

## TRENDS IN DRUG-INDUCED DEATHS IN AUSTRALIA, 1997-2017

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### Key findings:

- Preliminary estimates indicate that there were 1,795 drug-induced deaths among Australians in 2017 (1,591 drug-induced deaths among Australians aged 15-64 years). The number of drug-induced deaths in 2017 is similar to the peak in deaths observed in the late 1990s.
- The rate of drug-induced deaths has been increasing but has not reached the rate observed in 1999 (13.2 versus 9.8 deaths per 100,000 people aged 15-64 in 1999 versus 2017, respectively).
- Consistent with previous years, most drug-induced deaths (72%) in 2017 among Australians aged 15-64 years were considered accidental; one in five (20%) were intentional (68% and 25% for Australians all ages, respectively).
- Higher rates of drug-induced deaths were observed among males than females in 2017 (13.0 versus 6.7 deaths per 100,000 people aged 15-64; 9.4 versus 5.2 deaths per 100,000 all ages), consistent with previous years.
- There has been a shift over time to higher rates of drug-induced deaths in older age groups among both males and females. In 2017, the highest rate of drug-induced deaths among females occurred among the 45-54 age group (10.5 deaths per 100,000 people) and among males in the 35-44 age group (20.9 deaths per 100,000 people).
- Opioids are the main drug cited in drug-induced deaths occurring in Australians aged 15-64 (1,084 deaths, 6.7 deaths per 100,000 people; 1,171 deaths all-ages).
- There are increasing rates of deaths involving other drugs in recent years. In particular, increasing drug-induced deaths involving psychotropic medicines (e.g., benzodiazepines, antipsychotics) and non-opioid medicines used for treatment of certain pain conditions (e.g., pregabalin) are of concern.
- Natural and semi-synthetic opioids (e.g., morphine, oxycodone) have been the most commonly cited opioids in drug-induced deaths throughout monitoring. There have been particular increases in deaths involving heroin and synthetic opioids (e.g., fentanyl) over the past decade.
- Deaths attributed to amphetamine (e.g., methamphetamine, MDMA) have increased since 2010 (93 deaths, 0.6 deaths per 100,000 people aged 15-64 in 2017; 94 deaths all-ages).

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## Background

This bulletin reports on all drug-induced deaths (i.e., deaths directly attributable to drug use) in Australia from 1997-2017. Data were accessed from the [Australian Bureau of Statistics \(ABS\)](#). Full details of [methods](#) are available for download; [this document](#) and the [ABS Explanatory Notes](#) should be read alongside this bulletin.

Data presented here reflect key findings for Australians aged 15-64 years unless otherwise indicated (e.g., some estimates are 'all-ages' estimates the total population). The ABS undertake a revision process for coroner-certified deaths over a 3-year period; accordingly, data for 2016 and 2017 are not final.

We provide estimates of drug-induced deaths (e.g., overdose) directly attributable to use of *illicit drugs* (e.g., heroin), some *prescription medicines* (that may be prescribed to the individual or obtained via other means) and some *medicines available over-the-counter*. We have excluded deaths attributed to alcohol or tobacco use. These figures do not include deaths from adverse events from medicines or accidents caused by being under the influence of a drug.

Where possible, we have reported on deaths attributed to opioids, amphetamines, and cocaine as per [previous reporting](#). It is important to note many drug-induced deaths involve more than one drug (including alcohol), and sometimes it is not possible to determine one substance as the primary cause of death.

