

# Health Promotion and Chronic Disease Prevention in Canada

## *Research, Policy and Practice*

Volume 40 • Number 11/12 • November/December 2020

### Inside this issue

#### *Original quantitative research*

329 Discrimination in the health care system among higher-weight adults: evidence from a Canadian national cross-sectional survey

336 Pediatric injuries in the time of COVID-19

#### *Evidence-informed policy brief*

342 Substance use and related harms in the context of COVID-19: a conceptual model

#### *Commentary*

350 Rapid response to COVID-19: addressing challenges and increasing the mental readiness of public safety personnel

#### *Announcement*

356 Call for papers – 2021 special issue: Tobacco and vaping prevention and control in Canada

357 Open call for papers: COVID-19 pandemic

359 Other PHAC publications

Indexed in Index Medicus/MEDLINE, DOAJ, SciSearch® and Journal Citation Reports/Science Edition



Public Health  
Agency of Canada

Agence de la santé  
publique du Canada

Canada

---

## Editorial team

Anne-Marie Ugnat, PhD  
Publisher

Robert Geneau, PhD  
Editor-in-Chief

Minh T. Do, PhD  
Associate Scientific Editor

Scott Leatherdale, PhD  
Associate Scientific Editor

Gavin McCormack, PhD  
Associate Scientific Editor

Barry Pless, OC, MD, FRCPC  
Associate Scientific Editor

Kelly Skinner, PhD  
Associate Scientific Editor

Alexander Tsertsvadze, MD, PhD  
Associate Scientific Editor

Paul Villeneuve, PhD  
Associate Scientific Editor

Neel Rancourt, BA  
Managing Editor

Sylvain Desmarais, BA, BEd  
Production Editor

Susanne Moehlenbeck  
Assistant Editor

Chanelle Ayoub, BSc  
Junior Editor

Nicholas Cheta, BHSc  
Junior Editor

Joanna Odrowaz, BSc  
Freelance Copyeditor

Anna Olivier, PhD  
Freelance Copyeditor

Dawn Slaweki, BA  
Freelance Copyeditor

Liang Qian (Richard) You, MSc  
Web Content Manager

## Editorial Board

Lisa Bourque Bearskin, PhD  
Thompson Rivers University

Caroline Bergeron, DrPH  
Public Health Agency of Canada

Martin Chartier, DMD  
Public Health Agency of Canada

Erica Di Ruggiero, PhD  
University of Toronto

Charlotte Kent, PhD  
Centers for Disease Control and Prevention

Jean-Claude Moubarac, PhD  
Université de Montréal

Howard Morrison, PhD  
Public Health Agency of Canada

Candace Nykiforuk, PhD  
University of Alberta

Jennifer O'Loughlin, PhD  
Université de Montréal

Scott Patten, MD, PhD, FRCPC  
University of Calgary

Richard Stanwick, MD, FRCPC, FAAP  
Island Health

Mark Tremblay, PhD  
Children's Hospital of Eastern Ontario Research Institute

Joslyn Trowbridge, MPP  
University of Toronto

**To promote and protect the health of Canadians through leadership, partnership, innovation and action in public health.**  
— Public Health Agency of Canada

Published by authority of the Minister of Health.

© Her Majesty the Queen in Right of Canada, represented by the Minister of Health, 2020

ISSN 2368-738X

Pub. 190450

PHAC.HPCDP.journal-revue.PSPMC.ASPC@canada.ca

Également disponible en français sous le titre : *Promotion de la santé et prévention des maladies chroniques au Canada : Recherche, politiques et pratiques*

Submission guidelines and information on article types are available at:

<https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/information-authors.html>

---

## Original quantitative research

# Discrimination in the health care system among higher-weight adults: evidence from a Canadian national cross-sectional survey

Neeru Gupta, PhD (1); Andrea Bombak, PhD (1); Ismael Ferozghi, PhD (1); Natalie Riediger, PhD (2)

This article has been peer reviewed.

 [Tweet this article](#)

### Abstract

**Introduction:** Weight-related social stigma is associated with adverse health outcomes. Health care systems are not exempt of weight stigma, which includes stereotyping, prejudice and discrimination. The objective of this study was to examine the association between body mass index (BMI) class and experiencing discrimination in health care.

**Methods:** We used data from the 2013 Canadian Community Health Survey, which included measurements of discrimination never collected previously on a national scale. Logistic regression analysis was used to assess the risk of self-reported discrimination in health care in adults ( $\geq 18$  years) across weight categories: not obese (BMI  $< 30$  kg/m<sup>2</sup>), obese class I (BMI =  $30- < 35$  kg/m<sup>2</sup>) and obese class II or III (BMI  $\geq 35$  kg/m<sup>2</sup>).

**Results:** One in 15 (6.4%; 95% CI: 5.7–7.0%) of the adult population reported discrimination in a health care setting (e.g. physician's office, clinic or hospital). Compared with those in the not obese group, the risk of discrimination in health care was somewhat higher among those in the class I obesity category (odds ratio [OR] = 1.20; 95% CI: 1.00–1.44) and significantly higher among those in class II/III (OR = 1.52; 95% CI: 1.21–1.91), after controlling for sex, age and other socioeconomic characteristics.

**Conclusion:** Quantified experiences of weight-related discrimination underscore the need to change practitioner attitudes and practices as well as the policies and procedures of the health care system. More research is needed on the social and economic impacts of weight stigma to inform focused investments for reducing discrimination in the health care system as a microcosm of the society it reflects.

**Keywords:** *body weight, obesity, social stigma, social discrimination, social determinants of health, health surveys, attitude of health personnel*

### Introduction

A small but growing body of literature suggests that weight stigma is directly associated with adverse physiological and psychological outcomes.<sup>1</sup> Stigma and discrimination have a spectrum of effects that can lead to negative health outcomes by creating and reinforcing social inequalities.<sup>2</sup> These inequalities, in turn, limit access to resources and opportunities.<sup>2</sup>

Stigma in health care undermines diagnosis, treatment and optimal health.<sup>3</sup> Consequences of weight stigma may include avoidance of medical care, provider distrust, medication nonadherence, disordered eating, physical inactivity and poorer mental health.<sup>4-9</sup> Experiencing weight stigma has been associated with numerous cardiometabolic disturbances including atherosclerosis, cardiovascular conditions, diabetes and biological stress.<sup>10-13</sup>

### Highlights

- Weight stigma is associated with adverse physical and mental health outcomes.
- Based on data from the first nationally representative survey on every day and medical discrimination, we found that 6.4% of Canadian adults experienced discrimination in a health care setting.
- Higher-weight people were significantly more likely to report discrimination in health care, after adjusting for sex, income group and other social and demographic characteristics, than those whose body mass index was in the not obese category.
- More research is needed to inform interventions to reduce weight stigma in the health care system.

A longitudinal assessment from the United States associated weight discrimination with increased mortality risk, after adjustment for frequently related morbidities and behaviours.<sup>14</sup> The World Health Organization recognizes that many individuals and groups face discrimination in health care settings on the basis of their sex, age, ethnicity, gender identity, vulnerability to ill health and/or other characteristics—and that such discrimination does not occur in a vacuum.<sup>15</sup> An enhanced evidence base is needed to support accountability and policy development.<sup>15</sup>

The implications of stigma and discrimination for population health and health

### Author references:

1. Department of Sociology, University of New Brunswick, Fredericton, New Brunswick, Canada
2. Department of Food and Human Nutritional Sciences, University of Manitoba, Winnipeg, Manitoba, Canada

**Correspondence:** Neeru Gupta, Department of Sociology, University of New Brunswick, P.O. Box 4400, Fredericton, NB E3B 5A3; Tel: 506-453-5177; Email: [ngupta@unb.ca](mailto:ngupta@unb.ca)

inequities are increasingly acknowledged in Canada and elsewhere.<sup>16-18</sup> Data from a national household survey indicate that everyday discrimination persists across multiple social groups in Canada.<sup>19,20</sup> Discrimination is often attributed to gender and physical characteristics such as weight, although the intergroup empirical patterns of chronic subtle mistreatments do not necessarily follow a straightforward socialization theory trajectory.<sup>19,20</sup>

In particular, weight stigmatization is a commonly used umbrella term in the literature.<sup>21</sup> It can be defined as “negative weight-related attitudes and beliefs that are manifested by stereotypes, rejection and prejudice towards individuals because they are overweight or obese.”<sup>22</sup> Some studies found that substantial proportions of clinicians hold prejudiced beliefs about higher-weight patients, including that they are less motivated, noncompliant, awkward and lack will power.<sup>23-25</sup> In a sample of family physicians practising in Canada (n = 400), large proportions gave responses suggestive of weight bias: 49% agreed that “people with obesity increase demand on the public health care system”; 33% stated they “often feel frustrated with patients who have obesity”; 28% stated they felt “patients with obesity are often noncompliant with treatment recommendations”; 19% said “I feel disgust when treating a patient with obesity”; and 17% indicated that “sometimes I think that people with obesity are dishonest.”<sup>26</sup>

Under-explored in Canada is the prevalence of weight-based stigma in different settings, despite its pernicious effects.<sup>27</sup> This study aims to address this knowledge gap by assessing the association of higher body weight with self-reported discrimination in health care among Canadian women and men.

We used information from a national data collection on stigma and discrimination as an emerging population health issue to support evidence-based health promotion in this context of publicly funded universal health care coverage. The goal is to inform policy actions for enhanced accountability and reduction of stigma in the health care system as a microcosm of the society it reflects.

## Methods

### Study design

We analyzed data from the 2013 Canadian Community Health Survey (CCHS) and,

specifically, its rapid response module on everyday discrimination. The CCHS is an annual cross-sectional survey administered by Statistics Canada that collects information on health determinants, health status and health care from a nationally representative sample of the community-dwelling population aged 12 years and over. The 2013 CCHS included a unique module that captured data to measure discrimination never collected previously on a national scale.<sup>28</sup> The original sample for the CCHS “everyday discrimination” module included 19 876 respondents.<sup>29</sup> We limited the sample to adults aged 18 years and over with valid responses to all variables of interest (n = 16 340).

### Discrimination in health care

Respondents were asked questions about their perception of discrimination in their day-to-day life and in their experiences with health care services. Previous studies have found itemized measures of perceived discrimination to have consistent predictive validity.<sup>30</sup> The outcome variable for this analysis was based on valid answers to the question, “Have you received poorer service than other people in any of the following situations?” The settings included a physician’s office, a community health centre, a walk-in clinic, a hospital emergency room or another health care service.<sup>31</sup> We measured our outcome dichotomously, that is, whether or not the respondent reported receiving poorer service in any physical health care setting.

### Weight category

Our main independent variable was derived from self-reported height and weight. We grouped weight status from calculated body mass index (BMI) based on the standard Health Canada framework for classifying body weight: not categorized as obese (BMI < 30 kg/m<sup>2</sup>); categorized as obese class I (BMI = 30–<35 kg/m<sup>2</sup>); and categorized as obese class II or III (BMI ≥ 35 kg/m<sup>2</sup>). Women who were pregnant at the time of the survey were excluded.

### Statistical analysis

We conducted multiple logistic regression analysis to assess the independent association of weight status with stigma in health care, adjusting for other socioeconomic characteristics: sex (male or female); age group (18–29 years, 30–44 years, 45–64 years or

≥ 65 years); marital status (whether or not currently in a marital or common-law union); educational attainment (whether or not a household member had attained a postsecondary level of schooling); and income group. We dichotomized individuals’ income group into lower-range versus higher-range categories based on the total annual household income from all sources (\$0–29 999 versus ≥ 30 000).<sup>32</sup>

Bootstrapped survey weights were applied to the descriptive statistics to ensure population representation given the CCHS complex sampling design. Rounding algorithms were further applied to the descriptive counts in respect of data privacy protocols. To ease interpretation of the results from the logistic model, coefficients were converted to odds ratios (ORs) with 95% confidence intervals (CIs) ( $\alpha = 0.05$ ) using statistical software STATA version 15 (StataCorp LP, College Station, TX, USA).

We accessed the confidential survey micro-data used in the analysis in the secure environment of the Statistics Canada Research Data Centre (RDC) at the University of New Brunswick in Fredericton, Canada. The study complied with the University of New Brunswick’s Research Ethics Board, which does not require an internal institutional review for research projects using data accessed through the RDC, in accordance with the *Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans*.<sup>33</sup>

## Results

Based on data from the CCHS, 32.7% (95% CI: 31.0–34.5%) of the adult population reported experiencing discrimination in their everyday life and 6.4% (5.7–7.0%) reported discrimination in a health care setting. The number reporting discrimination in a health care setting represented 1 616 700 (1 453 400–1 780 000) Canadians. Of these people, 29% (24–33%) specifically reported poorer service in the health care sector, but did not also report everyday discrimination in the previous year.

One in five (19.4%) adults were classified with obesity. Specifically, 13.5% (95% CI: 12.6–14.4%) were categorized with class I obesity and 5.9% (5.4–6.5%) with class II or III (Table 1). Reflecting the aging of the population, there were more adults aged 45 years and over (54.8%; 54.2–55.4%) than those aged 18 to 44 years (45.2%; 44.3–46.0%). Fifteen per cent (15.7%; 95%

**TABLE 1**  
**Percentage distribution of the population aged 18 years and over by selected characteristics**

Characteristic	Percentage distribution, %	95% CI
<b>Experience of discrimination in a health care setting</b>		
Yes	6.4	5.7–7.0
No	93.6	92.7–94.6
<b>Weight category</b>		
Not obese	80.6	79.5–81.7
Obesity class I	13.5	12.6–14.4
Obesity class II or III	5.9	5.4–6.5
<b>Sex</b>		
Male	50.2	49.8–50.7
Female	49.8	49.2–50.3
<b>Age group, years</b>		
18–29	19.7	19.2–20.1
30–44	25.5	25.1–25.9
45–64	36.0	35.6–36.4
≥ 65	18.8	18.6–19.0
<b>Highest level of household education</b>		
At most secondary diploma	18.8	17.9–19.8
Any postsecondary education	81.2	80.0–82.3
<b>Marital status</b>		
Not currently married or in union	36.7	35.5–37.9
Married or common-law	63.3	62.0–64.6
<b>Household income group, \$</b>		
0–29 999	15.7	14.8–16.6
≥ 30 000	84.3	83.2–85.5

Source: Canadian Community Health Survey 2013–Everyday Discrimination Scale (n = 16 340).

Abbreviation: CI, confidence interval.

Note: Data are bootstrap weighted for population representation.

CI: 14.8–16.6%) were in the lowest household-income range (<\$30,000 annually).

Results from the multiple logistic regression showed that, compared with those whose BMI was categorized as not obese, the odds of reporting discrimination in a health care setting was somewhat higher among those with class I obesity (OR = 1.20, 95% CI: 1.00–1.44,  $p = .05$ ) and significantly higher among those with class II/III obesity (1.52, 1.21–1.91,  $p < .05$ ), after controlling for other sociodemographic characteristics (Table 2).

All else being equal, women had significantly higher odds than men of reporting discrimination in health care (OR = 1.48, 95% CI: 1.29–1.70,  $p < .05$ ). People not currently married or living in union had higher odds of reporting discrimination in health care than those who were married

(1.18, 1.03–1.38,  $p < .05$ ). The odds of those in the lowest household-income group reporting discrimination were higher than those of their higher-income counterparts (1.69, 1.44–2.00,  $p < .05$ ). Individuals aged 45 years and over were less likely to report discrimination in health care than those aged 18 to 29 years. People living in a household of at most secondary-level educational attainment were also less likely to report discrimination than those in households where a postsecondary level had been attained.

## Discussion

The need to pay attention to the consequences of systemic weight bias is increasingly advocated in policy and practice recommendations made through the lens of health promotion, equity and social determinants.<sup>34</sup>

This study is, to our knowledge, the first national investigation quantifying experiences of discrimination in health care among higher-weight persons using data representative of the Canadian population. A non-negligible proportion (6.4%) of adults reported discrimination in a health care setting. Compared with those in the not obese group, the risk of discrimination in health care was approaching statistical significance among those in the class I obesity category (OR = 1.20, 95% CI: 1.00–1.44,  $p = .05$ ) and was significantly higher among those in the class II or III obesity category (1.52, 1.21–1.91,  $p < .05$ ), after controlling for other sociodemographic characteristics.

Being male was found to be independently protective of the risk of experiencing discrimination in a health care setting. Previous studies have found perceived weight discrimination, including in health care contexts, to be more prevalent among women than men.<sup>35,36</sup> Being in a higher household-income group was associated with a significantly lower risk of experiencing discrimination in health care, whereas being in a household with higher educational attainment was associated with a significantly higher risk. These potentially contradictory patterns of self-reported discriminatory experiences depending on the measure of socioeconomic status examined may reflect, on the one hand, underreporting due to minimization bias (e.g. lack of awareness), or on the other hand, overreporting due to vigilance bias (heightened focus on their social identity status).<sup>19</sup>

These results underscore the need to change practitioner attitudes and practices that may be detrimental to health. One in 15 Canadian adults report discrimination in a health care setting, an indicator suggestive of more overt forms of discrimination compared with global discrimination measures.<sup>20</sup> However, weight bias has been a neglected issue in health professional education and training.<sup>37</sup> Despite the critical importance of an effective provider-patient relationship for achieving positive outcomes, there is little empirical evidence about the pathways to valuing trust and managing the power imbalance.<sup>38</sup>

More research is needed to address the negative attitudes health care professionals may have towards higher-weight patients and the underlying causes of

**TABLE 2**  
**Adjusted odds ratios (with 95% confidence intervals) from the multiple logistic regression for the risk of self-perceived discrimination in a health care setting**

Characteristic	Odds ratio	95% CI	p-value
<b>Weight category</b>			
Not obese (ref.)	1.00	–	–
Obesity class I	1.20	1.00–1.44	.05
Obesity class II or III	1.52*	1.21–1.91	<.001
<b>Sex</b>			
Male (ref.)	1.00	–	–
Female	1.48*	1.29–1.70	<.001
<b>Age group, years</b>			
18–29 (ref.)	1.00	–	–
30–44	0.97	0.79–1.20	.83
45–64	0.72*	0.59–0.88	.001
≥65	0.48*	0.38–0.59	<.001
<b>Highest level of household education</b>			
At most secondary diploma	0.79*	0.67–0.93	.007
Any postsecondary education (ref.)	1.00	–	–
<b>Marital status</b>			
Not currently married or in union	1.18*	1.03–1.38	.02
Married or common law (ref.)	1.00	–	–
<b>Household income group, \$</b>			
0–29 999	1.69*	1.44–2.00	<.001
≥ 30 000 (ref.)	1.00	–	–

Source: Canadian Community Health Survey 2013–Everyday Discrimination Scale (n = 16 340).

