Public Health Ontario | Santé publique Ontario

RAPID REVIEW

07/28/2020

Substance Use-Related Harms and Risk Factors during Periods of Disruption

Key Findings

- Evidence on substance use-related harms and relevant risk factors during periods of disruption, is limited and results varied. Few studies reflected the voices and experiences of people who use drugs, considered inequities, or examined intersecting determinants of health for people who use substances.
- Relevant records were based on Hurricane Sandy, Hurricane Katrina, the September 11 terrorist attacks, a heroin shortage, closure of a needle and syringe program, and the Coronavirus Disease 2019 (COVID-19) pandemic. Disruptions prior to the COVID-19 pandemic did not involve specific measures to distance people from each other.
- The most commonly cited substance use-related harms were fatal and nonfatal drug poisoning. In the current context, while evidence on the impacts of COVID-19 disruptions are not fully known, preliminary reports indicate an increase in fatal drug poisoning is occurring.
- The main risk factors for increased substance use-related harms reflected a disruption in ways that people typically manage their drug use and access a network of support. This included decreased availability and increased price of drugs, decreased access to substance use treatment, harm reduction services and other supports, and increased toxicity of the drug content.
- Monitoring and timely reporting of fatal and nonfatal poisoning, along with knowledge based on living and lived expertise of substance use, community experience, and practice are essential to understand the impacts of COVID-19 community-based public health measures and to inform response strategies.

Objectives and Scope

- This rapid review addresses the following questions:
    - What are the changes in substance use-related harms experienced by people who use substances during periods of disruption?
    - What are the risk factors related to increasing substance use-related harms that occur during periods of disruption?
- This review focuses on the changes in substance use-related harms experienced by people who use substances (e.g., fentanyl, cocaine) during periods of disruption. Changes in substance use-

related harms in this population, and harms related to alcohol, tobacco, and cannabis were out of scope for this rapid review.

- We define periods of disruption to include any disruption caused by infectious disease, natural disasters, disasters (e.g., terrorism, fires), war, service closures, or other emergencies that affect the social structures and supports for people who use substances. We recognize that some of these disruptions represent a discrete event (e.g., terrorist attack) and some represent a more prolonged event (e.g., COVID-19 pandemic, war). Further, responses to the event differ and may lead to different impacts (e.g., emphasis on people distancing during COVID-19).

- Individuals in provincial and local harm reduction programs, local drug strategies, and those with living and lived expertise of substance use were consulted at different stages of the rapid review process; a more in-depth community engagement process was not feasible at this time.

Background

In late 2019, a novel coronavirus, COVID-19, was identified and by March 11, 2020, the World Health Organization declared COVID-19 a global pandemic.[1] Certain population groups are at increased risk of COVID-19 exposure and serious complications. In Ontario, the COVID-19 situation continues to evolve. Numerous public health measures have been implemented to contain the spread of the virus, and a regional approach to de-escalation is proceeding in the province.[2] Interventions included the declaration of a state of emergency and ordered closures of non-essential services, businesses, limits on social gatherings, recommendations to stay at home and distance from others, among other public health measures.[3] People who use substances may be at higher risk of harms during the COVID-19 pandemic due to substance use practices; comorbidities;[4] the need to access essential services; barriers to health services; social and structural challenges (e.g., precarious housing, homelessness);[4] and limited resources to allow for protection against COVID-19 (e.g., access to hand hygiene, masks).

Prior to the COVID-19 pandemic, Ontario has experienced an increase in opioid-related deaths each year, rising from 366 in 2003[5] to 1535 in 2019.[6] The rate of apparent opioid-related deaths increased rapidly from 6.2 to 10.6 per 100,000 population between 2016 and 2019. The rapid change is largely attributed to the increasing presence of fentanyl in the illegal, unregulated drug supply, which was detected in 40.7% of opioid-related deaths in Ontario in 2016 and 69% in 2018.[5] The implementation of public health measures for COVID-19 may impact substance use patterns, changes in the drug supply, availability and access to drugs, and access to harm reduction and health care services. These social disruptions may contribute to an escalation of risks of withdrawal, drug poisoning, and other social and health harms for people who use substances during the ongoing overdose crisis. In response, several measures have been introduced to address the unique challenges for people who use substances and mitigate risk, including guidance to reduce the barriers to substance use treatment.[7,8]

Though the evidence on the consequences of COVID-19 disruptions is still emerging, there have been data and reports from jurisdictions across Canada suggesting increased numbers of substance use-related morbidity and mortality from non-fatal and fatal drug poisoning, respectively, since mid-March when community-based public health measures for COVID-19 were implemented broadly.[9,10] There is a growing need to better understand and assess the risk for increasing substance use-related harms in the context of the COVID-19 pandemic in order to identify, develop, and implement a range of strategies to mitigate negative health outcomes.

