

A Pan-Canadian Narrative Review on the Protocols for COVID-19 and Canadian Emergency Departments

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Abstract

First described in Wuhan, China, in December 2019, the World Health Organization declared the novel coronavirus disease (COVID-19) a global pandemic on March 11th, 2020. Canada identified its first positive COVID-19 patient on January 25th, 2020. The Canadian government and health care system immediately started discussing how best to respond to this pandemic. It was hypothesized that potentially positive and confirmed positive COVID-19 patients would present to emergency departments across the country. It has now been over a year since the first positive patient was identified in Canada, and there has yet to be a narrative review that explores how Canadian emergency departments have responded to the novel COVID-19 virus. This narrative review will discuss measures that were taken thus far, including pre-hospital care, the use and implementation of virtual care, the importance of simulation training, protocols regarding patient screening at presentation to the emergency department, the use of personal protective equipment, and lastly, rural emergency department response. This narrative review may be beneficial as the COVID-19 pandemic continues, by providing a concise summary of measures that were taken in various emergency departments across Canada to prevent the spread of the virus.

Key Words: COVID-19; Canada; Emergency Departments; Pre-hospital care (Source: MeSH-NLM).

Introduction

On March 11th, 2020, the World Health Organization (WHO) declared the novel coronavirus disease 2019 (COVID-19) a global health pandemic.¹ The disease was first described and identified in Wuhan, China in December 2019, and it is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).² The COVID-19 virus appears to have developed precipitously as data from October 10th, 2020, (approximately 7-months following the declaration from the WHO of a global pandemic) indicated that the virus had spread to over 200 countries and territories infecting 35 million people, which resulted in approximately 1-million deaths globally.²

In Canada, the first individual diagnosed with the COVID-19 virus was detected on January 25th, 2020.³ Cases then started spreading rapidly and began appearing in most provinces and territories. As a result, the Government of Canada decided to impose travel restrictions, and as of March 14th, 2020, only allowing Canadian Citizens, permanent residents, and citizens of the United-States to cross the Canadian border.³ The Canadian health care system hypothesized that patients with suspected COVID-19 or worsening symptoms from confirmed cases would present to the emergency departments or outpatient departments/clinics, and therefore, it was imperative that these departments have protocols in place to safely triage these patients.³

As patients often assume that hospital emergency departments are the best places to be assessed for COVID-19, the primary goal of this narrative review is to highlight some of the key measures and protocols taken by Canadian emergency departments in preparation for receiving patients with COVID-19, knowing that emergency departments may be the first point of contact for these patients.⁴ Highlighting these measures has both intrinsic and extrinsic value. Intrinsicly, it may be beneficial to have a narrative that highlights and summarizes the

measures that were taken in Canada. This article could also aide emergency departments across Canada by streamlining the review process of COVID-19 safety protocols that were implemented by various departments during the pandemic, making these safety protocols easily reproducible if needed.

The extrinsic benefit being that this narrative may generate ideas for healthcare practitioners in other regions of the world, particularly if these interventions are later found to be effective. Lastly, if another pandemic occurs, the strategies utilized that are brought forward in this narrative review may be beneficial - similar to how the SARS pandemic strategies are being applied to the current COVID-19 pandemic.⁵

Methods

A widespread literature search was conducted using the PubMed database and Google Scholar for articles that were related to COVID-19 and Canada. The literature search was conducted between the months of January and February 2021. During the search, key words were used including "COVID-19," "SARS-CoV-2," "Canada," "Emergency Department," and "Screening." Studies published in English with text that were made fully available via the university login were screened for utilization. As it was important in this review to explain some of the history of the COVID-19 Pandemic, a minute amount of the manuscript contains articles that were published using key words such as "COVID-19," and "History." However, for the remainder of the narrative review articles published in 2020 or sooner were considered for use. The original search results revealed 142 records. Two authors then screened the studies to ensure that they were relevant to the narrative review and to ensure that there were no duplicates. Studies extracted from the search for this review included: exploratory multiple case studies, commentaries, differential equation analysis, and government reports.

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As the response to COVID-19 in the context of emergency departments in Canada has not been extensively studied yet, there was not a lot of large multi centers available. Following the screening, the authors identified 19 articles that were relevant and included. They are summarized in **Table 1** below.

Additionally, the scale for the quality assessment of narrative review articles (SANRA) instrument was considered and utilized during the preparation of this narrative review.

Table 1. Summary of articles included in the narrative review.

