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Research

Hospital discharges for substance-related injuries before and during the COVID-19 pandemic: a descriptive surveillance study using administrative data

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Abstract

Background: The COVID-19 pandemic and associated behavioural changes have contributed to an increase in substance-related hospital discharges, and has altered the injury epidemiology landscape in Canada. We sought to evaluate hospital discharges for substance-related injuries during the pandemic compared with prepandemic and to identify subpopulations that have been greatly affected by substance-related injuries during the first year of the pandemic.

Methods: We compared data on hospital discharges in Canada from before the pandemic (March 2019–February 2020) with discharges during the first year of the pandemic (March 2020–February 2021) using the Discharge Abstract Database. We identified discharges for substance-related injuries using codes from the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision*. We calculated percent changes, age-standardized rates and age-specific rates of discharges for substance-related injuries.

Results: Hospital discharges for substance-related injuries increased by 7.1% during the first year of the pandemic. Discharges for intentional injuries decreased by 6.3%, whereas unintentional substance-related injuries increased by 15.1% during this period. Male patients accounted for 95.6% of the increase in hospital discharges for substance-related injuries during the first year of the pandemic. We observed a percent increase among discharges for injuries related to alcohol, opioid, cannabinoid, hallucinogen, tobacco, volatile solvents, other psychoactive substances and polysubstance use.

Interpretation: We observed an increase in hospital discharges for substance-related injuries during the first year of the COVID-19 pandemic, compared with the same time period before the pandemic. This work will provide useful insight into the ongoing management of the COVID-19 pandemic, as well as future policy and health care planning related to substance use in Canada.

Injuries are a leading cause of death, morbidity and potential years of life lost among people in Canada.[1–3] Human behavioural changes during the COVID-19 pandemic have altered the injury landscape, with fewer sports-related injuries, motor vehicle collisions and falls, and a greater proportion of injuries occurring in the home.[4–7] Unintentional poisonings, specifically overdoses and alcohol-induced deaths, have contributed to the excess mortality rate observed during the pandemic.

Throughout the pandemic, self-reported alcohol and cannabis use, and hospital discharges related to substance use have increased.[8–12] With public health measures encouraging people to stay home and limit social gatherings, people in Canada have changed their substance consumption habits by increasing consumption, changing the substances they normally use and using alone more frequently.[13–18] In addition, border closures, supply chain disruptions and increased pricing have altered the availability and toxicity of the illegal drug supply.[13,19–22] As the pandemic continues to evolve and impose changes to human behaviour, as well as access to support programs and services, the injury epidemiology and substance use patterns in Canada may also change.[23,24]

Studies conducted during the pandemic have shown an increase in substance-related hospital discharges, as well as overall changes in the injury landscape during the pandemic. Based on available evidence and changes to social behaviours, we suspect increased rates of hospital discharges for substance-related injuries in Canada during the pandemic. In the present study, we sought to evaluate monthly changes in hospital discharges for substance-related injuries during the first year of pandemic compared with before the pandemic. We also sought to identify subpopulations (based on age group, sex and substance type) that were greatly affected by substance-related injuries during the first year of the pandemic.

Competing interests: None declared.

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Methods

Study design and setting

We conducted a descriptive analysis of hospital discharges for substance-related injuries in Canada (excluding Quebec) before the pandemic (March 2019–February 2020) compared with during the first year of the COVID-19 pandemic (March 2020–February 2021). On Mar. 11, 2020, the World Health Organization declared the COVID-19 pandemic,[25] and around this time, the Government of Canada and provincial and territorial governments began implementing public health measures.[26]

We reported the results of this study in accordance with the Reporting of Studies Conducted Using Observational Routinely-collected Data statement.[27]

Data source and case definitions

We used data from the Discharge Abstract Database (DAD), a national database that collects administrative, clinical and demographic information on hospital discharges, from all provinces and territories, excluding Quebec. The DAD is managed by the Canadian Institute for Health Information. The cases reported in this study are acute inpatient discharge records. We excluded injuries from the adverse effects of drugs, injuries from surgical or medical care, and diagnoses that were uncertain.

We used the Canadian version of the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision* (ICD-10-CA) to classify diagnoses and medical interventions in the DAD.[28,29] We identified injury-related hospital discharges by searching all 25 diagnostic fields for an ICD-10 code of an external cause of injury (V01–Y98). We grouped codes by intent, namely unintentional injuries and intentional injuries (self-harm and assault injuries). To prevent misclassification of hospital discharges for injuries, we included only entries with a unique injury intent.

Once we identified hospital discharges for injuries, we searched for a corresponding substance-related diagnostic code to identify substance-related cases. We grouped substance codes by substance type (as outlined in the ICD-10 manual); we also identified mental and behavioural disorders (F00–F99); injury, poisoning and certain other consequences of external causes (T36–T65); and symptoms, signs and abnormal clinical and laboratory findings (R70–R79). The substance groups included in this study were alcohol, opioids, cannabinoids, sedatives or hypnotics, cocaine, other stimulants (including caffeine), hallucinogens, tobacco, volatile solvents and other psychoactive substance; we also included cases where multiple categories of psychoactive substances were recorded (polysubstance). Table 1 outlines the specific ICD-10 codes included in each of the injury intent and substance categories.