The aim of this rapid review is to: synthesize the substance use-related harms experienced in the adult population during periods of disruption and related risk factors for increased harm documented in the peer-reviewed and grey literature. This information can help inform public health agencies and communities in substance use planning and action.

Methods

- In considering feasibility, scope, and the need for responsiveness, a rapid review was chosen as an appropriate approach to address the research questions. A rapid review is a type of knowledge synthesis wherein certain steps of the systematic review process are compromised in order to be timely.[11]

- On May 27, 2020, Public Health Ontario (PHO) Library Services developed and conducted a specific COVID-19 and substance use search in three electronic databases: MEDLINE, Embase, and PsycInfo (see Appendix A). Records from all databases were combined and duplicates were removed. An additional search was conducted in PubMed to identify records on other periods of disruption, using key concepts including disaster, emergency, and drug poisoning.

- The grey literature search used five search strings in Google, websites of key organizations (e.g., Canadian Drug Policy Coalition, Canadian Centre on Substance Use and Addiction, European Monitoring Centre for Drugs and Drug Addiction), organizational list serves (e.g., Evidence Exchange Network), and the first 100 results of each were reviewed. Reference lists of select relevant records were screened and additional records were referred by PHO Library Services and other experts.

- English-language peer-reviewed and grey literature records that described the following were included: adults (25 years and older) who use substances or professionals involved in their care (e.g., physicians, program administrators); exposed to a period of disruption; measured outcomes relevant to substance-use-related harm (e.g., drug poisoning); and published from the Organisation for Economic Co-operation and Development (OECD) countries, where context may be more comparable with Canada. No restrictions were placed on the year of publication. Records were excluded if they were general organizational webpages, blog posts, or media articles.

- Titles and abstracts were screened by one reviewer, and the application of the eligibility criteria was reviewed by the senior author. Full-texts of peer-reviewed literature were divided into two sets with each set screened independently by a single reviewer. Articles of unclear relevance as well as the list of full-text articles that met inclusion criteria were collated and reviewed by the senior author for eligibility.

- Information from included records was extracted by two staff members using Microsoft Excel. This information included: the type of record (e.g., study design), location, setting, population, period of disruption, reported outcomes relevant to substance use-related harms.

- Two reviewers and the senior author were involved in the synthesis of relevant data. Critical appraisal of the methodological quality was not performed due to time constraints.

- We used a framework of “drug, person, and setting/context” to guide the analysis of information related to risk factors for increased substance use-related harm during disruptions.

This framework is informed by both the "drug, set, setting" [12] framework from substance use research and also the epidemiologic triad ("agent, host, environment")[13] used in public health to understand health issues. Here we refer to "drug" as the drug being consumed, the "person" is the individual consuming the drug, and the "setting/context" is the broader setting in which the drug is obtained or consumed, or where a person accesses a network of supports (informal and formal).

- Among terms used in this document, we used the term "drug poisoning" more than the term "overdose" to reflect the toxicity of the drug supply. Where an included report used a term with a specific definition, such as "suspected opioid overdose" or "overdose prevention service" we used the term from the original document. Additionally, we used the term "substance" rather than the term "drug" as it was perceived as less stigmatizing. However, when a familiar concept such as "injection drug," "people who use drugs," or "drug checking" appeared in the literature we kept the term "drug" for clarity. The term "harm reduction" in this document mainly refers to harm reduction services, distinct from substance use treatment services; we do not refer more broadly to harm reduction concepts and models.

Results

- Peer-reviewed and grey literature searches resulted in the retrieval of 1354 records (see Appendix B for the PRISMA flow diagram). Due to problems accessing some full-text journal articles, eight records were excluded. A total of 28 records met the eligibility criteria and were included in this review, of which nine were grey literature records (e.g., epidemiologic data from public health agencies, research briefs).[14-22]

- Most records were published between 2001 and 2020 and focused on the United States (U.S.) (n=16),[23-38] followed by Canada (n=8),[14-19,21,39] Australia (n=2),[40,41] Europe (n=1),[20] and one was multi-national in scope (n=1).[22]

- Records were commonly related to COVID-19 (n=9),[14-22] Hurricane Sandy (n=6),[27,28,30,33,34,37] Hurricane Katrina (n=6),[25,26,29,31,32,38] the September 11 terrorist attacks (n=4),[23,24,35,36] a heroin shortage in Australia (n=2),[40,41] and a closure of a needle and syringe program (n=1).[39] See Table 1.