Abbreviations: CI, confidence interval; ref., reference category.

\* p < .05.

weight stigma, as few intervention strategies have proven especially effective to date.<sup>39,40</sup> A qualitative study of stigma-reduction interventions prioritized better education on the etiology of body size, the difficulty of losing weight and the falsity of common weight-based stereotypes.<sup>22</sup> Appropriate interventions need to extend beyond issues of controllability of weight and address the negative value of fatness—such as unwarranted assumptions and judgements regarding higher-weight persons' health status or attractiveness.<sup>37,40</sup> As the science of anti-weight stigma intervention expands, to ensure lasting and noticeable impacts, anti-stigma education strategies must be supported through anti-weight discrimination legislation, anti-bullying policies and culture change.<sup>41</sup> In line with this, favouring neutral terminology such as “higher-weight” in health promotion, research and provider–patient communications has been identified

among the evidence-based means of fostering safe and respectful dialogue towards the ultimate goal of eliminating weight-stigmatizing attitudes and practices in health care.<sup>42–44</sup>

### Strengths and limitations

Strengths of the study include the nationally representative nature of the data. While the “true” extent of discrimination may be impossible to determine, as it may be underreported in a survey, the observational data reflect differences between members of Canadian society in judgements of disparate treatment.<sup>20</sup>

Limitations include the relatively small sample size of the CCHS rapid response module, which was not designed to produce high quality estimates at detailed levels,<sup>29</sup> hindering our ability to tease associations between specific health care settings

(such as a hospital emergency department versus a physician's office) or across provinces. In particular, we were unable to retain the statistical power to comprehensively investigate other individual-level characteristics potentially intersecting with weight-based social identity, such as ethnicity, Indigenous identity, immigration status, occupational type, racialization, language, sexual identity, physical disability status or mental health status.

Given the cross-sectional nature of the data, causality cannot be inferred. It is possible, for example, that individuals' past experiences of discrimination may have led to changes in weight and BMI categorization.<sup>1,8</sup> Using data on self-reported weight is known to underestimate BMI compared with measured weight; however, such misreporting is statistically predictable and does not necessarily lead to exaggerated bias in studies aiming to estimate effects of BMI on health-related outcomes (such as, in this case, on weight stigma).<sup>45</sup> Lastly, while BMI is an expedient measure to collect in national household surveys, it remains an imprecise means of assessing morbidity or mortality risk.<sup>46,47</sup>

### Conclusion

Quantifying experiences of stigma and discrimination in health care settings as related to higher-weight status and other individual characteristics is an important prerequisite to developing and implementing interventions that achieve better population health and equity in the health care system, including in the Canadian context of publicly funded universal coverage. Weight stigma may be exacerbated in the era of the COVID-19 pandemic, when increasing media and social media attention may be paid to weight gain during associated lockdowns.<sup>48</sup> International consultations have highlighted concerns among higher-weight individuals of scrutiny while eating, exercising and grocery shopping and of being stigmatized by health practitioners as a negative and lasting barrier to accessing care.<sup>48</sup>

The starting points for focused investment in health-care stigma reduction are standardized stigma measures and rigorous evaluation.<sup>3</sup> Results from this research, which revealed the persistence of weight stigma in health services delivery, are expected to help support evidence-informed decisions targeting the individual level, to

change practitioner attitudes and practices, and the structural level, to change the policies and procedures of the health system environment that guide the delivery of care.

## Acknowledgements

The data analysis for this study was conducted at the New Brunswick Research Data Centre (NB-RDC), which is part of the Canadian Research Data Centre Network (CRDCN). The services and activities provided by the NB-RDC are made possible by the financial or in-kind support of the Social Sciences and Humanities Research Council, the Canadian Institutes of Health Research, the Canadian Foundation for Innovation, Statistics Canada and the University of New Brunswick. Selected results were presented at the 2019 CRDCN National Conference (24–25 October 2019, Halifax, Canada).

## Conflicts of interest

The authors declare they have no competing interests.

## Authors' contributions and statement

NG, AB, IF and NR contributed to the design of the work and interpretation of the data. NG effected data acquisition. IF conducted formal data analysis. NG and AB prepared the first draft of the manuscript. All the authors critically reviewed the final version.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

## References

1. Wu YK, Berry DC. Impact of weight stigma on physiological and psychological health outcomes for overweight and obese adults: a systematic review. *J Adv Nurs*. 2018;74(5):1030-42. doi:10.1111/jan.13511.
2. Reitz JG, Banerjee R. Racial inequality, social cohesion and policy issues in Canada. In: *The art of the state, Vol III: Belonging? Diversity, Recognition and Shared Citizenship in Canada*. Banting KG, Courchene TJ, Seidle FL, editors. Montreal (QC): Institute for Research on Public Policy; 2007. pp. 489-545.
3. Nyblade L, Stockton MA, Giger K, et al. Stigma in health facilities: why it matters and how we can change it. *BMC Med*. 2019;17(1):25. doi:10.1186/s12916-019-1256-2.
4. Phelan SM, Burgess DJ, Yeazel MW, Hellerstedt WL, Griffin JM, van Ryn M. Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obes Rev*. 2015;16(4):319-26. doi:10.1111/obr.12266.
5. Richardson MP, Waring ME, Wang ML, et al. Weight-based discrimination and medication adherence among low-income African Americans with hypertension: how much of the association is mediated by self-efficacy? *Ethn Dis*. 2014;24(2):162-8.
6. Gudzone KA, Bennett WL, Cooper LA, Bleich SN. Patients who feel judged about their weight have lower trust in their primary care providers. *Patient Educ Couns*. 2014;97(1):128-31. doi:10.1016/j.pec.2014.06.019.
7. Amy NK, Aalborg A, Lyons P, Keranen L. Barriers to routine gynecological cancer screening for White and African-American obese women. *Int J Obes*. 2006;30(1):147-55. doi:10.1038/sj.ijo.0803105.
8. Puhl RM, Heuer CA. Obesity stigma: important considerations for public health. *Am J Public Health*. 2010;100(6):1019-28. doi:10.2105/AJPH.2009.159491.
9. Mensinger JL, Tylka TL, Calamari ME. Mechanisms underlying weight status and healthcare avoidance in women: a study of weight stigma, body-related shame and guilt, and healthcare stress. *Body Image*. 2018;25:139-47. doi:10.1016/j.bodyim.2018.03.001.
10. Udo T, Purcell K, Grilo CM. Perceived weight discrimination and chronic medical conditions in adults with overweight and obesity. *Int J Clin Pract*. 2016;70(12):1003-11. doi:10.1111/ijcp.12902.
11. Tomiyama AJ, Epel ES, McClatchey TM, et al. Associations of weight stigma with cortisol and oxidative stress independent of adiposity. *Health Psychol*. 2014;33(8):862-7. doi:10.1037/hea0000107.
12. Vadiveloo M, Mattei J. Perceived weight discrimination and 10-year risk of allostatic load among US adults. *Ann Behav Med*. 2017;51(1):94-104. doi:10.1007/s12160-016-9831-7.
13. Jackson SE, Kirschbaum C, Steptoe A. Perceived weight discrimination and chronic biochemical stress: a population-based study using cortisol in scalp hair. *Obesity (Silver Spring)*. 2016;24(12):2515-21. doi:10.1002/oby.21657.
14. Sutin AR, Stephan Y, Terracciano A. Weight discrimination and risk of mortality. *Psychol Sci*. 2015;26(11):1803-11. doi:10.1177/0956797615601103.
15. World Health Organization and United Nations. Joint United Nations statement on ending discrimination in health care settings. Geneva (CH): WHO; 2017.
16. Public Health Agency of Canada. The Chief Public Health Officer's Report on the State of Public Health in Canada 2019. Addressing stigma: towards a more inclusive health system. Ottawa (ON); PHAC; 2019.
17. Birbeck GL, Bond V, Earnshaw V, El-Nasoor ML. Advancing health equity through cross-cutting approaches to health-related stigma. *BMC Med*. 2019;17(1):40. doi:10.1186/s12916-019-1282-0.
18. Hatzenbuehler ML, Phelan JC, Link BG. Stigma as a fundamental cause of population health inequalities. *Am J Public Health*. 2013;103(5):813-21. doi:10.2105/AJPH.2012.301069.
19. Godley J. Everyday discrimination in Canada: prevalence and patterns. *Can J Sociol*. 2018;43(2):111-42. doi:10.29173/cjs29346.
20. Vang ZM, Chang Y. Immigrants' experiences of everyday discrimination in Canada: unpacking the contributions of assimilation, race, and early socialization. *Int Migr Rev*. 2019;53(2):602-31. doi:10.1177/0197918318764871.
21. Spahlholz J, Baer N, Koenig HH, Riedel-Heller SG, Luck-Sikorski C. Obesity and discrimination - a systematic review and meta-analysis of observational studies. *Obes Rev*. 2016;17(1):43-55. doi:10.1111/obr.12343.

22. Puhl RM, Moss-Racusin CA, Schwartz MB, Brownell KD. Weight stigmatization and bias reduction: perspectives of overweight and obese adults. *Health Educ Res.* 2008;23(2):347-58. doi:10.1093/her/cym052.
23. Schwartz MB, Chambliss HO, Brownell KD, Blair SN, Billington C. Weight bias among health professionals specializing in obesity. *Obes Res.* 2003; 11(9):1033-9. doi:10.1038/oby.2003.142.
24. Dixon JB, Hayden MJ, O'Brien PE, Piterman L. Physician attitudes, beliefs and barriers towards the management and treatment of adult obesity: a literature review. *Aust J Prim Health* 2008;14(3):9-18. doi:10.1071/PY08031.
25. Foster GD, Wadden TA, Makris AP, et al. Primary care physicians' attitudes about obesity and its treatment. *Obes Res.* 2003;11(10):1168-77. doi:10.1038/oby.2003.161.
26. Alberga AS, Nutter S, MacInnis C, Ellard JH, Russell-Mayhew S. Examining weight bias among practicing Canadian family physicians. *Obes Facts.* 2019;12(6):632-8. doi:10.1159/000503751.
27. Thille P, Friedman M, Setchell J. Weight-related stigma and health policy. *CMAJ.* 2017;189(6):E223-4. doi:10.1503/cmaj.160975.
28. Social Determinants and Science Integration Directorate. Strengthening the evidence base on social determinants of health: measuring everyday discrimination through a CCHS rapid response module. *Health Promot Chronic Dis Prev Can.* 2016;36(2):41. doi:10.24095/hpcdp.36.2.04.
29. Statistics Canada. Canadian Community Health Survey (CCHS): Rapid Response on the Everyday Discrimination Scale—complement to the user guide. Ottawa (ON): Statistics Canada; 2014.
30. Stucky BD, Gottfredson NC, Panter AT, Daye CE, Allen WR, Wightman LF. An item factor analysis and item response theory-based revision of the Everyday Discrimination Scale. *Cultur Divers Ethnic Minor Psychol.* 2011; 17(2):175-85. doi:10.1037/a0023356.
31. Statistics Canada. Canadian Community Health Survey - Annual component (CCHS) 2013 / Everyday Discrimination Scale. Ottawa (ON): Statistics Canada; 2014.
32. Statistics Canada. Canadian Community Health Survey: Rapid response on everyday discrimination scale-derived variable (DV) specifications. Ottawa (ON): Statistics Canada; 2014.
33. Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada. Tri-Council policy statement: ethical conduct for research involving humans—TCPS2 2018. Ottawa (ON); The Agencies; 2019.
34. Alberga AS, McLaren L, Russell-Mayhew S, von Ranson KM. Canadian Senate Report on Obesity: focusing on individual behaviours versus social determinants of health may promote weight stigma. *J Obes.* 2018;2018: 8645694. doi:10.1155/2018/8645694.
35. Hatzenbuehler ML, Keyes KM, Hasin DS. Associations between perceived weight discrimination and the prevalence of psychiatric disorders in the general population. *Obesity (Silver Spring).* 2009;17(11):2033-9. doi:10.1038/oby.2009.131.
36. Hansson LM, Naslund E, Rasmussen F. Perceived discrimination among men and women with normal weight and obesity. A population-based study from Sweden. *Scand J Public Health.* 2010;38(6):587-96. doi:10.1177/1403494810372266.
37. Brochu PM. Testing the effectiveness of a weight bias educational intervention among clinical psychology trainees. *J Appl Soc Psychol.* 2020 [online ahead of print]. doi:10.1111/jasp.12653.
38. Razzaghi MR, Afshar L. A conceptual model of physician-patient relationships: a qualitative study. *J Med Ethics Hist Med.* 2016;9:14.
39. Alberga AS, Pickering BJ, Alix Hayden K, et al. Weight bias reduction in health professionals: a systematic review. *Clin Obes.* 2016;6(3):175-88. doi:10.1111/cob.12147.
40. Danielsdottir S, O'Brien KS, Ciao A. Anti-fat prejudice reduction: a review of published studies. *Obes Facts.* 2010;3:47-58. doi:10.1159/000277067.
41. Pearl RL. Weight bias and stigma: public health implications and structural solutions. *Soc Issues Policy Rev.* 2018;12(1):146-82. doi:10.1111/sipr.12043.
42. Meadows A, Danielsdottir S. What's in a word? On weight stigma and terminology. *Front Psychol.* 2016;7:1527. doi:10.3389/fpsyg.2016.01527.
43. Puhl RM. What words should we use to talk about weight? A systematic review of quantitative and qualitative studies examining preferences for weight-related terminology. *Obes Rev.* 2020;21(6):e13008. doi:10.1111/obr.13008.
44. Batsis JA, Zagaria AB, Brooks E, et al. The use and meaning of the term obesity in rural older adults: a qualitative study. *J Appl Gerontol.* 2020; 733464820903253. doi:10.1177/0733464820903253.
45. Dutton, DJ, McLaren L. The usefulness of "corrected" body mass index vs. self-reported body mass index: comparing the population distributions, sensitivity, specificity, and predictive utility of three correction equations using Canadian population-based data. *BMC Public Health.* 2014; 14(1):430. doi:10.1186/1471-2458-14-430.
46. Flegal KM, Kit BK, Orpana H, Graubard BI. Association of all-cause mortality with overweight and obesity using standard body mass index categories: a systematic review and meta-analysis. *JAMA.* 2013;309(1): 71-82. doi:10.1001/jama.2012.113905.
47. Tomiyama AJ, Hunger JM, Nguyen-Cuu J, Wells C. Misclassification of cardiometabolic health when using body mass index categories in NHANES 2005-2012. *Int J Obes.* 2016;40(5):883-6. doi:10.1038/ijo.2016.17.



- 
48. Le Brocq S, Clare K, Bryant M, Roberts K, Tahrani AA; writing group from Obesity UK; Obesity Empowerment Network; UK Association for the Study of Obesity. Obesity and COVID-19: a call for action from people living with obesity. *Lancet Diabetes Endocrinol.* 2020;8(8):652-4. doi:10.1016/S2213-8587(20)30236-9.

# Original quantitative research

## Pediatric injuries in the time of COVID-19

Glenn Keays, MPH (1,2); Debbie Friedman, BSc pht, MMgmt (1,2,3,4); Isabelle Gagnon, PT, PhD (5,6)

Published online September 11, 2020

 [Tweet this article](#)

This article has been peer reviewed.

### Abstract

**Introduction:** Research has shown that during the 2003 SARS pandemic, emergency department (ED) visits among the pediatric population decreased. We set out to investigate if this was also true for injury-related ED visits during the COVID-19 pandemic.

**Methods:** Using data from the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP), we looked at 28 years of injury-related ED visits at the Montreal Children's Hospital, a provincially designated Pediatric Trauma Centre. We compared data from a two-month period during the COVID-19 lockdown (16 March to 15 May) to the same period in previous years (1993–2019) to determine whether the 2020 decrease in ED visit numbers was unprecedented (i.e. a similar decrease had never occurred) for different age groups, nature of injuries, mechanisms and severity.

**Results:** The 2020 decrease was unprecedented across all age groups between 1993 and 2019. When compared with the 2015 to 2019 average, the decrease was smallest in children aged 2 to 5 years (a 35% decrease), and greatest in the group aged 12 to 17 years (83%). Motor vehicle collisions and sports-related injuries practically vanished during the COVID-19 lockdown. Surprisingly, more children aged 6 to 17 years presented with less urgent injuries during the COVID-19 lockdown than in previous years.

**Conclusion:** As was the case with SARS in 2003, COVID-19 acted as a deterrent for pediatric ED visits. The lockdown in particular had a profound impact on injury-related visits. The de-confinement period will be monitored to determine the impact in both the short and the long term.

**Keywords:** COVID-19, adolescents, children, emergency, epidemiology, primary care, wounds, injuries

### Introduction

In his book *Love in the Time of Cholera*, Gabriel García Márquez explores a universal and age-old theme: during pandemics, life goes on. Unfortunately, that includes injuries. While one might not immediately associate a disease pandemic with injuries to children, it remains that the one might influence the other.

Rates of injuries in children and adolescents have been shown to fluctuate from one year to the next,<sup>1-6</sup> but also within each year according to seasonal variations.<sup>6-13</sup> At the onset of the COVID-19 lockdown in Montréal on 16 March, 2020, when schools and daycares closed and all organized sporting activities stopped, we anticipated a decrease in the number of children presenting with an injury to the

### Highlights

- During the COVID-19 lockdown in Montréal (16 March to 15 May, 2020) ED visits by children aged 0 to 17 years decreased by 72% compared to the average of the previous 5 years.
- In the same period, children's (aged 0–17 years) injury-related ED visits decreased by 62% compared to the average of the previous 5 years.
- The decrease in numbers was unprecedented over the past 28 years for fractures and mild traumatic brain injuries in children aged 6 to 17 years; for burns in children aged 0 to 5 years; and for motor vehicle collisions (all ages) and sports-related injuries (all ages).

emergency department (ED) of the Montreal Children's Hospital (MCH) Pediatric and Adolescent Trauma Centre.

