

Foodservice Emergency Preparedness in Canadian Long-Term Care

by

Juliana Maria Santos Pezzi Dullius

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ABSTRACT

Introduction: Food provision is vital for meeting the daily nutritional needs of long-term care (LTC) home residents and ensuring nutrition continuity during emergencies, such as natural disasters and infectious disease outbreaks. These events can disrupt foodservice operations in distinct ways, increasing vulnerability and potentially compromising the overall resilience of the home. Therefore, assessing Canadian LTC foodservice preparedness is essential to safeguard residents' nutritional health and mitigate operational burdens during emergencies. **Objectives:** This exploratory and descriptive study assessed self-reported emergency preparedness procedures and operational practices among a multi-provincial sample of Canadian LTC foodservice professionals during natural disasters and outbreaks. **Methods:** A cross-sectional online survey was conducted among LTC foodservice professionals across Canada. The 55-question survey explored respondent demographics, facility characteristics, previous emergency experiences, and components of preparedness. Data were analyzed using descriptive statistics and Fisher's exact test. **Results:** A total of 84 participants were included. Most respondents reported having emergency measures in place, such as contingency menus and staff guidelines. Staffing shortages and the need for menu modifications were common challenges in both scenarios, while natural disasters introduced unique barriers like food supply shortages and utility disruptions. Outbreak training for staff was provided by 62% of respondents, compared to 52% for natural disasters, and 71% rated their operations as prepared for outbreaks versus 63% for natural disasters. Having a plan for outbreaks was associated with providing emergency training to staff ($p = 0.003$) and perceived preparedness ($p = 0.043$). **Conclusion:** While participating LTC foodservice professionals indicated basic readiness for outbreaks, their reports suggested that notable gaps remain regarding natural disaster preparedness. Developing comprehensive emergency plans

and implementing targeted staff training are important steps to help address these gaps, maintain nutrition continuity, and safeguard resident safety during future emergencies.

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LIST OF ABBREVIATIONS

EFP	Emergency Foodservice Preparedness
LTC	Long-Term Care
PHAC	Public Health Agency of Canada
RD	Registered Dietitian
U.S.	United States
WRHA	Winnipeg Regional Health Authority

CHAPTER 1: INTRODUCTION

Overview

The population of older adults in Canada is increasing rapidly. Currently, 19.5% of Canadians are aged 65 years or older (Statistics Canada, 2022b, 2024). As people age and their ability to perform daily activities independently declines, many transition from private to collective dwellings to receive ongoing care services (Statistics Canada, 2011). One type of collective dwelling that provides 24-hour care for its residents is long-term care (LTC) homes, also known as nursing homes. In 2021, approximately 2.5% of individuals aged 65 to 79 and 11% of individuals aged 80 and older lived in LTC homes (Statistics Canada, 2025). As these figures are projected to rise in the coming years, it is essential to address the unique challenges faced by LTC homes and their residents, particularly during emergencies. For the purposes of this study, emergencies are defined as natural disasters (e.g., floods, wildfires, and extreme weather events) and infectious disease outbreaks, including pandemics.

Older adults living in LTC homes are among the most vulnerable groups during emergencies. They are particularly susceptible to poor food and fluid intake, which can increase morbidity and mortality, as well as significantly impact quality of life. Due to advanced age, frailty, and complex care needs, many older adults have difficulty with mobility, sensory response, chronic health conditions, and cognitive impairments, all of which can worsen their response to emergencies (Wakui et al., 2017). These factors, combined with their high dependency on staff for care, contribute to the LTC population experiencing higher disaster-related risks (Dosa et al., 2008).

In recent years, Canada has experienced various natural disasters, highlighting the effects of climate change. Examples include the 2013 floods in southern Alberta, the 2016 Fort

McMurray wildfire (Bush & Lemmen, 2019), and more recently the wildfire season in 2023, which lasted seven months (Public Health Agency of Canada, 2020). These recent events align with mid-century projections from Canada's Changing Climate Report (2019), which indicates an increased risk of future wildfires, droughts, and floods across the country due to changes in extreme temperature and precipitation patterns (Bush & Lemmen, 2019). These projections underscore the urgent need for community and institutional-level preparedness and resilience planning, particularly for facilities located in disaster-prone regions.

Another area of concern in LTC homes is the high risk of outbreaks within these settings. These environments, which are characterized by shared living spaces and close contact between residents and staff, make LTC homes particularly susceptible to the transmission of respiratory and gastrointestinal infections (Leece et al., 2023). Residents are especially prone to poor outcomes following infections and this increased vulnerability is largely due to their compromised health and weakened immune systems (Leece et al., 2023). The COVID-19 pandemic exposed critical gaps in the Canadian healthcare system. Notably, more than 80% of the deaths related to the virus during the first wave occurred in LTC homes (CIHI, 2020b), highlighting the urgent need for targeted outbreak preparedness in these facilities.

Foodservice operations provide essential services inside LTC homes. Adequate nutrition is essential for maintaining physiological functions, bolstering immune responses, and providing energy, particularly important during periods of increased stress, such as outbreaks and natural disasters. Therefore, LTC homes must have enough preparedness to adapt their foodservice systems to ensure residents receive safe and adequate nutrition during disruptions. Such preparedness may include having a food contingency plan, supply of non-perishable food for some days, plans for adaptation of dining room services, and supply chain contingencies.

Additionally, foodservice operations must secure food safety by preventing contamination due to the spread of biological and physical hazards, which can pose an additional risk of injury (Sadler, 2023).

The research literature on emergency foodservice preparedness in Canadian LTC homes is limited. To our knowledge, widely recognized, standardized resources specific to LTC foodservice preparedness remain scarce, leaving a notable gap in addressing this aspect of emergency planning. The most recent resource available is the 2007 “Emergency Food Service: Planning for Disasters”, developed by the Public Health Agency of Canada (PHAC) and tailored for foodservice professionals (PHAC, 2007). While this manual provides general guidelines for disaster planning, it is not LTC-specific and does not address outbreak situations. Due to the diverse governance of LTC homes across Canada, food and nutrition standards can significantly vary between provinces (Brauer et al., 2022). Considering these limitations, the purpose of this thesis was to explore the reported state of emergency preparedness for outbreaks and natural disasters within LTC foodservices across several Canadian provinces.

Research Objective

1. Assess the self-reported emergency preparedness procedures and practices within a sample of Canadian LTC foodservice professionals during outbreaks and natural disasters.

Research Questions

1. How have foodservice departments in LTC homes responded to emergencies including natural disasters and outbreaks?
2. What challenges do foodservice departments experience in response to these events?

3. What procedures and practices do foodservice departments in LTC homes have in place to respond to these events?
4. How often are emergency procedures and practices updated?
5. How often do staff receive training on foodservice emergency preparedness?

Significance of Research

Many LTC foodservice operations may face challenges in preparedness for these emergencies, which can place a significant burden on staff and residents. The general lack of targeted information potentially leaves facilities at risk of adverse outcomes due to potential inadequate preparation. Therefore, it is imperative to investigate the current state of foodservice preparedness as reported by LTC professionals across Canada and develop robust resources to respond effectively and efficiently, ensuring the health and safety of residents and mitigating stress and burden on LTC staff and residents.

Findings from this study aim to contribute to the literature about foodservice emergency preparedness in LTC homes in Canada, potentially helping to inform future policy development to support more consistent practices, as well as enhance foodservice emergency responsiveness for residents within these homes.

Chapter Summary

This thesis is structured as a paper-based manuscript and includes the following chapters:

- Chapter 2 - Provides a comprehensive summary of the literature.
- Chapter 3 - Outlines the methodology employed in this research.
- Chapter 4 - Presents the first manuscript titled “Long-Term Care Foodservice in Canada – Emergency Preparedness for Natural Disasters”.

- Chapter 5 - Presents the second manuscript titled “Long-Term Care Foodservice in Canada – Emergency Preparedness for Outbreaks”.
- Chapter 6 - Provides a general discussion of the main study findings and a final summary.

Contributions of Authors

Dr. Christina Lengyel (CL) was responsible for the study’s conceptualization, design, and funding acquisition. Juliana Dullius (JD) completed the ethics protocol, survey development (with initial drafts provided by CL), methodology refinement (in collaboration with CL), data collection and analysis, and interpretation under the supervision of CL. JD prepared the original draft of the manuscripts, which were reviewed and revised by CL, with additional feedback provided by advisory committee members, Dr. Natalie Riediger and Dr. Genevieve Thompson.

CHAPTER 2: LITERATURE REVIEW

The Context of LTC in Canada

Older Adults in Canada

In Canada, older adults are defined as those aged 65 and older (Government of Canada, 2023). They can also be classified into different subgroups, like youngest-old (65-74 years), middle-old (75-84 years), and oldest-old (over 85 years) (Alterovitz & Mendelsohn, 2013; Lee et al., 2018). Canada's older adult population is growing rapidly with 19.5% of people aged 65 years of age and older (Statistics Canada, 2024) and it is expected to reach approximately 21.6% by 2030 when the youngest baby boomers will be 65 years old (Statistics Canada, 2021). Among those aged 85 and older, projections indicate a rapid increase, especially from 2031 to 2050, when the baby-boom generation enters this age range (Statistics Canada, 2021).

Long-Term Care Homes

Long-Term Care (LTC) homes are care facilities that provide 24-hour care and accommodation including nursing care, personal care, and support and health services for people with medical or physical needs. These homes are also referred to as nursing homes, continuing care facilities, and personal care homes, due to their similar characteristics (CIHI, 2021). The services provided include meals, assistance with daily living activities such as bathing and dressing, housekeeping and laundry, medication assistance, and others (Government of Canada, 2022). Most residents of LTC homes are older adults, with the majority being older than 85, however, these facilities also accommodate a small proportion of residents younger than 65 (CIHI, 2023). In 2020, there were 474,000 residents in LTC homes across Canada, reflecting a national trend in which approximately 7.9% of older Canadians reside in residential care

facilities (Public Health Agency of Canada, 2020). This substantial population highlights the extensive reliance on these facilities for care.

LTC homes in Canada can be publicly or privately owned, and they may operate on a for-profit or not-for-profit basis. In 2021, there were 2,076 LTC homes across the country, with 46% being publicly owned and 54% privately owned (CIHI, 2021). These homes are regulated by provincial and territorial standards, which results in various funding and licensing methods (Brauer et al., 2022; Government of Canada, 2022a). Evidence suggests that not-for-profit homes generally provide higher quality care more consistently compared to for-profit homes (Comondore et al., 2009).

Resident Vulnerabilities during Emergencies in LTC

Emergencies are situations that pose immediate threats to health, life, or property, requiring urgent action to prevent further harm (Public Safety Canada, 2012). Disasters, on the other hand, are large-scale events that cause widespread disruption, leading to significant loss of life and property damage (WHO, 2020). In the context of this study, the term emergencies refers specifically to natural disasters, such as floods, wildfires, and extreme weather events, and infectious disease outbreaks, including pandemics. While emergencies can affect any population, LTC homes face unique challenges due to the vulnerability of their residents.

Given the level of care provided in LTC homes, the majority of residents have significant physical and cognitive difficulties, including frailty (Canadian Institute for Health Information, 2026). Physical frailty, as defined by the 2013 Frailty Consensus, is “a medical syndrome with multiple causes and contributors that is characterized by diminished strength, endurance, and reduced physiologic function that increases an individual’s vulnerability for developing increased dependency and/or death” (Morley et al., 2013). Being older does not necessarily make an

individual vulnerable; rather, it is the combination of aging and the increased likelihood of having special needs that contributes to frailty (Fernandez et al., 2002).

