



Report

December 2018

Opioid-Related Harms in Canada



Canadian Institute
for Health Information
Institut canadien
d'information sur la santé

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ISBN 978-1-77109-767-3 (PDF)

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How to cite this document:

Canadian Institute for Health Information. *Opioid-Related Harms in Canada, December 2018*. Ottawa, ON: CIHI; 2018.

Cette publication est aussi disponible en français sous le titre *Préjudices liés aux opioïdes au Canada, décembre 2018*.

ISBN 978-1-77109-768-0 (PDF)

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About this report

This report presents data on opioid-related hospitalizations and emergency department (ED) visits. For the first time, the Canadian Institute for Health Information (CIHI) is reporting information on 4 types of opioid harm: opioid poisonings, opioid use disorders, adverse drug reactions and neonatal withdrawal symptoms. Together, these categories provide a comprehensive picture of opioid-related harm in Canada.

The hospitalization analysis includes 2013 to 2018 data from all provinces and territories (except Quebec, where the most recent data available at the time of release was from 2016).

The ED analysis is based on available, comparable data. At the time of release, this included 2013 to 2018 data from Ontario, Alberta and Yukon.

[Supplementary data tables](#) accompany this report and are available online. The data tables provide more detailed breakdowns and trending information for opioid-related hospitalizations and ED visits.

CIHI will continue to update these analyses as more data becomes available.



Key findings

- Rates of harm due to opioid poisoning continue to rise across Canada — hospitalizations increased by 27% over the past 5 years.
- Between 2016 and 2017,
 - The rate of hospitalizations due to opioid poisoning increased by 8% in Canada, resulting in an average of 17 hospitalizations each day.
 - Despite continued national growth in the rate of hospitalizations due to opioid poisoning, several jurisdictions reported slight decreases in 2017.
 - In Ontario and Alberta, rates of ED visits due to opioid poisoning increased by 73% and 23%, respectively.
 - The fastest-growing rates of hospitalizations and ED visits due to opioid poisoning were seen among males age 25 to 44.
- Opioid poisonings affect small and suburban communities across Canada as well as large urban centres.
 - Rates of hospitalizations due to opioid poisoning are highest in communities with a population between 50,000 and 99,999.



Key findings

- Poisonings are the most serious and visible harms of opioid misuse. Other opioid-related harms that often require medical attention include opioid use disorders, adverse drug reactions and neonatal withdrawal symptoms.
 - Hospitalizations and ED visits due to poisonings and opioid use disorders are increasing, while those due to adverse drug reactions are declining slightly.
 - Hospitalizations due to neonatal withdrawal symptoms are also increasing.

Opioids are effective drugs that play an important role in pain management for many Canadians. But opioids, either prescribed or obtained from illicit sources, can cause a variety of harms.

Opioid-related harms

Hospitalizations due to opioid poisonings have been an important focus of public health programs; however, hospitalizations also occur due to opioid use disorders, adverse drug reactions and neonatal withdrawal symptoms. With the exception of adverse drug reactions, opioid-related harms can be caused by either prescription or illicit opioids.

Types of opioid-related harm

Opioid poisoning occurs when an opioid is taken incorrectly and results in harm.

Opioid use disorders include a wide variety of mental health and behavioural disorders that are attributable to the use of opioids.

Adverse drug reaction occurs when an opioid is taken as prescribed and results in harm.

Neonatal withdrawal symptoms occur when an infant experiences withdrawal symptoms from the mother's use of drugs of addiction. These include neonatal abstinence syndrome and drug withdrawal syndrome.

Notes

With the exception of adverse drug reactions, opioid-related harms can be caused by either prescription or illicit opioids.

Full definitions of these harms can be found in Appendix B.



Hospitalizations due to opioid poisoning

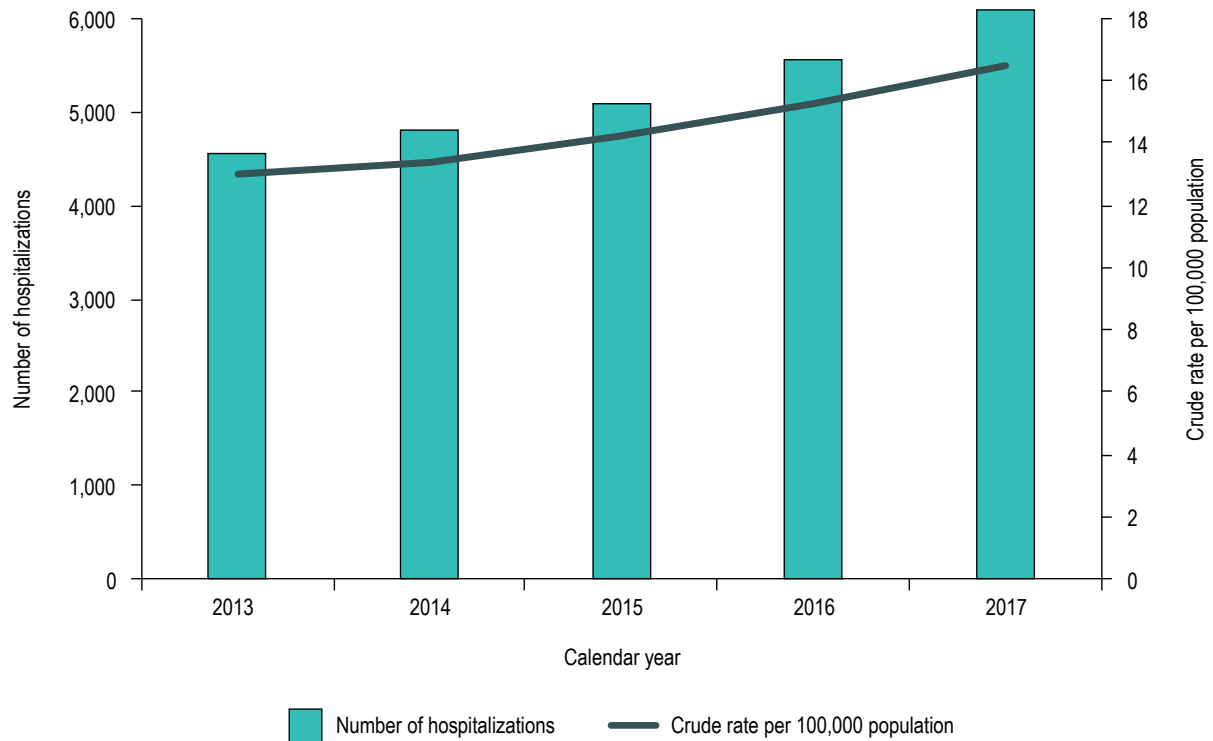
What is an opioid poisoning?

An opioid poisoning occurs when an opioid is taken incorrectly and results in harm.

Incorrect use of opioids can include

- Wrong dosage taken;
- Self-prescribed opioids taken in combination with another prescribed drug or alcohol; and
- Opioid not taken as recommended (whether the opioid was prescribed or illegally obtained).

Figure 1: Opioid poisoning hospitalizations, Canada, 2013 to 2017



From 2016 to 2017

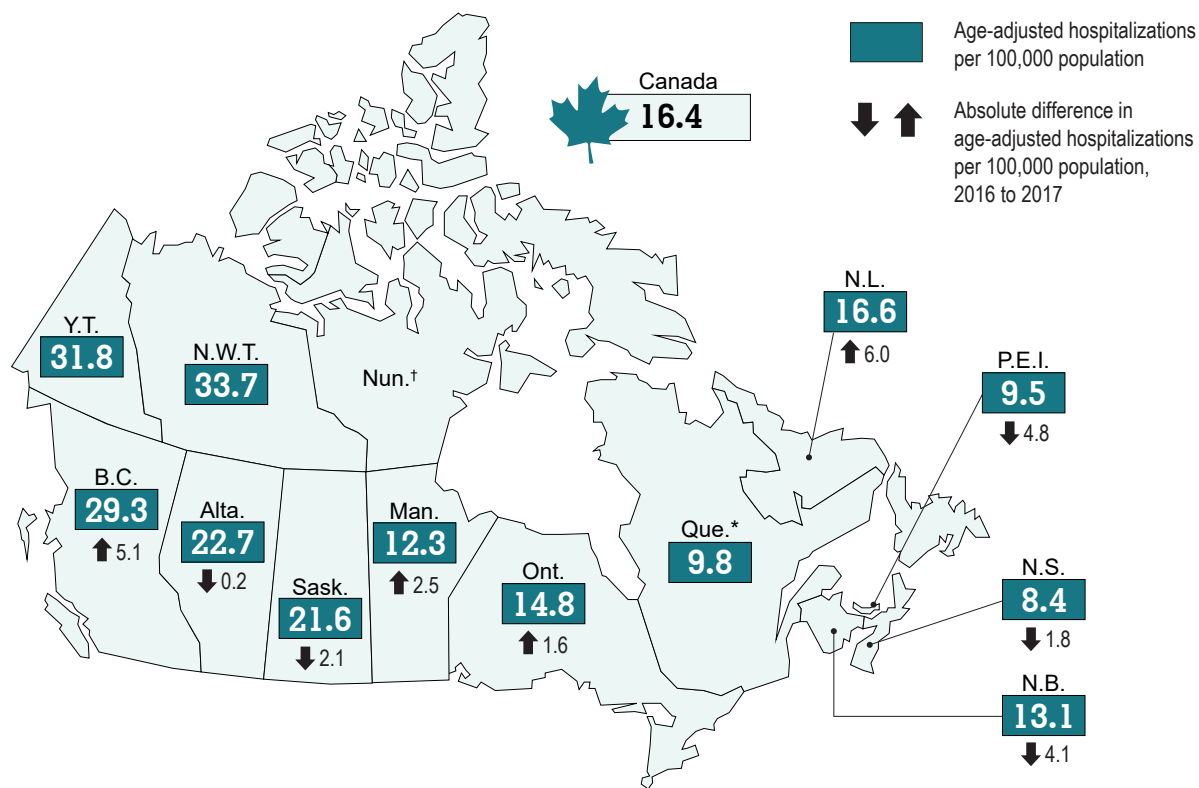
Number of opioid poisoning hospitalizations

per 100,000 population

↑ 8%

Note
Quebec data is from 2016 (the most recent year of data available).
Source
Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 2: Opioid poisoning hospitalizations by province/territory and Canada, 2017



The Northern and Western regions of Canada continue to have the highest rates of hospitalizations due to opioid poisoning.

Rates have increased in Newfoundland and Labrador, Ontario, Manitoba and British Columbia, while they've decreased in the other provinces.

Notes

* Quebec data is from 2016 (the most recent year of data available).

† CIHI did not receive Nunavut records for hospitalizations between September 1, 2016, and March 31, 2017.

Absolute rate differences are not reported for Yukon, the Northwest Territories and Nunavut due to variability resulting from low volumes.

Source

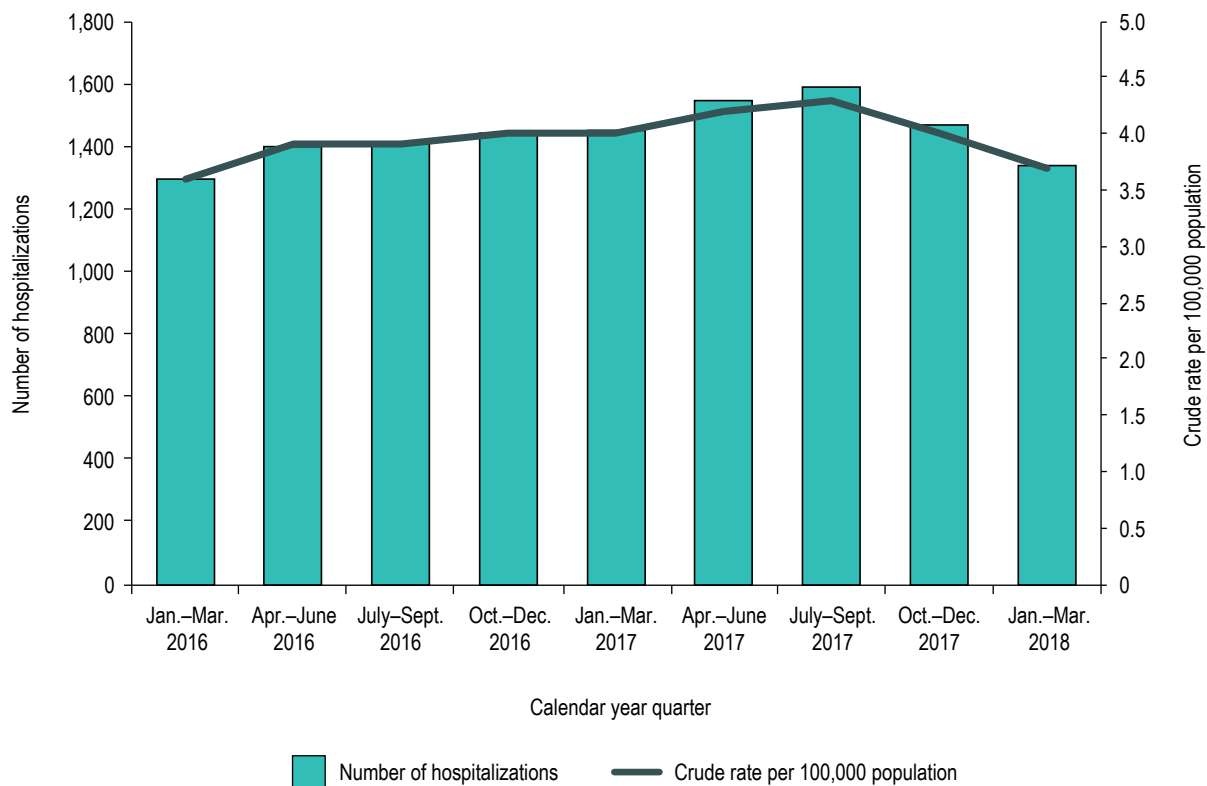
Hospital Morbidity Database, Canadian Institute for Health Information.

Despite continued national growth in the rate of hospitalizations due to opioid poisoning, several jurisdictions reported slight decreases in 2017.

In part, these decreases are a result of pan-Canadian, provincial, local and neighbourhood initiatives aimed at reducing the harms associated with opioids. Some of these initiatives include

- New pan-Canadian prescribing guidelines (*The 2017 Canadian Guideline for Opioids for Chronic Non-Cancer Pain*);¹
- An increased number of supervised consumption sites and overdose prevention sites;
- Provincial prescription monitoring programs that assist prescribers and pharmacists;
- Increased availability of naloxone without a prescription to people who use drugs, and to their families and friends;
- The *Good Samaritan Drug Overdose Act*; and
- Public awareness campaigns about the risks of illegally obtained opioids.

