



# Impact of COVID-19 on frontline pharmacists' roles and services in Canada: The INSPIRE Survey

Dillon H. Lee, PharmD; Kaitlyn E. Watson, BPharm(Hons), PhD, GradCertAppPharmPrac, FHEA   
Yazid N. Al Hamarneh, BSc(Pharm), PhD, CDM 

## Introduction

The global COVID-19 pandemic has significantly affected the way individuals interact with the health care system, with reallocation of resources and reports of patients delaying scheduled visits with family physicians or avoiding hospitals, due to fears of contracting the COVID-19 infection.<sup>1-3</sup> Similar attitudes were observed during the 2009 H1N1 virus pandemic, as patients sought perceived “safer” options to access health care services. Previous pandemic experiences indicated that pharmacies are considered one of these options. For example, the H1N1 pandemic experience highlighted that pharmacists are well placed to play roles and provide services in public health, education and vaccinations.<sup>4,5</sup> Indeed, Rubin and colleagues<sup>6</sup> reported that collaboration between pharmacists and local health departments during the H1N1 influenza outbreak improved community emergency response. Moreover, Watson and colleagues<sup>7</sup> identified 43 roles that pharmacists could undertake to prevent, prepare for, respond to and recover from any type of disaster, such as the current global COVID-19 pandemic.

Pharmacy has been recognized as a vital health care profession during the COVID-19 pandemic, as many jurisdictions categorized pharmacy as an essential service and adapted legislation to support pharmacists' roles.<sup>8-13</sup> Austin and Gregory<sup>14</sup> explored factors that may affect the resiliency of the pharmacy workforce in Ontario community pharmacies during the early phase of COVID-19 pandemic. Those investigators reported that the degrees of resiliency were affected by staffing, pharmacy workflow, number of multitasking requirements, use of professional guidance, usability of technology and access to personal protective equipment (PPE).<sup>14</sup> These findings provided insight

into the way pharmacists responded to the early phase of the COVID-19 pandemic. However, such findings were limited to Ontario, and we sought to evaluate the impact of the COVID-19 pandemic on Canadian pharmacists and pharmacy services and to identify frontline pharmacists' roles and pharmacy services during the early phase of the COVID-19 pandemic.

## Methods

### *Study design and participant recruitment*

This study was a descriptive, exploratory, nonexperimental cross-sectional survey. Pharmacists were recruited through social media and provincial/territorial and national pharmacy regulatory and advocacy organizations. The survey was provided in English and French and respondents had to give consent before progressing to it. Pharmacists were eligible to take part if they provided direct patient care during the COVID-19 pandemic. The survey was designed in April 2020 and was made available online from May 27 to July 31, 2020. There are approximately 42,500 pharmacists licensed in Canada.<sup>15</sup> Thus, the sample size required based on this population with 95% confidence interval and 5% margin of error was 381 pharmacists.

### *Data collection instrument and data analysis*

The survey questions were developed by the research team based on the current literature and media reports regarding pharmacists' roles and services during the COVID-19 pandemic. The online survey was developed and distributed using the secure electronic data capture web application Research Electronic Data Capture (RedCap). The survey was divided into 4 sections: 1) demographics, 2) the specific COVID-19

© The Author(s) 2021



Article reuse guidelines:

[sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)

DOI:10.1177/17151635211028253

## KNOWLEDGE INTO PRACTICE



- The global COVID-19 pandemic significantly affected Canadian frontline pharmacists' roles and services, and pharmacists were trailblazers, adapting their practices to meet the needs of society.
- There was a reported increase in the number of patients seeking pharmacists' care as they avoided other avenues of the health care system out of fear of contracting the COVID-19 infection.
- Pharmacists were increasingly required to manage the emotions and expectations of patients and community members seeking reassurance to calm their fears and anxieties about the pandemic, as well as provide COVID-19 information and public health guidance.
- Pharmacists have an important role in public health, especially in disasters, and they and their pharmacy advocacy bodies need to seize the opportunity that COVID-19 has presented and actively advocate for greater pharmacy involvement in disaster and emergency management, including representation within local emergency management groups.

pandemic roles and services that pharmacists provided, 3) communication strategies and how pharmacists obtained public health information, and 4) specific COVID-19 challenges that pharmacists faced. (Please refer to Appendix 1, available online at [www.cpjournal.ca](http://www.cpjournal.ca), for the survey questions.)