LTC residents frequently present multiple chronic conditions, physical limitations, or cognitive impairments that can complicate their ability to respond to emergencies. They frequently depend on staff for essential care, including assistance with activities of daily living such as eating, bathing, or moving around the facility (Dosa et al., 2008). In the event of a crisis, impairments such as reduced mobility, limited sensory awareness, and cognitive decline can restrict or even worsen, their response (Wakui et al., 2017).

Regarding physical limitations, residents with mobility difficulties may struggle to follow recommended self-protective actions like moving from one place to another or leaving a building by themselves, due to reduced speed and agility (Eldar, 1991). When it comes to diminished sensory awareness, residents with impaired vision or hearing may not have the capability to receive and perceive alerts and instructions (Eldar, 1991). Regarding those with mental disabilities, such as dementia and Alzheimer's disease, they usually rely on staff assistance to help them evaluate the severity of the ongoing situation and determine their next step (Wakui et al., 2017).

Between 2015 and 2016, 87% of residents in Canadian LTC homes had some form of cognitive impairment, which includes dementia as well as other conditions such as stroke or trauma. Among these residents, 69% were diagnosed with dementia (CIHI, n.d.). Dementia is characterized by various signs and symptoms, along with a decline in cognitive functions that impact daily activities. Symptoms include memory loss, difficulty with judgement and reasoning, and changes in behavior, mood and communication abilities (Government of Canada, 2017).

This condition may compromise residents' ability to comprehend emergency instructions and recognize dangerous situations.

There are unique challenges faced by LTC homes and their residents, especially in emergencies such as natural disasters and outbreaks. In the event of an emergency, the administration of a LTC home may need to decide between evacuating residents or sheltering in place as part of the response. According to WHO (2020), evacuating involves temporarily relocating residents to a safe location before, during, or after a disaster. In contrast, sheltering in place means that residents remain in a secure environment. Both strategies can present considerable challenges to the well-being of LTC residents.

An evacuation procedure may accelerate a rapid decline in the general health status of older residents with frailty, severe cognitive impairment or in palliative care (Dosa et al., 2008). Dosa et al. (2008) argue that probably there are inherent morbidity and mortality associated with evacuation that often occurs in the weeks following evacuation, increasing residents' hospitalization and worsening comorbidities. For an example, a study investigating the effects of evacuation on residents with severe dementia during Hurricane Gustav in the United States (U.S.) in 2008 found that they were at an increased risk of death up to 90 days after moving (Brown et al., 2012).

Furthermore, evacuation procedures may present logistical challenges, particularly regarding the transportation of frail residents. This highly complex, time-consuming, and costly process also involves moving medical equipment and essential supplies, such as medications, food, and water, to maintain residents' care (Dosa et al., 2008). However, overlooking these essential provisions can lead to critical outcomes, as observed by Hasegawa et al. (2016), who

reported a considerable number of fatalities resulting from the disruption of daily medical care and prolonged deprivation of food and water during unassisted bus evacuations.

When sheltering in place during emergencies, several challenges can arise that can significantly impact the safety and well-being of residents. For instance, nursing homes that serve as shelters during storms often see a sudden influx of people, including both residents and community-dwelling older adults, as well as family members and staff. The increase in the number of people looking for shelter dramatically raises the demand for essential supplies such as food and water, as well as sleeping areas (Dosa et al., 2008). Additionally, during these situations, LTC homes may face an increased risk of disease transmission and potential shortages of medications and other essential resources.

Disruptions to LTC Stability

Natural Disasters and Climate Change

Climate change refers to long-term shifts in temperature and weather patterns that have been greatly linked to human activities, such as fossil fuel combustion, deforestation, and industrial processes that emit greenhouse gases, like carbon dioxide (Bush & Lemmen, 2019). These changes have led to global warming and an increase in extreme weather events worldwide. A natural disaster is defined by the World Health Organization (2020) as "a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts".

Canada has experienced significant climate changes over the past decades, including rising temperatures, shifts in precipitation patterns, and reductions in snow and ice cover (Bush & Lemmen, 2019). Mid-century projections from the Canada's Changing Climate Report (2019)

indicate that during the 2031-2050 period, the country's average temperature is expected to increase approximately twice the global average rate. An overall intensification of extreme precipitation events is also expected during this timeframe (Bush & Lemmen, 2019).

The report also indicated that extreme hot temperatures would become more intense and frequent by mid-century, contributing to a higher risk of drought and wildfires. Furthermore, more intense rainfall events were projected to increase the likelihood of urban localized flooding, while rising sea levels pose a threat of coastal flooding along the Atlantic, Pacific, and Arctic coastlines (Bush & Lemmen, 2019). These changes highlight the growing need for communities across the country to prepare for a broad range of natural disasters. While these projections target future decades, many of these climate-related risks are already evident in Canada's recent disaster landscape.

Due to its vast geographic diversity, Canada is susceptible to various types of natural disasters, which can vary by province and territory. According to data from the Canadian Disaster Database (Public Safety Canada, n.d.), there were around 176 natural disaster events from 2010 to 2020, including floods, wildfires, storms, and winter storms. Floods were the most common (54 cases), followed by wildfires (37 cases), storms and severe thunderstorms (30 cases), and winter storms (19 cases). Notable examples include the 2013 floods in southern Alberta, the 2016 Fort McMurray wildfire (Bush & Lemmen, 2019), and more recently, the unprecedented wildfire season in 2023, which lasted seven months and led to the evacuation of over 200 communities (Jain et al., 2024).

These patterns highlight the importance of community and institutional-level preparedness and resilience planning, especially for facilities that care for vulnerable

populations. LTC homes require targeted emergency preparedness strategies to protect residents who may be especially at risk during such events.

Challenges Experienced by LTC Homes During Natural Disasters

Challenges faced by LTC homes during emergencies are greatly influenced by the fragile characteristics and needs of their residents. Some recent reports have highlighted the vulnerability of LTC homes during natural disasters, while others have called attention to their poor state of preparedness. For example, in the case that occurred in July 2024, more than 100 residents of a nursing home in Mississauga, Ontario, had to be evacuated by boat after torrential rain affected the region and flooded the facility's first floor with more than 5 feet of water. While there were no reported injuries, the 12-hour evacuation operation underscored logistical difficulties in safeguarding a fragile population (Kopun, 2024). A study conducted by Festa, Heaphy, et al. (2023) evaluated the association between wildfire exposure risk and emergency preparedness of LTC homes in California, U.S. The authors found that facilities located within wildfire risk zones (exposed) had poorer emergency preparedness compared to those located outside these zones. Additionally, exposed facilities frequently struggled to meet regulatory standards, with the most common deficiencies involving emergency power backup systems, evacuation testing, and overall emergency policy implementation (Festa, Heaphy, et al., 2023). Having power backup systems is a crucial topic for LTC homes, because power outages are especially challenging for residents who rely on medical equipment that depends on electricity, such as ventilators, dialysis machines, feeding pumps, etc.

Foodservices in LTC Homes During Natural Disasters

Natural disasters such as hurricanes, wildfires, and floods present significant challenges to foodservice operations in LTC homes. These emergencies often disrupt essential utilities such

as electricity, water, and gas, which are crucial for meal preparation and food safety.

Additionally, when evacuations are necessary, providing meals to residents during transportation or in temporary shelters can become logistically complicated. Dosa et al. (2008) examined the decision-making process regarding whether to evacuate or shelter in place during hurricanes in U.S. LTC homes. During the evacuation process, logistical and operational difficulties were highlighted, particularly regarding the transportation of not only residents but also food and water. The study also observed that the lack of priority in restoring power, providing fuel for generators, and restocking food supplies constituted significant barriers to adequate food provision after evacuation. For LTC homes that chose to shelter in place, many reported challenges in cooking due to power outages (Dosa et al., 2008). Such disruptions can compromise food safety and availability, increasing the risk of malnutrition and stress among frail residents.

Infectious Disease Outbreaks

An outbreak is defined as a localized epidemic in which two or more people in the same place manifest the same health condition at the same time (WHO, 2020). In LTC homes, the most common outbreaks involve respiratory and gastrointestinal (GI) infections. Respiratory outbreaks can be caused by a variety of viruses, including influenza A and B, parainfluenza, respiratory syncytial virus (RSV), and rhinovirus. They can also result from bacterial infections such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Chlamydia pneumoniae*, *Legionella species*, *Mycobacterium tuberculosis*, and *Bordetella pertussis* (Strausbaugh et al., 2003). GI outbreaks can be caused by viruses such as rotavirus, adenovirus, and astrovirus, bacteria including *Salmonella*, *Shigella*, *Staphylococcus aureus*, *Clostridium botulinum*, *Escherichia coli*, as well as parasites like *Entamoeba histolytica* and *Giardia lamblia* (Strausbaugh et al., 2003).

Challenges Experienced by LTC Homes During Outbreaks

LTC homes face particular challenges during outbreaks due to both environmental and resident-related factors that facilitate the rapid spread of infections. Residents often share common spaces such as bedrooms, bathrooms and living areas, which facilitates the spread of outbreaks. Additionally, most residents have fragile health status and underlying comorbidities, making them especially vulnerable to infectious diseases. Crowding is a significant risk factor in this context. A recent study by Leece et al. (2023) found that the incidence of respiratory outbreaks and associated mortality was substantially higher in crowded nursing homes in Ontario. These findings highlight the importance of adequate infection control measures and emergency preparedness in these environments.

COVID-19 Pandemic

In 2020 the world was severely hit by the Coronavirus disease (COVID-19), a respiratory infectious disease caused by the SARS-CoV-2 virus (WHO, 2023). It began as an outbreak in Wuhan, China, in December 2019, but soon gained worldwide proportions and became a pandemic (WHO, 2023). Similarly to other respiratory infections, COVID-19 is transmitted through small liquid particles from the secretions of an infected individual's mouth or nose (WHO, 2023). While most infected individuals are expected to develop mild to moderate illness and recover without hospitalization, some can become seriously ill or die (WHO, 2023). Individuals aged 60 and over and those with pre-existing health issues such as some chronic diseases, immunosuppression disorders, obesity and pregnancy, have a higher risk of getting seriously ill. Furthermore, unvaccinated people are also highly subject to developing severe symptoms (WHO, 2023).

From December 2019 to February 2025, the worldwide number of confirmed cases and deaths by COVID-19 surpassed 770 million and 7 million, respectively (WHO, 2025). When it comes to Canada, the first case was reported on January 25, 2020, and as of August 2022, it was estimated that around 15% of adults (more than 1.4 million people) contracted COVID-19 (CIHI, 2022; Government of Canada, 2022b).

COVID-19 Challenges in LTC Homes

In Canada, despite older adults being included in the highest risk group of COVID-19, those living in LTC homes or receiving home care were at a higher risk (CIHI, 2025). According to the Canadian Institute for Health Information (2020b), LTC residents accounted for more than 80% of all COVID-19 deaths in the country, a huge impact on such a vulnerable population. COVID-19 outcomes in LTC homes varied widely across Canada during the first wave, with some reporting no LTC-related deaths and others, like Quebec, Ontario, Alberta, and Nova Scotia experiencing disproportionately high mortality rates (CIHI, 2020a). However, in the next waves, provinces like Manitoba also experienced severe outbreaks. In Winnipeg, high mortality rates in facilities managed by private operators like Revera resulted in class-action lawsuits against both the operator and the regional health authority (CBC News, 2026).

When COVID-19 struck, fear and insufficient preparedness in LTC homes contributed to neglectful responses for many residents, even including abandonment. One notable case occurred at Résidence Herron in Dorval, Montreal between March 13 and April 11, 2020 where 31 residents died, with at least five of those deaths attributed to COVID-19 (Rubertucci, 2025). Health authorities found that the LTC home was largely abandoned by its staff, with only three employees in charge of more than 130 residents. Reports also showed that most of these

residents had experienced dehydration and malnutrition for at least three days, along with a lack of basic hygiene and personal care (Rubertucci, 2025).

