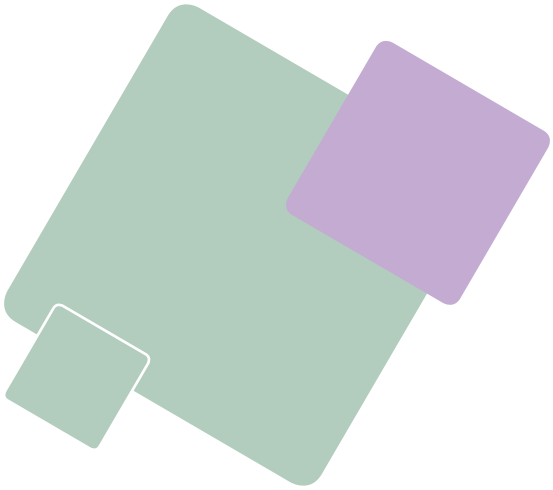
The **average age** of accidental poisonings was similar between Australia and Canada (48–49 years old), while for intentional poisonings the **average age** was slightly younger in Australia than in Canada, 38 and 44 years respectively.

Note that poisoning of unknown intent is included with accidental poisoning for Canada.

Dependence

Opioid dependence treatment occurs predominantly in the community in Canada, whereas in Australia it is possible for certain dependence treatments, such as supervised withdrawal, to take place in hospitals (ACT Health 2018a; North & West Homelessness Networks 2017; NSW Ministry of Health 2008). In Canada, community-based harm-reduction strategies have been employed under the directive of the Canadian Drugs and Substances Strategy (Government of Canada 2018a). In both Canada and Australia, 55% of opioid dependence hospital stays were among males:

- The average age was similar between countries, 44 and 42 years for Australia and Canada, respectively
- The rate of opioid dependence hospitalisations was over 4 times as high in Australia (any diagnosis) as in Canada (70.7 and 17.4 per 100,000 population, age-standardised to the 2010 OECD standard population), which is likely to be reflective of the difference in treatment practice (Table 6.2).



7

Discussion

This report brings together information on opioid use and its harmful effects in Australia. The findings highlight that there are substantial, and rising, harms associated with both pharmaceutical and illegal opioids and the need for interventions to reduce these harms. Because opioid harm has a large component relating to iatrogenic dependence—which develops unintentionally after using pharmaceutical opioids to treat a genuine medical issue—prevention strategies that target the early stages of drug addiction should be developed. Evaluation of the impact of such interventions is also important. Due to the changing patterns in the nature of opioid use; related harms; and regulatory interventions in response, ongoing monitoring of these different data sets will be critical.

The report also highlights gaps in opioid harm data, the lessons learnt from, and many benefits of, international collaboration.

Summary of findings

15.4 million prescription opioids were dispensed in 2016–17

Prescription opioids are commonly used in Australia with more than 15 million prescription opioids dispensed to 3.1 million people in 2016–17. The majority of prescriptions dispensed were for strong opioids with oxycodone being the most common type of opioid dispensed (5.7 million prescriptions dispensed to 1.3 million people).

When measured by OME, strong opioids accounted for 75% of prescription opioid use.

Women aged 65 and over were most likely to receive a prescription opioid, and females received 58% of all opioid prescriptions dispensed. People aged 65 and over received 44% of all opioid prescriptions dispensed.

Misuse of pharmaceutical opioids is more common than heroin use

More Australians have used *Pain-killers/analgesics and pharmaceutical opioids* for illicit or non-medical purposes in their lifetime than have used *Heroin*. While the percentage of Australians who have used *Heroin* in their lifetime has decreased over time, the percentage reporting illicit or non-medical use of *Pain-killers/analgesics and pharmaceutical opioids* in their lifetime has increased over time.

While *Heroin* remains the most common principal drug of concern for all opioid treatment services, between 2007–08 and 2016–17 there was a 36% decline in closed treatment episodes where *Heroin* was the principal drug of concern (from 15,571 to 9,988 closed treatment episodes).

By contrast, for the pharmaceutical opioids *Codeine* and *Oxycodone* there was a substantial increase in closed treatment episodes over the same period. Treatment episodes for *Codeine* doubled (from 628 to 1,233), and they tripled for *Oxycodone* (from 305 to 911). While pharmaceutical opioids account for only a small number of closed treatment services recorded, this could be due to unrecognised dependence following legitimate medical treatment, or stigma associated with seeking treatment for dependence (Cooper et al. 2018).

Opioid poisoning hospitalisations and opioid deaths have increased in recent times

Rates of hospitalisations with a principal diagnosis of opioid poisoning have increased over recent times. Although they are still lower than the peak in the late 1990s, rates of opioid deaths have also increased in recent times.

The rate of hospitalisations involving side effects of pharmaceutical opioid use has also increased over time.

This report also shows that pharmaceutical opioids are involved in far more opioid deaths and opioid poisoning hospitalisations than illegal opioids. In particular, *Naturally derived opioids* (which include codeine and oxycodone) were responsible for over half (52%) of hospitalisations with a principal diagnosis of opioid poisoning and were mentioned in 49% of opioid deaths. *Synthetic opioids*, such as fentanyl and tramadol, were responsible for a further 16% of hospitalisations with a principal diagnosis of opioid poisoning and were mentioned in 21% of opioid deaths. However, *Heroin* remained responsible for 20% of hospitalisations with a principal diagnosis of opioid poisoning and was mentioned in 32% of opioid deaths.

In 2016, deaths where *Synthetic opioids* are mentioned were 10 times as high as in 2007. Rates also rose over this period (by 2.7 times and 1.6 times, respectively) for deaths where *Heroin* and/or *Naturally derived opioids* are mentioned.

People in regional areas and lower socioeconomic groups have higher use of and harms from pharmaceutical opioids

People living in regional areas and from lower socioeconomic groups have higher rates of disease burden than those living in *Major cities* or from higher socioeconomic groups (AIHW 2016) which could contribute to an increased need for and use of opioids.

In 2016–17, the highest rate of prescriptions dispensed was in *Inner regional* areas. The rate of OME was also highest in *Inner regional* areas and lowest in *Very remote* areas.

While there was no difference by remoteness area in recent non-medical use of all opioids in 2016, non-medical use of *Pain-killers/analgesics and pharmaceutical opioids* was twice as high in *Remote and very remote* areas (6.6%) as in *Major cities* (3.3%) (AIHW 2017d).

Wastewater analysis from 2017 also shows that, for the pharmaceutical opioids oxycodone and fentanyl, consumption was at least twice as high in regional areas as it was in capital cities. By contrast, heroin consumption was higher in capital cities compared with regional areas.

In 2016–17, the rate of hospitalisations with opioid poisoning as the principal diagnosis was highest for people living in *Inner regional* areas, closely followed by people living in *Outer regional* areas, but lowest for those living in *Remote and very remote* areas.

Regional areas also had the highest rates of opioid deaths in 2016: the highest rate was 5.4 per 100,000 population in *Inner regional* areas, followed by *Outer regional* areas.

In 2016–17, people in the lowest socioeconomic group had the highest rates both of opioid prescriptions dispensed and of OME. Both measures decreased as socioeconomic group increased.

Those in the lowest socioeconomic group were also 1.8 times as likely to have used opioids for illicit or non-medical purposes, compared with those in the highest socioeconomic group.

In 2016–17, rates of ED and hospital presentations for opioid poisoning were twice as high for those in the lowest socioeconomic group, compared with those in the highest socioeconomic group. ED opioid dependence presentations also followed a clear socioeconomic gradient, but there was no clear difference by socioeconomic group for opioid dependence hospitalisations.

In 2016, rates of opioid deaths were 2.6 times as high for those in the lowest socioeconomic group, compared with those in the highest socioeconomic group.

Men aged 35–44 experienced some of the highest rates of opioid harm

Groups (by age and sex) that appeared to be at particular risk of opioid harm included:

- men aged 35–44—who experienced the highest rate of opioid deaths; the highest rates of ED presentations for opioid poisoning and opioid dependence; and the highest rates of hospitalisations with a principal diagnosis of opioid poisoning or opioid dependence
- females aged 15–24—who experienced the highest rate of hospitalisations with any diagnosis of opioid poisoning, most of which were by *Naturally derived opioids* (for example, codeine, oxycodone and morphine) and intentional self-poisonings
- older men and women—who experienced the highest rates of hospitalisations involving side effects of pharmaceutical opioid use.

Other research has shown that a large proportion of medical and non-medical prescription opioid users also have a history of a chronic medical condition or mental health problem (Roxburgh et al. 2011; Roxburgh et al. 2013b).

Multiple drug use is an area for further research

Although it was not a focus of this report, some of the report's findings highlight the use of opioids with other drugs. For example, for hospitalisations where opioid poisoning was an additional diagnosis, the top 5 principal diagnoses were other types of poisoning. The most common principal diagnosis was poisoning by *4-Aminophenol derivatives*, which includes paracetamol. For closed episodes of alcohol and other drug treatment services where opioids were the principal drug of concern, 21% included amphetamines as an additional drug of concern, while 19% included cannabis.

Both the use of multiple pharmaceutical drugs and the use of pharmaceutical drugs with illicit drugs pose potential harms. Treatment involving multiple pharmaceutical drugs may be useful for some conditions, or necessary when an individual has a number of comorbid conditions. But concurrent use of multiple pharmaceuticals also increases the risk of adverse drug interactions and side effects. This may in part explain the findings from this report that the greatest proportion of hospitalisations relating to opioids were from side effects of opioid use, and that the hospitalisation rate increased with increasing age.

Further research in this area is warranted to better understand the use of opioids with other drugs and the associated harms.

Box 7.1: Spotlight on codeine

Codeine is a weak opioid that was available in low doses over-the-counter at pharmacies in Australia until 1 February 2018. Codeine-based medicines are particularly susceptible to non-medical use and dependence as, until recently, they were readily available and can be addictive (Nielsen et al. 2010). Longer-term use of codeine-based medicines can cause significant harms, such as liver damage, gastric ulcers and even death (Nielsen et al. 2018; Robinson et al. 2010).