- This review presents the results by question. Sub-sections under types of harm or risk factor categories are presented in alphabetical order.

Table 1. Characteristics of Periods of Disruptions

Period of disruption	Location	Year of disruption	Length of time	Records
COVID-19	Worldwide, U.S., Canada, Europe	End of 2019	Ongoing	14-22
Hurricane Sandy	New York City, New York	2012	October 22 to 29[42]	27,28,30,33,34,37
Hurricane Katrina	New Orleans, Louisiana; Houston, Texas	2005	August 25 to 31[43]	25,26,29,31,32,38
September 11 terrorist attacks	New York City, New York	2001	September 11	23,24,35,36
Heroin shortage	Australia	2001	January to April	40,41
Closure of fixed site needle and syringe program	Victoria, BC	2008	Remained closed at data collection late 2010	39

Changes in Substance Use-Related Harms

SUBSTANCE USE-RELATED MORTALITY

- **Drug poisoning deaths:** Evidence from the COVID-19 pandemic and the September 11 terrorist attacks demonstrate increases in the number of drug poisoning deaths (terms vary based on record definitions). During April and May 2020, Toronto experienced its highest number of fatal suspected opioid overdose calls each month to Toronto Paramedic Services since September 2017.[21] Further, in May 2020, the British Columbia (BC) Coroners Service reported a 44% increase in the number of illicit drug toxicity deaths seen in May 2020 compared with April 2020, and 93% increase compared with May 2019.[17] One record also found higher alcohol or drug-related deaths compared to other causes following exposure to the September 11 terrorist attacks, specifically for individuals who were male, age 18 to 44, smoked tobacco at cohort enrollment, rescue/recovery workers, or experienced 9/11-related post-traumatic stress disorder (PTSD) or injury.[36]

SUBSTANCE USE-RELATED MORBIDITY

- **Hospitalization related to substance use (excluding poisoning):** One record found that hospitalization rates for substance use (e.g., drug-induced withdrawal, intoxication, psychosis) increased after Hurricane Katrina in New Orleans, from 7.13 per 1,000 in 2004 to 9.65 per 1,000 in 2008; however, it is important to note that this analysis combined hospitalizations related to either drugs or alcohol.[29]

- **Injection-related harms:** Following the onset of a reduced heroin supply in Australia in 2001, no changes were observed in the number of total notifications for human immunodeficiency virus (HIV), Hepatitis B (HBV) or C (HCV) or hospitalizations for injection-related problems.[41] Following the 2008 closure of a needle and syringe program in Victoria, BC, people who injected drugs described difficulty obtaining sterile needles and needle sharing increased from 10% to 20% by 2010, while rates remained low in Vancouver.[39]

- **Non-fatal drug poisoning:** During COVID-19 related public health measures, there is some emerging evidence of increases in the number of responses to drug poisoning (terms and definitions vary by report; here we have kept the terms specific to each report). In Calgary, the Safeworks supervised consumption services (SCS) and the Calgary Drop-in Centre have reported increases in the number of overdose responses.[14,18] For example, staff at the Safeworks SCS responded to 83 overdoses in March and 87 in April compared to an average of 57 a month between December 2019 and February 2020.[14] Similarly, there have been recent reports from Edmonton Medical Services on the increases in opioid-related emergencies in May 2020 (246 opioid-related emergencies) in comparison to May 2019 (108 opioid-related emergencies).[15] Toronto Paramedic Services have attended a higher number of non-fatal suspected overdose calls in March and April 2020[21] than the monthly average of 282 before 2020 (2020 personal email communication with Toronto Public Health; unreferenced). However, Toronto hospitals reported a decrease in substance-related emergency department visits in April 2020, which increased again in May and June but remained below average.[21] In contrast, during the heroin shortage in Australia, surveys of people who use drugs found a decrease in reported overdoses.[40]

- **Relapse:** Two studies reported experiences of relapse among people who recently stopped using substances prior to the September 11 terrorist attacks[35] or those enrolled in opioid agonist treatment (OAT) during Hurricane Sandy.[33] Another qualitative study found that half of patients in an outpatient program and 37% of patients on methadone reported relapse; many attributed their relapse to the September 11 terrorist attacks or subsequent events (55%).[24] However, program administrators noted that the relapse rate among patients on methadone was only slightly higher than usual.[24]

- **Substance use treatment admissions:** One record found substance use treatment admissions in New Orleans decreased between 2000 and 2012, before and after Hurricane Katrina.[32] However, admissions related to heroin increased, cocaine/crack decreased, and alcohol and cannabis remained stable.[32] Subsequent analysis of this period found that between 2006 and 2011, people with combined psychiatric and substance use issues were less likely to complete treatment, completion declined over time, and other factors for lower program completion included homelessness, criminal justice involvement and heroin use.[31]

