COVID-19 in Long-Term Care: A Two-Part Commentary

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COVID-19: coronavirus disease 2019
LTC: long-term care

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Part One: Examining the Definition of Disaster

The coronavirus disease 2019 (COVID-19) pandemic has had a major impact on health, economic, political, and social systems, exacerbated existing inequity, stretched systems to the point of failure, and exposed vulnerabilities globally. We will present a case study of COVID-19's impact in long-term care (LTC) in Canada's most populous province, Ontario. Originally, COVID-19 in LTC was called a crisis by politicians and mainstream media, but the situation and response were comparable to major disasters and wartime. Governments, health systems, and emergency agencies have disaster preparedness plans, however COVD-19's size and duration exposed the limits of these plans. This paper is the first of a two-part commentary that will begin by demonstrating that COVID-19 in LTC meets the definition of disaster by examining existing definitions and comparing COVID-19 in LTC to other disasters. The second paper will apply the case study of COVID-19 in LTC to a disaster framework to identify key contributing factors. The rationale of this discussion is to learn lessons from the experience of COVID-19 in LTC by expanding our perspective of what is a disaster, while identifying what factors contributed, in order to improve preparedness for all types of disaster.

The word "disaster" comes from the Greek word "dis" meaning bad or ill-favored, and "aster" meaning star.[1] This coincides with the belief that disasters were from an external force, and the Judeo-Christian view as an "act of God,"[2] which frames disasters as: "tragic situations over which persons, groups, or communities have no control – situations which are imposed by an outside force too great to resist."[3(p733)] However, more recently, perspectives related to the definition have shifted from event-centric to human-centric;[4] a complex interaction of environment and human agency,[5] and social phenomena – as Stallings stated: "'Social' separates disasters from tragedies that befall individuals or small groups such as a family. Disasters are collective in nature."[6(p263)] Thus, the focus of disaster theory has expanded from the "what" hazard that could impact a community - or event that has occurred - to the "how" and "why" it could or did impact a community.

The definition continues to evolve, shifting with dominant socio-political forces.[7–9] Similarities can be found in contemporary definitions and systems of classification. The International Federation of the Red Cross and Red Crescent Societies (Geneva, Switzerland) defines disaster as: "... serious disruptions to the functioning of a community that exceed its capacity to cope using its own resources. Disasters can be caused by natural,

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Figure 1. Interpretive Theory of Disaster.

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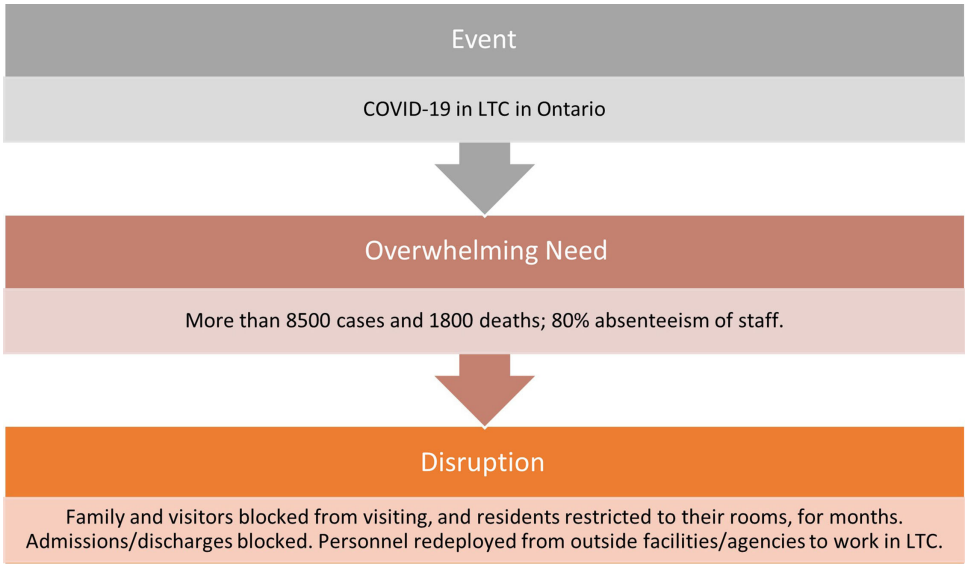

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Figure 2. COVID-19 in LTC Applied to Interpretive Theory of Disaster.
Abbreviations: COVID-19, coronavirus disease 2019; LTC, long-term care.