We looked first at the data from the 2003 SARS outbreak. While we did find research addressing reduced ED visit rates for children during that time, we did not find any papers specifically addressing the impact upon injury rates in the pediatric population. We then set out to determine and document the evolving impact that the COVID-19 lockdown had on ED visits related to injuries in the pediatric population (aged 0–17 years) according to the age of the child, the mechanism of injury, and the nature and the severity of the injury.

### Author references:

1. Trauma, Montreal Children's Hospital Trauma Centre, McGill University Health Centre, Montréal, Quebec, Canada
2. Canadian Hospitals Injury Reporting and Prevention Program, Montreal Children's Hospital, McGill University Health Centre, Montréal, Quebec, Canada
3. Department of Pediatrics and Pediatric Surgery, Faculty of Medicine and Health Sciences, McGill University, Montréal, Quebec, Canada
4. The WELL Office, Faculty of Medicine and Health Sciences, McGill University, Montréal, Quebec, Canada
5. School of Physical and Occupational Therapy, Faculty of Medicine and Health Sciences, McGill University, Montréal, Quebec, Canada
6. Division of Pediatric Emergency Medicine, McGill University Health Centre, Montreal Children's Hospital, Montréal, Quebec, Canada

**Correspondence:** Glenn Keays, McGill University Health Centre, Montreal Children's Hospital, 1001 Boulevard Décarie, Room B.S1.2766.2, Montréal, QC H4A 3J1; Tel: (514) 412-4400 ext. 23167; Email: Glenn.Keays@muhc.mcgill.ca

## Methods

We retrieved data from the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP), created in 1990 by the Public Health Agency of Canada to provide a broader understanding of injuries, especially those in the pediatric population (aged under 18 years), by gathering data from emergency visits from 10 pediatric hospitals. As of 2020, CHIRPP has over 3.5 million records and has been expanded to gather data from 19 hospitals across the country: 11 pediatric and 8 general.<sup>14</sup>

As per the CHIRPP protocol at Montreal Children's Hospital Pediatric and Adolescent Trauma Centre, patients or parents of patients who presented to the ED for assessment and treatment of an injury were asked to fill out a one-page questionnaire and provide detailed information about the injury, such as when, where and how it happened. In addition, clinical data, such as the nature of the injury, body part and type of treatment, were extracted from the ED record by the CHIRPP coordinator. For cases in which there was no CHIRPP form filled out by families, information was extracted from the patients' medical records by the coordinator. In order to ensure full confidentiality, the patient's hospital medical record number was scrambled, and the child's date of birth was rounded off to 15 or 31, depending on the day of the month the child was born. This was done prior to submission of the information to the central CHIRPP data centre in Ottawa. The Montreal Children's Hospital CHIRPP system captures over 97% of all ED injury-related visits occurring at the institution.

To document the decrease in number of injury-related visits during the COVID-19 lockdown period, we opted to do a comparison of the same period of time over 28 years, from 1993 to 2020. We restricted the cases to patients that visited the ED during the period from 16 March to 15 May (which corresponds to two months of COVID-19 lockdown in Montréal) for each of the 28 years. We separated children into four age groups: toddlers (aged 0–1 year), pre-school (2–5 years), elementary school (6–11 years) and high school (12–17 years).

We limited our injury mechanisms to three categories. The first one, motor vehicle collisions (MVCs), was an obvious choice, as traffic decreased in Montréal

during the lockdown. The second, sports-related injuries, was chosen because sports and recreational activities were not allowed during the COVID-19 lockdown. We included sports injuries that occurred in both organized settings and informal ones, and limited the sports to the following: ice hockey, football, soccer, basketball, rugby, skiing and snowboarding. The third category was injuries that occurred during recreational activities, which included cycling, skateboarding, scootering (push scooter) and trampoline (residential backyard trampolines).

To determine variations in injury severity, we used the ED triage scale (Canadian Triage and Acuity Scale)<sup>15,16</sup> to verify our hypothesis that during COVID-19 lockdown there would be a greater proportion of children presenting with urgent or severe injuries. We calculated the proportion of triage levels 1 (resuscitation), 2 (emergent) and 3 (urgent) for each year between 2010 and 2020 (we could not use years prior to 2010 because triage protocol changed at the MCH ED in 2009).

## Statistical analysis

Results are presented as plotted graphs for each age group and then further broken down by specific injuries. Given that there were demographic changes over the long study period, we limited our average calculations to the number of patients seen during the previous five years (2015–2019). We calculated 95% confidence intervals (CIs) for each average. Calculations and analyses were performed using

SPSS software version 17.0 (IBM Corp., Armonk, NY, USA).

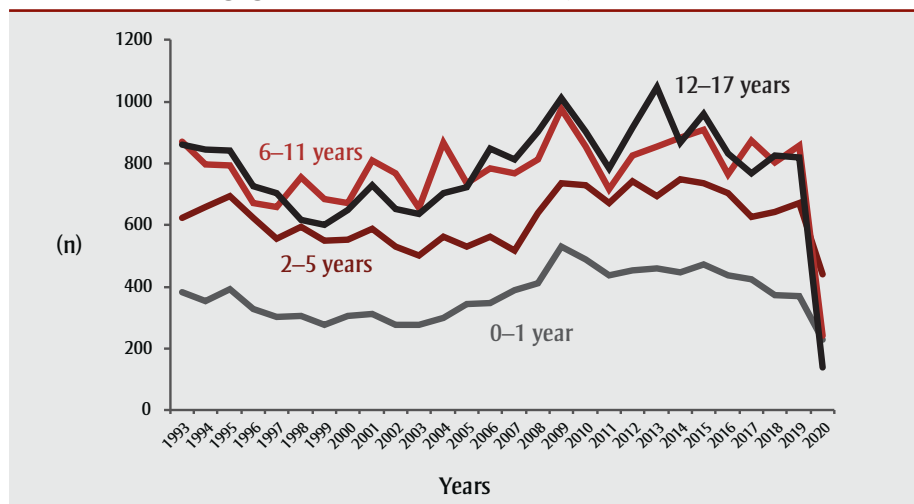
## Results

From 2015 to 2019, an average of 14 016 children (95% CI: 13 242–14 789) visited the MCH ED in the two-month period between 16 March and 15 May; in 2020, it was 3909—a 72% decrease. When we considered only those consulting for an injury, we found there was still a marked reduction, from an average of 2774 (95% CI: 2623–2924) down to 1052 in 2020—a 62% decrease.

The decreases in injury-related ED visits varied according to the age of the child (Figure 1). In toddlers aged 0 to 1 year, the lowest number seen over the 28-year period was 275 in 1999, while in 2020 it was 230. In preschoolers aged 2 to 5 years, the lowest number recorded was 500 in 2003, compared to 441 in 2020. When looking at the average for the years 2015 to 2019, we found the decrease was greater for toddlers (a 45% decrease from an average of 415 [95% CI: 377–453]) than for preschoolers (a 35% decrease from an average of 676 [95% CI: 637–715]).

For elementary school children, aged 6 to 11 years, the record low number was 656 in 2003 (241 in 2020), while for high school-aged children from 12 to 17 years, the lowest number was 601 in 1999 (down to 139 in 2020). When looking at the average for 2015 to 2019 for these groups, we found the decrease was greater for high school-aged children (an 83% decrease from an average of 841 [95% CI: 779–902])

**FIGURE 1**  
Number of injury-related visits to Montreal Children's Hospital emergency department, per age group, from 16 March to 15 May, 1993 to 2020



than for elementary school children (a 71% decrease from an average of 842 [95% CI: 792–892]. The gender of children visiting the ED did not vary; it averaged 55.4% males [95% CI: 54.3%–57.4%] between 2015 and 2019, and was 55.8% in 2020.

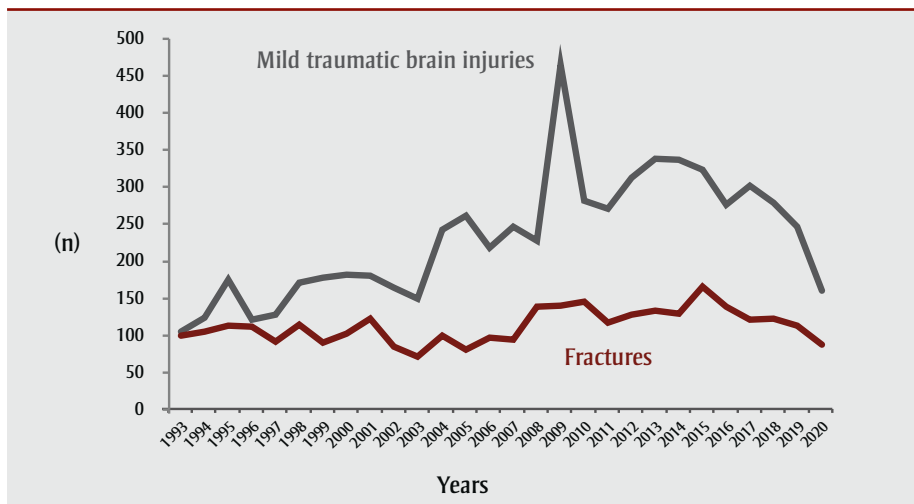
The decrease in numbers also varied by the type of injury and by age. To simplify the figures, we separated children into two age groups, 0 to 5 years and 6 to 17, and only looked at four types of injuries: fractures, mild traumatic brain injuries (mTBI), burns and poisonings. In children aged 0 to 5 years, only burns showed an unprecedented decrease (i.e. a similar decrease had never occurred in the study period): 15 cases in 2014 versus 10 in 2020 (Figures 2 and 3). When the 2015 to 2019 average was used, the decrease in 2020 was statistically significant in mTBI (a 44% decrease, from 285 [95% CI: 260–310] down to 160); in fractures (a 33% decrease, from 132 [95% CI: 114–151] down to 88); and in burns (a 55% decrease, from 22 [95% CI: 17–28] down to 10).

In children aged 6 to 17 years, the decrease in 2020 was unprecedented, for fractures (129 in 2020 vs. 265 in 1997) and mTBI (20 in 2020 vs. 75 in 1993). All injuries showed a statistically significant decrease in 2020 in comparison to the 2015 to 2019 average: there was a 70% decrease for fractures (428 [95% CI: 400–456] down to 129); a 93% decrease for mTBI (295 [95% CI: 269–322] down to 20); a 61% decrease for poisonings (36 [95% CI: 29–43] down to 14); and a 47% decrease for burns (8 [95% CI: 5–10] down to 4) (Figures 4 and 5).

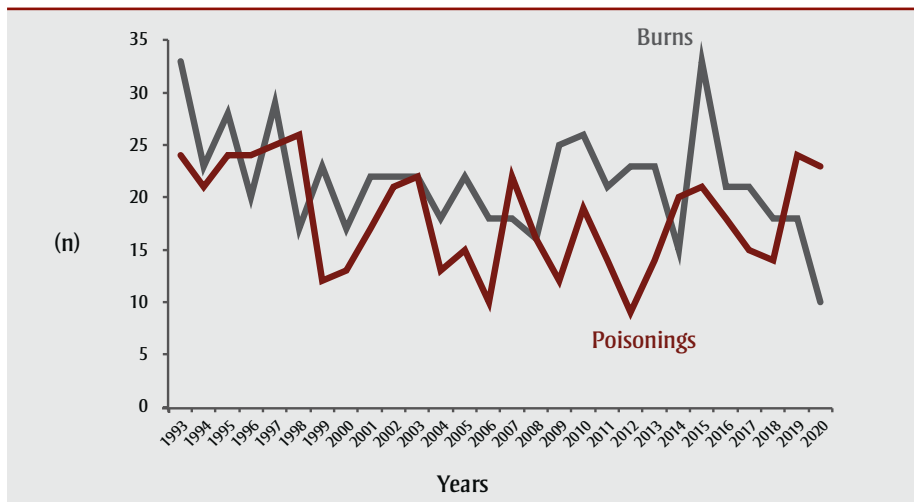
With regard to the mechanism of injury, we looked at recreational activities, sports-related and motor vehicle-related injuries. We examined four recreational activities specifically: cycling, skateboarding, scootering (push scooter) and trampoline (residential backyard trampolines). The COVID-19 lockdown did not yield any unprecedented results or significant changes from the past-five-year average. The one exception was cycling: injuries related to cycling had been steadily declining over the years and spiked during the COVID-19 lockdown (Figure 6).

MVCs and sports-related injuries saw the most drastic decreases of all of the

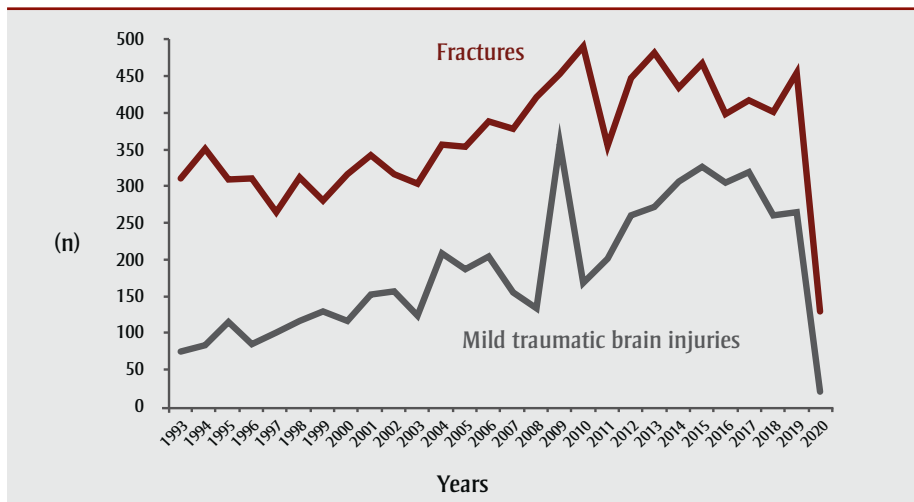
**FIGURE 2**  
Number of visits to Montreal Children’s Hospital emergency department for mild traumatic brain injuries and fractures in children aged 0 to 5 years, from 16 March to 15 May, 1993 to 2020



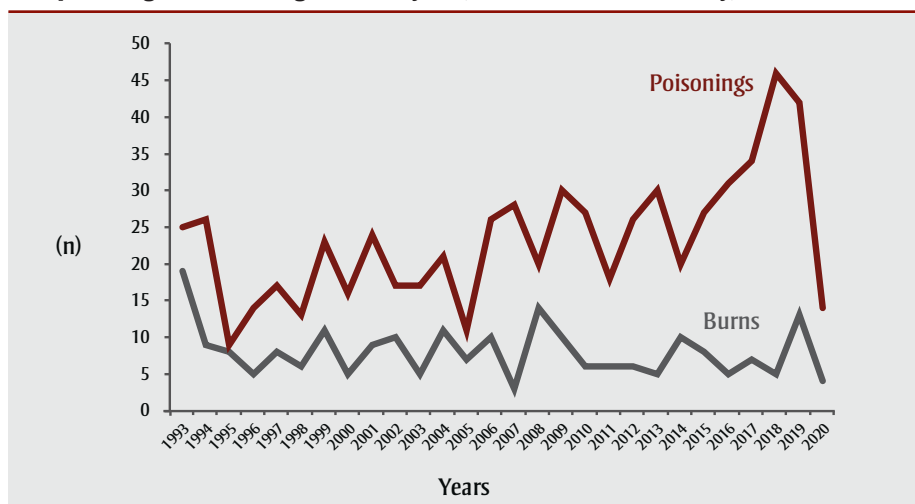
**FIGURE 3**  
Number of visits to Montreal Children’s Hospital emergency department for burns and poisonings in children aged 0 to 5 years, from 16 March to 15 May, 1993 to 2020



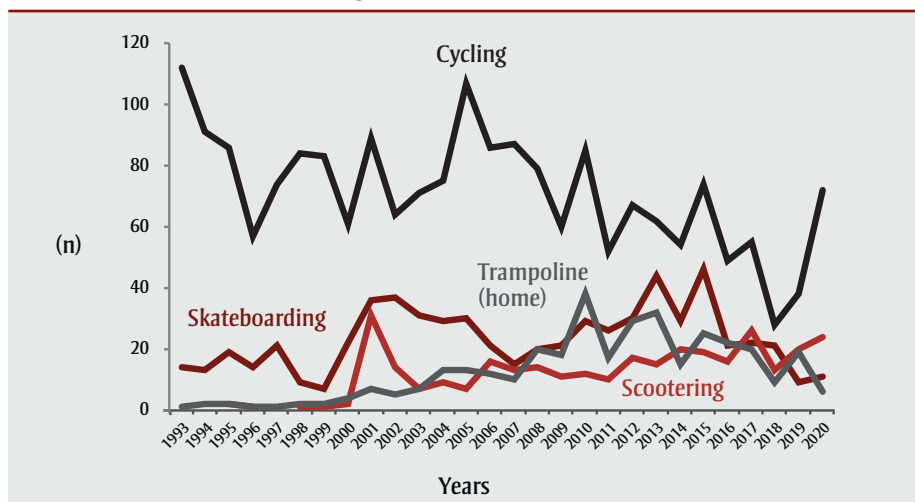
**FIGURE 4**  
Number of visits to Montreal Children’s Hospital emergency department for mild traumatic brain injuries and fractures in children aged 6 to 17 years, from 16 March to 15 May, 1993 to 2020



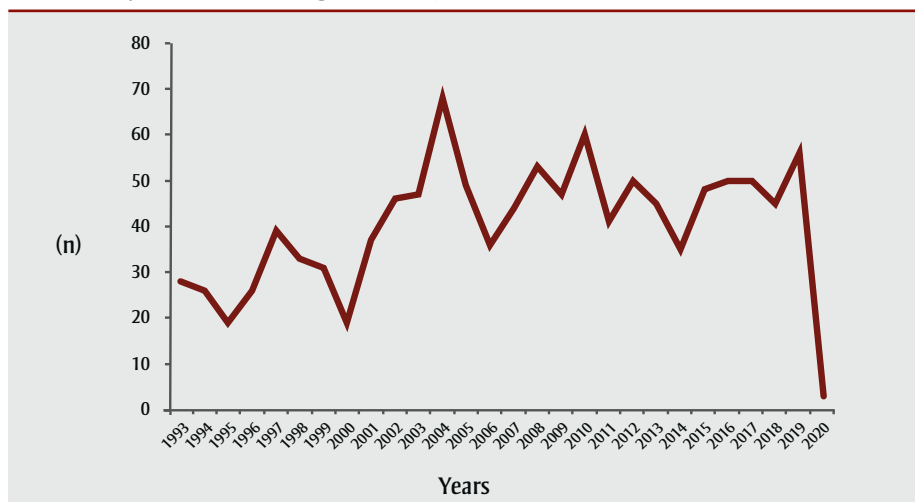
**FIGURE 5**  
Number of visits to Montreal Children's Hospital emergency department for burns and poisonings in children aged 6 to 17 years, from 16 March to 15 May, 1993 to 2020



**FIGURE 6**  
Number of visits to Montreal Children's Hospital emergency department for injuries related to recreational activities, in children aged 0 to 17 years, from 16 March to 15 May, 1993 to 2020



**FIGURE 7**  
Number of visits to Montreal Children's Hospital emergency department for motor vehicle-related injuries in children aged 0 to 17 years, from 16 March to 15 May, 1993 to 2020



mechanisms. For all children, aged 0 to 17 years, the lowest number of motor vehicle-related injuries on record was 19 in 1995; in 2020 it was only 3 (Figure 7), a 99% decrease compared to the 2015 to 2019 average of 50 (95% CI: 46–53). For sports-related injuries, the lowest number was 279 in 2011; in 2020 it was only 17 (Figure 8). As with MVCs, this represents a 99% decrease compared to the 2015 to 2019 average of 520 (95% CI: 481–559).