Between 2012–13 and 2016–17, codeine prescriptions dispensed declined slightly, from 3.8 million to 3.7 million, as did the number of individuals receiving them. However these numbers do not take into account the over-the-counter codeine available at the time—more than half of all codeine packs sold in Australia in 2013 were over-the-counter (Gisev et al. 2016).

While in 2016, non-medical use of *Over-the-counter codeine products* was the most common type of opioid reported, it is impossible to determine any changes over time from this survey due to changes in the survey (see Box 2.2).

Treatment for codeine dependence as the principal drug of concern using AOD treatment services or opioid substitution therapy is on the rise. Where *Codeine* was the principal drug of concern, AOD closed treatment service episodes doubled between 2007–08 and 2016–17, from 3.0% of all opioid-related episodes to 7.5% (AIHW 2018b), and where *Codeine* was the opioid drug of dependence, clients receiving opioid substitution therapy rose from 2.7% to 4.2% of all clients between 2014 and 2017 (AIHW 2018f). Codeine dependence can also be treated through a general practitioner, psychologist or other services, which may not be captured here. These data do not provide any indication of whether codeine dependence is based on over-the-counter or prescription products.

Hospital and deaths data are reported for *Naturally derived opioids*, which includes oxycodone and morphine in addition to codeine, so it is difficult to determine the current level of harm due to codeine (and over-the-counter codeine in particular) from these data sources. The National Coronial Information System includes information on the specific drug(s) mentioned in deaths that have been referred to a coroner. Research has shown that, between 2000 and 2009, the overall rates of codeine-related deaths more than doubled and were more likely to be due to accidental overdoses; however they were still less common than deaths related to heroin or strong (Schedule 8) opioids (Roxburgh et al. 2015).

What can be learnt from the collaboration with Canada?

The AIHW and CIHI worked together closely to enable the Australian and Canadian comparisons presented in this report.

The benefits of this collaboration have included:

- more detailed comparisons of opioid harm in Australia and Canada than were previously possible
- exchange of knowledge and ideas between countries
- a better understanding of the challenges involved in international comparisons.

Some of the challenges in comparing data from different countries, are:

- use of different terminology and different definitions
- uncertainty as to whether differences reflected real differences in the prevalence of opioid harm or reflected potential differences in how health systems work or how data were recorded
- unknown and unquantifiable differences in admission practices in EDs and hospitals.

Good communication between countries was important in facing these challenges and ensuring data were as comparable as possible.

What is being done to reduce opioid harm in Australia?

Several initiatives are already in place or under development to reduce opioid harm in Australia, involving both government and non-government organisations. Some of these are outlined below; however, the list is not exhaustive.

The National Drug Strategy

Since 1985, the National Drug Strategy (NDS) has provided the overarching framework for a consistent and coordinated approach to identifying national priorities related to alcohol, tobacco, and other drugs. The NDS 2017–2026 is the 7th iteration, and provides a framework to guide actions by governments (in partnership with service providers and the community) to minimise harm through effective demand, supply, and harm-reduction strategies.

The NDS 2017–2026 identifies opioids and non-medical use of pharmaceuticals among its priority substances (Department of Health 2017a). Evidence-informed approaches outlined in the NDS 2017–2026 that may be relevant to these substances include:

- increasing access to pharmacotherapy
- treatment services (inpatient, outpatient and community-based) and post treatment support programs
- strengthening data collection and analysis of sales and consumption of non-medically used pharmaceuticals
- building community knowledge of drug-related harms.

Other initiatives

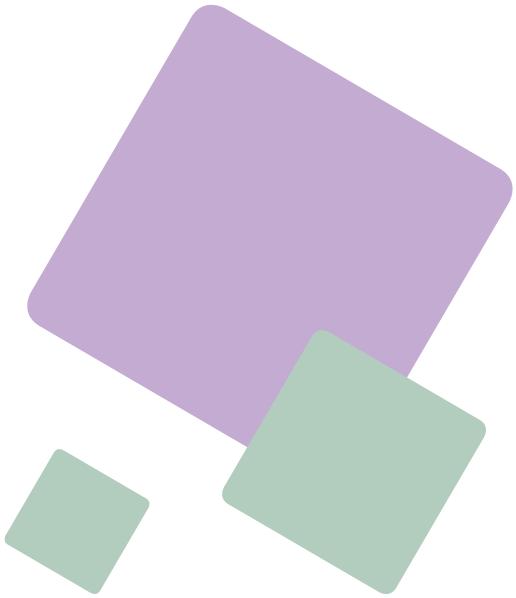
Other initiatives to reduce harm from opioids:

- The Australian Government committed $16 million in July 2017 for a national real-time monitoring system for select Schedule 8 medicines, including morphine and oxycodone. Real-time prescription monitoring aims to minimise 'doctor-shopping', by alerting doctors and pharmacists if patients have received multiple supplies of monitored medicines from other practitioners (TGA 2018a).
- From 1 February 2018, codeine became a prescription-only medicine in Australia. A report by KPMG, commissioned by the TGA, found that the change would be likely to result in decreased use of low-dose codeine and increased opportunities for doctors to consult on effective pain management (TGA 2016).
- The TGA also sought consultation in early 2018 on options for regulatory responses to prescription opioid use and misuse issues, with a proposed focus on higher-risk Schedule 8 opioids. Options for consideration included changes to pack sizes; a review of the indications for strong opioids; restrictions on who can prescribe higher dose products; and a review of label warnings (TGA 2018a).
- A tamper-resistant controlled-release oxycodone formulation was introduced with public subsidy in Australia in 2014 (Larance et al. 2018). The formulation makes tablets more difficult to crush or dissolve, potentially making intranasal or intravenous use more difficult.
- Publicly-funded alcohol and other drug treatment services are available in all states and territories, with treatment aims that can include reduction or cessation of drug use. Services are delivered in both residential and non-residential settings, and include detoxification, rehabilitation, counselling, and pharmacotherapy. Services cover both pharmaceutical and illicit drugs.
- Needle and syringe programs have operated in Australia since 1986 and operate in all states and territories (Iversen et al. 2017). The programs aim to reduce bloodborne viral infections and related impacts and provide clean injecting equipment, as well as information on reducing drug use, and referrals to other services. Needle and syringe programs operate in dedicated services, within existing health or community services, in community and retail pharmacies, and from syringe dispensing machines.
- Medically supervised injecting centres are facilities where injecting drug use is done under the supervision of qualified health professionals. Currently, Australia has 1 permanent operational centre in Kings Cross, Sydney, which was established on a trial basis in 2001 and made a permanent service by the New South Wales government in 2010. A second centre opened on a trial basis in North Richmond, Victoria in 2018.
- Pill testing has recently been introduced by the Australian Capital Territory government under the auspices of ACT Health, as a harm-reduction measure (ACT Health 2018b). The first trial of this service was undertaken at a 2018 music festival. State and territory governments outside the Australian Capital Territory have not yet committed to undertake pill testing at similar events.
- In 2016, the opioid agonist naloxone was made available over-the-counter in Australian pharmacies (Jauncey & Neilsen 2017). Naloxone can be administered to reverse the effects of an opioid overdose. Previously, naloxone could only be administered by medical professionals and paramedics, but pilot programs across Australia have been offering training to family and friends of opioid users to recognise symptoms of an overdose and administer naloxone.
- Take-home naloxone supply for overdose prevention.

What are the data gaps?

While this report provides information on opioid use and its harmful effects, data gaps remain. These include:

- an inability to determine how many opioid poisoning hospitalisations or opioid deaths involve specific opioids, such as fentanyl or codeine, because the current classification systems group some opioids together (for example, *Synthetic opioids* includes fentanyl, tramadol and pethidine)
- where codeine is involved, an inability to determine if opioid poisoning hospitalisations or opioid deaths involve over-the-counter or prescription codeine
- no requirement for cause of injury coding in the National Minimum Data Specifications of ED data, which limits the analysis of intent in opioid poisoning ED presentations
- possible issues with the quality of principal diagnosis coding in ED data, which limits the analysis of opioid type in opioid poisoning ED presentations
- an inability to determine, from PBS data, the indication for opioid use—for example, for cancer or non-cancer pain
- a lack of data on opioid use, opioid harm and effective responses to address these concerns in primary care.



Appendix A: Data sources and methods

Alcohol and Other Drug Treatment Services National Minimum Data Set

It is difficult to fully quantify the scope of alcohol and other drug services in Australia. There are a variety of settings in which people receive treatment for alcohol and other drug-related issues that are not in scope for this collection. These include agencies that do not receive any public funding; primarily provide accommodation (for example, sobering-up shelters); are based in correctional institutions; provide services primarily concerned with health promotion; are located in acute care/psychiatric hospitals, and only provide treatment to admitted patients; or have the sole function of prescribing or providing dosing services for opioid pharmacotherapy. These data are captured in the AIHW's National Opioid Pharmacotherapy Statistics Annual Data collection.

The AIHW collects AODTS NMDS data annually on closed episodes of treatment provided to clients of alcohol and other drug treatment services, drugs of concern and the types of treatment received. The AODTS NMDS counts completed treatment episodes provided to clients by in-scope alcohol and other drug treatment services. This includes all clients who had completed 1 or more treatment episodes at an alcohol and other drug treatment service that was in scope during the reference period.

The AODTS NMDS is a collection of data from publicly-funded treatment services in all states and territories, including those directly funded by the Department of Health. Publicly-funded alcohol and other drug treatment agencies collect the agreed data items and forward this information to the appropriate health authority—such as a state/territory health authority, contracted AOD organisation or the AIHW. Agencies are responsible for ensuring that the required information is accurately recorded. The AODTS NMDS does not cover all agencies that provide substance-use services to Aboriginal and Torres Strait Islander people. These agencies provide data to Online Services Report Collection.

For most states and territories, the data provided for the national collection are a subset of a more detailed jurisdictional data set used for planning at that level.

Data from the AODTS NMDS presented in this report, based on information about closed treatment episodes, are not directly comparable with data presented on persons—as a person may have multiple treatment episodes in a reference period. In the AODTS NMDS, data on people were not collected before 2012–13, so population rates are only presented for 2016–17.

A data quality statement for the AODTS NMDS is available at <http://meteor.aihw.gov.au/content/index.phtml/itemId/667446>.