The data were exported and analyzed using the Statistical Package for the Social Sciences (SPSS), version 25. Descriptive statistics were used to provide the frequencies and percentages of the impact of the COVID-19 pandemic on pharmacists' roles and services. Pharmacists were not required to answer every question; thus, the sample size may differ for each question depending on the number of pharmacists who opted to respond. This study was approved by the Research Ethics Board of the University of Alberta (Pro00101238).

## Results

There were 768 pharmacists who provided consent to take part in the study. Of those, 740 provided direct patient care during the COVID-19 pandemic and 97% of them completed the survey. Participant demographics are reported in Appendix 1. We received responses from pharmacists from the 10 Canadian provinces and 1 territory. The largest number of responses was from Ontario (53%), followed by Alberta (21.1%) and Quebec (6.8%) (Appendix 1). Most of the respondents were practising in a community setting (72.6%). Interestingly, a large majority of pharmacists surveyed (422/553, 76.3%) were not engaged with local disaster and public health organizations to coordinate a health response to the COVID-19 pandemic.

## MISE EN PRATIQUE DES CONNAISSANCES



- La pandémie mondiale de la COVID-19 a eu un effet très important sur les rôles et les services des pharmaciens canadiens de première ligne, et les pharmaciens ont été des pionniers en adaptant leurs pratiques pour répondre aux besoins de la société.
- Une augmentation du nombre de patients sollicitant les pharmaciens pour des soins a été signalée, car ces patients évitaient les autres voies du système de santé par crainte de contracter la COVID-19.
- Les pharmaciens ont été de plus en plus appelés à gérer les émotions et les attentes des patients et des membres de la société qui voulaient être rassurés pour calmer leurs craintes et leurs angoisses en ce qui concerne la pandémie, et à fournir des renseignements sur la COVID-19 et des conseils de santé publique.
- Les pharmaciens ont un rôle important à jouer dans le domaine de la santé publique, notamment en cas de catastrophe, et ils doivent, ainsi que leurs organismes de défense des intérêts des pharmaciens, saisir l'occasion offerte par la pandémie de la COVID-19 et encourager une plus grande implication des pharmaciens dans la gestion des catastrophes et des situations d'urgence, notamment par une présence au sein des groupes locaux de gestion des situations d'urgence.

In terms of the specific roles that pharmacists undertook during the COVID-19 pandemic, the most frequent roles were rationing the limited supplies of medications (e.g., limiting dispensing to 30 days' supply only) (75.3%), followed by handling logistics of obtaining medication supplies (e.g., identifying workarounds for drug shortages, coordinating with other pharmacies) (71.6%) and renewing/extending prescriptions for continuity of care for chronic diseases (70.4%) (Table 1).

When asked about the extent to which the COVID-19 pandemic affected them personally and professionally, the majority of participants reported that the pandemic significantly affected their workplace (91.3%) and the way they practice (87.3%) (Table 1). Unsurprisingly, most of the participants indicated that the pandemic significantly increased their concern for safety (personal and for others) (87.8%) and their stress level (82.5%) (Table 1). Remarkably, around three-quarters (72.2%) of the pharmacists agreed that community members and patients were coming to pharmacies and avoiding emergency services and other health care providers out of concern of contracting a COVID-19 infection (Table 1).