- **Withdrawal:** A cross-sectional survey of people who inject drugs in New York City found that following Hurricane Sandy, over half of participants (59.5%) were unable to obtain drugs on one or more days to avoid withdrawal, with reports of people helping others avoid withdrawal (49.0%).[30]

Risk Factors Related to Increases in Substance Use-Related Harms

DRUG (E.G., DRUG OR SUBSTANCE CONSUMED)

- **Drug content:** A recent Canadian report noted increased drug toxicity and contamination with changes in bulking agents or additional substances, changes to the form (e.g., increase in powdered drugs), unanticipated side effects, and unintentional poly-substance use during COVID-19.[19] Prior to the COVID-19 pandemic, there was evidence of increasing toxicity of the drug supply contaminated with new synthetic opioids and/or benzodiazepines.[19] Similar experiences in decreased drug purity and quality have been reported internationally.[22] Records from other periods of disruption including the September 11 terrorist attacks in New York City,[23]

Hurricane Sandy,[33] and the heroin shortage in Australia[40,41] describe decreases in drug quality and purity.

- **Drug production:** COVID-19 measures could impede production and trade of substances across jurisdictions (e.g., opiates, cocaine).[19,22] This may lead to increased domestic production, resulting in changes to drug quality.[19,22]

PERSON (E.G., PERSON USING SUBSTANCES)

- **Age:** Rates of hospitalizations for substance use disorder were found to cluster among those aged 20 to 49 pre-Hurricane Sandy, but were more evenly spread across age groups after the hurricane.[29]

- **Mental health and trauma history:** New mental health (e.g., depression, anxiety) or trauma symptoms may increase risk of relapse for patients in substance use treatment, while previous mental health history may not. An analysis of treatment outcomes among people enrolled in OAT found those with mental health comorbidity were no more likely to report increased use/relapse as a result of Hurricane Sandy; rather, new-onset of mental health symptoms post-Hurricane Sandy were associated with increased risk of relapse or increased use.[34,37] Meanwhile, another study on the impacts of the September 11 terrorist attacks found that patients experiencing PTSD were more likely to relapse.[24]

- **Neighborhood-level socioeconomic status:** Socioeconomic status, and its intersection with other equity issues such as race, may be a risk for substance use-related hospitalization. After Hurricane Katrina, people in disrupted neighborhoods with non-displaced residents had a higher risk of hospitalizations for substance use disorders, as did neighbourhoods with a greater percentage of non-Caucasian residents.[29]

- **Racial identity:** We found few studies that addressed race, ethnicity, Indigenous identity, people with refugee status, or the intersection with other factors related to health equity. One study found that areas with higher non-white populations predicted higher hospitalization rates for substance use after Hurricane Katrina.[29]

- **Sex and gender:** There was limited information on sex and gender issues for changes in substance use-related harms. A study on the hospitalization rates for substance use disorders before and after Hurricane Katrina found that males were more likely to be hospitalized during both periods.[29] Further, during the COVID-19 pandemic in BC, the rate of illicit drug overdose deaths increased among males from 2.26 in January 2020 to 3.88 per 100, 000 population in April 2020.[16] In contrast, during the same time period, deaths among females was relatively stable between January and April 2020 (0.81 and 0.74 per 100,000 population, respectively).[16] Results from a study on the impacts of the September 11 terrorist attacks on substance use treatment programs in New York City found that males were more likely to relapse than females. [24]

- **Substance use practices:** One study found changes to drug use networks following Hurricane Sandy, with 14.4% of participants reporting injecting drugs with people they would not typically inject with.[30] Additionally, one-third of participants reported helping obtain sterile syringes for others (33.3%), sharing syringes (19.0%), drug preparation equipment (17.0%) or "backloading/piggy-backing" (12.3%).[30]

- **Substance use treatment history:** An individual's personal history in substance use treatment prior to times of disruption may influence their outcomes during a disruption. A cross-sectional survey and chart review of patients enrolled in buprenorphine treatment was analyzed for outcomes based on patient characteristics pre-Hurricane Sandy.[33] Those with a shorter length of time in treatment and history of repeat positive urine screen tests or no-show visits in the past 6 months had an increased risk of opioid use and relapse.[33]

SETTING/CONTEXT (E.G., SETTING IN WHICH THE PERSON OBTAINS OR USES SUBSTANCES OR ACCESSES SUPPORTS)