Authors	Country (Province)	Study Design	Study Period
World Health Organization	Global	Statement from WHO declaring global pandemic	Not applicable
Brondani et al.,	Canada	Narrative Review	April-July, 2020
Scarabel et al.,	Canada	Model-free Estimation	January-March, 2021
Lin et al.,	Ontario, Canada	Data Analysis of COVID-19 rates in Hospitals	January 20th – February 19th, 2020
Devine	Canada	Retrospective Analysis	February 2020
Glauser	Canada	Proposed Protocol to keep COVID-19 out of Hospitals	March, 2020
Reece et al.,	Alberta, Canada	Simulation Training with Quantitative Analysis	April-July, 2020
Rosenfield	Canada	Literature Review	July – August, 2020
Brittain et al.,	British-Columbia, Canada	Commentary	2020
Chaplin et al.,	Canada	Commentary	September, 2020
Marchand-Sénécal et al.,	Canada	Case-Study	November, 2020
Harris et al.,	Nova-Scotia, Canada	Educational Model	June, 2020
Ravani et al., 2020	Alberta, Canada	Prospective Quality-Improvement Study	April-May, 2020
COVID-19 Patient Screening Guidance Document	Ontario, Canada	Ministry of Health COVID-19 Patient Screening Guidance Document	June 11th, 2020
Eckbo et al.,	British-Columbia, Canada	Clinical Evaluation	June, 2020
Savage et al.,	Ontario, Canada	Differential Equation Analysis	September, 2020
Walsh et al.,	Ontario, Canada	Case Study	December, 2020
Fleet et al.,	Quebec, Canada	Exploratory Multiple Case Study	January, 2020
National Ambulatory Care Reporting System, 2018–2019 to 2020–2021 (open-year data), Canadian Institute for Health Information.	Canada	Report	March-June, 2020

Discussion

Virtual Care Received Prior to Emergency Department Presentation

Early-on during the COVID-19 pandemic in Canada, most people who were infected or had COVID-19 symptoms were instructed to present to the nearest emergency department.⁶ However, it was originally proposed that people suspected to have COVID-19 would be evaluated, swabbed, and examined in their homes by paramedics who had received special training and appropriate protective equipment to conduct these home evaluations.⁶ A good example of this home and virtual care delivery method was conducted in the province of British Columbia, specifically with the British Columbia Emergency Health Service (BCEHS). The BCEHS is the primary out of hospital health service for the province of British Columbia.⁷ Prior to the COVID-19 pandemic, the BCEHS had already cultivated therapeutic relationships with approximately 99 rural and remote communities within the province, that had limited access to healthcare.⁷ BCEHS was effectively providing virtual care for patients in these rural communities before the pandemic and continued to do so throughout. Additionally, BCEHS saw an increase in the number of home-visit requests.⁷ This strategy was originally proposed and utilized in order to limit the number of individuals presenting to the emergency departments for healthcare issues that could be managed appropriately and effectively at home, attempting to prevent the spread of the COVID-19 virus.⁶

Looking beyond paramedic services, some children's hospitals also implemented emergency department services via a virtual platform.⁸ Using a virtual platform consisted of providing pediatric patients with virtual same-day or next-day appointments for families at home seeking medical care but not wanting to risk being exposed or exposing others. The design of this new virtual platform also served as a template for other hospitals that wished to begin providing similar virtual care to patients. In order for these virtual platforms to be effective, emphasis needed to be placed on ensuring patient safety by: (1) instructing acutely ill or unstable patients to physically present to the emergency department, (2) by having qualified physicians available, and (3) by having access to user friendly technology for both the healthcare providers and the patients.

Although the impacts of the COVID-19 pandemic have not been fully explored or established, this strategy of home visits and delegating virtual visits to paramedics that are trained in community paramedicine may have been beneficial in keeping people at home and away from emergency departments, thus limiting the spread of COVID-19 amongst the remainder of the population.⁹ Additionally, it was hypothesized that these measures would save resources including personal protective equipment. It was believed that this would be an effective strategy as some evidence suggested that during the SARS pandemic, healthcare institutions in Canada acted as vectors involved in propagating the disease.⁶

Although it was suggested that pre-hospital and virtual visits would be an effective healthcare delivery method, it was inevitable that individuals who were asymptomatic or symptomatic would eventually present to the emergency department. As such, it is important to discuss the preparation that emergency departments took to ensure the safety of patients and hospital staff in attempting to prevent the spread of the COVID-19 virus.

Simulation Training

While the benefit of simulation training in the emergency department was believed to be of utmost importance in training hospital staff, it was also known that there would be some variations based off of local needs.¹⁰ However, there were some common themes that were identified early on in various emergency departments in Canada that included: (1) protocol development and system testing, (2) healthcare provider education, and (3) team-based training. The protocol development included the creation of novel pandemic-related protocols that were then utilized in simulations. An example of a new COVID-19

related protocol was one that involved an intubation checklist.¹⁰ This was particularly important as airway interventions such as intubations, are aerosol-generating procedures thus needed to be reconsidered and evaluated for their safety, as these procedures are commonly performed yet high-risk for exposure to the COVID-19 virus.¹¹ Additionally, the importance of team-based training and taking an interdisciplinary approach was highlighted. For example, it was believed that the intubation checklist protocol would be more effective and valuable if several members of the healthcare team could understand and implement it, rather than one team member being solely responsible.¹²