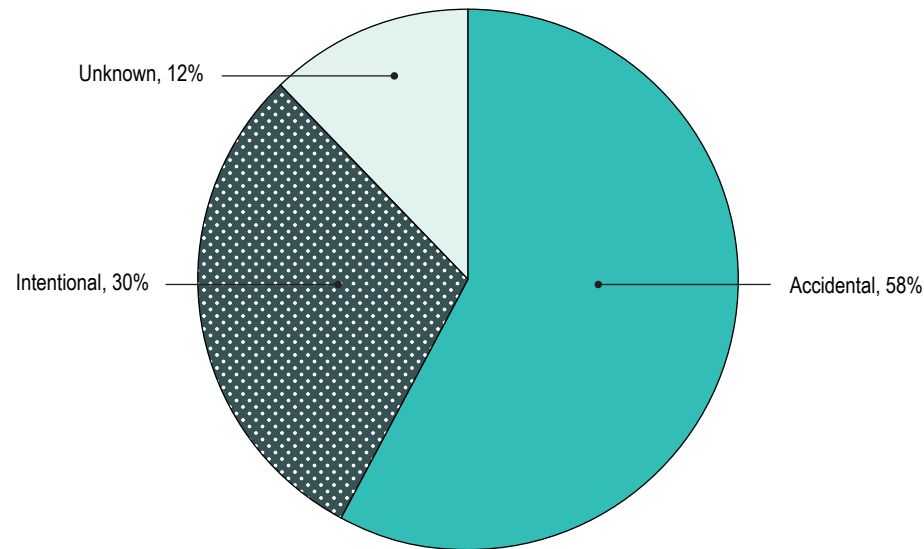
Figure 3: Opioid poisoning hospitalizations by quarter, Canada, Q1 2016 to Q1 2018



Canada saw a decreasing trend in hospitalizations due to opioid poisonings between Q3 2017 (July to September) and Q1 2018 (January to March).

Note
Quebec data is from 2016 (the most recent year of data available).
Source
Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 4: Reasons for opioid poisoning hospitalizations, Canada, 2017



In 2017, more than half of opioid poisoning hospitalizations were due to accidental causes, while almost one-third were due to intentional causes.

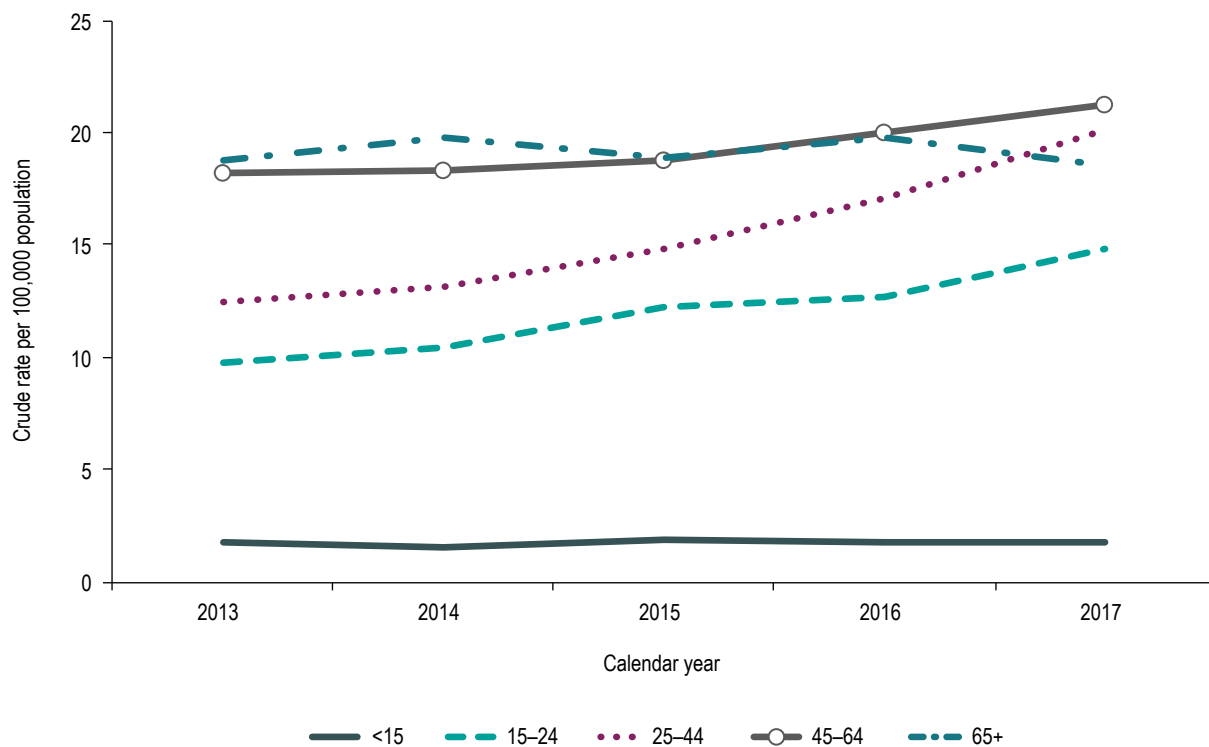
Note

Quebec data is from 2016 (the most recent year of data available).

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

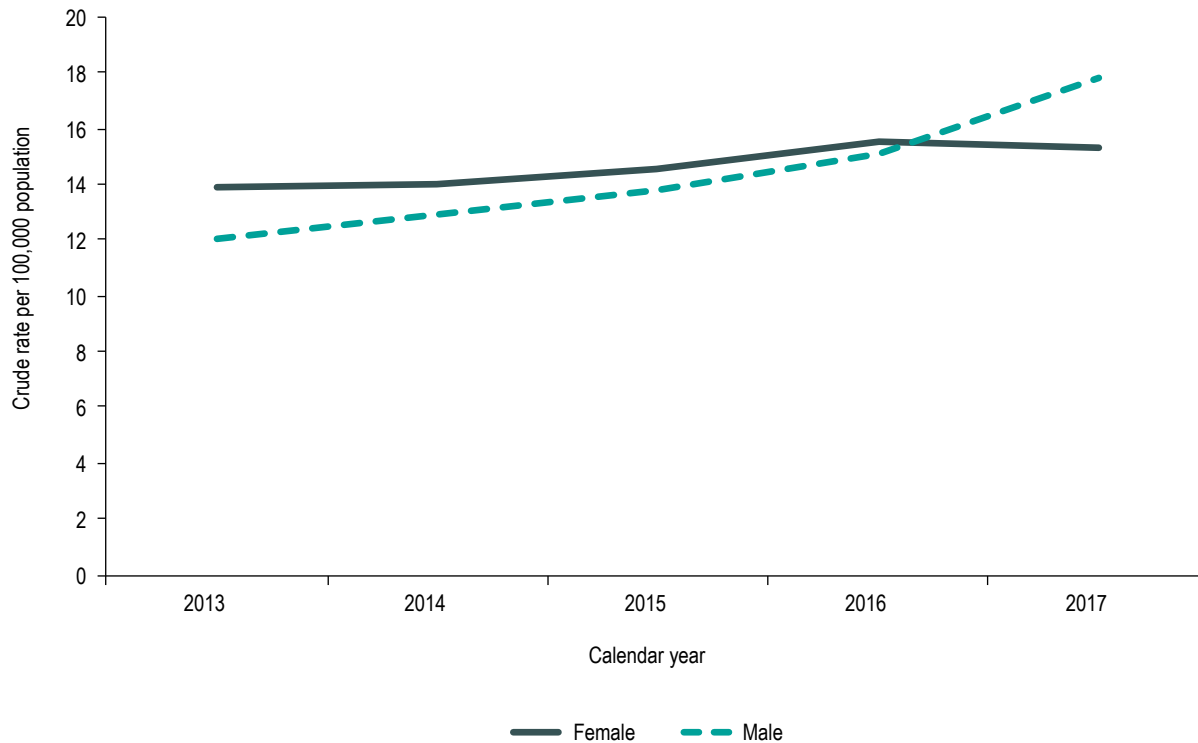
Figure 5: Opioid poisoning hospitalizations by age, Canada, 2013 to 2017



Over the past 5 years, younger adults age 25 to 44 and youth age 15 to 24 had the fastest-growing rates of opioid poisonings, with increases of 62% and 53%, respectively.

Note
Quebec data is from 2016 (the most recent year of data available).
Source
Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 6: Opioid poisoning hospitalizations by sex, Canada, 2013 to 2017



Over the past 5 years, the rate of opioid poisoning hospitalizations increased by 48% among males and 10% among females.

The decrease seen among females between 2016 and 2017 can primarily be attributed to the 65+ age group.

Note

Quebec data is from 2016 (the most recent year of data available).

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 7a: Opioid poisoning hospitalizations by age group, Canada, 2013 to 2017: Males

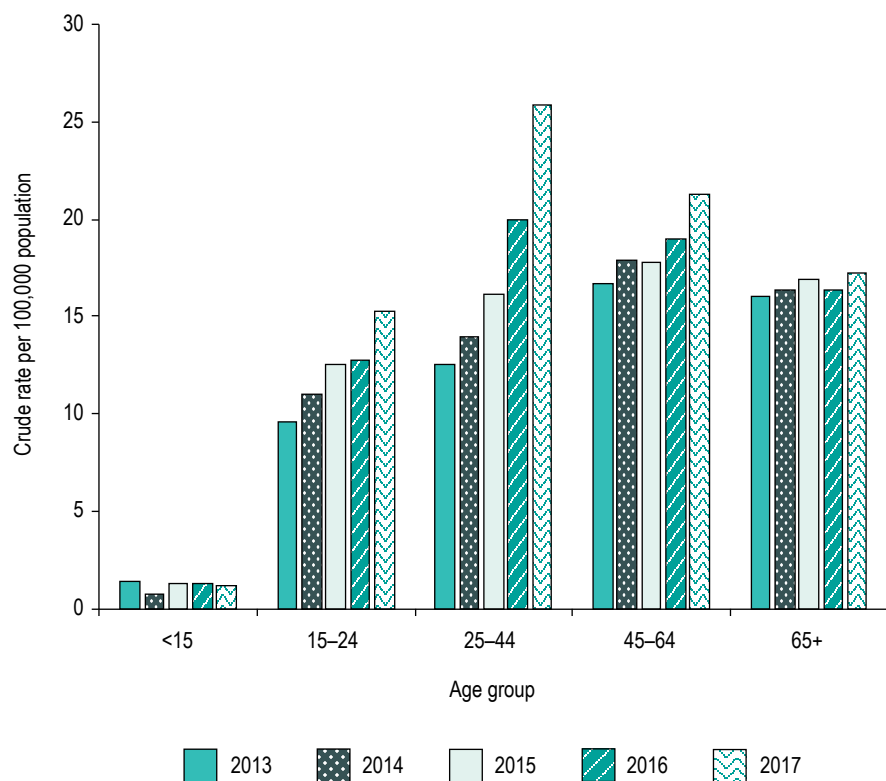
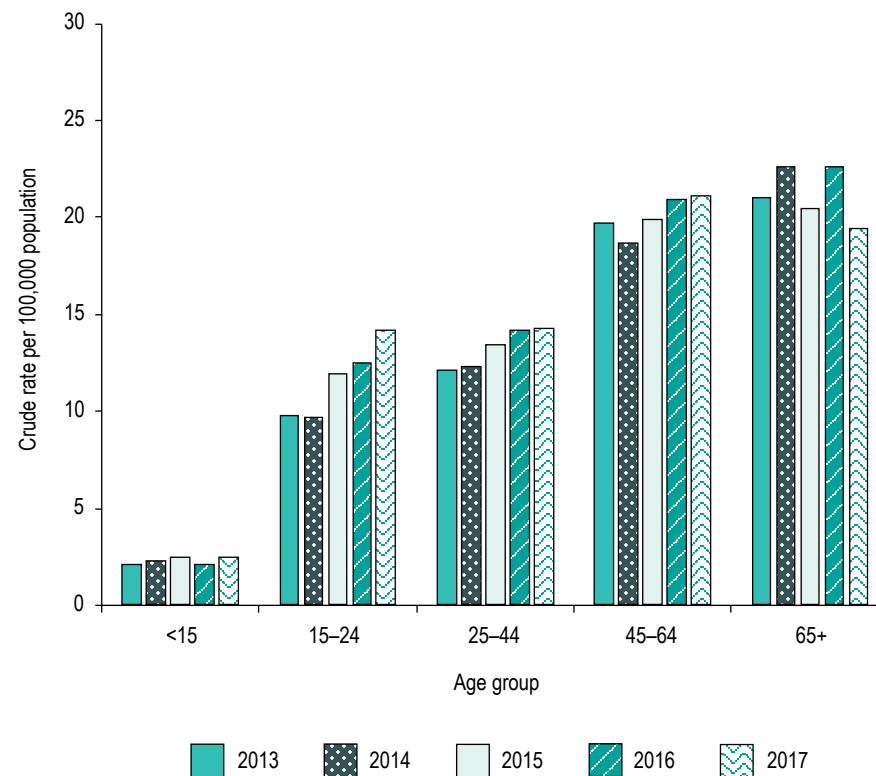


Figure 7b: Opioid poisoning hospitalizations by age group, Canada, 2013 to 2017: Females



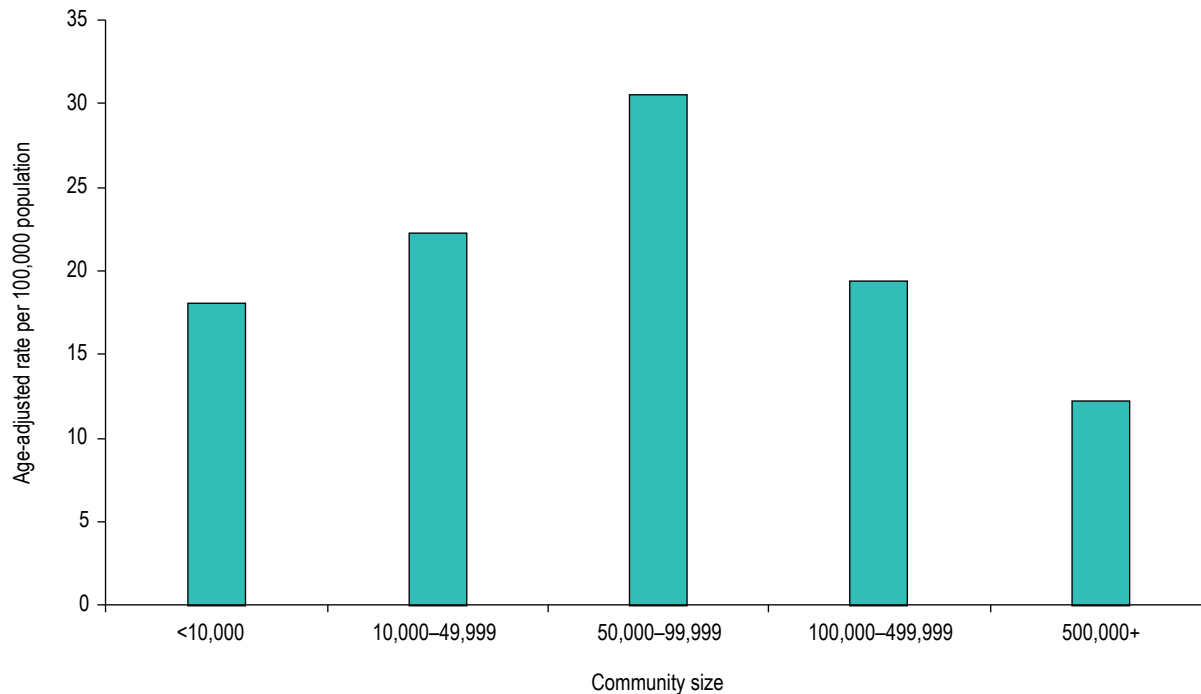
Note
Quebec data is from 2016 (the most recent year of data available).
Source
Hospital Morbidity Database, Canadian Institute for Health Information.