With regard to a change in severity for all injury-related visits, the proportion of urgent triage (those coded 1 to 3 by the ED triage nurse) remained the same for children aged 0 to 5 years. Surprisingly, for those aged 6 to 17 years, the March-to-May lockdown period in 2020 saw the lowest percentage of urgent/severe injury-related cases, a 63% decrease from the 2015 to 2019 average of 52% [95% CI: 48%–56%] down to 19% in 2020 (Figure 9).

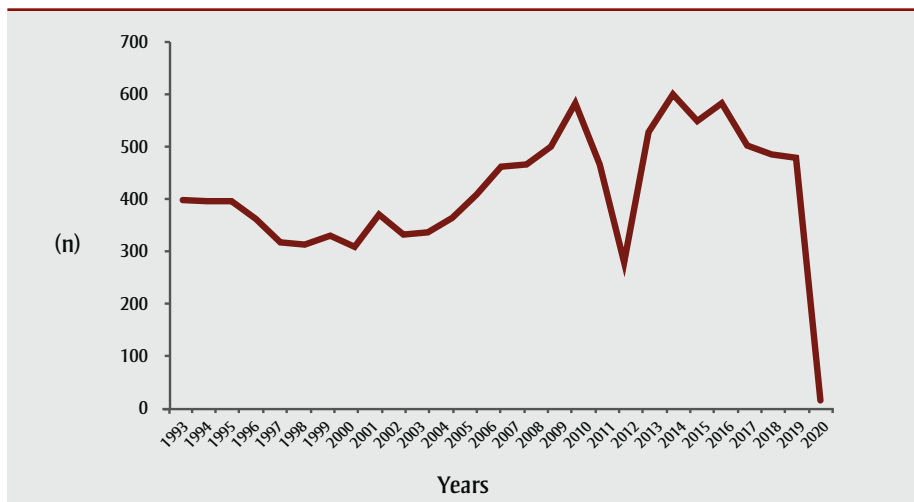
## Discussion

We determined that the COVID-19 lockdown had a drastic impact on children's (aged 0–17 years) ED visits. Studies on the SARS 2003 pandemic also pointed to a decrease in pediatric visits to the ED.<sup>17–19</sup> One study from Italy on COVID-19 has also reported a decrease in pediatric ED visits.<sup>20</sup> However, if we use the same age group as a Toronto study on the impact of SARS 2003,<sup>17</sup> we get opposite results (i.e. the decrease in number of cases in the Toronto study was greatest in the youngest age group and lowest in the oldest).

The reduction in MVCs during the COVID-19 lockdown is already making news. A report from the Road Ecology Center estimated a 50% reduction in MVCs in California.<sup>21</sup> Seattle and San Francisco also reported a 50% reduction.<sup>22</sup> We cannot conclude that our nearly 100% decrease in ED visits due to MVCs is reflective of the current number of MVCs in Montréal, but it does point to a substantial reduction in MVCs during COVID-19 times.

We could not find anything in the press or the scientific literature regarding the decrease in sports-related injuries during the COVID-19 lockdown, or during SARS, for that matter. Because the lockdown forced children and teenagers to stop practising sports, it did not surprise us that it was responsible for a nearly 100% decrease in injuries usually sustained through these activities. It will be

**FIGURE 8**  
**Number of visits to Montreal Children's Hospital emergency department for sports-related<sup>a</sup> injuries in children aged 0 to 17 years, from 16 March to 15 May, 1993 to 2020**



<sup>a</sup> Sports include ice hockey, football, soccer, basketball, rugby, skiing and snowboarding.

interesting to monitor the situation and determine if a two-month period of inactivity will have an impact on sports-related injuries when they reappear.

The decrease in severe/urgent visits for school-aged children (aged 6–17 years) during the COVID-19 lockdown is hard to explain. Interestingly, there were more patients presenting to the ED with nonurgent or mild injuries during this period, which was contrary to what might be expected—that is, that these patients would stay away from the ED for fear of catching COVID-19. It is unclear how to explain these results, as there is nothing in the scientific literature that could shed some light on this issue.

Of interest: five children (aged 0–6 years) consulted our ED (3 were hospitalized) following intoxication from cannabis products (mostly edibles) during the 2020 COVID-19 lockdown. Cannabis intoxication in children aged 0 to 3 years is extremely rare at our ED. In the past 28 years, during the same two-month period, it has only occurred three times: in 1995, 2004 and 2006.

### Strengths and limitations

A major strength of this study is that it relied on data collected over a very long period of time, and not just on a year-before/year-after design, as many studies have done. Data collected over a short

time frame may indicate a striking change between one year and the next, but not reveal whether this change was unprecedented. Another strength of this study is that although the data come from only one hospital, they relied on large numbers, allowing for small confidence intervals and thus better inference.

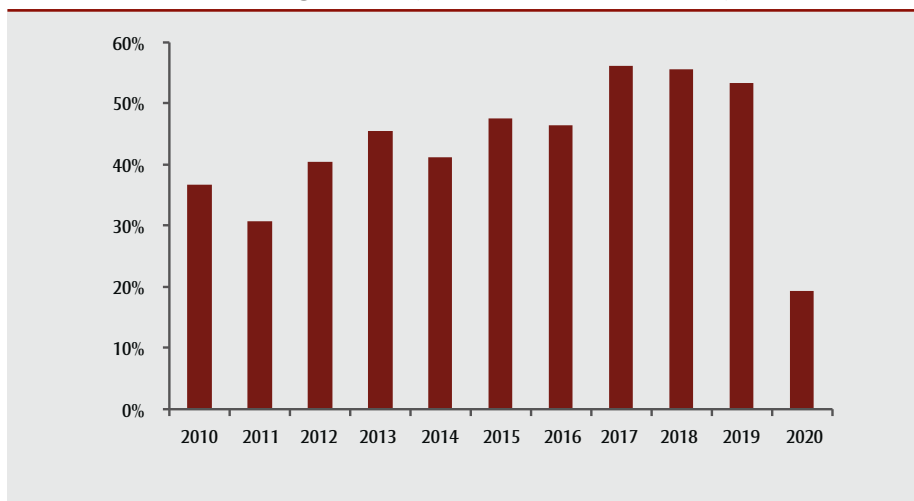
The main limitation of this study is that it relied on data from one hospital and cannot be used to infer trends over the general population. While the decrease in pediatric injury-related ED visits is significant and unprecedented, we cannot determine whether there really were fewer injuries, or whether the decrease was a social response to COVID-19. Parents may have decided not to consult or decided to visit private clinics instead of pediatric EDs, which could mean we are overestimating the reduction our results suggest.

During COVID-19, patients (or their parents) visiting the ED were not given CHIRPP questionnaires to fill out for fear of disease transmission; this resulted in a loss of detail, as the information we used came from ED reports. This would have mattered had we chosen to look at specific narratives (e.g. cyclists on bike paths, falls from monkey bars at the local parks, etc.). It is the main reason we did not report on home injuries—the location of the injury is rarely present on the ED report, unlike CHIRPP, and since the 2020 data relied heavily on ED report, information regarding where the injury occurred was missing. It might be tempting to assume that most injuries occurred at home during the lockdown but we cannot be certain (in fact, some of the few CHIRPP reports we received during this period stated that the injury occurred at the grandparents' residence, and others in skate parks, both of which were off limits during lockdown). Nevertheless, our capture rate remained the same for the entire period 1993 to 2020 (between 97% and 98% of all injury-related ED visits were included), and thus we believe our results to be valid, since none of the variables studied (age, gender, and type of injuries) were missing.

### Conclusion

The ED department of the Montreal Children's Hospital Pediatric and Adolescent Trauma Centre saw drastic and often unprecedented decreases in pediatric visits during the two-month COVID-19 lockdown

**FIGURE 9**  
**Proportion of urgent triage<sup>a</sup> injury-related visits to Montreal Children's Hospital emergency department in children aged 6 to 17 years, from 16 March to 15 May, 2010 to 2020**



<sup>a</sup> Urgent/severe triage levels 1 (resuscitation), 2 (emergent) and 3 (urgent) coded by the emergency department triage nurse.

period. The decreases were most evident for school-aged children (aged 6–11 years). Injury mechanisms such as MVCs and sports-related injuries practically vanished during lockdown. We hope that others will review their injury-related ED visits during the period of lockdown associated with COVID-19 to help ascertain whether our observed reduction in injuries presenting to the ED remains true across a more generalizable pediatric sample.

## Acknowledgements

This research was made possible from a grant from the Public Health Agency of Canada.

## Conflicts of interest

We have no conflict of interest to report.

## Authors' contributions and statement

GK drafted the manuscript and all authors contributed to its revision. GK analyzed the data and DF and IG contributed to the development and revisions. GK takes responsibility for the paper as a whole.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

## References

- McAdams RJ, Swidarski K, Clark RM, Roberts KJ, Yang J, McKenzie LB. Bicycle-related injuries among children treated in US emergency departments, 2006–2015. *Accid Anal Prev*. 2018;118:11–7.
- McKenzie LB, Fletcher E, Nelson NG, et al. Epidemiology of skateboarding-related injuries sustained by children and adolescents 5–19 years of age and treated in US emergency departments: 1990 through 2008. *Inj Epidemiol* [Internet]. 2016 [cited July 15, 2020];3(1):10. doi:10.1186/s40621-016-0075-6.
- Vollman D, Smith GA. Epidemiology of lawn mower-related injuries to children in the United States, 1990–2004. *Pediatr*. 2006;118(2):e273–e278.
- Vollman D, Witsaman R, Comstock RD, et al. Epidemiology of playground equipment-related injuries to children in the United States, 1996–2005. *Clin Pediatr (Phila)*. 2009;48(1):66–71.
- Scheidt PC, Harel Y, Trumble AC, Jones DH, Overpeck MD, Bijur PE. The epidemiology of nonfatal injuries among US children and youth. *Am J Public Health*. 1995;85(7):932–8.
- Chen Y, Mo F, Yi QL, Jiang Y, Mao Y. Unintentional injury mortality and external causes in Canada from 2001 to 2007. *Chronic Dis Inj Can*. 2013;33(2):95–102.
- Jespersen E, Holst R, Franz C, Rexen CT, Wedderkopp N. Seasonal variation in musculoskeletal extremity injuries in school children aged 6–12 followed prospectively over 2.5 years: a cohort study. *BMJ Open* [Internet]. 2014 [cited July 15, 2020];4(1):e004165. doi:10.1136/bmjopen-2013-004165.
- Balseven-Odabasi A, Tümer AR, Keten A, Yorganci K. Burn injuries among children aged up to seven years. *Turk J Pediatr*. 2009;51(4):328–35.
- Lim GW, Belton KL, Pickett W, Schopflocher DP, Voaklander DC. Fatal and non-fatal machine-related injuries suffered by children in Alberta, Canada, 1990–1997. *Am J Industr Med*. 2004;45(2):177–85.
- Van Niekerk A, Rode H, Laflamme L. Incidence and patterns of childhood burn injuries in the Western Cape, South Africa. *Burns*. 2004;30(4):341–7.
- Morrison A, Stone DH, Doraiswamy N, Ramsay L. Injury surveillance in an accident and emergency department: a year in the life of CHIRPP. *Arch Dis Child*. 1999;80(6):533–6.
- Stephens BD, Diekema DS, Klein EJ. Recreational injuries in Washington state national parks. *Wilderness Environ Med*. 2005;16(4):192–7.
- Foltran F, Avossa F, Fedeli U, Baldi I, Spolaore P, Gregori D. Seasonal variations in injury rates in children: evidence from a 10-year study in the Veneto Region, Italy. *Int J Inj Control Saf Promot*. 2013;20(3):254–8.
- Butler M, Newton S, MacPhee S. The Canadian Hospital Injury Reporting and Prevention Program: captured versus uncaptured injuries for patients presenting at a paediatric tertiary care centre. *Paediatr Child Health*. 2017;22(3):134–8.
- Warren DW, Jarvis A, LeBlanc L, et al. Revisions to the Canadian Triage and Acuity Scale paediatric guidelines (PaedCTAS). *Can J Emerg Med* 10(3): 224–32.
- Travers DA, Waller AE, Katznelson J, Agans R. Reliability and validity of the Emergency Severity Index for pediatric triage. *Acad Emerg Med*. 2009;16(9):843–9.
- Heiber M, Lou WW. Effect of the SARS outbreak on visits to a community hospital emergency department. *Can J Emerg Med*. 2006;8(5):323–8.
- Huang H-H, Yen DH-T, Kao W-F, Wang L-M, Huang C-I, Lee C-H. Declining emergency department visits and costs during the severe acute respiratory syndrome (SARS) outbreak. *J Formos Med Assoc*. 2006;105(1):31–7.
- Boutis, K, Stephens, D, Lam, Ungar WJ, Schuh S. The impact of SARS on a tertiary care pediatric emergency department. *CMAJ*. 2004;171(11): 1353–8.
- Lazzerini M, Barbi E, Apicella A, Marchetti F, Cardinale, F, Trobia G. Delayed access or provision of care in Italy resulting from fear of COVID-19. *Lancet Child Adolesc Health*. 2020;4(5):e10–e11.
- Shilling, F. Special Report 3: impact of COVID19 mitigation on traffic, fuel use and climate change [Internet]. Davis (CA): University of California; 2020 Apr [cited 2020 May 28]. Available from: [https://roadeology.ucdavis.edu/files/content/projects/COVID\\_CHIPs\\_Impacts\\_updated\\_430.pdf](https://roadeology.ucdavis.edu/files/content/projects/COVID_CHIPs_Impacts_updated_430.pdf)
- Kopf D. Traffic collisions are plummeting in several US cities [Internet]. New York (NY): Quartz. 2020 Mar 20 [cited 2020 May 28]. Available from: <https://qz.com/1822492/traffic-accidents-are-plummeting-because-of-the-pandemic>

## Evidence-informed policy brief

# Substance use and related harms in the context of COVID-19: a conceptual model

Aganeta Enns, MSc (1); Adena Pinto, BSc (1,2); Jeyasakthi Venugopal, MPH (1,3); Vera Grywacheski, MPH (1); Mihaela Gheorghe, MSc (1); Tanya Kakkar, MPH (1); Noushon Farmanara, MScPH (1); Bhumika Deb, MPH (1); Amy Noon, MSc (1); Heather Orpana, PhD (1,2)

Published online September 16, 2020

 [Tweet this article](#)

This article has been peer reviewed.

### Abstract

As the effects of COVID-19 have been unfolding, growing attention has been paid to the intersection of COVID-19 and substance use and the related harms. However, there are few theories and little empirical evidence to guide investigations in this area. To advance this emerging area of inquiry, we present a conceptual model that synthesizes evidence, information and knowledge on substance use and related harms in the context of the pandemic. The conceptual model offers a visual representation of the connections between the pandemic and substance use and related harms, and can be used to identify areas for future research.

**Keywords:** COVID-19, coronavirus, substance use, substance-related harms, opioids, conceptual model

### Introduction

In March 2020, the World Health Organization declared the coronavirus disease 2019 (COVID-19) a pandemic.<sup>1</sup> In response, Canada has implemented significant public health measures to reduce transmission.<sup>2</sup> Studies on the effects of physical distancing and self-isolation suggest that people may be changing how they use substances—alcohol,<sup>3</sup> opioids<sup>4-7</sup> and cigarettes<sup>7</sup>—as a result of the COVID-19 pandemic. Moreover, the pandemic and associated secondary effects\* may present unique challenges, such as decreased access to services and safe supplies of substances, and increased risk of substance-related harms.<sup>3-7</sup>

The COVID-19 pandemic is an unprecedented event in modern history. The limited

evidence that can be drawn from previous pandemics, for example, the severe acute respiratory syndrome (SARS) outbreak of 2003, may not be representative of current circumstances. A rapidly evolving area of investigation has been of substance use and related harms in the context of the pandemic. Despite a growing number of editorials and media reports,<sup>3-7</sup> there are few theories and little empirical evidence to guide future research.

A conceptual model is a diagram of “linkages among a set of concepts believed to be related to a particular public health problem.”<sup>8</sup> This type of model is particularly useful when there is little existing empirical evidence and formal theory. Model development involves summarizing and integrating the knowledge available from the scientific literature and from the

### Highlights

- As of June 2020, substance use and related harms in the context of a pandemic remained largely uninvestigated.
- The COVID-19 pandemic may impact how Canadians use substances and may present specific challenges and harms among people who use substances.
- The conceptual model in this paper offers a synthesis of evidence, information and knowledge of the concepts and associations relevant to substance use and harms in the context of the pandemic.
- Relevant concepts were synthesized into five interrelated domains that can be used to identify areas for future research into substance use and related harms in the context of COVID-19: substance use as a means of coping; changes in social support and networks; availability and accessibility of services; increased risk of COVID-19 transmission among people who use substances; and increased risk of severe outcomes.

experience of experts and professionals. Conceptual models can guide future research by providing potentially pertinent concepts and guiding hypotheses to

\* In this paper, we use the term “secondary effects of COVID-19” to refer to the indirect effects of the pandemic, including the impacts of public health measures taken to control the spread of COVID-19 and the psychosocial impact of the pandemic environment such as worry and fear.

