



## Types of Opioid Harms in Canadian Hospitals: Comparing Canada and Australia



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# Acknowledgements

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- The Australian Institute of Health and Welfare (AIHW) collaborated closely on this report. We would like to acknowledge AIHW's partnership and valuable contributions.
- We would also like to thank Dr. Michael Otterstatter at the BC Centre for Disease Control (BCCDC) for graciously sharing BCCDC's findings and allowing the use of this data in our report.

This report represents a collaborative effort across much of CIHI. We would like to thank the many individuals and teams who contributed their expertise and time in various capacities.

Please note that the analyses and conclusions in the present document do not necessarily reflect those of the individuals or organizations mentioned above.

## Executive summary

Canada is in the midst of an opioid crisis. Opioid use can lead to addiction, as well as other to harms such as accidental overdose or poisoning, suicide, motor vehicle accidents, infections from injection use, and many other social and emotional problems.<sup>1</sup> The opioid-related death rate in Canada in 2017 was estimated at 10.9 per 100,000 population.<sup>2</sup>

Representatives from the Canadian Institute for Health Information (CIHI) and the Australian Institute of Health and Welfare (AIHW) worked together to produce comparable estimates of opioid use and harms in each country. The goals of the collaboration were to explore the usefulness of international comparisons, to understand the comparability of different data holdings and to learn about the differences and similarities between the 2 countries. In addition, this work will expand our understanding of Canada's opioid crisis and the impact of opioid harms beyond poisonings on hospital care.<sup>3</sup>

Hospital stays and emergency department (ED) visits for those suffering from 5 types of opioid harm are profiled in this report:

- Accidental poisoning (including poisoning of unknown intent);
- Intentional poisoning;
- Opioid dependence;
- Adverse drug reaction; and
- Other harm.

Key findings in this report include the following:

- Canada and Australia are seeing different opioid challenges (fentanyl versus heroin) and have different processes in their hospitals, which makes direct comparisons difficult.
- While poisoning is the most severe opioid harm, it is the tip of the iceberg, representing about a third of all opioid harms seen in hospitals and EDs.
- There are 5 distinct opioid harm profiles, indicating that different strategies may be required to tackle the challenges of opioids. These profiles present differently across care settings, including the community, the ED and the hospital. A cross-setting perspective is required.
  - Fentanyl is the leading cause of opioid-related deaths outside of hospitals in Canada, but most patients who come to hospitals with opioid harms are seen for more commonly prescribed opioids such as codeine, morphine and oxycodone.
  - Individuals who use opioids typically use the health care system more frequently than the general population, and they are also more likely to leave care against medical advice.
  - Poisoning is more common among younger people, but a larger proportion of resources is spent on older people whose care has been complicated by opioid use.

## About this report

Representatives from CIHI and AIHW worked together to produce comparable estimates of opioid use and harms in each country.<sup>4</sup> This topic was selected because opioids are a class of drug causing concern in both Canada and Australia and impacting most of the developed world. The goals of the collaboration were to explore the value of international comparisons for opioids, to understand the comparability of different data holdings and to learn about the differences and similarities between the 2 countries.

## Why are we comparing Canada and Australia?

It is natural to compare Canada and Australia because they have similar demographic profiles, similar health care systems (mostly public), single-source data stewards for hospital and ED data (CIHI and AIHW, respectively) and a common data coding system (ICD-10<sup>i</sup>).

**Table 1** Canadian and Australian demographic measures

Demographics	Canada	Australia
Sex (percentage female)	50%	50%
Life expectancy at birth	81.9	82.3
Median age	42.2	38.7
Population age 25 to 54 (workforce)	40%	41%
Population living in urban areas	82%	90%
Health expenditure (percentage of GDP)	10%	10%
Privately funded health care	33%	30%

### Note

GDP: Gross domestic product.

### Sources

#### Canada

Statistics Canada. [Report on the demographic situation in Canada](#). Accessed July 24, 2018.

Canadian Institute for Health Information. [National health expenditure trends](#). Accessed July 24, 2018.

#### Australia

Australian Bureau of Statistics. [3101.0 — Australian demographic statistics, Dec 2017](#). Accessed July 24, 2018.

Australian Institute of Health and Welfare. [Australia's Health 2018](#). 2018.

IndexMundi. [Australia demographics profile 2018](#). Accessed July 24, 2018.

i. International Statistical Classification of Diseases and Related Health Problems, 10th Revision.

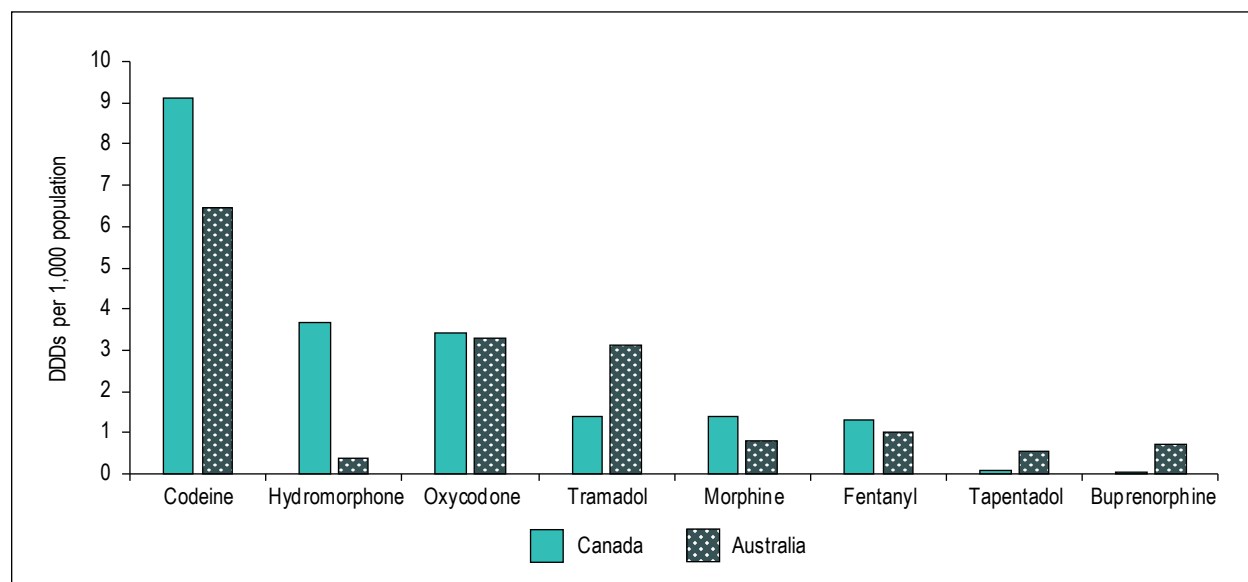
## Availability and use of opioids in Canada and Australia

Although Canada and Australia 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 understanding differences in opioid harms and where care is sought.

In recent years, Canada and Australia have targeted campaigns at physicians to encourage responsible opioid prescribing. Overall, there was a downward trend in prescribed opioid use in both countries in the 5 years prior to 2016–2017 (in defined daily doses; see notes to Figure 1 below for definition). There were differences in the types of opioids prescribed, with hydromorphone playing a larger role in Canada, and tramadol and buprenorphine being common in Australia.

Medically prescribed opioids are generally safe when used as prescribed, but they can become harmful if misused. Examples of misuse include taking more than the prescribed dose or mixing opioids with other medications or with alcohol. Natural opioids, such as oxycodone, codeine and morphine, are the most commonly documented drugs related to hospital stays for opioid poisoning in Canada and Australia.

**Figure 1** Number of defined daily doses dispensed, Canada and Australia, 2017



### Notes

DDD: Defined daily dose.

Data was not available for the Canadian territories.

DDDs are defined by the World Health Organization Collaborating Centre for Drug Statistics Methodology. DDD is a standardized measure of consumption that accounts for variation in potency among drugs. It is not intended to be used clinically to account for the analgesic potency of each opioid.

### Sources

Prepared using data from CompuScript, IQVIA (Canada). AIHW analysis of Pharmaceutical Benefits Scheme (PBS) data maintained by Health and sourced from the Department of Human Services (Australia).

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 large 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 in Australia since then, there is still an aging population of entrenched heroin users.<sup>5</sup> Today in Australia, while heroin use is low compared with other opioids, it is still higher than in Canada and remains a concerning source of opioid harm.

In Canada, illicit use of fentanyl is more common than 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.<sup>6</sup> In British Columbia, the BC Centre for Disease Control reports that 4 of 5 drugs being used in safe injection sites tested positive for fentanyl and that 3 of 5 overdose deaths were due to drugs containing fentanyl.<sup>7</sup> Fentanyl is often cut into other drugs without the user's knowledge. In Australia, seizure of fentanyl does not rank as a separate category, with heroin accounting for 95% of opioid seizures.

The impact of this difference in opioid patterns is that users have different trajectories and different contacts with the hospital system, and that their care requires different strategies. For example, a B.C. study on opioid overdose deaths found that people who overdosed had repeat visits to (were high users of) the ED in the 6 months prior to their death.<sup>8</sup> Ironically, additional information from that work tells us that for 17 of 20 people who died of an overdose, 911 was not called, either because they were alone when they overdosed or they were afraid of repercussions.<sup>7</sup> We also know that many poisoning cases result in death outside of the acute care system.<sup>9</sup> As a result, interventions have focused on preventing overdose (specifically by using Naloxone) rather than on treating addiction. Naloxone, an antidote for opioid poisoning, has been used by medical professionals to counteract opioid overdoses. It is now more readily available to those in need and is effective when used by properly trained bystanders.<sup>10</sup>

Comparisons and learnings must be interpreted with caution. For example, AIHW has data on addiction treatment and more detailed prescribing information than Canada does; however, because different drugs are being prescribed/misused, comparisons may not be relevant.



## Beyond opioid poisoning

This work is also an opportunity to expand our understanding in Canada of the characteristics of individuals who visited EDs or were admitted to hospital with opioid harms other than poisonings.

This work builds on CIHI's commitment to providing information on [opioids in Canada](#).<sup>3</sup> Analyses are supported by international comparisons with Australia; see Table 3 for a comparison of rates. As well, data from the B.C. Provincial Overdose Cohort study was included, as CIHI does not hold comparable ED data for that province.<sup>11, 12</sup> This helps to provide a more complete picture, particularly where data gaps exist (see below).



### Technical considerations

**Our analyses used administrative data from acute care hospitalizations and EDs. This data includes only opioid users who come into contact with the acute care system. The unit of analysis is these contact points. As a result, some opioid harm will be missed. For example, patients with acute intoxication who did not come to hospital or who died before medical care arrived are not captured in the report. Additional information on the methodology and data sources can be found in Appendix A.**

**Note: It is mandatory to assign an external cause code to denote intent whenever a code of opioid poisoning is assigned. The pan-Canadian coding standard for poisoning also specifies that, in cases where there is no documentation of intent, a default code of accidental poisoning should be recorded. Where poisoning is documented as intentional or where intent of poisoning is documented as undetermined, it is coded as such. Physician documentation is not always available to identify the intent behind opioid poisoning.**

## Opioid harm in Canada

It is estimated that 1 in 5 Canadians live with chronic pain and may face lengthy waits for treatment.<sup>13, 14</sup> Causes of pain can be acute (e.g., injury, surgery, advanced terminal illness) or chronic and long-lasting (e.g., from conditions such as arthritis).<sup>14</sup> The use of opioids to treat pain is complex. Opioids can play a role in pain relief; however, the benefits must be carefully assessed against the risks and, whenever possible, pain should be treated by non-pharmacological means such as physical therapy and/or meditation.<sup>15, 16</sup>

Many factors, including liberal prescribing and aggressive marketing tactics, have led to Canadians being some of the highest consumers of prescription opioids in the world.<sup>14, 17</sup> In 2017 in Canada, 21.3 million prescriptions for opioids were dispensed.<sup>18</sup> Fentanyl prescribing is decreasing and any increase in deaths linked to this opioid may be explained by an increase in illicit use.<sup>19</sup>

Levels of opioid overdose are high in North America, particularly in the United States, and opioid overdose is a priority for health services and related policy intervention initiatives. Governments and research sectors in other countries with similar demographic profiles and health spending, such as Australia, are taking steps to curb opioid misuse and non-medical use.<sup>20</sup>

Canadian health care providers and physicians are becoming more sensitive to the harms of opioid use.<sup>16, 21</sup> Choosing Wisely Canada has launched [Opioid Wisely](#), a campaign that encourages thoughtful conversation between clinicians and patients to reduce harms associated with opioid prescribing.<sup>22</sup> At the time of this report, there were 15 specialty-specific recommendations outlining when opioids should not be first-line therapy. In Canada in 2017, there was a 1.9% drop in prescriptions from the previous year, the first decline in overall prescription numbers since 2012.<sup>18</sup>

Federal support has also been provided to address the problem by supporting multi-year treatment projects and improving the collection of data. Provincial and territorial governments have been actively responding to the needs of their populations. Almost all jurisdictions have their own strategies in place or in development and have struck committees to manage the situation. This may include addressing prescribing practices and increasing access to opioid agonist treatment options, such as methadone.<sup>19</sup> CIHI plays an important role in the collection and analysis of data related to opioid use and opioid harms across the country. Understanding the characteristics of patients suffering opioid harm can help to support better decisions for both clinicians and patients, ultimately leading to healthier Canadians.

## Use of opioids

Prescription opioids include a number of different drugs of varying potency, such as codeine, fentanyl, morphine, oxycodone and hydromorphone.<sup>23</sup>

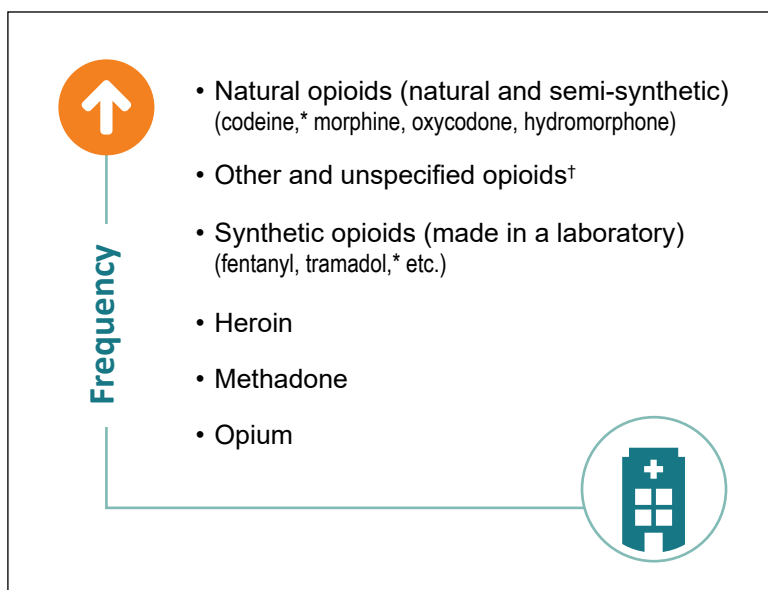
Natural opioids are the most common cause of hospital visits for opioid poisonings in Canada. This group of opioids includes codeine, morphine, oxycodone and hydromorphone.



### Technical considerations

Prescription opioids may be used for non-medical purposes against the recommendations of prescribers. The difference between medical and non-medical use (or licit and illicit) may be hard to distinguish; for example, prescribed medication can become non-medical by altering the frequency or dose to achieve a high. Other illicit use may include opioids that are produced or obtained illegally, which may be the case for those such as heroin or fentanyl. In this report, the type of opioid is identified but there is less information on how the patient encountered the drug. Illicit use of opioids is known to be a large driver of opioid-related harms in some jurisdictions.

**Figure 2** Frequency of hospital visits, by opioid



#### Notes

\* Codeine and tramadol are considered weak opioids. Other listed opioids such as morphine, oxycodone and hydromorphone are considered strong opioids.

† A complete list of other and unspecified opioids can be found in Appendix E.

In 2017, 21.3 million prescriptions for opioids were dispensed. 6 opioids accounted for 96% of all opioid prescriptions: codeine, oxycodone, hydromorphone, morphine, tramadol and fentanyl.<sup>18</sup>

Concern over opioid prescribing has been around for almost 10 years, with increasing opioid deaths being flagged as far back as 2000.<sup>24</sup> Prescribing trends are changing slowly. While we are seeing some decline in the number of prescriptions, the larger impact is in the quantity of opioids in those prescriptions. Specifically, the number of defined daily doses per 1,000 population declined by 10.1% between 2016 and 2017 and is trending down. From 2016 to 2017, fentanyl had the largest decrease at almost 23%; tramadol had the lowest decrease at just less than 1%.<sup>18</sup>



## Technical considerations

**Defined daily dose is the average daily maintenance dose for a drug's main indication in adults.**

Both the smaller quantities in each prescription and a decrease in the number of prescriptions result in a message that fewer opioids are being dispensed in Canada.

For more detailed information on opioid prescribing, see CIHI's report [\*Pan-Canadian Trends in the Prescribing of Opioids and Benzodiazepines, 2012 to 2017.\*](#)

## Types of opioid harm

In this report, we look at the following 5 types of opioid harm that are seen in ED visits or hospital stays:

- Accidental poisoning:**  
 Unintended poisoning by and exposure to opioids (includes poisoning of undetermined intent).
- Intentional poisoning:**  
 Intended self-poisoning by and exposure to opioids.
- Opioid dependence:** Behavioural, cognitive and physiological phenomena that develop after repeated opioid use, including difficulties controlling opioid use, persistent use despite harmful consequences and withdrawal symptoms with cessation or reduction of use.
- Adverse drug reaction:** An adverse reaction to opioids used as prescribed.  
 Note: Harm from drugs *not used as prescribed* will fall into one of the other types of harm.
- Other harm:** Other mental health and behavioural disorders or intoxication from opioids (includes acute intoxication or other harmful use, such as using drugs not prescribed or not using as prescribed, and other mental disorders related to opioid use). These individuals as seen in the ED or hospital may not meet the coding threshold in that episode to be classified as poisoning or opioid dependence, even though their profile is similar to either of these harms.