Community rates of opioid poisoning hospitalizations

The following is an expanded local-level analysis that aims to provide a more comprehensive and in-depth view of opioid-related harms across Canada. In this section we examine hospitalizations at the census metropolitan area (CMA) and census subdivision (CSD) levels.

Figure 8: Rates of hospitalizations due to opioid poisoning by community size, Canada, 2017



Rates of hospitalizations due to opioid poisoning are highest for patients who live in communities with a population between 50,000 and 99,999.

Communities with a population greater than 500,000 have the lowest rates of hospitalizations.

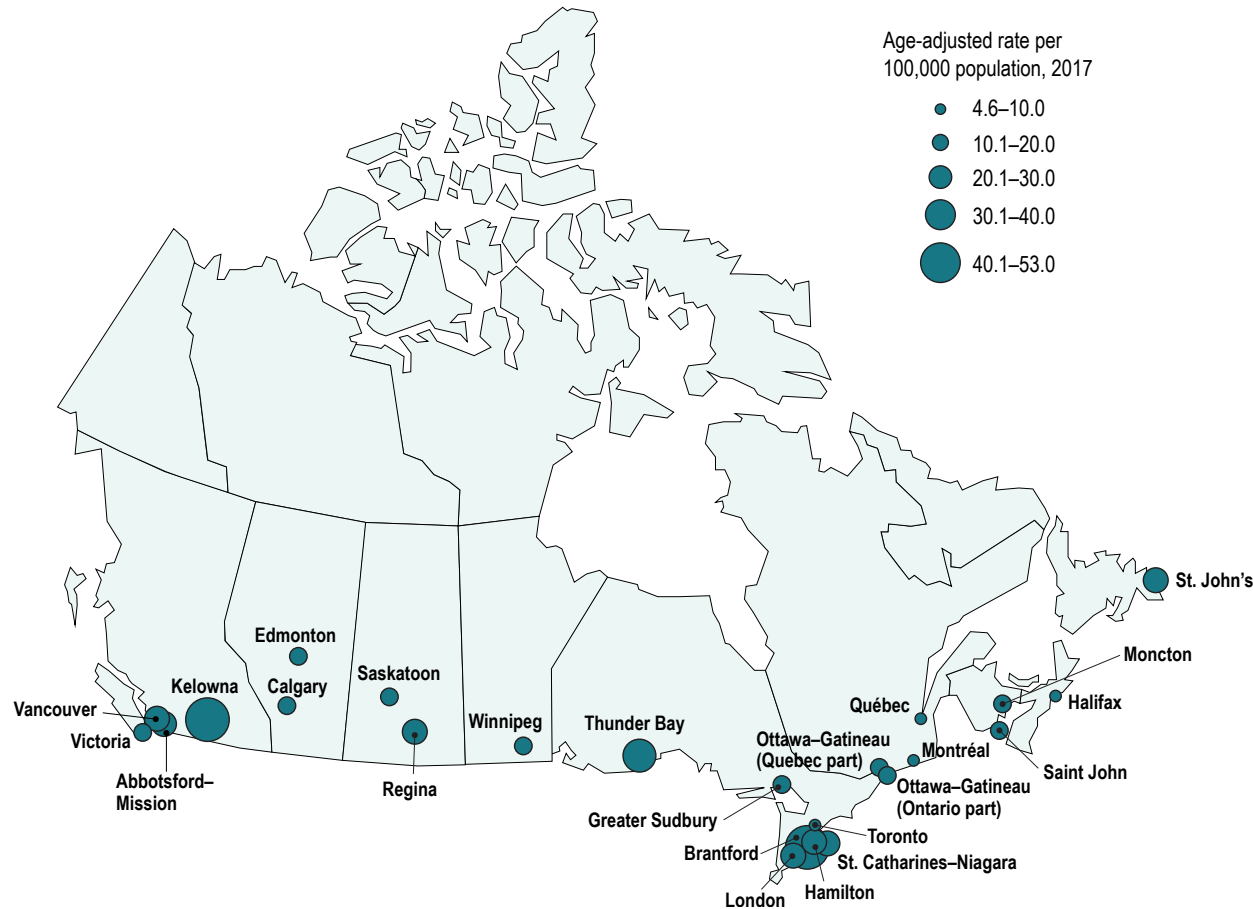
Note

Quebec data and population data are from 2016 (the most recent year of data available).

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 9: Opioid poisoning hospitalization rates, census metropolitan areas, Canada, 2017



Notes

Quebec data is from 2016 (the most recent year of data available).

To be considered a CMA, the area must have a total population of at least 100,000, of which 50,000 or more live in the urban core.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Table 1 Highest rates of opioid poisoning hospitalizations by census metropolitan area, Canada, 2017

CMA	Province	Number of hospitalizations	Age-adjusted rate per 100,000 population	Absolute rate difference, 2016 to 2017
Kelowna	B.C.	101	52.8	22.7
Brantford	Ont.	59	41.2	16.9
Thunder Bay	Ont.	42	34.7	10.1
St. Catharines–Niagara	Ont.	116	27.1	8.5
Abbotsford–Mission	B.C.	51	26.7	-3.6
London	Ont.	119	22.5	-1.4
Regina	Sask.	54	21.4	1.3
St. John's	N.L.	48	21.0	11.9
Vancouver	B.C.	536	20.4	5.1
Hamilton	Ont.	159	20.2	2.1
Saskatoon	Sask.	62	19.7	-0.8
Greater Sudbury	Ont.	31	19.1	3.8
Victoria	B.C.	73	18.7	-1.5
Edmonton	Alta.	253	18.5	-3.0
Calgary	Alta.	251	17.8	2.1

Notes

To be considered a CMA, the area must have a total population of at least 100,000, of which 50,000 or more live in the urban core.

This table shows the 15 CMAs with the highest rates of opioid poisoning hospitalizations. Please see Appendix A for the rates for all CMAs.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Table 2 Highest rates of opioid poisoning hospitalizations by census subdivision, Canada, 2017

Census subdivision	Province	Number of hospitalizations	Age-adjusted rate per 100,000 population	Absolute rate difference, 2016 to 2017
Nanaimo	B.C.	49	57.7	10.9
Prince George	B.C.	43	57.7	25.1
City of Kelowna	B.C.	69	54.7	18.5
City of Brantford	Ont.	52	52.8	23.8
Kamloops	B.C.	47	51.6	14.2
Belleville	Ont.	23	48.4	10.7
Medicine Hat	Alta.	26	43.8	-0.8
Sault Ste. Marie	Ont.	30	43.3	6.0
City of Victoria	B.C.	36	40.4	14.4
St. Catharines	Ont.	54	38.4	15.3
Port Coquitlam	B.C.	23	37.4	10.4
City of Thunder Bay	Ont.	40	37.1	11.0
Surrey	B.C.	178	35.1	16.1
Grande Prairie	Alta.	19	32.0	3.1
Red Deer	Alta.	33	30.9	2.4

Notes

CSD is the general term for municipalities as determined by provincial/territorial legislation.

This table shows the 15 CSDs with a population of 50,000 or more with the highest rates of opioid poisoning hospitalizations. Please see the associated data tables for a more comprehensive list of CSDs.

Source

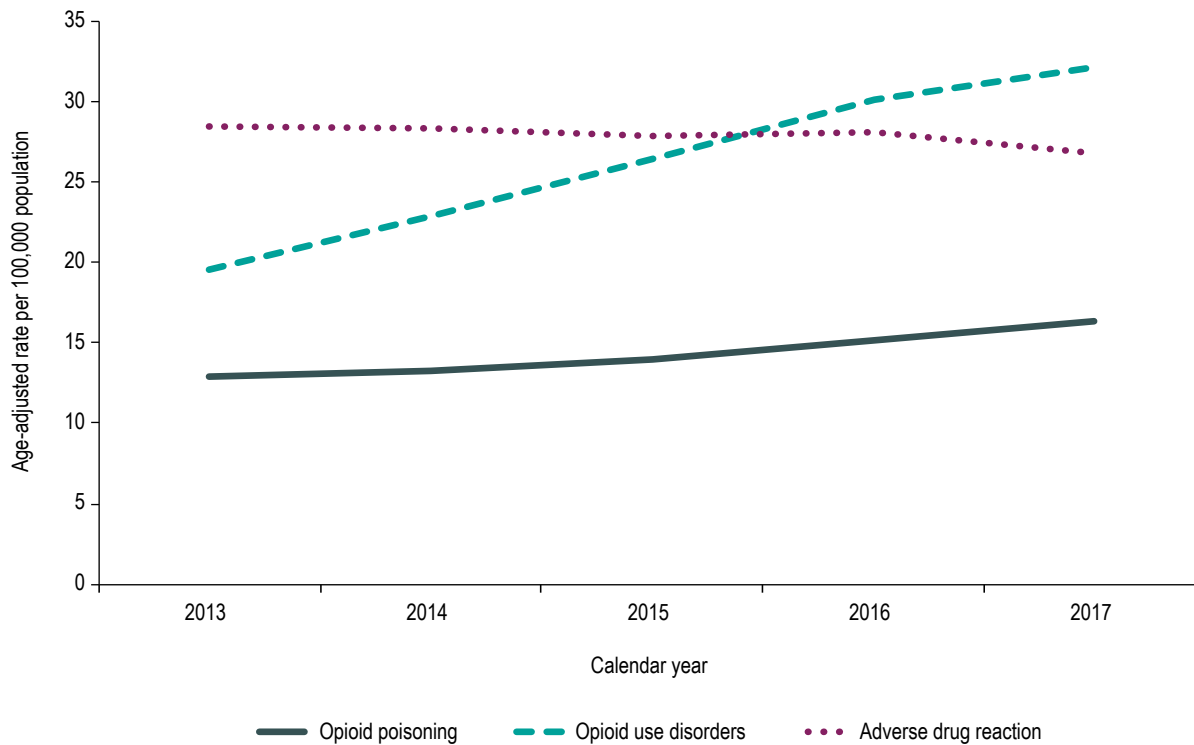
Hospital Morbidity Database, Canadian Institute for Health Information.



Other opioid-related harms

The following presents hospitalization rates due to opioid use disorders, adverse drug reactions and neonatal withdrawal symptoms.

Figure 10: Opioid-related hospitalizations, Canada, 2013 to 2017



Opioid poisonings have been an important focus of public health programs due to their associated acute harms; however, it is valuable to note that opioid use and misuse can result in other types of harm.

A variety of strategies are necessary to address the different types of harm.

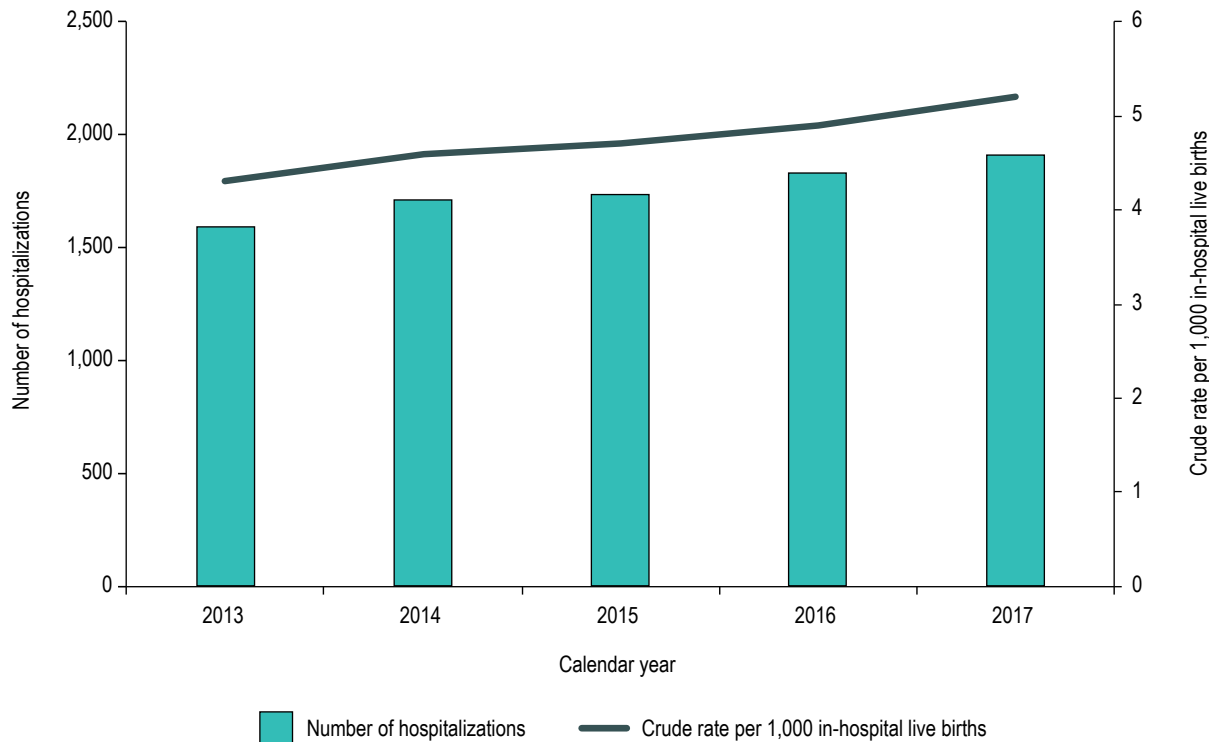
Notes

Quebec data is from 2016 (the most recent year of data available).
 For full definitions of opioid-related harms, refer to Appendix B.

Sources

Hospital Morbidity Database and Ontario Mental Health Reporting System, Canadian Institute for Health Information.

Figure 11: Hospitalizations for neonatal withdrawal symptoms, Canada, 2013 to 2017



Across Canada, the rate of hospitalizations for neonatal withdrawal symptoms increased by 21% between 2013 and 2017.

Neonatal abstinence syndrome occurs in 55% to 94% of infants exposed to opioids in utero.² It is rarely fatal but can be associated with significant health care costs, as the diagnosis often results in prolonged hospital stays.³

Notes

Quebec data is from 2016 (the most recent year of data available).
For full definitions of opioid-related harms, refer to Appendix B.