National Drug Strategy Household Survey

The NDSHS is the leading national population-based survey of licit and illicit drug use in Australia. The 2016 survey was the 12th conducted under the auspices of the National Drug Strategy. Previous surveys were done in 1985, 1988, 1991, 1993, 1995, 1998, 2001, 2004, 2007, 2010, and 2013. The data collected through these surveys have contributed to the development of policies for Australia's response to drug-related issues.

The Department of Health commissioned the AIHW to manage the 2016 survey, and the AIHW commissioned Roy Morgan Research to collect the data.

In 2016, 23,772 people aged 12 and over gave information on their drug use patterns, attitudes, and behaviours (Table A1). The sample was based on households, so people who were homeless or institutionalised were not included in the survey (consistent with the approach in previous years). Most of the analyses are based on the population aged 14 and over (unless specified), as this allows consistent comparison with earlier survey results.

Table A1: National Drug Strategy Household Survey sample sizes

Survey year	Respondents
2016	23,772
2013	23,855
2010	26,648
2007	23,356
2004	29,445
2001	26,744
1998	10,030
1995	3,850
1993	3,500

NDSHS data cover a significant variety of people, and use a method that is powerful enough to enable generalisation of the results.

Not all population groups are included in the data—for example, people in institutional settings, hostels, or motels, or those who are homeless. Foreign language interviews are not done, and the survey is not specifically designed to obtain reliable national estimates for Indigenous Australians: it requires a good comprehension of the English language, as the questionnaire is self-completed.

In 2016, the NDSHS was unable to include remote Indigenous communities with relatively low levels of English literacy. The exclusion of these communities makes it difficult to generalise the results in the NDSHS to the whole Indigenous population.

The pharmaceutical use questions in the survey are designed to help respondents differentiate between legitimate, medical use, and non-medical use. For each class of pharmaceuticals, the respondent was asked whether they have ever used the drugs in question, and, if so, whether they have used them for 'non-medical purposes' or when 'not supplied to you medically'. Only those who answer 'yes' to the second question are counted as misusing pharmaceuticals. However, the questions rely on the respondents' self-reported behaviour, and on their understanding that they have used pharmaceuticals for non-medical purposes.

For this report '*Pain-killers/analgesics* and opioids' are referred to as *Pain-killers/analgesics and pharmaceutical opioids*, but might include the use of some non-opioid analgesics such as gabapentinoids.

Changes to pharmaceutical questions in the 2016 NDSHS

It is important to note that, in 2016, changes were made to the way the NDSHS captures non-medical use of *Pain-killers/analgesics and other opioids* to better reflect how these substances are used and understood in the community. These changes represent a break in the time series for both 'pain-killers/analgesics' and 'other opiates/opioids' and, because of this, making comparisons over time for these drug types is avoided. Where time series data are presented, pain-killers/analgesics and opioids data have been combined in earlier years but are still not directly comparable to 2016.

In 2016, the way the NDSHS captured non-medical use of *Pain-killers/analgesics and opioids* changed. Specifically:

- over-the-counter non-opioid analgesics, such as paracetamol and aspirin, were removed from the section, because they are not known to be misused for cosmetic purposes, to induce or increase a drug experience, or to increase performance
- the previously separate 'pain-killers/analgesics' and 'other opiates/opioids' sections of the survey were combined, to avoid capturing users of prescription pain-killer/opiates such as oxycodone in more than 1 section
- categories of analgesics are now defined by their most psychoactive ingredient, rather than their brand name, and brand names are only presented as examples, bringing the section in line with other pharmaceuticals captured in the survey
- there were no changes to the tranquillisers/sleeping pills, steroids, or methadone/buprenorphine sections of the questionnaire.

National Hospital Morbidity Database

Information on hospitalisations is taken from the National Hospital Morbidity Database (NHMD). In 2016–17, almost all public hospitals provided data for the NHMD. The exception was an early parenting centre in the Australian Capital Territory. The great majority of private hospitals also provided data, except for the private free-standing day hospital facilities and 1 overnight private hospital in the Australian Capital Territory.

Further information about the NHMD is available in *Admitted patient care 2016–17: Australian Hospital Statistics* (AIHW 2018a). A complete data quality statement for the NHMD is available online at <http://meteor.aihw.gov.au/content/index.phtml/itemId/612171>.

Classification of hospitalisation data

The hospitalisation data included in this report were extracted from the NHMD using a selection of codes from the International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian modification, 9th edition (ICD-10-AM) (ACCD 2014) (Table A2).

Table A2: Relationship between ICD-10-AM code and opioid hospitalisations

Opioid hospitalisation type	Example of opioids included	ICD-10-AM code/s
Opioid poisoning	All opioids	T40.0–T40.4 and T40.6
Opium	Opium	T40.0
Heroin	Heroin	T40.1
Naturally derived opioids	Oxycodone, codeine, morphine	T40.2
Methadone	Methadone	T40.3
Synthetic opioids	Fentanyl, tramadol	T40.4
Other and unspecified opioids	Other, unknown or not specified opioids	T40.6
Accidental opioid poisoning	All opioids	X42
Intentional opioid self-poisoning	All opioids	X62
Poisoning of undetermined intent	All opioids	Y12
Opioid dependence	All opioids	F11.2–F11.4
Other mental and behavioural disorders due to use of opioids	All opioids	F11.0, F11.1, F11.5–F11.7
Side effects of pharmaceutical opioid use	All opioids	Y45.0

Inclusions and exclusions

For all analyses, hospitalisations for which the care type was reported as *Newborn* with no qualified days, and records for *Hospital boarders* and *Posthumous organ procurement*, were excluded.

For analyses of opioid poisoning, opioid dependence, and other mental and behavioural disorders due to use of opioids, hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* were excluded. The purpose of this was to reduce counting of multiple episodes of care related to the same poisoning, dependence, or other mental and behavioural disorder.

For analyses of side effects of pharmaceutical opioid use, hospitalisations for which the mode of admission was *Admitted patient transferred from another hospital* were included. The purpose of this was to ensure that in-hospital events were captured.

Intent analyses

Intent, in the context of opioid poisoning relates to the intention or purpose underlying the poisoning by the poisoned individual. The intent of an opioid poisoning can be determined by using the external cause relating to the diagnosis captured in the NHMD. The 'external cause' is defined as the environmental event, circumstance or condition identified as the cause of the injury, poisoning and other adverse effect.

External causes relating to the intent of an opioid poisoning are:

- X42 (accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified)
- X62 (intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified)
- Y12 (poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified, undetermined intent).

Opioid poisoning as principal diagnosis

For analyses of intent where opioid poisoning was the principal diagnosis, intent was based on the first reported external cause. Hospitalisations with a principal diagnosis of opioid poisoning and a first reported external cause of:

- X42 were considered accidental
- X62 were considered intentional self-poisonings
- Y12 were considered to be of undetermined intent.

Cases for which there was no external cause, or a first reported external cause not in X42, X62 or Y12, were grouped as 'other'.

Opioid poisoning as any diagnosis

For analyses of intent where opioid poisoning was any diagnosis, intent was based on the first cause reported of the external cause codes X42, X62, Y12. Hospitalisations without an external cause of X42, X62 or Y12 were classified as having an intent of 'other'. Records with 2 of the above external cause codes were also classified as having intent of 'other'.

National Mortality Database

The National Mortality Database (NMD) holds records for deaths in Australia from 1964. The database comprises information about causes of death and other characteristics of the person, such as sex, age at death, area of usual residence and Indigenous status.

Data quality statements underpinning the NMD are in these Australian Bureau of Statistics (ABS) publications:

- ABS quality declaration summary for *Deaths, Australia* (ABS cat. no. 3302.0)
- ABS quality declaration summary for *Causes of death, Australia* (ABS cat. no. 3303.0).

Registration of deaths

In Australia, either a medical practitioner or a coroner is required to certify the cause of death. They should report on all medical conditions that directly caused, or contributed to, the death and, where appropriate, the circumstances (for example, the type of accident or violence) that led to the death. Important demographic information, such as the sex of the person and their age at death, is also reported.

All deaths are registered with the Registrars of Births, Deaths and Marriages in each state and territory and additional information about coroner-certified deaths are maintained by the National Coronial Information System. Demographic and other important information about the deceased person is captured on a deaths registration statement. (See Box A.1 for more details).

Box A.1: Roles and responsibilities of agencies that contribute to the development of national cause of death data in Australia

The **Registrars of Births, Deaths and Marriages (RBDMs)** in each jurisdiction are responsible for maintaining registers of deaths. Individual state and territory legislation governs the registration process and the roles and responsibilities of the registries.

The **National Coronial Information System (NCIS)** is a data storage, retrieval, analysis, interpretation and dissemination system for coronial information. It enables coroners, their staff, public sector agencies, researchers and other agencies to access coronial data to inform death and injury prevention activities. It contains data about deaths reported to an Australian coroner from July 2000 (from 1 January 2007 for Queensland), and to a New Zealand coroner from July 2007 (closed cases only), and is an initiative of the Australasian Coroners Society. The NCIS is managed by the Victorian Department of Justice on behalf of a board of management, and is based at the Coronial Services Centre in Southbank, Victoria.

The **Australian Bureau of Statistics (ABS)** is Australia's national statistical agency. The ABS provides key statistics on a wide range of economic, environmental and social issues. This includes information about the Australian population for which deaths information is required. The ABS also codes the causes of deaths to an international standard, making the data useable for statistical purposes. The ABS sources information about the circumstances of death for coroner-certified deaths from the NCIS, which facilitates coding of the cause of death. In addition to coding causes of death, the ABS enhances the statistical utility of the data by coding various sociodemographic data items, such as area of usual residence and country of birth.

The **Australian Coordinating Registry (ACR)** is an agency appointed for managing a particular activity on behalf of all RBDMs. A coordinating registry undertakes the coordination and management of the designated activity. The underlying legal responsibility is retained by the collective registrars.

Coding of causes of deaths

The ABS sources information about deaths and their causes from the RBDMs in each state and territory. The ABS compiles these data and codes the causes of death to an international standard called the *International Statistical Classification of Diseases and Related Health Problems* (ICD). Coding causes of death to an international standard enables the comparability of statistics over time and between countries.