### Technical considerations

Information on specific opioids is collected only for accidental and intentional poisonings.

Previous and ongoing [opioid reporting](#) at CIHI has focused on harms directly related to poisoning.<sup>3</sup> In-depth analysis has examined variation by province and in major urban areas, as well as the use of heroin and synthetic drugs.

## B.C. Provincial Overdose Cohort

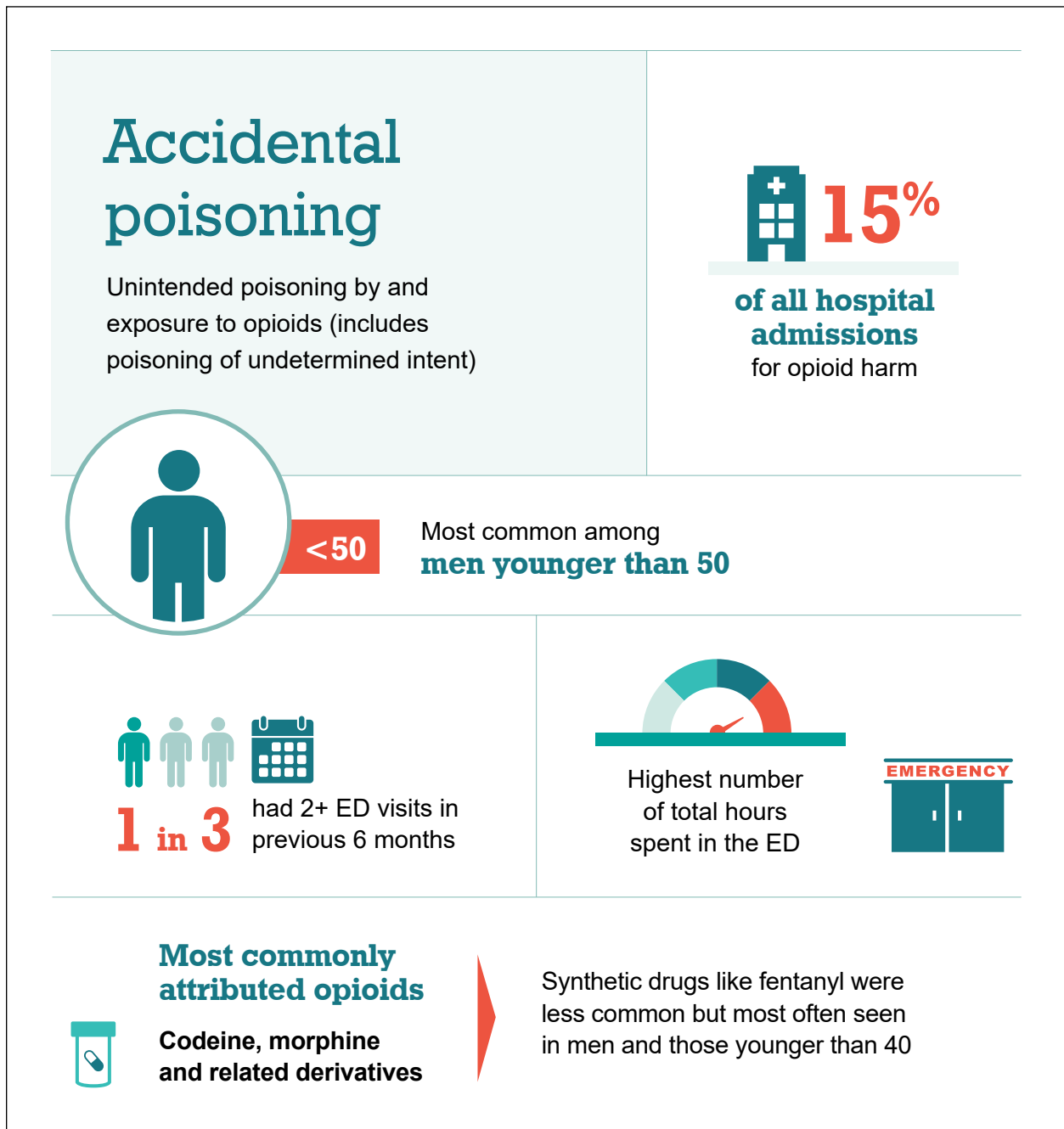
In 2016, B.C.'s Provincial Health Officer declared a public health emergency in response to rising opioid-related overdoses and deaths.<sup>26</sup> As part of the overdose response, the BC Centre for Disease Control created a linked administrative health data set for in-depth analyses of people who experienced an opioid overdose in B.C.<sup>12</sup> Initial findings from this Provincial Overdose Cohort are now available and address a knowledge gap in health care utilization among people who overdose.<sup>27</sup>

The B.C. Provincial Overdose Cohort identified 10,455 people with at least one drug-related overdose (either fatal or non-fatal) between January 1, 2015, and November 30, 2016. They were compared with a matched set of 52,275 control residents of the same sex, age and residence location as those who overdosed.

In B.C., about 1 in 6 people who overdosed did not visit the ED, the hospital or a community physician in the year before overdose. This highlights the need for accessible interventions outside of a medical setting, such as supervised consumption sites/overdose prevention sites and advocacy organizations of people who use drugs.

**Note:** The B.C. study uses the term “overdose,” which is equivalent to the ICD-10 coding of “poisoning.” Where comparable, data from the B.C. Provincial Overdose Cohort has been included alongside CIHI data in this report.

**Figure 3** Profile of accidental poisonings

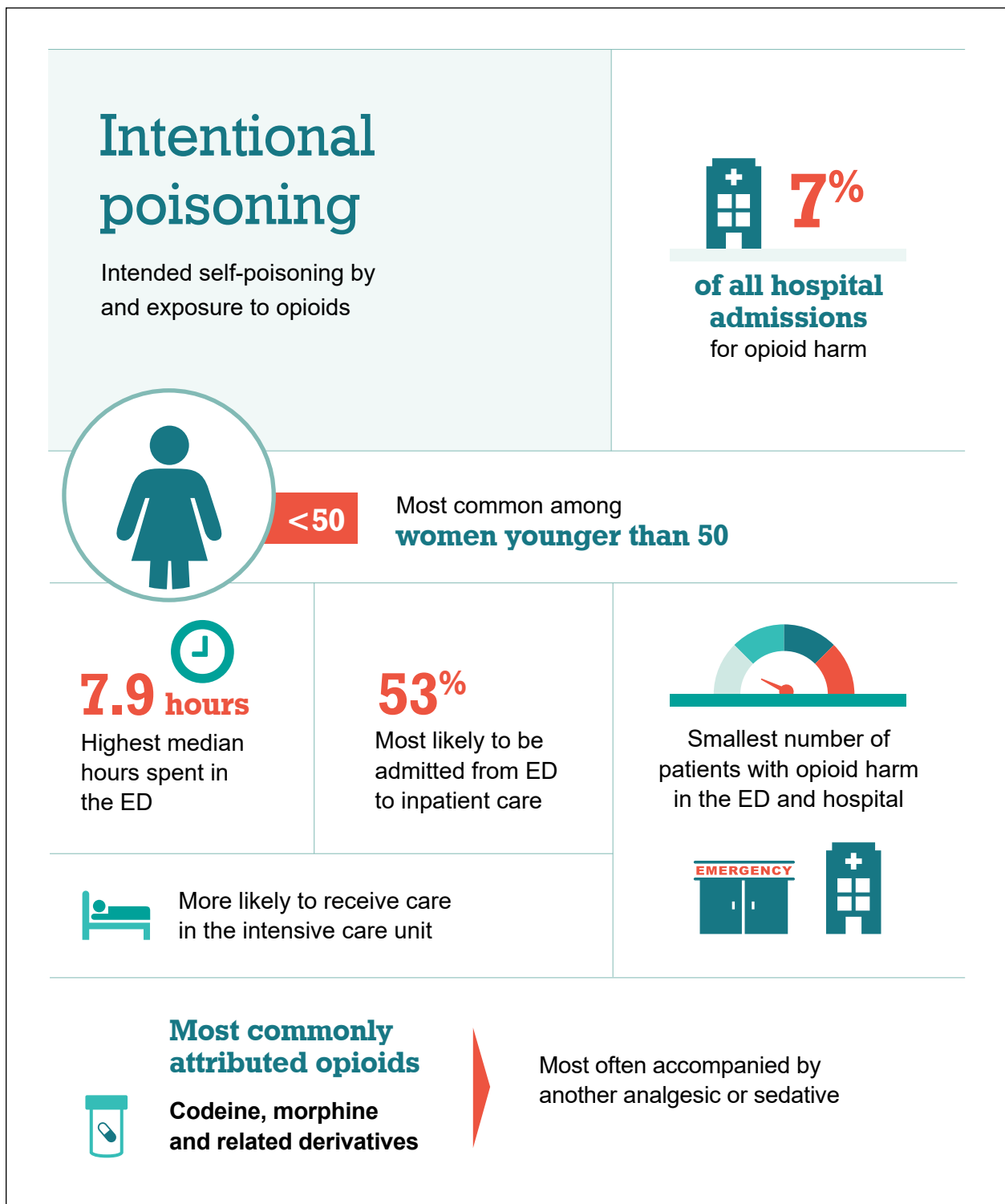


**Notes**

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

**Figure 4** Profile of intentional poisonings



**Notes**

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

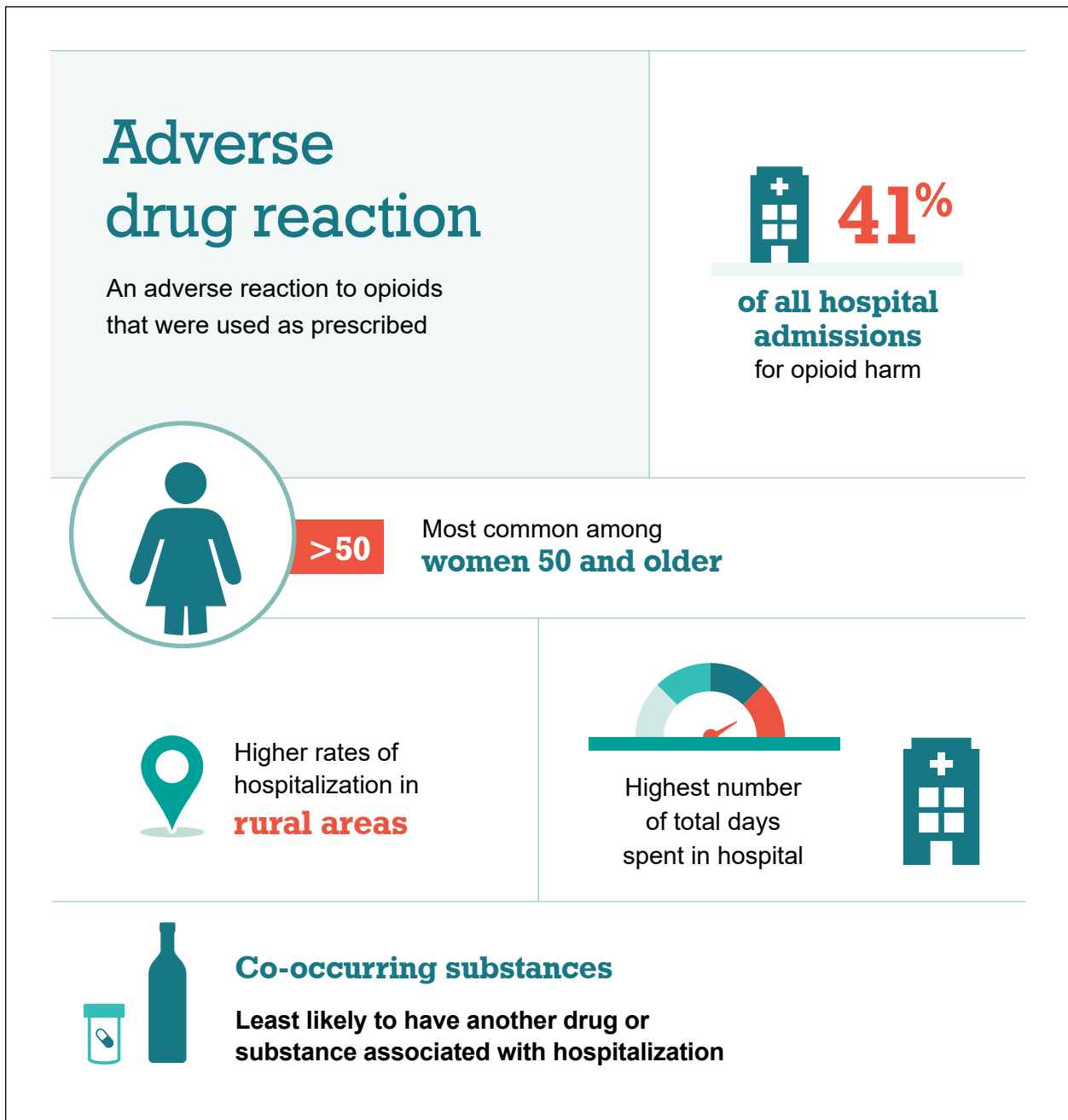


**Figure 5** Profile of opioid dependence**Notes**

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

**Figure 6** Profile of adverse drug reactions



**Notes**

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

**Figure 7** Profile of other harms



**Notes**

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

# Patient characteristics

## ED visits and hospital stays

In 2016–2017, the highest rates of ED visits and the highest number of ED visits per day were for those with opioid dependence, accidental poisoning and other harm, while intentional poisoning and adverse drug reactions were more infrequent by comparison.

On the other hand, the highest rates of hospital stays and the highest number of hospital stays per day were for those with adverse drug reactions. Accidental poisoning and other harm, which showed high rates of ED visits, had comparably lower rates of hospital stays.



### Technical considerations

Profiles of opioid harm in Canadian EDs are available for comparison in Ontario, Alberta and Yukon only. The rates differed but the characteristics of the profiles did not. Hospital stay data is available for all provinces and territories.

**Table 2** Canadian standardized rates (per 100,000) and visits per day for ED visits and hospital stays, 2016–2017

Type of harm	ED rate	ED visits per day	Hospital stay rate	Hospital stays per day
Accidental poisoning (including poisoning of unknown intent)	38.0	19.4	9.8	10.2
Intentional poisoning	10.5	5.3	4.7	4.8
Opioid dependence	39.3	20.1	17.4	17.6
Adverse drug reaction	17.8	9.2	26.8	29.1
Other harm	30.9	15.6	8.6	8.7

#### Notes

Canadian rates were standardized using the 2010 Organisation for Economic Co-operation and Development standard population to enable international comparison.

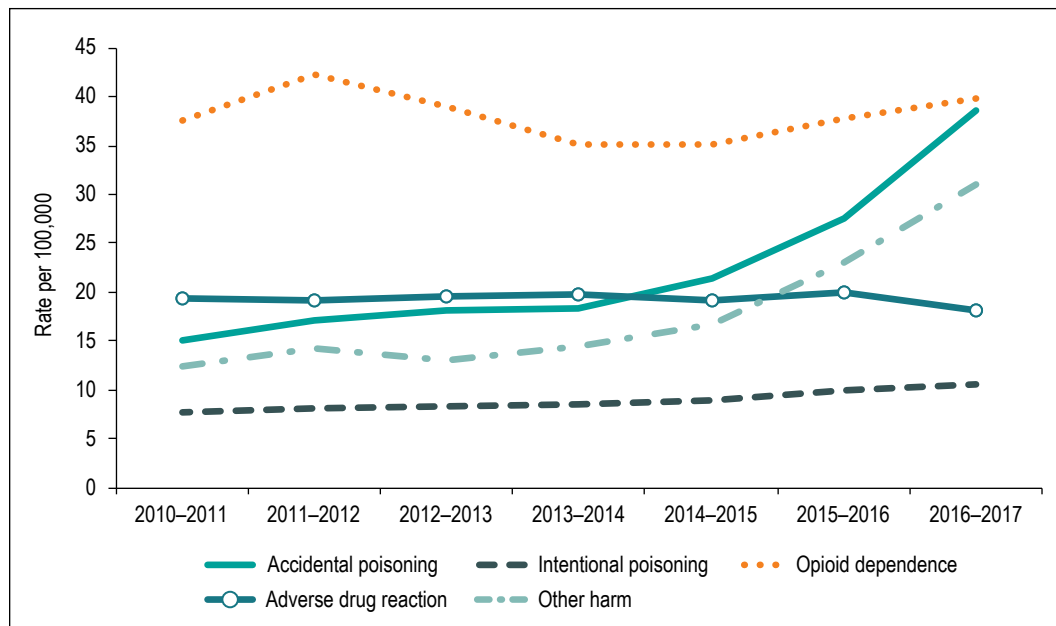
The fiscal year in Canada starts on April 1 and ends on March 31.

#### Sources

National Ambulatory Care Reporting System and Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

There was an increase of almost 150% in the rate of ED visits for accidental poisoning and other harm between 2010–2011 and 2016–2017, with a larger proportion of increase occurring in the 3 most recent years. Rates for intentional poisoning and opioid dependence were more stable, and visits with adverse drug reactions may be showing early signs of a downturn.

**Figure 8** ED visits for opioid harm, by year, 2010–2011 to 2016–2017



**Note**

Rates were standardized using the Canadian standard population.