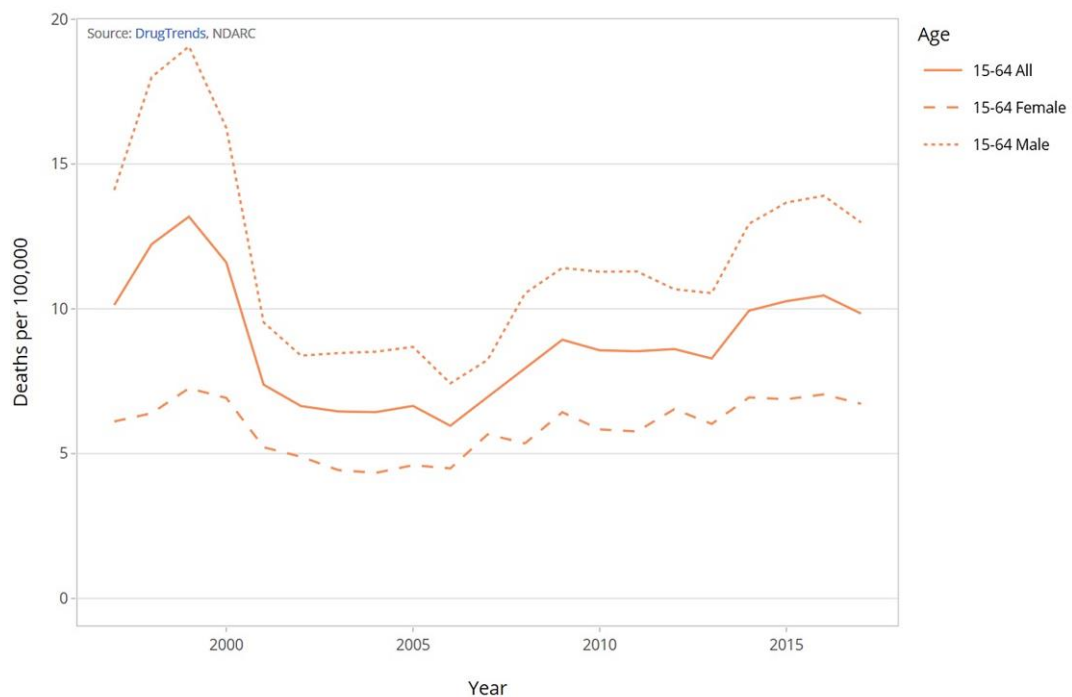
We have discussed select trends of interest identified in feedback from stakeholders in the panels (Panel A: trends in drug-induced deaths involving pregabalin; Panel B: trends in deaths involving fentanyl). An accompanying public [online interactive data visualisation](#) also allows viewers to disaggregate data in many different ways, and to download these images. This visualisation allows viewers to look at trends by drug, jurisdiction, sex, age group and intent, and as numbers or rates per 100,000 or 1,000,000 population.

## Findings

### Trends in Drug-Induced Deaths among Australians

In 2017, there were [1,591 drug-induced deaths](#) among Australian adults aged 15-64 years (1,795 drug-induced deaths in the total population). This equates to 9.8 deaths per 100,00 people aged 15-64 years (7.3 deaths per 100,000 people in the total population).

There was a peak in drug-induced deaths in the late 1990s, followed by a decline in the early-mid 2000s (**Figure 1**). Since 2006, drug-induced deaths in Australia have increased. The number of deaths recorded each year from 2014-2017 has been similar to the number observed during the earlier peak in drug-induced deaths in the late 1990s. The rate of drug-induced deaths was also high in recent years but has not reached the level observed in the late 1990s (13.2 versus 9.8 deaths per 100,000 people aged 15-64 in 1999 versus 2017, respectively).



**Figure 1. Rate of drug-induced deaths per 100,000 people for the Australian population aged 15-64 years, by sex, 1997-2017**

The estimated number of drug-induced deaths among adults aged 15-64 did not increase from 2016 to 2017 (1,670 versus 1,591 deaths or 10.5 deaths versus 9.8 deaths per 100,000 people). It is important to note that estimates for both these years are still subject to revision.