Statistical analysis

We calculated results as rates, proportions, odds ratios (ORs) and percent changes, stratified by sex and age group. We calculated age-specific rates per 100 000 population using population estimates from Statistics Canada (excluding Quebec) for 2019 and 2020. We standardized rates per 100 000 by age to the 2011 Canadian population (excluding Quebec) using direct standardization. We calculated the percent change to identify the relative difference of hospital discharges for substance-related injuries before the pandemic (2019–2020), compared with during the first year of the pandemic (2020–2021). We used nonoverlapping 95% confidence intervals

Table 1: Codes from the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision*, used for case selection of hospital discharges for substance-related injuries in the Discharge Abstract Database

Type	Codes
Intent of external causes of injuries	
Unintentional injuries	V01–V99, W00–W19, W20–W49, W50–W64, W65–W74, W75–W84, W85–W99, X00–X09, X10–X19, X20–X39, X40–X49, X50, X52
Intentional injuries	X60–X84, W84–Y09, Y87 (0.0–0.1)
Substance-related diagnoses	
Alcohol only	F10, X45, X65, Y91, T51 (0.0–0.3, 0.8, 0.9), R78.0
Opioids only	F11, Y45, T40 (0.0–0.4, 0.6), R78.1
Cannabinoids only	F12, T40.7
Sedatives or hypnotics only	F13, Y47, T42 (0.3, 0.4, 0.6, 0.7)
Cocaine only	F14, T40.5, R78.2
Other stimulants only	F15, Y49.7, Y50.8, T43.6
Hallucinogens only	F16, T40 (0.8, 0.9), R78.3
Tobacco only	F17, T65.2
Volatile solvents only	F18, X46, X66, T52
Unspecified psychoactive substances	F19, X41–X42, X61–X62, T43 (0.8, 0.9), R78.5
Polysubstance	More than 1 of the above substance categories

(CIs) to assess significant differences ($\alpha = 0.05$). We used a χ^2 test to calculate the odds of hospital discharge for substance-related injuries among all discharges for injuries by period. We conducted all analyses using SAS EG 7.1. Rates and proportions calculated using small cells with counts between 1 and 5 have been suppressed.

Ethics approval

Research ethics board review was not required by the Government of Canada as the research used deidentified, routinely collected, clinical administrative health data.

Results

From March 2020 to February 2021, the total number of hospital discharges decreased by 12.3%, compared with the same period in 2019–2020. Discharges for injuries without an associated substance-related diagnosis also decreased during this time by 7.5% (174 579 discharges in 2019–2020 v. 161 516 discharges in 2020–2021), whereas those with substance-related diagnoses increased by 7.1% (24 446 discharges in 2019–2020 v. 26 170 discharges in 2020–2021). The odds of hospital discharge for substance-related injuries among all injury discharges was 16% greater during the pandemic than before the pandemic (OR 1.16, 95% CI 1.14–1.18).

Hospital discharges for intentional substance-related injuries decreased by 6.3% ($n = 576$), whereas unintentional substance-related injuries increased by 15.1% ($n = 2118$), compared with the prepandemic period. Figure 1 highlights the monthly percent change in hospital discharges for injuries, between the prepandemic and pandemic periods. In the early months of the COVID-19 pandemic, discharges for injuries, both with and without an associated substance diagnosis, decreased compared with the same months in 2019. By the summer of 2020, injury discharges without an associated substance diagnosis, returned to comparable numbers to 2019, whereas discharges for substance-related injuries in the fall and winter months exceeded those of 2019. A peak in discharges for substance-related injuries occurred in October 2020, with a significant increase of 15.6% from October 2019.

March and April 2020 had lower counts and age-standardized rates of hospital discharges for substance-related injuries, compared with 2019 (Figure 2). Beginning in May 2020, these counts and rates surpassed those of 2019, and consistently remained higher than the prepandemic period.

The provinces and territories that had the largest percent increases in hospital discharges for substance-related injuries during the first year of the pandemic were Nunavut (20.3%), Yukon (20.3%), Manitoba (15.3%) and British Columbia (12.2%). However, BC had the greatest absolute increase in