Few records describe the impacts of COVID-19 public health measures on a range of services including harm reduction and outreach, shelters, health care, and residential treatment: [19,20,22]

- **Barriers to harm reduction service access:** Harm reduction services such as SCS and overdose prevention services (OPS) have largely been able to remain open during COVID-19.[19] However, services have had to adjust to new restrictions to reduce the spread of COVID-19, which may pose challenges for people seeking services.[19] Disruptions in SCS or barriers to access during emergencies may increase risk of drug poisoning or infection. For example, The Works in Toronto had 3853 visits in February 2020 prior to the public health restrictions related to COVID-19 and declined to 127 visits in April 2020, including a closure period of 3 weeks and appointment-only operation upon re-opening.[21] Similarly, Alberta Health Services reports that visits to Safeworks SCS in Calgary have declined by one-third since operating at reduced client capacity since mid-March.[14] Between December and February 2020, Safeworks SCS had 6600 visits a month, which decreased to 5,850 in March, and dropped again to 4,440 in April 2020.[14] Meanwhile, visits to OPS and SCS in British Columbia have declined from 59,307 visits in February 2020 to 51,981 in March 2020.[16] In the European Union and Norway, 15 countries have reported a decrease in the availability of harm reduction services during the first two months of the COVID-19 pandemic response, with drop-in centres specifically reporting high closures and reductions.[20] A qualitative study on the impacts of the September 11 terrorist attacks on people who use substances in New York City found no significant changes in service access; however, some participants reported that local pharmacies provided easier access to needles than harm reduction services.[23]

- **Barriers to accessing other service and supports:** We did not find records describing changes in access to informal supports, such as peer networks. One study found that among HIV-positive participants on OAT, about 40% missed HIV medication doses the week after Hurricane Sandy (42.6%).[30]

- **Barriers to substance use services including OAT:** Preliminary data from the European Union and Norway suggests a decline in the availability, closure or significant reduction in substance use treatment services during the first two months of the COVID-19 pandemic response.[20] During Hurricane Sandy, Hurricane Katrina, and the September 11 attacks, substance use treatment services experienced similar closures or evacuations that disrupted access for patients.[20,23,24,29,30,33,34]

- A cross-sectional survey of the impacts of Hurricane Sandy on people who inject drugs in New York City found that only 30.1% of people in OAT programs were able to obtain adequate take-home doses to avoid withdrawal, while others were able to obtain some doses (22.9%) or use informal sources (23.5%); about 10% reported withdrawal due to being unable to obtain a

regular dose (8.5%).[30] Another study found half of participants in OAT reported disruptions in their buprenorphine supply after Hurricane Sandy, and commonly reduced their doses to last longer.[33] While most clients attempted contacting their OAT clinic (64%) following Hurricane Sandy, only one-third (33%) reported having their needs met.[33] Additionally, one study found that exposure to disruptions in buprenorphine supply was associated with increased risk of use or relapse post-Hurricane Sandy.[37] However, one study of an office-based buprenorphine program post-Hurricane Sandy found 98% of patients remained in treatment at 6 months, without an increase in positive urine drug tests or reports of substance use.[34]

- **Drug availability and price:** During the COVID-19 pandemic, there have been reports of the decreased availability of non-pharmaceutical drugs (e.g., heroin, cocaine), resulting in increased prices at the point of purchase.[19,22] The impacts of changes in the drug supply during and after periods of disruption have included: decreased or change in drug availability,[25,26] increased prices,[25,26,30,33,41] increased demand,[23] changes to regular source or difficulty obtaining drugs,[26,30] or being unable to purchase their drug of choice.[25] Similarly, prices increased during the heroin shortage in Australia.[40] These changes may result in an increased risk of fatal or non-fatal drug poisoning (e.g., loss of tolerance), withdrawal, and other harms.[19] Two qualitative studies on the impacts of the September 11 terrorist attacks in New York City report similar or more drug availability following the attack,[23,35] despite concerns of drug scarcity.[23]

- **Drug market violence:** Following Hurricane Katrina, one record described increases in drug market violence due to disputes over specific territories and clients.[26]

- **International drug trade:** A research brief from the United Nations Office of Drugs and Crime reports on the impacts of COVID-19-related border closures, workforce availability, and travel restrictions on the drug supply chain and disruptions in trade.[22] Specific changes have been noted related to the disruptions in trade, reduced availability (including precursor agents for synthetic drugs) and increases in prices.[22]

- **Substance use setting:** We did not find records that described the experiences of people who use drugs around the impact of a disruption on their setting for drug use, including their housing or other places. There is some anecdotal evidence from law enforcement that substance use-related deaths have more frequently occurred in private residences since the COVID-19 pandemic response.[19]

Discussion

Twenty-eight records were identified that described the changes in substance use-related harms or related risk factors during periods of disruptions. Fatal and nonfatal drug poisoning were the most commonly reported harms. Factors that increase risk of harms often included decreased drug availability and increased price, reduced accessibility to substance use treatment and harm reduction services, and increasing toxicity of the drug content. Though these were most commonly reported, the evidence was limited and showed mixed results (e.g., may or may not have demonstrated change).