Source

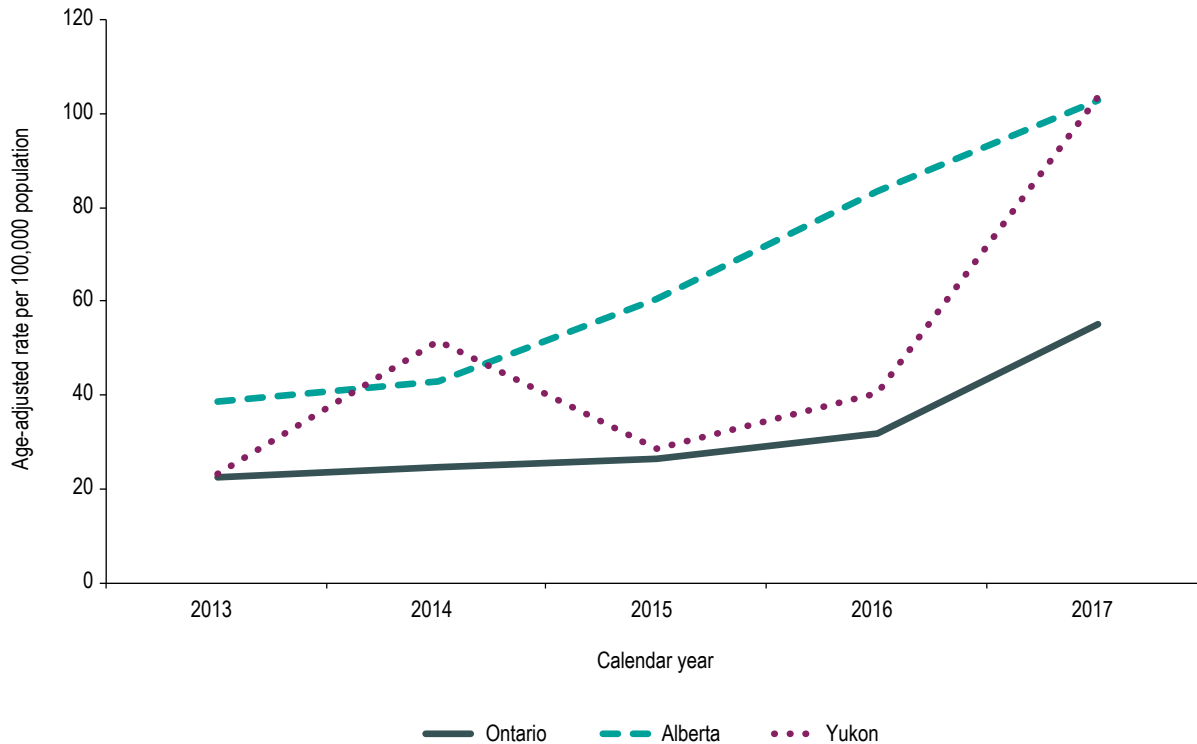
Hospital Morbidity Database, Canadian Institute for Health Information.



ED visits due to opioid poisonings

The analysis of ED visits is currently limited to Ontario, Alberta and Yukon. Although CIHI collects ED data from other jurisdictions, these submissions do not yet include the level of detail or coverage required for this analysis.

Figure 12: Opioid poisoning ED visits, Ontario, Alberta and Yukon,* 2013 to 2017



Over the past 5 years, the rates of opioid poisoning ED visits have increased significantly.

Between 2016 and 2017, the rates of opioid poisoning ED visits in Ontario and Alberta increased by 73% and 23%, respectively.

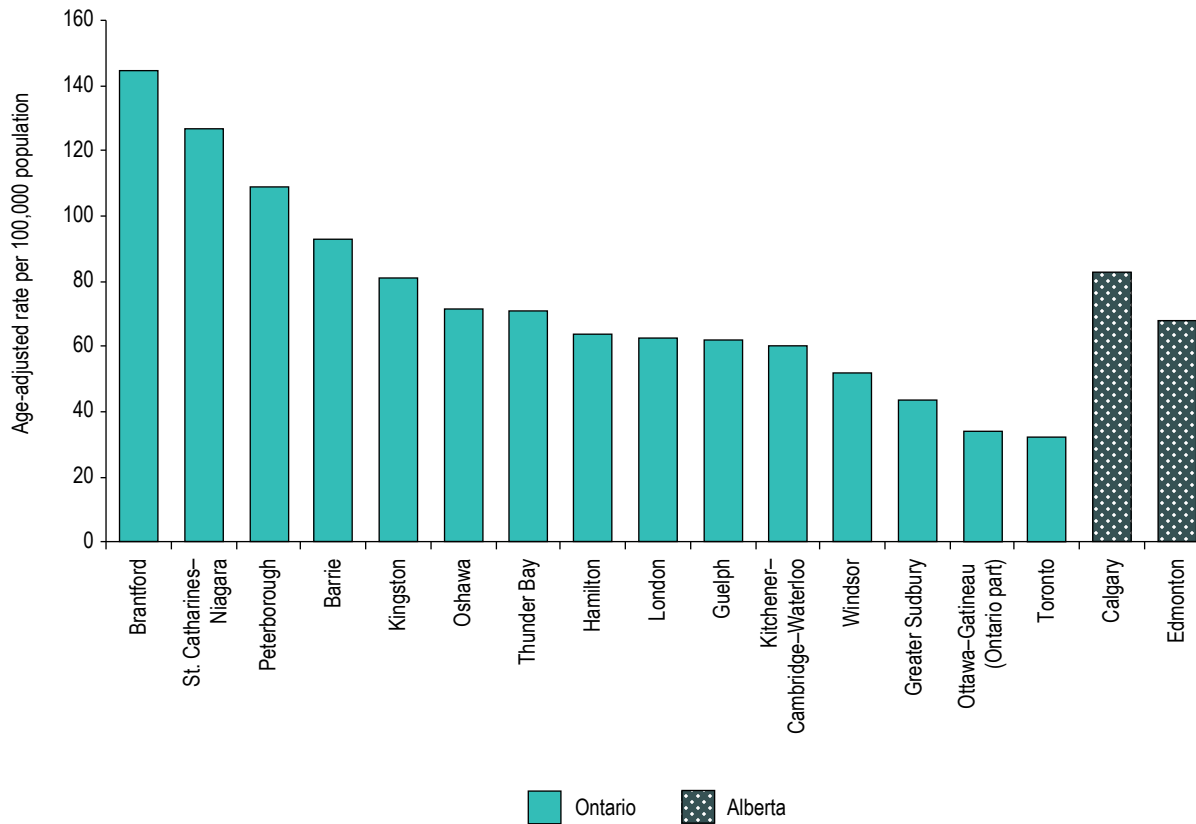
Note

* Due to the low number of ED visits in Yukon, trends must be interpreted with caution.

Source

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

Figure 13: Opioid poisoning ED visits by census metropolitan area, Ontario and Alberta, 2017



Opioid poisoning ED visits are not restricted to urban areas in Canada — smaller cities across the country are also experiencing them.

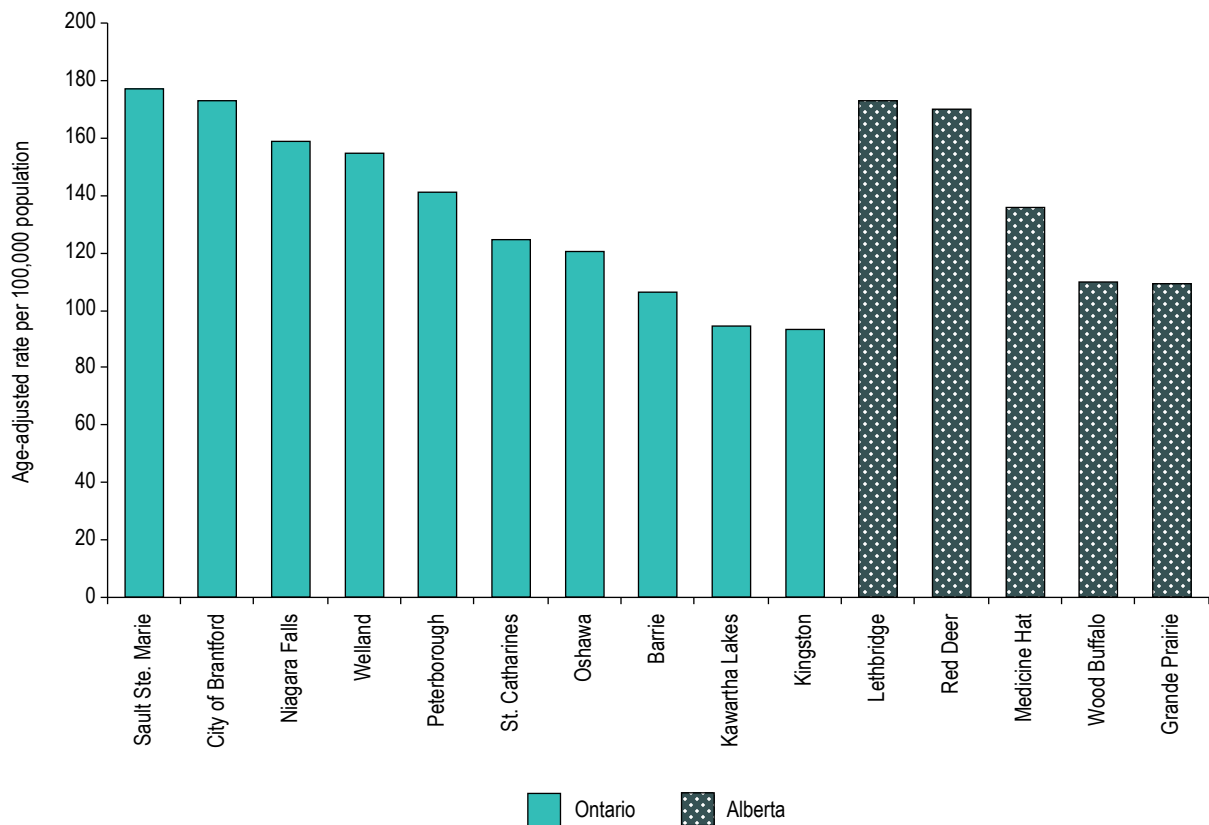
Note

To be considered a CMA, the area must have a total population of at least 100,000, of which 50,000 or more live in the urban core.

Source

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

Figure 14: Highest rates of opioid poisoning ED visits by census subdivision, Ontario and Alberta, 2017



Rates of opioid poisoning ED visits varied by census subdivision.

Notes

CSD is the general term for municipalities as determined by provincial/territorial legislation.

This figure shows the 15 CSDs in Ontario and Alberta with a population of 50,000 or more with the highest rates of opioid poisoning ED visits. Please see the associated data tables for a more comprehensive list of CSDs.

Source

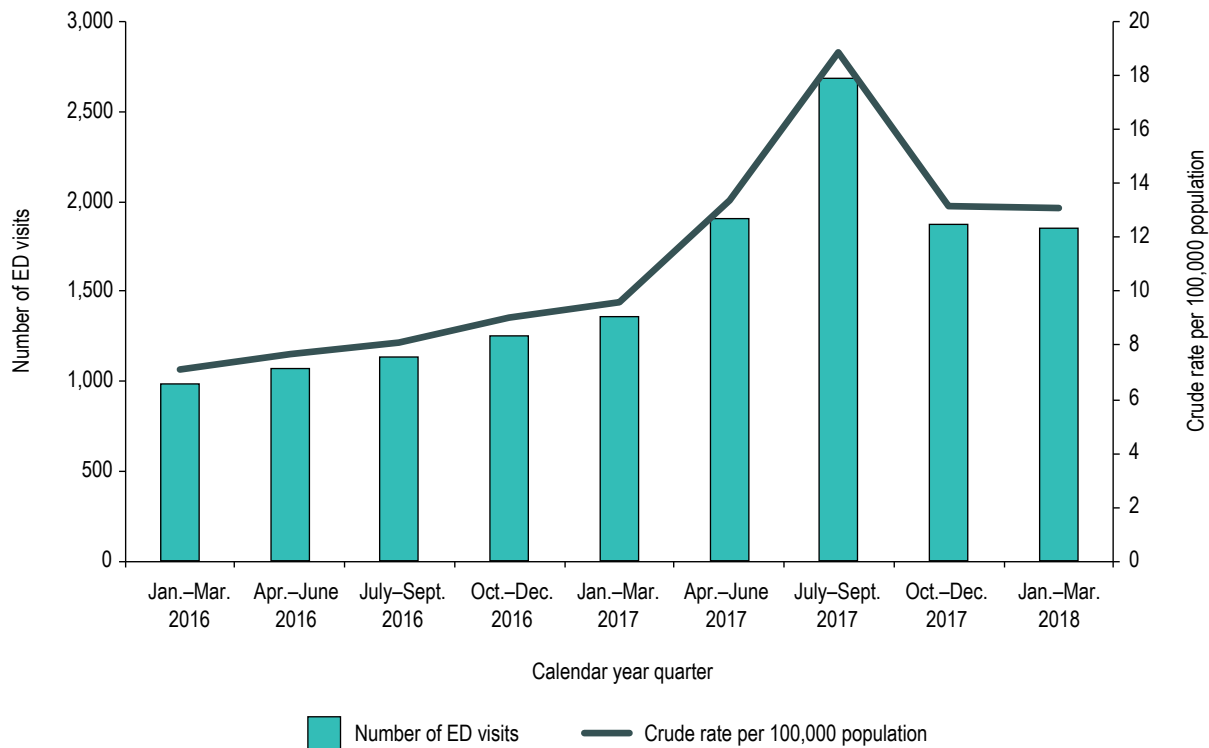
National Ambulatory Care Reporting System, Canadian Institute for Health Information.



Ontario ED visits

Between 2016 and 2017, the rate of ED visits due to opioid poisoning increased by 73%, to 55.3 per 100,000. The increase was mostly due to male younger adults age 25 to 44.

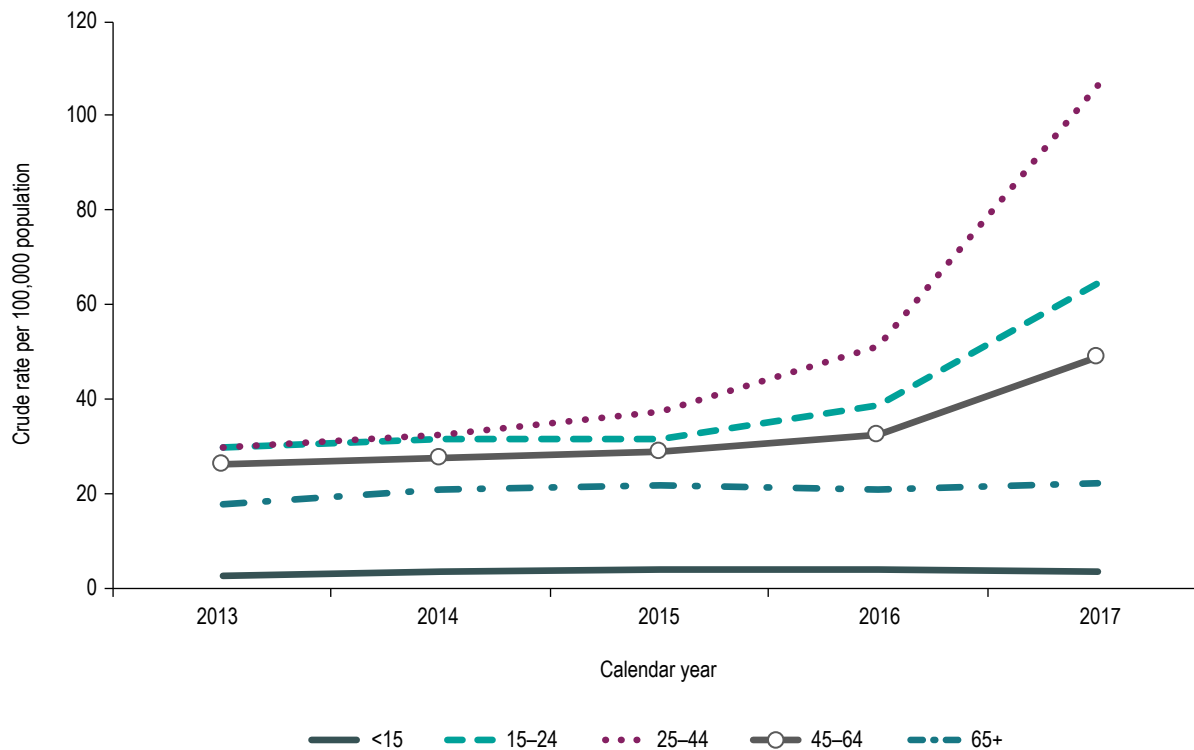
Figure 15: Opioid poisoning ED visits by quarter, Ontario, Q1 2016 to Q1 2018



As of April 2017, as part of a comprehensive strategy to prevent opioid addiction and overdose, the Ontario Ministry of Health and Long-Term Care requires all Ontario facilities to provide weekly submissions of ED opioid overdose cases to CIHI.

