Project Overview and Objective

The aim of this project is to adapt the Occupational Disease Surveillance System (ODSS) and establish a surveillance program to monitor opioid-related harms among injured workers and the Ontario workforce more broadly. Specifically, the objective is to identify and estimate trends in hospitalizations and emergency department visits for opioid poisonings, opioid-related mental and behavioural disorders, and adverse drug reactions in administrative health records in Ontario. The demographic, injury, and occupational characteristics associated with opioid-related harms will also be examined in order to better understand whether rates in particular worker subgroups are changing over time to inform targeted prevention and harm reduction activities.

This project is a collaboration between the Institute for Work & Health and the Occupational Cancer Research Centre at Ontario Health.

Purpose of This Document

This document summarizes the approach used in this surveillance project to identify cases of opioid-related harms in hospitalization and emergency department records in Ontario.

Data Sources

Two administrative health databases provided by the Canadian Institute for Health Information (CIHI) are being used to identify opioid-related harms in the ODSS:

1) The Discharge Abstract Database [DAD] contains data for hospital discharges from acute care institutions (including deaths, sign-outs and transfers), as well as day surgery procedures, long-term care, rehabilitation and other types of care. Data from Ontario hospitals contained in the DAD are used to identify opioid-related hospitalizations.
2) The National Ambulatory Care Reporting System (NACRS) contains data from hospital and community ambulatory care, including day surgery, outpatient, and community-based clinics and emergency departments. Data from emergency departments in Ontario hospitals contained in the NACRS are used to identify opioid-related emergency department visits.

Case Definitions for Opioid-Related Harms

Case definitions used in this surveillance project are based on those previously used by CIHI, Health Canada, and the Public Health Agency of Canada (PHAC).(1-3)

Hospitalizations and emergency department visits for three types of opioid-related harms are considered:

1) Opioid-related poisonings (overall and by intent)
2) Opioid-related mental and behavioural disorders
3) Opioid-related adverse drug reactions

Each type of harm is identified in the DAD and NACRS using diagnostic codes coded using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada (ICD-10-CA) (specific ICD-10-CA codes are described in the section below 'Diagnostic Codes').

Hospitalizations

In the DAD, a maximum of 25 diagnostic codes can be entered for a single admission record.

For each diagnostic field, there is also an associated diagnosis type. Diagnosis type is used to classify the impact of a diagnosis on the patient's care. As defined in CIHI's coding standards,(4) the following diagnosis types identify "significant" diagnoses (i.e., those considered to be influential to the time spent in hospital and/or patient treatment received in hospital):

Type M: Most responsible diagnosis (the diagnosis or condition that can be described as being most responsible for the patient's stay in a facility)
Type 1: Pre-admit comorbidity (a diagnosis or condition that existed prior to admission)
Type 2: Post-admit comorbidity (a diagnosis or condition that arises post-admission)
Type 6: Proxy most responsible diagnosis (assigned to a designated asterisk code in a dagger/asterisk convention when the condition it represents fulfills the requirements stated in the definition for diagnosis Type M)
Types W, X, Y: Service transfer diagnoses (diagnoses associated with the first, second or third service transfer, respectively)

For the purposes of identifying hospitalizations for opioid-related poisonings and opioid-related mental and behavioural disorders in the DAD, relevant diagnostic codes (described in in the section 'Diagnostic Codes') with a diagnosis type M, 1, 2, 6, W, X, or Y are included.

For the purposes of identifying hospitalizations for adverse drug reactions from prescribed opioids in the DAD, relevant diagnostic codes with a diagnosis type 9 are included, used to identify external cause of injury codes.

However, for all opioid-related harms, ICD-10-CA diagnostic codes with a prefix of Q, indicating a suspected rather than confirmed diagnosis, are excluded.

Emergency department visits

In the NACRS, a main diagnostic code and a maximum of 9 additional diagnostic codes can be entered for a single registration record. There is no diagnosis type field in the NACRS.

Therefore, for the purposes of identifying opioid-related emergency department visits in the NACRS, relevant diagnostic codes (as described in subsequent sections) in all fields are included.

However, ICD-10-CA diagnostic codes with a prefix of Q, indicating a suspected rather than confirmed diagnosis, are excluded.

Finally, records are excluded if they are not Level 3 submission level abstracts or a true emergency department visit (see **Note 1** below for additional information).

Diagnostic Codes

Opioid-related poisonings

Opioid poisoning occurs when an opioid is taken incorrectly and results in harm. Poisonings may involve pharmaceutical opioids, non-pharmaceutical opioids, or a combination of pharmaceutical and non-pharmaceutical opioids.(1, 3)

Opioid poisonings are identified in the DAD and NACRS using the ICD-10-CA codes described in Table 1.