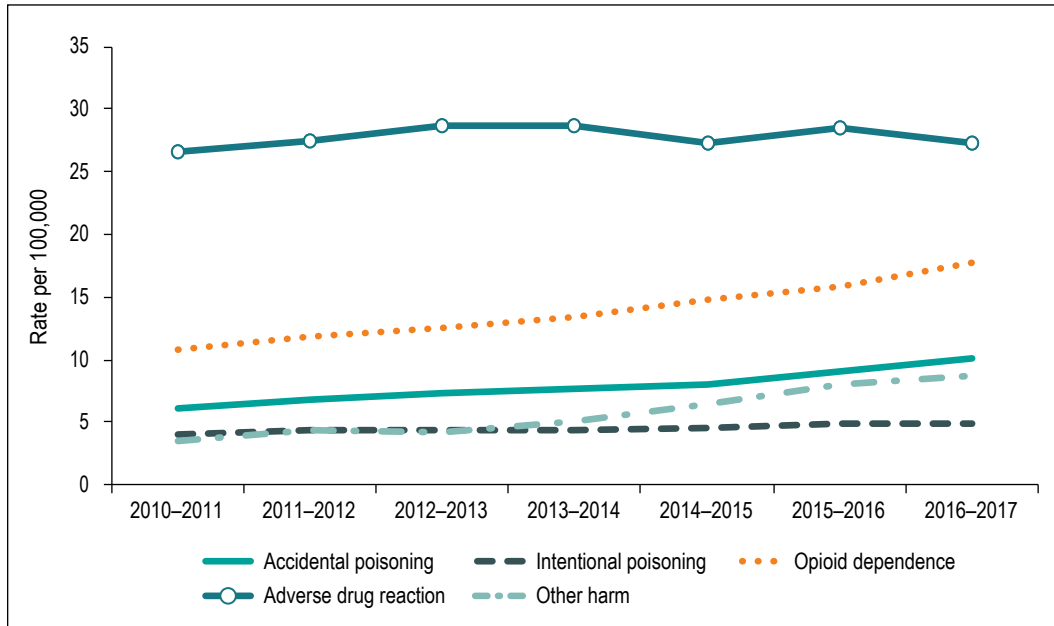
**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

As reported previously, strong opioid prescriptions as a proportion of all opioid prescriptions rose between 2012 and 2016, though the number of fentanyl prescriptions decreased during this time. The overall quantity of opioids dispensed in Canada, as measured by the number of defined daily doses, declined by 4.9% between 2012 and 2016.<sup>28</sup>

Moderate increases were seen in the rates of hospital stay for accidental poisoning (63%) and opioid dependence (65%), while the rate for other harm increased by almost 150% in that time period.

**Figure 9** Hospital stays for opioid harm, by year, 2010–2011 to 2016–2017



**Note**

Rates were standardized using the Canadian standard population.

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

## Age and gender

Patients who visited the ED for opioid harm were most likely to be age 20 to 44. The exception was those suffering adverse drug reactions, who were more likely to be 50 and older.

Patients admitted to hospital were, on average, more likely to be older than those who visited the ED, regardless of type of opioid harm. The greatest proportion of patients were age 25 to 64, again with the exception of adverse drug reactions, which were more common for those 50 and older.

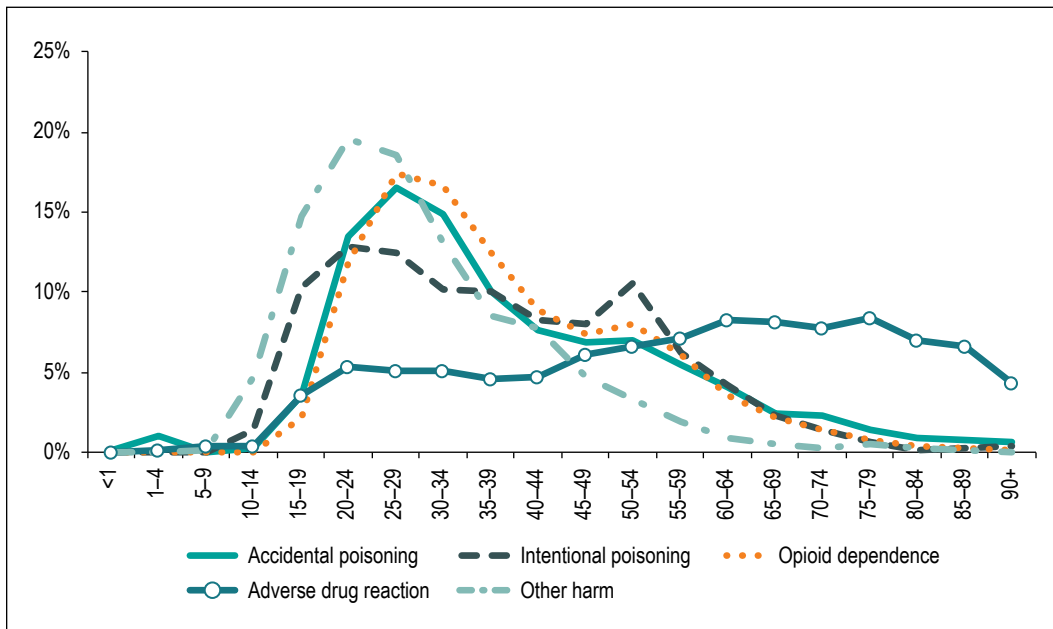


### Technical considerations

There are 2 ways to quantify the impact of opioid harm: the highest *proportion* (i.e., where there are the most people) or the highest *rate* (i.e., which people are most at risk).

In Canada, we focused on the highest proportion of opioid-related ED visits and hospital stays.

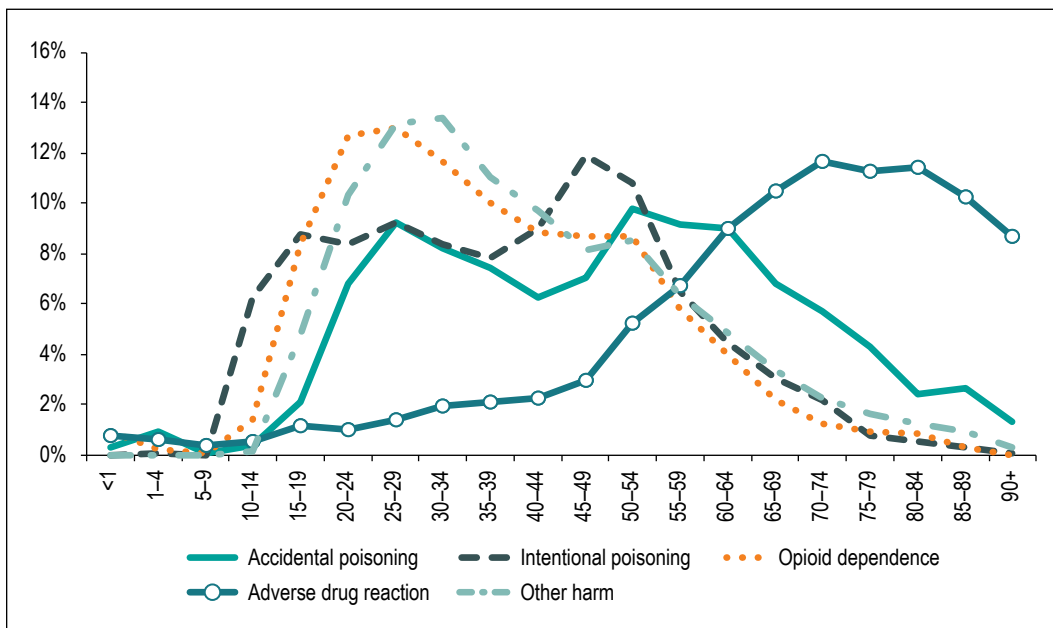
**Figure 10a** ED visits by age group, 2016–2017



**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 10b** Hospital stays by age group, 2016–2017



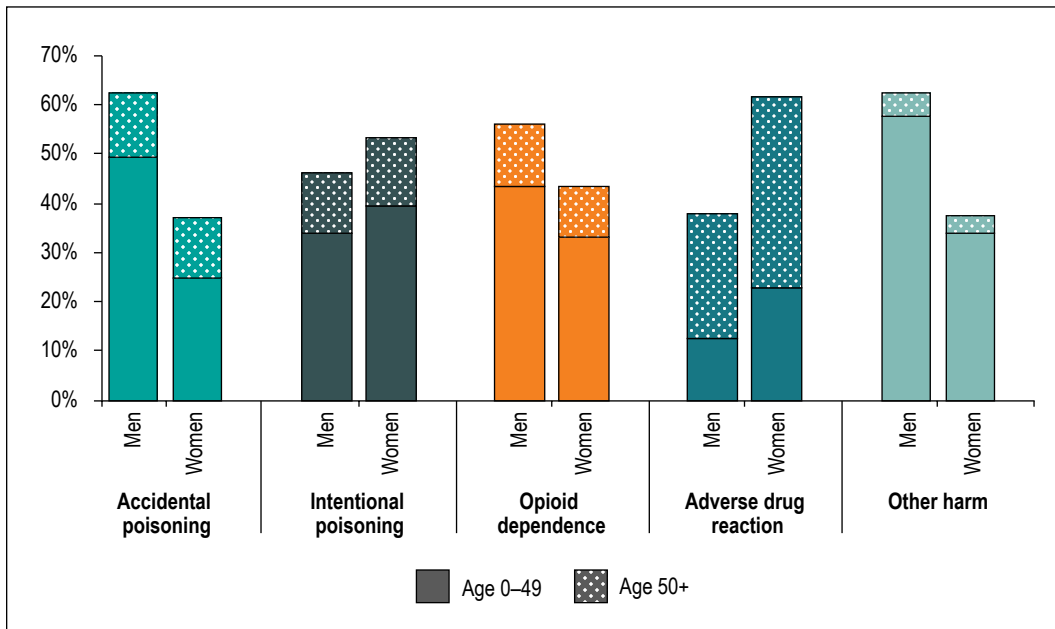
**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

When looking at both age and gender, there is variation by type of opioid harm. Men, particularly those younger than 50, were more commonly seen in the ED than women for accidental poisoning, opioid dependence and other harm. More women than men visited the ED for intentional poisoning and adverse drug reactions.

Generally, the likelihood of being admitted to hospital from an ED increased for those age 50 and older. A greater proportion of hospital stays were for those 50 and older, compared with ED visits, particularly for adverse drug reactions. As seen for ED visits, patients hospitalized for accidental poisoning, opioid dependence and other harm were more likely to be men; those hospitalized for intentional poisoning and adverse drug reactions were more likely to be women.

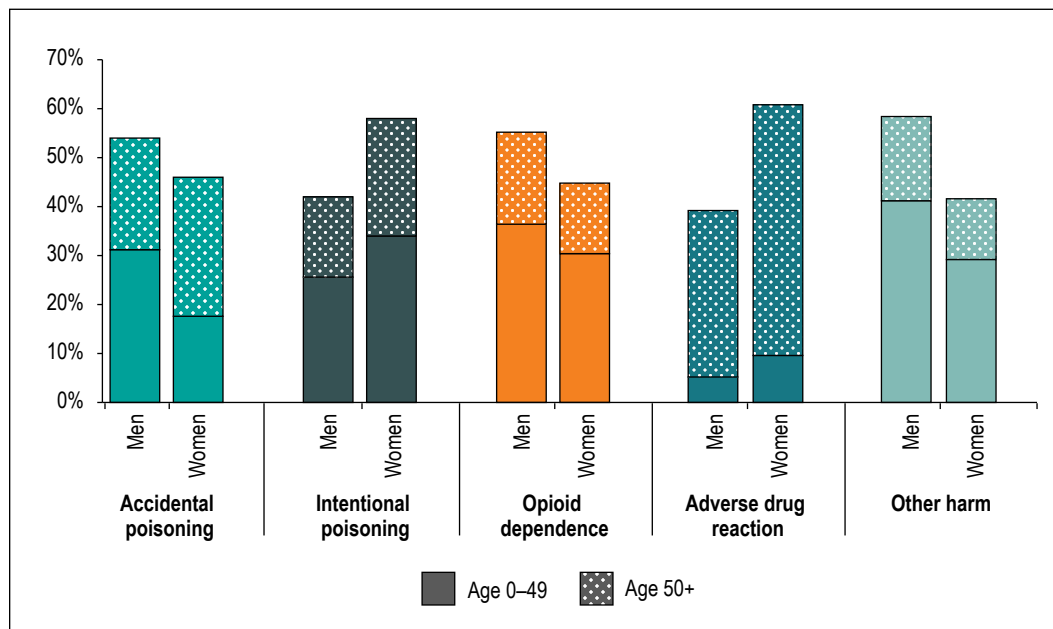
**Figure 11a** ED visits by age and gender, 2016–2017



**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.



**Figure 11b** Hospital stays by age and gender, 2016–2017**Source**

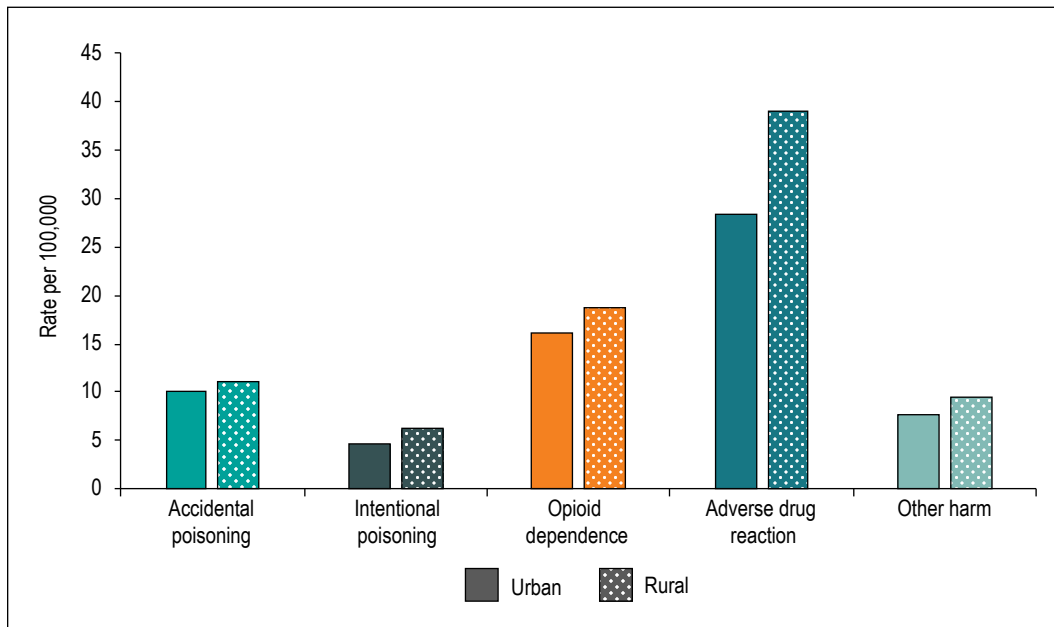
Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

## Location

The majority of hospital stays for opioid harms occur in urban areas, where most Canadians live. For all types of harm, at least 70% of hospital stays were in urban areas.

While rural areas saw smaller volumes of opioid harm, the rates that were adjusted to account for differences in population were higher for most groups in rural areas — indicating higher risk for those who live in rural Canada. The adverse drug reaction group had the highest rates and the largest difference between urban and rural rates. Rates of accidental poisoning, intentional poisoning and other harm were lower in both urban and rural areas. [Previous CIHI reporting](#) compared hospital stay rates for opioid poisoning by major urban areas in more detail.<sup>25</sup>

**Figure 12** Rates of hospital stays by location, 2016–2017



**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

## Income

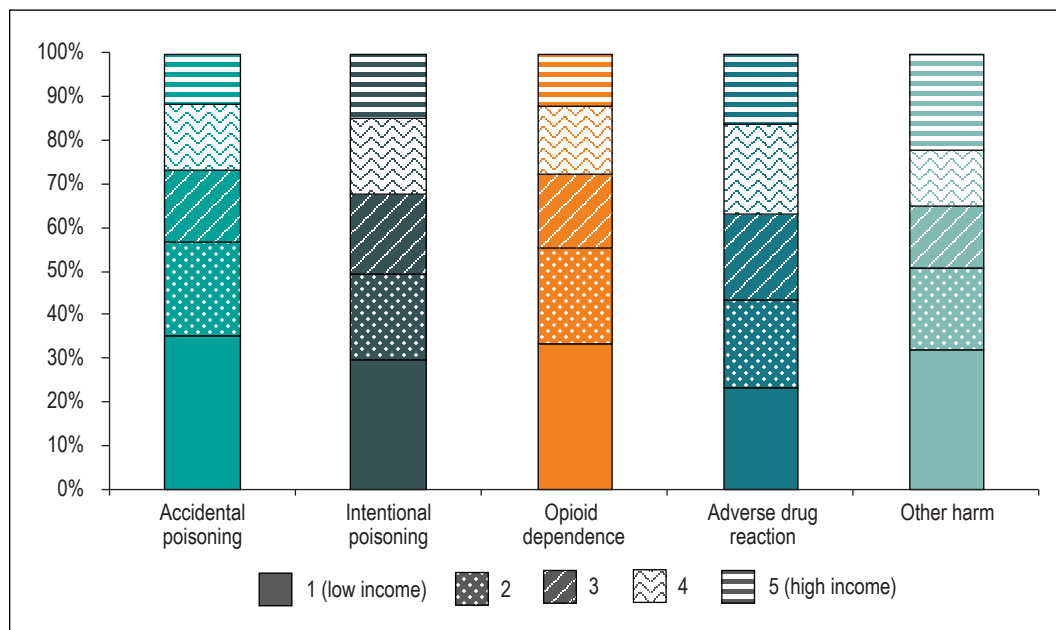
Average incomes across neighbourhoods were used to categorize individuals into income quintiles (i.e., fifths). There is an unequal distribution of opioid harms across quintiles: while we do see opioid harm across all income groups, patients who visited the ED or who were hospitalized for opioid harm were more likely to live in lower-income areas. Approximately 1 in 3 patients lived in the lowest income quintile, regardless of the type of opioid harm. The highest disparity (ratio of those in the highest quintile relative to those in the lowest quintile) was for those in the opioid dependence group, where hospitalized patients were almost 4 times as likely to be in the lowest income quintile as in the highest.

## Homelessness and economic deprivation

Although this should be interpreted with caution due to coding variations, there is some indication for the 5 types of harm that the greatest proportion of homelessness and economic deprivation was observed in patients presenting with opioid dependence. Men suffering opioid harm were more likely than women to experience homelessness and economic deprivation, as were patients age 20 to 49 for most types of opioid harm.