The ICD is revised periodically and currently in its 10th revision (ICD-10). The ICD-10 has been used for Australian causes of death statistics since 1997 and comprises more than 14,000 causes of death and illness. Analysis of groups of causes is therefore more manageable than individual causes.

The coding produces an **underlying cause**—the disease or condition which initiated the sequence of events resulting in death—and, for most deaths, **associated causes** (any other diseases or conditions that contributed to the death but were not the underlying cause).

In this report, the deaths data presented are for those deaths where there is a mention of opioids in the 'associated cause' and the 'underlying cause' is 1 of those considered to be directly related to drugs; this methodology is consistent with the ABS methodology used for reporting on drug-induced deaths. The full list of underlying causes included in the analysis is available from the ABS website at <http://www.abs.gov.au/AUSSTATS/abs@.nsf/stproducts/3303.0Appendix22016?opendocument&tabname=Notes&prodno=3303.0&issue=2016&num=&view=>.

The majority of opioid deaths are from external causes specifying whether the death was accidental, intentional or of undetermined intent (Table A.3). There could also be 1 or more mentions of a specific type of opioid. ICD-10 codes used to determine whether these deaths were opioid-related are listed in Table A.3.

Caution must be used when interpreting numbers of heroin deaths, as heroin can be difficult to identify at toxicology. Heroin is rapidly metabolised by the body, and is converted to monoacetyl morphine (MAM) and then to morphine. (The presence of MAM indicates heroin use as opposed to morphine use). At times, toxicology is not able to determine MAM, and in these cases the death is coded to T40.2—*Other opioids*, as only the morphine derivative was identified (ABS 2017).

Table A3: Relationship between ICD-10 code and opioid deaths

Opioid death type	Examples of opioids included	ICD-10 code/s
Underlying causes		
Accidental opioid poisoning	All opioids	X42–X44
Intentional opioid poisoning	All opioids	X62–X64
All other causes	All opioids	See ABS 2017
Opioid poisoning types		
Opium	Opium	T40.0
Heroin	Heroin	T40.1
Naturally derived opioids	Oxycodone, codeine, morphine	T40.2
Methadone	Methadone	T40.3
Synthetic opioids	Fentanyl, tramadol	T40.4
Other and unspecified opioids	Other, unknown or not specified opioids	T40.6

For a more detailed description of the coverage and processing of deaths data, including deaths certified by the coroner, or coding of drug-induced deaths, refer to the Explanatory Notes in ABS Causes of death, Australia (ABS Catalogue No. 3303.0), which is available from the ABS website (ABS 2017).

National Non-admitted Patient Emergency Department Care Database (NNAPEDC)

Information on ED presentations is taken from the National Non-admitted Patient Emergency Department Care Database (NNAPEDC).

Further information about the NNAPEDC is available in *Emergency department care 2016–17: Australian Hospital Statistics*. A complete data quality statement for the NNAPEDC is available online at <https://www.aihw.gov.au/about-our-data/our-data-collections/national-hospitals-data-collection>.

Variables used in analyses in this report are outlined below. If not otherwise indicated, data elements were defined according to the 2016–17 definitions in the *National health data dictionary*, version 16 (AIHW 2012) (as summarised in the Glossary) and on METeOR <http://meteor.aihw.gov.au/content/index.phtml/itemId/612346>.

Classification of emergency department data

The emergency department data included in this report were extracted from the NNAPEDC using a selection of codes from the International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian modification (ICD-10-AM), 6th, 7th, 8th and 9th editions (ACCD 2014) and from the Systematized Nomenclature of Medicine—Clinical Terms—Australian version, Emergency Department Reference Set (SNOMED CT-AU EDRS) (Table A4).

Table A4: Relationship between ICD-10-AM code, SNOMED CT-AU EDRS code and opioid emergency department presentations

Opioid hospitalisation type	Examples of opioids included	ICD-10-AM code/s	SNOMED CT-AU EDRS code/s
Opioid poisoning	All opioids	T40.0–T40.4 and T40.6	11196001, 242828004, 297199006
Opioid dependence	All opioids	F11.2–F11.4	231477003
Other mental and behavioural disorders due to use of opioids	All opioids	F11.0, F11.1, F11.5–F11.7	Not applicable

Triage category

The triage category indicates the urgency of the patient's need for medical and nursing care. The category is usually assigned by an experienced registered nurse or medical practitioner at, or shortly after, the time of presentation to the emergency department. The triage category is assigned in response to the question: 'This patient should wait for medical assessment and treatment for no longer than…?'

The Australasian Triage Scale has 5 categories—defined in the *National health data dictionary*, version 16 (AIHW 2012)—that incorporate the time within which the patient should receive care. These categories are:

- *Resuscitation:* immediate (within seconds)
- *Emergency:* within 10 minutes
- *Urgent:* within 30 minutes
- *Semi-urgent:* within 60 minutes
- *Non-urgent:* within 120 minutes.

Proportion seen on time

The proportion *Seen on time* is the proportion of presentations for which the period waiting for commencement of clinical care was within the time specified in the definition of the triage category.

Seen on time categories are:

- *Seen on time*
- *Not seen on time*
- *Not stated*.

For the purposes of this report, a patient with a triage category of *Resuscitation* was considered to be *Seen on time* if the waiting time to commencement of clinical care was less than or equal to 2 minutes.

Arrival mode

The *Arrival mode* variable is a record of the mode of transport by which the patient arrived at the emergency department. These categories are:

- Ambulance—which includes road ambulance, air ambulance or helicopter rescue service
- Police or correctional services vehicle
- Other—which includes patients who walked into the emergency department, or came by private transport, public transport, community transport or taxi.

Episode end status

The *Episode end status* describes the status of the patient at the conclusion of the non-admitted patient episode in the emergency department. For the NMDS, the *Episode end status* can be reported as:

- *Admitted to this hospital* (either a short-stay unit, hospital-in-the-home, or non-emergency department hospital ward)
- *Departed without being admitted or referred to another hospital:* the patient left without being transferred to a short-stay unit, hospital-in-the-home, or other admitted patient care unit in this hospital or referred to another hospital
- *Referred to another hospital for admission:* emergency department stay completed—referred to another hospital for admission
- *Did not wait to be attended by a health-care professional*
- *Left at own risk:* the patient left after being attended by a health-care professional but before the non-admitted patient emergency department service episode was completed
- *Died in emergency department*
- *Dead on arrival:* a patient who was dead on arrival, and an emergency department clinician certified the death of the patient
- *Registered, advised of another health-care service, and left the emergency department without being attended by a health-care professional*.

Changes to 'Episode end status' for 2016–17

The status *Registered, advised of another health-care service, and left the emergency department without being attended by a health-care professional* was introduced into the *Episode end status* data element from 1 July 2016. As a result, the 2016–17 data presented for *Episode end status* are not comparable with the data reported in previous years.

Presentations should be reported as *Registered, advised of another health-care service, and left the emergency department without being attended by a health-care professional* if they underwent a clerical registration process, were provided with advice about another health-care service that could provide assessment and/or treatment of their condition, and left the emergency department without receiving clinical care, with the intention to seek assistance from another health-care service.

The health-care service to which the patient is referred may include primary care/general practitioner clinics; other clinics that provide specialised treatment (for example, mental health-care or drug and alcohol treatment); or other health services (such as the patient's usual general practitioner). The service may be co-located with the hospital in which the emergency department is located, or may be a separate facility.

National Opioid Pharmacotherapy Statistics Annual Data collection

The National Opioid Pharmacotherapy Statistics Annual Data (NOPSAD) collection provides information on clients accessing pharmacotherapy for the treatment of opioid dependence. Data were collected on a snapshot day in June 2017 (with the exception of Western Australia, where data were collected on a snapshot day in May 2017).

The NOPSAD collection is a set of jurisdictional data that includes information about:

- clients accessing pharmacotherapy for the treatment of opioid dependence
- prescribers participating in the delivery of pharmacotherapy treatment
- dosing sites providing pharmacotherapy drugs to clients.

State and territory governments use different methods to collect data about the clients, prescribers and dosing points associated with the opioid pharmacotherapy system. These methods are driven by differences between the states and territories in relation to legislation, information technology systems and resources. More information on the NOPSAD is available on the AIHW website at <https://www.aihw.gov.au/reports/alcohol-other-drug-treatment-services/nopsad-2017/notes>. The data quality statement can be viewed at <http://meteor.aihw.gov.au/content/index.phtml/itemId/686955>.

National Wastewater Drug Monitoring Program

The National Wastewater Drug Monitoring Program is an initiative of the Australian Criminal Intelligence Commission. Wastewater analysis is applied as a tool to measure and interpret drug use within national populations.

In December 2017, data were drawn from 45 sites nationally, covering approximately 54% of the population (around 12.7 million people). The 45 sites are categorised into either 'regional' or 'capital city.'

The principle underlying wastewater-based monitoring of drug use is that any given compound that is consumed (irrespective of whether it is swallowed, inhaled/smoked or injected) will subsequently be excreted from the body (either in the chemical form it is consumed and/or in a chemically modified form that is referred to as a metabolite). The excreted compound or metabolite will eventually arrive in the sewer system. Collectively, waste products in the sewer system arrive at a wastewater treatment plant where wastewater samples are collected over a defined sampling period. Measuring the amount of target compound in the wastewater stream allows for a back calculation factor to be applied to determine the amount of drug that was used over the collection period (ACIC 2018).

To obtain an estimate of drug use, representative samples are collected over a given period (typically 24 hours) using auto-samplers that collect time or flow proportional samples. Wastewater treatment plant operators provide assistance with collecting the samples from the influent auto-sampler (where the wastewater enters the treatment plants).

Collected samples are analysed in participating university laboratories.

A noted limitation of the March 2018 report (which reports use in December 2017) is that patterns of drug use over the sampling week were not able to be determined, as had been possible in previous reports.

A summary of the collection and analytical methodologies used in wastewater analysis and the quality-assurance measures undertaken by the Australian Criminal Intelligence Commission (ACIC) is given in the first National Wastewater Drug Monitoring Program report: <https://www.acic.gov.au/sites/g/files/net1491/f/national_wastewater_drug_monitoring_program_report_1_0.pdf?v=1490333695>.