Table 1. ICD-10-CA diagnostic codes used to identify opioid-related poisoning hospitalizations and emergency department visits

Outcome: Opioid-Related Poisonings	ICD-10-CA Code
Opioid poisoning	T40.0-T40.4, T40.6
Poisoning by opium	T40.0
Poisoning by heroin	T40.1
Poisoning by other opioids	T40.2
Poisoning by codeine and derivatives	T40.20*
Poisoning by morphine	T40.21*
Poisoning by hydromorphone	T40.22*
Poisoning by oxycodone	T40.23*
Poisoning by other opioids, not elsewhere classified	T40.28*
Poisoning by methadone	T40.3
Poisoning by other synthetic narcotics	T40.4
Poisoning by fentanyl and derivatives	T40.40*
Poisoning by tramadol	T40.41*
Poisoning by other synthetic narcotics, not elsewhere classified	T40.48*
Poisoning by unspecified and other narcotics	T40.6

*These diagnostic codes were introduced as of April 1, 2018.

Opioid-related poisoning by intent

Opioid poisonings are also differentiated by intent according to the ICD-10-CA diagnostic codes defined by CIHI (1) and described in Table 2. See **Note 2** below for additional information.

Table 2. ICD-10-CA diagnostic codes used to identify intent of opioid-related poisoning hospitalizations and emergency department visits

Intent of Opioid-Related Poisonings	ICD-10-CA Code
Accidental poisoning (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)	X42
Intentional poisoning (the poisoning occurred as a result of purposely self-inflicted harm)	X62
Unknown poisoning (categorization of the poisoning is due to physician documentation of undetermined/unknown intent)	Y12

Opioid-related mental and behavioural disorders

Opioid-related mental health and behavioural disorders include a wide variety of 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.(1)

Opioid-related mental health and behavioural disorders are identified in the DAD and NACRS using the ICD-10-CA codes described in Table 3.

Table 3. ICD-10-CA diagnostic codes used to identify opioid-related mental and behavioural disorder hospitalizations and emergency department visits

Outcome: Opioid-Related Mental Health and Behavioural Disorders	ICD-10-CA Code
Mental and behavioural disorders due to use of opioids	F11.0-F11.9
Mental and behavioural disorders due to use of opioids, acute intoxication	F11.0
Mental and behavioural disorders due to use of opioids, harmful use	F11.1
Mental and behavioural disorders due to use of opioids, dependence syndrome	F11.2
Mental and behavioural disorders due to use of opioids, withdrawal state	F11.3
Mental and behavioural disorders due to use of opioids, withdrawal state with delirium	F11.4
Mental and behavioural disorders due to use of opioids, psychotic disorder	F11.5
Mental and behavioural disorders due to use of opioids, amnesic syndrome	F11.6
Mental and behavioural disorders due to use of opioids, residual and late-onset psychotic disorder	F11.7
Mental and behavioural disorders due to use of opioids, other mental and behavioural disorders	F11.8
Mental and behavioural disorders due to use of opioids, unspecified mental and behavioural disorder	F11.9

Opioid-related adverse drug reactions

An opioid-related adverse drug reaction is defined as a prescribed opioid taken or administered correctly as prescribed that results in an adverse effect or harm.(1)

Opioid-related adverse drug reactions are identified in the DAD and NACRS using the diagnostic codes described in Table 4.

Table 4. ICD-10-CA diagnostic codes used to identify opioid-related adverse drug reaction hospitalizations and emergency department visits

Outcome: Opioid-Related Adverse Drug Reactions	ICD-10-CA Code
Drugs, medicaments and biological substances causing adverse effects in therapeutic use, Opioids and related analgesics	Y45.0
Codeine and derivatives	Y45.01*
Morphine	Y45.02*
Hydromorphone	Y45.03*
Oxycodone	Y45.04*
Fentanyl and derivatives	Y45.05*
Tramadol	Y45.06*
Other and unspecified opioids and related analgesics	Y45.09*

*These diagnostic codes were introduced as of April 1, 2018.

Additional notes

Note 1: A large number of records prior to 2018 contain missing values for the fields used to identify the submission level of a record and whether the visit represented a true emergency department visit. In order to avoid excluding a substantial proportion of data, records in NACRS with missing values on these fields are retained (under the assumption that these are eligible), in addition to keeping Level 3 submission level abstracts and true emergency department visits. However, in sensitivity analyses, records are limited to those with non-missing values for these two fields.

Note 2: For the analysis of opioid poisonings by intent, some records may have multiple intention codes. In this instance, each intent is counted separately, such that the sum of opioid poisonings by each intent type may be higher than the total number of opioid poisonings.

Records with an opioid poisoning diagnostic code, but without at least one intention code are excluded from the analysis of poisonings by intent, but retained for the analysis of overall opioid poisonings.

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References

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