Following our search, preliminary findings were published for a relevant literature synthesis, *Rapid Review of the Impacts of "Big Events" On People Who Use Drugs and Delivery of Harm Reduction and Drug Treatment Services: Implications for Strengthening Systems in Response to COVID-19*.[44] There was minimal overlap with our included articles due to differences in the search strategy and selection criteria. The synthesis on "big events" included more articles on heroin shortage and selected articles on

various economic crises. It did not include grey literature, and as a result did not capture articles on COVID-19. Our findings were similar in describing decrease in drug availability and purity, and increase in price. The review on "big events" differed in describing lower overdose and mortality, likely reflecting an emphasis on heroin shortage and economic recessions. It described an increase in drug market violence and drug offences, as well as transition to/from injection and frequency of injection, but did not describe other outcomes such as relapse and substance use-related hospitalization.

We found that few studies reflected the voices and experiences of people who use drugs, but rather information on programs or clinical outcomes. Most often the literature focused on changes to substance use or substances that were out of scope for this review (e.g., alcohol) and were excluded. Commonly, records examined the impacts of interruptions or closure of substance use treatment on enrolled patients.[24,27,28,31-34,37] Further research is needed on the experience and impacts for people who use drugs who are not enrolled in treatment programs, as well as the impacts of interruptions to harm reduction, other services, and other networks of support to inform public health emergency planning and response.

Additionally, many of our included records on previous periods of disruption were from American events from a decade or two ago (e.g., September 11 terrorist attacks, Hurricane Katrina).[23-26,29,31,32,35,36,38] Findings from different types of disruption, in different places, and different time periods may not be as relevant to the current Ontario context (e.g., heroin shortage in Australia in 2001 vs. current opioid supply in North America). For example, harm reduction and treatment practice has changed over the past decade, and more recent practice changes during the COVID-19 pandemic were implemented. It is also important to consider that the changes during the COVID-19 pandemic are prolonged rather than a discrete event in a short period of time and the public health measures in place contribute to social isolation and disruptions to familiar social supports and support networks. Given these differences, it is challenging to compare and understand the relevant and useful information from other periods of disruption.

Most records on documented harms related to fatal and nonfatal drug poisoning were from Canadian sources documenting events during the COVID-19 pandemic; most suggesting increases in fatal and nonfatal poisoning.[7,14-16,18,21] These findings on increases in fatal and nonfatal poisoning are consistent with recent media reports from other Canadian jurisdictions.[45-47] Lower emergency department visits for substance use in areas such as Toronto may reflect lower emergency department use overall during this time. Measuring the impacts of COVID-19 on substance use-related harms is still early, and new data are still emerging; thus, it is difficult to ascertain whether these changes may be due to the drug supply, COVID-19 measures, or other factors and their intersections. Other gaps in understanding outcomes may include experience of violence that may occur for people who use drugs, suicide, and other impacts of isolation for extended periods of time. To appropriately understand and address the evolving situation of COVID-19, assessment, monitoring and timely reporting of substance use-related harms, using various sources of information such as community and practice experience, is essential to address negative health outcomes.

Findings related to risk factors for increased substance use-related harms are similar to those during periods without disruption. Specifically, increased risk of opioid-related harms among males;[48-51] those with mental health issues;[48-50] of lower socio-economic status;[48,50] reduced access to health and other services; and drug use settings (i.e., use alone in a private setting). This may reflect the pre-existing gaps in the mental health and substance use sectors for meeting the needs of people who use drugs. During the pandemic, we found records reflecting reduced access to services, and there may also be disruption in the informal or social networks of support familiar to people who use drugs that have not been

characterized. Responses could be informed by the meaningful involvement of people who use drugs, and consider addressing the health and social systems (e.g., basic level of supports required) and emergency adaptations (e.g., enabling communication) to meet the physical, mental, and social needs of people affected.