Another significant case occurred in Regina, Saskatchewan, where 39 residents of a single LTC home died from a COVID-19 outbreak, between November 2020 and January 2021 (Quenneville, 2021). The home reported that in total 194 residents and 132 staff workers contracted the virus. Additionally, other outbreaks were reported at the facility in the first seven months of 2020, including eleven respiratory cases, one vomiting/diarrhea, and one scabies infection (Quenneville, 2021).

Foodservices in LTC Homes During the COVID-19 Pandemic

The COVID-19 pandemic forced LTC homes to modify their foodservice procedures to implement necessary infection control measures. These changes often required substantial operational adjustments with little prior guidance or preparation. Keller et al. (2021) examined the adaptations to dining services in LTC homes during the COVID-19 pandemic in Canada. According to the authors, the majority of Canadian LTC homes transitioned their residents to in-room dining during the pandemic and more than 40% began using disposable dishware and switched to tray service. Moreover, the study also showed increased staff workloads and reduced food options. With many homes restricting access to the facility, insufficient staff and lack of support from family members or volunteers to assist residents during mealtime were significant concerns (Keller et al., 2021). These challenges can directly impact residents' ability to maintain adequate intake of food and fluids, potentially increasing their risk of malnutrition and dehydration.

The research by Keller et al. (2021) is crucial to understanding how foodservice operations and care staff adapted their practices to meet the infection control procedures.

However, the study focused only on dining services and staff perceptions and did not explore other aspects of foodservice operations, such as production and distribution.

Foodservice: The Critical Infrastructure

In the context of LTC homes, foodservice operations encompass all activities related to the provision of meals to residents. These include, but are not limited to, menu planning, food purchasing, food storage and preparation, meal service delivery, equipment and space requirements, and sanitation (Drummond et al., 2022). Many LTC residents have specific dietary needs that differ from those of the general population, such as hydration support, therapeutic and texture-modified diets, enteral nutrition, oral supplementation, assisted feeding, and end-of-life nutrition care. These requirements are typically prescribed by a primary health care provider, registered dietitian, or occupational therapist, and the foodservice department is responsible for their implementation.

Food provision is essential not only for meeting residents' daily nutritional needs but also for supporting their health and well-being during emergencies, such as natural disasters and outbreaks (PHAC, 2007). Despite its vital role, foodservice is generally underemphasized in broader emergency preparedness literature and planning. This relative lack of integration can leave certain LTC homes without sufficiently detailed protocols for adapting their foodservice operations during emergencies, potentially increasing residents' vulnerability and compromising the facility's overall resilience.

Emergency Foodservice Preparedness

Foodservice is a fundamental component of emergency planning in LTC homes, supporting the continuity of nutrition care during disruptions. However, meeting this standard can be challenging, especially for residents with complex dietary requirements. Efficient and organized

preparation is critical because emergencies can occur at any time. According to Public Safety Canada (2017), emergency management follows four interdependent components: prevention and mitigation; preparedness; response; and recovery. This research focuses on the preparedness and response stages.

Foodservice preparedness is complex, it involves staff training, contingency menus for various scenarios, and robust supply protocols. Professional organizations recommend that LTC homes include alternative food provision methods into emergency plans to address situations like natural disasters, pandemics, and power outages (Brauer et al., 2022). These contingency menus should include texture-modified options for residents with dysphagia, as standard emergency foods can significantly increase the risk of ingestion difficulties and aspiration among older adults requiring care (Tashiro et al., 2019). Additionally, a secured supply of potable water is fundamental to support adequate hydration, food preparation, and sanitation (Public Health Agency of Canada, 2007).

Regulatory Landscape

In Canada, LTC homes are regulated by provincial and territorial standards, which can result in wide variations in foodservice policies and practices (Brauer et al., 2022). Table 2.1 summarizes some of these regulations, specifically highlighting the presence or absence of mandatory food provision planning, means to ensure dietary services and contingency supply of food, during emergencies. Based on available public records, explicit requirements addressing foodservice within emergency planning standards appear limited primarily to Newfoundland and Labrador, Ontario, and Prince Edward Island. On the other hand, some provinces seem to offer practical compliance tools. British Columbia, for example, provides a Nutrition and Food

Service Audit Manual for LTC homes that includes an emergency preparedness checklist and a sample three-day emergency menu (British Columbia. Ministry of Health, n.d.).

Table 2.1 Provincial Regulations and Standards

Province	Regulation or Standard Reference	Observation
Alberta	Accommodation Standards – Continuing Care Home (Government of Alberta, 2024)	Standard 15: Requires LTC homes to have contingency plans. Does not explicitly mention food provision aspect.
British Columbia	Community Care and Assisted Living Act - Residential Care Regulation (B.C. Reg. 96/2009, n.d.)	Division 2, 51: Requires LTC homes to have an emergency plan. Does not explicitly mention food provision aspect.
	Audits & More: A Nutrition and Food Service Audit Manual for Adult Residential Care Facilities with 25 or more Persons in Care (British Columbia. Ministry of Health, n.d.)	Chapter 7 and 8, and Appendix 11: Sample three-day emergency menu; and sample supply and equipment lists. Also provides a blank emergency preparedness checklist.
Manitoba	Personal Care Homes Standards Regulation (Personal Care Homes Standards Regulation, M.R. 30/2005, 2005)	Part 7, Section 35: Requires LTC homes to establish a disaster management program containing a disaster response plan. Does not explicitly mention food provision aspect.
New Brunswick	Standards Manual - Nursing Home Services (Department of Social Development, 2026)	II. Fire and Safety Program: Requires LTC homes to have a disaster plan. Does not explicitly mention food provision aspect.
Newfoundland and Labrador	Long Term Care Facilities in Newfoundland and Labrador Operational Standards (Government of Newfoundland and Labrador, 2005)	SECTION 7, Standard 4: Requires LTC homes to have an emergency preparedness plan and states that contingency arrangements to provide food should be included.
Nova Scotia	Long-Term Care Program Requirements: Nursing Homes & Residential Care Facilities (Nova Scotia Department of Seniors and Long-Term Care, 2026)	Section 9.2: Requires LTC homes to have a Business Continuity Plan. Does not explicitly mention food provision aspect.
Ontario	Fixing Long-Term Care Act, 2021 (Fixing Long-Term Care Act, 2025)	PART VI, Section 90: Requires LTC homes to have emergency plans including epidemics and pandemics. Does not explicitly mention food provision aspect.

Continued....

Province	Regulation or Standard Reference	Observation
	Ontario Regulation 246/22 (Ontario Regulation 246/22, 2022)	ss. 268(4) paragraph 6: Requires LTC homes to have a plan for food and fluid provision in an emergency.
Prince Edward Island	Operational and Care Service Standards for Community Care Facilities (Department of Health, 2009)	STANDARD 5.3 (5.3.18): Requires LTC homes to have a contingency plan. Does not explicitly mention food provision aspect.
	Operational and Care Service Standards for Private Nursing Homes (Department of Health and Wellness, 2018)	STANDARD 5.3 (5.3.23): Requires LTC homes to have a contingency/emergency plan, including means to ensure provision of dietary service and one week supply of food.
Quebec	Act respecting health services and social services, chapter S-4.2 (Act Respecting Health Services and Social Services, Chapter S-4.2 , 1991)	Section 373, 2 ^o : Does not explicitly require an "emergency plan" for individual LTC homes, instead, it states that the public health director should be responsible for "identifying situations which could pose a threat to the population's health and seeing to it that the measures necessary for its protection are taken". It does not explicitly mention or detail food provision requirements.
Saskatchewan	Program Guidelines for Special Care Homes (Saskatchewan Ministry of Health, 2021)	Section I (1.5.5): Requires LTC homes to have an emergency preparedness plan. Does not explicitly mention food provision aspect.

At the institutional level, LTC homes are responsible for developing their own emergency response plans that address potential disasters and emergencies. Some facility-level plans are summarized in Table 2.2 to demonstrate the operational variability in foodservice emergency documentation. For example, Pioneer Manor in Sudbury (Ontario) utilizes two separate plans, one addressing utility disruptions and another dedicated to pandemic scenarios (Pioneer Manor, 2021, 2022). Other institutional examples include the documented emergency plans for The

Pines LTC home in the District Municipality of Muskoka (The Pines, 2024) and the Meighen Retirement Residence (Meighen Health Centre, 2022). At the national level, the Centre for Emergency Preparedness and Response of the Public Health Agency of Canada provides a standardized guideline, the 2007 Emergency Food Service: Planning for Disasters manual (PHAC, 2007), however, this manual is not LTC specific and does not address outbreak scenarios.

Table 2.2 Overview of Selected Institutional Foodservice Emergency Plans

Reference	Description	Key components
Pioneer Manor (2021)	Facility-level plan for natural and man-made disaster response in Sudbury, Ontario	Five sub-plans addressing specific emergencies: loss of utilities, receiving evacuees, water shortage; emergency menus for regular, minced, and pureed diets
Pioneer Manor (2022)	Facility-level plan for pandemic response in Sudbury, Ontario	Meal service modifications, staffing protocols, environmental cleaning, food purchasing and delivery, clinical nutrition, and palliative care considerations
The Pines (2024)	Facility-level plan for outbreak/pandemic response in in the District Municipality of Muskoka, Ontario	Dietary services, IPAC, staffing and scheduling, food shortages, dining room services, clinical dietary assessments, supply chain changes, and communication protocols
Meighen Health Centre (2022)	Facility-level plan for outbreak/pandemic response. LTC home is operated by the Salvation Army under Ontario's Ministry of Long-Term Care	Implementation procedures, role of foodservice supervisors and call managers, emergency menu guidance, resident ticketing, food and supply storage

These examples demonstrate some of the variation in foodservice emergency preparedness among selected LTC homes. Since facility-level emergency plans are often internal operational documents and not publicly available, the examples in this section were limited to those accessible online, which were from Ontario. Although most provinces require general emergency planning (Fixing Long-Term Care Act, 2025; Personal Care Homes Standards Regulation, M.R. 30/2005, 2005), the lack of explicit requirements regarding food provision often leaves facilities to voluntarily address this important aspect. Consequently, while provincial regulatory bodies inspect LTC homes' compliance with established standards, the absence of clear criteria may allow LTC administrations to prioritize other operational areas over foodservice. Additionally, without standardized guidelines, facilities may also struggle to develop effective protocols.

Therefore, given the variability between regulatory requirements and institutional execution, studies investigating the actual preparedness of LTC foodservices are needed.

As a basis for comparison, it is valuable to explore how other countries around the world have approached emergency food provision in LTC settings, which will be detailed in the following subsection.

International Perspectives

In the United States (U.S.), federal regulations require LTC homes to incorporate subsistence planning, including food and water provision, in their emergency preparedness protocols. According to the Centers for Medicare & Medicaid Services (n.d.), LTC homes must have policies in place to ensure the availability of adequate food, water, and medical supplies, whether they evacuate or shelter in place. An example of emergency manual related to foodservice is the document entitled Emergency Preparedness Planning for Nursing Homes and Residential Care Settings in Vermont, from the state of Vermont, U.S. (DAIL Vermont, 2010). Although the plan is not exclusively designed for the foodservice department, it provides instructions for food provision when sheltering in place, including procedures for stockpiling food and water and maintaining contracts with multiple suppliers. It also provides a checklist for evacuation planning, including types and amounts of food and water required during evacuation, as well as logistics for transport and distribution (DAIL Vermont, 2010).