Websites of the government (77.1%), pharmacy colleges (63.5%) and the World Health Organization (49.7%) were highlighted as the top 3 sources for COVID-related information

**TABLE 1** Pharmacists' roles and perceptions of extent of impact of the COVID-19 pandemic

<b>Pharmacists' roles during the COVID-19 pandemic</b>	<b>Never-Rarely</b>	<b>Sometimes</b>	<b>Often-Always</b>	<b>N/A</b>	<b>Total (n)</b>
Rationing limited supplies of medications (e.g., limiting dispensing to 30 days' supply only)	12.4%	3.4%	75.3%	8.8%	611
Handling logistics of obtaining medication supplies (e.g., identifying workarounds for drug shortages, coordinating with other pharmacies)	11.6%	14.6%	71.6%	2.1%	610
Renewing/extending a prescription for continuity of care for chronic diseases	12.4%	10.1%	70.4%	7.1%	605
Educating the public on reducing the spread of COVID-19 infection (e.g., handwashing, social distancing)	10.6%	16.9%	67.4%	5.1%	611
Providing emergency supply refills during the COVID-19 pandemic (e.g., 30 days' supply)	17.1%	9.8%	64.7%	8.3%	601
Treating ambulatory conditions (e.g., mild constipation, skin rash)	14.7%	18.6%	60.8%	5.9%	607
Establishing remote pharmacy services (e.g., medication delivery system, telehealth)	26.9%	15.7%	50.3%	7.1%	606
Screening for COVID-19 infection symptoms	34.4%	24.1%	38.8%	2.7%	601
Providing psychological first aid (e.g., allaying patients' fears of the COVID-19 pandemic, identifying patients at risk of mental health crises)	33.4%	25.4%	37.5%	3.6%	610
Providing expertise or guidance to community members on COVID-19 infection treatments	38.6%	26.1%	31.4%	3.9%	609
Providing independent prescribing	39.2%	14.5%	26.4%	19.9%	602
Providing expertise or guidance to other health care providers on COVID-19 infection treatments	49.4%	22.6%	23.7%	4.3%	603
Administering vaccinations (e.g., influenza vaccines)	56.0%	14.5%	20.3%	9.2%	595
Following up on patients' medication safety and efficacy when being actively treated with proposed COVID-19 infection treatments	65.1%	8.2%	18.1%	8.6%	607
<b>Pharmacists' perceptions of the extent of impact the COVID-19 pandemic has had on them personally and professionally</b>	<b>Strongly Disagree or Disagree</b>	<b>Neutral</b>	<b>Strongly Agree or Agree</b>	<b>N/A</b>	<b>Total (n)</b>
The COVID-19 pandemic significantly affected my place of work (e.g., pharmacy)	1.3%	0.5%	91.3%	6.9%	607
The COVID-19 pandemic significantly affected the way I practise	3.0%	5.0%	87.3%	4.8%	604
The COVID-19 pandemic significantly increased my concern for safety (e.g., self and others)	2.7%	4.5%	87.8%	5.1%	603
The COVID-19 pandemic significantly increased my stress level	4.5%	8.6%	82.5%	4.5%	605
Patients came to my pharmacy as they did not want to risk going to other health care providers and/or emergency rooms	3.2%	6.2%	72.2%	18.5%	601
Community members are coming to my pharmacy for information on the COVID-19 pandemic	9.5%	15.3%	59.4%	15.9%	603
Community members are coming to my pharmacy for me to calm their fears and anxiety regarding the COVID-19 pandemic	11.6%	19.4%	52.9%	16.1%	603

N/A: Not Applicable.

**TABLE 2** Challenges that significantly affected pharmacists' practice

Challenge	Number of participants	Percentage	Total (n)
Decreased supply of medications (e.g., medication shortage)	468	65.5	714
General supply shortage (e.g., hand sanitizer)	456	63.8	715
Unfair patient expectations (e.g., feeling frustrated with delay in services)	372	52	716
Prescription surge (e.g., patient stockpiling)	357	49.9	715
Lack of personal protective equipment (e.g., face masks, gloves)	334	47	710
Lack of time for clinical counselling (e.g., care plan activities)	329	46	715
Insurance issues (e.g., co-pay)	317	44.3	716
Inadequate time for breaks or meals	316	44.2	715
Inadequate staffing	309	43.2	715
HR-related issues (e.g., vacation time, paid time off, sick leave, personal leave, scheduling flexibility, threat of repercussions for missing work, hazard pay)	265	37.1	714
Discomfort with temporary expanded practice scope (e.g., extending opioids for continuity of care)	156	21.8	716
Lack of priority access to COVID-19 infection testing	147	20.6	715

used by pharmacists (Table 1), whereas the phone (75%), in-person visits (70.4%) and fax (34.9%) were the top 3 means that pharmacists used to communicate with their patients during the early phase of the COVID-19 pandemic.