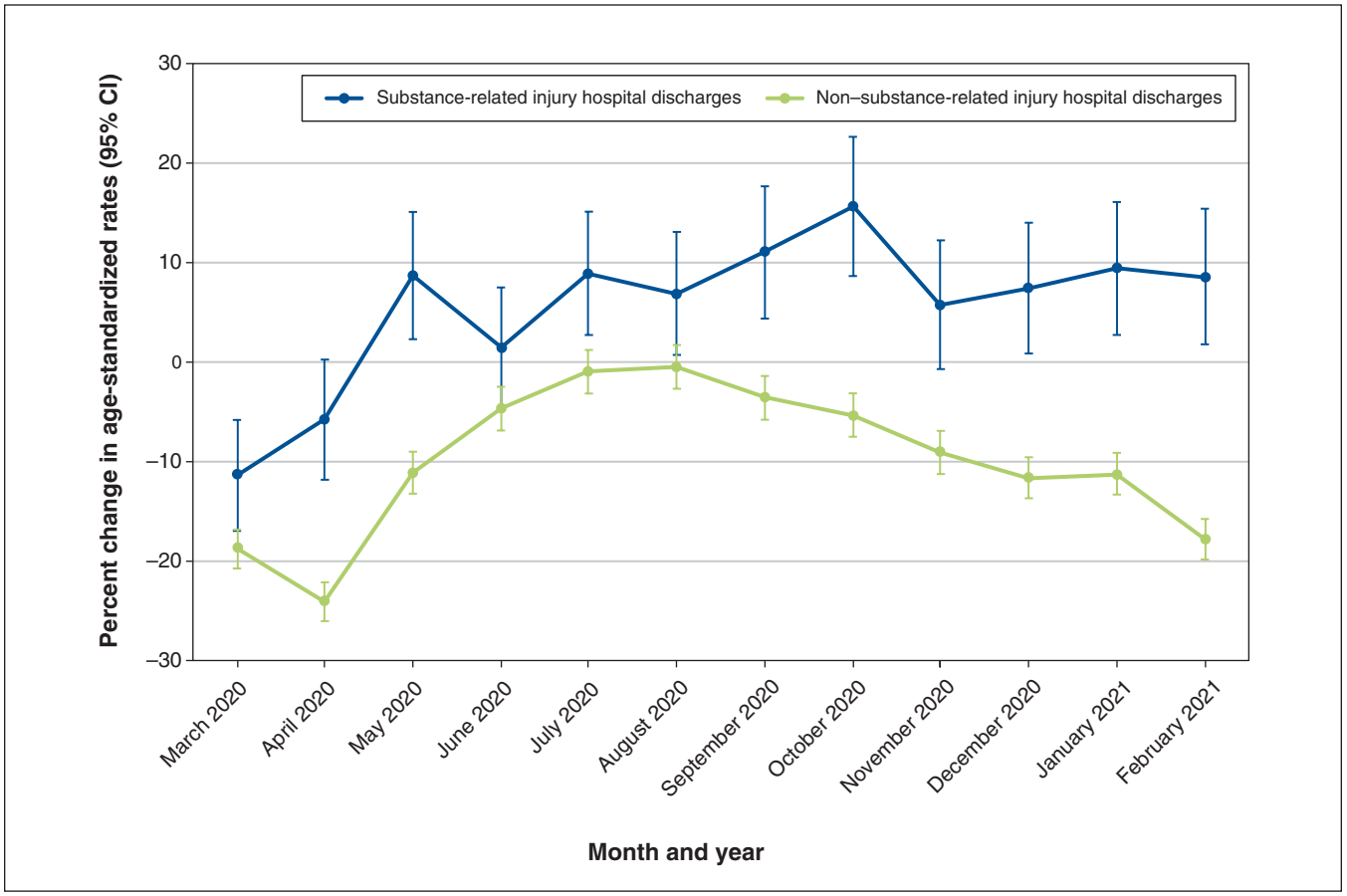

Figure 1: Percent change in age-standardized rates of hospital discharges for injuries (with and without a substance-related diagnosis) from March 2020 to February 2021, compared with March 2019 to February 2020, in Canada (excluding Quebec). Note: CI = confidence interval.

cases, with an additional 737 cases during the pandemic, making up 42.7% of the additional cases seen across Canada during the pandemic period. Few regions exhibited a percent decrease in discharges for substance-related injuries, namely Prince Edward Island (12.7%), Northwest Territories (4.4%) and Newfoundland and Labrador (2.3%).

During the pandemic period, male patients comprised 95.6% of the increase in hospital discharges for substance-related injuries. Age-specific rates of discharges for unintentional substance-related injuries were significantly higher during the first year of the pandemic than the year before the pandemic among male patients aged 1–9 years and 20–64 years and among female patients aged 5–9 years and 20–39 years (Table 2). The largest absolute increase in discharges for unintentional substance-related injuries was among male patients aged 50–64 years (n = 600) and among female patients aged 30–39 years (n = 160). Age-specific rates of intentional substance-related injuries were significantly lower during the first year of the pandemic than before the pandemic among male patients aged 65–74 years and female patients aged 30–39 years and 50–64 years. The largest absolute increase in intentional substance-related injuries was among male patients aged 30–39 years (n = 73) and female patients aged 10–14 years (n = 27).

In the prepandemic and pandemic periods, the leading external causes of unintentional substance-related injuries among both male and female patients were unintentional poisonings, falls and transport collisions, all of which showed percent increases during the pandemic; unintentional poisonings (female: 9.4%, male: 31.1%), falls (female: 1.9%, male: 9.3%) and transport collisions (female: 14.8%, male: 16.5%). Among intentional substance-related injuries, self-harm injuries decreased (female: –9.6%, male: –11.3%) and assault injuries increased (female: 33.6%, male: 22.4%) during the first year of the pandemic, compared with the prepandemic period.

Among the substance groups analyzed in this study, hospital discharges for injuries related to alcohol, opioids, cannabinoids, hallucinogens, tobacco, volatile substances, other psychoactive substances and polysubstance groups exhibited an increase from the prepandemic period to the pandemic period, ranging from 2 to 1046 additional cases (Figure 3). Conversely, discharges for injuries related to sedatives, cocaine and stimulants decreased from the prepandemic period to the pandemic period, ranging from 4 to 43 fewer cases.

Interpretation

In this study, we compared hospital discharges for substance-related injuries before and during the first year of the COVID-19 pandemic in Canada. Between March 2020 and February 2021, substance-related injury discharges increased by 7.1%, compared with the same period in 2019–2020. Hospital discharges for substance-related injuries initially declined at the onset of the pandemic (March–April 2020), but then remained consistently higher than the prepandemic period