Event	Nursing Home Fire	Barrie Tornado	Twin-Engine Plane Crash	SARS Epidemic	COVID-19 in LTC
Year	1980	1985	1989	2002 -2003	2020 – 2021
Location	Mississauga	Barrie	Dryden	Toronto	LTCs across Ontario
Persons Ill/Injured (Deaths)	35 (21)	200 (12)	45 (24)	208 (43)	8,500 (1,800)

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Table 1. Comparison of COVID-19 and Select Disasters in Ontario
Note: CRED Online Database, Ontario, 1973 – Present.[13]
Abbreviations: SARS, severe acute respiratory syndrome; COVID-19, coronavirus disease 2019; LTC, long-term care.

man-made, and technological hazards, as well as various factors that influence the exposure and vulnerability of a community."[10] The United Nations Environmental Program (Nairobi, Kenya) and Centre for Research on Epidemiology of Disasters (CRED; Brussels, Belgium) list four criteria: "ten or more people reported killed; 100 people reported affected; a call for international assistance; and declaration of a state of emergency."[11(p707)] Kim and Sohn identify two commonalities in their review of contemporary definitions of disaster: "(1) Disaster is triggered by external factors of natural phenomenon, lack of technology, terror, etc.; [and] (2) Disaster means a condition where the damage cannot be overcome without national or external assistance due to lack of capacity or resources of the damaged community or local/state governments."[2(p27)] These definitions are important to clarify what is considered a disaster, providing the foundation for conceptualizing disaster. For the purposes of this paper, these definitions were distilled into an interpretive theory that helps to unpack the basic elements that constitute a disaster (Figure 1).

When an event creates an overwhelming impact on a community or communities resulting in wholesale disruption of societal functions that cannot be reset without serious and sustained external assistance, it is a disaster. The *event* needs to be a specific, identifiable, external force exerted on a community. This external force must be significant enough to overwhelm local ability to cope. The overwhelming inability to cope with local resources must result in serious societal disruption that includes but is not limited to impacting human health and well-being. This suggests a complex interaction between the environment and human agency resulting in disastrous outcomes.[4–6] We apply this theory to the case-study of COVID-19 in LTC to demonstrate its relevance to the disaster literature (Figure 2).

The COVID-19 pandemic is a global event that has impacted all aspects of society. Although COVID-19 caused harm in many communities, the case study of COVID-19 in LTC was chosen for discussion because of comparability with other disasters, including its disproportionate impact and subsequent response by government. Figure 2 demonstrates how we believe contemporary criteria and definitions of disaster can be applied to COVID-19's impact in LTC in Ontario;[12,13] the "event" of COVID-19's emergence and subsequent transmission in LTC caused an overwhelming "need" due to the number of outbreaks and deaths, which resulted in disruption of restrictive measures to contain the virus and mobilization of external support.

Further, Table 1 compares COVID-19 in LTC with examples of disasters experienced in Ontario over the past 50 years.

Previously, LTC in Ontario had experienced significant issues for over two decades that were exacerbated into a sector-wide crisis for LTC in Ontario.[14] Approximately 34% of homes experienced outbreaks in the first-wave, with over 8,500 COVID-19 cases, 1,800 deaths,[15] and critical staff shortages of up to 80% absenteeism in some facilities.[16] In response to the worsening situation in LTC, the Ontario government requested external

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support, and enacted emergency legislation that allowed the re-deployment of staff and transfer of 35 LTC home management to local acute care hospitals. Personnel were also deployed into LTC from the Canadian military and the Canadian Red Cross Society. The response was unprecedented. Although the Red Cross and military have been deployed to support communities in the past, previous responses had not occurred for the duration – weeks to months – or large geographic area – across southern Ontario. Moreover, the number of hospitals that supported the operation of LTC homes and re-deployed staff has also not previously been seen.

There is no question that COVID-19's impact in LTC met the definition of disaster. However, the geographically dispersed, protracted, sector-specific disaster that was COVID-19 in LTC is also not the "typical" disaster that governments and emergency organizations prepare for. Further, legacy challenges and the lack of preparedness undoubtedly set LTC up for failure. Hence, to learn from this experience, if we are to prepare for the next disaster, we first need to reflect on disasters of past, including those that may not have received their full credence, such as the impact of infectious diseases on communities. Now that we have recognized the impact of COVID-19 in LTC as a disaster, we can use existing theory to dissect the phenomenon and compare it with other disasters. In the second part of this commentary, we will use a disaster framework to identify what contributed to the disaster of COVID-19 in LTC and where we can start in preparing for future disasters.