The major challenges that significantly affected pharmacists' practices (Table 2) were decreased supply of medications (65.5%), followed by general pharmacy supplies shortage (63.8%) and unfair patient expectations (52%).

## Discussion

To our knowledge, this is the first study to identify and provide a snapshot of the effect of the COVID-19 pandemic on Canadian pharmacists' roles and pharmacy services. Although the pandemic continues and its impact is ongoing, this study provides evidence of the impacts and challenges faced by Canadian frontline pharmacists during the early phase of the pandemic. Pharmacists identified the major challenges in this early phase of the pandemic to be managing medication shortages and unfair patient expectations. It was reported that pharmacists were increasingly required to manage the emotions and expectations of patients and community members seeking reassurance and information about the pandemic. This is an important role, as patients avoid other avenues of the health care system during a crisis but continue to trust and seek out pharmacists.

Our findings corroborate the suggested overview of key roles and activities for community pharmacists during the COVID-19 pandemic conducted by Cadogan and Hughes<sup>8</sup> and Zheng et al.,<sup>16</sup> as well as studies from previous disaster events (e.g., H1N1

pandemic).<sup>5,7,17</sup> A scoping review conducted in 2021 by Watson and colleagues<sup>18</sup> to examine pharmacists' roles and services during the first year of the pandemic suggested that the COVID-19 pandemic could be the catalyst to integrate and cement these important pharmacist roles and services beyond the pandemic. Those investigators hypothesized that the pandemic has made visible the different layers of pharmacists' roles and services in public health, information and medication management.

Our study has also uncovered the importance of pharmacists' public health roles during the COVID-19 pandemic, for example, playing a major role in disputing misinformation and combating the "infodemic,"<sup>19</sup> as participants indicated that they frequently educate the public on the COVID-19 pandemic and how to reduce the spread of COVID-19 infection (e.g., handwashing, physical distancing, appropriate use of medications for patients and other health care professionals). Moreover, participants highlighted that patients use the pharmacy as a "safe haven," as they did not want to risk going to other health care providers or emergency rooms. This finding is unique and should be explored further.

Pharmacists' roles and services evolve throughout the life-cycle of a pandemic or disaster.<sup>7</sup> Such evolution is associated with various challenges as the pandemic continues to unfold. In April 2020, pharmacists' access to PPE and priority access to COVID-19 testing for infectious symptoms were serious concerns.<sup>20-23</sup> However, by the time pharmacists completed this survey in July 2020, PPE was no longer a major pressing issue and medication shortages came to the forefront as the most

significant challenge affecting pharmacies.<sup>24-27</sup> For example, in Canada, to combat these medication shortages, pharmacists were requested to ration their medication supplies, reducing their usual 100-day supply to 30 days.<sup>28,29</sup> At the time of writing, other challenges were being reported, including misinformation management (e.g., hydroxychloroquine), asymptomatic COVID-19 testing in pharmacies and the co-current flu season vaccinations. Another complication that surfaced for pharmacists as a consequence of the temporary rationing of medication supplies was the syncing of patient refills. The majority of patients who had been given 30-day supplies of their medications during the peak months of the COVID-19 pandemic all required their 100-day refills at the same time, causing medication stock flow issues and significantly affecting the workload of pharmacists and pharmacy staff. Predictably, a year on at the time of publication, COVID-19 vaccinations are taking centre stage with pharmacists globally playing a significant role in the mass vaccination campaign.