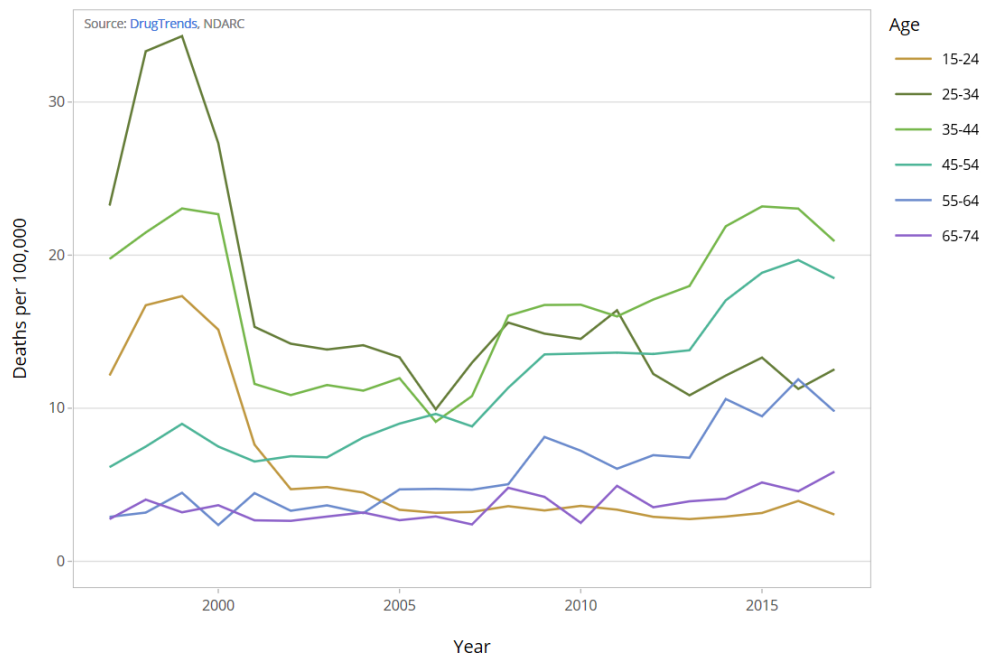
### Age and Sex Profile of Drug-Induced Deaths

In 2017, the rate of drug-induced deaths in males aged 15-64 was double that of females (13.0 deaths versus 6.7 deaths per 100,000 people; 9.4 deaths versus 5.2 deaths per 100,000 people all ages). There were 1,045 drug-induced deaths among males and 546 deaths among females aged 15-64 (1,148 and 647 all-ages, respectively). Drug-induced deaths were most common among those aged 35-44 (14.9 deaths per 100,000 people) and 45-54 (14.4 per 100,000 people), and least common amongst those aged 15-24 years (2.4 deaths per 100,000 people).

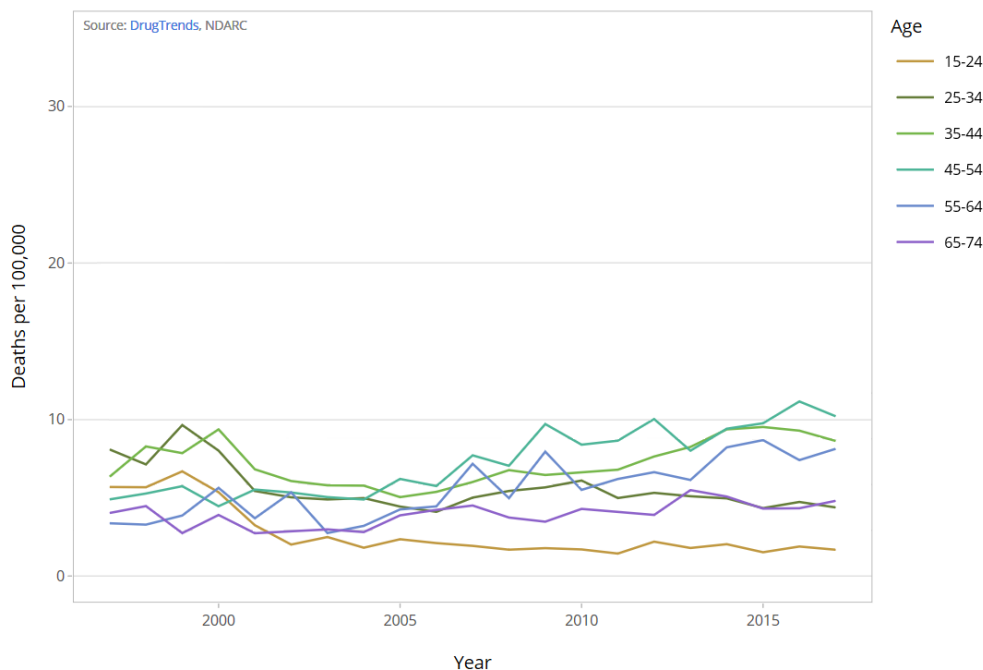
In the late 1990s, deaths were most common among males aged 25-34. There has been a shift over time to higher rates of drug-induced death among males in older age groups. Specifically, higher rates have been observed in the 35-44 age group since 2008 and among the 45-54 age group since 2012 (relative to the rate for the 25-34 age group; **Figure 2**).