Patient Screening Upon Presentation to the Emergency Department

Screening healthy individuals for COVID-19 in Canadian emergency departments has demonstrated limited evidence.¹³ For example, the Ontario Ministry of Health provided emergency departments with a COVID-19 patient screening document that was created based off of the COVID-19 case definitions and situation reports that were published by the WHO. Typically, patients that presented to the emergency department were asked questions that provided a rapid screen for COVID-19. Screening questions enquired about foreign travel in the last 14-days, confirmed positive COVID-19 tests, symptoms such as fever, cough, and other symptoms that have been described in people infected with the COVID-19 virus.¹³ The screener would then follow the screening questionnaire to determine if a patient possessed either a negative COVID-19 screen or a positive screen.¹⁴ This system allowed the healthcare practitioners to take the proper precautions necessary in the emergency department in an attempt to ensure safety for patients and staff.¹⁴ In select emergency departments, anyone presenting to the emergency department was also tested for COVID-19 using nasopharyngeal or oropharyngeal swab samples.¹⁵ Although this protocol was implemented, its purpose was to evaluate the accuracy of nasopharyngeal and oropharyngeal swabs in COVID-19 detection, as opposed to the actual management of patients in the emergency department.¹⁵

Personal Protective Equipment and Precautions

In order to keep patients and staff safe and to reduce the spread of COVID-19, there was an acute demand globally in the amount of personal protective equipment (PPE) needed. Protocols were designed accordingly in order to preserve as much PPE as possible.¹⁶ If a patient was suspected of having COVID-19 symptoms and was being investigated in the emergency department, proper PPE was required before entering this patient's room. During the diagnosis of the first case of COVID-19 in Canada, PPE consisted of: (1) a long-sleeved gown, (2) gloves, (3) an N-95 respirator mask that had been properly fitted, and (4) a face shield for eye protection.¹⁶ Patient encounters were conducted by regular emergency department staff members including screeners, nurses, physicians and phlebotomists.

At the beginning of the pandemic in Ontario, January 23rd, 2020, further recommendations emphasised the use of N-95 respirators in addition to droplet precautions and airborne isolation rooms for patients that were being investigated for the COVID-19 virus. These precautions were deemed mandatory based off of previous information that Canada had acquired during the SARS epidemic in the year 2003.⁴

When reviewing the PPE that was used early in the pandemic within emergency departments, it is of note that this type of equipment and the precautions taken may not have been easily accessible in most outpatient clinics.⁴ This lack of PPE availability prevented suspected COVID-19 patients from being tested in outpatient clinics, thus promoting testing and evaluation to occur in emergency departments. It is also important to note that staff members in emergency departments were trained in donning and doffing PEE appropriately, which may not always be the case in outpatient clinics.

Other precautions that were utilized included limiting the amount of healthcare workers that came in contact with patients suspected of having the virus. Additionally, all healthcare workers who were in contact with suspected COVID-19 patients were logged, in order to keep an accurate record of potential exposures. Equipment that was needed for examining suspected patients such as blood pressure cuffs, thermometers, otoscopes, and stethoscopes were solely used for the patient under investigation and was not used for any other patient. Lastly, in an attempt to limit the amount of traffic in and out of exam rooms, patients were not allowed to have visitors.⁶

Once patients were discharged and left their room, cleaning of these rooms was done using 0.5% hydrogen peroxide. The rooms were cleaned twice, and an infection prevention and control professional audited the room cleanings to ensure thoroughness.¹⁶

Emergency Departments in a Rural Context

Depending on the definition that is used, approximately 19-30 percent of Canadians live in a rural setting.⁷ It has been chronically documented that Canadians who live in a rural setting face disproportionate health burdens and needs.¹⁷ The specific needs of rural emergency departments in Canada may vary between provinces and territories however, most are faced with similar challenges. Examples of the challenges face by rural communities include but are not limited to, access to primary healthcare services, lower income, unhealthy lifestyles, less education, isolation and higher mortality rates. Rural emergency departments are faced with the difficult and complex task of providing accessible and quality care for these communities while being distant from larger referral centers. Unfortunately, these isolated rural departments struggle with recruiting and retaining staff, and often have limited access to medical equipment and resources needed to provide comprehensive care in rural communities.¹⁸ As a result, it had been suggested that rural populations would face a disproportionate amount of disadvantages with COVID-19, versus Canadians living in urban settings.¹⁷ This was largely attributed to the fact that rural Canadians generally have worse health status, leading to an increase in Intensive Care Unit (ICU) admissions and increase mortality compared to urban populations.¹⁷ An example of the protocols developed by a Canadian rural emergency department during the COVID-19 pandemic are outlined below.