In terms of overall emergency preparedness of LTC homes in the U.S., a study estimated the proportion of nursing homes exposed to hurricane-related inundation within Coastal Atlantic and Gulf Coast states. Festa, Throgmorton, et al. (2023) found that approximately 1 of 10 homes were at risk of exposure to severe hurricane-related inundation. The most frequently cited deficiencies were related to establishing, maintaining, and training for emergency preparedness

procedures. Nursing homes in New England, the New York metropolitan area, and the Mid-Atlantic also struggled with ensuring proper subsistence supplies including medicines, food, and water (Festa, Throgmorton, et al., 2023).

Japan is particularly prone to disasters, and its cities, towns, and villages establish evacuation shelters when such events occur (Sudo et al., 2022). While stockpiling guidelines are documented, no national guidelines exist specifically for foodservice in LTC homes. As of 2024, all caregiving service providers in Japan are required to establish a Business Continuity Plan (BCP) and conduct training sessions and drills (Takeda et al., 2023). However, even among LTC homes located in disaster-prone areas, only 36.6% have conducted meal service training (Takeda et al., 2023).

To identify disaster preparedness issues related to meal service in a LTC home in Japan, Takeda et al. (2023) conducted a meal service training session comprising transportation of stockpiled supplies, meal preparation, and meal services, simulating disruptions in electricity, water, and gas. The authors found that one of the most common challenges was transporting stockpiled food supplies in dark conditions. Additionally, inadequate hygiene among food handlers and poor waste storage management were also reported. During the cooking process, the most notable gap was the absence of safety procedures by staff while installing and handling cassette stoves, which may pose fire or injury risks. Notably, despite having a manual for meal services during emergencies, foodservice staff had never prepared their entire contingency menu before this training session (Takeda et al., 2023).

This study illustrates the crucial role of conducting disaster training and drills within the foodservice department to identify and address potential operational gaps in preparedness. While set in Japan, the lessons of Takeda et al. (2023) study are broadly relevant to other LTC homes,

including those homes in Canada, where emergency protocols may exist on paper but remain untested in practice.

Furthermore, a study by Nozue et al. (2014) showed that the majority of LTC homes assessed in their study had an emergency food supply before the Great East Japan Earthquake. The authors highlighted that having meals readily available, along with effective communication between cooperating institutions, was essential for improving the recovery process following the earthquake. These findings underscore the importance of comprehensive emergency planning that includes not only adequate food stockpiling but also well-established cooperative agreements to ensure an effective emergency response.

Research Gap

Disasters are increasing in both frequency and intensity due to climate change. Recent Canadian experiences with the COVID-19 pandemic and natural disasters, such as the wildfire season of 2023, have highlighted notable vulnerabilities in emergency preparedness, particularly in LTC homes. In Canada, the PHAC 2007 manual provides general guidelines for foodservice disaster planning, but it is not LTC-specific and does not address outbreak situations. At the provincial level, while most regulations require general emergency planning, they occasionally mandate explicit food provisions, leaving individual LTC homes to address this aspect independently.

Beyond preparedness planning, it is also important to explore how LTC homes have responded during actual emergency events. While natural disasters frequently present logistical and infrastructural challenges, outbreaks generally introduce infection control requirements that can impact food provision. Therefore, understanding the real-world application of planning protocols and the associated operational challenges of foodservice during emergencies is critical.

Currently, the literature on emergency preparedness in LTC foodservice operations remains limited. Notably, there is a lack of Canadian research exploring how foodservice departments adapt during emergencies, as well as the specific resources in place to help guide them during natural disasters and infectious disease outbreaks.

CHAPTER 3: METHODOLOGY

Ethics

Ethics approval (Appendix A) for this study was approved by the Research Ethics Board (REB 2) at the University of Manitoba (Protocol Number: HE2024-0316).

Study Design

This exploratory and descriptive study used an observational, cross-sectional, quantitative design. Data were collected through an online survey, which allowed efficient collection of self-reported data from a geographically diverse sample of participants working in a variety of LTC homes throughout Canada.

Survey Development

Based on identified gaps in the literature, a self-administered, non-experimental survey was designed to assess emergency preparedness practices reported by foodservice professionals within Canadian LTC homes. The initial version included 35 questions created in consultation with members of a 2024 CFDR grant proposal team, based on existing literature, and national and provincial guidelines. The questions addressed topics such as preparedness plans for natural disasters and outbreaks, frequency of plan revisions, types of foodservice interventions, and internal communication protocols.

This study includes two parts: Part A refers to the pilot testing stage, where the survey was validated and refined. Part B involves distributing the finalized Emergency Foodservice Preparedness in Long-Term Care Homes (EFP) Survey for data collection.

Part A: Pilot Testing the Survey

Before full distribution, a paper-based version of the survey underwent pilot testing to evaluate its clarity, relevance, and feasibility for the target audience. Feedback from participants

was systematically reviewed and used to make targeted revisions aimed at improving the overall quality and appropriateness of the final instrument. Following pilot testing, the survey was revised and finalized for online distribution.

Participant Recruitment

A purposive sample of ten participants was selected based on literature recommendations. According to Hertzog (2008), 10-30 participants are appropriate for exploratory studies assessing survey instruments. Convenience and snowball sampling methods were used to recruit participants via email invitations (Appendix B). RDs and experts in survey development, aging, LTC home operations, and foodservice were included. Initial participants were selected from the researcher's professional network within the university departments and local LTC homes. These individuals subsequently shared the invitation with colleagues who had the required expertise.

Pilot Testing Process

Participants received an information package by email containing an Informed Consent form, the EFP Survey, and an Evaluation Sheet. After completing the survey, they were asked to return the signed consent and the evaluation sheet via email. The Evaluation Sheet (Appendix C) included both scaled and open-ended questions to gather feedback on the survey's alignment with objectives, clarity of questions, response options, length, redundancy, and any missing topics or errors. All feedback was systematically reviewed to guide necessary revisions prior to finalizing the survey.

Revision of Participant Feedback

Participant feedback was analyzed to identify potential improvements related to survey clarity, terminology, structure, and response options. Each suggestion was assessed based on its relevance and feasibility, and adjustments were made where appropriate to enhance the final

survey for clarity, usability, and alignment with the study's objectives. Table 3.1 summarizes the specific feedback received and the corresponding actions taken. Refer to Appendix D for a detailed summary of changes to the survey.

Table 3.1 Summary of Pilot Test Feedback and Actions Taken

Survey Item or Section	Participant Feedback/Comment	Action Taken (or Justification for No Change)
Overall survey wording and flow	Overall clear and smooth; a few refinements suggested	Reviewed specific wording suggestions and adjusted for clarity where needed
Inclusion criteria	Include clear inclusion/exclusion criteria upfront	Inclusion/exclusion criteria added at the start of the survey to ensure clarity
Screening questions	Clarify if data is collected or only for eligibility	Clarified in survey introduction these questions were for eligibility screening
Objective alignment	Survey objectives were not clearly outlined in the preamble	Added a brief description of the survey objectives in the introduction text of the survey
Use of definitions	Some questions need definitions at first mention (e.g., outbreak, natural disaster)	Definitions provided where terms first appear; start of each section
Question 10 (Meal delivery system)	Include 'select all that apply' to cover variation in practice	Revised question to include 'select all that apply' to capture multiple systems in use
Questions 11-15 (LTC home characteristics)	Add 'I don't know' option; clarify terms like 'chain'	Added 'I don't know' option and clarified terms in survey instructions
Questions 16-20 (LTC home characteristics)	Ask for "best approximation" for the number of residents	Instructions updated
Section C & D definitions	Recommend defining natural disaster and outbreak at start of each section	Definitions of 'natural disaster' and 'outbreak' added at the start of relevant sections
Questions 25 and 38	Ask 'Are your plans reviewed or updated?' to better capture the process	Instructions updated to better capture the process of revision/update
Question 30 (scale of preparedness feeling)	Clarify if the question intends to be general or foodservice related	Clarified that question and answer were foodservice focused
Section E (COVID-19 section)	Add a 'Not applicable' option for respondents not working during the pandemic	Added 'Not applicable' response option in the COVID-19 section
Question 43 (Challenges during outbreak)	Response options are all negative, consider balance	Reviewed response options

Continued...

Survey Item or Section	Participant Feedback/Comment	Action Taken (or Justification for No Change)
Question 45 (Storage limitations during COVID-19)	Clarify if the question is referring to extra food items specifically or extra items in general	Clarified question aims for extra food items only.
Section F (Open-ended questions)	Clarify responses focused on foodservice	Instructions updated to clarify that responses should focus on foodservice in LTC settings

Part B: Emergency Foodservice Preparedness in Long-Term Care Homes Survey

This section covers the details and process of online set-up and testing of the finalized EFP survey, as well as participant recruitment procedures.

EFP Survey

The final EFP survey (Appendix E) is organized into six sections, labeled A through F, and more details are presented in Table 3.2.

Table 3.2 EFP Survey Details

Section	Question Range	Types of Questions
A	1-8	Characteristics of respondents, including their positions in the LTC home, province of origin, duration of employment at the LTC home, and length of time in their current position
B	9-21	Characteristics of the LTC foodservice operations, such as type of foodservice operation used (e.g., traditional cook and serve, cook/chill, retherm from an outside facility, etc.), the meal delivery system (such as mobile carts, non-mobile carts, insulated trays, etc.), whether the operation is for-profit or non-profit, if it is part of a chain or continuum of care, any cultural or religious affiliations, and the number of beds available, occupied or reserved for respite care.
C	22-35	Practices and procedures related to foodservice emergency preparedness during natural disasters and outbreaks, respectively. These items address previous experiences and challenges, current formal or informal written procedures, and staff training.
D	36-48	
E	49-53	LTC home's challenges related to COVID-19
F	54-55	Two open-ended questions, allowing respondents to share insights gained from previous experiences that could benefit other facilities and to provide considerations for topics not covered in the survey.

Online Setup and Testing

The survey was set up online using the Qualtrics XM Online Survey Platform, with support from the Manitoba Centre for Nursing and Health Research (MCNHR). Following this, the final version of the survey was internally tested on Qualtrics by J. Dullius and C. Lengyel to ensure that responses were captured accurately and that skipping patterns worked properly. Any technical issues identified during this phase were resolved before distributing the survey to participants.

Participant Recruitment

Eligibility criteria included being a foodservice professional (registered dietitian, foodservice supervisor, or manager and currently working in a LTC home in Canada. To ensure

that participants in the study met the inclusion criteria, convenience and snowball sampling methods were used. An estimated sample size of 350 participants was initially established as the target quota for data collection. The target sample was calculated considering a finite population of approximately 3,000 foodservice professionals in Canadian LTC homes, using a 5% margin of error and a 95% confidence level. However, due to recruitment challenges, this quota was not met, resulting in a smaller, exploratory cohort.

Participants were recruited by sending email invitations (Appendix F and G) containing a generic link for the online survey to relevant professional organizations like the Dietitians of Canada Gerontology Network, Winnipeg Regional Health Authority (WRHA) Long Term-Care Dietitians Group, Gerry Kasten's Listserv, and other provincial LTC groups to be shared with their members.

Data Collection Process

Data were collected via the Qualtrics XM Online Survey Platform from June 23 to September 29, 2025, over a three-month period. Reminders were sent approximately one month after the initial invitation and again closer to the survey deadline to encourage participation (see Table 3.3). Participants who answered at least 80% of the core survey questions (which were displayed to all respondents regardless of skip patterns) were entered into a prize draw for Amazon gift cards. This completion threshold was established to encourage survey completion.