### Author references:

1. Substance Related Harms Division, Centre for Surveillance and Applied Research, Public Health Agency of Canada, Ottawa, Ontario, Canada
2. School of Epidemiology and Public Health, University of Ottawa, Ottawa, Ontario, Canada
3. Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

Correspondence: Aganeta Enns, 785 Carling Ave, Ottawa, ON K1A 0K9; Tel: 343-551-4367; Email: aganeta.enns@canada.ca



be tested on the potential relationships between concepts.<sup>8</sup>

The objective of this paper is to present a conceptual model of the possible effects of the COVID-19 pandemic on substance use and related harms. This model was developed primarily with a focus on opioids and other illegal drugs; however, alcohol and cannabis use were also considered. This model can be used to generate specific research questions and hypotheses that can then be tested through rigorous methods. The model can be updated and refined as evidence emerges.

## Model development

While there is no standardized methodology for developing a conceptual model, we used the general approach to model development described by Earp and Ennett<sup>8</sup> to guide the development process. Earp and Ennett's approach is a well-established and widely cited and adapted method of conceptual model development.<sup>9,10</sup> The overarching process of model development involves determining the scope of the model, identifying concepts or variables that relate to the issue of interest and explicating potential relationships between concepts.<sup>8,9</sup>

The scope of the model presented in this paper includes substance use and related

harms as they pertain to the COVID-19 pandemic. We developed the model through an iterative process of literature review, discussion within the research group and consultation with public health professionals and experts. Model development was led by a researcher (AE) with experience in qualitative research and thematic analysis.

We developed the first version of the model by summarizing a list of potentially relevant concepts and conducting a literature review of these concepts in published and grey literature sources. Beginning in March 2020, we searched the peer-reviewed literature in MEDLINE and the World Health Organization COVID literature database for English-language original research articles, reviews and editorials/commentaries. We then searched pre-print databases and grey literature sources. As the focus on the conceptual model is an emerging area of investigation, with limited high quality literature to rely on, we expanded the search to include expert opinion and media reports to support generating potential concepts to include in the model. The members of the research group discussed the list of concepts and the potential relationships between them, and revised these based on the results of the literature review. We then drafted the visual model and circulated it for

discussion and revision within the research group.

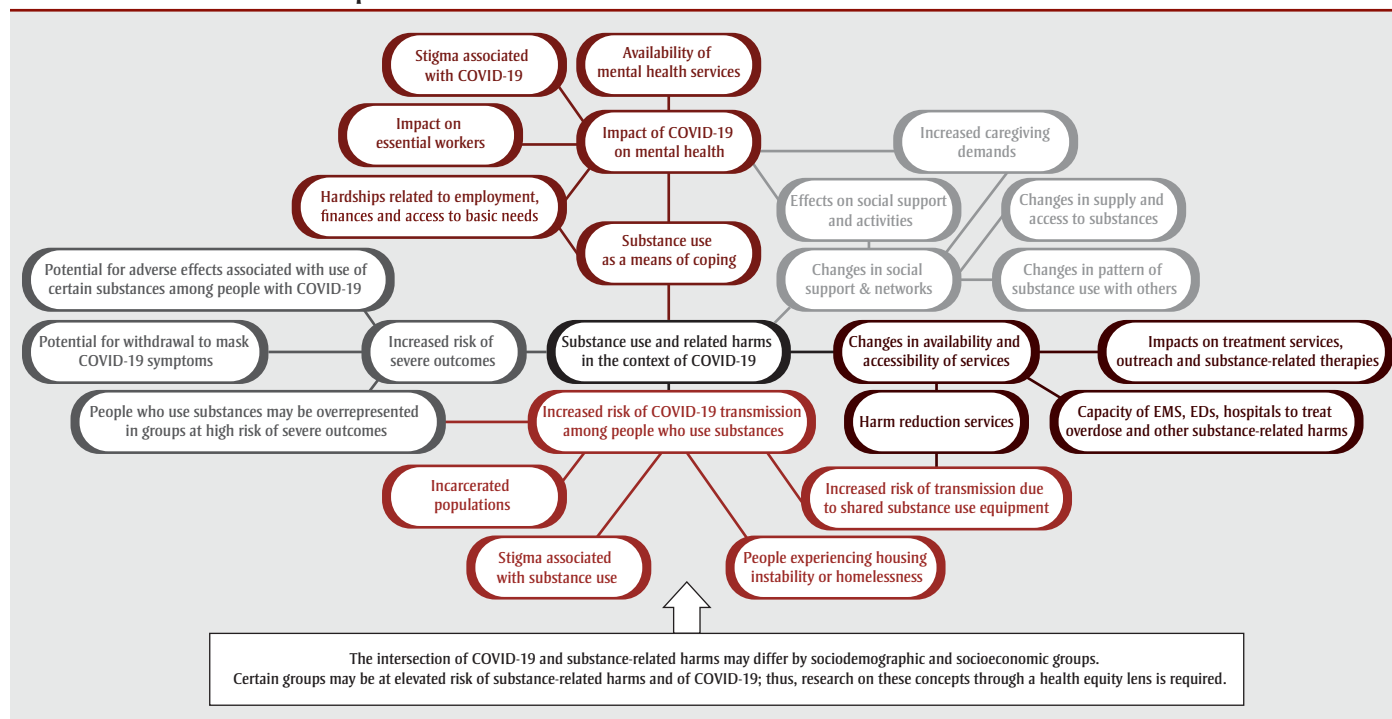
To obtain rapid feedback, we invited professionals with expertise in substance use and related harms surveillance, research, policy and program to critically review the draft of the visual model and accompanying text descriptions and to comment. We gave these professionals a spreadsheet to document comments and questions on each domain as well as to provide feedback on the overall model. Using the feedback, we refined the conceptual model and circulated the revised model and text descriptions to the research group and to the experts who had provided feedback on the model for confirmation and additional feedback. The conceptual model was developed between March and May 2020.

This model should be considered a first version that may be revised and expanded as the pandemic and its effects continue to unfold, new areas of concern and investigation emerge, and research evidence becomes available.

## Conceptual model

The conceptual model (Figure 1) provides a visual representation of how intersecting factors associated with the COVID-19 pandemic affect harms in people who use

**FIGURE 1**  
Conceptual model for substance use and related harms in the context of COVID-19



substances. The model has five main inter-related domains:

- substance use as a means of coping;
- changes in social support and networks;
- changes in availability and accessibility of services related to substance use and harms;
- increased risk of COVID-19 transmission among people who use substances; and
- increased risk of severe outcomes among people who use substances.

The domains likely intersect and interact, which may increase the risk of harms in many cases. Moreover, the concepts and relationships may differ between socio-demographic and socioeconomic groups (e.g. by sex, gender, age, ethnicity, racialization, income or occupation) as not all groups and communities in Canada are equally affected by COVID-19 or substance-related harms. While literature has emerged on the disproportionate effects of COVID-19 in the United States and how the pandemic has exacerbated health inequalities,<sup>11</sup> as of June 2020, there was little evidence available on the Canadian context.

### ***Substance use as a means of coping***

The COVID-19 pandemic has affected many facets of daily life. People may turn to substances to cope with distress and other secondary effects of COVID-19, such as boredom and changes in routine. A survey of 1036 adults in Canada conducted between March 30 and April 2, 2020, found that a quarter of people aged 35 to 54 years reported increased alcohol consumption during the pandemic outbreak.<sup>12</sup>

### **Impact of COVID-19 on mental health**

Recognition of how the pandemic may directly and indirectly affect mental health is growing. Symptoms of stress, anxiety and depression associated with the pandemic have been observed in the general population.<sup>13</sup> Fewer people aged 15 and older reported excellent or very good mental health during the period from March 30 to April 2, 2020, compared to 2018 estimates.<sup>14</sup> The survey revealed that younger adults (aged 15 to 24) were particularly affected, with 62% reporting excellent or very good mental health in 2018 compared

to just 42% during the pandemic;<sup>14</sup> thus, this age group may also be at higher risk of using substances to cope.

The number of people experiencing distress may be increasing for reasons directly related to COVID-19, that is, diagnosis with infection and/or risk of transmission. But more people may be experiencing distress due to the secondary effects of the pandemic, for example, economic impacts or changes to health care services. Participants in a United Kingdom survey reported increased anxiety, depression, stress and concerns about the effects of physical distancing and the practical implications, such as financial impacts, on their well-being.<sup>15</sup>

### **Stigma associated with COVID-19**

Experiences of social stigma related to COVID-19 may contribute to poor mental health outcomes in some populations. For example, stereotyping and prejudiced messaging in the media, such as using terms that link COVID-19 to China (e.g., “China virus”), may fuel discrimination and stigmatization.<sup>16</sup> Older adults,<sup>17</sup> health care workers and people who have tested positive for COVID-19 and their families are among the groups who also potentially face stigma.<sup>18</sup> Increased distress and other impacts on mental health can result in increased use of substances.<sup>19</sup>

### **Hardships related to employment, finances and access to basic needs**

Many people across the country have faced hardships as a result of the decline in employment between February and April, 2020.<sup>20</sup> In April 2020, approximately 5.5 million Canadians either lost their employment or were working substantially reduced hours.<sup>20</sup> Employment decreased more sharply among recent immigrants than among people born in Canada. Moreover, compared with men, women had higher rates of unemployment in the early months of the pandemic.<sup>20</sup>

For some, the pandemic has resulted in having to work from home, changes to their regular schedules and boredom. A 2020 survey published by the Canadian Centre on Substance Use and Addiction found that schedule changes and boredom were two of the top three reasons given for increased alcohol and cannabis use.<sup>12</sup> The third reason most often cited was stress. Note that this survey was conducted over 3 days early in the outbreak, and the situation has evolved since then.

Job loss or insecurity and continued financial hardships and related issues, such as food and housing insecurity, may have resulted in increased stress.

### **Impact on essential workers**

Workers who have continued to provide essential services may be at increased risk of exposure to COVID-19 at their physical workplaces and transmission of the virus. Essential workers include people employed in health care, transportation and food and those services necessary for the basic functioning of society. These workers may face demands and challenges associated with implementing new and evolving protocols related to COVID-19. Essential workers may be at increased risk of depression, anxiety and distress,<sup>21</sup> which increases the likelihood of substance use.

### **Availability of mental health services**

The capacity of mental health services, including the availability and accessibility of trained personnel and infrastructure, may be affected during the pandemic. Demand for services may increase as people try to cope with stressors associated with COVID-19. Many service providers have transitioned to telehealth services.<sup>22</sup> This may be a barrier to people who do not have consistent access to phones, computers or private space, for example. If mental health needs are not met because of these limitations, people may turn to substances as a coping behaviour.<sup>19</sup>

### **Changes in social support and networks**

#### **Effects on social support and activities**

Physical distancing, closures of recreation and community facilities, limits on cultural and religious gatherings and other secondary effects of COVID-19 may affect access to social supports and resources for coping with stress. This could result in people feeling isolated and/or bored.<sup>23</sup> Restrictions or service alterations, such as changes in end-of-life care and funeral arrangements, may also affect the supports available to people who lose a family member or friend during the pandemic. Decreased social support and isolation may be associated with distress and increased use of substances to cope.<sup>24,25</sup> Lack of support or social isolation may disproportionately affect some, for example, people living in retirement homes or long-term care facilities that have limited visitors, people living alone and essential workers who may have to spend extended time away from family.

When people are overcoming a substance use disorder, social support, including informal supports and peer-support group meetings, may be a crucial facet of their recovery.<sup>9</sup> The secondary effects of COVID-19 may affect access to such social supports. Support groups may be facilitated through web-based platforms, but people who have barriers to accessing technology may not be able to benefit from this type of support.

### **Increased caregiving demands**

Childcare and caregiving demands may increase because of daycare and school closures and changes in access to support and care resulting from physical distancing. In addition, many people will be caring for sick or distressed loved ones during the pandemic. The impacts of these demands will not be equal across sociodemographic groups; for example, a disproportionately high number of caregivers are women.<sup>26</sup> Thus, sex and other factors that affect health inequalities should be considered while examining these issues.<sup>26</sup>

Quality of care and risk of infection for caregivers may also be of particular concern.

These changes in caregiving demands may increase distress and the use of substances to cope.

### **Changes in patterns of substance use with others**

Patterns of substance use, including where people use and who they use substances with, may change due to the need for physical distancing and other secondary effects of COVID-19. Reduction or closure of harm reduction services may also affect patterns of substance use. If people are following physical distancing guidelines, they may be using substances alone, increasing the risk of death if they overdose.<sup>27</sup> People may also be driven to use in public places, which may result in increased risk of harm, anxiety and likelihood of arrest and possible incarceration.<sup>28</sup>

### **Changes in supply and access to substances**

International travel limitations and reduced travel between Canadian provinces and territories has affected supply chains of illegal substances.<sup>29,30</sup> In addition, COVID-19 risk reduction measures such as physical distancing and self-isolation may also have affected access. Limited supplies may change the potency or composition of

the illegal drugs that are available.<sup>31</sup> Changes in supply and access may also pose as a barrier to COVID-19 risk reduction measures. For example, individuals seeking new sources may not be able to practise physical distancing.

If access to substances is limited, there may be an increase in the number of people who go through withdrawal and an increase in instances of people starting to use new or unfamiliar but more readily available substances.<sup>31</sup> Interruptions in supply can affect a person's tolerance, increasing the risk of overdose when substances do become available. The risk of overdose may be greater if potency is increased or substances are contaminated.

Some jurisdictions have seen increases in overdoses since the beginning of the pandemic. In June 2020, British Columbia recorded the highest number of illicit drug toxicity deaths to date as well as an increase in the number of cases that involved high concentrations of fentanyl.<sup>32</sup> Note that there may be geographical differences in supply dynamics and how provinces, territories and municipalities are working to mitigate these issues.

For legal substances such as alcohol and cannabis, some provinces and territories made changes to existing regulations about the sale of these substances. While most licensed establishments were closed for in-person dining and drinking during the initial period of restrictive measures, other actions increased access to alcohol. For example, licensed restaurants in Ontario were allowed to sell alcohol with takeout and delivery orders, and to sell spirits at a lower price with these orders.<sup>33</sup> Delivery of cannabis by licensed retail stores was also allowed in Ontario in March, but was discontinued in July.<sup>34</sup>

### **Changes in availability and accessibility of services related to substance use and harms**

#### **Impacts on treatment services, outreach and substance-related therapies**

The COVID-19 pandemic may affect the availability and accessibility of certain treatment services for substance use disorders.<sup>4,5</sup> Many providers have shifted to telehealth outpatient services and wait times may be affected. People who made use of outreach services for substance use and related harms may be affected during

the pandemic. Service reductions in outreach programs may take place due to personnel or infrastructure limitations.

The implications of COVID-19 on opioid agonist therapies have been discussed in commentaries, media reports and in regard to policy.<sup>4,5</sup> As these therapies are typically administered in-person on a regimented basis, the pandemic may disrupt therapy for people who are in isolation or afraid to leave their home. As mentioned above, jurisdictions have responded in different ways to mitigate issues to do with the safe supply of substances. For example, British Columbia has increased efforts to provide a safe supply of substances to reduce harms during the pandemic.<sup>35</sup> The safe supply approach involves prescribing and dispensing pharmaceutical-grade medications as an alternative to the unregulated street supply of substances to people who are at risk of harms such as an overdose.<sup>36</sup>

### **Harm reduction services**

Harm reduction services sites, including safe consumption sites, may reduce their hours, limit the number of people they can serve or close temporarily during the COVID-19 pandemic.<sup>37</sup> Service reductions may involve limiting the number of available consumption booths to take into account physical distancing measures and accommodating reductions in staff because of their need to self-isolate or quarantine. Programs that provide harm reduction supplies (e.g. sterile equipment) and distribute naloxone may face closures, reduced hours and/or other service restrictions<sup>38</sup> that limit the number of people that they can serve.

### **Capacity of hospitals, emergency departments, first responders to treat overdose and other substance-related harms**

If hospitals or first responders become overwhelmed as a result of pandemic-related patient intake, their capacity to respond to and provide treatment for overdoses and other substance-related harms may be limited.<sup>1</sup> Moreover, some people may choose to delay treatment, avoid accessing health care services or abstain from calling emergency services due to fears associated with COVID-19.

Drug-related overdoses may be treated differently due to COVID-19. Opioid poisonings (overdoses) are typically treated by administering naloxone and immediately providing oxygen, either through a mask

<sup>†</sup> As of the time of submitting this paper (June 2020), this has not been the case in Canada.

or rescue breathing. First responders may no longer be able to give oxygen this way because of the risk of COVID-19 transmission.<sup>29</sup> Moreover, some first responders have stopped administering naloxone in a nasal spray due to the risk of COVID-19 transmission through nasal droplets,<sup>39</sup> although as of June 2020, we found no reports of changes to practices of administering naloxone by injection.

Some people who overdose require ventilators to survive. Should a situation occur where demand for ventilators is overwhelmed due to COVID-19, only a limited number of ventilators may be available.<sup>†</sup>

### **Increased risk of COVID-19 transmission among people who use substances**

#### **Increased risk of transmission due to shared substance use equipment**

Sharing substance use equipment (e.g. pipes, joints, vaping devices or alcohol containers) increases the risk of virus transmission. (This is linked to the “availability of harm reduction services” domain, as the availability and accessibility of harm reduction services, such as sterile supply programs, may impact access to clean equipment and consequently, risk of transmission.)

#### **Stigma associated with substance use**

Stigmatizing substance use stems from erroneous beliefs that people with substance use disorders are to blame for their conditions or are dangerous or reckless, and that substance use is a choice or matter of will power. Experiences related to stigma may act as a barrier to accessing health and social services.<sup>40</sup> People who use substances may also receive poorer quality health care services or engage in harmful behaviours or coping methods (e.g. avoidance of health care or more or more frequent substance use).