Source
National Ambulatory Care Reporting System, Canadian Institute for Health Information.

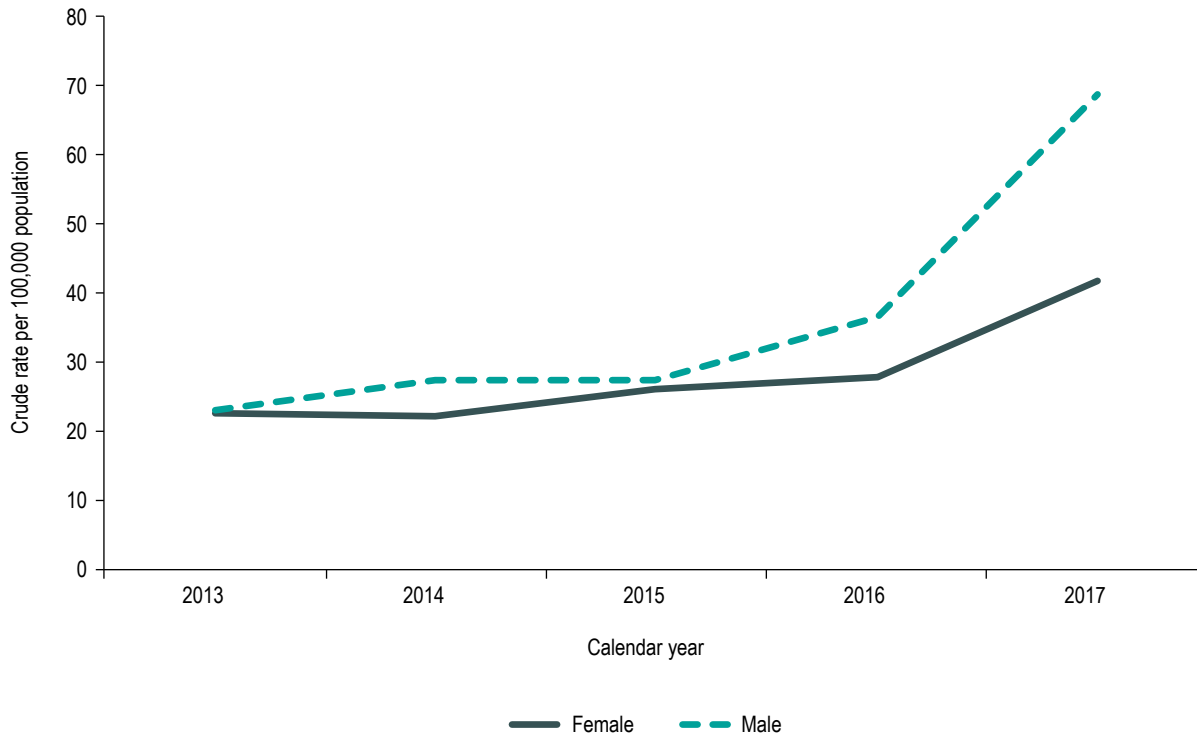
Figure 16: Opioid poisoning ED visits by age group, Ontario, 2013 to 2017



The rate of opioid poisoning ED visits for younger adults age 25 to 44 doubled between 2016 and 2017, increasing more than the rate for any other age group.

Source
National Ambulatory Care Reporting System, Canadian Institute for Health Information.

Figure 17: Opioid poisoning ED visits by sex, Ontario, 2013 to 2017



The rate of ED visits for opioid poisonings increased by 90% among males and 50% among females between 2016 and 2017.

Source

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

Figure 18a: Opioid poisoning ED visits by age group, Ontario, 2013 to 2017: Males

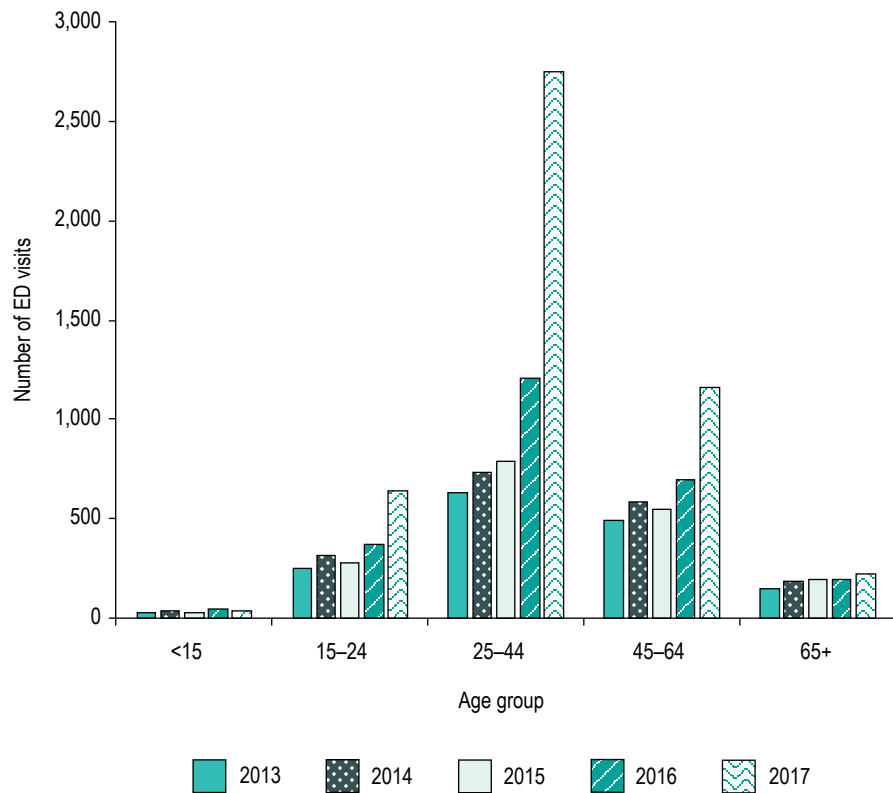
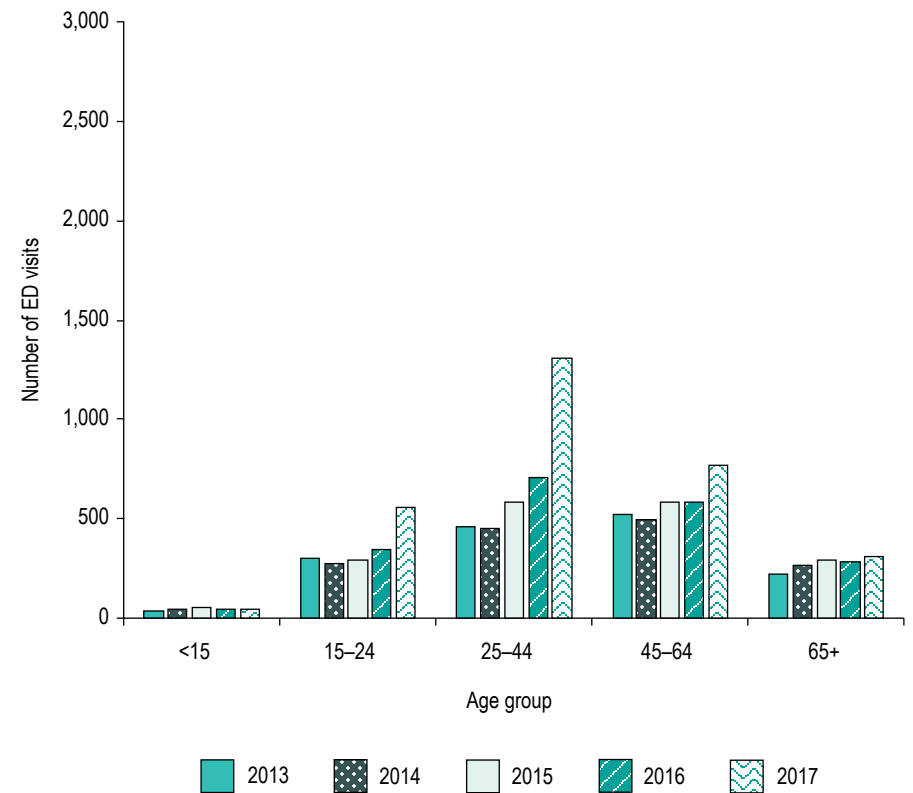
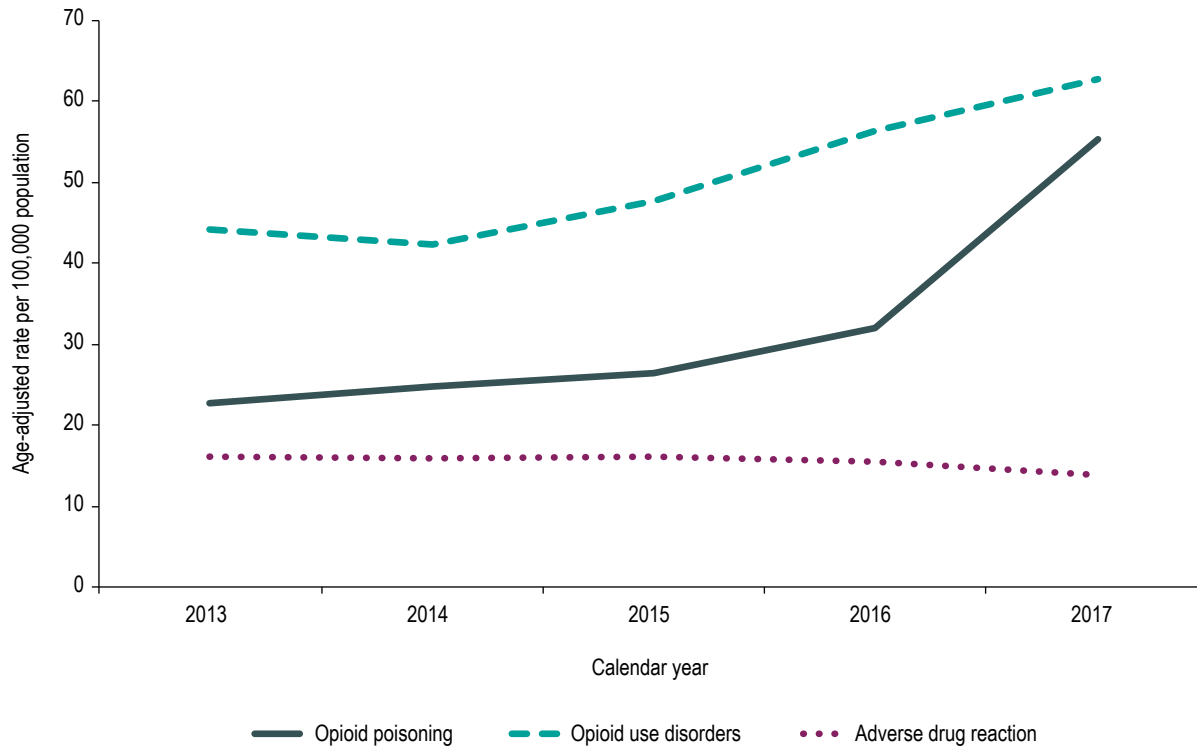


Figure 18b: Opioid poisoning ED visits by age group, Ontario, 2013 to 2017: Females



Source
National Ambulatory Care Reporting System, Canadian Institute for Health Information.

Figure 19: ED visits for opioid-related harms, Ontario, 2013 to 2017



Over the past 5 years, rates of ED visits due to opioid poisoning increased by 144%, while rates due to opioid use disorders increased by 42%.

Note

For full definitions of opioid-related harms, refer to Appendix B.

Source

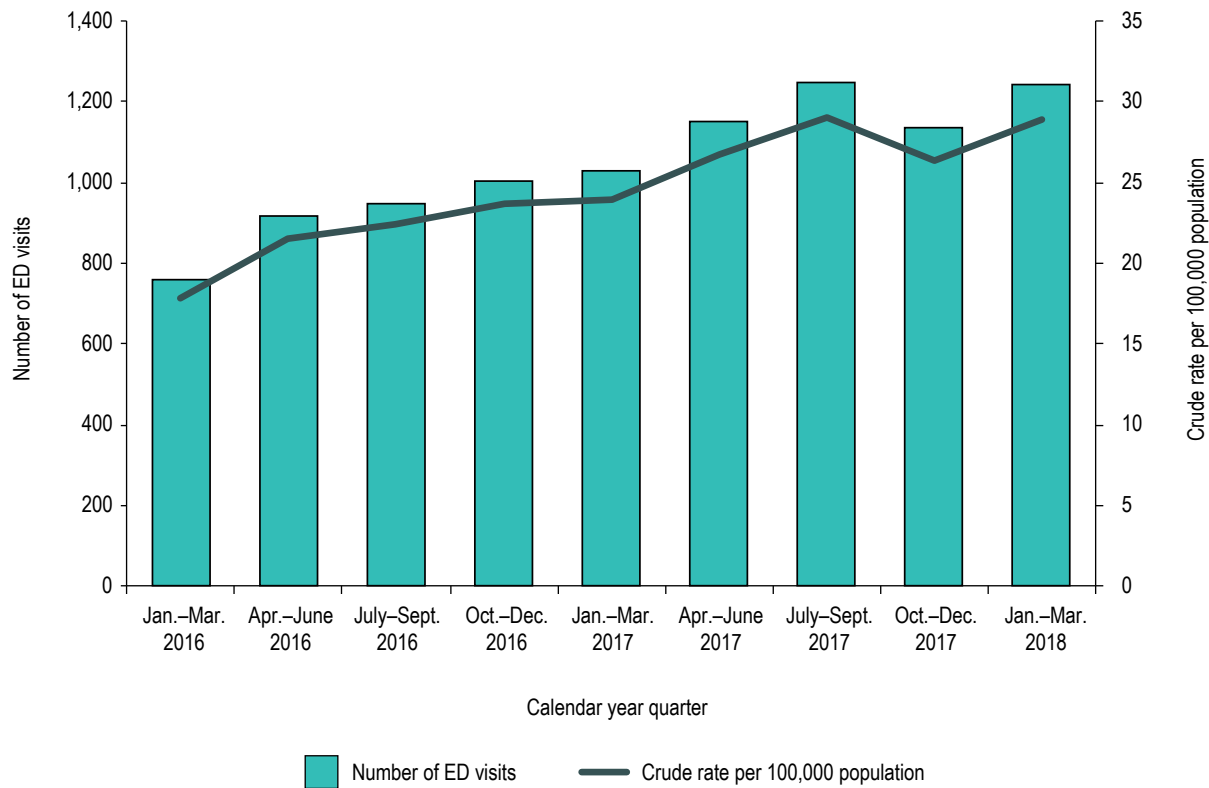
National Ambulatory Care Reporting System, Canadian Institute for Health Information.