It is well understood that the first response to a pandemic or disaster comes from the local community affected, and federal or national services only step in when the local resources become overwhelmed.<sup>30,31</sup> Thus, disaster and/or pandemic plans and procedures often identify the need for local agencies, organizations, community groups and health care to collaborate when preparing for, responding to and recovering from disasters. For example, in Alberta, the Alberta Emergency Management Agency is responsible for leading this collaboration between the various organizations involved in disasters,<sup>32</sup> whereas in Ontario, Emergency Management Ontario fulfills that role.<sup>33</sup> However, pharmacists are frequently overlooked and struggle to identify who to contact during a pandemic or a local disaster to contribute to health-related disaster decision-making processes.<sup>34,35</sup> This continual challenge was evident in our findings, with 76.3% of frontline pharmacists stating they are not engaged with the local disaster and public health groups. This indicates the need for better integration of pharmacists into

disaster health teams and for the disaster health community to acknowledge the vital roles and services being undertaken by those essential primary care providers. Pharmacists and pharmacy organizations in each province should reach out to the pandemic planning groups to advocate for pharmacy's seat at the table where these pandemic health decisions are discussed.

#### Limitations

Although this study begins to determine the effect of the COVID-19 pandemic on pharmacists in Canada, the pandemic is still ongoing and the full extent of the impacts and challenges being faced by communities, patients and pharmacists is still unknown. This survey was designed to identify the aspects of pharmacy practice that were affected during the early phase of the COVID-19 pandemic; the implications of these impacts on pharmacy services were beyond the scope of this study and further research is needed to understand the long-term effects of this pandemic. The study was designed to explore the impacts and challenges being faced by frontline pharmacists and, as such, the effects on the business of pharmacy (e.g., signage, costs of PPE, plexiglass, COVID-19 safety plan) were not explored.

#### Conclusion

The global COVID-19 pandemic is significantly affecting frontline pharmacists' roles and services. Although the pharmacy workforce has faced some challenges during the pandemic (e.g., PPE, medication shortages), pharmacists need to continue to be trailblazers in undertaking new opportunities, fulfilling disaster roles and services and cementing their place in the health care system as an essential frontline health service during disasters. Pharmacists and pharmacy organizations need to seize the opportunity and communicate the benefits of greater pharmacy involvement in disaster and emergency preparedness, response and recovery. Pharmacy organizations should advocate for better integration of pharmacists into local disaster and pandemic health groups. ■

From the Faculty of Pharmacy and Pharmaceutical Sciences (Lee); and EPICORE Centre (Watson, Al Hamarneh), Department of Medicine, University of Alberta. Contact kewatson@ualberta.ca.

First and second authors contributed equally.

**Acknowledgments:** The authors would like to acknowledge and thank all the pharmacy organizations that assisted in widely distributing this survey across Canada. We would also like to thank the pharmacists who participated in this research: thank you for your continued dedication to your patients during the COVID-19 pandemic and for taking the time to be a part of this research.

**Author Contributions:** D.H. Lee conceived the presented idea. K.E. Watson and Y.N. Al Hamarneh provided supervision of the project. D.H. Lee, K.E. Watson and Y.N. Al Hamarneh developed the survey and collected the data. K.E. Watson and Y.N. Al Hamarneh performed the data analysis. K.E. Watson wrote the first manuscript draft with contributions from D.H. Lee and Y.N. Al Hamarneh. D.H. Lee, K.E. Watson and Y.N. Al Hamarneh revised and edited the manuscript and provided approval for publication.