Outcomes associated with the stigmatization of people who use substances may be exacerbated during the pandemic and may impede access to care and uptake of COVID-19 risk reduction measures.<sup>6,12,41</sup> People who use substances are likely to experience multiple forms of stigmas (i.e. targeted toward their health conditions, characteristics, sex/gender or gender identity, racialized identity, age, ability or language). Complex intersections between multiple stigmas can further affect health.<sup>40</sup>

### **Incarcerated populations**

People who use substances tend to be overrepresented in incarcerated populations, and substance use is common in prison populations in Canada.<sup>42</sup> Incarcerated populations are at increased risk of disease transmission during the pandemic and face unique challenges when implementing risk reduction measures.<sup>7,43</sup> For example, the aging prison population, issues of crowding within cells and the high prevalence of substance use and associated comorbidities may elevate the risk of COVID-19 infection and likelihood of severe outcomes.<sup>43</sup>

#### **People experiencing homelessness, instability or inadequate housing**

People who use substances may be more likely to experience housing instability or homelessness. Individuals who rely on shelters, shared or overcrowded accommodations or public places are less likely to have regular access to hygiene supplies and may not be able to practise physical distancing. They are at higher risk of acquiring and transmitting COVID-19. In addition, they may face barriers to implemented risk reduction measures.<sup>44</sup> Service reductions due to the pandemic and limiting capacity at shelters may serve as a barrier to accessing shelter, hygiene facilities and safe places to use substances. This would likely increase the risks of both infection and overdose. Moreover, this population often has worse access to health services, experiences higher rates of substance use and may be less likely to engage in harm reduction measures (e.g. using sterile drug equipment).<sup>44</sup>

#### **Increased risk of severe outcomes among people who use substances**

##### **People who use substances may be overrepresented in groups at high risk of severe outcomes**

Several pre-existing health conditions are risk factors for severe outcomes among people diagnosed with COVID-19.<sup>45</sup> Many of the conditions that have been identified as risk factors also disproportionately affect people who use substances: chronic lung disease, cardiovascular disease and weakened immune system.<sup>45,46</sup>

As mentioned in the section “Substance use as a means of coping,” effects of the pandemic may contribute to increased substance use. In addition, use of certain

substances may increase the risk of severe illness among people diagnosed with COVID-19: the use of certain substances may weaken the immune system and the use of long-acting and immunosuppressive opioids, such as methadone or fentanyl, has been associated with increased risks of respiratory infections.<sup>47</sup>

Abrupt discontinuation of opioids, which can trigger withdrawal, has also been associated with an elevated risk of serious infection,<sup>48</sup> meaning that disruptions in access to opioids during the pandemic may exacerbate the risk of COVID-19 infection.

Chronic alcohol consumption has also been associated with weakened immune function and even moderate consumption has been linked with increased risk of infection.<sup>49</sup>

##### **Potential for adverse effects associated with use of certain substances among people with COVID-19**

Among those infected with COVID-19, people who use substances may be susceptible to complications and more severe outcomes. Opioid use increases risk of respiratory infections that, in turn, increases the risk of disease complications and severe outcomes.<sup>7</sup> Methamphetamine use may also increase the risk of severe COVID-19 outcomes, as its use can lead to pulmonary damage and/or affect immune function.<sup>7,50</sup> Examining potential adverse effects of methamphetamine use among people with COVID-19 may be an important area of investigation as the prevalence of methamphetamine use is rising in North America.<sup>50</sup>

Due to the harmful effects on lung health, smoking and vaping may also increase the risk of severe COVID-19 infection.<sup>7</sup> However, these associations have not yet been substantiated and further investigation is needed.

Poly-substance use may impact disease outcomes and could interact with risk factors, including older age or having one or more chronic conditions, for severe outcomes related to COVID-19.

In addition to the potential for substance use to affect the severity of COVID-19 outcomes, the effects of COVID-19 on respiratory function could affect the risk of opioid overdose. Chronic respiratory

<sup>†</sup> As of the time of submitting this paper (June 2020), this has not been the case in Canada.

disease has been associated with greater risk of opioid overdose hospitalizations and mortality.<sup>51,52</sup> Similarly, diminished lung capacity caused by COVID-19 infection may further increase harms.<sup>7</sup> Coupled with the potential changes in drug supplies and reduced availability of certain harm reduction and treatment services, as described above, the risk of overdose may be particularly high for some people who use substances during the pandemic.

### Potential for withdrawal to mask COVID-19 symptoms

COVID-19 symptoms such as fever and difficulty breathing could be mistaken for withdrawal symptoms among people who use substances. Changes in the circulating drug supply and available services as a result of the pandemic may increase the number of people experiencing withdrawal. There may also be less oversight of these issues due to limitations to the accessibility or availability of services during the pandemic.

### Implications for research

The secondary effects of the COVID-19 pandemic is a rapidly evolving topic. This conceptual model of substance-related harms and COVID-19 offers guidance for future areas of investigation where there is currently a dearth of empirical evidence.

As this area of investigation is emerging, few original peer-reviewed studies and reviews were available. Therefore we also included commentaries and non-reviewed sources to inform the development of the model. While the quality of evidence informing this conceptual model is limited, the inclusion of a variety of evidence sources, including peer-reviewed original research, allowed for a rapid and in-depth examination of this emerging area. While conceptual models are not intended to specify how or where to target interventions,<sup>14</sup> the information provided in this paper may help to identify areas where research could support intervention efforts.

The present model suggests that COVID-19 and its secondary effects may have far-reaching implications for how people use substances in Canada and the unique harms to which they are exposed. Given this, research on these topics is needed to confirm or disprove the proposed relationships.

The model presented five interrelated domains of concepts that highlight potential

associations of interest. Empirical evidence on changes in patterns of substance use in response to the mental health and social effects of the pandemic is needed. Substance use and exposure to related harms may be affected by changes in social support, safe access to substances and access to services. Risk of COVID-19 infection among people who use substances, as well as severe outcomes among people diagnosed with COVID-19, should be monitored to elucidate how substance use, including poly-substance use, contribute to disease outcomes.

The relationships posited in this model likely intersect with sociodemographic or socioeconomic factors, as certain populations are at elevated risk for both substance-related harms and COVID-19. Research into how the intersection between the pandemic and substance-related harms affects different communities and groups across Canada is needed to document health inequalities and inequities.

### Conclusion

In this paper we presented a model that illustrated relevant interrelated concepts in the emerging area of substance use and related harms in the context of the COVID-19 pandemic. The conceptual model synthesized information from a variety of sources—including peer-reviewed literature, opinion pieces and commentaries, grey literature and expert opinion and perspectives on substance use and related harms during the COVID-19 pandemic—to summarize the available material and generate future research directions.

The full effects of the pandemic on substance use and related harms have likely not yet been realized. Evidence is needed to elucidate the relationships shown in the conceptual model to better understand these issues as they unfold and to guide future research and considerations for policy and programs during the pandemic.

### Conflicts of interest

The authors have no conflicts of interest to disclose.

### Authors' contributions and statement

AE and HO conceived of the project. AE, AP, JV and VG conducted the literature review. AE led the development of the

conceptual model. AP, JV, VG, MG, NF, TK, BD, AN and HO contributed to the development of the model. AE drafted the article. All authors critically revised the article.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

### References

1. World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19 [Internet]. Geneva (CH): WHO; 2020 [cited 2020 May 14]. Available from: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>
2. Government of Canada. Coronavirus disease (COVID-19) [Internet]. Ottawa (ON): Government of Canada; 2020 [cited 2020 May 14]. Available from: <https://www.canada.ca/en/public-health/services/diseases/coronavirus-disease-covid-19.html>
3. Clay JM, Parker MO. Alcohol use and misuse during the COVID-19 pandemic: a potential public health crisis? *Lancet Public Health*. 2020;5(5):e259. doi:10.1016/S2468-2667(20)30088-8.
4. Alexander GC, Stoller KB, Haffajee RL, Saloner B. An epidemic in the midst of a pandemic: opioid use disorder and COVID-19. *Ann Intern Med*. 2020;173(1):57-8. doi:10.7326/M20-1141.
5. Becker WC, Fiellin DA. When epidemics collide: coronavirus disease 2019 (COVID-19) and the opioid crisis. *Ann Intern Med*. 2020;173(1):59-60. doi:10.7326/M20-1210.
6. Jenkins WD, Bolinski R, Bresett J, et al. COVID-19 during the opioid epidemic-exacerbation of stigma and vulnerabilities. *J Rural Health*. 2020; 10.1111/jrh.12442. doi:10.1111/jrh.12442.
7. Volkow ND. Collision of the COVID-19 and addiction epidemics. *Ann Intern Med*. 2020;173(1):61-2. doi:10.7326/M20-1212.

8. Earp JA, Ennett ST. Conceptual models for health education research and practice. *Health Educ Res.* 1991;6(2): 163-71. doi:10.1093/her/6.2.163.
9. Paradies Y, Stevens M. Conceptual diagrams in public health research. *J Epidemiol Community Health.* 2005; 59(12):1012-3. doi:10.1136/jech.2005 .036913.
10. Brady SS, Brubaker L, Fok CS, et al.; Prevention of Lower Urinary Tract Symptoms (PLUS) Research Consortium. Development of conceptual models to guide public health research, practice, and policy: synthesizing traditional and contemporary paradigms. *Health Promotion Pract.* 2020;21(4): 510-24. doi:10.1177/1524839919890869.
11. van Dorn A, Cooney RE, Sabin ML. COVID-19 exacerbating inequalities in the US. *Lancet.* 2020;395(10232):1243-4. doi:10.1016/S0140-6736(20)30893-X.
12. Nanos. COVID-19 and increased alcohol consumption [Internet]. Ottawa (ON): Canadian Centre on Substance Abuse; 2020 Apr [cited 2020 May 4]. Available from: <https://www.ccsa.ca/sites/default/files/2020-04/CCSA-NANOS-Alcohol-Consumption-During-COVID-19-Report-2020-en.pdf>
13. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. *Asian J Psychiatr.* 2020;52:102066. doi:10.1016/j.ajp.2020.102066.
14. Findlay L, Arim R. Canadians report lower self-perceived mental health during the COVID-19 pandemic [Internet]. Ottawa (ON): Statistics Canada; 2020 [cited 2020 May 11] Available from: [https://www150.statcan.gc.ca/n1/en/pub/45-28-0001/2020001/article/00003-eng.pdf?st=3GIUQH\\_D](https://www150.statcan.gc.ca/n1/en/pub/45-28-0001/2020001/article/00003-eng.pdf?st=3GIUQH_D)
15. Holmes EA, O'Connor RC, Perry VH, et al. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *Lancet Psychiatry.* 2020;7(6):547-60. doi:10.1016/S2215-0366(20)30168-1.
16. Budhwani H, Sun R. Creating COVID-19 stigma by referencing the novel coronavirus as the "Chinese virus" on Twitter: quantitative analysis of social media data. *J Med Internet Res.* 2020;22(5). doi:10.2196/19301.
17. Jimenez-Sotomayor MR, Gomez-Moreno C, Soto-Perez-de-Celis E. Coronavirus, ageism, and Twitter: an evaluation of tweets about older adults and COVID-19. *J Am Geriatr Soc.* 2020; 68(8):1661-5. doi:10.1111/jgs.16508.
18. Logie CH, Turan JM. How do we balance tensions between COVID-19 public health responses and stigma mitigation? Learning from HIV research. *AIDS Behav.* 2020;24(7):2003-6. doi: 10.1007/s10461-020-02856-8.
19. Sinha R. How does stress increase risk of drug abuse and relapse? *Psychopharmacology (Berl).* 2001; 158(4):343-59. doi:10.1007/s0021301 00917.
20. Statistics Canada. Labour force survey, April 2020 [Internet]. Ottawa (ON): Statistics Canada; 2020 May 8 [cited 2020 May 14]. Available from: <https://www150.statcan.gc.ca/n1/daily-quotidien/200508/dq200508a-eng.htm>
21. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open.* 2020;3(3):e203976. doi:10.1001/jamanetworkopen.2020 .3976.
22. Zhou X, Snoswell CL, Harding LE, et al. The role of telehealth in reducing the mental health burden from COVID-19. *Telemed J E Health.* 2020; 26(4):377-9. doi:10.1089/tmj.2020 .0068.
23. Douglas M, Katikireddi SV, Taulbut M, McKee M, McCartney G. Mitigating the wider health effects of covid-19 pandemic response. *BMJ.* 2020;369:m1557. doi:10.1136/bmj .m1557.
24. Chou KL, Liang K, Sareen J. The association between social isolation and DSM-IV mood, anxiety, and substance use disorders: wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2011;72(11):1468-76. doi:10.4088/JCP.10m06019gry.
25. Peirce RS, Frone MR, Russell M, Cooper ML. Financial stress, social support, and alcohol involvement: a longitudinal test of the buffering hypothesis in a general population survey. *Health Psychol.* 1996;15(1):38-47. doi: 10.1037//0278-6133.15.1.38.
26. Gausman J, Langer A. Sex and gender disparities in the COVID-19 pandemic. *J Womens Health.* 2020;29(4):465-6. doi:10.1089/jwh.2020.8472.
27. BC Coroners Service. Illicit drug overdose deaths in B.C.; Findings of coroners' investigations [Internet]. British Columbia: Government of British Columbia; 2018 Sep 27 [cited 2020 Jun 10]. Available from: <https://www2.gov.bc.ca/assets/gov/birth-adoption-death-marriage-and-divorce/deaths/coroners-service/statistical/illicit-drug-overdosed-deaths-in-bc-findings-of-coroners-investigations-final.pdf>
28. Harris K. CBC News. Halt drug possession charges during pandemic to stem spike in overdose deaths, advocates say [Internet]. Toronto (ON): Canadian Broadcasting Corporation; 2020 May 14 [cited 2020 May 15]. Available from: <https://www.cbc.ca/news/politics/drug-possession-covid19-1.5568631>
29. City News. Dwindling drug supply on DTES drives prices up, leaves users desperate as COVID-19 closes border [Internet]. Vancouver (BC): City News; 2020 Mar 24 [cited 2020 May 4]. Available from: <https://www.citynews1130.com/2020/03/24/drug-supply-bc-covid-19-border/>
30. Bula F. Safe supply of opioids needed 'right away' to avoid overwhelming hospitals in COVID-19 pandemic: Vancouver Mayor. Vancouver (BC): Globe and Mail; 2020 Mar 24 [cited 2020 May 4]. Available from: <https://www.theglobeandmail.com/canada/british-columbia/article-safe-supply-of-opioids-needed-right-away-to-avoid-overwhelming/>
31. Canadian Centre on Substance Abuse. Changes related to COVID-19 in the illeZ and resulting health harms (CCENDU Alert) [Internet]. Ottawa (ON): Canadian Centre on Substance Abuse; 2020 May [cited 2020 Jun 10]. Available from: <https://www.ccsa.ca/changes-related-covid-19-illegal-drug-supply-and-access-services-and-resulting-health-harms>

32. BC Coroners Service. Illicit drug toxicity deaths in BC: January 1, 2010 – May 31, 2020 [Internet]. British Columbia: Government of British Columbia; 2020 Jun 11 [cited 2020 Jun 12]. Available from: <https://www2.gov.bc.ca/gov/content/life-events/death/coroners-service/statistical-reports>
33. Ministry of Finance. Ontario supports Ontario's beverage alcohol sector during COVID-19 [Internet]. Toronto (ON): Government of Ontario; 2020 Jun 17 [cited 2020 Aug 18]. Available from: <https://news.ontario.ca/mof/en/2020/06/ontario-supports-ontarios-beverage-alcohol-sector-during-covid-19.html>
34. O. Reg. 128/20: Pick up and delivery of cannabis. Toronto (ON): Government of Ontario; 2020 [cited 2020 Aug 18]. Available from: [https://www.ontario.ca/laws/regulation/200128?\\_ga=2.115126085.334318074.1597752485-584514098.1593817007](https://www.ontario.ca/laws/regulation/200128?_ga=2.115126085.334318074.1597752485-584514098.1593817007)
35. CTV News. Vancouver: B.C. offering safe supply to some drug users to minimize harm during COVID-19 crisis. Vancouver (BC): CTV News; 2020 Mar 26 [cited 2020 May 19]. Available from: <https://bc.ctvnews.ca/b-c-offering-safe-supply-to-some-drug-users-to-minimize-harm-during-covid-19-crisis-1.4870530>
36. Health Canada. Government of Canada approves new treatment options for opioid use disorder and supports research, treatment and harm reduction projects in Ontario [Internet]. Ottawa (ON): Government of Canada; 2019 [cited 2020 May 19]. Available from: <https://www.canada.ca/en/health-canada/news/2019/05/government-of-canada-approves-new-treatment-options-for-opioid-use-disorder-and-supports-research-treatment-and-harm-reduction-projects-in-ontario.html>
37. Jeffords S. Toronto: "Two crises": Ontario's opioid problem worsens during COVID-19 as services for drug users scale back [Internet]. Toronto (ON): Canadian Broadcasting Corporation; 2020 Apr 30 [cited 2020 May 11]. Available from: <https://www.cbc.ca/news/canada/toronto/ontario-opioid-covid19-1.5551368>
38. Polewski L. Hamilton: Coronavirus: opioid crisis escalating in Hamilton due to naloxone restrictions, doctor says [Internet]. Hamilton (ON): Global News; 2020 Apr 23 [cited 2020 May 19]. Available from: <https://globalnews.ca/news/6855439/coronavirus-hamilton-opioid-crisis-naloxone-restrictions/>
39. Little L-A. North Bay: North Bay emergency responders to stop using naloxone nasal spray during pandemic. North Bay (ON): CTV News; 2020 Apr 3 [cited 2020 May 19]. Available from: <https://northernontario.ctvnews.ca/north-bay-emergency-responders-to-stop-using-naloxone-nasal-spray-during-pandemic-1.4881599>
40. Public Health Agency of Canada. The Chief Public Health Officer's report on the state of public health in Canada 2019. Addressing stigma: towards a more inclusive health system [Internet]. Ottawa (ON): Public Health Agency of Canada; 2019 [cited 2020 May 11]. Available from: <https://www.canada.ca/en/public-health/corporate/publications/chief-public-health-officer-reports-state-public-health-canada/addressing-stigma-toward-more-inclusive-health-system.html>
41. European Monitoring Centre for Drugs and Drug Addiction. COVID-19 and people who use drugs [Internet]. Lisbon (PT): European Monitoring Centre for Drugs and Drug Addiction; 2020 Mar 25 [cited 2020 May 11]. Available from: [https://www.emcdda.europa.eu/publications/topic-overviews/covid-19-and-people-who-use-drugs\\_en](https://www.emcdda.europa.eu/publications/topic-overviews/covid-19-and-people-who-use-drugs_en)
42. Kouyoumdjian F, Schuler A, Matheson FI, Hwang SW. Health status of prisoners in Canada: narrative review. *Can Fam Physician*. 2016;62(3):215-22.
43. Blair A, Parnia A, Siddiqi A. Testing lags and emerging COVID-19 outbreaks in federal penitentiaries in Canada. *medRxiv*. 2020 Jan 1. doi:10.1101/2020.05.02.20086314.
44. Tsai J, Wilson M. COVID-19: a potential public health problem for homeless populations. *Lancet Public Health*. 2020;5(4):e186-7. doi:10.1016/S2468-2667(20)30053-0.
45. CDC COVID-19 Response Team. Preliminary estimates of the prevalence of selected underlying health conditions among patients with coronavirus disease 2019 - United States, February 12–March 28, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(13):382-6. doi:10.15585/mmwr.mm6913e2.
46. Slaunwhite AK, Gan WQ, Xavier C, Zhao B, Buxton JA, Desai R. Overdose and risk factors for coronavirus disease 2019. *Drug Alcohol Depend*. 2020;212:108047. doi:10.1016/j.drugalcdep.2020.108047.
47. Brack A, Rittner HL, Stein C. Immunosuppressive effects of opioids—clinical relevance. *J Neuroimmune Pharmacol*. 2011;6(4):490-502. doi:10.1007/s11481-011-9290-7.
48. Farkas A, Lynch MJ, Westover R, et al. Pulmonary complications of opioid overdose treated with naloxone. *Ann Emergency Med*. 2020;75(1):39-48. doi:10.1016/j.annemergmed.2019.04.006.
49. Szabo G, Saha B. Alcohol's effect on host defense. *Alcohol Res*. 2015;37(2):159-70.
50. Carrico AW, Horvath KJ, Grov C, et al. Double jeopardy: methamphetamine use and HIV as risk factors for COVID-19. *AIDS Behav*. 2020;1-4. doi:10.1007/s10461-020-02854-w.
51. Leece P, Cavacuiti C, Macdonald EM, et al.; Canadian Drug Safety and Effectiveness Research Network. Predictors of opioid-related death during methadone therapy. *J Subst Abuse Treat*. 2015;57:30-5. doi:10.1016/j.jsat.2015.04.008.
52. Peterson C, Liu Y, Xu L, Nataraj N, Zhang K, Mikosz C. U.S. national 90-day readmissions after opioid overdose discharge. *Am J Prev Med*. 2019;56(6):875-81. doi:10.1016/j.amepre.2018.12.003.