**Note:** Homelessness is based on a specific postal code or ICD-10-CA code that is noted only when homelessness impacts treatment and/or discharge. Therefore, it may be under-reported. Measures are being taken to improve this data capture in the future.

**Figure 13a** ED visits by income quintile, 2016–2017



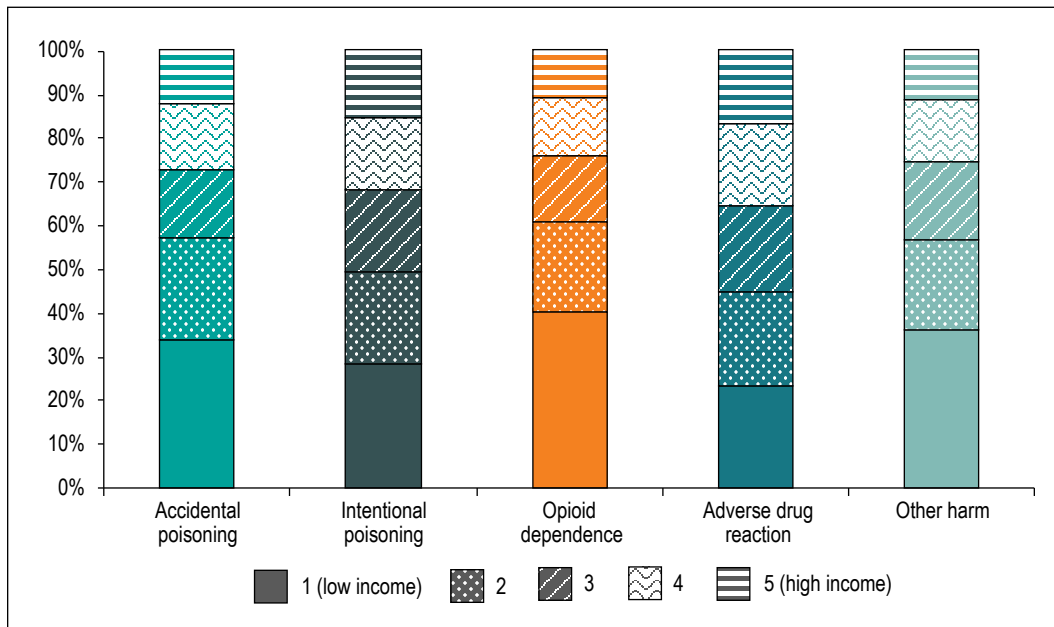
**Note**

Values for each type of opioid harm may not add up to 100% due to missing postal codes or an out-of-country indicator.

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 13b** Hospital stays by income quintile, 2016–2017



**Note**

Values for each type of opioid harm may not add up to 100% due to missing postal codes or an out-of-country indicator.

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

# System perspectives

## ED visits for opioid harms



**Analysis of ED data includes 3 jurisdictions: Ontario, Alberta and Yukon. Comparable or supplementary information from AIHW and B.C. is provided where possible.**

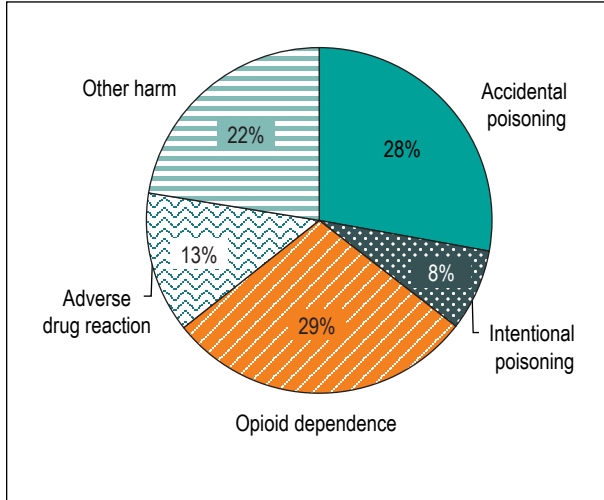
The ED is the entry point to hospital care for many people. In 2016–2017, there were 25,000 visits to the ED for opioid harm in the 3 jurisdictions included in this analysis. Visits were most likely to be made by patients with opioid dependence (29%) or accidental poisoning (28%). The fewest visits were for intentional poisoning (8%). Patients spent almost 200,000 hours in the ED in 2016–2017 in Ontario, Alberta and Yukon for all types of opioid harm.



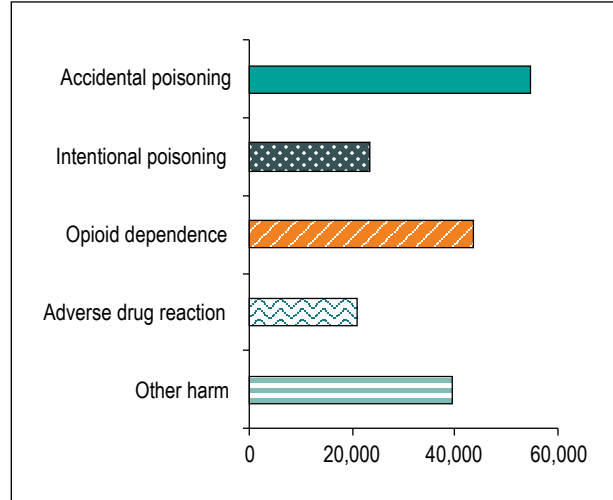
**There were 2.7 times as many ED visits as inpatient admissions related to opioids.**

In B.C., data from the Provincial Overdose Cohort study showed that those who overdosed were also likely to visit the ED but not necessarily to be admitted to hospital. There were more than 4.3 times as many ED visits as hospital admissions among overdose patients, compared with 2.4 times as many for general population control patients.

**Figure 14a** Proportion of ED visits for opioid harm, 2016–2017



**Figure 14b** Total ED hours for opioid harm, 2016–2017

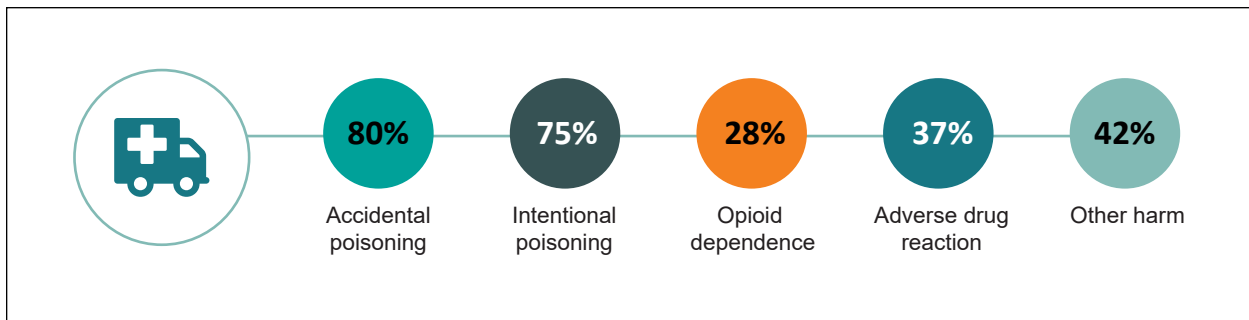


**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

Overall, 50% of people who visited the ED for opioid harms arrived by ambulance. There was significant variation by group; three-quarters of patients suffering accidental poisoning or intentional poisoning arrived this way, reflecting the severity of harm due to poisoning.

**Figure 15** Arrivals to the ED by ambulance, 2016–2017

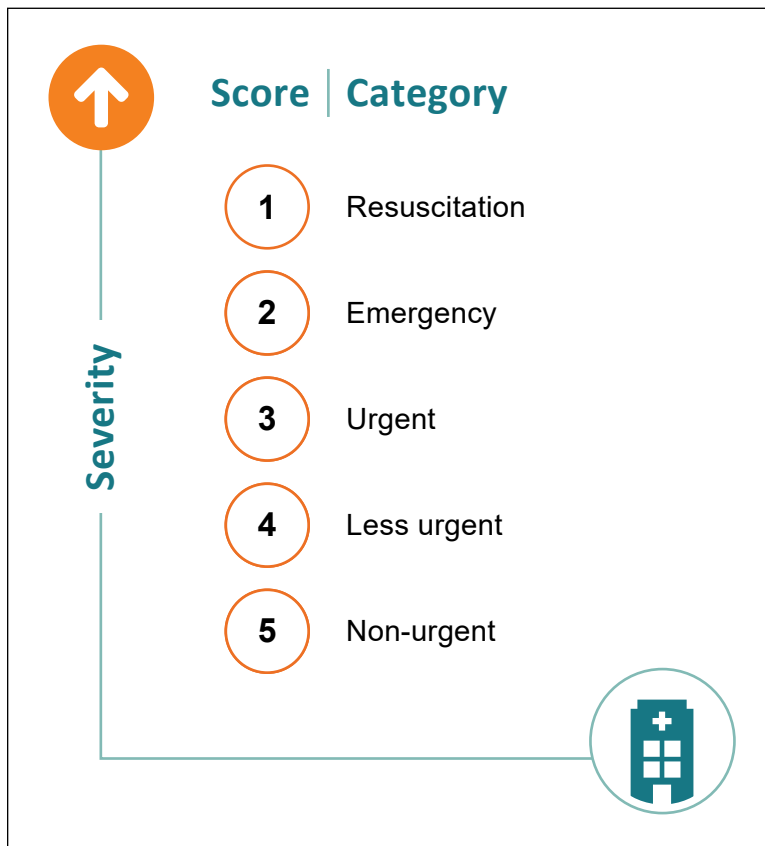


**Source**

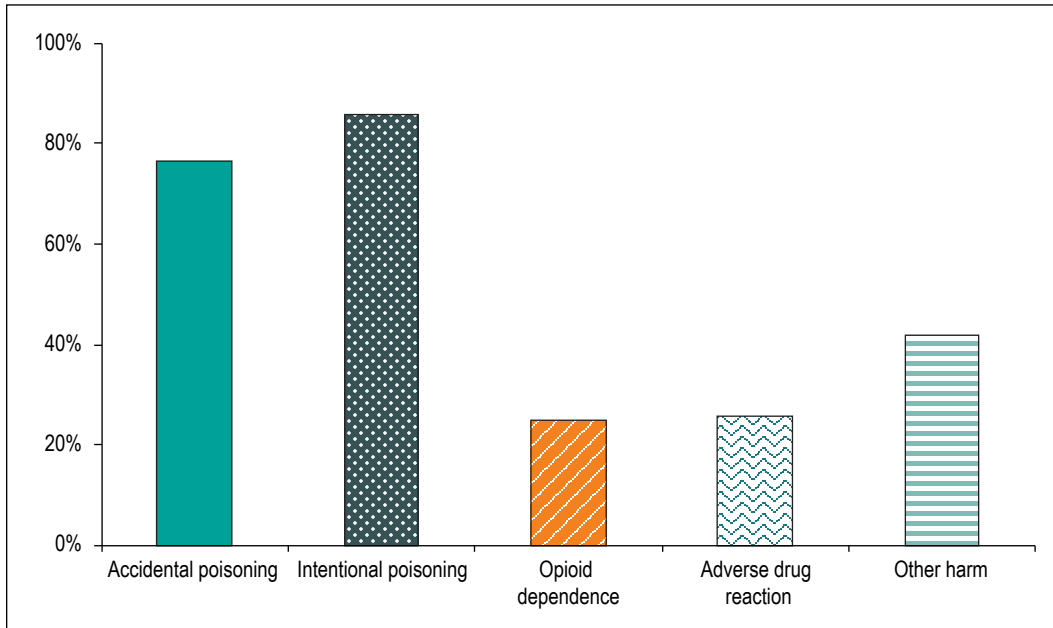
National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

The Canadian Triage and Acuity Scale (CTAS) allows ED staff to prioritize patient care and the need for medical interventions.<sup>29</sup> The most frequently assigned triage level for accidental poisoning, intentional poisoning and other harm was emergency (CTAS 2).

**Figure 16** Canadian Triage and Acuity Scale



**Figure 17** Triaged as resuscitation or emergency (CTAS 1 or 2) in the ED, 2016–2017



**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.



**All patients with opioid harm had longer median wait times in the ED than the general ED population (4.3 hours versus 2.6 hours). Patients suffering from intentional poisoning had the highest median wait time in the ED, followed by those with accidental poisoning.**

For individuals with intentional poisoning, wait times were particularly long from the time of physician assessment to the time when the decision to admit was made.

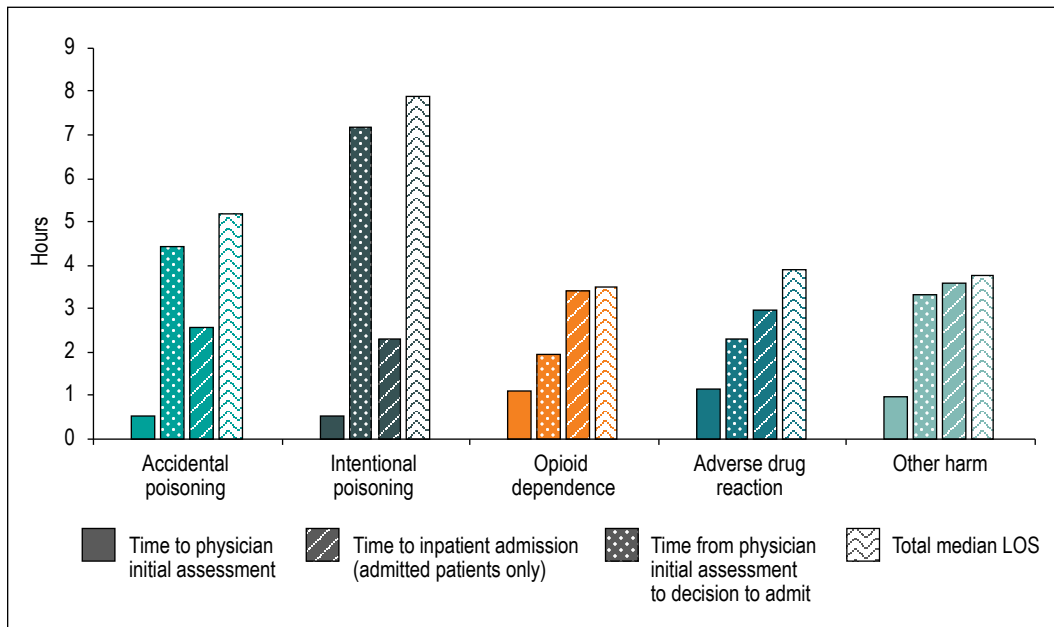
Of all types of opioid harm, individuals with opioid dependence and other harm waited the longest for admission to hospital, possibly a reflection of how difficult it is to find appropriate and available resources and treatments for these individuals.

### Psychiatric consultations

Psychiatric consultations were common for patients experiencing opioid harm in the ED, particularly intentional poisoning (28%) and other harm (11%) patients. For all types of opioid harm, these consults increased the time spent in the ED before admission to inpatient care.



**Figure 18** Length of stay in the ED, 2016–2017



**Notes**

LOS: Length of stay.

The median is the point at which 50% of patients have been treated and 50% are waiting.

Physician initial assessment is the time when the patient was first assessed by a physician.

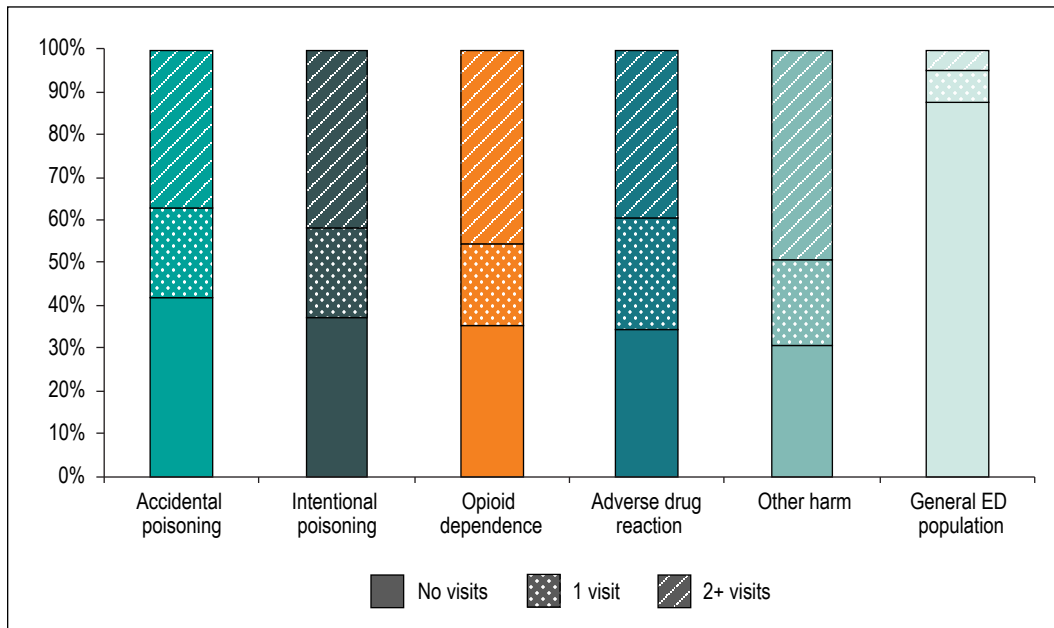
**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.



**Patients who experienced opioid harms were frequent users of the ED. 63% had had at least one other ED visit in the previous 6 months for any reason. Patients experiencing an adverse drug reaction and other harm were most likely to have had another ED visit in that time frame. In contrast, only about 10% of general users of the ED had had another visit in the previous 6 months.**

**Figure 19** Number of ED visits in the previous 6 months, 2016–2017



**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

In B.C., people with an opioid-related overdose also had high rates of ED visits. In the year prior to their overdose, more than half (54%) had had at least one ED visit, compared with 17% of the control population.

In addition to studying the type of opioid harm experienced, looking at all of an individual's diagnoses can provide insight into opioid harm and the role of additional medical and social factors.