Information about the draw criteria was provided to participants prior to beginning the survey. At the end of the survey, eligible participants who met the inclusion criteria were directed to a separate, unlinked form to enter their name and email address for the draw. The draw was organized into two parts: 1) the Early Bird Draw (surveys completed by July 31, 2025, were

eligible for a \$250 gift card) and 2) the Regular Draw (participants were eligible for one of eight gift cards once the survey closed: five at \$20; two at \$50; and one at \$100).

The survey was estimated to take 15 minutes to complete. Upon entering the online survey platform, participants were asked two screening questions to determine eligibility: 1) whether the LTC beds were contained within a hospital setting; and 2) whether the LTC home had been in operation for less than six months. These criteria were applied to exclude LTC homes within hospital settings, as they may share institutional resources, and new LTC homes lacking operational experience needed to evaluate past preparedness. Respondents who met these exclusion criteria were directed to the end of the survey and thanked for their time, while eligible participants proceeded to the Informed Consent form (Appendix H). Once consent was obtained, the survey questions were displayed to respondents.

Table 3.3 Initial Survey Requests and Reminders

Organization	Initial Request	Reminder 1	Reminder 2	Reminder 3 and Extension of Deadline
Gerry Kasten listserv	June 24	-	August 11	September 16 (extended deadline)
LTC dietitians' group at WRHA ^a	September 3	-	-	September 16 (extended deadline)
OSNAC & FNAT ^b ; Seasons Care; AdvantAge Ontario	July 21 July 14 -	August 12	-	September 11
Publicly-operated LTC homes and independent LTC organizations ^c	June 18-25	July 22	August 12	-
Gerontology Network at DC ^d	June 26	-	August 20	-
Canadian Association for Long Term Care	June 9	July 21	August 12	September 16 (extended deadline)

Notes: Dates for initial requests and reminders reflect the timeframe during which these specific

organizations/facilities were contacted.

^a Winnipeg Regional Health Authority.

^b Ontario Seniors Nutrition & Advocacy Committee (OSNAC) & Food & Nutrition Advisory Team (FNAT).

^c To maintain institutional and respondent anonymity, direct invitations sent to individual public and independent LTC homes have been aggregated.

^d Dietitians of Canada.

Data Cleaning

Data collected through Qualtrics were exported to the Statistical Package for the Social Sciences (SPSS) software, version 29 (IBM, 2022), for cleaning and preparation. The process included verifying dataset structure, variable formats, and response completeness. Variable names and formats were standardized to ensure consistency. Responses were then screened for eligibility and completeness. Cases that did not answer the screening questions, did not qualify based on eligibility criteria, or did not provide answers beyond the screening section were removed.

Data were checked for duplication by comparing the following variables: ‘IPAddress’, ‘LocationLatitude’, and ‘LocationLongitude’, which were automatically collected by the survey platform. After this verification, all data were de-identified and anonymized by excluding these variables. Details of the data cleaning procedures are provided in Appendix I. Figure 3.1 summarizes the exclusion process from the total number of survey entries (n = 162) to the final analytic sample (n = 84).

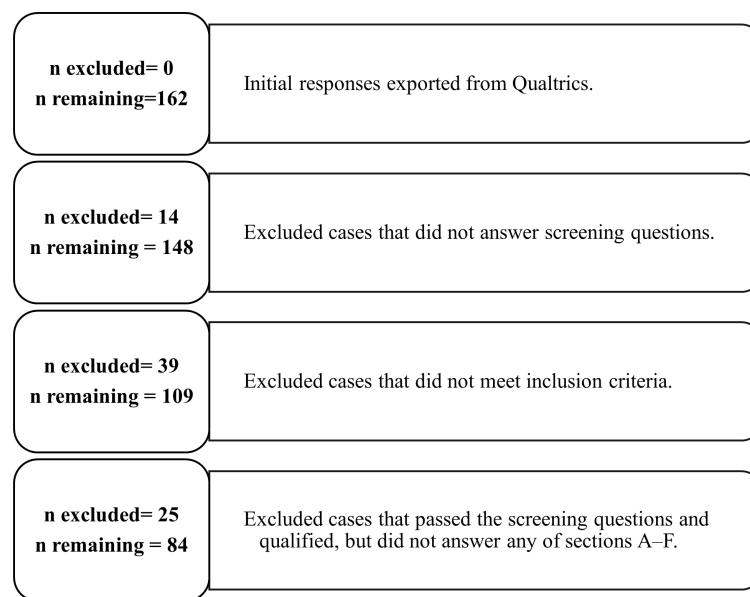


Figure 3.1 Participant Flow Diagram

Data Analysis

The data analysis plan with survey questions, coding, variable types, and planned analyses is provided in Table 3.4. Data were analyzed to describe the sample and to identify potential patterns in emergency and outbreak preparedness across LTC homes. A descriptive analysis was conducted to examine the characteristics of LTCs and their operational preparedness practices and procedures. Categorical variables were presented as frequencies and proportions. Ordinal variables were summarized using medians and interquartile ranges. Multiple-choice questions were reported as the proportion of respondents selecting each option. Open-ended responses were grouped by common answers, added to existing options, or summarized in the text and table notes.

Group comparisons were also explored. Proportions were compared using Fisher's exact test, or the Chi-square test when cell counts were sufficient (expected counts ≥ 5). Findings were interpreted with caution given the small sample size ($N < 100$) and the limited statistical power (higher risk of Type II error). The statistical tests were two-sided, with a significance threshold of $p < .05$. Where appropriate, data were recoded to support analysis and ensure consistency. Examples include grouping continuous variables, consolidating categorical responses, or simplifying Likert scales. Recoding decisions were guided by the distribution of responses and best practices to maintain validity and clarity. All analyses were conducted using SPSS, version 29 for Windows (IBM, 2022).

Table 3.4 Data Analyses Plan

Section A - Participant Characteristics			
Survey Question	Coding	Variable Type	Planned Analysis/Test
1. In what year were you born?	Year	Numerical	Mean (standard deviation), range; frequencies and proportions (%)
2. My gender identity is	1. Woman 2. Man 3. Non-binary/Trans/Gender Diverse 5. Other 6. Prefer not to answer	Categorical	Frequencies and proportions (%)
3. Are you a Registered Dietitian (RD)?	1. Yes 2. No	Categorical (Binary)	Frequencies and proportions (%)
4. Which of the following best describes your position/role in the LTC home? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Foodservice Manager - Foodservice Supervisor - Other	Categorical (Multiple response)	Frequencies and proportions (%) for each
5. In which province or territory do you currently work within LTC?	1. British Columbia 2. Alberta 3. Saskatchewan 4. Manitoba 5. Ontario 6. Quebec 7. New Brunswick 8. Nova Scotia 9. Newfoundland & Labrador 10. Prince Edward Island 11. Yukon 12. Northwest Territories 13. Nunavut	Categorical	Frequencies and proportions (%)

Continued...

Section A - Participant Characteristics			
Survey Question	Coding	Variable Type	Planned Analysis/Test
6. What is the population in the location of your LTC home (approx. population size)?	1. Hamlet (fewer than 300) 2. Village (300-999) 3. Town (1,000 – 9,999) 4. Small city (10,000 – 29,999) 5. Medium city (30,000 – 99,999) 6. Large city (100,000 – 999,999) 7. Metropolitan area (1 million +) 8. Other 9. Unknown	Categorical (Ordinal)	Frequencies and proportions (%)
7. How long have you worked in your current LTC home?	1. Less than one year 2. 1-5 years 3. 6-10 years 4. 11-15 years 5. 16-20 years 6. 21 years or more	Categorical (Ordinal)	Frequencies and proportions (%)
8. How long have you worked in your current position?	1. Less than one year 2. 1-5 years 3. 6-10 years 4. 11-15 years 5. 16-20 years 6. 21 years or more	Categorical (Ordinal)	Frequencies and proportions (%)
Section B - Characteristics of LTC Homes			
9. What type of foodservice operation does your LTC home have?	1. Traditional Cook and Serve 2. Cook/Chill 3. Retherm from an Outside Facility 4. Other	Categorical	Frequencies and proportions (%)
10. What type of meal delivery system is used in your home?	1. Mobile Carts 2. Non-Mobile Carts 3. Insulated Trays 4. Other	Categorical	Frequencies and proportions (%)
11. Is your LTC home publicly or privately owned?	1. Public 2. Private	Categorical (Binary)	Frequencies and proportions (%)
Continued...			

Section B - Characteristics of LTC Homes			
Survey Question	Coding	Variable Type	Planned Analysis/Test
12. Is your LTC home:	1. For-Profit 2. Non-Profit/Charitable	Categorical (Binary)	Frequencies and proportions (%)
13. Is your LTC home part of a chain?	1. Yes 2. No	Categorical (Binary)	Frequencies and proportions (%)
14. Is your LTC home part of a Continuum of Care?	1. Yes 2. No	Categorical (Binary)	Frequencies and proportions (%)
15. Is your LTC home licensed by a provincial or territorial authority?	1. Yes 2. No	Categorical (Binary)	Frequencies and proportions (%)
16. Does your LTC home have cultural or religious affiliations?	1. Yes. Please specify: 2. No	Categorical (Binary) / String	Frequencies and proportions (%); content analysis
17. How many total beds are available in your LTC home?	Raw numbers	Numerical	Mean (SD)
18. How many beds are currently occupied in your LTC home?	Raw numbers	Numerical	Mean (SD)
19. How many of the total beds are reserved for respite care?	Raw numbers	Numerical	Mean (SD)
20. How many beds are currently occupied for respite care?	Raw numbers	Numerical	Mean (SD)
21. How many of your residents are 65 years of age or older?	Raw numbers	Numerical	Mean (SD)
Section C - Foodservice Emergency Preparedness during Natural Disasters			
22. In the last 2 years, has your LTC home had a natural disaster that affected foodservices?	1. Yes 2. No 3. I don't know	Categorical (Multiple response)	Frequency; Chi-square

Continued...

Section C - Foodservice Emergency Preparedness during Natural Disasters			
Survey Question	Coding	Variable Type	Planned Analysis/Test
22a. How many times? / Please describe	Raw count/ Open-ended	Numerical/ String	Mean (SD); content analysis
23. Did your home experience any of the following in foodservices during the natural disaster? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Staff shortages - Recruitment, hiring and retainment challenges - Food supply shortages - Difficulty getting needed supplies/equipment due to cost - Difficulty getting needed supplies/equipment due to availability - Restrictions on family/loved ones for resident mealtime help - Storage space limitations for extra supplies and equipment - Communication challenges related to providing information - Other - Not Applicable	Categorical (Multiple response)	Frequencies and proportions (%) for each
24. Has the foodservice department you work in had to make any of the following modifications in response to the natural disasters it has experienced? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Cross-training staff to meet nutrition and hydration needs of residents	Categorical (Multiple response)	Frequencies and proportions (%) for each

Continued...

Section C - Foodservice Emergency Preparedness during Natural Disasters			
Survey Question	Coding	Variable Type	Planned Analysis/Test
	- Immediate role changes of staff to meet critical/essential needs of LTC (without training) - Menu modifications - Other - Not Applicable		
25. Thinking of the last natural disaster your LTC home experienced, how did you communicate changes to your foodservice operation to team members and the facility? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Bulletin boards - Huddles - Rounds - Meetings - Email - Informal verbal communication - 24-hour report - Other - Not Applicable	Categorical (Multiple response)	Frequencies and proportions (%) for each
26. Does your LTC home have any of the following foodservice emergency preparedness components? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Staffing Guidelines. Describe: - Contingency menu. Describe: - Dining Room modifications. Describe: - Foodservice Delivery Modifications. Describe: - Emergency Food Supplier Information. Describe: - Other - Not Applicable	Categorical (Multiple response) / String	Frequencies and proportions (%) for each; mean (SD); content analysis

Continued...