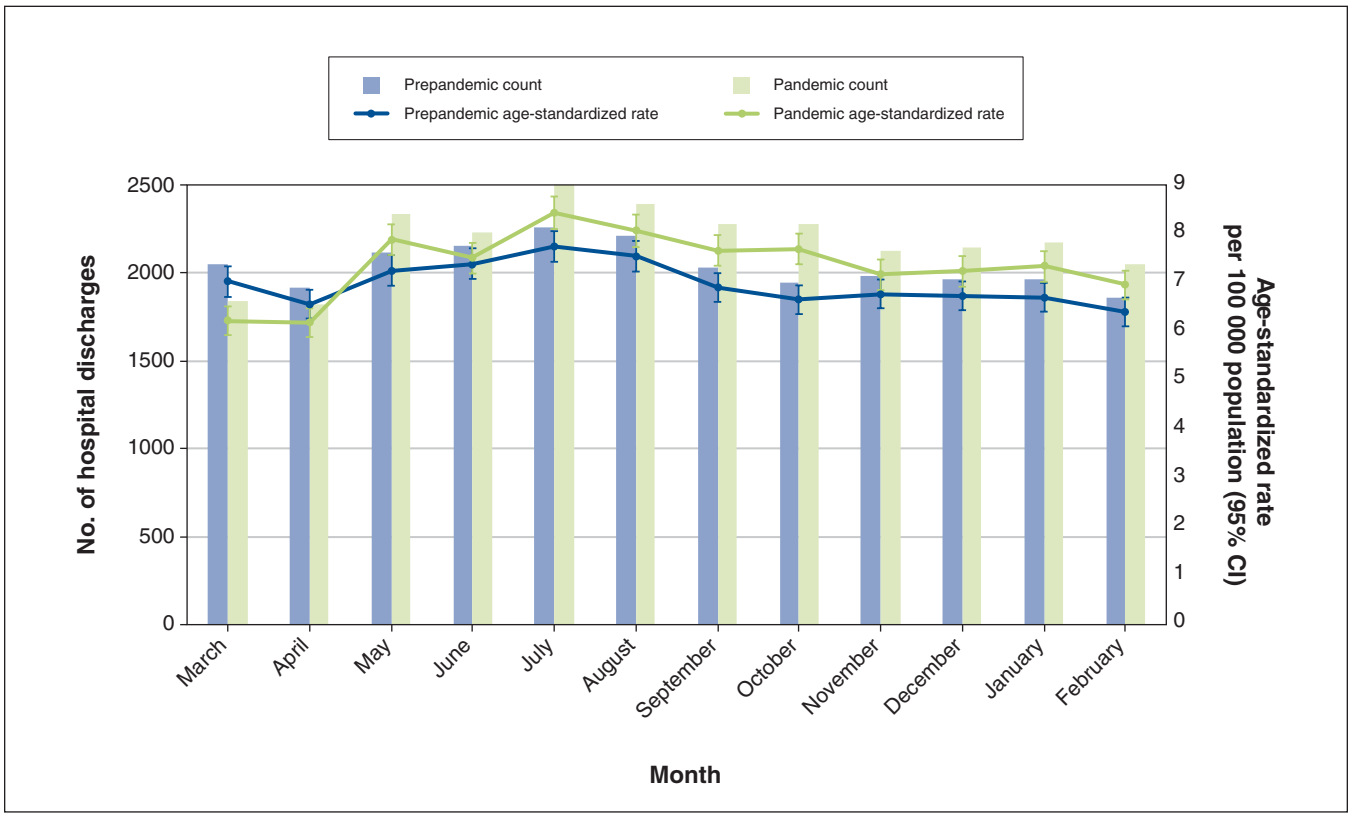

Figure 2: Number (bars, left Y axis) and age-standardized rate (lines, right Y axis) of hospital discharges for substance-related injuries in Canada (excluding Quebec) in the prepandemic (March 2019–February 2020) and pandemic (March 2020–February 2021) periods. Age-standardized rates are standardized to the 2011 Canadian population (excluding Quebec). Note: CI = confidence interval.

Table 2: Age-specific rates of hospital discharges for substance-related injuries in Canada (excluding Quebec), before (March 2019–February 2020) and during the first year (March 2020–February 2021) of the COVID-19 pandemic, by injury intent and sex*

	Unintentional injuries, rate per 100 000 population (95% CI)				Intentional injuries, rate per 100 000 population (95% CI)			
	Male patients		Female patients		Male patients		Female patients	
Age groups, yr	Prepandemic	Pandemic	Prepandemic	Pandemic	Prepandemic	Pandemic	Prepandemic	Pandemic
< 1	8.2 (3.6–12.9)	9.6 (4.6–14.6)	6.5 (2.2–10.7)	12.1 (6.4–17.9)	0	0	0	0
1–4	17.4 (14.0–20.7)	25.6 (21.6–29.6)†	16.6 (13.2–19.9)	23.2 (19.3–27.0)	0	0	0	0
5–9	2.9 (1.7–4.1)	7.2 (5.3–9.0)†	2.1 (1.1–3.1)	6.1 (4.3–7.8)†	0	0	NA	NA
10–14	3.9 (2.5–5.3)	4.5 (3.0–5.9)	7.3 (5.4–9.2)	8.4 (6.3–10.4)	6.9 (5.1–8.8)	5.8 (4.2–7.5)	46.7 (41.8–51.5)	48.6 (43.7–53.4)
15–19	28.0 (24.5–31.6)	28.1 (24.5–31.6)	23.8 (20.5–27.2)	25.3 (21.9–28.7)	41.7 (37.4–46.0)	34.6 (30.7–38.6)	124.6 (116.9–132.3)	120.0 (112.5–127.4)
20–29	49.2 (46.2–52.3)	59.8 (56.5–63.1)†	29.5 (27.0–31.9)	35.4 (32.8–38.0)†	41.1 (38.3–43.8)	38.6 (35.9–41.2)	68.5 (64.8–72.3)	62.5 (59.0–66.0)
30–39	69.3 (65.6–73.0)	84.4 (80.4–88.4)†	32.7 (30.2–35.3)	39.1 (36.4–41.8)†	38.3 (35.6–41.0)	40.5 (37.8–43.3)	43.1 (40.2–46.0)	36.8 (34.2–39.5)†
40–49	58.7 (55.3–62.0)	82.6 (78.4–86.7)†	32.8 (30.2–35.4)	37.1 (34.3–39.8)	31.8 (29.3–34.3)	32.2 (29.6–34.9)	38.7 (35.8–41.5)	35.1 (32.4–37.8)
50–64	81.8 (78.5–85.1)	102.6 (98.9–106.3)†	46.5 (44.1–49.0)	45.9 (43.5–48.4)	25.8 (24.0–27.7)	24.3 (22.5–26.1)	31.0 (29.0–33.0)	24.5 (22.7–26.2)†
65–74	95.0 (89.8–100.3)	102.3 (96.9–107.6)	58.5 (54.5–62.4)	54.7 (51.0–58.4)	14.8 (12.7–16.8)	10.7 (9.0–12.4)†	15.9 (13.9–18.0)	12.7 (11.0–14.5)
75–84	105.2 (97.3–113.1)	91.2 (84.0–98.4)	80.6 (74.3–86.9)	74.3 (68.4–80.3)	10.7 (8.2–13.2)	9.2 (6.9–11.5)	10.0 (7.7–12.2)	10.9 (8.6–13.2)
≥ 85	118.5 (104.3–132.6)	104.5 (91.4–117.6)	117.8 (107.0–128.5)	98.8 (89.1–108.6)	17.2 (11.8–22.6)	12.8 (8.2–17.4)	9.7 (6.6–12.8)	10.4 (7.3–13.6)