- Poisoning patients often had a combination of drugs involved. Individuals with opioid dependence showed signs of long-term use and withdrawal symptoms.
- Patients experiencing an adverse drug reaction often reported constipation, nausea and vomiting that were linked to previous surgical or medical care.
- Patients experiencing other harm were most likely to have hospital records documenting harmful use of opioids or acute intoxication relating to their opioid use. These patients also had diagnoses relating to other drugs, most frequently alcohol, other stimulants such as caffeine, and cocaine. Again, these patients look very similar to patients in the poisoning and opioid dependence profiles, but they either did not meet the criteria for these groups or there was not enough information to include them.



## Technical considerations

**Hospital and ED diagnoses provide a wealth of information. They can indicate the focus of treatment, the reason for coming to hospital and contextual information.**

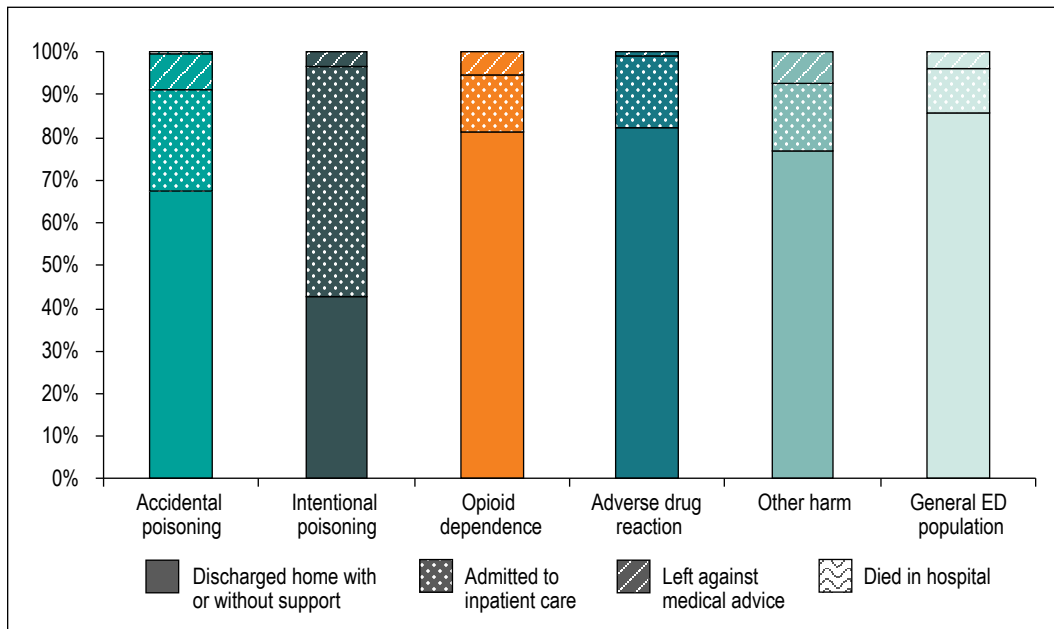
**Often, opioids are the reason behind the visit or admission. For example, opioid harm may be secondary to another, more pressing condition, such as respiratory failure or delirium.**

**In a few situations, opioids will appear as the main problem or reason for visit when there are no immediate threats to the individual. These situations are typically acute intoxication where no intervention is given or drug-seeking behaviour.**



The majority of patients who visited the ED for opioid harms went home on discharge. Of particular note in this group are those patients who left the ED against medical advice. Patients who leave against medical advice are at an increased risk of adverse health outcomes and are more likely to return to hospital, often for the same or a related condition.<sup>30</sup> Patients with opioid harm were more likely to leave against medical advice than the general ED population, particularly those experiencing other harm and accidental poisoning.

**Figure 20** Discharges from the ED, 2016–2017



**Note**

Values for each type of opioid harm may not add up to 100%, as there are other discharge options not shown (e.g., admissions to other types of institutions).

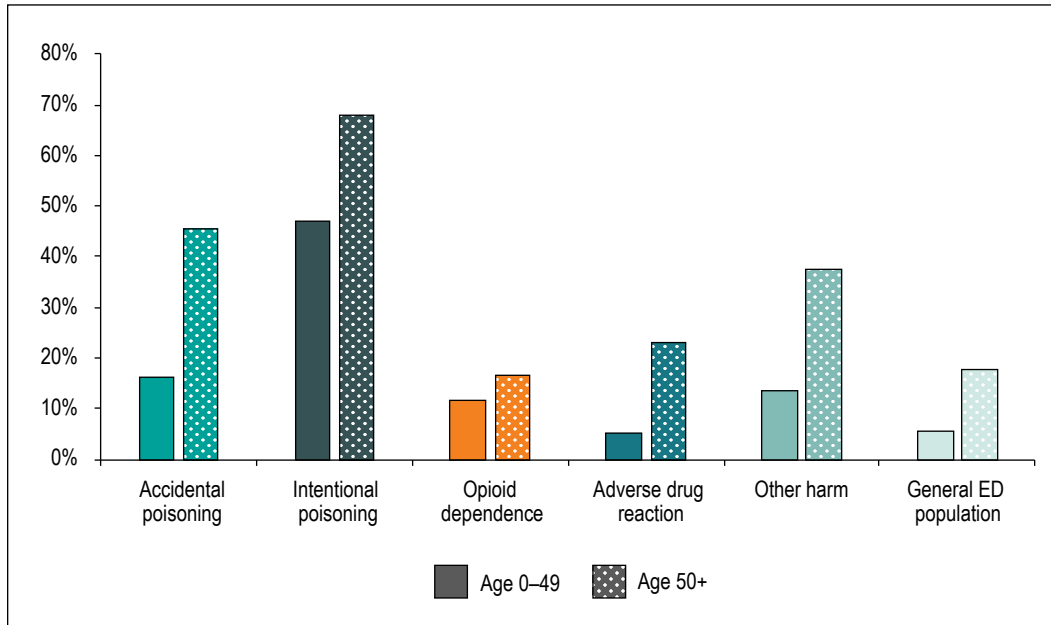
**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

In B.C., 1 in 5 people with an opioid-related overdose had previously left the ED without being seen by a doctor or against medical advice. Approximately 60% of those who left without being seen had other health care encounters (either in acute care or in the community) in the following week.<sup>31</sup> This highlights a missed opportunity for engagement with care and indicates that interventions to reduce both leaving against medical advice and repeat visits are needed.

While typically about 10% of patients in the ED are admitted to inpatient care, this proportion is double for patients suffering opioid harm (20%). As a group, those being treated for intentional poisoning (53%) were most likely to be admitted to hospital. Across all groups, patients were more frequently admitted if they were 50 and older.

**Figure 21** Hospital admissions from the ED by age, 2016–2017



**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

In B.C., roughly one-quarter (26%) of people with an opioid-related overdose were admitted to hospital, compared with 9% of matched controls (i.e., people who looked the same on key characteristics other than opioid use). Comparing rates of health care use by patients with overdose and matched controls, those with overdose

- Visited the ED 7.5 times more often;
- Were admitted to hospital 4.2 times more often; and
- Visited community physicians 2.2 times more often.

The pattern of health care use was similar between people who died from an overdose and those who survived an overdose.

## Opioid-related deaths

Opioid-related deaths after arrival in acute care are very rare. If people make it to hospital or if a first responder gets to them, they receive life-saving treatments.<sup>9</sup> Sadly, many people die before receiving medical care. In B.C., 85% of people who died of overdose did not call 911.<sup>7</sup> Our data does not capture any encounter that does not come through the hospital's doors.

The federal government has been working with the provinces and territories to collect data on opioid-related deaths and to provide timely reporting. In 2017, almost 4,000 people died of causes related to opioids, a 34% increase from 2016.<sup>2</sup> There are some provincial and territorial differences (i.e., not all provinces can report data exclusive to illicit opioid use), so caution should be used when trending and making cross-jurisdictional comparisons. That said, there is evidence that most illicit drug deaths are related to opioids.

In Ontario, 5.3 deaths per 100,000 people were related to opioids. Among those 25 to 34, opioids accounted for 1 in every 6 deaths.<sup>32</sup>

In B.C., where the opioid crisis is particularly intense, the death rate from illicit drugs was 30.1 per 100,000 people in 2017, 84% of which could be attributed directly to fentanyl.<sup>33</sup>

In Australia, the age-adjusted rate of opioid deaths increased by 62% between 2007 and 2016, from 2.9 to 4.7 deaths per 100,000 population. Opioid deaths were most common among men 35 to 44 and were mostly related to accidental poisoning. The most commonly mentioned opioid in opioid deaths was natural opioids; however, the rate of deaths mentioning synthetic opioids (including fentanyl) was 10 times as high in 2016 as in 2007.<sup>4</sup>

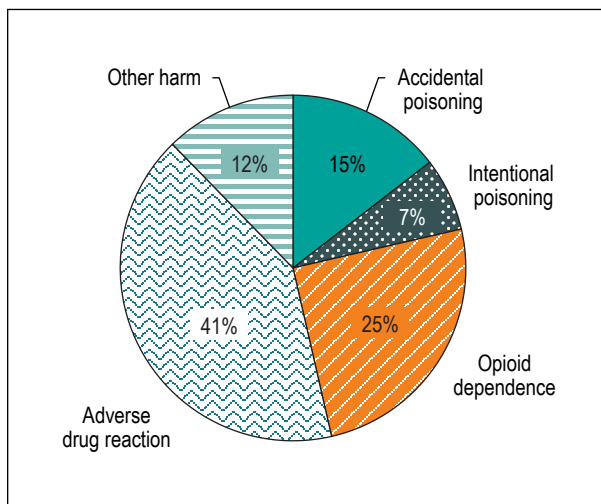
## Hospital stays for opioid harms



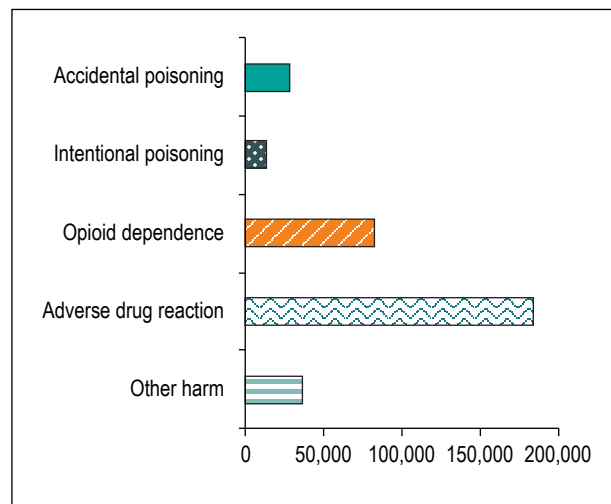
Analysis of hospitalization data includes all Canadian provinces and territories. Comparable or supplementary information from AIHW is provided where possible.

In 2016–2017, there were almost 25,000 hospital stays for all types of opioid harm in Canada. Put another way, there were almost 350,000 days spent in hospital due to opioid harm. Adverse drug reactions and opioid dependence comprised two-thirds of opioid harm admissions to hospital and the vast majority of opioid harm inpatient days.

**Figure 22a** Proportion of hospital stays for opioid harm, 2016–2017



**Figure 22b** Total inpatient days for opioid harm, 2016–2017

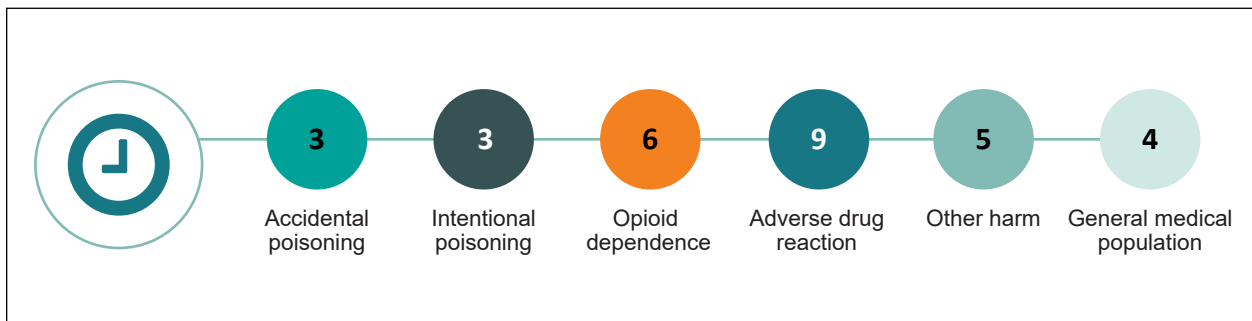


**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

Accidental poisoning and intentional poisoning patients had the shortest stays, while adverse drug reaction patients had the longest stays. These patients were older and may have had additional comorbidities that contributed to their longer length of stay.

**Figure 23** Median length of stay in hospital (days)



**Notes**

The general medical population excludes episodes where the major clinical category was recorded as surgical, as Pregnancy and Childbirth, or as Newborns and Neonates With Conditions Originating in the Perinatal Period. The median is the point at which 50% of patients have been treated and 50% are waiting.

**Source**

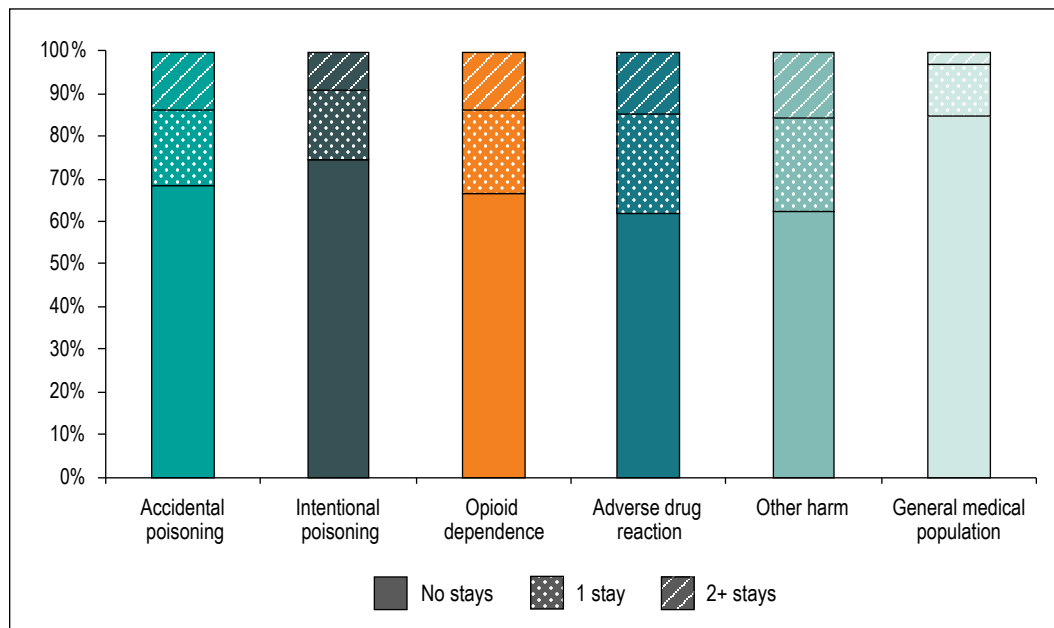
Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.



Like ED patients, those admitted for opioid harm were frequent users of the hospital. One-third of individuals had been hospitalized in the previous 6 months for any reason. Patients in the adverse drug reaction and other harm groups were most likely to have previously stayed in hospital in that time frame.



**Figure 24** Number of hospital stays in the previous 6 months, 2016–2017



**Note**

The general medical population excludes episodes where the major clinical category was recorded as surgical, as Pregnancy and Childbirth, or as Newborns and Neonates With Conditions Originating in the Perinatal Period.

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

Similar to ED visits, opioid harm is listed as the main diagnosis of a patient's hospital stay when that is the focus of treatment. However, it is also possible for opioid harm to be listed as secondary to, or complicating, another condition that requires the majority of treatment. Exploring these additional codes provides the following insights, for a more comprehensive picture of hospital stays:

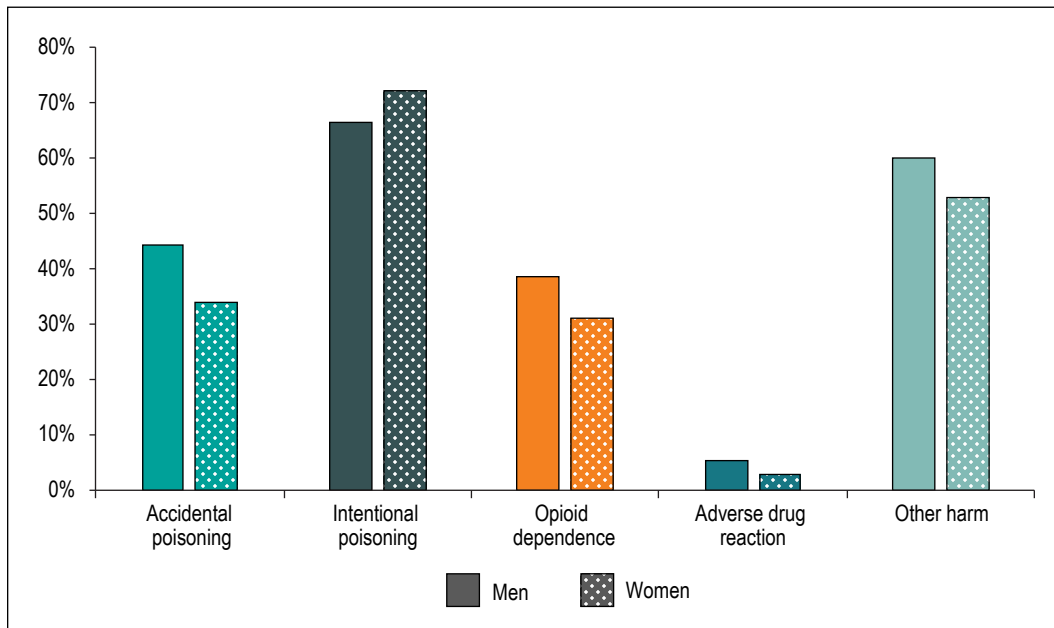
- Patients admitted for intentional poisoning often had a combination of drugs indicated, as well as mental health conditions such as depression.
- Patients suffering from accidental poisoning often had a combination of drugs involved, along with respiratory issues such as acute respiratory failure.
- Opioid dependence patients had conditions such as chronic obstructive pulmonary disease or those linked to dangerous infections, like pneumonia and sepsis.
- Patients experiencing an adverse drug reaction had diagnoses related to awareness and cognition, chemotherapy and radiation treatment, and bone fractures.