## Commentary

# Rapid response to COVID-19: addressing challenges and increasing the mental readiness of public safety personnel

Alexandra Heber, MD (1,2); Valerie Testa, BEd (3,7); Lorraine Smith-MacDonald, PhD (4,5);  
Suzette Brémault-Phillips, PhD (4,5); R. Nicholas Carleton, PhD (6,7)

Published online September 9, 2020

 [Tweet this article](#)

### Introduction

The COVID-19 pandemic has underscored the essential role of public safety personnel (PSP) in serving and protecting all Canadians. PSP include professionals striving to ensure the safety and security of Canadians, such as border services officers, public safety communicators (e.g. emergency dispatchers), correctional workers, firefighters (career and volunteer), Indigenous emergency managers, operational and intelligence personnel, paramedics and police (municipal, provincial and federal).<sup>1,2</sup> PSP often work alongside health care providers<sup>1</sup> and are critical for managing the COVID-19 pandemic. Prior to COVID-19, PSP reported repeated exposures to potentially psychologically traumatic events (PPTE)<sup>2</sup> and significant occupational stressors like staffing shortages, insufficient resources and fatigue.<sup>3,4</sup> Therefore, pervasive COVID-19 pandemic stressors, such as the risk of personal and familial contagion (Commander S. Leduc, conversation with VT, 20 July, 2020), can be reasonably expected to further increase strain on PSP.

The different PSP sectors (e.g. police, fire, paramedics, corrections) require tailored supports to help sustainably manage the COVID-19 pandemic stressors. A growing literature documents the impact of previous epidemics (e.g. SARS, MERS) and the current pandemic on health care workers,<sup>5,6</sup> but there is very little literature delineating the impact of pandemics and epidemics on PSP. Collecting PSP-specific

data to generate evidence amidst the COVID crisis would be informative, but would require shifting time and attention away from provision of essential services and towards research. An alternative approach for rapidly synthesizing evidence-informed, peer-reviewed knowledge and for disseminating strategies to support PSP was required; accordingly, the COVID-19 Readiness Resource Project (CRRP) of the Canadian Institute for Public Safety Research and Treatment (CIPSRT) was established with substantive resource support from Veterans Affairs Canada (VAC). The CRRP provides a national online knowledge hub for trusted information on PSP mental health and well-being based on consultations with PSP frontline staff, leadership and subject matter experts to identify challenges faced by PSP. Responses to the challenges are then derived from the extant peer-reviewed literature on the impact of pandemics and epidemics on health care workers, as well as general information on disaster mental health. The resulting derivations are then tailored for PSP and disseminated online by PSP, clinicians and researchers in various forms, including accessible written content; interactive virtual town halls led by subject matter experts and PSP panellists; videos; and guided audio-recorded stress management exercises.

### Purpose

This article outlines five priority areas for supporting PSP during COVID-19, as

### Highlights

- The COVID-19 pandemic has underscored the essential role of public safety personnel in serving and protecting all Canadians.
- Public safety personnel were reporting challenges with mental health and well-being before the COVID-19 pandemic; accordingly, the new stressors may mean public safety personnel need additional resources to sustainably help them help us.
- This article suggests elements of support that may be attainable avenues for supporting the well-being of public safety personnel during the protracted stress caused by the COVID-19 pandemic.
- Sustained self-care may be critical for maintaining the mental health and well-being of public safety personnel during the COVID-19 pandemic.

**Keywords:** *public safety personnel, first responders, COVID-19, training, crisis communication, leadership, quarantine, self-care*

identified by the CRRP. The intent is to raise awareness of PSP experiences and to encourage collective innovation in supporting PSP well-being. The listed priorities and recommendations are not exhaustive, definitive or mutually exclusive, and will not apply to every PSP sector or agency. Instead, this work offers

### Author references:

1. Veterans Affairs Canada, Ottawa, Ontario, Canada
2. Department of Psychiatry, Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada
3. Interdisciplinary School of Health Sciences, Faculty of Health Sciences, University of Ottawa, Ottawa, Ontario, Canada
4. Heroes in Mind, Advocacy and Research Consortium, University of Alberta, Edmonton, Alberta, Canada
5. Faculty of Rehabilitation Medicine, University of Alberta, Edmonton, Alberta, Canada
6. Department of Psychology, University of Regina, Regina, Saskatchewan, Canada
7. Canadian Institute for Public Safety Research and Treatment, Regina, Saskatchewan, Canada

Correspondence: Alexandra Heber, Veterans Affairs Canada, 161 Grafton Street, PO Box 7700, I/B 029, Charlottetown, PE C1A 8M9; Tel: (613) 617-1355; Email: alexandra.heber@canada.ca



recommendations for possible starting points to continue supporting PSP, their families and their leaders. Table 1 presents a summary of these recommendations.

## Supporting PSP during COVID-19

### Specialized preparedness training

PSP operate in environments of heightened uncertainty,<sup>7</sup> potentiating the mental health risk of repeated PPTE exposures.<sup>3</sup>

PSP organizations may be able to support PSP functionality and mitigate risks of PPTEs<sup>3</sup> through formal and informal preparedness training,<sup>8,9</sup> as well as mental health training.<sup>4</sup> Preparedness training through “rehearsal” may familiarize PSP with PPTEs, decrease surprise and mitigate the autonomic “fight, flight or freeze” stress response that might occur during a PPTE.<sup>10,11</sup> The unexpected nature of the COVID-19 crisis may have compromised

specific preparedness training capacities for many PSP; nevertheless, PSP are working successfully to meet the challenges and may benefit from additional supports to sustain their efforts as the pandemic continues to unfold.

Additional supports may include:

- 1. Just-in-time learning opportunities.** Preparedness training for the COVID-19 emergency response was necessarily compromised by the sudden outbreak of COVID-19, and the subsequently compressed time windows available to prepare staff. PSP, however, may continue to benefit from synthesized current information, provided with regular and brief (re)training opportunities (e.g. once weekly at a daily meeting; a brief video clip) from respected authorities on the latest guidelines, developments and intervention strategies.<sup>12-14</sup> Regular training can help to decrease anxiety, increase trust in leadership, reinforce perceptions of agency, and decrease feelings of isolation.<sup>13,14</sup>
- 2. Decision-making aids.** Formal decision mnemonics, trees or algorithms, if approved by leadership and specific to various COVID-19 challenges, may reduce uncertainty and anxiety for PSP navigating the current crisis.<sup>4,15</sup> The information can be updated as new evidence becomes available.
- 3. Being mindful of the marathon.** Preparedness during the current pandemic involves pacing to support the “marathon” of navigating the pandemic in the long term, while engaging in the intermittent “sprints” needed for emergency responses.<sup>16</sup> PSP may need additional encouragement to monitor their own health and self-care, including exercise, rest, time off from work and socializing.

### Communication

Getting the right information to the right people at the right time can be challenging at the best of times and may be even harder during a pandemic. “Crisis communication” is intended to effectively deliver information during the chaotic milieu of a crisis situation. Communications must be easily understood and consistent for people to remember key messages and take effective action.

**TABLE 1**  
Support summary examples

Specialized preparedness training	
Just-in-time learning opportunities	Regular and brief (re)training opportunities with synthesized current information
Decision-making aids	Formal decision mnemonics, trees or algorithms, approved by leadership and specific to COVID-19 challenges
Being mindful of the marathon	Encourage people to practise pacing  Encourage people to practise self-care (e.g. exercise, rest, time off from work, socializing)
Communication	
Sustain communication	Frequent, consistent, transparent and interactive  Allocate time for questions, discussions and suggestions  Underscore recognition and value
Express empathy	Provide regular messaging that emphasizes understanding and a desire to help
Leverage media	Use specific and consistent media tools for disseminating information
Leadership and team building	
Remain visible, available and current	Maintain the visibility of trusted leaders engaged in empathic, constructive and supportive communication
Support basic needs	Innovate solutions to support members in navigating access to basic needs despite the new complications
Social support	Emphasize the importance of consistent social support  Support peer support efforts
Quarantine	
Stay connected	Keep quarantined personnel connected with regular remote contact, reinforcing they are integral and valued
Consider the basics	Support self-isolated PSP in navigating access to services, social support, medical care and groceries
Address domestic violence and substance misuse	Be aware of increased risk for domestic violence and alcohol and substance misuse; remind members to seek help early and provide information on where to access help
Self-care	
Healthy coping	Focus on healthy habits for sleep, nutrition, hydration and exercise  Practise stress management and relaxation techniques (e.g. diaphragmatic breathing; mindfulness exercises)
Maintain routines	Sustain or establish routines
Healthy connections and help	Stay connected with family, friends and co-workers  Seek support and assistance from trusted family, peers or evidence-based health care services if needed

**Abbreviation:** PSP, public safety personnel.

Federal health authorities such as the US Centers for Disease Control and Prevention<sup>17</sup> provide guidelines for supporting efforts towards effective crisis communication. Additional supports may include:

- 1. Sustain communication.** Keep communication frequent, consistent, transparent and interactive. New information is best retained and actioned when the content is concise, consistent and delivered by a respected source.<sup>18</sup> Allocating time for questions, discussions and suggestions creates spaces that can help leaders better understand PSP needs and is important to sustaining capacity during the marathon.<sup>7</sup> Regular interactive communication with leadership can help reinforce team member's self-esteem by underscoring that their efforts are recognized and valued.
- 2. Express empathy.** The pandemic crisis may, at times, engender reactions of fear or anger in the public with whom PSP interact. Expressing empathic understanding and a wish to help may defuse these intense emotions.<sup>19</sup> However, the pandemic might complicate PSP efforts to convey empathy (e.g. masks can interfere with nonverbal cues), requiring extra effort from PSP, which can increase their levels of strain. Despite the increased effort, overcoming the pandemic barriers to find ways to display empathy and caring may help facilitate positive outcomes for PSP and the people they serve.
- 3. Leverage media.** Media can help to encourage altruistic, ethical and public-spirited behaviour, which will facilitate healthy communities during times of crisis.<sup>18</sup> When possible, choose a small number of consistent sources for delivering information to maximize the number of people reached, while making it easy for PSP to know where to go for information. Traditional and social media can convey important information to help maximize public safety during the pandemic. Media communications can also be used to help mitigate hindsight bias and criticism that PSP and other frontline personnel can experience while making time-sensitive decisions in an unprecedented context that often require developing new best practices in real time.<sup>18</sup>

### *Leadership and team building*

Leaders can play a critical role in supporting the psychological resilience and morale of their teams. Facilitating rapid access to evidence-based mental health services after a mental health injury remains important;<sup>5,20</sup> however, reminding PSP that they can have support before, during and after a PPTE, particularly a protracted PPTE like the COVID-19 pandemic, may help to mitigate stress, burnout and other mental health injuries.<sup>21-23</sup> Evidence-informed recommendations for leaders include:

- 1. Remain visible, available and current.** The visibility of trusted leaders can bolster morale and underscore perceptions of available support, which may reinforce resilience. Leaders demonstrating, even briefly, that they have knowledge about shared stressors impacting their teams and unique stressors impacting individual team members can be particularly effective. Leaders can try to help by reminding PSP that COVID-19 is a protracted PPTE that requires attainable short- and long-term goals, as well as a focus on sustainable activities. Leaders can help their personnel to find meaning in the situation, to focus beyond the present crisis and to take pride in knowing they are contributing to the greater good of their community and country.<sup>16,24</sup>
- 2. Support basic needs.** PSP always need their basic needs met in order to do their jobs effectively, but the pandemic has resulted in complications, such as self-isolation, that can compromise their ability to meet basic needs such as childcare and grocery shopping. Leaders and organizations may be able to help by working to identify such challenges and innovating solutions to offset the new complications.<sup>25</sup>
- 3. Social support.** Social support can also be important for resilience, but aspects of social support can be compromised by necessary social distancing and self-isolation.<sup>25,26</sup> PSP leaders can help reinforce positive relationships and morale by emphasizing their support for their teams, encouraging peer-to-peer support within teams and, where possible, supporting work-sustainable and consistent PSP work cycles and team composition.<sup>25-27</sup>

### *Quarantine*

Evidence from previous epidemics has associated isolation with compromised mental health.<sup>6,18,28,29</sup> Quarantine or self-isolation can lead to loneliness, boredom, fear, loss of routine and consequences such as alcohol and substance misuse.<sup>30-32</sup> Multiple rounds of mandatory isolation during a pandemic can also exacerbate pre-existing mental health challenges.<sup>5</sup> Following isolation, returning to work may be anxiety-provoking due to fears of (re)infection and reactions of colleagues who may have had to work overtime to cover short-staffing. Potential options for decreasing detrimental impacts of isolation include:

- 1. Stay connected.** Workplaces can support isolated personnel by staying connected to them through regular remote check-ins. Reinforcing that people in isolation remain integral and valued members of the team can help mitigate potential mental health challenges.
- 2. Consider the basics.** Measures that support PSP during self-isolation may include facilitating access to remote services and supplies (e.g. social support, medical care, groceries).
- 3. Address domestic violence and substance misuse.** There have been increased incidents of domestic violence during the COVID-19 pandemic, as well as alcohol and substance misuse.<sup>30-32</sup> PSP should be aware of the increased risk, reminded to seek help early and provided with access to resources.

### *Self-care*

Maintaining self-care can be particularly challenging when facing occupational stressors such as shift work, irregular hours and exhaustion. The increased stress of COVID-19 may be partially mitigated by regularly encouraging PSP to engage in daily self-care practices to support their well-being, particularly their mental health and resilience.<sup>33,34</sup> Suggestions for self-care include:

- 1. Healthy coping.** Remind and encourage PSP to focus on maintaining healthy sleep, nutrition, exercise and regular rest. Practising stress management and relaxation techniques (e.g. diaphragmatic breathing; mindfulness

exercises) can help to maintain a sense of well-being. Even 30 seconds of deep breathing or a five-minute mindfulness exercise during breaks and before sleep may help.

- Maintain routines.** Sustaining even simple routines, such as preparations before sleeping or scheduled physical training, can provide a sense of structure and predictability during the prolonged uncertainty generated by the pandemic.
- Maintain healthy social connections and help.** Staying connected with family, friends and co-workers can help preserve a sense of community, resilience and well-being. Where possible, prioritize positive online social media platforms and activities, and minimize platforms and activities that are distracting, distressing and frustrating.<sup>35</sup> Seeking support from trusted family, peers or evidence-based health care services when needed can help PSP to manage the protracted stress caused by the pandemic.

## Conclusion

The COVID-19 pandemic has underscored our dependence on the relative few who work to maintain public health, well-being and safety, and has highlighted the challenges to supporting PSP while they perform their critical roles. The unprecedented nature, size and scope of the pandemic has required ongoing, innovative and iteratively evaluated solutions. This article outlines clinically informed and, where available, evidence-informed recommendations to support PSP. The recommendations are being curated and disseminated by a national Canadian initiative, the COVID-19 Readiness Resource Project. As the COVID-19 pandemic evolves and new challenges arise, concerted efforts will be needed to provide and sustain psychosocial supports specific to PSP, allowing PSP not only to cope with the many challenges ahead, but to thrive in the face of them.