Pharmaceutical Benefits Scheme data

The Australian Government subsidises the cost of prescription medicines through the Pharmaceutical Benefits Scheme (PBS) and the Repatriation Pharmaceutical Benefits Scheme (RPBS) for eligible war veterans and their dependants. Most prescriptions for general schedule medicines (Section 85) are dispensed through community pharmacies, but PBS-subsidised drugs are also available in private hospitals and through eligible public hospitals to patients on discharge and to day patients (in all jurisdictions except New South Wales and the Australian Capital Territory).

Some drugs are distributed under alternative arrangements, and come under section 100 of the *National Health Act 1953*. Examples are the highly specialised drugs program, the Opiate dependence treatment program (which includes opioids used in opioid substitution therapy) and general schedule medicines that are supplied directly to Indigenous patients via Aboriginal Health Services in remote areas of Australia.

Note that drugs used in the Opiate Dependence Treatment Program are provided under section 100 of the National Health Act 1953 and have been excluded from the analysis, as script-level data are not available for this program.

The PBS does not include:

- private prescriptions
- over-the-counter medicines
- medicines supplied to some public hospital inpatients.

Private prescriptions and low-dose codeine combinations sold over-the-counter are not included in the dataset (except for a limited number of low-dose codeine preparations subsidised through the RPBS).

Calculating number of persons receiving opioids

The number of persons receiving opioids is calculated by counting the number of people who had any opioid script dispensed to them in a given time period.

By age

A patient's birthday may occur within in a span of time captured by the PBS, and this may result in patient having 2 'ages' in the same period. For example, in the period 2016–17, a patient could be aged 34 at the time of script 1 and aged 35 at the time of script 2, due to a birthday. In this case, the age at the last date of dispensing was taken to be the age of that patient for all scripts dispensed in 2016–17 (that is, the patient is aged 35 for both script 1 and script 2 and is allocated into the age group 35–44, rather than both the 25–34 and 35–44 age group). This avoids double-counting patients with 2 different ages when analysing the data by age groups.

By population groups

Patients may also move address in a given time period, and therefore 1 patient could potentially have 2 postcodes in the same period. As with the approach for age group analysis, the patient's postcode at the last date of dispensing is taken to be the postcode for that patient for all scripts dispensed in 2016–17. This avoids double counting patients who moved to different postcodes (and may thus also move to a different remoteness level or socioeconomic grouping), when analysing data by remoteness area and socioeconomic groups.

Calculating defined daily dose and oral morphine equivalents

The defined daily dose (DDD) per 1,000 population, per day, was calculated using the following formula:

$$\text{DDD/1,000 population/day} = \frac{mass \times quantity \times number\ of\ pack\ dispensed}{DDD\ amount \times population \times days} \times 1{,}000$$

Where *mass* = mass or strength of the product:

Quantity = quantity in the pack supplied

DDD amount = WHO-assigned defined daily dose

Days = number of days in the reference period.

In this report, the DDDs per 1,000 population per day figure has been calculated from prescription data according to the methodology recommended by the Department of Health and described in the Australian Statistics of Medicines <http://www.pbs.gov.au/info/statistics/asm/asm-2015>.

For combination opioids, the World Health Organisation (WHO) method was used (WCCfDS 2017) where the DDD for the combination product was equal to the DDD for the main active ingredient identified by the Anatomical Therapeutic Chemical (ATC) code. For example, for the combination opioid 'codeine with paracetamol', the ATC5 code is N02AJ06, where N02A indicates that the main active ingredient is the opioid. The assigned DDD for the combination product is therefore 100mg, the WHO-assigned DDD for codeine.

In this report, the DDD/1,000 population/day includes both plain and combination products.

Calculation of OME is based on the DDD. It is a measure of the relative potency or amount of oral morphine required to achieve an equivalent analgesic effect. Each different formulation of each opioid will have a different conversion factor to obtain the equivalent mg dosage of oral morphine (Gisev et al. 2018).

The rate of OME doses per 1,000 population per day is calculated by multiplying the DDD for each formulation of each opioid by a conversion factor, then adding these together for a type of opioid to represent the rate of OME doses for that opioid.

$$OME/1{,}000\ population/day = DDD/1{,}000\ population/day \times conversion\ factor$$

Calculating by socioeconomic group and remoteness

All measures calculated are based on the patient's postcode as recorded in the PBS dataset, and not based on the prescriber's or dispenser's postcode.

Remoteness

For this analysis, the 2016 census remoteness areas were used. To calculate all measures by remoteness, the individual patient's postcode was mapped to 1 or more 2016 remoteness area/s using a '2017 postcode to 2016 remoteness area' concordance. Where a postcode crossed 2 remoteness areas, the number of events (for example, number of scripts) was allocated to each remoteness area according to the proportion of the postcode population that falls within that remoteness area.

Postcodes without a mapped remoteness area were excluded. Therefore, national totals should not be derived from remoteness levels.

Socioeconomic group

To calculate all measures by socioeconomic group, the individual patient's postcode was mapped to 1 or more Statistical Area Level 2 (SA2) using a '2016 postal areas to 2016 SA2' concordance. Where a postcode crossed SA2 boundaries, the number of events (for example, number of scripts) was allocated to each SA2 according to the proportion of the postcode population that falls within that SA2. Postcodes without a mapped SA2 area were excluded. The mapped SA2 data were then allocated a socioeconomic classification (quintiles are used in this report), based on the Index of Relative Socio-economic Disadvantage (IRSD) score. The IRSD score summarises the attributes of an area's population, such as low income, low educational attainment, high unemployment, and jobs in relatively unskilled occupations. Areas are then ranked by their IRSD score and are classified into groups based on their rank. Areas used in this report were calculated from ABS Statistical Area Level 1.

Any number of groups may be used: 5 is common, and if 5 are used, then the IRSD commonly describes the population living in the 20% of areas with the greatest overall level of disadvantage as 'living in the lowest socioeconomic group'. The 20% at the other end of the scale—the top fifth—is described as 'living in the highest socioeconomic group'.

SA2 without an allocated socioeconomic grouping were excluded. Therefore, national totals should not be derived from socioeconomic groups.

Methods

Crude and age-specific rates

Population estimates for 30 June at the beginning of the reporting period were used for crude rates.

Age-standardised rates

For comparisons within Australia (for example, over time or between population subgroups), the age-standardised rates presented in this report were calculated using the direct standardisation method and 5-year age groups, using a highest age group of 85 and over. Population estimates for 30 June at the beginning of the reporting period were used for the observed rates. The total Australian population for 30 June 2001 was used as the standard population against which expected rates were calculated.

For comparisons with Canada, the 2010 Organisation for Economic Co-operation and Development standard population (available at <http://stats.oecd.org/wbos/fileview2.aspx?IDFile=638c2ac2-5f0f-41ef-b2d9-2cfa1fd56429>) was used as the standard population against which expected rates were calculated.

Remoteness area classification

Data for the NMD and PBS are based on the 2016 Census remoteness area classification.

Remoteness areas used in NDSHS, AODTS NMDS, NHMD and NAPEDDC analysis are based on the ABS Australian Statistical Geography Standard Remoteness Structure 2011.

Socioeconomic group classification

Socioeconomic groups used in NHMD and NAPEDDC analyses are based on the ABS Socio-Economic Indexes for Areas (SEIFA) 2011. The groups are based on the Index of Relative Socio-economic Disadvantage scores for the SA2 of usual residence of the patient reported or derived for each separation. The '1—Lowest' group represents the areas containing the 20% of the national population with the most disadvantage, and the '5—Highest' group represents the areas containing the 20% of the national population with the least disadvantage.

Comparability of Australian and Canadian ED and hospital presentation data

Australia	Canada
The AIHW National Non-admitted Patient Emergency Department Care Database (NNAPEDC) has episode-level records for most persons presenting to public EDs in Australia. An emergency department presentation occurs following the arrival of the patient at the ED, and is the earliest occasion of being registered clinically or triaged. The principal diagnosis is the diagnosis established at the conclusion of the patient's attendance in an ED to be mainly responsible for occasioning the attendance. The quality of the information provided for ED principal diagnosis data has not been fully assessed. As a result, these data should be interpreted with caution. While there are fields for additional diagnoses, provision of these data is currently limited. There are no fields for external causes.	Canada's National Ambulatory Care Reporting System (NACRS) collects detailed diagnostic information in 3 provinces in Canada.
The AIHW National Hospital Morbidity Database (NHMD) has episode-level records for admitted patients from essentially all public and private hospitals in Australia. A hospital separation is a completed episode of admitted hospital care ending with discharge, death, or transfer, or a portion of a hospital stay starting or ending in a change to another type of care (for example, from acute care to rehabilitation). In this report, hospital separations are referred to as 'hospitalisations'. Hospitalisations data do not include episodes of non-admitted patient care in outpatient clinics or EDs. Patients in these settings might be admitted subsequently, with the care provided to them as admitted patients being included in the NHMD. The principal diagnosis is the diagnosis established, after study, to be chiefly responsible for occasioning the patient's episode of admitted patient care. An additional diagnosis is a condition or complaint that either coexists with the principal diagnosis or arises during the episode of care (reported if the condition affects patient management). An external cause is the environmental event, circumstance or condition that was the cause of injury, poisoning or adverse event.	CIHI's Hospital Morbidity Database (HMDB) has record-level information that is combined to create an episode for all public hospitals in Canada. Diagnostic information is collected and identified as existing prior to admission, post-admission, causal factor and optional existing but not contributing to patient management. Only pre- and post-admission diagnoses were included for these analyses. Coded but not contributing diagnoses were excluded. Please see the CIHI report (CIHI 2018) for more information on the Canadian data.

Sources: AIHW 2017c; AIHW 2017a; CIHI 2018; Australian Consortium for Classification Development 2017.