Other harm patients most often had a combination of drugs indicated, as well as mental and behavioural conditions such as depression and schizophrenia.

In B.C., diagnoses related to substance use and mental health conditions were significantly more common among people who overdosed than among matched controls. Nevertheless, 60% of overdose patients did not have diagnoses related to these conditions recorded as the primary reason for hospitalization.<sup>31</sup> This suggests that it may be difficult to identify at-risk people, including recreational drug users and problematic drug users, before they overdose.

For many individuals hospitalized for opioid harm, consumption of alcohol or other drugs (e.g., sedatives, cocaine, stimulants) was noted at the time of admission. Mixing opioids and other substances can enhance each drug’s effects, increasing the chances of dangerous side effects and the possibility of overdose.

**Figure 25** Proportion of admissions with indication of alcohol and other drugs, 2016–2017



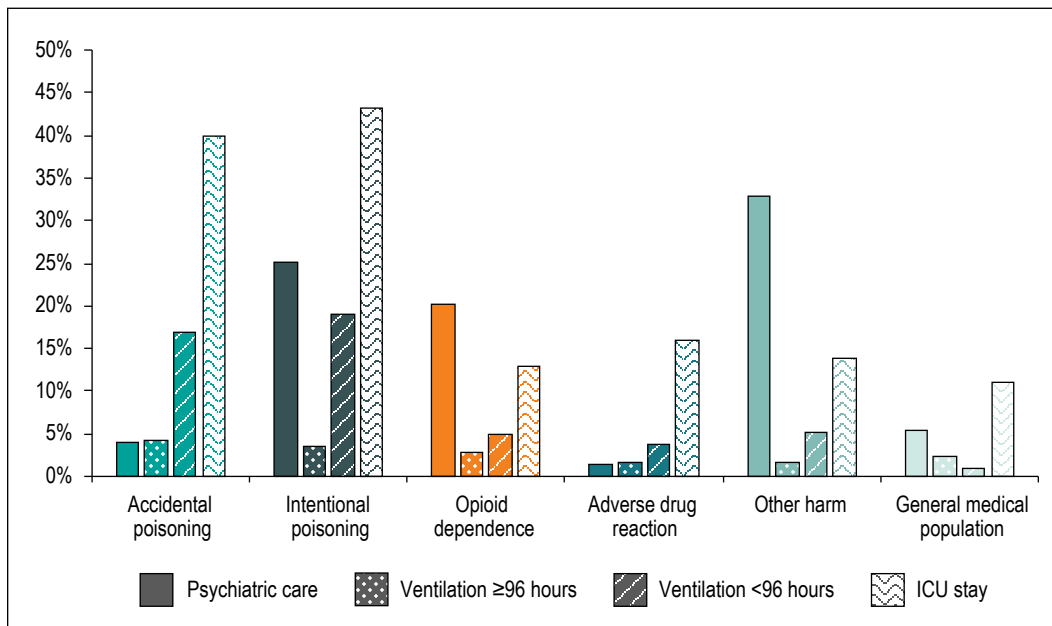
**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

Patients most seriously affected by drugs may require specialized care. The most commonly received treatments in hospital were ventilation for a duration of less than 4 days (96 hours) and psychiatric care. Ventilation was particularly common for accidental poisoning and intentional poisoning patients, while psychiatric care was most common for patients suffering intentional poisoning, opioid dependence and other harm.

Patients admitted with any type of opioid harm were more likely to stay in the intensive care unit (ICU) than the general medical population. This is likely a reflection of the seriousness of their condition leading to a need for life-supporting care. In particular, approximately 40% of accidental poisoning and intentional poisoning patients had a stay in the ICU.

**Figure 26** Specialized care in hospital, 2016–2017



**Notes**

ICU: Intensive care unit.

The general medical population excludes episodes where the major clinical category was recorded as surgical, as Pregnancy and Childbirth, or as Newborns and Neonates With Conditions Originating in the Perinatal Period. Patients who received more than one type of specialized care are counted in each category.

Quebec is not included in the psychiatric care category due to data limitations.

**Source**

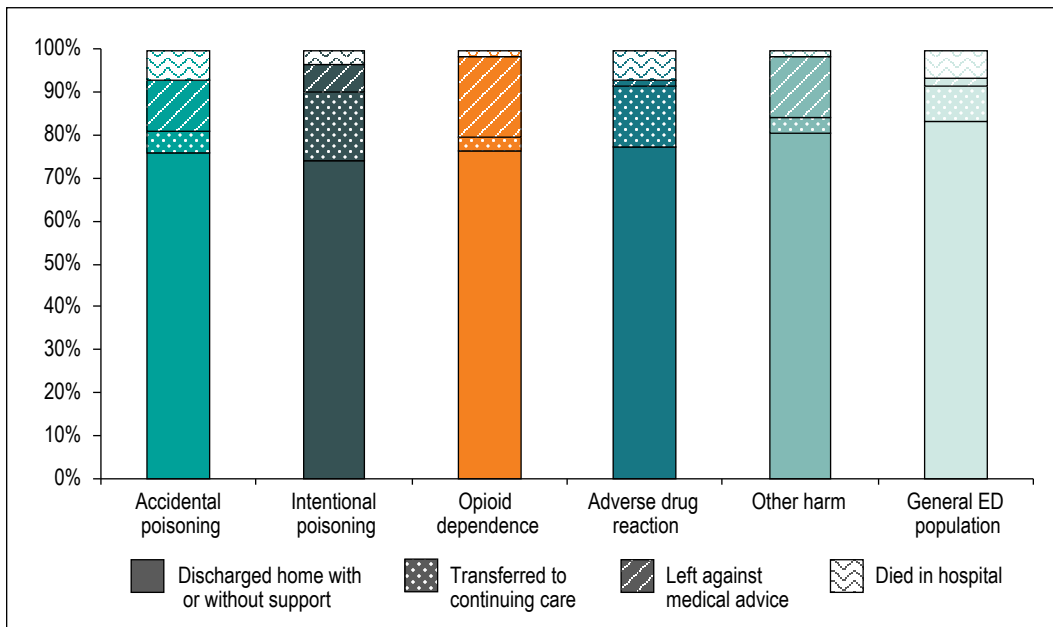
Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.



The majority of patients admitted to hospital were discharged home at the end of their stay. Few patients were transferred to continuing care, though this was more common for intentional poisoning patients and those experiencing adverse drug reactions.

Of particular note, hospital stays involving opioid harm were more likely to end with a patient leaving against medical advice than stays for the general population. Rates were higher for hospital stays than for ED visits: 18% of admitted patients with opioid dependence, 13% with other harm and 12% with accidental poisoning left against medical advice. Few patients with an adverse drug reaction left against medical advice (about 1%).

**Figure 27** Discharges from hospital, 2016–2017



**Notes**

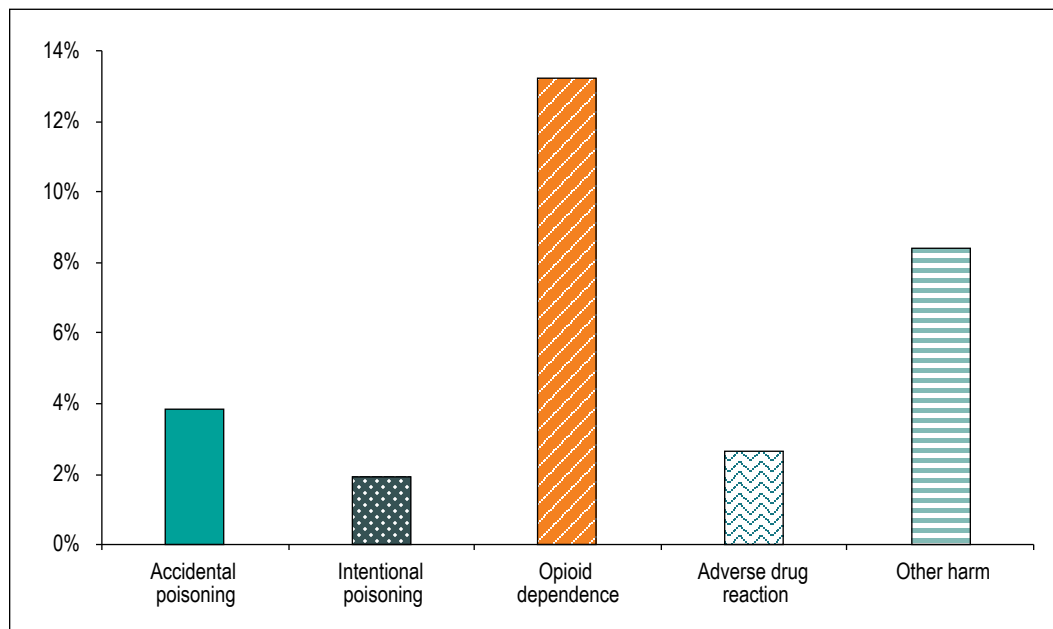
The general medical population excludes episodes where the major clinical category was recorded as surgical, as Pregnancy and Childbirth, or as Newborns and Neonates With Conditions Originating in the Perinatal Period. Values for each type of opioid harm may not add up to 100%, as there are other discharge options not shown (e.g., admissions to other types of institutions).

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

Some patients who were discharged from hospital were readmitted within the same year. This may reflect the complexity of treating those who experienced opioid harm, the quality of care initially received or a lack of coordination and follow-up when discharged. Readmissions were most common for opioid dependence (13%) and other harm (8%), and were least common for intentional poisoning (2%).

**Figure 28** Repeat hospital admissions within the year for opioid harms, 2016–2017



**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

## Opioid harms in Canada and Australia

Canadian and Australian data for ED visits and hospital stays initially appears comparable; however, even after standardizing for age there are large differences in the rates of ED visits and hospital stays for opioid harms. This was thoroughly explored by both CIHI and AIHW, and some key differences surfaced that may impact rates and any subsequent comparisons.

### How comparable is ED and admitted hospital patient data for Canada and Australia?

#### Hospital admissions

Both the Canadian and Australian administrative hospital data sets record diagnosis information as codes using modifications of 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 one main condition; however, each country uses a different name and definition for the main condition. Canada uses most responsible diagnosis; Australia uses principal diagnosis.

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. 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. While the definitions appear similar, the Canadian definition is based on resource use, while the Australian definition is based on reason for admission.<sup>34</sup> This difference means that if the same episode of admitted patient care were to occur in Canada and Australia, it could be represented differently in the administrative hospital data sets, as shown in the example scenario below. This has implications when comparing data between the countries.

In order to provide more comparable estimates between countries and to capture all diagnoses that affect patient management, other diagnosis fields were also included in the analysis. For the Canadian data, pre-admit comorbidities and post-admit comorbidities were included (diagnoses that impact patient management); codes for diagnoses not requiring treatment were excluded. For the Australian data, the additional diagnosis field was included (diagnoses that coexist with the principal diagnosis or that arise during the episode of care and impact patient management).

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

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

## Scenario comparing coding of a hospitalization in Canada and Australia

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 the person's prescribed medication. The person is on a ventilator for 5 days and in hospital for a further 3 days before being discharged. The person also has liver disease, which affects care.

In the Canadian data set (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

In the Australian data set (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

## Emergency department visits

Collecting diagnosis information for ED data in Australia is relatively new; the quality of the principal diagnosis has not been fully assessed, and fields for additional diagnoses are not often filled in. There are no fields to collect data on external causes.

In Australia, admission rates from the ED to the hospital are higher than in Canada overall. In Canada, 20% of patients with opioid harm treated in the ED are admitted to inpatient care; in Australia, this proportion is much higher at 53%.<sup>4</sup> While this could reflect differing needs for care, it could also be related to different admission practices. In Canada, patients who come to the ED and may be held for observation for assessment or diagnosis remain, administratively, ED patients. In Australia, patients requiring observation may be admitted to hospital. The impact is that patients admitted with opioid harms in Australia will not be reflected the same way as patients in Canadian data will (with higher volumes in Canadian EDs for harm and lower volumes in Australian EDs).

Due to the data differences, ED presentation rates are presented for consideration, but no further comparison has been made here.

## ICD-10

In general, while both countries use the same diagnostic coding (ICD-10), the 2 health care systems may have different processes of care that impact how and what diagnosis information is recorded. For example, clinicians may be required to record certain safety and quality information or certain diagnoses in one country but not the other. In Canada, there is no specific directive beyond the ICD-10 coding manuals, whose interpretation can be subjective. It is not possible to fully assess the impact this may have. See Appendix B for more information.

**Table 3** Canadian and Australian standardized rates for ED visits and hospital stays, 2016–2017

Type of harm	Standardized ED rate, 2016–2017, per 100,000: Canada	Standardized ED rate, 2016–2017, per 100,000: Australia	Standardized hospital stay rate, 2016–2017, per 100,000: Canada	Standardized hospital stay rate, 2016–2017, per 100,000: Australia
Accidental poisoning	38.0	17.7	9.8	6.6–12.2
Poisoning of unknown intent				2.5–4.2
Intentional poisoning	10.5		4.7	8.1–23.4
Opioid dependence	39.3	2.4	17.4	15.5–70.7
Adverse drug reaction	17.8	—	26.8	112.9
Other harm	30.9	1.3	8.6	2.5–18.7

### Notes

— Adverse drug reactions cannot be identified in Australian ED data in a comparable way.

Canadian and Australian rates were standardized using the 2010 Organisation for Economic Co-operation and Development standard population.

Poisoning of unknown intent is included in accidental poisoning in Canada.

Australian ED poisoning visits cannot be separated by intent.

The fiscal year in Canada starts on April 1 and ends on March 31. The fiscal year in Australia starts on July 1 and ends on June 30.

Australian hospitalizations are presented as a range of rates from principal diagnosis to any diagnosis.

For Australian rates, the following hospitalizations were excluded: care type reported as “newborn” with no qualified days; hospital boarders; posthumous organ procurement. For hospitalizations for all harm types except adverse drug reaction, hospitalizations for which the mode of admission was “admitted patient transferred from another hospital” have been excluded.

### Sources

National Ambulatory Care Reporting System and Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information, and National Non-Admitted Patient Emergency Department Care Database and National Hospital Morbidity Database, 2016–2017, Australian Institute of Health and Welfare.



## Adverse effects of therapeutic use/adverse drug reactions

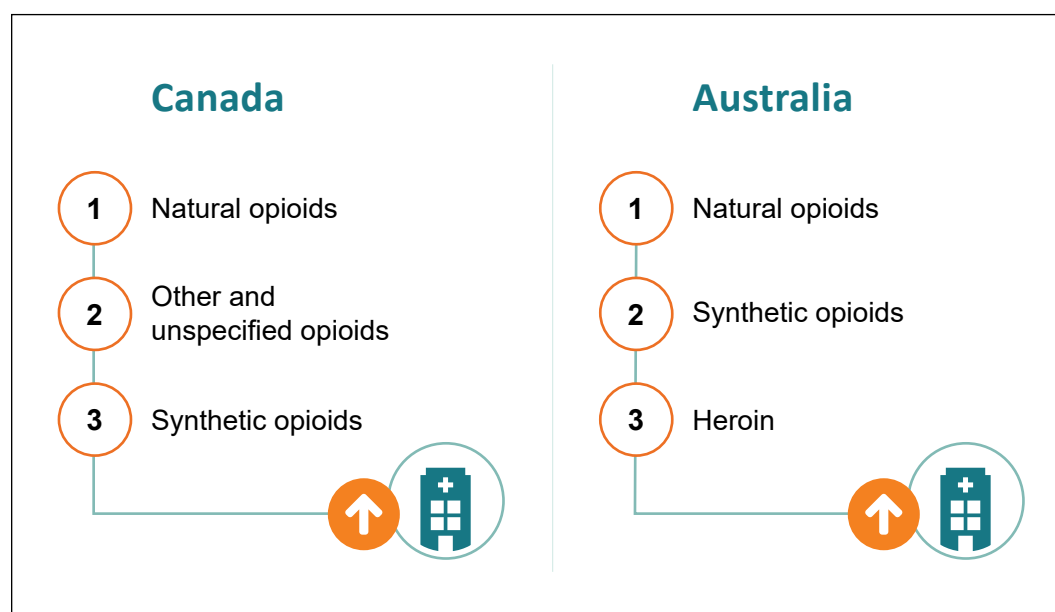
Adverse drug reactions arise only from medically prescribed opioids that have been used as directed. This type of harm may have a less-severe impact on the patient (relative to opioid dependence and poisoning), but it has the highest rate of hospital stays and has a greater impact on the health care system.

The age and sex profile for these hospital stays was similar in Canada and Australia: they were more common among women, there were increasing rates of hospitalization with increasing age and hospital stays mirrored the rates of prescription opioids in both countries. Australian prescribing data contains more detailed patient information than Canadian data (see AIHW's report for more detail on who received opioid prescriptions).<sup>4</sup>

## Poisoning

Natural opioids were most commonly responsible for hospital stays for poisoning in both Canada and Australia. However, the types of opioid varied, mainly reflecting the differences in illicit use discussed previously. Heroin was more commonly related to opioid poisoning for hospital stays in Australia, and other and unspecified opioids were more common in Canada (refer to Appendix E for a full list of drugs in this category).

**Figure 29** Opioids responsible for hospital stays for poisoning, 2016–2017



### Sources

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information, and AIHW analysis of the National Hospital Morbidity Database.

There were similarities in the profiles of people hospitalized for opioid poisoning:

- Men in both countries were more likely to be admitted to hospital for accidental poisoning than females (54% in Canada and 52% in Australia).
- Women in both countries were more likely to be admitted for intentional poisoning than men (58% in Canada and 61% in Australia).
- The average age of accidental poisonings was similar in Canada and Australia (49 and 48, respectively). For intentional poisonings, the average age was slightly older in Canada than in Australia (44 and 38, respectively).