Most notably, we found few records that considered inequities and none that examined intersecting determinants of health for people who use substances (e.g., the impacts of multiple factors intersecting with each other such as race, ethnicity, Indigenous identity, refugee status, sex, gender, sexual orientation, sex work, housing, employment or income), which is pertinent to the understanding of substance use-related harms and risk factors. These intersecting factors exacerbate the stigma and discrimination that impact the health and wellbeing of people who use substances and their access to services and supports, leading to unequal outcomes (e.g., criminalization)[52-54] and differences in vulnerability, risk factors, and exposure to them. While there were few records identified that addressed racial and Indigenous identity during periods of disruptions, the experiences and disproportionate impacts of substance use-related harms experienced by racialized and Indigenous communities are well documented. [52,55,56] More recently, data from BC highlights the increasingly disproportionate burden of overdose deaths among First Nations in BC during the COVID-19 pandemic.[57] Without these considerations, and engagement with people who use substances, there remains a gap in our understanding of substance use-related harms and risk factors and effective strategies to address them.[58,59]

Finally, there were several limitations of the study designs for included records. Most records were qualitative designs[24-28,35] or less rigorous cross-sectional surveys.[30,33,34,39] Further, some did not directly compare reports of behaviours before and after a period of disruption, and focussed on immediate impacts rather than long-term effects.[23,30] Other reported limitations include low response rates,[33] small[35,37] or convenient[23] sample sizes of participants from a single care setting, further limiting the applicability of the results to the Ontario context.

Limitations and Strengths

Strengths of this review include the search of both peer-reviewed and grey literature for relevant records using multiple search strings. The questions explored in this review are timely and contribute to better understanding of substance use-related harms and risk factors for increased harms during periods of disruption that can inform our response during the COVID-19 pandemic. Additionally, the use of a framework provided for a systematic approach to analyze findings.

Due to time and resource constraints, we searched multiple databases only for COVID-19 specific records. A systematic search strategy for previous periods of disruptions did not involve multiple databases or a review of all citation lists. As such, it is likely that relevant literature may have been missed in this rapid review; however, its generalizability to the current context may be limited. Additionally, we recognize that the data and research during the COVID-19 pandemic are rapidly evolving and emerging, and new relevant records may now be available. The records included were examined by one reviewer and were not assessed for methodological quality using a quality appraisal tool. However, the full-text list was reviewed and discussed with the senior author.

The search identified several records that examined the changes in harms related to alcohol, tobacco, and cannabis during periods of disruption. Although out of scope for this review, harms related to these substances warrants further review.

Conclusion

This rapid review provides a synthesis of the substance use-related harms and risk factors for increased harms that can be used to understand and inform measures to mitigate risks of substance use-related and other negative health outcomes during COVID-19. Evidence on substance use-related harms and risk factors for increased harms during periods of disruption is limited and mixed. Emerging evidence from COVID-19 and other periods of disruption suggests increases in fatal and nonfatal drug poisoning, and changes in the availability and price, drug content, access to harm reduction services, and mental health may increase risk of harms. While evidence on the impacts of COVID-19 disruptions are not fully known, monitoring and timely reporting of substance use-related harms will be essential to understand the impacts of COVID-19 community-based public health measures to inform strategies to mitigate risk.

Local and provincial public health agencies, alongside other sector partners and people who use substances, should further explore evidence-informed options to address changes in the drug supply, mental health, and accessibility of harm reduction and treatment services to mitigate risks of negative health outcomes for people who use substances.