Glossary

acute intoxication: An intense condition that proceeds after the administration of closely related dose levels of a psychoactive substance (for example, drugs) and causes disturbances in level of cognition, consciousness, perception and other psychophysiological functions and responses.

additional diagnosis: A condition or complaint either coexisting with the principal diagnosis or arising during the episode of admitted patient care, episode of residential care or attendance at a health-care establishment.

additional drugs of concern: Clients receiving treatment for their own drug use nominate a principal drug of concern that has led to them to seek treatment, and any additional drugs of concern, of which up to 5 are recorded in the AODTS NMDS. Clients receiving treatment for someone else's drug use do not nominate drugs of concern.

age-standardisation: A set of techniques used to remove as far as possible the effects of differences in age when comparing 2 or more populations.

aspiration: Accidental sucking in of fluid or food particles into the lungs.

benzodiazepines: A commonly prescribed pharmaceutical to help people sleep, or to treat stress and anxiety.

care type: The care type defines the overall nature of a clinical service provided to an admitted patient during an episode of care (admitted patient care), or the type of service provided by the hospital for boarders or posthumous organ procurement (care other than admitted care). Admitted patient care consists of the following categories: Acute care, Rehabilitation care, Posthumous organ procurement, Hospital boarder, Palliative care, Geriatric evaluation and management, Psychogeriatric care, Maintenance care, Newborn care and Other admitted patient care.

cessation: The act of ending or stopping a behaviour. For example, stopping taking drugs.

closed treatment episode: A period of contact between a client and a treatment provider or team of providers. A treatment episode is 'closed' when treatment is completed, there has been no further contact between the client and the treatment provider for 3 months, or when treatment is ceased.

crude measure: A measurement that is not exact but can be useful or correct for general purposes.

emergency department presentation: see **patient presentation at emergency department**.

episode end status: The status of the patient at the end of the non-admitted patient emergency department service episode. (METeOR id: 616654 for the NAPEDC NMDS; METeOR id: 551305 for the NAPEDC NBEDS)

extrapolated: To estimate or predict a value outside a known or observed range based on values that are already known.

fentanyl analogue: A drug that has been designed to mimic the pharmacological effects of the original drug (fentanyl). These new analogues can be created as an attempt to avoid classification as illegal, or in response to policy restrictions on manufacturing and/or detection in standard drug tests.

hospital: Health-care facility established under Commonwealth, state, or territory legislation as a hospital or a free-standing day procedure unit, and authorised to provide treatment and/or care to patients. (METeOR id: 404245)

hypothermia: Abnormally low body temperature (below 35°C), whereby the body loses more heat than can be produced.

iatrogenic dependence: Drug dependence that has developed following medical treatment.

idiosyncratic reaction: An unpredictable adverse effect to a drug that does not usually occur in most patients.

non-medical use of pharmaceutical: The consumption of a prescription or over-the-counter drug for non-therapeutic purposes or other than directed by a registered health-care professional.

principal diagnosis: The diagnosis established, after study, to be chiefly responsible for occasioning an episode of patient care (hospitalisation), an episode of residential care or an attendance at the health-care establishment.

principal drug of concern: The main substance that the client stated led them to seek treatment from an alcohol and drug treatment agency.

patient presentation at emergency department: The presentation of a patient at an emergency department occurs following the arrival of the patient at the emergency department. It is the earliest occasion of being registered clerically, or triaged. (METeOR id: 471889)

pharmacotherapy: The treatment of disease and illnesses using pharmaceutical drugs.

opioid analgesic: A commonly prescribed pharmaceutical used for pain management, and as a substitution for treatment of heroin and other opioid dependence.

prescription-only medicine: Medicines that are only available to buy from approved providers (pharmacies) with a valid prescription from an approved prescriber (for example, a medical or dental practitioner).

remoteness area: A classification of the remoteness of a location using the Australian Statistical Geography Standard Remoteness Structure (2011). The Australian Statistical Geography Standard Remoteness Area is a geographical classification that defines locations in terms of remoteness, that is, the physical distance of a location from the nearest urban centre. (METeOR id: 531713)

respiratory depression: Characterised by slow or shallow breathing, which can result in inefficient gas exchange—in particular too little oxygen and too much carbon dioxide in the body (also referred to as hypoventilation).

respiratory failure: Inability of the lungs to perform gas exchange by transferring inhaled oxygenated air into the blood and carbon dioxide out of the blood for expiration.

schedule 8 controlled drug: These substances are available for use, but require restriction of manufacture, supply, distribution, possession and use, in order to reduce non-medical use and physical and psychological dependence.

stratify: Divide or arrange into classes, groups or social strata.

triage category: A category used in the emergency departments of hospitals to indicate the urgency of the patient's need for medical and nursing care. Patients will be triaged into 1 of 5 categories on the Australasian Triage Scale. The triage category is allocated by an experienced registered nurse or medical practitioner. (METeOR id: 474185)

treatment episode: The period of contact between a client and a treatment provider or a team of providers. Each treatment episode has 1 principal drug of concern and 1 main treatment type. If the principal drug or main treatment changes, then a new episode is recorded.

References

ABC 2017. Prescription killer: Australia's imminent fentanyl epidemic. Sydney: ABC. Viewed 1 August 2018, <http://www.abc.net.au/radionational/programs/backgroundbriefing/prescription-killer:-australias-imminent-fentanyl-epidemic/9180318#transcript>.

ABS (Australian Bureau of Statistics) 2017. Causes of death, Australia, 2016. ABS cat. no. 3303.0. Canberra: ABS.

ABS 2018. Australian Demographic Statistics, Dec 2017. ABS cat. no. 3101.0. Canberra: ABS.

ACCD (Australian Consortium for Classification Development) 2014. The International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian Modification (ICD-10-AM), 9th edn—Tabular list of diseases and Alphabetic index of diseases. Adelaide: Independent Hospital Pricing Authority.

ACIC (Australian Criminal Intelligence Commission) 2017. Illicit drug data report 2015–2016. Canberra: ACIC.

ACIC 2018. National Wastewater Drug Monitoring Program—Report 4, March 2018. Canberra: ACIC.

ACT Ambulance Service 2010. ACT Ambulance Service clinical management manual. Canberra: ACT Ambulance Service.

ACT Health 2018a. Alcohol and drug services. Canberra: ACT Health. Viewed 23 August 2018, <http://health.act.gov.au/our-services/alcohol-and-other-drugs/services>.

ACT Health 2018b. Pill testing in the ACT. Canberra: ACT Health. Viewed 6 June 2018, <http://www.health.act.gov.au/pilltesting>.

AIHW (Australian Institute of Health and Welfare) 2012. National Health Data Dictionary. Version 16. Cat. no. HWI 119. Canberra: AIHW.

AIHW 2016. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study series no. 3. Cat. no. BOD 4. Canberra: AIHW.

AIHW 2017a. Admitted patient care 2015–16: Australian hospital statistics. Health services series no. 75. Cat. no. HSE 185. Canberra: AIHW.

AIHW 2017b. Emergency department care 2016–17: Australian hospital statistics. Health services series no. 80. Cat. no. HSE 194. Canberra: AIHW.

AIHW 2017c. National Drug Strategy Household Survey 2016: detailed findings. Drug Statistics series no. 31. Cat. no. PHE 214. Canberra: AIHW.

AIHW 2017d. Non-medical use of pharmaceuticals: trends, harms and treatment: 2006–07 to 2015–16. Drug treatment series no. 30. Cat. no. HSE 195. Canberra: AIHW.

AIHW 2018a. Admitted patient care 2016–17: Australian hospital statistics. Health services series no. 84. Cat. no. HSE 201. Canberra: AIHW.

AIHW 2018b (in press). Alcohol and Other Drug Treatment Services in Australia 2016–17: key findings (web Tableau). Drug statistics series. Cat. no. HSE 200. Canberra: AIHW.

AIHW 2018c. Arthritis snapshot. Canberra: AIHW. Viewed 1 August 2018, <https://www.aihw.gov.au/reports/chronic-musculoskeletal-conditions/arthritis-snapshot/contents/arthritis>.

AIHW 2018d. Australia's health 2018. Australia's health series no. 16. AUS221. Canberra: AIHW.

AIHW 2018e. Impact of alcohol and illicit drug use on the burden of disease and injury in Australia: Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 17. Cat. no. BOD 19. Canberra: AIHW.

AIHW 2018f (in press). National opioid pharmacotherapy statistics annual data (NOPSAD) 2017 (web report). Cat. no. HSE 199. Canberra: AIHW.

Australian Consortium for Classification Development 2017. The International Statistical Classification of Diseases and Related Health Problems, tenth revision, Australian modification (ICD-10-AM/ACHI/ACS). 10th edn., Independent Hospital Pricing Authority, Darlinghurst, NSW.

Barrett SP, Meisner JR & Stewart SH 2008. What constitutes prescription drug misuse? Problems and pitfalls of current conceptualizations. Current Drug Abuse Reviews 1:255–62.

BC Centre for Disease Control 2017. The opioid overdose emergency. Vancouver: BC Centre for Disease Control. Viewed 1 August 2018, <http://www.bccdc.ca/resource-gallery/Documents/opioid%20od%20emergency%2020170606%20-%20Colour.pdf>.

Bendall JC, Simpson PM & Middleton PM 2011. Prehospital analgesia in New South Wales, Australia. Prehospital and Disaster Medicine 26:422–26.

Britt H, Miller GC, Bayram C, Henderson J, Valenti L, Harrison C et al. 2016a. A decade of Australian general practice activity 2006–07 to 2015–16. Sydney: University of Sydney Family Medicine Research Centre.

Britt H, Miller GC, Henderson J, Bayram C, Harrison C, Valenti L et al. 2016b. General practice activity in Australia 2015–16. Sydney: University of Sydney Family Medicine Research Centre.

Carnwath T & Merrill J 2002. Dose equivalents in opioid substitution therapy. The International Journal of Drug Policy 13(6):445–47.

CDC (Centers for Disease Control and Prevention) 2017. Opioid overdose. Atlanta: CDC. Viewed 17 July 2018, <https://www.cdc.gov/drugoverdose/data/index.html>.

Chang AK, Bijur PE, Esses D, Barnaby DP & Baer J 2017. Effect of a single dose of oral opioid and non-opioid analgesics on acute extremity pain in the emergency department: a randomized clinical trial. Journal of the American Medical Association 318(17):1661–67.