Females have shown a similar trend however, the rate of drug-induced deaths in 2017 was highest among females aged 45-54 (10.5 deaths per 100,000 people), whilst the rate was highest among males aged 35-44 (20.9 deaths per 100,000 people). The gap in rate of drug-induced deaths between males and females lessened with older age in 2017.

## A. Male



## B. Female



**Figure 2. Rate of drug-induced deaths per 100,000 people for males (A) and females (B), by age group, 1997-2017**

### Intent of Drug Induced Deaths

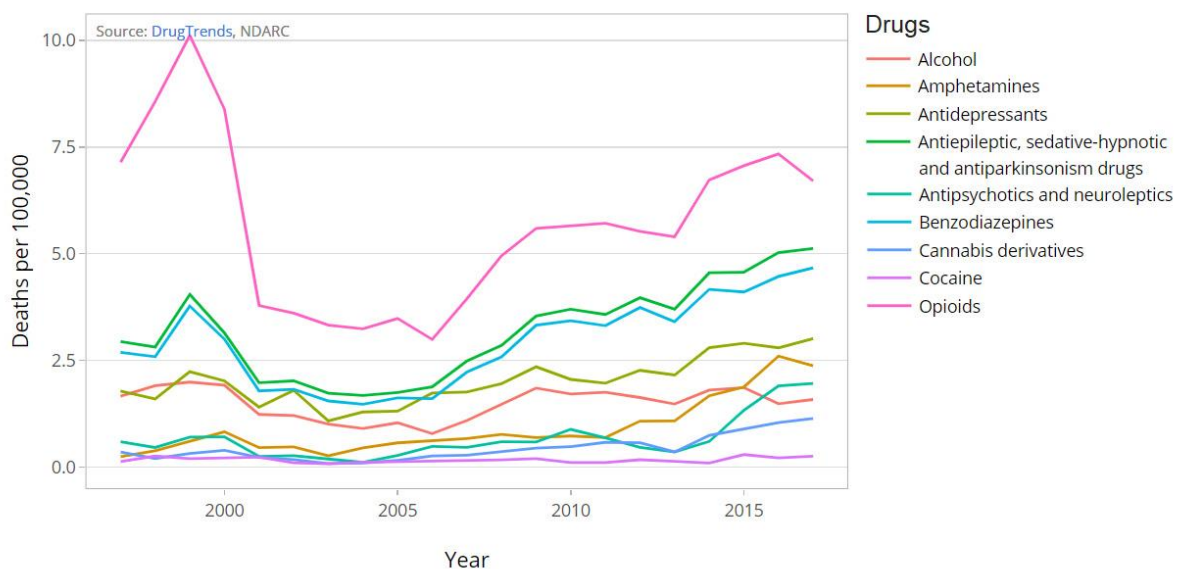
The rate of accidental drug-induced deaths among adult Australians aged 15-64 has been consistently higher than intentional drug-induced deaths (7.1 deaths versus 2.0 per 100,000 people in 2017). Three-quarters (72%) of drug-induced deaths among Australians aged 15-64 were considered accidental and 20% intentional (68% accidental and 25% intentional for all-ages). Approximately one in seven (15%) drug-induced deaths among males aged 15-64 were intentional (78% accidental, 7% undetermined intent), while one-third (31%) among females aged 15-64 were intentional (60% accidental, 9% undetermined intent).

### Drug-Induced Deaths by Jurisdiction of Usual Residence

In 2017, the largest number of deaths among adults aged 15-64 was reported in NSW (496 people; 563 all-ages), followed by VIC (392 deaths; 432 all-ages), and QLD (301 deaths; 337 all-ages). The highest rate was observed in WA (12.7 deaths per 100,000 people aged 15-64). The rate of deaths in other jurisdictions (excluding NT) were similar (9.3-10.6 deaths per 100,00 people aged 15-64).