Note: CI = confidence interval, NA = not applicable.
*Age-specific rates per 100 000 population were calculated using Statistics Canada population estimates (excluding Quebec) for 2019–2020 and 2020–2021. Rates based on counts between 1 and 5 are not reported (indicated as NA).
†Indicates a difference in rates with $p < 0.05$.

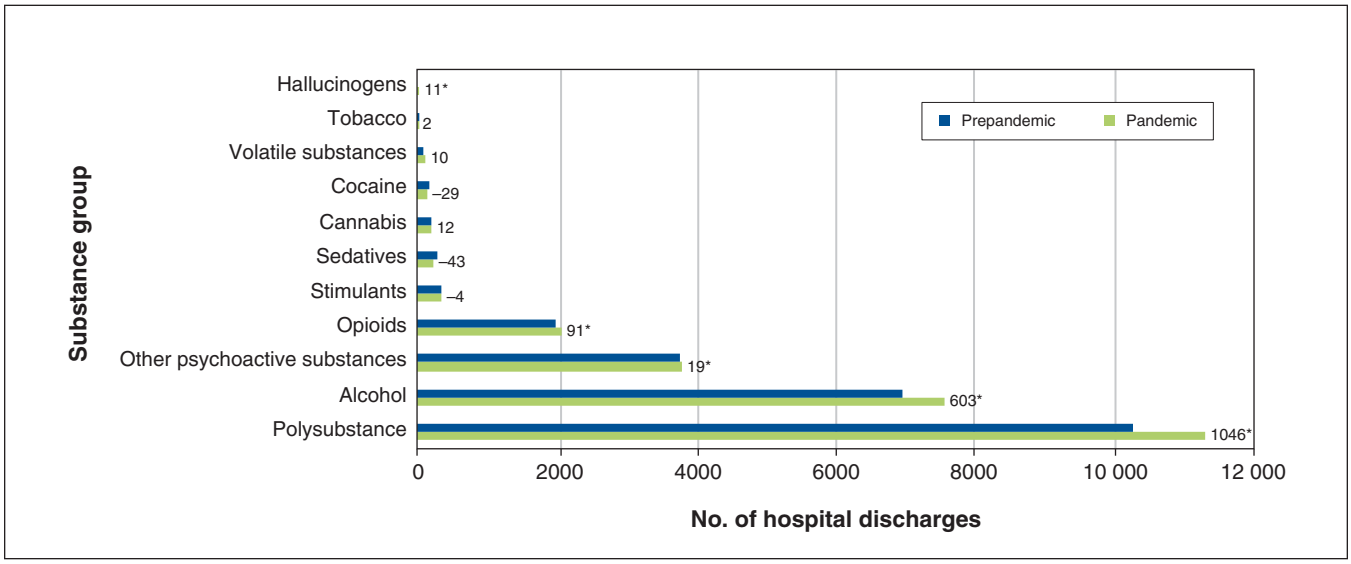

Figure 3: Hospital discharges for substance-related injuries by substance type in the pandemic (March 2020–February 2021) versus the pre-pandemic (March 2019–February 2020) periods. *Indicates difference in counts with $p < 0.05$.

from May 2020 to February 2021. During the pandemic period, there was an increase in injury discharges associated with alcohol, opioids, cannabinoids, hallucinogens, tobacco and polysubstance use.

Previous Canadian surveillance work has shown comparable trends to what we reported in the present study. Hospital discharges related to substance use declined at the onset of the pandemic, but increased and surpassed prepandemic levels by the summer and fall of 2020.[12,30] The observed monthly trends also followed a similar pattern to the epidemic curve of COVID-19 cases in discharges.[26] The initial decline in substance-related hospital discharges may be attributable to public health messaging that advised people to stay home and to avoid less urgent hospital visits. For many people in Canada, the hardships resulting from the pandemic may not have been immediately felt, but as the pandemic persisted and lockdowns, employment layoffs and uncertainty prevailed, more people may have experienced deteriorating mental health and turned to different coping mechanisms during this difficult time.[31,32]

Several risk factors have been associated with increased substance-related harms during periods of disruption, including pandemics, such as the type of drug consumed, the drug market and availability, as well as the age group and sex of the individual. After periods of disruption, increases in substance-related harms have been commonly reported among those aged 20–49 years and males.[33] Hospital discharges for unintentional substance-related injuries increased during the pandemic among both male and female patients, with patterns across age groups otherwise remaining relatively consistent over the last 10 years before the pandemic.[34] During the pandemic, males aged 20–64 years had a more observable increase in rates of discharges for unintentional substance-related injuries than females of the same age groups. Other work has indicated that males have had a greater increase in hospital discharges for substance harms than females during the pandemic.[30]

Injury research during the pandemic has highlighted that some of the most frequent external causes of unintentional injury — including motor vehicle collisions, falls and sports injuries — have declined during the pandemic, whereas unintentional poisonings have increased.[7,24] Conversely, our work showed an increase in hospital discharges for substance-related injuries related to falls, motor vehicle collisions and unintentional poisonings.