Alberta ED visits

Between 2016 and 2017, the rate of ED visits for opioid poisonings increased by 23%. This increase was mostly due to youth and younger adults age 15 to 44.

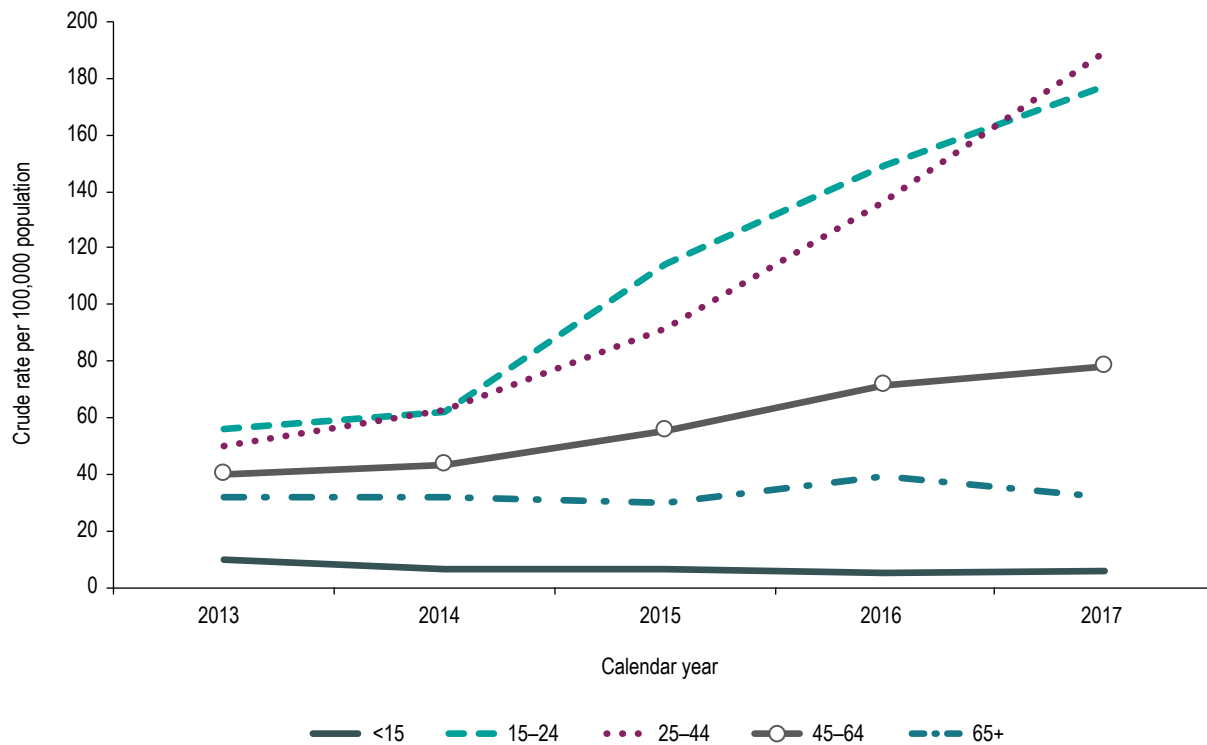
Figure 20: Opioid poisoning ED visits by quarter, Alberta, Q1 2016 to Q1 2018



The rate of ED visits increased by 20% from Q1 2017 (January to March) to Q1 2018.

Source
National Ambulatory Care Reporting System, Canadian Institute for Health Information.

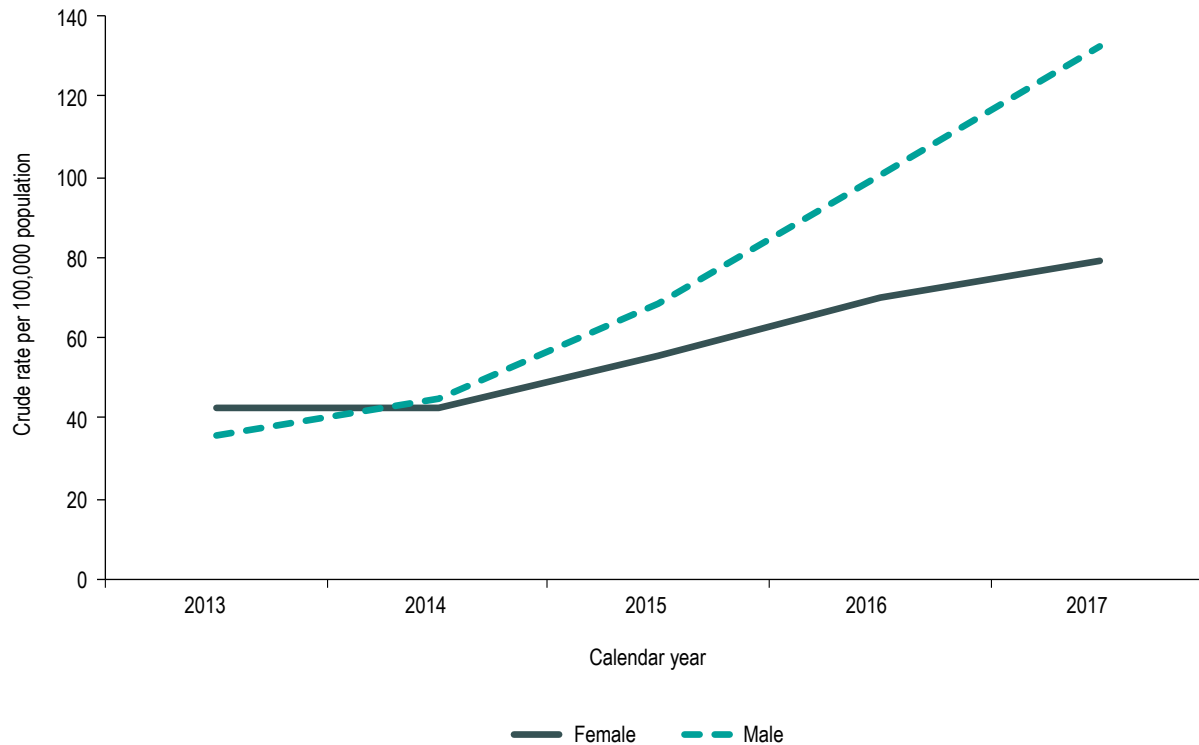
Figure 21: Opioid poisoning ED visits by age group, Alberta, 2013 to 2017



In Alberta, youth age 15 to 24 and younger adults age 25 to 44 continued to have the highest rates of ED visits.

Source
National Ambulatory Care Reporting System, Canadian Institute for Health Information.

Figure 22: Opioid poisoning ED visits by sex, Alberta, 2013 to 2017



The rate of ED visits for opioid poisoning increased by 31% among males and 14% among females between 2016 and 2017.

Source

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

Figure 23a: Opioid poisoning ED visits by age group, Alberta, 2013 to 2017: Males

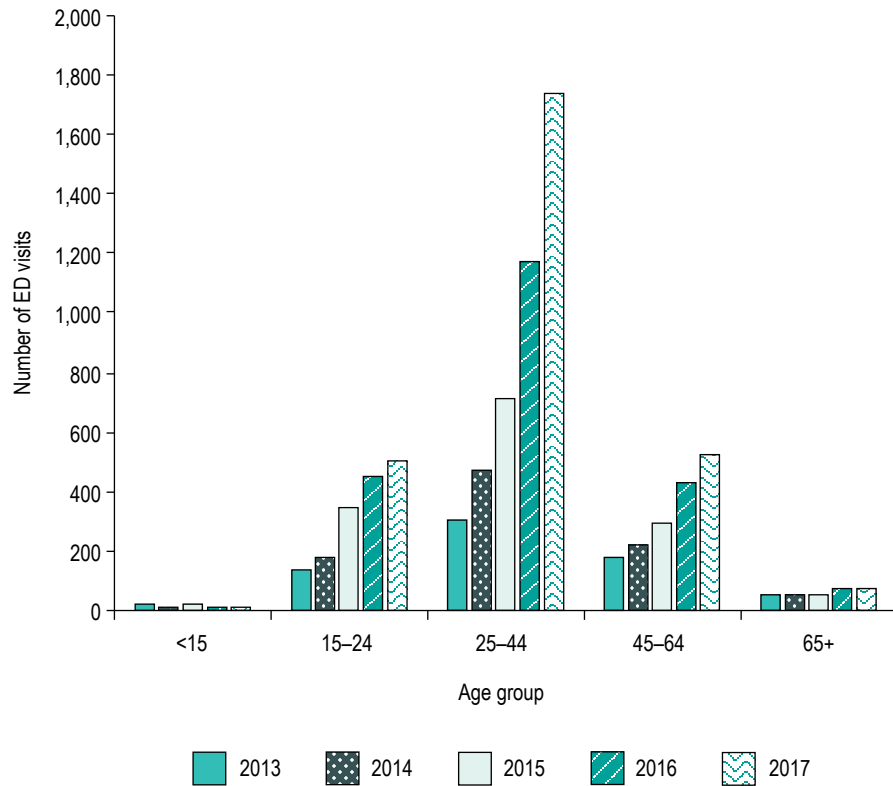
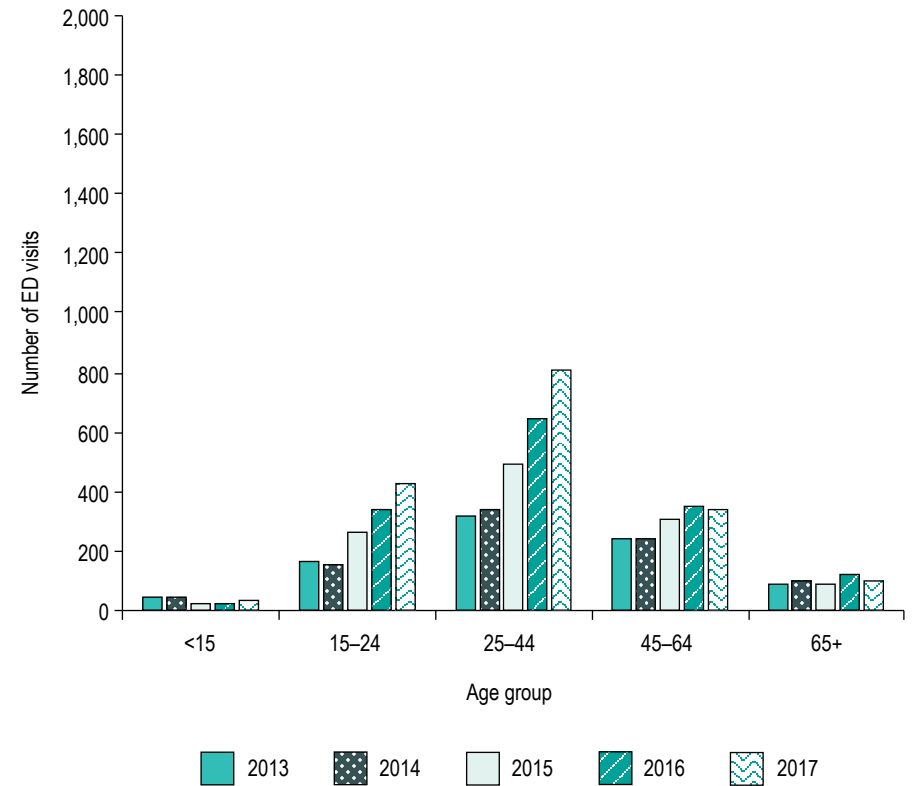
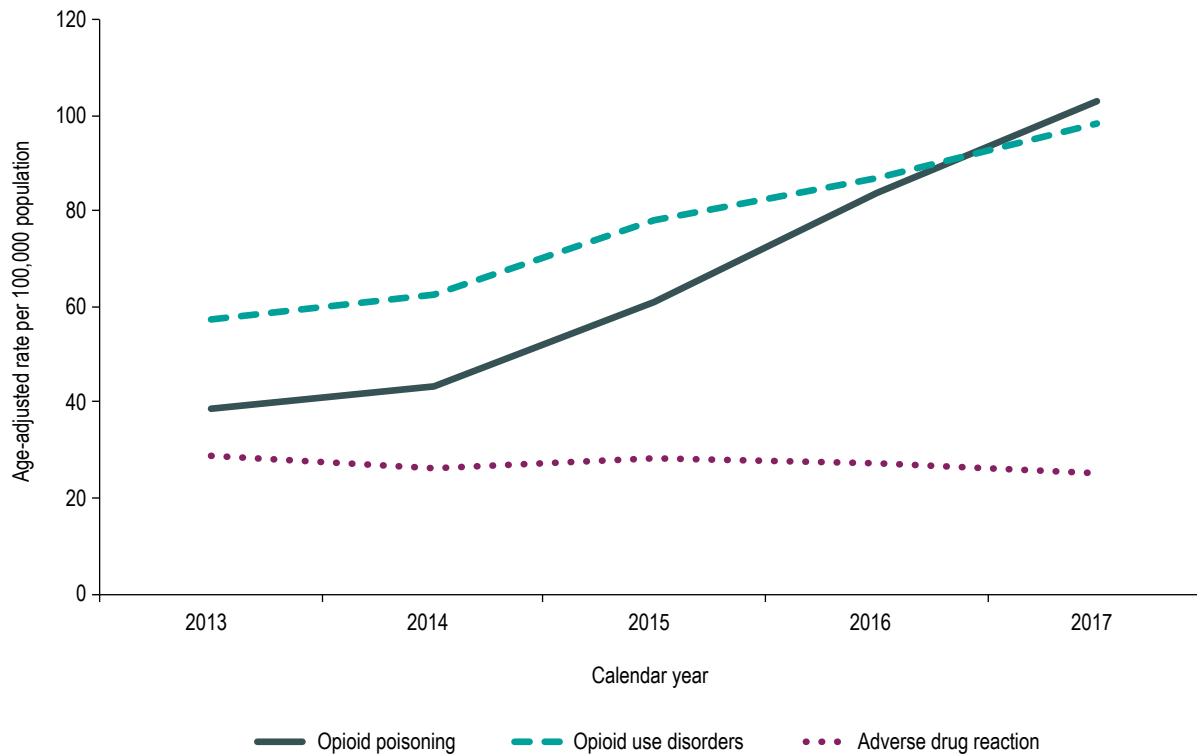


Figure 23b: Opioid poisoning ED visits by age group, Alberta, 2013 to 2017: Females



Source
National Ambulatory Care Reporting System, Canadian Institute for Health Information.

Figure 24: ED visits for opioid-related harms, Alberta, 2013 to 2017



Over the past 5 years, rates of ED visits due to opioid poisoning increased by 165%, while rates due to opioid use disorders increased by 71%.

Note

For full definitions of opioid-related harms, refer to Appendix B.