### Drugs Involved in Drug-Induced Deaths

The following findings relate to drugs identified in toxicology reports as being present in the person's system and contributory to that death. Multiple drugs can contribute to a drug-induced death. In 2017, the most common class of drug involved in drug-induced deaths among Australians aged 15-64 was opioids, with 1,084 deaths at a rate of 6.7 deaths per 100,000 people (1,117 deaths all-ages; **Figure 3**). This was followed by antiepileptic, sedative-hypnotic and anti-parkinsonism drugs (828 deaths, 5.1 deaths per 100,00 people 15-64; 925 deaths all-ages), which predominantly comprised benzodiazepines (755 deaths, 4.7 deaths per 100,00 people aged 15-64; 824 deaths all-ages).



**Figure 3. Rate of drug-induced deaths per 100,000 people aged 15-64 by drug class, 1997-2017.**

*Note that one drug-related death may involve multiple drugs and that findings here reflect the number of drug-induced deaths involving each drug (not necessarily attributed solely to that drug).*



Other common drug classes cited in deaths among Australians aged 15-64 included antidepressants (487 deaths; 544 all-ages), amphetamines (e.g., methamphetamine, MDMA; 384 deaths; 386 all-ages), antipsychotics and neuroleptics (317 deaths; 340 all-ages), alcohol (256 deaths; 274 all-ages), and non-opioid analgesics, antipyretics and antirheumatics (227 deaths; 268 all-ages).

While opioids are the main drug cited in these deaths, there are increasing rates of drug-induced deaths involving other drugs. Indeed, excluding opioids and alcohol, the rate of deaths per 100,000 population has increased for all drug classes since the mid-to-late 2000s. Increased involvement of psychotropic medicines (e.g., benzodiazepines, antipsychotics) and of non-opioid medicines used for treatment of certain pain conditions (see **Panel A**) is of concern. For example, the rate of deaths involving benzodiazepines increased from 1.5 to 4.7 deaths per 100,000 people from 2004 to 2017 (197 to 755 deaths among people 15-64; 204 to 824 deaths all-ages). Similarly, the rate of drug-induced deaths involving antipsychotics and neuroleptics has increased over fourfold, from 0.4 deaths per 100,000 people in 2013 to 2.0 deaths per 100,000 people in 2017 (55 deaths to 317 deaths; 62 to 340 deaths all-ages). These estimates do not consider changes in prescribing.

#### **Panel A. Involvement of pregabalin in drug-related deaths in Australia**

Pregabalin is a medicine that has analgesic and anti-convulsant effects. It was registered in 2005 for the treatment of neuropathic pain and listed under the Pharmaceutical Benefits Scheme for subsidy in 2013. In 2016-17, it was the sixth most prescribed subsidised drug in Australia. There has been concern about mortality risk from pregabalin, particularly when consumed with opioids, as the two substances may interact to increase respiratory depression or pregabalin may reverse tolerance to the respiratory depressant effect of opioids. Recent studies have described deaths in New South Wales and Queensland where pregabalin was identified, with nearly all cases involving other drugs.

Findings here show fewer than 20 deaths involving pregabalin annually before 2015. Subsequently, there were 72 deaths recorded in 2016 and 100 in 2017 (69 and 87 deaths among Australians aged 15-64, respectively). Most of these deaths were attributed to opioids (62 and 74 opioid-induced deaths in people aged 15-64 involved pregabalin in 2016 and 2017, respectively).

These numbers may be an underestimate as pregabalin has not always been included in routine toxicological screening for drugs detected at death. Further, other drugs may be coded to the class in which pregabalin is coded ('antiepileptic and sedative-hypnotic drugs unspecified'), although advice from the ABS is that pregabalin form the vast majority of cases. Prescribing of pregabalin has also increased over this period. Regardless, these findings highlight the importance of ensuring that consumers are aware of the overdose risks of concomitantly using sedatives (e.g., opioids, benzodiazepines, alcohol), including pregabalin.