Hospital discharges for intentional substance-related injuries declined during the first year of the pandemic, but the overall patterns for both males and females across all age groups remained similar to those of the prepandemic period. Recent work has shown that hospital discharges for self-harm behaviour in Canada decreased by 6% during the pandemic compared with before the pandemic, except among females aged 10–24 years and males aged 80 years and older; these groups experienced an increase during the pandemic.[12,35,36] Our work, however, has shown slightly higher rates of intentional substance-related injuries among female youth and older males in the prepandemic period. Assault-related emergency department visits and hospital discharges in Canada, from March to December 2020, also declined during the pandemic.[37] The minor changes in hospital discharges for substance-related intentional injuries across age groups, seen in our work, may be attributable to people not seeking medical attention for these injuries during the pandemic. Reasons that may deter someone from seeking help for an intentional injury during the pandemic include concern about burdening the health care system, social stigma or fear of aggravating a domestic violence situation, especially when more time is being spent at home.[38–40]

In our study, we observed that hospital discharges for substance-related injuries that involved alcohol, opioids, cannabis, hallucinogens, tobacco, volatile solvents, other psychoactive substances and polysubstance increased during the first year of the pandemic. Other Canadian surveillance work has reported an increase in discharges for harms related to alcohol (10%), opioid (30%) and cannabis (14%) during the pandemic.[12] Increases in hospital discharges for alcohol- and cannabis-related injuries during the pandemic may be related to the increase in self-reported use of these substances during the pandemic, given that 14% of people in Canada reported increased alcohol consumption and 6.5% reported increased cannabis consumption early in the pandemic.[41,42] The increase in hospital discharges for alcohol- and cannabis-related injuries may also be related to the ease of access to these substances in Canada during the pandemic, as stores where these substances can be purchased have been considered essential services in most jurisdictions.[16–18] Previous research has shown an increase in opioid-related harms and deaths during the pandemic.[13,22,43,44] This may be attributable to reduced availability of support services such as supervised consumption sites, changes in access to the illegal drug supply and changes to the levels of fentanyl in the illegal opioid supply, resulting in more cases of opioid poisonings and overdoses.[31,43]

We observed a decrease in hospital discharges for stimulant-, sedative- and cocaine-related injuries during the first year of the pandemic. Since stimulants, sedatives and cocaine are often consumed in social settings, and the pandemic limited social gatherings, this may contribute to the reduction in discharge for injuries related to these substances.[13] In addition, border closures, supply chain disruptions and increased pricing has made access to the illegal drug market more challenging during the pandemic.[13,19,21]

Limitations

The DAD does not include data on hospital discharges from Quebec, and diagnostic codes for substance use are reported only in cases where the substance was a notable contributor in the overall diagnosis or episode of care.[34] This may have resulted in potential misclassification bias. There is also potential for misclassification of injury intent, as health care providers use self-reported or clinically observable symptoms for diagnosis, and may not have all external information regarding the intent of injury. Studies that have evaluated the accuracy of ICD-10 coding for substance use in administrative databases have shown high accuracy of ICD codes, with

very high specificity and a wider range of sensitivity (50%–80%). Some findings suggest that including more ICD codes increases the sensitivity.[45,46]

Given the limited variables available to analyze sociodemographic characteristics, our results may be biased by unmeasured confounders.[47] Although this study provides overall trends in hospital discharges for substance-related injuries, additional analyses, including by geographic and sociodemographic subgroups, as well as pre-existing health conditions, would aid in providing a more complete understanding of the most affected populations.

This study did not capture patients who were only treated in an emergency department; therefore, our results may be biased toward severe injuries that required hospital admission and additional care. Further, this work primarily focuses on results at the national level, and although all of Canada was affected by the COVID-19 pandemic, the situation evolved differently across provinces and territories.[26]

We considered other statistical methods of time trend analysis, such as interrupted time-series analyses; however, given the few time points available after the onset of the pandemic, and the lack of a singular interruption event, we decided that this would not be the most appropriate method.

Conclusion

During the first year of the COVID-19 pandemic, hospital discharges for substance-related injuries increased, particularly those associated with alcohol, opioids, cannabis, hallucinogens, tobacco, volatile solvents, other psychoactive substances and polysubstance use. Future work using qualitative surveillance data would aid in providing more circumstantial details and sociodemographic characteristics surrounding substance-related injuries that cannot be achieved using administrative data alone. Understanding patterns in hospital discharges for substance-related injuries will help inform the ongoing management of the COVID-19 pandemic and aid in priority setting for health services during public health emergencies.