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Part Two: Implications of Applying a Disaster Framework

Introduction

Coronavirus disease 2019 (COVID-19) had a devastating impact on long-term care (LTC) across the globe.[1] Despite the marked difference between COVID-19 in LTC and other disasters (ie, hurricane, earthquake, or terrorist act), there exist comparable elements to be explored. This paper is the second of a two-part commentary; the authors previously demonstrated that the case study of COVID-19 in LTC met the definition of disaster by examining existing definitions of disaster and comparing it with past disasters to demonstrate its relevance to disaster research. This paper will further discussion by applying a disaster framework to the case study of COVID-19 in LTC for thorough analysis of which variables contributed to the disaster and where to start to improve preparedness and response. The World Association for Disaster and Emergency Medicine's (WADEM; Madison, Wisconsin USA) Conceptual Framework for Disaster[2] was selected as an "all hazard" framework that illustrates the connection between nine variables that contribute to a disaster (Table 2).

Hazard

The emergence of the novel COVID-19 was the *hazard* to LTC populations. In contrast to a finite hazard, such as natural disasters of a hurricane or earthquake, or human-caused such as a terrorist act, COVID-19's ability to evolve and evade detection made it pervasive and repeatedly impacted populations. Despite existing issues in LTC, COVID-19 represents the proximal, or direct cause of the disaster in LTC.

Prevention

Prevention of COVID-19 in LTC would require the elimination of the hazard, COVID-19. However, since preventing the emergence of novel disease is not currently plausible, the next level of prevention could be considered vaccination: preventing the hazard from becoming an event by reducing transmission, which could gradually lead to eliminating the hazard – as seen with other vaccine preventable diseases, such as Diphtheria, Meningitis, and Smallpox. Although vaccines did become available - like other communicable diseases - evolving variants and vaccination rates stymied efforts to control the virus. Facility-level prevention measures also include existing infection-control practices to prevent infectious diseases (hazards) from becoming outbreaks (events).

Modification

Measures to reduce transmission existed at all levels. Within Ontario's LTC sector, the province had existing requirements for reporting outbreaks, stock-piling resources, and pandemic plans.

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Variable	Definition
Hazard	Anything that may cause a danger; a natural or type-specific man-made phenomenon that has the potential to adversely affect human health, property, activity, and/or environment.
Prevention	[. . .] approaches or measures taken to ensure human actions or natural phenomenon DO NOT cause or result in an event related to [. . .] a hazard.
Modification	Changing the risk that an event will occur or the magnitude or frequency of the event when it occurs.
Risk	The probability that an event related to a specific hazard will occur.
Event	An occurrence negatively influencing living beings and/or their environment.
Impact	The action of one force coming in contact with another body.
Vulnerability	Susceptibility of the population or environment to the [. . .] event.
Resilience	[Population/environment's] pliability, flexibility, or elasticity to absorb the event.
Damage	The destruction and injuries resulting from the event.

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Table 2. Disaster Variables: WADEM Conceptual Framework of Disaster[2]

However, these measures were found to not be complied with or monitored; further, untested measures were inadequate for the risk COVID-19.[3] Although modifications to existing measures were taken as the pandemic progressed – including mandatory masking and testing, restricting access to LTC facilities, re-deployment of personnel, and additional funding for increased staffing and supplies – these measures were seen as too little, too late. The inadequacy of these modifications represents distal, or indirect cause that contributed to the disaster in LTC.

Risk

Early in the pandemic, reports indicated the heightened risk of COVID-19 in congregate settings such as LTC; this was in-part due to an older and medically compromised population, with outdated designs of many facilities, with shared bedrooms and common areas, made disease transmission a formidable challenge to mitigate.[4] Although COVID-19 was not initially recognized as a threat to the local population, it was recognized globally that congregate settings were at a heightened risk.

Event

COVID-19's local transmission was the *event*, with first cases declared in Ontario LTC homes in January 2020.[5] Events are characterized by their *onset* – either sudden, gradual, slow, or delayed – and *duration* – brief, short, intermediate, or prolonged.[2] Although the onset of COVID-19 in LTC would be characterized as a slow-onset of weeks to months, individual case transmission was gradual, occurring over days and weeks. Further, the evolving variants and lack of vaccines, LTC homes experienced multiple waves of COVID-19 and re-infection of residents; therefore, the *slow onset* of COVID-19 caused a prolonged duration of multiple "events" over more than a two-year period.