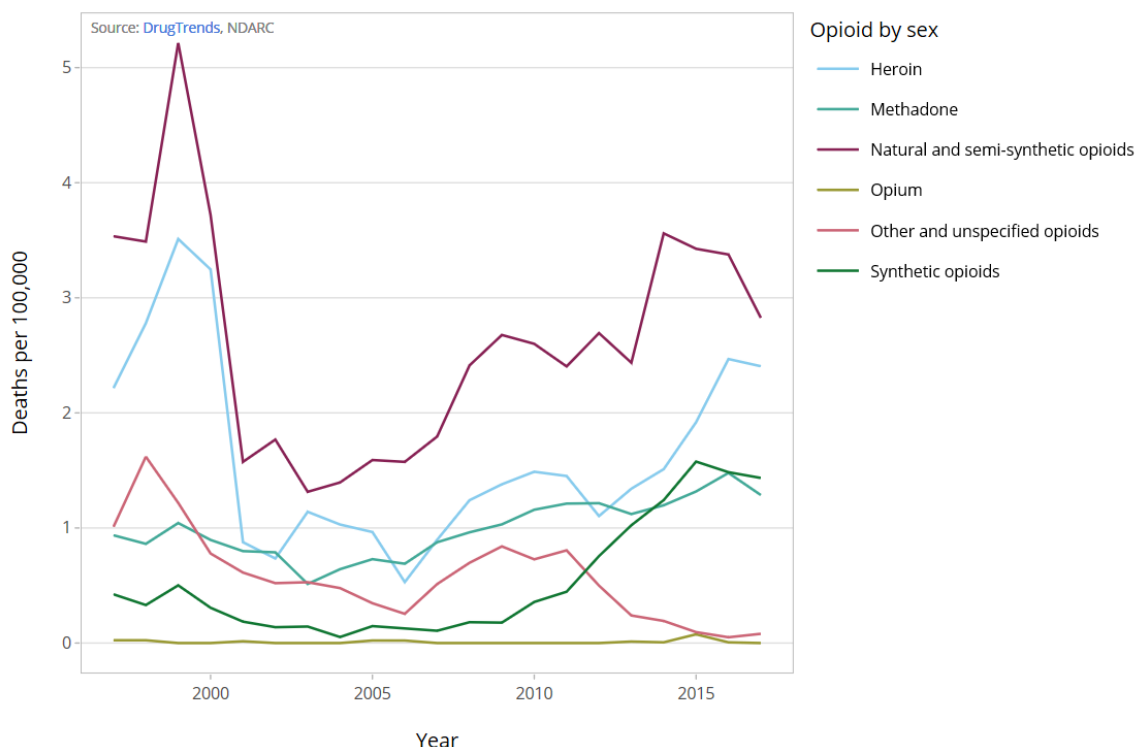
## Deaths Attributed to Opioids

The following findings relate to 'opioid-induced deaths'; that is, those directly attributable to use of opioids (e.g., from opioid overdose). In 2017, there were 1,072 opioid-induced deaths among Australians aged 15-64 years (6.6 deaths per 100,000 people; 1,153 deaths all-ages) compared to 1,153 opioid-induced deaths in 2016 (7.2 deaths per 100,000 people; 1,227 deaths all-ages), noting that both estimates are subject to revision. The number and rate of opioid-induced deaths has been increasing over the past ten years, although the rate remains lower than the peak observed in 1999 (9.8 deaths per 100,000 people, 1,227 deaths among people 15-64; 1,251 deaths all-ages).

## Types of opioids and other drugs involved in opioid-induced deaths

In 2017, three in five opioid-induced deaths (63%, n=671) among Australians aged 15-64 were attributed to pharmaceutical opioids only; one-quarter to illicit opioids (e.g., heroin, opium) only (28%, n=301); and 8% (n=88) to both pharmaceutical opioids and illicit opioids.

There were 457 opioid-deaths involving natural and semi-synthetic opioids (e.g. morphine, codeine, and oxycodone; 522 deaths all-ages), 389 deaths involving heroin (391 deaths all-ages), 232 deaths involving synthetic opioid analgesics (e.g. fentanyl and tramadol; see **Panel B** for further information on deaths involving fentanyl), and 208 deaths involving methadone among Australian adults in 2017 (these numbers are not additive).