References

1. *Table 13-10-0031-0: Potential years of life lost, by selected causes of death and sex, population aged 0 to 74, three-year average, Canada, provinces, territories, health regions and peer groups*. Ottawa: Statistics Canada; 2017. Available: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310003101 (accessed 2022 Feb. 16).
2. Deaths, 2019. Ottawa: Statistics Canada; 2020 Nov. 26. Available: https://www150.statcan.gc.ca/n1/daily-quotidien/201126/dq201126b-eng.htm (accessed 2022 Feb. 16).
3. *Table 13-10-0394-01: Leading causes of death, total population, by age group*. Ottawa: Statistics Canada; 2022. Available: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310039401 (accessed 2022 Feb. 16).
4. Gielen AC, Bachman G, Badaki-Makun O, et al. National survey of home injuries during the time of COVID-19: who is at risk? *Inj Epidemiol* 2020;7:63.
5. Keays G, Friedman D, Gagnon I. Injuries in the time of COVID-19. *Health Promot Chronic Dis Prev Can* 2020;40:336-41.
6. Impact of COVID-19 on accidental falls in Canada. Ottawa: Canadian Institute for Health Information; 2021. Available: https://www.cihi.ca/sites/default/files/document/impact-covid-19-accidental-falls-canada-report-en.pdf (accessed 2022 Feb. 16).
7. Injury and trauma emergency department and hospitalization statistics, 2018–2019. Ottawa: Canadian Institute for Health Information; 2020. Available: https://www.cihi.ca/sites/default/files/document/impact-covid-19-accidental-falls-canada-report-en.pdf (accessed 2022 Feb. 16).
8. Alcohol and drug use in Canada, 2019. Statistics Canada; 2021 Dec. 20. Available: https://www150.statcan.gc.ca/n1/daily-quotidien/211220/dq211220c-eng.htm (accessed 2022 Feb. 16).
9. Varin M, Hill MacEachern K, Hussain N, et al. Measuring self-reported change in alcohol and cannabis consumption during the second wave of the COVID-19 pandemic in Canada. *Health Promot Chronic Dis Prev Can* 2021;41:325-30.
10. Zajacova A, Jehn A, Stackhouse M, et al. Changes in health behaviours during early COVID-19 and socio-demographic disparities: a cross-sectional analysis. *Can J Public Health* 2020;111:953-62.
11. Hospital stays for substance use harms increased during the first months of the COVID-19 pandemic. Ottawa: Canadian Institute for Health Information; 2021. Available: https://www.cihi.ca/en/hospital-stays-for-substance-use-harms-increased-during-the-first-months-of-the-covid-19-pandemic#:~:text=Key%20links&text=May%206%2C%202021%20%E2%80%94%20According%20to,the%20same%20period%20in%202019 (accessed 2022 Feb. 16).
12. Unintended consequences of COVID-19: impact on harms caused by substance use, self-harm and accidental falls. Ottawa: Canadian Institute for Health Information; 2021. Available: https://www.cihi.ca/en/covid-19-resources/impact-of-covid-19-on-canadas-health-care-systems/unintended-consequences (accessed 2022 Feb. 16).
13. Ali F, Russell C, Nafeh F, et al. Changes in substance supply and use characteristics among people who use drugs (PWUD) during the COVID-19 global pandemic: a national qualitative assessment in Canada. *Int J Drug Policy* 2021;93:103237.
14. Sylvestre M-P, Dinkou GDT, Naja M, et al. A longitudinal study of change in substance use from before to during the COVID-19 pandemic in young adults. *Lancet Reg Health Am* 2022;8:100168.
15. Roberts A, Rogers J, Mason R, et al. Alcohol and other substance use during the COVID-19 pandemic: a systematic review. *Drug Alcohol Depend* 2021;229:109150.
16. MacKillop J, Cooper A, Costello J. National retail sales of alcohol and cannabis during the COVID-19 pandemic in Canada. *JAMA Netw Open* 2021;4:e2133076.
17. Paradis C. Open versus closed: the risks associated with retail liquor stores during COVID-19. Ottawa: Canadian Centre on Substance Use and Addiction; 2020. Available: https://www.ccsa.ca/sites/default/files/2020-04/CCSA-Risks-Associated-with-Retail-Liquor-Stores-COVID-19-Report-2020-en.pdf (accessed 2022 Feb. 16).
18. Cannabis retail during COVID-19 [policy brief]. Ottawa: Canadian Centre on Substance Use and Addiction; 2021. Available: https://www.ccsa.ca/cannabis-retail-during-covid-19-policy-brief (accessed 2022 Feb. 16).
19. Changes related to COVID-19 in the illegal drug supply and access to services, and resulting health harms [CCENDU alert]. Ottawa: Canadian Centre on Substance Use and Addiction; 2020. Available: https://www.ccsa.ca/changes-related-covid-19-illegal-drug-supply-and-access-services-and-resulting-health-harms (accessed 2022 Feb. 16).
20. Pardo B. Supplying synthetic opioids during a pandemic: an early look at North America. *Int J Drug Policy* 2021;93:102833.
21. Farhoudian A, Radfar SR, Mohaddes Ardabili H, et al. A global survey on changes in the supply, price, and use of illicit drugs and alcohol, and related complications during the 2020 COVID-19 pandemic. *Front Psychiatry* 2021;12:646206.
22. Morin KA, Acharya S, Eibl JK, et al. Evidence of increased fentanyl use during the COVID-19 pandemic among opioid agonist treatment patients in Ontario, Canada. *Int J Drug Policy* 2021;90:103088.
23. Impacts of the COVID-19 pandemic on substance use treatment capacity in Canada [report]. Ottawa: Canadian Centre on Substance Use and Addiction; 2020. Available: https://www.ccsa.ca/impacts-covid-19-pandemic-substance-use-treatment-capacity-canada (accessed 2022 Feb. 16).
24. Provisional death counts and excess mortality, January 2020 to April 2022. Ottawa: Statistics Canada; modified 2022 Apr. 14. Available: https://www150.statcan.gc.ca/n1/daily-quotidien/210712/dq210712b-eng.htm (accessed 2022 Feb. 16).
25. WHO Director-General's opening remarks at the media briefing on COVID-19: 11 March 2020. Geneva: World Health Organization; 2020. Available: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19—11-march-2020 (accessed 2022 Feb. 16).
26. COVID-19 intervention timeline in Canada. Ottawa: Canadian Institute for Health Information; 2022; Available: https://www.cihi.ca/en/covid-19-intervention-timeline-in-canada#info (accessed 2022 Mar. 22).
27. Benchimol EI, Smeeth L, Guttmann A, et al.; RECORD Working Committee. The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) statement. *PLoS Med* 2015;12:e1001885.
28. Discharge Abstract Database (DAD). Ottawa: Canadian Institute for Health Information. Available: https://www.cihi.ca/en/discharge-abstract-database-metadata-dad (accessed 2022 Mar. 22).
29. Codes and classifications. Ottawa: Canadian Institute for Health Information. Available: https://www.cihi.ca/en/submit-data-and-view-standards/codes-and-classifications (accessed 2022 Mar. 22).