Chaparro LE, Furlan AD, Deshpande A, Mailis-Gagnon A, Atlas S & Turk DC 2013. Opioids compared to placebo or other treatments for chronic low-back pain. Cochrane Database of Systematic Reviews Aug 27(8):CD004959.

Chodoff P & Domino EF 1965. Comparative pharmacology of drugs used in neuroleptanalgesia. Anesthesia & Analgesia 44(5):558–63.

CIHI (Canadian Institute for Health Information) 2017a. National Health Expenditure Trends, 1975 to 2017. Ottawa, Ontario: CIHI.

CIHI 2017b. Opioid-related harms in Canada. Ottawa, Ontario: CIHI.

CIHI 2018. Types of opioid harms in Canadian hospitals: comparing Canada and Australia. Ottawa, Ontario: CIHI.

Clark AK, Wilder CM & Winstanley EL 2014. A systematic review of community opioid overdose prevention and naloxone distribution programs. Journal of Addiction Medicine 8(3):153–63.

Cooper S, Campbell G, Larance B, Murnion B & Nielsen S 2018. Perceived stigma and social support in treatment for pharmaceutical opioid dependence. Drug and Alcohol Review 37(2):262–72.

Currow DC, Phillips J & Clark K 2016. Using opioids in general practice for chronic non-cancer pain: an overview of current evidence. Medical Journal Australia 204:305–09.

Degenhardt L, Day C & Hall W 2004. The causes, course and consequences of the heroin shortage in Australia. Sydney: University of NSW National Drug & Alcohol Research Centre.

Degenhardt L, Gisev N, Cama E, Nielsen S, Larance B & Bruno R 2016. The extent and correlates of community-based pharmaceutical opioid utilisation in Australia. Pharmacoepidemiology and Drug Safety 25(5):521–38.

Department of Health 2010. Nurse practitoner PBS prescribing: medicines which may be prescribed by authorised nurse practitioners. Canberra: Department of Health. Viewed 20 December 2017, <https://www.pbs.gov.au/browse/nurse>.

Department of Health 2016a. The Pharmaceutical Benefits Scheme. Canberra: Department of Health. Viewed 10 January 2017, <www.pbs.gov.au/pbs/home>.

Department of Health 2016b. Australian statistics on medicines 2015. Canberra: Department of Health. Viewed 28 August 2018, < http://www.pbs.gov.au/info/statistics/asm/asm-2015>.

Department of Health 2017a. National Drug Strategy 2017–2026. Canberra: Department of Health.

Department of Health 2017b. Nurse practitioner PBS prescribing. Canberra: Department of Health. Viewed 20 December 2017, < https://www.pbs.gov.au/browse/nurse?initial=z>.

Drug and Alcohol Services South Australia 2017. What is heroin? Adelaide: SA Health. Viewed 4 December 2017, <http://www.sahealth.sa.gov.au/wps/wcm/connect/ca4209804f50b879ad87ed330cda8a00/What+is+heroin+%2800504%29+2017.pdf?MOD=AJPERES&CACHEID=ca4209804f50b879ad87ed330cda8a00&CACHE=NONE>.

Gibson A, Degenhardt L, Topp L, Day C, Hall W, Dietze P et al. 2003. Global and Australian heroin markets. Sydney: University of NSW National Drug and Alcohol Research Centre.

Gisev N, Nielsen S, Cama E, Larance B, Bruno R & Degenhardt L 2016. An ecological study of the extent and factors associated with the use of prescription and over-the-counter codeine in Australia. European Journal of Clinical Pharmacology 72(4):469–94.

Gisev N, Pearson S-A, Karanges EA, Larance B, Buckley NA, Larney S et al. 2018. To what extent do data from pharmaceutical claims under-estimate opioid analgesic utilisation in Australia? Pharmacoepidemiology and Drug Safety 27:550–55.

Global Burden of Disease Collaborative Network 2017. Global Burden of Disease Study 2016 results. Seattle: Institute for Health Metrics and Evaluation. Viewed 19 March 2018, <http://ghdx.healthdata.org/gbd-results-tool>.

Government of Canada 2018a. Harm Reduction: Canadian Drugs and Substances Strategy. Ottawa: Government of Canada. Viewed 23 August 2018, <https://www.canada.ca/en/health-canada/services/substance-use/canadian-drugs-substances-strategy/harm-reduction.html>.

Government of Canada 2018b. Drug Analysis Service: Summary report of samples analysed 2017. Ottawa: Government of Canada,. Viewed 1 August 2018, <https://www.canada.ca/en/health-canada/services/health-concerns/controlled-substances-precursor-chemicals/drug-analysis-service/2017-drug-analysis-service-summary-report-samples-analysed.html>.

The Guardian 2018. Fentanyl drug deaths rise by nearly a third in England and Wales. The Guardian. Viewed 5 September 2018, <https://www.theguardian.com/society/2018/aug/06/fentanyl-drug-deaths-rise-nearly-third-england-wales?CMP=Share_AndroidApp_%2BBlueMail>.

Harrison CM, Charles J, Henderson J & Britt H 2012. Opioid prescribing in Australian general practice. Medical Journal of Australia 196:380–81.

Hartman H 2015. Risk factors for iatrogenic opioid dependence: an Australian perspective. Australian Medical Student Journal 6(2):23–25.

International Narcotics Control Board 2017. Narcotic drugs: report 2017. Estimated world requirements for 2018: statistics for 2016. Vienna: INCB. Viewed 19 July 2018, <https://www.incb.org/incb/en/narcotic-drugs/Technical_Reports/2017/narcotic-drugs-technical-report-2017.html>.

Iversen J, Linsen S, Kwon JA & Maher L 2017. Needle Syringe Program National Minimum Data Collection: national data report 2016. Sydney: Kirby Institute, University of NSW.

Jauncey ME & Neilsen S 2017. Community use of naloxone for opioid overdose. Australian Prescriber 40(4):137–40.

Karanges EA, Blanch B, Buckley NA & Pearson S-A 2016. Twenty-five years of prescription opioid use in Australia: a whole-of-population analysis using pharmaceutical claims. British Journal of Clinical Pharmacology 82(1):255–67.

Karanges EA, Buckley NA, Brett J, Blanch B, Litchfield M, Degenhardt L et al. 2018. Trends in opioid utilisation in Australia, 2006–2015: insights from multiple metrics. Pharmacoepidemiology and Drug Safety 27(5):504–12.

Krebs E, Gravely A, Nugent S, Jensen AC, DeRonne B, Goldsmith ES et al. 2018. Effect of opioid vs nonopioid medications on pain-related function in patients with chronic back pain or hip or knee osteoarthritis pain: the SPACE randomized clinical trial. JAMA 319(9):872–82.

Larance B, Dobbins T, Peacock A, Ali R, Bruno R, Lintzeris N et al. 2018. The effect of a potentially tamper-resistant oxycodone formulation on opioid use and harm: main findings of the National Opioid Medications Abuse Deterrence (NOMAD) study. The Lancet Psychiatry 5(2):155–66.

Latimer J, Ling S, Flaherty I, Jauncey M & Salmon AM 2016. Risk of fentanyl overdose among clients of the Sydney Medically Supervised Injecting Centre. International Journal of Drug Policy 37:111–14.

Monheit B, Pietrzak D & Hocking S 2016. Prescription drug abuse—a timely update. Australian Family Physician 45(12): 862–66.

Nielsen S, Cameron J & Pahoki S 2010. Over the counter codeine dependence. Richmond: Turning Point Drug and Alcohol Centre.

Nielsen S, MacDonald T & Johnson JL 2018. Identifying and treating codeine dependence: a systematic review. Medical Journal of Australia 208(10):451–61.

North & West Homelessness Networks 2017. National list of private and public AOD detox and rehab services. Collingwood: North & West Homelessness Networks. Viewed 28 August 2018, <http://www.nwhn.net.au/news_details.aspx?newsID=4741&startingrecord=0&category=[ALL]&year=[ALL]>.

NPS MedicineWise 2018. Chronic pain: opioids and beyond. Surry Hills: NPS MedicineWise. Viewed 7 June 2018, <https://www.nps.org.au/cpd/activities/chronic-pain-opioids-and-beyond>.

NSW Department of Health 2008. Drug and Alcohol Withdrawal Clinical Practice Guidelines—NSW. Sydney: NSW Department of Health.

Otterstatter MC, Crabtree A, Dobrer S, Kinniburgh B, Klar S, Leamon A, et al. 2018. Patterns of health care utilization among people who overdosed from illegal drugs: a descriptive analysis using the BC Provincial Overdose Cohort. Health Promotion and Chronic Disease Prevention in Canada. 38(9):328-333.

Penington Institute 2017. Australia's annual overdose report 2017. Carlton, Victoria: Penington Institute.

Public Health Agency of Canada 2018. National report: apparent opioid-related deaths in Canada (January 2016 to December 2017) Canada: Public Health Agency of Canada. Viewed 5 September 2018, <https://www.canada.ca/en/public-health/services/publications/healthy-living/national-report-apparent-opioid-related-deaths-released-june-2018.html#a2.3>.

Quan H, Moskal L, Forster A, Brien S, Walker R, Romano PS et al. 2014. International variation in the definition of 'main condition' in ICD-coded health data. International Journal for Quality in Health Care 26(5):511–15.

RACGP (Royal Australian College of General Practitioners) 2017. Prescribing drugs of dependence in general practice. East Melbourne: RACGP. Viewed 7 June 2018, <https://www.racgp.org.au/your-practice/guidelines/drugs-of-dependence-c/>.

Robinson GM, Robinson S, McCarthy P & Cameron C 2010. Misuse of over-the-counter codeine-containing analgesics: dependence and other adverse effects. The New Zealand Medical Journal 123(1317):59–64.

Roxburgh A, Bruno R, Larance B & Burns L 2011. Prescription of opioid analgesics and related harms in Australia. Medical Journal of Australia 195(5):280–84.

Roxburgh A, Burns L, Drummer OH, Pilgrim JL, Farrell M & Degenhardt L 2013a. Trends in fentanyl prescriptions and fentanyl-related mortality in Australia. Drug and Alcohol Review 32(3):269–75.