Section C - Foodservice Emergency Preparedness during Natural Disasters			
Survey Question	Coding	Variable Type	Planned Analysis/Test
27. Does your home have an Emergency Foodservices Plan tailored to natural disaster situations?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
27a. Are you planning to develop one?	1. Yes 2. No. Why?	Categorical (Binary) / String	Frequencies and proportions (%); content analysis
28. What resources specifically guided the development of your LTC home's Emergency Foodservices Plan for natural disasters? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Government/Provincial guidelines - Industry standards - Consultation with experts - Internal assessments - Learned experience - Other - I don't know	Categorical (Multiple response)	Frequencies and proportions (%) for each
29. Is your LTC home's Emergency Foodservices Plan for natural disasters revised, reviewed or updated?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
29a. When was it last revised, reviewed or updated?	1. Past 6 months 2. 6–12 months 3. 1–2 years 4. More than 2 years 5. I don't know	Categorical (Ordinal)	Frequencies and proportions (%)
29b. How frequently is it revised, reviewed or updated?	1. Annually 2. Every two years 3. Every five years 4. Only as needed 5. Other (please specify below) 6. I don't know	Categorical (Ordinal)	Frequencies and proportions (%)
30. Who is part of the revision team?	Open-Ended	String	Content analysis

Continued...

Section C - Foodservice Emergency Preparedness during Natural Disasters			
Survey Question	Coding	Variable Type	Planned Analysis/Test
31. In the last 2 years, has your LTC home had to activate or implement its Emergency Foodservices Plan in response to a natural disaster?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
31a. How many times? / Why?	Raw count / Open-ended	Numerical / String	Mean (SD); content analysis
31b. Did you need to change the plan when implementing it?	1. Yes. Why? 2. No 3. I don't know	Categorical (Binary) / String (for open-text)	Frequencies and proportions (%); content analysis
32. Has the LTC foodservice staff at your LTC home received any training in emergency foodservice procedures?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
33. How often is training in emergency foodservice procedures provided to foodservice staff at your LTC home?	1. Monthly 2. Quarterly 3. Biannually 4. Annually 5. Never 6. I don't know	Categorical (Ordinal)	Frequencies and proportions (%)
34. Considering your foodservice department's current preparedness (e.g., procedures, training, supplies), how prepared do you feel your LTC home is for a natural disaster?	1 - Extremely prepared 2 - Moderately prepared 3 - Slightly prepared 4 - Not at all prepared 5 - I don't know	Categorical (Ordinal)	Frequencies and proportions (%)
35. Does your LTC home have any protocol in place to address the foodservice needs of residents with special dietary requirements (e.g., modified textures for those with swallowing difficulties) during emergencies?	1. Yes. Please describe: 2. No 3. I don't know	Categorical (Binary) / String	Frequencies and proportions (%); content analysis

Continued...

Section D - Foodservice Emergency Preparedness during Outbreaks			
Survey Question	Coding	Variable Type	Planned Analysis/Test
36. In the last 2 years, has your LTC home had an outbreak that affected foodservices?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
36a. How many times? Please describe:	Raw count/Open-ended	Numerical/String	Mean (SD); content analysis
37. Did your home experience any of the following in foodservices during the outbreak? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Lack of time - Limited staff support due to illness - Limited staff support due to ineffective policies - Limited staff support due to leader challenges - Limited administrative support - Limited financial support - Limited physical space to store goods - Limited training personnel - Food supply shortages - Food supply chain delays - Equipment supply chain delays - Other - Not Applicable	Categorical (Multiple response)	Frequencies and proportions (%) for each
38. Has the foodservice department you work in had to make any modifications in response to the outbreak it has experienced? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Cross-training staff to meet nutrition and hydration needs of residents	Categorical (Multiple response)	Frequencies and proportions (%) for each

Continued...

Section D - Foodservice Emergency Preparedness during Outbreaks			
Survey Question	Coding	Variable Type	Planned Analysis/Test
	- Immediate role changes of staff to meet critical/essential needs of LTC (without training) - Menu modifications - Other - Not Applicable		
39. Thinking of the last outbreak your LTC home experienced, how did you communicate changes to your foodservice operation to team members and the facility? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Bulletin boards - Huddles - Rounds - Meetings - Email - Informal verbal communication - 24-hour report - Other - Not Applicable	Categorical (Multiple response)	Frequencies and proportions (%) for each
40. Does your LTC home have any of the following foodservice emergency preparedness components? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Staffing Guidelines. Describe: - Contingency menu. How many days? Describe: - Dining Room modifications. Describe: - Foodservice Delivery Modifications. Describe: - Emergency Food Supplier Information. Describe: - Other	Categorical (Multiple response / Numerical/ String)	Frequencies and proportions (%) for each; mean (SD); content analysis
41. Does your LTC home have an Emergency Foodservices Plan tailored to outbreaks situations?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)

Continued...

Section D - Foodservice Emergency Preparedness during Outbreaks			
Survey Question	Coding	Variable Type	Planned Analysis/Test
41a. Are you planning to develop one?	1. Yes 2. No. Why?	Categorical (Binary) / String	Frequencies and proportions (%); content analysis
42. What resources specifically guided the development of your LTC home's Emergency Foodservices Plan for outbreaks? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Government/Provincial guidelines - Industry standards - Consultation with experts - Internal assessments - Learned experience - Other - I don't know	Categorical (Multiple response)	Frequencies and proportions (%) for each
43. Are your LTC home's Emergency Foodservices Plan for outbreaks revised, reviewed or updated?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
43a. When was it last revised, reviewed or updated?	1. Past 6 months 2. 6–12 months 3. 1–2 years 4. More than 2 years 5. I don't know	Categorical (Ordinal)	Frequencies and proportions (%)
43b. How frequently is it revised, reviewed or updated?	1. Annually 2. Every two years 3. Every five years 4. Only as needed 5. Other 6. I don't know	Categorical (Ordinal)	Frequencies and proportions (%)
44. Who is part of the revision team?	Open-ended	String	Content analysis
45. In the last 2 years, has your LTC home had to activate or implement its Emergency Foodservices Plan in response to an outbreak?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
Continued...			

Section D - Foodservice Emergency Preparedness during Outbreaks			
Survey Question	Coding	Variable Type	Planned Analysis/Test
45a. How many times? / Why?	Raw count / Open-ended	Numerical /String	Mean (SD); Content analysis
45b. Did you need to change the plan when implementing it?	1. Yes. Why? 2. No 3. I don't know	Categorical (Binary) / String	Frequencies and proportions (%); content analysis
46. Has the LTC foodservice staff at your LTC home received any training in emergency foodservice procedures?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
47. How often is training in emergency foodservice procedures provided to foodservice staff at your LTC home?	1. Monthly 2. Quarterly 3. Biannually 4. Annually 5. Never 6. I don't know	Categorical (Ordinal)	Frequencies and proportions (%)
48. Considering your foodservice department's current preparedness (e.g., procedures, training, supplies), how prepared do you feel your LTC home is for outbreaks?	1 - Extremely prepared 2 - Moderately prepared 3 - Slightly prepared 4 - Not at all prepared 5 - I don't know	Categorical (Ordinal)	Frequencies and proportions (%)
Section E - COVID-19 pandemic in foodservices			
49. Were you working at your current LTC home or in your current role anytime during the COVID-19 pandemic (March 2020 to May 2023)	1. Yes 2. No	Categorical (Binary)	Frequencies and proportions (%)
50. Did your LTC home order any extra food items during the COVID-19 pandemic in anticipation of food supply chain shortages?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
50a. What extra food and/or food-related items did you order more of (please specify below)?	Open-ended	String	Content analysis

Continued...

Section E - COVID-19 pandemic in foodservices			
Survey Question	Coding	Variable Type	Planned Analysis/Test
51. Did your LTC home experience any storage limitations related to foodservice equipment, supplies, or ingredients?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
51a. Where did you store the extra food-related items? (select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Refrigerators - Freezers - Dry storage - Off-site storage - Other	Categorical (Multiple response)	Frequencies and proportions (%) for each
52. Did your LTC home require any special equipment for storage of foodservice supplies or ingredients?	1. Yes 2. No 3. I don't know	Categorical (Binary)	Frequencies and proportions (%)
52a. What kind of equipment did you need for storage of foodservice supplies or ingredients? (Please specify below)	Open-ended	String	Content analysis
53. Did your LTC foodservice department experience any of the following during the COVID-19 pandemic? (Select all that apply)	Coded as a separate binary variable 1 = Yes (option selected) 0 = No (option not selected) - Staff shortages due to COVID-19 illness - Recruitment, hiring and retainment challenges - Cross-training staff to meet nutrition and hydration needs of residents - Immediate role changes of staff to meet critical/essential needs of LTC (without training) - Food supply shortages	Categorical (Multiple response)	Frequencies and proportions (%) for each

Continued...

Section E - COVID-19 pandemic in foodservices			
Survey Question	Coding	Variable Type	Planned Analysis/Test
	- Difficulty getting needed supplies/equipment due to cost - Difficulty getting needed supplies/equipment due to availability - Restrictions on family/loved ones for resident mealtime help - Storage space limitations for extra supplies and equipment - Communication challenges related to providing information - Menu modifications - Modifications in meal service for residents - Other		
Section F			
54. Over the past few years, what have you learned about emergency preparedness in foodservices that might be helpful to others? (Please answer below)	Open-ended	String	Content analysis
55. Is there anything you would like to add about emergency foodservices in LTC that we didn't ask you about? (Please answer below)	Open-ended	String	Content analysis

CHAPTER 4: LONG-TERM CARE FOODSERVICE IN CANADA – EMERGENCY PREPAREDNESS FOR NATURAL DISASTERS

Introduction

Older adults living in LTC homes are among the most vulnerable during natural disasters. For the purposes of this study, natural disasters are defined as large-scale events that cause widespread disruption and significant loss of life and property damage, as defined by the World Health Organization (2020). These disasters can include floods, wildfires, and other extreme weather events. They are predicted to increase in frequency and intensity across Canada in the coming years due to climate change (Bush & Lemmen, 2019). LTC residents experience higher disaster-associated risks due to their compromised physical and mental health status and high dependency on staff for care, including assistance with activities of daily living (Dosa et al., 2008). Given these vulnerabilities, it is crucial to consider systems that support residents' daily needs during emergencies, particularly foodservices, as they play a vital role in ensuring nutritional care and quality of life.

Foodservice operations comprise of all activities related to providing meals to residents. This includes menu planning, food purchasing, storage and preparation, meal distribution and service, and sanitation (Drummond et al., 2022). Adequate nutrition is essential for maintaining residents' physiological functions, boosting immune responses, and providing energy. This is particularly important during periods of increased stress, such as during natural disasters. Therefore, LTC homes must be prepared to adapt their foodservice systems to ensure residents receive safe and adequate nutrition during disruptions.

Dosa et al. (2008) examined the decision-making process for evacuating or sheltering in place during hurricanes in LTC homes. They found that a lack of urgency in restoring power,

providing fuel for generators, and replenishing food supplies posed significant barriers to providing adequate food after an evacuation. Many LTC homes that chose to shelter in place reported challenges in cooking due to power outages (Dosa et al., 2008). Such disruptions can compromise food safety and availability, increasing the risk of malnutrition and stress among frail residents.

There is limited research literature on emergency foodservice preparedness for natural disasters in Canadian LTC homes, and publicly available, standardized resources for these homes appear to be scarce. This leaves a notable gap in addressing this aspect of emergency planning. The objective of this exploratory study was to assess the self-reported emergency preparedness procedures and practices among a multi-provincial sample of Canadian LTC foodservice professionals during natural disasters.