Source

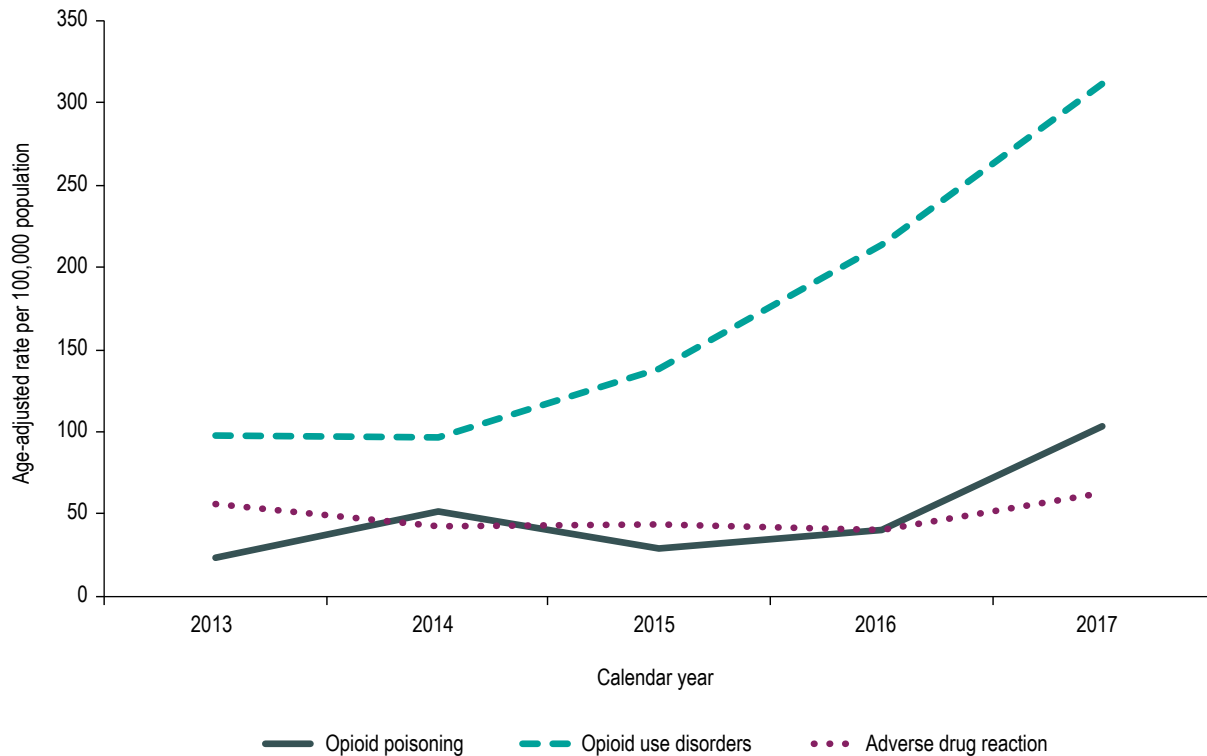
National Ambulatory Care Reporting System, Canadian Institute for Health Information.



Yukon ED visits

Only high-level results are presented for Yukon, as the data represents low volumes and trends must be interpreted with caution.

Figure 25: ED visits for opioid-related harms, Yukon, 2013 to 2017



Over the past 5 years, rates of ED visits due to opioid poisoning increased more than four-fold and rates due to opioid use disorders increased more than three-fold.

Note

For full definitions of opioid-related harms, refer to Appendix B.

Source

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

CIHI will continue to play a role in the monitoring and surveillance of opioid use and misuse to support public policy and decision-making. We will publicly report on opioid-related harms as more data becomes available.



Methodology

Data sources

Hospital Morbidity Database

The Hospital Morbidity Database (HMDB) captures administrative, clinical and demographic information on inpatient separations (referred to here as “hospitalizations”) from acute care hospitals. Hospitals in all provinces and territories (except Quebec) submit data directly to CIHI. Quebec data is submitted by the ministère de la Santé et des Services sociaux du Québec.

National Ambulatory Care Reporting System

The National Ambulatory Care Reporting System (NACRS) contains data on hospital-based and community-based ambulatory care — including day surgery, outpatient and community-based clinics, and EDs — for 64% of the country: all of Ontario, Alberta and Yukon, and some facilities in Prince Edward Island, Nova Scotia, Manitoba, Saskatchewan and British Columbia. CIHI receives data directly from participating facilities or from regional health authorities and ministries of health.

Ontario Mental Health Reporting System

The Ontario Mental Health Reporting System (OMHRS) captures information on all individuals receiving adult mental health services in Ontario, as well as on some individuals receiving services in youth inpatient beds and selected facilities in other provinces. All facilities in Ontario with designated inpatient mental health beds report to OMHRS; this includes all general and specialty psychiatric facilities in the province, numbering approximately 5,000 inpatient mental health beds. OMHRS includes information about mental and physical health, social supports, service use, care planning, outcome measurement, quality improvement and case-mix funding applications.

Opioid poisoning: ICD-10-CA coding

The following ICD-10-CA version 2015 codes were used to identify opioid poisonings that resulted in hospitalizations and ED visits:

ICD-10-CA code	Description	Example of opioid(s) included
T40.0	Poisoning by opium	Opium alkaloids
T40.1	Poisoning by heroin	Heroin, diacetylmorphine
T40.2	Poisoning by other opioids	Codeine, oxycodone, hydromorphone
T40.3	Poisoning by methadone	Methadone
T40.4	Poisoning by other synthetic narcotics	Fentanyl, tramadol
T40.6	Poisoning by unspecified and other narcotics	Opiates not elsewhere classified

Codes with a prefix of Q (indicating a suspected diagnosis) were excluded from this analysis.

Reasons for opioid poisoning: ICD-10-CA coding

Opioid poisoning hospitalizations were categorized based on the following ICD-10-CA categories:

- Accidental (X42): The poisoning was considered to be non-intentional in nature. Includes accidental poisoning of drug, wrong drug given or taken in error, and drug taken inadvertently.
- Intentional (X62): The poisoning occurred as a result of purposely self-inflicted harm.
- Unknown (Y12): Categorization of the poisoning is due to physician documentation of undetermined/unknown intent.

Notes

It is mandatory to assign an additional (external cause) code to denote the intent whenever a code for opioid poisoning is assigned. There is a pan-Canadian coding standard specifying 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.

Cases with no associated intent code were excluded from this section of the analysis.

Opioid use disorders: ICD-10-CA coding

The following ICD-10-CA version 2015 codes were used to identify opioid use disorders that resulted in hospitalizations and ED visits:

ICD-10-CA code	Description
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
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
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
F11.8	Mental and behavioural disorders due to use of opioids, other mental and behavioural disorders
F11.9	Mental and behavioural disorders due to use of opioids, unspecified mental and behavioural disorder

Codes with a prefix of Q (indicating a suspected diagnosis) were excluded from this analysis.

Opioid use disorders: DSM-5 coding

Unlike the HMDB and NACRS, OMHRS uses *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (DSM-5) coding to record psychiatric diagnoses in discharge assessments. The following DSM-5 codes were used to identify hospitalizations for opioid-related harms in the Psychiatric Diagnosis fields (Q2a–Q2f):

DSM-5 code	Description	Notes
304.00	Opioid use disorder moderate, and opioid use disorder severe	Before April 1, 2016, this code was referred to as “opioid dependence.”
305.50	Opioid use disorder mild	Before April 1, 2016, this code was referred to as “opioid abuse.”

Adverse drug reaction: ICD-10-CA coding

The following ICD-10-CA version 2015 code was used to identify opioid-related adverse drug reactions that resulted in hospitalizations and ED visits:

ICD-10-CA code	Description
Y45.0	Drugs, medicaments and biological substances causing adverse effects in therapeutic use: Opioids and related analgesics

Codes with a prefix of Q (indicating a suspected diagnosis) were excluded from this analysis.

Neonatal withdrawal symptoms: ICD-10-CA coding

The following ICD-10-CA version 2015 code was used to identify neonatal withdrawal symptoms that resulted in hospitalizations and ED visits:

ICD-10-CA code	Description
P96.1	Neonatal withdrawal symptoms from maternal use of drugs of addiction

Codes with a prefix of Q (indicating a suspected diagnosis) were excluded from this analysis.

Opioid poisoning: Hospitalizations

HMDB data was included for calendar years 2013 to 2017 and for the first quarter of calendar year 2018 across all provinces and territories. However, the most recent data for Quebec was from 2016, and CIHI did not receive Nunavut data for discharges between September 1, 2016, and March 31, 2017.

The analysis was limited to significant diagnoses, that is, cases in which opioid poisoning was considered influential to the time spent in hospital and treatment received by the patient while there. To determine significant opioid poisoning and opioid use disorders hospitalizations, the following diagnosis types were selected:

(M) = Most responsible diagnosis (MRDx)

(1) = Pre-admit comorbidity

(2) = Post-admit comorbidity

(W), (X), (Y) = Service transfer diagnosis

(C) = CIHI-assigned value for Quebec

Opioid use disorders: Hospitalizations

HMDB data was included for calendar years 2013 to 2017 across all provinces and territories. However, the most recent data for Quebec was from 2016, and CIHI did not receive Nunavut data for discharges between September 1, 2016, and March 31, 2017.

The analysis was limited to significant diagnoses, that is, cases in which opioid use disorders were considered influential to the time spent in hospital and treatment received by the patient while there.

OMHRS data was also included. The analysis was limited to Ontario facilities with assigned mental health beds and records indicating either a full discharge assessment or a short stay assessment. Opioid-related harm codes found in data element Q2a — Psychiatric Diagnosis were categorized as significant diagnoses, while those found in data elements Q2b to Q2f were categorized as any diagnoses, to align with findings from the HMDB and NACRS. It should be noted that OMHRS classifies these as primary diagnoses and remaining disorders, respectively. In the first quarter of 2018, 1 facility missed the reporting deadline and was consequently omitted from the data set; 2018 numbers may therefore be under-reported.

To determine significant opioid use disorders hospitalizations, the following diagnosis types were selected:

HMDB	OMHRS
(M) = Most responsible diagnosis (MRDx) (1) = Pre-admit comorbidity (2) = Post-admit comorbidity (W), (X), (Y) = Service transfer diagnosis (C) = CIHI-assigned value for Quebec	Primary diagnosis

Adverse drug reaction: Hospitalizations

HMDB data was included for calendar years 2013 to 2017 across all provinces and territories. However, the most recent data for Quebec was from 2016, and CIHI did not receive Nunavut data for discharges between September 1, 2016, and March 31, 2017.

Adverse drug reactions (per external cause code Y45.0 *Drugs, medicaments and biological substances causing adverse effects in therapeutic use: Opioids and related analgesics*) are based on any diagnosis.

Neonatal withdrawal symptoms: Hospitalizations

HMDB data was included for calendar years 2013 to 2017 across all provinces and territories. However, the most recent data for Quebec was from 2016, and CIHI did not receive Nunavut data for discharges between September 1, 2016, and March 31, 2017.

The analysis for neonatal withdrawal symptoms was limited to significant diagnoses. To determine significant neonatal withdrawal symptoms hospitalizations, the following diagnosis types were selected:

(M) = Most responsible diagnosis (MRDx)

(1) = Pre-admit comorbidity

(2) = Post-admit comorbidity

(W), (X), (Y) = Service transfer diagnosis

(C) = CIHI-assigned value for Quebec

In addition, the analysis included only neonates, defined as persons less than 29 days old at the time of admission to the reporting facility.

ED visits

NACRS data from Ontario, Alberta and Yukon was included for calendar years 2013 to 2017 and for the first quarter of calendar year 2018. The analysis includes Level 3 ED abstracts where an opioid harms diagnosis was noted as either a main or other problem.

Limitations

The coding of diagnoses using ICD-10-CA is based on documentation on the patient's chart by the physician or primary care provider. Deficiencies in chart documentation and/or failure to provide coders with appropriate documents can affect data quality and lead to under-reporting.

The data in this analysis includes only opioid harms for which an individual was admitted to hospital (or to the ED in Ontario, Alberta and Yukon) and does not capture cases that received treatment in other environments. Therefore, these figures represent an underestimate of the extent of opioid harms in Canada; the magnitude of this underestimation is unknown.

Coding and reporting practices may change over time due to factors such as education and policy changes. This should be taken into consideration when interpreting time trends.

Other methodology notes

For analysis by age, the following age groups were used: younger than 15 (children), 15 to 24 (youth), 25 to 44 (younger adults), 45 to 64 (older adults) and 65 and older (seniors).

To calculate standardized rates, the direct standardization process was used with the 2011 Canadian population as the reference year.

2017 population numbers (the most recent year of data available) were used to calculate crude rates for 2018.

Facility postal codes were used for the provincial/territorial analysis, and patient postal codes were used for the local-level analysis (CMA and CSD).

Appendix A: Opioid poisonings by CMA

Table A1 Opioid poisoning hospitalizations by census metropolitan area, 2017

Province	CMA	Number of hospitalizations	Age-adjusted rate per 100,000 population	Absolute rate difference, 2016 to 2017	2017 rank
N.L.	St. John's	48	21.0	11.9	8
N.S.	Halifax	20	4.6	-6.0	34
N.B.	Moncton	25	16.0	-3.1	20
N.B.	Saint John	20	15.5	-4.3	23
Que.	Montréal	286	6.9	n/a	33
Que.	Ottawa–Gatineau (Quebec part)	40	12.6	n/a	27
Que.	Québec	84	9.8	n/a	31
Que.	Saguenay	22	11.6	n/a	28
Que.	Sherbrooke	38	17.5	n/a	16
Que.	Trois-Rivières	24	13.6	n/a	25
Ont.	Barrie	35	16.6	-2.9	18
Ont.	Brantford	59	41.2	16.9	2
Ont.	Greater Sudbury	31	19.1	3.8	12
Ont.	Guelph	27	16.9	5.6	17
Ont.	Hamilton	159	20.2	2.1	10
Ont.	Kingston	29	15.8	7.9	21

Province	CMA	Number of hospitalizations	Age-adjusted rate per 100,000 population	Absolute rate difference, 2016 to 2017	2017 rank
Ont.	Kitchener–Cambridge–Waterloo	66	12.4	-0.8	26
Ont.	London	119	22.5	-1.4	6
Ont.	Oshawa	58	14.3	0.1	24
Ont.	Ottawa–Gatineau (Ontario part)	107	10.3	0.4	30
Ont.	Peterborough	22	16.1	-8.8	19
Ont.	St. Catharines–Niagara	116	27.1	8.5	4
Ont.	Thunder Bay	42	34.7	10.1	3
Ont.	Toronto	510	7.9	0.9	32
Ont.	Windsor	54	15.6	1.0	22
Man.	Winnipeg	94	11.3	3.9	29
Sask.	Regina	54	21.4	1.3	7
Sask.	Saskatoon	62	19.7	-0.8	11
Alta.	Calgary	251	17.8	2.1	15
Alta.	Edmonton	253	18.5	-3.0	14
B.C.	Abbotsford–Mission	51	26.7	-3.6	5
B.C.	Kelowna	101	52.8	22.7	1
B.C.	Vancouver	536	20.4	5.1	9
B.C.	Victoria	73	18.7	-1.5	13

Notes

To be considered a CMA, the area must have a total population of at least 100,000, of which 50,000 or more live in the urban core. Quebec data is from 2016 (the most recent year of data available).

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Appendix B: Definitions of opioid-related harms

Opioid poisoning occurs when an opioid is taken incorrectly and results in harm. Incorrect use includes wrong dosage of an opioid, self-prescribed opioids taken in combination with another prescribed drug or alcohol, and self-prescribed opioid not taken as recommended.