## Opioid dependence

Treatment for opioid dependence 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.<sup>35</sup> In Canada, community-based harm reduction strategies have been employed under the directive of the Canadian Drugs and Substances Strategy.<sup>36</sup>

- In both Canada and Australia, 55% of opioid dependence hospital stays were for males.
- The average age was similar, at 42 and 44 for Canada and Australia, respectively.
- The rate of hospital stays for opioid dependence was more than 4 times as high in Australia as in Canada (70.7 and 17.4 per 100,000 population, respectively, age-standardized to the 2010 Organisation for Economic Co-operation and Development standard population), reflecting the difference in treatment practice.

## Conclusion

The profiles shown in this report highlight the need for tailored interventions for opioid harms rather than a one-size-fits-all solution. People experience opioid harm differently and look different across care settings. In 2016, the Opioid Conference and the Opioid Summit were held to address and reduce the harm related to opioids in Canada. The summit brought together more than 30 organizations, including CIHI and 9 provincial/territorial ministries of health willing to make a commitment to action, and resulted in the Joint Statement of Action to Address the Opioid Crisis.<sup>37</sup>

In order to effectively reduce the harm associated with opioids, a public health approach may be helpful.<sup>38, 39</sup> Significant activities could focus on better access to alternative treatments for pain that are either non-pharmacological or non-opioid; improved education around pain management and addiction; and treatment that is highly integrated with primary care and care in the community, ideally using multidisciplinary teams with extensive expertise. The latter, if care is effectively provided in the community, could help to reduce both ED visits and hospital stays for opioid harm.

The Government of Canada has committed \$5 billion to provinces and territories over 10 years to improve access to mental health and addictions services for Canadians. To reduce opioid harm, a number of steps have been taken or are planned.<sup>19</sup> Areas of focus include partnerships and information sharing across the country and internationally, legislative and regulatory changes, law enforcement and improved public security, and public health programs. Increased opioid data collection will provide an integrated national picture of opioid-related deaths and harms, consistent with the Government of Canada's commitment to an evidence-based drug policy. Accurate and complete data on opioid harm will help to track trends and better coordinate responses. Other specific examples include international coordination on drug policies; streamlined approval of supervised consumption sites; multiple law enforcement strategies to target importers, distributors, manufacturers and traffickers; and encouraging efforts to promote harm reduction initiatives based on the unique needs of First Nations and Inuit communities.<sup>19</sup>

In Australia, initiatives are already in place or under development to reduce opioid harm involving both government and non-government organizations. This includes a new iteration of the National Drug Strategy that provides a framework to minimize harm through effective demand, supply and harm reduction strategies; funding to monitor medicines such as morphine and oxycodone that would alert doctors and pharmacists if patients have received multiple supplies of monitored medicines from other practitioners; tamper-resistant properties of strong opioids such as oxycodone; and publicly funded drug treatment services.

In collaboration with federal, provincial and territorial governments and expert stakeholders, CIHI is working to

- Identify data and information needs for prescription drug use surveillance;
- Develop pan-Canadian standards to guide data collection;
- Establish indicators and metrics for public reporting;
- Produce analyses that measure the prevalence, consumption and potential harms of prescription drug use; and
- Produce resources to support stakeholder understanding and use of data.

Visit CIHI's website for more information on all of our work related to [opioids in Canada](#).

# Appendix A: Technical notes

## Definition of opioid-related harm

Opioid-related harm is defined as injury, damage or hurt resulting from opioid use or misuse. The harms resulting from opioid use or misuse can be intentional or unintentional, and the use of opioids can be either licit or illicit. That is, people may be taking opioids that have been legally prescribed to them, they may be using prescription opioids obtained illegally or they may be using illegal forms of opioids, such as heroin.

Harms included are specific to morbidity and mortality that present or occur in an in-hospital or ED setting. Social harms (e.g., job loss, antisocial behaviour, imprisonment) are not measured in this report.



### Technical considerations

**The purpose of this project is to describe the types of opioid harms that appear in acute care. This is different from other work at CIHI that seeks to quantify opioids in Canada, and some different methodological decisions were made in response to data quality concerns.**

**The unit of analysis in this report is the entire episode of the hospital stay. Episode building was performed to follow the flow of patients through the acute care system.**

**Episodes with poisoning harm were included only if they followed the coding standards (i.e., they had a T-code and a matching external cause code identifying the intent of the poisoning). As a result, this report may underestimate the magnitude of opioid poisoning by approximately 2%.**

**Poisonings of accidental and undetermined intent were combined, as these patients would be treated similarly in the hospital. These poisonings are reported separately in other CIHI products.**

**In Canada, the coding standard directs people to “classify all poisonings as accidental unless there is clear documentation of intentional self-harm or undetermined intent.” This guideline does not exist in Quebec.**

**Canadian coding guidelines also specify that adverse reactions due to the therapeutic use of opioids should be coded as such (using external cause code Y45.0) and not coded as opioid poisonings. We included all episodes with indication of therapeutic use as adverse reactions, regardless of poisoning indication. This miscoding occurred in less than 1% of episodes. Data quality actions are being taken to correct this in 2018–2019 that may affect these trends.**

**The analyses in this report are restricted to the acute care system.**

**Selected mental health beds in Ontario (and a small number of psychiatric facilities outside Ontario) are reported to a separate/non-comparable database (Ontario Mental Health Reporting System) and were not included in this analysis. These facilities provide important addictions services, and excluding them will lead to regional under-representation in this report.**

# Appendix B: Canadian and Australian data

**Table B1** Comparability of Canadian and Australian data

Canada	Australia
<p>CIHI's National Ambulatory Care Reporting System collects detailed diagnostic information in 3 provinces in Canada.</p>	<p>AIHW's National Non-Admitted Patient Emergency Department Care Database has episode-level records for most persons presenting to public EDs in Australia.</p> <p>An <b>ED presentation</b> occurs following the arrival of the patient at the ED and is the earlier of being clinically registered or triaged.</p> <p>The <b>principal diagnosis</b> is the diagnosis established at the conclusion of the patient's ED visit to be mainly responsible for the visit. The quality of the information provided for ED principal diagnosis data has not been fully assessed. As a result, this data should be interpreted with caution.</p> <p>While there are fields for additional diagnoses, this data is currently limited. There are no fields for external causes.</p>
<p>CIHI's Hospital Morbidity Database has record-level information that is combined to create an episode for all public hospitals in Canada. Diagnostic information is collected and conditions are identified as existing prior to admission, existing post-admission, causal factor and (optionally) existing but not contributing to patient management. Only pre- and post-admission diagnoses were included for these analyses. Existing but not contributing diagnoses were excluded.</p>	<p>AIHW's National Hospital Morbidity Database has episode-level records for admitted patients from essentially all public and private hospitals in Australia.</p> <p>A <b>hospital separation</b> 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 (e.g., from acute care to rehabilitation). In this report, hospital separations are referred to as hospitalizations.</p> <p>Hospitalization data does 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 database.</p> <p>The <b>principal diagnosis</b> is the diagnosis established after study to be chiefly responsible for the patient's episode of admitted patient care.</p> <p>An <b>additional diagnosis</b> is a condition or complaint that either co-exists with the principal diagnosis or arises during the episode of care (reported if the condition affects patient management).</p> <p>An <b>external cause</b> is the environmental event, circumstance or condition that was the cause of injury, poisoning or adverse event.</p> <p>Please see AIHW's report for more information on the Australian databases.<sup>4</sup></p>

## Sources

Australian Institute of Health and Welfare. [Admitted Patient Care 2015–16: Australian Hospital Statistics](#). 2017.

Australian Institute of Health and Welfare. [Emergency Department Care 2016–17: Australian Hospital Statistics](#). 2017.

The Independent Hospital Pricing Authority. *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM), Australian Classification of Health Interventions (ACHI) and Australian Coding Standards (ACS) — ICD-10-AM/ACHI/ACS*. 2017.

## Appendix C: Coding for opioid harm groups

**Table C1** Accidental poisoning codes

A diagnosis of one of the following:

Code	Definition
<b>X42</b>	Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified
<b>Y12</b>	Poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified, undetermined intent

In combination with any of the following:

Code	Definition
<b>T40.0</b>	Poisoning by opium
<b>T40.1</b>	Poisoning by heroin
<b>T40.2</b>	Poisoning by other opioids, i.e., codeine, morphine
<b>T40.3</b>	Poisoning by methadone
<b>T40.4</b>	Poisoning by other synthetic narcotics, i.e., pethidine
<b>T40.6<sup>‡</sup></b>	Poisoning by other and unspecified narcotics

**Notes**

<sup>‡</sup> This code includes opioids not included elsewhere. All narcotics are opioids, but not all opioids are narcotics.

X42 and Y12 will include significant diagnosis type 9 only. Other codes will include significant diagnosis types M, 1, 2, W, X and Y only.

**Table C2** Intentional poisoning codes

A diagnosis of the following:

Code	Definition
X62	Intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified

In combination with any of the following:

Code	Definition
T40.0	Poisoning by opium
T40.1	Poisoning by heroin
T40.2	Poisoning by other opioids, i.e., codeine, morphine
T40.3	Poisoning by methadone
T40.4	Poisoning by other synthetic narcotics, i.e., pethidine
T40.6 <sup>‡</sup>	Poisoning by other and unspecified narcotics

**Note**

<sup>‡</sup> This code includes opioids not included elsewhere. All narcotics are opioids, but not all opioids are narcotics.

X62 will include significant diagnosis type 9 only. Other codes will include significant diagnosis types M, 1, 2, W, X and Y only.

**Table C3** Opioid dependence codes

A diagnosis of any of the following:

Code	Definition
F11.2	Mental and behavioural disorders due to use of opioids, dependence syndrome
F11.3	Mental and behavioural disorders due to use of opioids, withdrawal state
F11.4	Mental and behavioural disorders due to use of opioids, withdrawal state with delirium

**Note**

These codes will include significant diagnosis types M, 1, 2, W, X, Y and C only.

**Table C4** Adverse drug reaction code

A diagnosis of the following:

Code	Definition
Y45.0**	Drugs, medicaments and biological substances causing adverse effects in therapeutic use, opioids and related analgesics

**Note**

This code will include significant diagnosis type 9 only.

**Table C5** Other harm codes

A diagnosis of any of the following:

Code	Definition
F11.0	Mental and behavioural disorders due to use of opioids, acute intoxication
F11.1	Mental and behavioural disorders due to use of opioids, harmful use (pattern of use)
F11.5	Mental and behavioural disorders due to use of opioids, psychotic disorder
F11.6	Mental and behavioural disorders due to use of opioids, amnesic syndrome
F11.7	Mental and behavioural disorders due to use of opioids, residual and late-onset psychotic disorder

**Note**

These codes will include significant diagnosis types M, 1, 2, W, X, Y and C only.



## Appendix D: Coding for specialized care

**Table D1** Codes for ventilation, heart resuscitation and psychiatric care

Intervention	Code	Definition
<b>Ventilation</b>	Intervention codes (identified by case mix group): Invasive approach by intubation	1GZ31CAEP Manual hand assisted (e.g. ambu bag), invasive per orifice approach by (endotracheal) intubation 1GZ31CAND invasive per orifice approach by (endotracheal) intubation 1GZ31CRND invasive per orifice with incision approach for intubation through tracheostomy Positive pressure (e.g. CPAP, BIPAP) 1GZ31CAPK pneumatic resuscitator (e.g. pneumobelt), invasive per orifice approach by (endotracheal) intubation
<b>Heart resuscitation</b>	Intervention codes (identified by case mix group)	1HZ30JN Resuscitation, heart NEC, by external manual compression with or without concomitant ventilation
<b>Psychiatric care</b>	Diagnosis codes (ICD-10)	Z00.4 General psyc exam, NEC Z03.2 Observation for suspected mental or behaviour disorder Z04.6 Psyc exam requested by authority
	Intervention codes (CCI)	Starting with 6AA (therapeutic interventions for mental health and addictions)
	Patient service	Main/sub patient service = 64

**Note**

NEC: Not elsewhere classified.

## Appendix E: Coding for other and unspecified opioids

**Table E1** Other and unspecified opioids

Drug	Code
<b>Antitussive NEC</b>	
— Codeine mixture	T40.2
— Opiate	T40.2
<b>Acemorphan</b>	T40.2
<b>Codeine (derivatives)</b>	T40.2
<b>Dihydrocodeine</b>	T40.2
<b>Dihydrocodeinone</b>	T40.2
<b>Dihydrohydroxycodeinone</b>	T40.2
<b>Dihydromorphinone</b>	T40.2
<b>Drocode</b>	T40.2
<b>Ethylmorphine</b>	T40.2
<b>Hydrocodone</b>	T40.2
<b>Hydromorphone</b>	T40.2
<b>Methylmorphine</b>	T40.2
<b>Morfin</b>	T40.2
<b>Morphine</b>	T40.2
<b>Nicomorphine</b>	T40.2
<b>Opioid NEC</b>	T40.2
<b>Oxycodone</b>	T40.2
<b>Oxymorphone</b>	T40.2
<b>Alfentanil</b>	T40.4
<b>Alphaprodine</b>	T40.4
<b>Anileridine</b>	T40.4
<b>Bezitramide</b>	T40.4
<b>Buprenorphine</b>	T40.4
<b>Butorphanol</b>	T40.4
<b>Dextromoramide</b>	T40.4
<b>Dextropropoxyphene</b>	T40.4
<b>Dipipanone</b>	T40.4
<b>Eptazocine</b>	T40.4

<b>Drug</b>	<b>Code</b>
<b>Ethoheptazine</b>	T40.4
<b>Fentanyl (derivatives)</b>	T40.4
<b>Isonipecaine</b>	T40.4
<b>Ketobemidone</b>	T40.4
<b>Levopropoxyphene</b>	T40.4
<b>Levorphanol</b>	T40.4
<b>Meperidine</b>	T40.4
<b>Nalbuphine</b>	T40.4
<b>Pentazocine</b>	T40.4
<b>Narcotic NEC</b>	T40.6
<b>— Synthetic NEC</b>	T40.4
<b>Phenazocine</b>	T40.4
<b>Phenoperidine</b>	T40.4
<b>Piritramide</b>	T40.4
<b>Profadol</b>	T40.4
<b>Propoxyphene</b>	T40.4
<b>Sufentanil</b>	T40.4
<b>Tilidine</b>	T40.4
<b>Tramadol</b>	T40.4
<b>Analgesic NEC</b>	
<b>– Narcotic NEC</b>	T40.6
<b>– – Combination</b>	T40.6
<b>– – Obstetric</b>	T40.6
<b>Narcotic NEC</b>	T40.6
<b>Opiate NEC</b>	T40.6

**Note**

NEC: Not elsewhere classified.

## Appendix F: Summary statistics for opioid harm groups

**Table F1** ED visits

Metric	Accidental poisoning (including poisoning of unknown intent)	Intentional poisoning	Opioid dependence	Adverse drug reaction	Other harm
Rate of emergency visits (per 100,000)	38.0	10.5	39.3	17.8	30.9
Percentage of all opioid harm visits	28%	8%	29%	13%	22%
Percentage men	63%	46%	56%	38%	62%
Average age	39.0	37.8	38.5	57.1	35.0
Percentage men 50 and older	13%	13%	13%	25%	5%
Percentage women 50 and older	12%	14%	10%	39%	3%
Median length of stay (hours)	5.2	7.9	3.5	3.9	3.8
Percentage who died in ED	0.5%	0.3%	0.0%	0.0%	0.1%
Percentage admitted to hospital	23.9%	52.7%	13.1%	16.8%	15.6%
Percentage who left against medical advice	8.3%	3.2%	5.5%	1.0%	7.6%
Percentage with 2+ visits in previous 6 months	37%	42%	45%	40%	49%

**Table F2** Hospital stays

Metric	Accidental poisoning (including poisoning of unknown intent)	Intentional poisoning	Opioid dependence	Adverse drug reaction	Other harm
Rate of admissions (per 100,000)	9.8	4.7	17.4	26.8	8.6
Percentage of all opioid harm admissions	15%	7%	25%	41%	12%
Percentage men	54%	42%	55%	39%	58%
Average age	49.2	43.7	42.4	67.4	41.2
Percentage men 50 and older	23%	16%	19%	34%	17%
Percentage women 50 and older	28%	24%	14%	51%	12%
Median length of stay (days)	3.0	3.0	6.0	9.0	5.0
Percentage who died in hospital	6.8%	3.1%	1.7%	7.2%	1.5%
Percentage who left against medical advice	11.7%	6.1%	17.5%	0.9%	13.5%
Percentage with 2+ admissions in previous 6 months	13.5%	9.0%	13.5%	14.6%	15.7%
Percentage with another substance recorded	39%	70%	35%	4%	57%
Rate of hospital stays in rural areas	11.1	6.2	18.6	38.9	9.3

## Appendix G: Text alternatives for figures

**Figure 1: Number of defined daily doses dispensed, Canada and Australia, 2017**

Type of opioid	Canada	Australia
Codeine	9.1	6.5
Hydromorphone	3.7	0.4
Oxycodone	3.4	3.3
Tramadol	1.4	3.1
Morphine	1.4	0.8
Fentanyl	1.3	1.0
Tapentadol	0.1	0.6
Buprenorphine	0.1	0.7

### Notes

DDD: Defined daily dose.

Defined daily doses per 1,000 population.

Data was not available for the Canadian territories.

DDDs are defined by the World Health Organization Collaborating Centre for Drug Statistics Methodology. DDD is a standardized measure of consumption that accounts for variation in potency among drugs.

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### Sources

Prepared using data from CompuScript, IQVIA (Canada) and analysis of Pharmaceutical Benefits Scheme database (Australia).