Methods

A cross-sectional survey of a multi-provincial sample of Canadian LTC foodservice professionals was conducted using an online survey approach. Ethical approval for the study was obtained from the Research Ethics Board (REB 2) at the University of Manitoba (protocol number: HE2024-0316). This manuscript will only provide results related to participants' previous experiences with and preparedness for natural disasters.

Sample

The target population included foodservice professionals such as registered dietitians, foodservice managers and supervisors, currently working in Canadian LTC homes. Participant inclusion criteria were as follows: 1) LTC beds not located in a hospital setting, and 2) the LTC home in operation for at least six months. Participation was voluntary and data was anonymized. Participants completed consent forms prior to participating in the study.

Questionnaire Development and Testing

In consultation with members of the research team, a survey was developed based on identified gaps in the literature and national and provincial guidelines to assess emergency preparedness practices reported by foodservice professionals within Canadian LTC homes. The 55-question survey included demographic questions (age, gender, RD status, job role, province/territory of origin, length of employment, and length of time in their current position), and questions about the characteristics of the LTC home (type of foodservice operations/meal delivery system used, profit/non-profit status, affiliation with a chain or continuum of care, cultural or religious affiliations, number of available beds, and number of occupied/reserved beds for respite care). Questions about practices and procedures included previous disaster experiences and challenges, current formal or informal written procedures, and staff training. Respondents also had the opportunity to share insights gained from previous experiences that could benefit other facilities and to provide considerations for topics not covered in the survey.

Prior to distributing and administering the survey, a paper-based version of the survey instrument was pilot tested to evaluate its clarity, relevance, and feasibility for the target audience. A purposive sample of ten participants, including RDs and experts in survey development, aging, LTC home operations, and foodservice, was selected. Their feedback was systematically reviewed and used to make targeted revisions aimed at improving the final survey's overall quality and appropriateness.

Survey Procedures

The final survey was developed using the online Qualtrics XM platform. Convenience and snowball sampling methods were used to recruit participants. An invitation containing the survey website link was emailed to relevant professional organizations to share with their

members. These organizations included the Dietitians of Canada's Gerontology Network, the Canadian Association for Long Term Care, the Ontario Seniors Nutrition & Advocacy Committee & Food & Nutrition Advisory Team, AdvantAge Ontario, the Winnipeg Regional Health Authority Long-Term Care Dietitians Group, Gerry Kasten's listserv, and provincial LTC groups. To maximize the response rate, three reminders were sent during the three-month data collection period from June 23 to September 29, 2025.

Analysis

Due to the exploratory nature of the study and the size of the cohort, the analysis focused exclusively on descriptive measures such as means, standard deviations, frequencies, ranges, and percentages. This approach provided a reliable representation of the participants' experiences without the limitations of inferential testing that may not be sufficiently powered. Where appropriate, data were recoded to support the analysis and ensure consistency. The analysis was conducted using the Statistical Package for the Social Sciences (SPSS), version 29 for Windows (IBM, 2022). Despite the high variance, the completion time for the survey closely approximated the anticipated 15-minute duration. Cases with a duration exceeding 60 minutes were excluded from the calculation to control for inactive time, such as leaving the session open or automatic submission. Responses were screened for eligibility and completeness. Cases that did not answer the screening questions ($n = 14$), did not qualify based on the eligibility criteria ($n = 39$), or that left all the questions blank ($n = 25$) were excluded.

Results

Participant Characteristics

Characteristics of participants in the study are listed in Table 4.1. Of the 162 surveys received, 84 were included in the study. Of those, 74 respondents were female (88%), eight were

male (9.5%), and two did not specify (2.4%). The mean age of the participants was 40.8 years (SD = 11.4). Most participants were from British Columbia (44%) and Manitoba (24%), and the largest proportion of LTC homes were located in large/metropolitan areas (40.5%), followed by rural and small towns (32%). Over half (51%) of the respondents were registered dietitians. Nearly 60% of participants had worked five years or less in their current LTC home or position. The average completion time for the survey was 18.9 minutes (SD = 12.11).

Table 4.1 Participant Characteristics

Variable	Overall % (n)
Age (years) [n=83]	
Mean±SD	40.8±11.4
Range	23-64
18-29	16.9 (14)
30-39	33.7 (28)
40-49	27.7 (23)
50-59	14.5 (12)
60-69	7.2 (6)
Registered Dietitian (RD) [n=84]	
Yes	51.2 (43)
No	48.8 (41)
Position/Role in LTC (RD) (Multiple response) [n=43]	
Clinical RD	69.8 (30)
Foodservice Manager/Supervisor	34.9 (15)
Clinical RD with Foodservice Collaboration	16.3 (7)
Position/Role in LTC (Non-RD) (Multiple response) [n=41]	
Foodservice Manager	73.2 (30)
Foodservice Supervisor	29.3 (12)
Other ^a	4.9 (2)
Province (n=84)	
British Columbia	44 (37)
Manitoba	23.8 (20)
Ontario	9.5 (8)
Saskatchewan	8.3 (7)
Alberta	6 (5)
Atlantic Provinces ^b	6 (5)
Northwest Territories	1.2 (1)
Quebec	1.2 (1)
Location of LTC (n=84)	
Large/Metropolitan	40.5 (34)
Rural and Small Towns ^c	32.1 (27)
Small/Medium Population Centres	22.6 (19)
Other/Unknown ^d	4.8 (4)
Years in current LTC home (n=84)	
<5 years	58.3 (49)
6-15 years	28.6 (24)
>15 years	13.1 (11)
Years in current position (n=84)	
<5 years	56 (47)
6-15 years	28.6 (24)
>15 years	15.5 (13)

Note:

^a Responses included: healthcare support worker and LTC home owner.

^b Newfoundland & Labrador (n=2), Nova Scotia (n=2), and Prince Edward Island (n=1).

^c Rural and small towns refer to anywhere outside a census metropolitan area or census agglomeration based on Statistics Canada's 2021 (Statistics Canada, 2022a, 2023).

^c Responses included: facilities in metropolitan area as well as smaller towns such as Nelson, Salmon Arm, Campbell River, Duncan, Kamloops, Kelowna, etc.; and health region.

Overview of LTC Homes

The characteristics of the participating LTC homes are provided in Table 4.2. The majority of respondents (89%) indicated traditional cook-and-serve as their main foodservice system. The most common meal delivery methods were mobile carts (62.2%) and non-mobile carts (53.7%). Over two-thirds of facilities were publicly owned and operated on a non-profit basis. Furthermore, 58% of the LTC homes were part of a chain, with nearly 20% belonging to a continuum of care, a system where residents transition between independent living and nursing care within the same organization. Finally, 79% reported no religious or cultural affiliation, and the largest size category was medium-sized homes (42.3%).

Table 4.2 LTC Homes Characteristics

Variable	Overall % (n)
Type of foodservice system (Multiple response) [n=82]	
Traditional Cook and Serve	89 (73)
Cook/Chill	17.1 (14)
Retherm from an Outside Facility	13.4 (11)
Other ^a	1.2 (1)
Meal delivery methods (Multiple response) [n=82]	
Mobile Carts	62.2 (51)
Non-Mobile Carts	53.7 (44)
Insulated Trays	9.8 (8)
Other ^b	4.9 (4)
Ownership (n=82)	
Public	63.4 (52)
Private	36.6 (30)
Organizational status ^c (n=82)	
Non-Profit/Charitable	63.4 (52)
For-Profit	36.6 (30)
Part of a chain (n=82)	
Yes	58.5 (48)
No	41.5 (34)
Part of a continuum of care ^d (n=81)	
No	80.2 (65)
Yes	19.8 (16)
Licensed by authority (n=82)	
Yes	98.8 (81)
No	1.2 (1)
Cultural/religious affiliation (n=81)	
No	79 (64)
Yes ^e	21 (17)
Size of homes (in beds) (n=79)	
Mean $\pm$ SD	143.5 $\pm$ 83.7
Medium (100-199 beds)	42.3 (33)
Small (<100 beds)	32.1 (25)
Large ($\geq$ 200 beds)	25.6 (20)
Occupancy Rate (%) ^f [n=79]	
Mean $\pm$ SD	97.1 $\pm$ 5.9
Respite Occupancy Rate (%) ^g [n=23]	
Mean $\pm$ SD	63.9 $\pm$ 37.8

Note:

^a Responses included: “our organization operates its own centralized kitchen (cook/chill/freeze) and distributes daily to our own LTC centres”.

^b Responses included: Food is cooked and served from the kitchen directly (n=2); communal dining room (n=1); central kitchen for food prep and delivery to four home areas (n=1).

^c Non-Profit/Charitable: all surplus revenue is reinvested into facility care. For-Profit: surplus revenue can return for owners or shareholders.

^d A system where residents transition between independent living and nursing care within the same organization.

^e Responses included: Catholic (n=2); Evangelical (n=2); Jewish (n=1); “All inclusive”; “5 Churches: Roman Catholic, Anglican, Presbyterian, Mennonite, and United”; “Belong to an ethnic society”; “Faith based”; “Ukrainian Catholic”; and “Mennonite organization”.

^f Percentage of total capacity filled at the time of survey: $(\text{occupied beds} \div \text{total beds}) \times 100$.

^g Percentage of dedicated respite beds (short-stay) filled at the time of survey: $(\text{occupied respite beds} \div \text{beds reserved for respite}) \times 100$.

Reported Disruptions and Challenges

Table 4.3 provides details about previous experiences. Approximately thirteen percent of the participants’ LTC homes were affected by natural disasters, primarily ice storms, snowstorms, wildfires, and flooding, which disrupted essential power and water services. The affected homes were distributed across various regions of Canada and were predominantly in rural and small towns (40%), chain-affiliated (60%) and small in size (50%, fewer than 100 beds).

The most frequently cited challenges were staff shortages (80%) and food supply shortages (70%), where participants could select multiple options. Additional comments provided in open-ended text fields highlighted the following key issues: 1) staff could not access food because the cook, who was the only person with access, was unable to reach the site due to the disaster; 2) they did not know that the refrigerators were not connected to backup power generators, which caused the food to spoil; and 3) software damage during power outage affected access to production worksheets and meal tickets. In response to these types of disruptions, all respondents modified the menu, with most using short stand-up meetings, also referred to as ‘huddles’, to communicate changes to team members.

Table 4.3 Natural Disaster Experiences of Participants

Variable	Overall % (n)
Experienced a natural disaster that affected foodservices (in the last 2 years) [n=79]	
No	79.7 (63)
Yes	12.7 (10)
I don't know	7.6 (6)
Province of affected LTC homes (n=10)	
Ontario	(3)
British Columbia	(2)
Saskatchewan	(2)
Alberta	(1)
Quebec	(1)
Northwest Territories	(1)
Experiences during the natural disaster (Multiple response) [n=10] ^a	
Staff shortages	80 (8)
Food supply shortages	70 (7)
Difficulty getting needed supplies/equipment due to availability	40 (4)
Communication challenges related to providing information	40 (4)
Other	40 (4)
Storage space limitations for extra supplies and equipment	30 (3)
Recruitment, hiring and retainment challenges	20 (2)
Restrictions on family/loved ones for resident mealtime help	20 (2)
Difficulty getting needed supplies/equipment due to cost	10 (1)
Modifications in response to natural disaster (Multiple response) [n=9] ^a	
Menu modifications	100 (9)
Immediate role changes of staff to meet critical/essential needs of LTC (without training)	33.3 (3)
Other ^b	22.2 (2)
Communication of changes to team members (Multiple response) [n=10] ^a	
Huddles	80 (8)
Meetings	50 (5)
Informal verbal communication	50 (5)
Rounds	40 (4)
Other ^c	40 (4)
Bulletin boards	30 (3)
24-hour report	30 (3)
Email	20 (2)

Note:

^a Variables were only displayed for participants that confirmed having experienced a natural disaster in the last two years.