Located in the rural region of Greater Napanee, Ontario, the Lennox and Addington County General Hospital (LACGH) took the following measures in an attempt to keep the COVID-19 cases at bay.¹⁷ The first approach that was taken by this rural hospital was the establishment of an incident command team. The command team originally met daily to exchange ideas and come up with solutions to prevent the spread of COVID-19 in the emergency department and hospital.¹⁷ This team consisted of various employees including the chief of staff, nursing officer, and frontline workers.

The LACGH decided that it would close all doorways to the public with the exception of the emergency department doors. They also decided to post signs in the parking lot stating that people should only proceed if they were experiencing a "serious medical emergency." Lastly, they ensured that the emergency department was adequately supplied with PPE for staff.

Other changes included protocols for registering and triaging patients safely, and even providing care via telephone whenever possible. Physically, a negative pressure room served as a resuscitation room so that airway management (if need be) could be conducted as safely as possible. Lastly, a dedicated Code Blue team was established for possible COVID-19 cases and the team participated in frequent simulations and debriefs.

Limitations

As this is a narrative review, it possesses limitations that are typical for this type of article (i.e., does not answer a specific quantitative research question). However, the SANRA tool was utilized to ensure that proper rigor for a narrative review was maintained. When assessing the specific limitations of this narrative review the most important thing to consider is that during the writing of this article the COVID-19 global pandemic is ongoing. As a result, it is not possible to evaluate the interventions that have been mentioned and their efficacy (i.e., did these interventions and measures work) in the context of emergency departments in Canada. However, once studies evaluate these interventions it may be ideal to complete a follow-up or additional narrative review.

General Summary

After having conducted this review, the authors have not been able to find a narrative review that details the response and reaction of Canadian emergency departments to the COVID-19 pandemic. The purpose of this narrative review was to outline the pan-Canadian steps undertaken in emergency departments across Canada during the first year of the COVID-19 pandemic. Literature suggest that the initial strategy was to include home and virtual visits for patients that may have had symptoms, however, were not critically ill enough to seek care from an emergency department or tertiary center.

Of note, there was a movement in the pandemic's infancy attempting to steer patients away from the emergency department, while not sacrificing the care of patients in need. The initial fear was that overcrowded emergency departments would act as vectors, spreading the virus and endangering patients and staff. People were urged to stay at home and limit their contact with others by governments across Canada, while health care professionals limited patient encounters to urgent and needed treatments.¹⁹ The Canadian Institute for Health Information released information regarding changes in emergency department visit numbers from early in the pandemic. The stay-at-home orders from the Canadian government seemed to be effective as rates of emergency department visits in Canada started to decline in March 2020, reaching a low of 50% compared to March 2019. The rates slowly started to climb but were still low at 85% in June, months after the start of the pandemic. Fewer people sought care for common concerns such as abdominal care and even more serious concerns like cardiac events and traumas. Unfortunately, the potential consequences of emergency department avoidance by patients are not known as per The Canadian Institute for Health Information.¹⁹

However, emergency departments understood that symptomatic patients would inevitably present for care. In preparation for this influx

of COVID-19 patients, emergency department staff prepared themselves by participating in several simulation sessions. These simulations identified strengths and weaknesses within the department, which lead to protocol development, healthcare provider education, and emphasized the importance of a team-based approach.^{13,14} These developments lead to better patient care while ensuring constant safety.

Once patients did present to the emergency department, they were screened prior to entering. Patient screening was useful in identifying those that were high risk for COVID-19. Screeners asked patients questions related to travel and asked if they had been experiencing any symptoms. This allowed healthcare practitioners to take necessary precautions while assessing these patients.^{13,14} Such precautions involved the use of appropriate PPE, limiting the number of contacts that a suspected COVID-19 patient had, and appropriate cleaning of patient rooms once the patient had been discharged from the emergency department.¹⁶

Canada has a large percentage of its citizens living in rural settings making it important for the emergency departments serving these rural regions to be prepared and have appropriate protocols in place to assess COVID-19 patients, as rural populations are more vulnerable than their non-rural counterparts. These protocols included having a single door for access to the entire hospital via the emergency department, actively encouraging community members to avoid emergency departments for non-urgent services, creating an incident command team, and having a dedicated code blue team.¹⁷

It will be interesting to reflect on the various interventions that were implemented across Canadian emergency department and to evaluate their effectiveness following the fruition of the COVID-19 pandemic. Intrinsically, there may be lessons to be learned from the response within Canada. Extrinsically, there may be takeaways that other areas with similar infrastructure and populations (i.e., rural) may consider implementing.

Conclusion

The protocols designed and utilized by various Canadian emergency departments are important to document and analyze despite not yet knowing the full scope of their effectiveness, as they could be the foundation for future research and could be beneficial if a similar situation manifested in the future.

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