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Appendix A

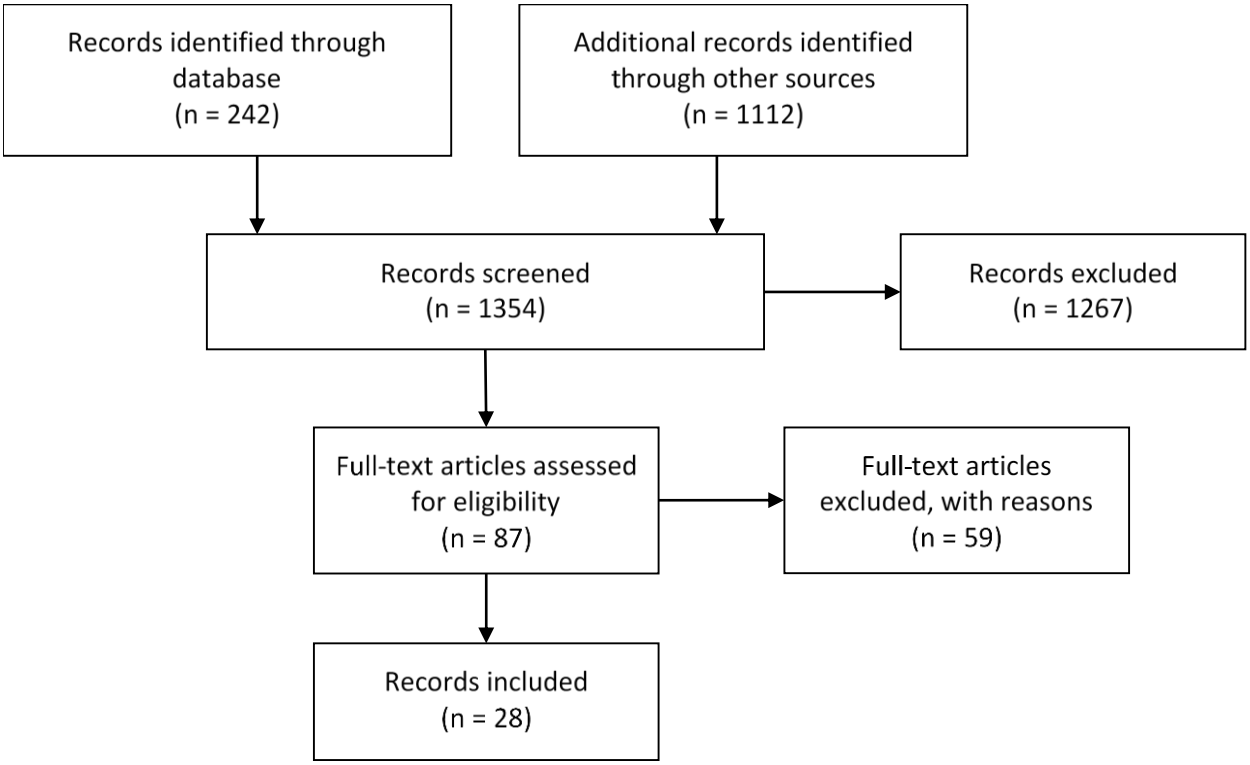
The following search was designed by PHO Library Services in Ovid MEDLINE and adapted to the Ovid platform databases Embase and PsycINFO.

Table 1.Search Strategy in Ovid MEDLINE (1946 to May 26, 2020)

#	Searches
1	("2019 corona virus" or "2019 coronavirus" or "2019 ncov" or "corona virus 19" or "corona virus 2019" or "corona virus 2019" or "corona virus disease 19" or "corona virus disease 2019" or "corona virus epidemic*" or "corona virus outbreak*" or "corona virus pandemic*" or "coronavirus 19" or "coronavirus 2019" or "coronavirus 2019" or "coronavirus disease 19" or "coronavirus disease 2019" or "coronavirus epidemic*" or "coronavirus outbreak*" or "coronavirus pandemic*" or "covid 19" or "covid 2019" or "new corona virus" or "new coronavirus" or "novel corona virus" or "novel coronavirus" or "novel human coronavirus" or "sars coronavirus 2" or "sars cov 2" or "sars cov2" or "sars like coronavirus" or "severe acute respiratory syndrome corona virus 2" or "severe acute respiratory syndrome coronavirus 2" or "severe specific contagious pneumonia" or "wuhan corona virus" or "wuhan coronavirus" or 2019ncov or covid19 or covid2019 or ncov or sarscov2 or "coronavirus response" or "corona virus response").af.
2	((novel or Wuhan or China or Chinese or "seafood market" or "2019" or outbreak* or epidemic* or pandemic*) adj5 (coronavirus* or "corona virus*" or betacoronavirus* or "beta coronavirus*" or "beta corona virus*" or pneumonia* or SARS or "severe acute respiratory syndrome")).af.
3	((coronavirus* or "corona virus*" or betacoronavirus* or "beta coronavirus*" or "beta corona virus*" or SARS or "severe acute respiratory syndrome") adj5 pneumonia*).af.
4	1 or 2 or 3
5	exp Analgesics, Opioid/ or Fentanyl/ or Heroin/ or Heroin Dependence/ or Hydrocodone/ or Hydromorphone/ or Illicit Drugs/ or Narcotics/ or Oxycodone/ or Oxymorphone/ or Opioid Epidemic/ or Opioid-Related Disorders/ or Street Drugs/ or Substance Abuse, Intravenous/ or Substance-Related Disorders/
6	(acetylfentan#l or carfentan#l or diacetylmorph#ne or fentan#l* or heroin or hydrocodone or hydromorph#ne or morphine or oxycodone or phentan#l or tramadol or ((injection or intravenous) adj2 "drug use*") or ((drug or substance*) adj2 (abuse or addict* or dependence or misuse))).ab,ti,kw,kf.
7	(opioid* or opiate*).ti,ab,kw,kf,hw.
8	5 or 6 or 7
9	4 and 8

Appendix B

Figure 1. PRISMA Flow Diagram



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