Roxburgh A, Hall WD, Burns L, Pilgrim J, Saar E, Nielsen S et al. 2015. Trends and characteristics of accidental and intentional codeine overdose deaths in Australia. Medical Journal of Australia 203(7):29.

Roxburgh A, Ritter A, Slade T & Burns L 2013b. Trends in drug use and related harms in Australia, 2001 to 2013. Sydney: National Drug and Alcohol Research Centre.

Royal Australasian College of Physicians 2009. Prescription Opioid Policy: Improving management of chronic non-malignant pain and prevention of problems associated with prescription opioid use. Sydney: RACP.

Statistics Canada 2018. Report on the demographic situation in Canada. Ottawa: Statistics Canada. Viewed 1 August 2018 <https://www150.statcan.gc.ca/n1/pub/91-209-x/91-209-x2018001-eng.htm>.

TGA (Therapeutic Goods Administration) 2016. Economic modelling and financial quantification of the regulatory impact of proposed changes to codeine scheduling. Canberra: TGA.

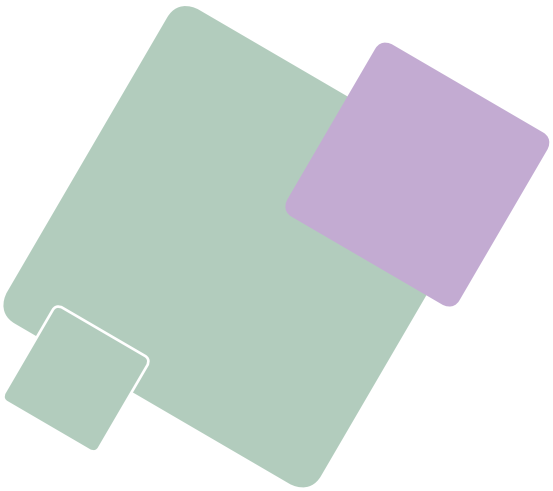
TGA 2018a. Prescription strong (Schedule 8) opioid use and misuse in Australia—options for a regulatory response. Canberra: TGA.

TGA 2018b. TGA opens consultation on the use of prescription opioids for pain. Canberra: TGA. Viewed 8 May 2018, <https://www.tga.gov.au/media-release/tga-opens-consultation-use-prescription-opioids-pain>.

UNODC (United Nations Office on Drugs and Crime) 1953. The opium alkaloids. Vienna: UNODC. Viewed 1 August 2018, <https://www.unodc.org/unodc/en/data-and-analysis/bulletin/bulletin_1953-01-01_3_page005.html>.

WCCfDS (WHO Collaborating Centre for Drug Statistics Methodology) 2017. Guidelines for ATC classification and DDD assignment 2018. Oslo: WCCfDS.

List of tables



List of figures

Related publications

The following AIHW publications relating to opioid harm might also be of interest:

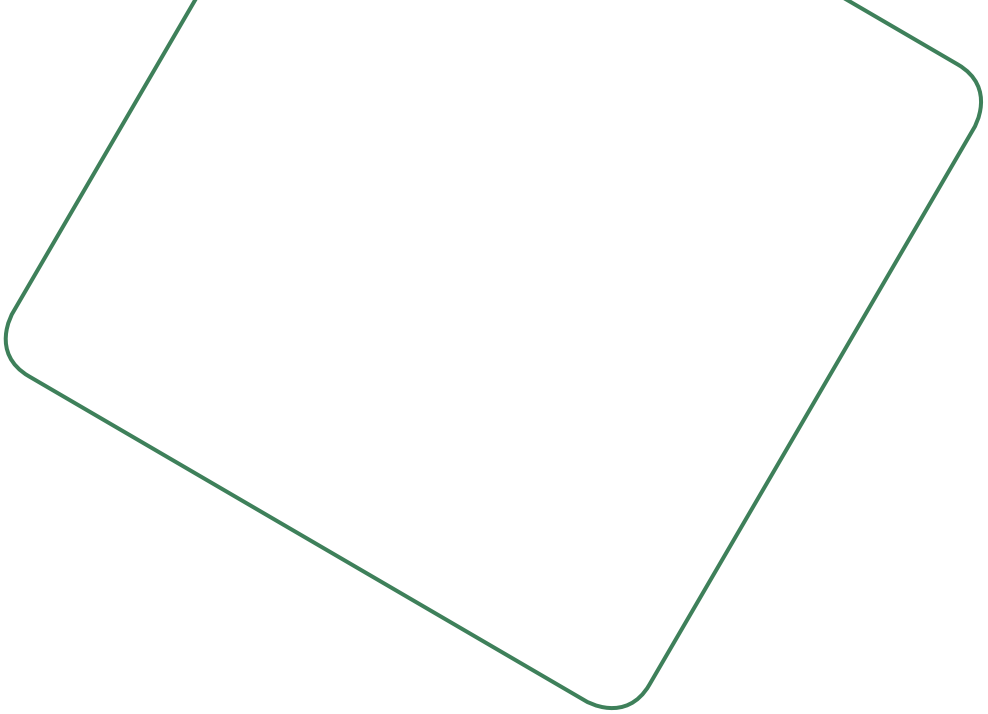
AIHW 2017. National Drug Strategy Household Survey detailed report 2016. Drugs statistics series no. 13. Cat. no. PHE 214. Canberra: AIHW.

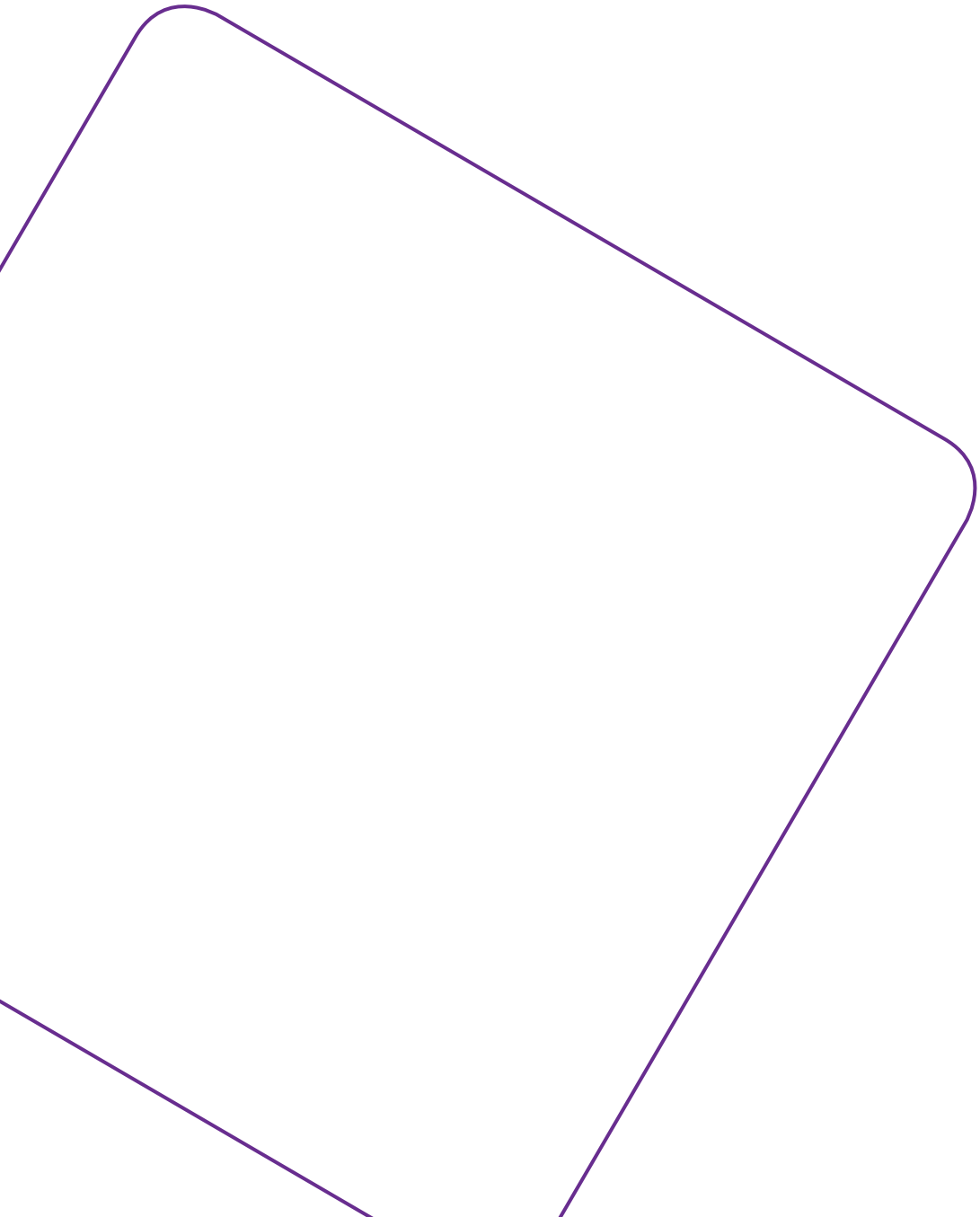
AIHW 2017. Non-medical use of pharmaceuticals: trends, harms and treatment 2006–07 to 2015–16. Drug treatment series no.20. Cat. no. HSE 195. Canberra: AIHW.

AIHW 2018. Alcohol and Other Drug Treatment Services in Australia 2016–17: key findings (web Tableau). Drug statistics series. Cat. no. HSE 200. Canberra: AIHW.

AIHW 2018. Impact of alcohol and illicit drug use on the burden of disease and injury in Australia: Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 17. Cat. no. BOD 19. Canberra: AIHW.

AIHW 2018. National opioid pharmacotherapy statistics annual data (NOPSAD) 2017 (web report). Cat. no. HSE 199. Canberra: AIHW.





Opioid use and its associated harms is an issue of great public health interest, both within Australia and internationally. This report shows that rates of opioid harms are an issue in both Australia and Canada. Rates of opioid deaths and hospitalisations in Australia increased in the last 10 years. In 2016, pharmaceutical opioids were involved in more opioid deaths and opioid poisoning hospitalisations than heroin.

aihw.gov.au

AIHW

Stronger evidence,
better decisions,
improved health and welfare