## Acknowledgements

The authors sincerely thank the following individuals for their valued contributions: Dr. Cyd Courchesne, Health Professionals Division, Veterans Affairs Canada; Dr. Ron Martin, Faculty of Education, University of Regina; Dr. Rosemary Ricciardelli, Department

of Sociology, Memorial University of Newfoundland; Lorraine Downey, Ottawa Paramedic Service, City of Ottawa/First Responder Mental Health Network Collaboration; Christine Godin, Ottawa Paramedic Service, City of Ottawa; Dr. Heather Hadjistavropoulos, Department of Psychology, University of Regina; Dr. Ruth Lanius, PTSD Research Unit, University of Western Ontario/Department of Psychiatry, University of Western Ontario/School of Rehabilitation Science, McMaster University; Dr. Margaret McKinnon, Department of Psychiatry and Behavioural Neurosciences, McMaster University/Mental Health and Addictions, St. Joseph's Healthcare Hamilton/Homewood Research Institute; Captain Alain Pellegroms, Ottawa Fire Service, City of Ottawa; Dr. James M. Thompson, Department of Public Health Sciences, Queen's University/Canadian Institute for Military and Veteran Health Research; the CRRP committee members and Public Safety Personnel reviewers. Please visit the CRRP website for a full list acknowledging the many valued contributors to the COVID-19 Readiness Resource Project.

## Conflicts of interest

The authors declare that they have no conflicts of interest to report.

## Authors' contributions and statement

AH, VT, LSM, SBP and NC informed the concept and contributed to the design, writing, and critical review of this commentary.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

## References

- Government of Canada. Federal framework on posttraumatic stress disorder. Ottawa (ON); Government of Canada; 2020. 85 p. [Catalogue No. HP10-34/2020E-PDF]. Available from: <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/healthy-living/federal-framework-post-traumatic-stress-disorder/pub1-eng.pdf>

- Canadian Institute for Public Safety Research and Treatment (CIPSRT). Glossary of terms: a shared understanding of the common terms used to describe psychological trauma (version 2.1). Regina (SK): CIPSRT; 2019. 31 p. Available from: <https://www.cipsrt-icrtsp.ca/wp-content/uploads/2020/02/Glossary-of-Terms-Version-2.1.pdf>
- Carleton RN, Afifi TO, Taillieu, T, et al. Exposures to potentially traumatic events among public safety personnel in Canada. *Can J Behav Sci.* 2019; 51:37-52. doi:10.1037/cbs0000115.
- Carleton RN, Afifi TO, Turner S, et al. Mental health training, attitudes toward support, and screening positive for mental disorders. *Cogn Behav Ther.* 2020;49(1):55-72. doi:10.1080/16506073.2019.1575900.
- Walton M, Murray E, Christian MD. Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. *Eur Heart J Acute Cardiovasc Care.* 2020; 9(3):241-7. doi:10.1177/2048872620922795.
- Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg Infect Dis.* 2004;10(7):1206-12. doi: 10.3201/eid1007.030703.
- Camp RD, Mellow R. PSP Leadership and mental health. Presentation at CRRP Virtual Town Hall Series; 2020 May 7; Canadian Institute for Public Safety Research and Treatment (CIPSRT). Available from: <https://www.youtube.com/watch?v=97-mII-ugEO>
- Public Safety Canada. Emergency Preparedness [Internet]. Ottawa (ON): Government of Canada; 2019 [cited 2020 May 29]. Available from: <https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/mrgnc-prprdnss/index-en.aspx>
- Perry RW, Lindell MK. Preparedness for emergency response: guidelines for the emergency planning process. *Disasters.* 2003;27(4):336-50. doi:10.1111/j.0361-3666.2003.00237.x.

10. Carleton RN. Into the unknown: a review and synthesis of contemporary models involving uncertainty. *J Anxiety Disord.* 2016;39:30-43. doi: 10.1016/j.janxdis.2016.02.007.
11. Carleton RN, Koroll S, Wagner J, et al. A prospective assessment of PTSD symptoms using analogue trauma training with nursing students. *Can J Behav Sci.* 2019;51(3):181-91. doi: 10.1037/cbs0000127.
12. Becker AL. World Health Assembly addresses pandemic flu [Internet]. Minneapolis (MN): Center for Infectious Disease Research and Policy; 2005 May 19 [cited 2020 May 18]. Available from: <https://www.cidrap.umn.edu/news-perspective/2005/05/world-health-assembly-addresses-pandemic-flu>
13. O'Donnell R. When it comes to training, timing is everything. *HR Dive* [Internet]. 2017 Oct 17 [cited 2020 May 18]. Available from: <https://www.hrdiver.com/news/when-it-comes-to-training-timing-is-everything/506971/>
14. Mason R, Pegler C, Weller M. A learning object success story. *J Asynchron Learn Netw.* 2005;9(1):97-105.
15. Rosenbaum L. Facing Covid-19 in Italy - ethics, logistics, and therapeutics on the epidemic's front line. *N Engl J Med.* 2020;382:1873-5. doi: 10.24059/olj.v9i1.1805.
16. Wu AW, Connors C, Everly GS Jr. COVID-19: peer support and crisis communications strategies to promote institutional resilience. *Ann Intern Med.* 2020;172(12):822-3. doi:10.7326/M20-1236.
17. U.S. Department of Health and Human Services. Crisis emergency and risk communication. Centers for Disease Control and Prevention; 2014. 425 p. Available from: [https://emergency.cdc.gov/cerc/ppt/cerc\\_2014edition\\_Copy.pdf](https://emergency.cdc.gov/cerc/ppt/cerc_2014edition_Copy.pdf)
18. Lunn PD, Belton CA, Lavin C, McGowan FP, Timmons S, Robertson, DA. Using behavioral science to help fight the coronavirus. *JBPA.* 2020;3(1):1-15. doi:10.30636/jbpa.31.147.
19. Decety J, Bartall IB-A, Uzefovsky F, Knafo-Noam A. Empathy as a driver of prosocial behaviour: highly conserved neurobehavioural mechanisms across species. *Phil Trans R Soc Lond B Biol Sci* [Internet]. 2016 [cited 2020 May 29]; 371(1686):20150077. doi: 10.1098/rstb.2015.0077.
20. Kinman G, Teoh K. What could make a difference to the mental health of UK doctors? A review of the research evidence. London (UK): Society of Occupational Medicine; 2018. 39 p. Available from: [https://www.som.org.uk/sites/som.org.uk/files/What\\_could\\_make\\_a\\_difference\\_to\\_the\\_mental\\_health\\_of\\_UK\\_doctors\\_LTF\\_SOM.pdf](https://www.som.org.uk/sites/som.org.uk/files/What_could_make_a_difference_to_the_mental_health_of_UK_doctors_LTF_SOM.pdf)
21. Maunder RG, Lancee WJ, Balderson KE, Bennett JP, Borgundvaag B, Evans S, et al. Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerg Infect Dis.* 2006;12(12):1924-32. doi:10.3201/eid1212.060584.
22. Brooks SK, Dunn R, Amlôt R, Rubin GJ, Greenberg N. A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during an infectious disease outbreak. *J Occup Environ Med.* 2018; 60(3):248-57. doi:10.1097/JOM.0000000000001235.
23. Yassi A, Moore D, Fitzgerald JM, Bigelow P, Hon C, Bryce E. Research gaps in protecting healthcare workers from SARS and other respiratory pathogens: an interdisciplinary, multi-stakeholder, evidence-based approach. *J Occup Environ Med.* 2005;47(1):41-50. doi:10.1097/01.jom.0000150207.18085.41.
24. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *JAMA.* 2020;323(21):2133-4. doi:10.1001/jama.2020.5893.
25. Naushad VA, Bierens JJ, Nishan KP, et al. A systematic review of the impact of disaster on the mental health of medical responders. *Prehosp Disaster Med.* 2019;34(6):632-43. doi:10.1017/S1049023X19004874.
26. Brewin CR, Andrews B, Valentine JD. Meta-analysis of risk factors for post-traumatic stress disorder in trauma-exposed adults. *J Consult Clin Psychol.* 2000;68(5):748-66. doi: 10.1037//0022-006x.68.5.748.
27. Ho C, Chee C, Ho R. Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. *Ann Acad Med Singapore.* 2020;49(3):155-60.
28. Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet.* 2020; 395:912-20. doi:10.1016/S0140-6736(20)30460-8.
29. Maunder RG, Leszcz M, Savage D, et al. Applying the lessons of SARS to pandemic influenza. *Can J Public Heal.* 2008;99(6):486-8. doi:10.1007/BF03403782.
30. Bradbury-Jones C, Isham L. The pandemic paradox: the consequences of COVID-19 on domestic violence. *J Clin Nurs.* 2020;29(13-14):2047-9. doi: 10.1111/JOCN.15296.
31. Douglas M, Katikireddi SV, Taulbut M, McKee M, McCartney G. Mitigating the wider health effects of covid-19 pandemic response. *BMJ* [Internet]. 2020 [cited 2020 May 29];369:m1557. doi:10.1136/bmj.m1557.
32. Humphreys KL, Myint MT, Zeanah CH. Increased risk for family violence during the COVID-19 pandemic. *Pediatrics* [Internet]. 2020 [cited 2020 May 26];e20200982. doi:10.1542/peds.2020-0982.
33. Unadkat S, Farquhar M. Doctors' wellbeing: self-care during the covid-19 pandemic. *BMJ* [Internet]. 2020 [cited 2020 May 29];368(1150). doi: 10.1136/bmj.m1150.
34. Adams JG, Walls RM. Supporting the health care workforce during the COVID-19 global epidemic. *JAMA.* 2020;323(15):1439-40. doi:10.1001/jama.2020.3972.

- 
35. Bansal P, Bingermann TA, Greenhawt M, et al. Clinician wellness during the COVID-19 pandemic: extraordinary times and unusual challenges for the allergist/immunologist. *J Allergy Clin Immunol Pract.* 2020;8(6):1781-90.e3. doi:10.1016/j.jaip.2020.04.001.

# Call for papers – 2021 special issue

## Tobacco and vaping prevention and control in Canada

 [Tweet this article](#)

**Editors:** Jennifer O’Loughlin (University of Montreal), Thierry Gagné (University College London) and Robert Geneau (Editor-in-Chief, Public Health Agency of Canada)

It is estimated that more than 45 000 Canadians die from a tobacco-related disease each year,<sup>1</sup> making tobacco use the leading preventable cause of premature death in Canada.<sup>2</sup> In recent years, the growing use of vaping products, especially among youth, has also raised significant public health concerns. There is emerging evidence that vaping products are not without risks for individual users, with more research needed to determine the long-term risks. The electronic cigarette market, if left to expand without an appropriate mix of regulations in place, could also threaten the “Tobacco Endgame.”<sup>3,4</sup> Tobacco and vaping control policies are now largely intertwined.

Canada continues to implement comprehensive tobacco control policies and programs as part of its commitment to reach a national target of less than 5% tobacco use by 2035.<sup>5</sup> Regulations on vaping products have also been introduced in recent years at the federal level and across several provinces and territories, with one of the clear aims being to curb the use of vaping products among youth.

The objective of this special issue is to disseminate current and emerging scientific evidence on tobacco and vaping-related epidemiology, prevention and control, with a focus on youth. To this effect, *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice* seeks relevant topical research articles that present new findings or synthesize existing evidence on:

- Policies, interventions and regulations related to tobacco and/or vaping initiation, use and consumption, and cessation, including tobacco and vaping-related policy gaps and implementation challenges;
- Health inequalities in tobacco/vaping use and related harms; and
- Associations between the use of vaping products, smoking cessation and harm reduction behaviours in both smokers and non-smokers.

International submissions will be considered if they include Canadian data, results (e.g. as part of global comparisons) and/or evidence-based discussion of implications for public health in Canada.

Consult the journal’s website for information on invited article types and detailed submission guidelines for authors. Kindly refer to this call for papers in your cover letter. All manuscript submissions, pre-submission inquiries and questions about suitability or scope should be directed to PHAC.HPCDP.Journal-Revue.PSPMC.ASPC@canada.ca.

**Submission Deadline:** March 31st, 2021.

### References

1. Health Canada. Canada’s tobacco strategy [Internet]. Ottawa (ON): Health Canada; [modified 2020 Jan 10; cited 2020 Nov 20]. Available from: <https://www.canada.ca/en/health-canada/services/publications/healthy-living/canada-tobacco-strategy.html>
2. Health Canada. Consultation on the future of tobacco control in Canada: what we heard. Ottawa (ON): Health Canada; 2017. Available from: <https://www.canada.ca/en/health-canada/services/publications/healthy-living/consultation-future-tobacco-control-what-we-heard.html>
3. McDaniel PA, Smith EA, Malone RE. The tobacco endgame: a qualitative review and synthesis. *Tob Control*. 2016;25:594-604. <https://doi.org/10.1136/tobaccocontrol-2015-052356>
4. The Tobacco Endgame Cabinet. Getting to less than 5% by 2035: the 2019 Tobacco Endgame report. Ottawa (ON): The Canadian Lung Association; 2019. Available from: <https://www.lung.ca/sites/default/files/EndGameReport-final.pdf>
5. Health Canada. Overview of Canada’s tobacco strategy. Ottawa (ON): Health Canada; 2018. Available from: <https://www.canada.ca/en/health-canada/services/publications/healthy-living/canada-tobacco-strategy/overview-canada-tobacco-strategy.html>

# Open call for papers: COVID-19 pandemic

*With a rapid publication process*

 [Tweet this article](#)

## Special Call for Peer Reviewers

The HPCDP Journal is currently seeking volunteer peer reviewers with interdisciplinary expertise to conduct timely reviews of manuscripts submitted to the journal through the issued open call for papers on the COVID-19 pandemic and its links to the fields of health promotion and chronic disease prevention.

Relevant topic areas include, but are not limited to:

- Chronic diseases, their risk factors and links with COVID-19 (e.g., increased risk of severe illness and longer term health effects)
- Mental health
- Problematic substance use
- Impact and consequences of public health measures
- Delivery of preventive health care
- Emerging evidence for promising interventions
- Health equity

To be considered as a potential peer reviewer for the HPCDP Journal COVID-19 series, please email us at [PHAC.HPCDP.Journal-Revue.PSPMC.ASPC@canada.ca](mailto:PHAC.HPCDP.Journal-Revue.PSPMC.ASPC@canada.ca), and briefly indicate your areas of expertise, institutional affiliation(s) and availability. A concise biosketch, C.V. or biolinks may be provided to assist in the selection process.

Reviewers are asked to commit to completing at least one peer review within 5 days of accepting a request.

The societal impact of the novel coronavirus disease (COVID-19) pandemic is multifaceted, and all Canadians, one way or another, have been affected. From a public health perspective, we also see this pandemic colliding with the slow-motion chronic disease epidemic that is affecting all parts of the globe.

*Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice* (the HPCDP Journal) is the monthly, online scientific journal of the Health Promotion and Chronic Disease Prevention Branch of the Public Health Agency of Canada. The HPCDP Journal is hereby inviting original quantitative and qualitative research papers, commentaries, editorials and At-a-glance manuscripts that address the links between the COVID-19 pandemic and health promotion, chronic disease and health equity.

There are many relevant topics, including, but not limited to:

- Associations between chronic diseases (and their risk factors) and the risk for infection, severe illness and poorer outcomes.
- The longer-term health effects of COVID-19 on survivors, including long-lasting mental health issues such as depression, anxiety and more.
- Studying the public health response and its impact and unintended consequences at the individual level (e.g. physical and mental health, health and health-seeking behaviours), family level, and the community or societal level.
- The delivery of preventive health care during the pandemic.
- Emerging scientific evidence, including through natural experimental studies, about promising interventions to improve the public health response (e.g. social distancing measures, protecting people with underlying chronic conditions) or to mitigate the negative impacts of the response (e.g. mental health consequences).
- Health equity and the social determinants of health as cross-cutting issues.

---

To ensure lasting relevance, we expect all submissions to discuss the implications of their findings for the recovery phase of the current crisis, and beyond.

Manuscripts will be considered as they are received. Those selected for further consideration will be assigned to a special editorial committee dedicated to this series, as well as to two peer reviewers if appropriate for the article type.

We will strive to provide an initial editorial decision on submitted manuscripts within 15 business days of completed submission for peer-reviewed papers and five business days for non-peer-reviewed manuscripts. Accepted manuscripts will be prioritized for publication and will appear online, in HTML format, and be indexed as “ahead of print” articles prior to being produced in PDF and included in a regular issue of the Journal.

Refer to our website for information on invited article types and detailed submission guidelines for authors: <https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/information-authors.html>.

For any pre-submission questions about suitability or scope, please direct inquiries to [PHAC.HPCDP.Journal-Revue.PSPMC.ASPC@canada.ca](mailto:PHAC.HPCDP.Journal-Revue.PSPMC.ASPC@canada.ca).

**Submission information:** Kindly refer to this call for papers in your submission covering letter and submit manuscripts by email to [PHAC.HPCDP.Journal-Revue.PSPMC.ASPC@canada.ca](mailto:PHAC.HPCDP.Journal-Revue.PSPMC.ASPC@canada.ca). This call will continue until further notice.

**Submission deadline:** Open until further notice.



## Other PHAC publications

---

**Researchers from the Public Health Agency of Canada also contribute to work published in other journals. Look for the following articles published in 2020:**

Auger N, Therrien A, Bilodeau-Bertrand M, **Nelson C**, Arbour L. Coeliac disease and risk of birth defects in pregnancy. *Gut*. 2020. doi:10.1136/gutjnl-2020-322425.

Fluke JD, **Tonmyr L**, Gray J, et al. Child maltreatment data: a summary of progress, prospects and challenges. *Child Abuse Negl*. 2020;104650. doi:10.1016/j.chiabu.2020.104650.

**Hoffmann MD, Lang JJ**, Guerrero MD, [...] **Orpana HM, de Groh M**. Evaluating the psychometric properties of the parent-rated Strengths and Difficulties Questionnaire in a nationally representative sample of Canadian children and adolescents aged 6 to 17 years. *Health Rep*. 2020;31(8):13-20. doi:10.25318/82-003-x202000800002-eng.

McVea DA, **Cumming E**, Rahim T, Kosatsky T. A descriptive analysis of blood mercury test results in British Columbia to identify excessive exposures. *Can J Public Health*. 2020. doi:10.17269/s41997-020-00340-3.

Nah K, Chen S, Xiao Y, [...] **Ogden NH**, et al. Scenario tree and adaptive decision making on optimal type and timing for intervention and social-economic activity changes to manage the COVID-19 pandemic. *Eur J Pure Appl Math*. 2020;13(3):710-29. doi:10.29020/nybg.ejpam.v13i3.3792.

**Williams GC**, Burns KE, Battista K, **de Groh M, Jiang Y**, Leatherdale ST. High school sport participation and substance use: a cross-sectional analysis of students from the COMPASS study. *Addict Behav Rep*. 2020;12:100298. doi:10.1016/j.abrep.2020.100298.