Impact

COVID-19 had an overt impact on the health of residents and staff in LTC. However, impacts on staffing and restrictions also had significant indirect consequences on residents and staff; these consequences included: poor resident mental health due to isolation, impaired physical health due to inadequate care from severe staffing shortages, and poor staff mental health from moral injury and trauma.[6–8] Lastly, the emotional impact on families and friends locked-out from seeing their loves ones should not be under-stated.[9,10]

Vulnerability

Vulnerability is described as dependent of resilience – with greater resilience, a community's vulnerability to a hazard is reduced. The natural vulnerability was the health status of LTC residents, including comorbidities, age, and cognitive impairment complicating isolation practices.[11] Meanwhile, the augmented (human-caused) vulnerability, included shared rooms (ie, close proximity), communal activities, and existing issues in LTC pre-dating the pandemic,[3] represents additional distal causes that contributed to the "perfect storm" for COVID-19 to become a disaster. However, there was variation, as for-profit, chain ownership with older designed homes experienced larger outbreaks and deaths, than compared with non-profit, municipally-run, and newer designed home.[12,13]

Resilience

Resilience is described as: (1) absorbing capacity, (2) buffering capacity, and (3) response from the event.[2] Absorbing capacity is both the natural resilience of society and environment, as well as surplus available goods and services. Existing issues of insufficient funding, staffing, and aging infrastructure increased the sector's vulnerability while decreasing resilience. Institutional knowledge garnered from annual influenza and the experience of SARS helped prepare some facilities.[3] However, legacy issues in LTC disadvantaged the sector's ability to manage the novel virus, while the pandemic's prolonged duration quickly diminished the little existing resources.[14,15] The last aspect of resilience – the response – saw implementation of restrictive measures from government to reduce the risk of COVID-19 entering LTC, followed by the deployment of external support from acute care hospitals, the military, and Canadian Red Cross. Later, LTC residents and staff were prioritized for vaccination when they became available in the province. As the authors note, however, response measures may also have a negative impact – as was seen with restricting front-line personnel to working at one facility and locking out family from LTC homes, hindering both the physical and psychosocial care residents received.[14]

Damage

The direct damage from COVID-19 in LTC in Ontario during the first wave, March 2020 to August 2020, included over 8,500 resident cases and over 1,800 deaths.[15] Other indirect effects that have been identified include decreased mental health outcomes of residents, greater number of falls and use of psychotropic medications for residents,[16] and Canadian population's mistrust of LTC.[17] Although LTC experienced the brunt of COVID-19 during the initial waves, COVID-19 continues to actively impact LTC and challenges efforts to recover.

Discussion

Originally, LTC was experiencing crisis prior to the emergence of COVID-19, with inadequate staffing and outdated infrastructure of many facilities,[3,14] leaving it sorely unprepared for the emergence of COVID-19. While governments, public health systems, and

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emergency response agencies were left unprepared to respond when alarm bells rang over the state of LTC. The arrival of the highly transmissible novel virus was the proximal, or direct cause of the disaster, however decades of policy decisions that neglected LTC represent a confluence of distal, or indirect factors contributing to the disaster. The framework's application demonstrates what contributed to and hindered the response. Further, the framework provides a means by which variables can be compared in LTC with other disasters.

Parallels can be drawn between distal factors of the disaster in LTC and natural disasters; for example, a community with poor housing standards and infrastructure is likely to experience greater devastation from a natural disaster than a community with improved housing and infrastructure. Susceptibility makes a population more vulnerable to a hazard, and vulnerability is dependent on a population's resilience. Thus, existing inadequate staffing, resources, and infrastructure left LTC vulnerable to the devastating damage of COVID-19. Recommended *modifications* of addressing the existing crisis and updating LTC infrastructure would reduce vulnerability, while improving and testing preparedness plan and training would improve resilience.[3] Further, managers from acute care facilities who deployed into LTC identified the lack of knowledge and resource sharing between LTC and the acute care system, which could have helped LTC more effectively cope in the early waves of the pandemic. Some regional health organizations have since taken lessons from the pandemic and developed local networks with LTC facilities in a "hub and spoke" model for information sharing, knowledge translation, and risk management. Government has made commitments to address some of these issues through increased levels of care, incentives to update facilities, and national LTC standards; however, it is still to be seen if emerging issues do not distract public support from these commitments being followed through.

Conclusion

The experience of COVID-19 in LTC fulfills all the conditions that define a disaster and demonstrates the importance of government policy to take a broader view of disaster to effectively allocate resources. Further, the framework's application provides an opportunity to dissect the disaster and identify key distal factors that impacted LTC's vulnerability and resilience to COVID-19 in LTC. Disaster preparedness and response systems exist to address "typical" natural and infrastructure disasters such as tornadoes, floods, and train derailments; however, we were sorely unprepared for the disaster in LTC. Recognition of an infectious disease's potential for a disaster would have improved preparedness of facilities and allowed for a more coordinated and systematic response of the government and other agencies. The key contributing factors identified in this paper represent a starting point for health system strengthening and pandemic planning, so that future generations are not analyzing their own "health system disaster."

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