Opioid use disorders include a wide variety of mental health and behavioural disorders that differ in severity and clinical form (e.g., withdrawal, intoxication) but that are all attributable to the use of opioids, which may or may not have been medically prescribed.

Adverse drug reaction is defined as an opioid taken or administered correctly as prescribed that results in an effect or harm.

Neonatal withdrawal symptoms from the mother's use of drugs of addiction include neonatal abstinence syndrome and drug withdrawal syndrome in an infant of a dependent mother.

Appendix C: Text alternative data tables for figures

Figure 1 Opioid poisoning hospitalizations, Canada, 2013 to 2017

Calendar year	Number of hospitalizations	Crude rate per 100,000 population
2013	4,554	13.0
2014	4,776	13.4
2015	5,088	14.2
2016	5,554	15.3
2017	6,072	16.5

Note

Quebec data is from 2016 (the most recent year of data available).

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 2 Opioid poisoning hospitalizations by province/territory and Canada, 2017

Province/territory	Age-adjusted hospitalizations per 100,000 population	Absolute difference in age-adjusted hospitalizations per 100,000 population, 2016 to 2017
N.L.	16.6	6.0
P.E.I.	9.5	-4.8
N.S.	8.4	-1.8
N.B.	13.1	-4.1
Que.*	9.8	n/a
Ont.	14.8	1.6
Man.	12.3	2.5
Sask.	21.6	-2.1
Alta.	22.7	-0.2
B.C.	29.3	5.1
Y.T.	31.8	n/r
N.W.T.	33.7	n/r
Nun.†	n/r	n/r
Canada	16.4	n/r

Notes

* Quebec data is from 2016 (the most recent year of data available).

† CIHI did not receive Nunavut records for hospitalizations between September 1, 2016, and March 31, 2017.

n/a: Not applicable.

n/r: Not reported.

Absolute rate differences are not reported for Yukon, the Northwest Territories and Nunavut due to variability resulting from low volumes.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 3 Opioid poisoning hospitalizations by quarter, Canada, Q1 2016 to Q1 2018

Calendar year quarter	Number of hospitalizations	Crude rate per 100,000 population
January to March 2016	1,301	3.6
April to June 2016	1,399	3.9
July to September 2016	1,409	3.9
October to December 2016	1,445	4.0
January to March 2017	1,456	4.0
April to June 2017	1,549	4.2
July to September 2017	1,593	4.3
October to December 2017	1,474	4.0
January to March 2018	1,341	3.7

Note

Quebec data is from 2016 (the most recent year of data available).

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 4 Reasons for opioid poisoning hospitalizations, Canada, 2017

Year	Accidental	Intentional	Unknown
2017	58%	30%	12%

Note

Quebec data is from 2016 (the most recent year of data available).

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 5 Opioid poisoning hospitalizations by age, Canada, 2013 to 2017

Age group	2013	2014	2015	2016	2017
<15	1.8	1.5	1.9	1.7	1.8
15–24	9.7	10.4	12.2	12.7	14.8
25–44	12.4	13.1	14.8	17.1	20.1
45–64	18.2	18.3	18.8	20.0	21.2
65+	18.8	19.8	18.9	19.8	18.5

Notes

Quebec data is from 2016 (the most recent year of data available).

Crude rate per 100,000 population.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 6 Opioid poisoning hospitalizations by sex, Canada, 2013 to 2017

Sex	2013	2014	2015	2016	2017
Female	13.9	14.0	14.6	15.5	15.3
Male	12.0	12.9	13.8	15.1	17.8

Notes

Quebec data is from 2016 (the most recent year of data available).

Crude rate per 100,000 population.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 7a Opioid poisoning hospitalizations by age group, Canada, 2013 to 2017: Males

Age group	2013	2014	2015	2016	2017
<15	1.4	0.8	1.3	1.3	1.2
15–24	9.6	11.1	12.6	12.8	15.3
25–44	12.6	14.0	16.2	20.0	25.9
45–64	16.7	17.9	17.8	19.0	21.3
65+	16.1	16.4	16.9	16.4	17.3

Notes

Quebec data is from 2016 (the most recent year of data available).

Crude rate per 100,000 population.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 7b Opioid poisoning hospitalizations by age group, Canada, 2013 to 2017: Females

Age group	2013	2014	2015	2016	2017
<15	2.1	2.3	2.5	2.1	2.5
15–24	9.8	9.7	11.9	12.5	14.2
25–44	12.1	12.3	13.4	14.2	14.3
45–64	19.7	18.7	19.9	20.9	21.1
65+	21.0	22.6	20.5	22.6	19.4

Notes

Quebec data is from 2016 (the most recent year of data available).

Crude rate per 100,000 population.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 8 Rates of hospitalizations due to opioid poisoning by community size, Canada, 2017

Community size	Age-adjusted rate per 100,000
<10,000	18.1
10,000–49,999	22.3
50,000–99,999	30.5
100,000–499,999	19.4
500,000+	12.2

Note

Quebec data and population data are from 2016 (the most recent year of data available).

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 9 Opioid poisoning hospitalization rates, census metropolitan areas, Canada, 2017

CMA	Province	Age-adjusted rate per 100,000 population, 2017
Abbotsford–Mission	B.C.	26.7
Brantford	Ont.	41.2
Calgary	Alta.	17.8
Edmonton	Alta.	18.5
Greater Sudbury	Ont.	19.1
Hamilton	Ont.	20.2
Kelowna	B.C.	52.8
London	Ont.	22.5
Regina	Sask.	21.4
Saskatoon	Sask.	19.7
St. Catharines–Niagara	Ont.	27.1
St. John’s	N.L.	21.0
Thunder Bay	Ont.	34.7
Vancouver	B.C.	20.4
Victoria	B.C.	18.7
Halifax	N.S.	4.6
Moncton	N.B.	16.0
Saint John	N.B.	15.5
Montréal	Que.	6.9
Ottawa–Gatineau (Quebec part)	Que.	12.6

CMA	Province	Age-adjusted rate per 100,000 population, 2017
Québec	Que.	9.8
Ottawa–Gatineau (Ontario part)	Ont.	10.3
Toronto	Ont.	7.9
Winnipeg	Man.	11.3

Notes

Quebec data is from 2016 (the most recent year of data available).

To be considered a CMA, the area must have a total population of at least 100,000, of which 50,000 or more live in the urban core.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 10 Opioid-related hospitalizations, Canada, 2013 to 2017

Calendar year	Opioid poisoning	Opioid use disorders	Adverse drug reaction
2013	12.9	19.5	28.5
2014	13.3	22.9	28.4
2015	14.0	26.4	27.9
2016	15.2	30.1	28.1
2017	16.4	32.1	26.8

Notes

Quebec data is from 2016 (the most recent year of data available).

For full definitions of opioid-related harms, refer to Appendix B.

Age-adjusted rate per 100,000 population.

Sources

Hospital Morbidity Database and Ontario Mental Health Reporting System, Canadian Institute for Health Information.

Figure 11 Hospitalizations for neonatal withdrawal symptoms, Canada, 2013 to 2017

Calendar year	2013	2014	2015	2016	2017
Crude rate per 1,000 in-hospital live births	4.3	4.6	4.7	4.9	5.2
Number of hospitalizations	1,592	1,710	1,736	1,832	1,908

Notes

Quebec data is from 2016 (the most recent year of data available).

For full definitions of opioid-related harms, refer to Appendix B.

Source

Hospital Morbidity Database, Canadian Institute for Health Information.

Figure 12 Opioid poisoning ED visits, Ontario, Alberta and Yukon,* 2013 to 2017

Province/territory	2013	2014	2015	2016	2017
Ontario	22.7	24.7	26.5	32.0	55.3
Alberta	38.8	43.1	60.7	83.5	102.8
Yukon	23.2	51.6	28.7	40.5	103.4

Notes

* Due to the low number of ED visits in Yukon, trends must be interpreted with caution.

Age-adjusted rate per 100,000 population.

Source

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

Figure 13 Opioid poisoning ED visits by census metropolitan area, Ontario and Alberta, 2017

CMA	Province	Age-adjusted rate per 100,000 population
Brantford	Ont.	144.5
St. Catharines–Niagara	Ont.	126.4
Peterborough	Ont.	108.9
Barrie	Ont.	92.5
Kingston	Ont.	80.8
Oshawa	Ont.	71.0
Thunder Bay	Ont.	70.8
Hamilton	Ont.	63.7
London	Ont.	62.2
Guelph	Ont.	61.5
Kitchener–Cambridge–Waterloo	Ont.	59.9
Windsor	Ont.	51.7
Greater Sudbury	Ont.	43.1
Ottawa–Gatineau (Ontario part)	Ont.	33.8
Toronto	Ont.	32.0
Calgary	Alta.	82.3
Edmonton	Alta.	67.8

Note

To be considered a CMA, the area must have a total population of at least 100,000, of which 50,000 or more live in the urban core.

Source

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

Figure 14 Highest rates of opioid poisoning ED visits by census subdivision, Ontario and Alberta, 2017

CSD	Province	Age-adjusted rate per 100,000 population
Sault Ste. Marie	Ont.	176.6
City of Brantford	Ont.	172.5
Niagara Falls	Ont.	158.5
Welland	Ont.	154.0
Peterborough	Ont.	140.7
St. Catharines	Ont.	124.1
Oshawa	Ont.	119.9
Barrie	Ont.	105.9
Kawartha Lakes	Ont.	93.9
Kingston	Ont.	93.0
Lethbridge	Alta.	172.3
Red Deer	Alta.	169.4
Medicine Hat	Alta.	135.1
Wood Buffalo	Alta.	109.7
Grande Prairie	Alta.	109.1

Notes

CSD is the general term for municipalities as determined by provincial/territorial legislation.

This table shows the 15 CSDs in Ontario and Alberta with a population of 50,000 or more with the highest rates of opioid poisoning ED visits.

Please see the associated data tables for a more comprehensive list of CSDs.

Source

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

Figure 15 Opioid poisoning ED visits by quarter, Ontario, Q1 2016 to Q1 2018

Calendar year quarter	Number of ED visits	Crude rate per 100,000 population
January to March 2016	990	7.1
April to June 2016	1,076	7.7
July to September 2016	1,137	8.1
October to December 2016	1,257	9.0
January to March 2017	1,361	9.6
April to June 2017	1,902	13.4
July to September 2017	2,685	18.9
October to December 2017	1,873	13.2
January to March 2018	1,855	13.1

Source

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

Figure 16 Opioid poisoning ED visits by age group, Ontario, 2013 to 2017

Age group	2013	2014	2015	2016	2017
<15	2.9	3.5	3.9	4.0	3.5
15–24	29.8	31.8	31.5	38.8	64.8
25–44	30.0	32.5	37.4	51.2	106.4
45–64	26.4	27.8	29.1	32.5	49.1
65+	17.7	21.1	22.1	20.8	22.2

Note

Crude rate per 100,000 population.

Source

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

Figure 17 Opioid poisoning ED visits by sex, Ontario, 2013 to 2017

Sex	2013	2014	2015	2016	2017
Female	22.3	22.1	25.9	27.7	41.5
Male	23.1	27.4	27.1	36.2	68.7

Note

Crude rate per 100,000 population.

Source

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

Figure 18a Opioid poisoning ED visits by age group, Ontario, 2013 to 2017: Males

Age group	2013	2014	2015	2016	2017
<15	28	32	25	42	30
15–24	247	308	279	365	640
25–44	632	734	790	1,201	2,749
45–64	486	578	548	690	1,161
65+	144	186	193	191	219

Note

Number of ED visits.

Source

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

Figure 18b Opioid poisoning ED visits by age group, Ontario, 2013 to 2017: Females

Age group	2013	2014	2015	2016	2017
<15	36	45	60	47	49
15–24	301	277	295	343	557
25–44	458	455	585	712	1,310
45–64	524	493	582	582	770
65+	221	265	296	286	308

Note

Number of ED visits.

Source

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

Figure 19 ED visits for opioid-related harms, Ontario, 2013 to 2017

Opioid-related harm	2013	2014	2015	2016	2017
Opioid poisoning	22.7	24.7	26.5	32.0	55.3
Opioid use disorders	44.2	42.2	47.7	56.3	62.7
Adverse drug reaction	16.2	16.0	16.2	15.5	13.8

Notes

For full definitions of opioid-related harms, refer to Appendix B.

Age-adjusted rate per 100,000 population.

Source

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

Figure 20 Opioid poisoning ED visits by quarter, Alberta, Q1 2016 to Q1 2018

Calendar year quarter	Number of ED visits	Crude rate per 100,000 population
January to March 2016	757	17.9
April to June 2016	917	21.6
July to September 2016	948	22.4
October to December 2016	1,002	23.7
January to March 2017	1,027	24.0
April to June 2017	1,148	26.8
July to September 2017	1,245	29.0
October to December 2017	1,132	26.4
January to March 2018	1,239	28.9

Source

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

Figure 21 Opioid poisoning ED visits by age group, Alberta, 2013 to 2017

Age group	2013	2014	2015	2016	2017
<15	9.6	6.6	6.2	5.3	5.7
15–24	56.2	61.8	114.0	149.1	177.5
25–44	50.2	62.6	91.2	136.1	189.5
45–64	40.1	43.0	55.5	71.7	78.4
65+	31.7	32.1	29.8	39.2	31.9

Note

Crude rate per 100,000 population.

Source

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

Figure 22 Opioid poisoning ED visits by sex, Alberta, 2013 to 2017

Sex	2013	2014	2015	2016	2017
Female	42.6	42.5	55.9	69.7	79.3
Male	35.4	45.0	68.4	100.9	132.3

Note

Crude rate per 100,000 population.

Source

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

Figure 23a Opioid poisoning ED visits by age group, Alberta, 2013 to 2017: Males

Age group	2013	2014	2015	2016	2017
<15	26	13	24	18	16
15–24	146	181	355	453	503
25–44	312	472	718	1,179	1,747
45–64	178	220	296	437	527
65+	56	54	59	80	77

Note

Number of ED visits.

Source

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

Figure 23b Opioid poisoning ED visits by age group, Alberta, 2013 to 2017: Females

Age group	2013	2014	2015	2016	2017
<15	44	36	23	23	29
15–24	155	153	255	335	423
25–44	313	338	485	638	805
45–64	239	235	299	340	330
65+	86	96	86	119	92

Note

Number of ED visits.

Source

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

Figure 24 ED visits for opioid-related harms, Alberta, 2013 to 2017

Opioid-related harm	2013	2014	2015	2016	2017
Opioid poisoning	38.8	43.1	60.7	83.5	102.8
Opioid use disorders	57.4	62.3	77.8	86.9	98.0
Adverse drug reaction	28.9	26.0	28.1	27.3	25.2

Notes

For full definitions of opioid-related harms, refer to Appendix B.

Age-adjusted rate per 100,000 population.

Source

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

Figure 25 ED visits for opioid-related harms, Yukon, 2013 to 2017

Opioid-related harm	2013	2014	2015	2016	2017
Opioid poisoning	23.2	51.6	28.7	40.5	103.4
Opioid use disorders	97.8	96.2	138.4	214.1	311.6
Adverse drug reaction	55.5	42.1	44.1	40.4	62.2

Notes

For full definitions of opioid-related harms, refer to Appendix B.

Age-adjusted rate per 100,000 population.

Source

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

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