**Figure 2: Frequency of hospital visits, by opioid**

In descending order, the opioids most frequently seen in hospital are

- Natural opioids (natural and semi-synthetic), which include codeine,\* morphine, oxycodone and hydromorphone;
- Other and unspecified opioids;†
- Synthetic opioids (made in a laboratory), which include fentanyl, tramadol\* and others;
- Heroin;
- Methadone; and
- Opium.

### Notes

\* Codeine and tramadol are considered weak opioids. Other listed opioids such as morphine, oxycodone and hydromorphone are considered strong opioids.

† A complete list of other and unspecified opioids can be found in Appendix E.

### Figure 3: Profile of accidental poisonings

Accidental poisoning is defined as unintended poisoning by and exposure to opioids (includes poisoning of undetermined intent). Accidental poisoning was most common among men younger than 50. 1 in 3 of these patients had 2 or more visits to the ED in the previous 6 months. They also spent the highest number of total hours in the ED. Accidental poisonings accounted for 15% of hospital admissions for opioid harm. The most commonly attributed opioids were codeine, morphine and related derivatives. Synthetic drugs like fentanyl were less common but most often seen in men and those younger than 40.

#### Notes

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

### Figure 4: Profile of intentional poisonings

Intentional poisoning is defined as intended self-poisoning by and exposure to opioids. Intentional poisoning was most common among women younger than 50. These patients had the highest median time spent in the ED at 7.9 hours. 53% were admitted from the ED to inpatient care, the highest percentage among the 5 opioid profiles. Nevertheless, the intentional poisoning group represented the smallest number of patients with opioid harm in the ED and in hospital. They accounted for only 7% of hospital admissions for opioid harm. Intentional poisoning patients were more likely to receive care in the ICU. The most commonly attributed opioids were codeine, morphine and related derivatives. These were most often accompanied by another analgesic or sedative.

#### Notes

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

### Figure 5: Profile of opioid dependence

Opioid dependence is defined as a cluster of behavioural, cognitive and physiological phenomena that develop after repeated opioid use, including difficulties controlling opioid use, persistent use despite harmful consequences and withdrawal symptoms with cessation or reduction of use. Opioid dependence was most common among men younger than 50. This group had the highest proportion of low-income patients. 3 in 4 patients who visited the ED for opioid dependence went home after their care. Opioid dependence accounted for 25% of hospital admissions for opioid harm. Almost 1 in 5 patients left inpatient care against medical advice. Those suffering opioid dependence were also most likely to have a repeat hospitalization within 1 year. The most common co-occurring substances were alcohol or stimulants.

#### Notes

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

### Figure 6: Profile of adverse drug reactions

Adverse drug reaction is defined as an adverse reaction to opioids that were used as prescribed. Adverse drug reactions were most common among women 50 and older. They accounted for 41% of hospital admissions for opioid harm. These patients also accounted for the highest number of total days spent in hospital. Rates of hospitalizations were higher in rural areas. Patients with an adverse drug reaction were least likely to have another drug or substance associated with their hospitalization.

#### Notes

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

### Figure 7: Profile of other harms

Other harm is defined as other mental health and behavioural disorders or intoxication from opioids (includes acute intoxication or other harmful use, and other mental disorders related to opioid use). Other harm was most common among men younger than 50. Patients suffering other harm were most likely to have had 2 or more ED visits in the previous 6 months. Other harm accounted for 12% of hospital admissions for opioid harm. Most admissions were related to mental health disorders. These patients were most likely to receive psychiatric care during a hospitalization and were second most likely to leave inpatient care against medical advice.

#### Notes

Data is for 2016–2017.

Comparisons are with other types of opioid harm.

### Figure 8: ED visits for opioid harm, by year, 2010–2011 to 2016–2017

Type of harm, per 100,000 population	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017
Accidental poisoning (including poisoning of unknown intent)	15.1	17.1	18.2	18.3	21.4	27.6	38.5
Intentional poisoning	7.7	8.2	8.4	8.6	8.9	10.0	10.7
Opioid dependence	37.5	42.2	39.0	35.1	35.2	37.8	39.9
Adverse drug reaction	19.4	19.2	19.5	19.8	19.1	19.9	18.2
Other harm	12.4	14.3	13.0	14.4	16.7	23.1	31.1

#### Note

Rates were standardized using the Canadian standard population.

#### Source

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.



**Figure 9: Hospital stays for opioid harm, by year, 2010–2011 to 2016–2017**

Type of harm, per 100,000 population	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017
Accidental poisoning (including poisoning of unknown intent)	6.2	6.9	7.3	7.6	8.1	9.0	10.1
Intentional poisoning	4.0	4.4	4.4	4.4	4.5	4.9	4.9
Opioid dependence	10.8	11.9	12.5	13.4	14.9	15.9	17.8
Adverse drug reaction	26.6	27.5	28.7	28.7	27.3	28.5	27.2
Other harm	3.6	4.3	4.3	5.0	6.4	8.0	8.8

**Note**

Rates were standardized using the Canadian standard population.

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 10a: ED visits by age group, 2016–2017**

Age group	Accidental poisoning (including poisoning of unknown intent)	Intentional poisoning	Opioid dependence	Adverse drug reaction	Other harm
<1	0.2%	0.0%	0.1%	0.1%	0.0%
1–4	1.1%	0.1%	0.0%	0.2%	0.0%
5–9	0.1%	0.0%	0.0%	0.4%	0.2%
10–14	0.3%	1.4%	0.1%	0.4%	4.7%
15–19	3.6%	10.3%	2.2%	3.6%	14.7%
20–24	13.4%	12.9%	11.9%	5.4%	19.6%
25–29	16.5%	12.5%	17.4%	5.1%	18.6%
30–34	14.9%	10.1%	16.7%	5.1%	13.0%
35–39	10.1%	10.0%	12.5%	4.6%	8.5%
40–44	7.7%	8.3%	8.9%	4.8%	7.8%
45–49	6.8%	8.0%	7.4%	6.2%	4.7%
50–54	7.0%	10.6%	8.0%	6.6%	3.4%
55–59	5.5%	6.3%	6.1%	7.1%	2.0%
60–64	4.1%	4.2%	3.5%	8.3%	0.9%
65–69	2.4%	2.4%	2.2%	8.1%	0.6%
70–74	2.3%	1.4%	1.5%	7.8%	0.2%
75–79	1.5%	0.6%	0.8%	8.4%	0.5%
80–84	0.9%	0.2%	0.4%	7.0%	0.2%
85–89	0.9%	0.3%	0.3%	6.6%	0.1%
90+	0.7%	0.4%	0.1%	4.4%	0.1%

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 10b: Hospital stays by age group, 2016–2017**

Age group	Accidental poisoning (including poisoning of unknown intent)	Intentional poisoning	Opioid dependence	Adverse drug reaction	Other harm
<1	0.3%	0.0%	1.0%	0.8%	0.0%
1–4	1.0%	0.1%	0.2%	0.6%	0.0%
5–9	0.1%	0.0%	0.1%	0.4%	0.0%
10–14	0.4%	6.3%	1.4%	0.6%	0.2%
15–19	2.1%	8.8%	8.4%	1.1%	4.7%
20–24	6.8%	8.4%	12.7%	1.0%	10.3%
25–29	9.3%	9.2%	13.0%	1.4%	13.1%
30–34	8.2%	8.4%	11.7%	1.9%	13.4%
35–39	7.4%	7.8%	10.0%	2.1%	11.0%
40–44	6.2%	9.0%	8.9%	2.3%	9.7%
45–49	7.1%	11.9%	8.7%	2.9%	8.1%
50–54	9.7%	10.8%	8.7%	5.3%	8.5%
55–59	9.2%	6.5%	5.8%	6.7%	6.3%
60–64	9.0%	4.5%	4.0%	9.0%	4.8%
65–69	6.8%	3.0%	2.2%	10.5%	3.3%
70–74	5.7%	2.2%	1.2%	11.7%	2.2%
75–79	4.3%	0.8%	0.9%	11.3%	1.7%
80–84	2.4%	0.5%	0.9%	11.4%	1.2%
85–89	2.7%	0.3%	0.3%	10.3%	0.9%
90+	1.3%	0.1%	0.0%	8.7%	0.3%

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 11a: ED visits by age and gender, 2016–2017**

Type of harm	Men age 0–49	Men age 50+	Women age 0–49	Women age 50+
Accidental poisoning (including poisoning of unknown intent)	49%	13%	25%	12%
Intentional poisoning	34%	13%	40%	14%
Opioid dependence	44%	13%	33%	10%
Adverse drug reaction	13%	25%	23%	39%
Other harm	58%	5%	34%	3%

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 11b: Hospital stays by age and gender, 2016–2017**

Type of harm	Men age 0–49	Men age 50+	Women age 0–49	Women age 50+
Accidental poisoning (including poisoning of unknown intent)	31%	23%	18%	28%
Intentional poisoning	26%	16%	34%	24%
Opioid dependence	37%	19%	31%	14%
Adverse drug reaction	5%	34%	10%	51%
Other harm	41%	17%	29%	12%

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 12: Rates of hospital stays by location, 2016–2017**

Type of harm, per 100,000 population	Urban	Rural
Accidental poisoning (including poisoning of unknown intent)	9.9	11.1
Intentional poisoning	4.6	6.2
Opioid dependence	16.1	18.6
Adverse drug reaction	28.3	38.9
Other harm	7.5	9.3

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 13a: ED visits by income quintile, 2016–2017**

Type of harm	1 (low income)	2	3	4	5 (high income)
Accidental poisoning (including poisoning of unknown intent)	31%	19%	14%	14%	10%
Intentional poisoning	28%	19%	17%	16%	14%
Opioid dependence	31%	20%	16%	14%	11%
Adverse drug reaction	23%	19%	19%	20%	16%
Other harm	28%	16%	12%	11%	19%

**Note**

Values for each type of opioid harm may not add up to 100% due to missing postal codes or an out-of-country indicator.

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 13b: Hospital stays by income quintile, 2016–2017**

Type of harm	1 (low income)	2	3	4	5 (high income)
Accidental poisoning (including poisoning of unknown intent)	32%	21%	15%	14%	11%
Intentional poisoning	27%	20%	18%	16%	15%
Opioid dependence	35%	18%	13%	11%	10%
Adverse drug reaction	23%	21%	19%	19%	17%
Other harm	31%	18%	15%	12%	10%

**Note**

Values for each type of opioid harm may not add up to 100% due to missing postal codes or an out-of-country indicator.

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 14a: Proportion of ED visits for opioid harm, 2016–2017**

Type of harm	Proportion of visits
Accidental poisoning (including poisoning of unknown intent)	28%
Intentional poisoning	8%
Opioid dependence	29%
Adverse drug reaction	13%
Other harm	22%

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 14b: Total ED hours for opioid harm, 2016–2017**

Type of harm	Total ED hours
Accidental poisoning (including poisoning of unknown intent)	55,022
Intentional poisoning	23,662
Opioid dependence	43,652
Adverse drug reaction	20,901
Other harm	39,621

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 15: Arrivals to the ED by ambulance, 2016–2017**

Type of harm	Proportion arriving by ambulance
Accidental poisoning (including poisoning of unknown intent)	80%
Intentional poisoning	75%
Opioid dependence	28%
Adverse drug reaction	37%
Other harm	42%

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 16: Canadian Triage and Acuity Scale**

In order of decreasing severity, CTAS has 5 categories:

- Resuscitation (score 1)
- Emergency (score 2)
- Urgent (score 3)
- Less urgent (score 4)
- Non-urgent (score 5)

**Figure 17: Triage as resuscitation or emergency (CTAS 1 or 2) in the ED, 2016–2017**

Type of harm	Proportion triaged as resuscitation or emergency
Accidental poisoning (including poisoning of unknown intent)	76.7%
Intentional poisoning	85.9%
Opioid dependence	24.9%
Adverse drug reaction	25.9%
Other harm	42.0%

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 18: Length of stay in the ED, 2016–2017**

Type of harm	Time to physician initial assessment (hours)	Time from physician initial assessment to decision to admit (hours)	Time to inpatient admission (admitted patients only) (hours)	Total median LOS (hours)
Accidental poisoning (including poisoning of unknown intent)	0.6	4.4	2.6	5.2
Intentional poisoning	0.5	7.2	2.3	7.9
Opioid dependence	1.1	2.0	3.4	3.5
Adverse drug reaction	1.2	2.3	3.0	3.9
Other harm	1.0	3.3	3.6	3.8

**Notes**

LOS: Length of stay.

The median is the point at which 50% of patients have been treated and 50% are waiting.

Physician initial assessment is the time when the patient was first assessed by a physician.

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 19: Number of ED visits in the previous 6 months, 2016–2017**

Type of harm	No visits	1 visit	2+ visits
Accidental poisoning (including poisoning of unknown intent)	42%	21%	37%
Intentional poisoning	38%	21%	42%
Opioid dependence	35%	19%	45%
Adverse drug reaction	35%	26%	40%
Other harm	31%	20%	49%
General ED population	88%	7%	5%

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 20: Discharges from the ED, 2016–2017**

Type of harm	Discharged home with or without support	Admitted to inpatient care	Left against medical advice	Died in hospital
Accidental poisoning (including poisoning of unknown intent)	67%	24%	8%	5%
Intentional poisoning	42%	53%	3%	0%
Opioid dependence	79%	13%	5%	0%
Adverse drug reaction	82%	17%	1%	0%
Other harm	75%	16%	8%	0%
General ED population	85%	11%	4%	0%

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 21: Hospital admissions from the ED by age, 2016–2017**

Type of harm	Age 0–49	Age 50+
Accidental poisoning (including poisoning of unknown intent)	16%	46%
Intentional poisoning	47%	68%
Opioid dependence	12%	17%
Adverse drug reaction	5%	23%
Other harm	14%	38%
General ED population	6%	18%

**Source**

National Ambulatory Care Reporting System, 2016–2017, Canadian Institute for Health Information.

**Figure 22a: Proportion of hospital stays for opioid harm, 2016–2017**

Type of harm	Proportion of hospital stays
Accidental poisoning (including poisoning of unknown intent)	15%
Intentional poisoning	7%
Opioid dependence	25%
Adverse drug reaction	41%
Other harm	12%

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 22b: Total inpatient days for opioid harm, 2016–2017**

Type of harm	Total inpatient days
Accidental poisoning (including poisoning of unknown intent)	28,139
Intentional poisoning	13,264
Opioid dependence	83,340
Adverse drug reaction	184,561
Other harm	37,036

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 23: Median length of stay in hospital (days)**

The median length of stay in hospital for each group was as follows:

- Accidental poisoning (including poisoning of unknown intent): 3 days
- Intentional poisoning: 3 days
- Opioid dependence: 6 days
- Adverse drug reaction: 9 days
- Other harm: 5 days
- General medical population: 4 days

**Notes**

The general medical population excludes episodes where the major clinical category was recorded as surgical, as Pregnancy and Childbirth, or as Newborns and Neonates With Conditions Originating in the Perinatal Period. The median is the point at which 50% of patients have been treated and 50% are waiting.

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 24: Number of hospital stays in the previous 6 months, 2016–2017**

Type of harm	No stays	1 stay	2+ stays
Accidental poisoning (including poisoning of unknown intent)	68%	18%	14%
Intentional poisoning	75%	16%	9%
Opioid dependence	67%	20%	13%
Adverse drug reaction	62%	23%	15%
Other harm	63%	22%	16%
General medical population	85%	12%	3%

**Note**

The general medical population excludes episodes where the major clinical category was recorded as surgical, as Pregnancy and Childbirth, or as Newborns and Neonates With Conditions Originating in the Perinatal Period.

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.



**Figure 25: Proportion of admissions with indication of alcohol and other drugs, 2016–2017**

Type of harm	Men	Women
Accidental poisoning (including poisoning of unknown intent)	44%	34%
Intentional poisoning	66%	72%
Opioid dependence	38%	31%
Adverse drug reaction	5%	3%
Other harm	60%	53%

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 26: Specialized care in hospital, 2016–2017**

Type of harm	Psychiatric care	Ventilation ≥96 hours	Ventilation <96 hours	ICU stay
Accidental poisoning (including poisoning of unknown intent)	4%	4%	17%	40%
Intentional poisoning	25%	3%	19%	43%
Opioid dependence	20%	3%	5%	13%
Adverse drug reaction	1%	2%	4%	16%
Other harm	33%	2%	5%	14%
General medical population	5%	2%	1%	11%

**Notes**

ICU: Intensive care unit.

The general medical population excludes episodes where the major clinical category was recorded as surgical, as Pregnancy and Childbirth, or as Newborns and Neonates With Conditions Originating in the Perinatal Period.

Patients who received more than one type of specialized care are counted in each category.

Quebec is not included in the psychiatric care category due to data limitations.

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 27: Discharges from hospital, 2016–2017**

Type of harm	Discharged home with or without support	Transferred to continuing care	Left against medical advice	Died in hospital
Accidental poisoning (including poisoning of unknown intent)	74%	5%	12%	7%
Intentional poisoning	70%	15%	6%	3%
Opioid dependence	73%	3%	18%	2%
Adverse drug reaction	75%	14%	1%	7%
Other harm	77%	4%	13%	2%
General medical population	81%	8%	2%	7%

**Notes**

The general medical population excludes episodes where the major clinical category was recorded as surgical, as Pregnancy and Childbirth, or as Newborns and Neonates With Conditions Originating in the Perinatal Period.

Values for each type of opioid harm may not add up to 100%, as there are other discharge options not shown (e.g., admissions to other types of institutions).

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 28: Repeat hospital admissions within the year for opioid harms, 2016–2017**

Type of harm	Proportion with repeat admissions
Accidental poisoning (including poisoning of unknown intent)	3.8%
Intentional poisoning	1.9%
Opioid dependence	13.2%
Adverse drug reaction	2.6%
Other harm	8.4%

**Source**

Hospital Morbidity Database, 2016–2017, Canadian Institute for Health Information.

**Figure 29: Opioids responsible for hospital stays for poisoning, 2016–2017**

Country	1	2	3
Canada	Natural opioids	Other and unspecified opioids	Synthetic opioids
Australia	Natural opioids	Synthetic opioids	Heroin

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