**Figure 4. Rate of opioid-induced deaths per 100,000 people aged 15-64 for heroin, methadone, natural and semi-synthetic opioids (e.g., morphine, oxycodone), opium, synthetic opioids (e.g., fentanyl, tramadol) and other opioids, 1997-2017**

The highest rate of death has consistently been observed for natural and semi-synthetic opioids relative to other opioid types (Figure 3). The rate of opioid-induced deaths involving natural and semi-synthetic opioids has been rising over the last 10 years. The rate of deaths among Australians aged 15-64 attributed to heroin has increased over the past decade, from 0.9 to 2.4 deaths per 100,000 people in 2007 versus 2017, although it remains lower than that observed in the late 1990s (3.5 deaths per 100,000 people in 1999).

### ***Age, sex, and intent of opioid-induced deaths***

The majority (81%, n=868) of opioid-induced deaths in 2017 among Australians aged 15-64 were considered accidental; one in seven (14%; n=147) intentional; and a minority (5%, n=57) of undetermined intent. This pattern has been relatively consistent over recent years.

In 2017, the rate of opioid-induced deaths was highest for Australians aged 35-44 years (10.8 per 100,000 people), and lowest for Australians 15-25 and 65-84. Particular increases have been observed in the 45-54 and 55-64 age groups over the period of monitoring. Males aged 15-64 had a two-fold higher rate of opioid-induced deaths than females in 2017; this has been consistent over the past ten years.

### **Panel B. Trends in fentanyl-related deaths in Australia**

Fentanyl is a highly potent synthetic opioid prescribed to manage severe pain and can cause respiratory depression and death in small doses, particularly among opioid naive individuals. Increases in opioid overdose deaths due to fentanyl have been identified in various countries, most prominently in North America and Europe. These deaths are often attributed to illicitly manufactured fentanyl, including fentanyl analogues.

The data presented here do not allow us to identify trends for pharmaceutical versus illicitly-manufactured fentanyl, nor for solely fentanyl, being coded alongside other opioids (e.g., tramadol) as 'synthetic opioids'. The current data from Australia show that the rate of deaths attributed to synthetic opioids has increased from 0.05 in 2004 to 1.4 deaths per 100,000 people aged 15-64 in 2017, with rates being consistently higher among males than females over that period.

There is little evidence of deaths involving fentanyl analogues occurring in large numbers in Australia, although there are single case studies of deaths and various efforts underway to detect these substances, including wastewater analyses and urine screening. Clinical guidance has suggested that overdoses involving fentanyl and its analogues may require additional doses and/or more rapid escalation of dosing of naloxone (a drug available over-the-counter that reverses opioid overdose) relative to heroin and other opioids.



### Deaths Attributed to Amphetamines

In 2017, there were 93 amphetamine-induced deaths among Australians aged 15-64 years (0.6 deaths per 100,000 people; 94 deaths all-ages). The rate of amphetamine-induced deaths among Australians aged 15-64 increased substantially from 2011 (21 deaths, 0.14 deaths per 100,000 people) to 2016 (103 deaths, 0.7 deaths per 100,000 people). The preliminary estimate of amphetamine-induced deaths in 2017 (0.6 deaths per 100,000 people, 93 deaths) does not represent a further increase on this rate.

Data provided do not allow disaggregation of deaths attributed to methamphetamine versus 3,4-methylenedioxymethamphetamine (MDMA).

### Deaths Attributed to Cocaine

In 2017, there were fewer than 20 cocaine-induced deaths among Australians aged 15-64 years. This low number is consistent with previous years.

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## Recommended citation

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## Related Links

- Data visualisations: [https://drugtrends.shinyapps.io/deaths\\_2017/](https://drugtrends.shinyapps.io/deaths_2017/)
- Methods document: <https://ndarc.med.unsw.edu.au/resource/trends-drug-induced-deaths-australia-1997-2017>
- For more information on NDARC research, go to: <http://ndarc.med.unsw.edu.au/>
- For more information about the ABS, go to: <http://www.abs.gov.au>
- For more information on ICD coding go to: <http://www.who.int/classifications/icd/en/>
- For more research from the Drug Trends program go to: <https://ndarc.med.unsw.edu.au/program/drug-trends>

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