**Declaration of Conflicting Interests:** The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

**Funding:** The authors received no financial support for the research, authorship and/or publication of this article.

**ORCID iDs:** Kaitlyn E. Watson  <https://orcid.org/0000-0001-6617-9398>

Yazid N. Al Hamarneh  <https://orcid.org/0000-0003-3984-3542>

## References

1. Snowdon W. *Avoiding emergency care during pandemic a dangerous trend, Edmonton ER doctor warns*. May 15, 2020. Available: <https://www.cbc.ca/news/canada/edmonton/covid-coronavirus-emergency-rooms-1.5571469> (accessed Aug. 18, 2020).
2. Howard J. *Covid-19 fears keep people from hospitals, but doctors say call 911 for heart attack and stroke*. April 22, 2020. Available: <https://www.cnn.com/2020/04/22/health/coronavirus-hospitals-heart-health-statement/index.html> (accessed Aug. 18, 2020).
3. Bush E. *'Where are the patients?' People are avoiding doctors, hospitals because of coronavirus worries*. May 25, 2020. Available: <https://www.seattletimes.com/seattle-news/health/patients-are-delaying-care-at-what-price/> (accessed Aug. 18, 2020).
4. Mullen E, Smith GH, Irwin AN, Angeles M. Pandemic H1N1 influenza virus: academy perspectives on pharmacy's critical role in treatment, prevention. *J Am Pharm Assoc (2003)* 2009;49(6):728.
5. Miller S, Patel N, Vadala T, Abrons J, Cerulli J. Defining the pharmacist role in the pandemic outbreak of novel H1N1 influenza. *J Am Pharm Assoc (2003)* 2012;52(6):763-7.
6. Rubin S, Schulman R, Roszak A, Herrmann J, Patel A, Koonin L. Leveraging partnerships among community pharmacists, pharmacies health departments to improve pandemic influenza response. *Biosecur Bioterror* 2014;12(2):76-84.
7. Watson KE, Singleton JA, Tippett V, Nissen LM. Defining pharmacists' roles in disasters: a Delphi study. *PLoS One* 2019;14(12):e0227132.
8. Cadogan CA, Hughes CM. On the frontline against COVID-19: community pharmacists' contribution during a public health crisis. *Res Social Adm Pharm* 2021;17:2032-5.
9. Bukhari N, Rasheed H, Nayyer B, Babar Z-U-D. Pharmacists at the frontline beating the COVID-19 pandemic. *J Pharm Policy Pract* 2020;13(1):8.
10. Mertz E. *Pharmacists get billing code to screen Albertans for COVID-19; asked to limit drug supplies*. March 19, 2020. Available: <https://globalnews.ca/news/6703187/pharmacists-screen-coronavirus-alberta-health-drug-supply/> (accessed May 4, 2020).
11. Visacri MB, Figueiredo IV, Lima TdM. Role of pharmacist during the COVID-19 pandemic: a scoping review. *Res Social Adm Pharm* 2021;17:1799-1806.
12. College of Pharmacists of British Columbia. *COVID-19 public information—prescription refills can be provided by a pharmacist*. Available: <https://www.bcparmacists.org/news/covid-19-public-information-prescription-refills-can-be-provided-pharmacist> (accessed Mar. 18, 2020).
13. *Coronavirus outbreak: pharmacists can provide some medications*. March 21, 2020. Available: <https://globalnews.ca/video/6713210/covid-19-pharmacists-can-provide-some-medications> (accessed Mar. 21, 2020).
14. Austin Z, Gregory P. Resilience in the time of pandemic: the experience of community pharmacists during COVID-19. *Res Social Adm Pharm* 2021;17:1867-75.
15. Canadian Pharmacists Association. *Pharmacists in Canada*. Available: <https://www.pharmacists.ca/pharmacy-in-canada/pharmacists-in-canada/#:~:text=Canada%20has%20approximately%2042%2C500%20licensed,%20associations%20colleges%20and%20universities> (accessed Aug. 18, 2020).
16. Zheng S-q, Yang L, Zhou P-x, Li H-b, Liu F, Zhao R-s. Recommendations and guidance for providing pharmaceutical care services during COVID-19 pandemic: a China perspective. *Res Social Adm Pharm* 2021;17:1819-24.
17. Watson KE, Tippett V, Singleton JA, Nissen LM. Disaster health management: do pharmacists fit in the team? *Prehosp Disaster Med* 2019;34(1):30-7.
18. Watson KE, Schindel TJ, Barsoum ME, Kung JY. COVID the catalyst for evolving professional role identity? A scoping review of global pharmacists' roles and services as a response to the COVID-19 pandemic. *Pharmacy (Basel)* 2021;9:99.