30. Unintended consequences of COVID-19: impact on harms caused by substance use. Ottawa: Canadian Institute for Health Information; 2021. Available: https://www.cihi.ca/sites/default/files/document/unintended-consequences-covid-19-substance-use-report-en.pdf (accessed 2022 Mar. 5).
31. A struggling system: understanding the health care impacts of the pandemic. Ottawa: Canadian Medical Association; 2021. Available: https://www.cma.ca/sites/default/files/pdf/health-advocacy/Deloitte-report-nov2021-EN.pdf (accessed 2022 Feb. 16).
32. Jenkins EK, McAuliffe C, Hirani S, et al. A portrait of the early and differential mental health impacts of the COVID-19 pandemic in Canada: findings from the first wave of a nationally representative cross-sectional survey. *Prev Med* 2021;145:106333.
33. Substance use-related harms and risk factors during periods of disruption [rapid review]. Toronto: Public Health Ontario; 2020. Available: https://www.publichealthontario.ca/-/media/documents/ncov/main/2020/08/substance-use-related-harms-disruption.pdf?la=en (accessed 2022 Feb. 16).
34. Toigo S, McFaull SR, Thompson W. Impact of substance-related harms: injury hospitalizations in Canada from 2010 to 2020. *Health Promot Chronic Dis Prev Can*. In press.
35. Unintended consequences of COVID-19: impact on self-harm behaviour. Ottawa: Canadian Institute for Health Information; 2021. Available: https://www.cihi.ca/sites/default/files/document/unintended-consequences-covid-19-self-harm-report-en.pdf (accessed 2022 Mar. 5).
36. Turner BJ, Robillard CL, Ames ME, et al. Prevalence and correlates of suicidal ideation and deliberate self-harm in Canadian adolescents during the coronavirus disease 2019 pandemic. *Can J Psychiatry* 2022;67:403-6.
37. Saunders N, Plumptre L, Diong C, et al. Acute care visits for assault and maltreatment before vs during the COVID-19 pandemic in Ontario, Canada. *JAMA Health Forum* 2021;2:e211983.
38. Brabete AC, Wolfson L, Stinson J, et al. Exploring the linkages between substance use, natural disasters, pandemics, and intimate partner violence against women: a rapid review in the context of COVID-19. *Sexes* 2021;2:509-22.
39. Prosman GJ, Lo Fo Wong SH, Lagro-Janssen ALM. Why abused women do not seek professional help: a qualitative study. *Scand J Caring Sci* 2014;28:3-11.
40. Fugate M, Landis L, Riordan K, et al. Barriers to domestic violence help seeking: implications for intervention. *Violence Against Women* 2005;11:290-310.
41. Rotermann M. Canadians who report lower self-perceived mental health during the COVID-19 pandemic more likely to report increased use of cannabis, alcohol and tobacco. Cat no 45-28-0001. Ottawa: Statistics Canada; 2020. Available: https://www150.statcan.gc.ca/n1/pub/45-28-0001/2020001/article/00008-eng.htm (accessed 2022 Feb. 16).
42. Alcohol and cannabis use during the pandemic: Canadian Perspectives Survey Series 6. Statistics Canada; 2021 Mar. 4. Available: https://www150.statcan.gc.ca/n1/daily-quotidien/210304/dq210304a-eng.htm (accessed 2022 Feb. 16).
43. Modelling opioid-related deaths during the COVID-19 outbreak. Ottawa: Health Canada; modified 2022 Aug. 5. Available: https://www.canada.ca/en/health-canada/services/opioids/data-surveillance-research/modelling-opioid-overdose-deaths-covid-19.html (accessed 2022 Feb. 16).
44. Opioid- and stimulant-related harms in Canada. Ottawa: Public Health Agency of Canada; modified 2022 June 23. Available: https://health-infobase.canada.ca/substance-related-harms/opioids-stimulants (accessed 2022 Feb. 16).
45. Rowe CL, Santos G-M, Kornbluh W, et al. Using ICD-10-CM codes to detect illicit substance use: a comparison with retrospective self-report. *Drug Alcohol Depend* 2021;221:108537.
46. McGrew KM, Homco JB, Garwe T, et al. Validity of *International Classification of Diseases* codes in identifying illicit drug use target conditions using medical record data as a reference standard: a systematic review. *Drug Alcohol Depend* 2020;208:107825.
47. Enns A, Pinto A, Venugopal J, et al. Substance use and related harms in the context of COVID-19: a conceptual model. *Health Promot Chronic Dis Prev Can* 2020;40:342-9.

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Data sharing: Access to programming code and aggregated data can be made available upon request through the corresponding author.

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