19. Erku DA, Belachew SA, Abrha S, et al. When fear and misinformation go viral: pharmacists' role in deterring medication misinformation during the 'infodemic' surrounding COVID-19. *Res Social Adm Pharm* 2021;17:1954-63.
20. Bowden O. Pharmacists fear for their safety due to mask and glove shortages amid coronavirus pandemic. April 2, 2020. Available: <https://globalnews.ca/news/6763214/coronavirus-pharmacists-safety/> (accessed Aug. 27, 2020).
21. Karim M. *Manitoba pharmacists not being given gloves, masks during COVID-19 outbreak*. April 2, 2020. Available: <https://globalnews.ca/news/6761791/pharmacists-winnipeg-ppe-covid-19/> (accessed Aug. 27, 2020).
22. Fedor T. *Pharmacists struggling to receive PPE as Alberta prepares to ship medical supplies to other provinces*. April 13, 2020. Available: <https://calgary.ctvnews.ca/pharmacists-struggling-to-receive-ppe-as-alberta-prepares-to-ship-medical-supplies-to-other-provinces-1.4894460> (accessed Aug. 27, 2020).
23. Zaidi STR, Hasan SS. Personal protective practices and pharmacy services delivery by community pharmacists during COVID-19 pandemic: results from a national survey. *Res Social Adm Pharm* 2021;17:1832-37.
24. Badreldin HA, Atallah B. Global drug shortages due to COVID-19: impact on patient care and mitigation strategies. *Res Social Adm Pharm* 2021;17:1946-9.
25. Neustaeter B. *Inhalers, blood pressure meds top list of drug shortages reported by Canadian pharmacists*. May 27, 2020. Available: <https://www.ctvnews.ca/health/inhalers-blood-pressure-meds-top-list-of-drug-shortages-reported-by-canadian-pharmacists-1.4956946> (accessed Aug. 27, 2020).
26. Canadian Pharmacists Association. *National survey of community pharmacists on drug supply issues during COVID-19*. Available: [https://www.pharmacists.ca/cpha-ca/assets/File/cpha-on-the-issues/Infographic\\_drug-shortages-COVID\\_EN.pdf](https://www.pharmacists.ca/cpha-ca/assets/File/cpha-on-the-issues/Infographic_drug-shortages-COVID_EN.pdf) (accessed Aug. 27, 2020).
27. Hardcastle L, Beall R. *How coronavirus is contributing to drug shortages in Canada*. Available: <https://theconversation.com/how-coronavirus-is-contributing-to-drug-shortages-in-canada-137436> (accessed Aug. 27, 2020).
28. Canadian Pharmacists Association. *Statement on 30-day supply of prescription medications*. March 23, 2020. Available: <https://www.pharmacists.ca/news-events/news/statement-on-30-day-supply-of-prescription-medications/> (accessed Sept. 2, 2020).
29. Alberta College of Pharmacy. *Pharmacy services during the COVID-19 pandemic*. Last updated February 24, 2021. Available: <https://abpharmacy.ca/pharmacy-services-during-covid-19-pandemic> (accessed Aug. 18, 2020).
30. *Emergency management strategy for Canada: toward a resilient 2030*. Ottawa (ON): Public Safety Canada; 2019:1-32.
31. *National emergency response system*. Ottawa (ON): Public Safety Canada; 2011.
32. Government of Alberta. *Alberta Emergency Management Agency: about us*. Available: <https://www.alberta.ca/alberta-emergency-management-agency.aspx#toc-0> (accessed Aug. 27, 2020).
33. Ontario Ministry of the Solicitor General. *Emergency management in Ontario*. Available: [https://www.emergencymanagementontario.ca/english/insideemo/em\\_in\\_ontario/em\\_in\\_ontario.html](https://www.emergencymanagementontario.ca/english/insideemo/em_in_ontario/em_in_ontario.html) (accessed Aug. 27, 2020).
34. Singleton J, Khng S, Watson K, McCourt E, Lau E. Still burning: an exploration of the impacts of the 2018/19 Tasmanian summer bushfires on community pharmacy operations in affected communities. *Prehosp Disaster Med* 2020;35(6):612-18. doi:10.1017/S1049023X20001077.
35. Watson KE. *The roles of pharmacists in disaster health management in natural and anthropogenic disasters* [thesis]. 2019. Available: <https://eprints.qut.edu.au/130757/> (accessed Jul. 2020).