^b Responses included: "use of disposable/single-use dishes to reduce the water usage on dishwashing"; "make copies of the meal tickets and production sheets and re-use them once the computer software was damaged because of the storm".

^c Responses included: "whiteboards in the huddle area"; "text message"; and "written memos".

Current Status of Emergency Planning and Preparedness Components

Table 4.4 shows the components of preparedness and planning. Over 80% (n = 40/49) of participants reported having a formal emergency plan designed to provide foodservices to residents in the event of a natural disaster. A formal plan involves documented, structured procedures, as opposed to an informal one. The presence of a plan was similar between RDs (83.3%) and non-RDs (80.7%), as well as between publicly owned LTC homes (82.8%) and private homes (80%). It was also reported at a higher frequency among small and medium population centers (100%) than large areas (79%).

Among those without a formal plan, 66.7% said they did not intend to develop one. The main barriers cited were difficulty of preparing for unknown disasters affecting foodservices, the belief that existing contingency menus tailored to outbreaks would be sufficient, and the tendency to plan only when an issue was anticipated.

Most plans (84%) were developed based on government or provincial guidelines and reviewed annually (43%). However, the specific guidelines utilized were not identified in this study. Although only 10.8% of participants activated their plan within the past two years, half of those who did modify it. Specifically, experience with events like Hurricane Fiona revealed that existing preparations may underestimate the duration of disasters. One participant said, "[Hurricane] Fiona was a major issue for us [because] it lasted about a week when we are [used] to [three] days".

Table 4.4 Components and Planning for Natural Disaster Preparedness

Variable	Overall % (n)
Components of Preparedness (Multiple response) [n=70]	
Contingency menu	82.9 (58)
Staffing guidelines	62.9 (44)
Meal delivery modifications	48.6 (34)
Emergency food supplier information	37.1 (26)
Dining room modifications	37.1 (26)
Other ^a	7.1 (5)
Have an Emergency Foodservices Plan tailored to natural disaster situations (n=49)	
Yes	81.6 (40)
No	18.4 (9)
Resources used to develop plan (Multiple response) [n=38] ^b	
Government/Provincial guidelines	84.2 (32)
Industry standards	57.9 (22)
Learned experience	47.4 (18)
Internal assessments	44.7 (17)
Consultation with experts	26.3 (10)
Other ^c	13.2 (5)
Plan is revised, reviewed or updated (n=34) ^b	
Yes ^d	91.2 (31)
No	8.8 (3)
Last revision period (n=29) ^{b,e}	
Past 6 months	37.9 (11)
6–12 months	27.6 (8)
1–2 years	24.1 (7)
More than 2 years	10.3 (3)
Frequency of revision (n=28) ^{b,e}	
Annually	42.9 (12)
Only as needed	28.6 (8)
Every two years	14.3 (4)
Other ^f	14.3 (4)
Had to activate or implement the plan in response to a natural disaster (in the last 2 years) [n=37] ^b	
No	89.2 (33)
Yes	10.8 (4)
Foodservice staff received training in emergency foodservice procedures (n=54)	
Yes	51.9 (28)
No	48.1 (26)
Frequency of training (n=23) ^g	
Annually	78.3 (18)
Biannually	13 (3)
Quarterly	4.3 (1)
Monthly	4.3 (1)

Continued...

Variable	Overall % (n)
Preparedness of LTC foodservice (n=65)	
Moderately prepared	52.3 (34)
Slightly prepared	29.2 (19)
Extremely prepared	10.8 (7)
Not at all prepared	7.7 (5)
Have a protocol to address the foodservice needs of residents with special dietary requirements during emergencies (n=58)	
Yes ^h	86.2 (50)
No	13.8 (8)

Note:

^a Responses included: "extra shelf-stable food items stored in ready-to-grab tubs"; "there is a provincial emergency preparedness on-call person".

^b Variables were only displayed for participants that confirmed having a plan.

^c Responses included: "food supplier, associations"; "emergency preparedness with the proper training of staff"; "the learned experience was through other homes within the organization"; "accreditation standards"; and "corporate menus".

^d Those that declared they had a plan were asked who was part of the revision team. The responses included: local management (leadership); partnerships between the foodservice and the clinical/care team (RDs, directors of care), or between leadership and foodservice, or leadership and clinical/care team; senior corporate management; quality/safety teams; and third-party services.

^e Variables were only displayed for participants that confirmed the plan is revised, reviewed or updated.

^f Responses included: "every 2 months"; "2 times a year"; and "twice in semiannual".

^g Variables were only displayed for participants that confirmed receiving training in emergency foodservice procedures.

^h Responses included: emergency menus already include texture modifications; care plans are sent with residents if they evacuate to a nearby facility; emergency stock of pre-purchased nonperishable or frozen texture-modified items, such as pureed food and thickeners; back-up generators to run small food processors; prepared for pre-thickened fluids but not for texture modified food options.

The most frequently reported components were the contingency menu (82.9%) and staffing guidelines (62.9%). When selecting each component, participants were requested to

provide additional descriptions in open-ended text fields. A summary of these qualitative details and selected illustrative quotes is presented in Table 4.5.

Table 4.5 Details of Emergency Preparedness Components

Component	Common details	Example quotes
Contingency menus	The majority (n = 44) indicated having a menu for at least 3 days.	"...we have a 3-day menu for no service, no power, no water", and "... Emergency water [supply] stored on campus, 4 liters/per person/day".
Staffing guidelines	Protocols such as staffing shortage protocols, emergency fan-out process, and working alone plan.	"We have specific staffing protocols in place to ensure essential foodservice personnel are available during emergencies."
Meal delivery modifications	Most respondents indicated using tray service.	"[we have] different kinds of closed carts available to prevent any damages to the food", "[we] need to use alternate method if elevator is down [due to power outage] - [currently, we are] not well prepared for this", "residents [are] often moved to a new site with different food service delivery styles", and "...renting an external mobile kitchen, or having prepared meals (texture modified) delivered".
Dining room modifications	Use of disposable tableware and evacuation procedures.	"[for] lack of power [we have] emergency lighting in the dining room, disposable dishes. [If an] alternate location for dining [is required], [we have] portable tables...", "use of propane burners, change to disposable dishes", and "[gathering] residents together to keep an eye on everyone".

Although most participants reported having an emergency plan, only 52% of all respondents offered emergency training to their staff. In terms of location, operations in rural and small towns had the lowest percentage at 39%. Among those providing training, 87.5% had a formal emergency plan. When asked to rate the preparedness of their LTC foodservice operations, 63.1% of respondents identified their operations as moderately or extremely prepared. This preparedness rating was higher among operations with a formal plan or that provided emergency staff training (74% in both cases) compared to those without. Interestingly, the highest preparedness ratings (88.9%) were among participants who had

previously experienced a natural disaster. This finding suggests that lived experience with disasters may play an important role in perceived readiness. In terms of preparedness level by location, operations in small and medium population centres were rated as the most prepared (81%), compared to large or metropolitan areas (50%). Finally, RDs were slightly less confident in their LTC foodservice's ability to respond to a natural disaster compared to non-RDs (55.6% vs. 68.4%).

Discussion

The purpose of this study was to assess the current emergency preparedness procedures and practices of Canadian LTC foodservice operations as reported by a sample of foodservice professionals in the event of a natural disaster. Many respondents mentioned that their LTC homes have some components of preparedness for their foodservice operations, including a contingency menu for at least three days, guidelines for personnel shortages, and a formal emergency plan. However, just over half of the respondents provided emergency training for staff, and only half felt their LTC homes were prepared for natural disasters. Notably, 12.7% of participants reported that their LTC foodservice was affected by a natural disaster within the past two years. Foodservice teams generally responded by modifying the menu, changing staff roles, and using disposable dishes, as well as hard copies of meal tickets and production sheets. Common challenges included insufficient staffing levels, food supply shortages, and electricity and water disruptions.

Institutional Emergency Planning

Most participating LTC homes have a formal plan designed to provide foodservices to residents in the event of a natural disaster, and a contingency menu for at least three days, aligning with professional recommendations (Dietitians of Canada, 2019; Dietitians of Canada & Gerontology Network, 2022). Interestingly, the majority of respondents reported using government or provincial guidelines and industry standards to develop their plans.

However, only three provinces seem to explicitly require food provision in LTC emergency plans (Department of Health and Wellness, 2018; Government of Newfoundland and Labrador, 2005; Ontario Regulation 246/22, 2022). Additionally, the number of LTC homes with contingency menus alone slightly exceeded the number of homes with a specific foodservice emergency plan (n=58 vs. n=40).

This variation could be explained by how provinces require emergency preparedness. While all provinces require LTC homes to have general emergency plans, most do not provide official templates or explicitly require food provision. Therefore, homes that developed comprehensive foodservice plans likely combined general provincial guidelines with industry standards and professional guidance. On the other hand, facilities without a dedicated foodservice plan may still have a contingency menu by using external resources, for example. These resources could include standard templates available in foodservice software or provided by food distributors and suppliers. Lastly, this suggests that LTC homes without a complete foodservice emergency plan may rely on individual components of preparedness rather than a structured and comprehensive planning process.

Although standard LTC menus usually follow Canada's Food Guide (CFG) and Dietary Reference Intakes (Dietitians of Canada, 2019), it is important to explore if contingency menus adequately meet the nutritional requirements of residents. This is because many homes in the present study reported reducing menu options to manage potential staff shortages and time constraints when responding to emergencies. This adaptation may prevent menus from fully meeting standard recommendations, as observed in other studies (Colón-Ramos et al., 2019). Therefore, there is a potential need to develop specific nutritional recommendations for emergencies that account for these practical limitations, similar to Japan, which established specific nutritional guidelines for disasters (Sato et al., 2025).

Some participants without an emergency plan indicated in the open-ended text fields that they believed their outbreak menus were enough for disaster events. However, natural disasters and infectious disease outbreaks can affect LTC foodservices in different ways. Disasters often cause logistical and infrastructural issues. For example, road closures could interrupt the delivery of food supplies, and boil water advisories could limit water for cooking, cleaning, and hydration. These problems could happen even if the event does not directly impact the facility. Therefore, it is important to have clear protocols for maintaining food provision during utility disruptions, as these issues do not usually occur during outbreaks.

Emergency Training for Foodservice Staff

Only half of all respondents provided emergency training to their staff, even though conducting these activities within the foodservice department is essential to educate staff and promote disaster preparedness (Canadian Red Cross & National Institute on Ageing, 2020; Takeda et al., 2023). A study by Takeda et al. (2023) highlights the importance of practical preparation. The authors observed that, despite having a plan, foodservice staff had never prepared their entire contingency menu. When they participated in a practical drill, several challenges with executing the plan were identified, such as issues with lighting, cooking processes, inadequate sanitation, and serving foods unsuitable for residents with impaired chewing and swallowing. Therefore, regular training is critical to ensure optimal nutrition care during disasters. In Ontario, for example, LTC homes must ensure that staff are trained in emergency procedures (Ministry of Long-Term Care, 2022). However, it remains unclear whether food provision is covered during this training session. This gap highlights the need for foodservice professionals across Canada along with residents' family members to advocate for this specific aspect to be included in mandatory staff training at their LTC homes.

Insights into Reported Perceptions of Preparedness

The results of this survey showed that two-thirds of the respondents rated their LTC foodservice operations as prepared to respond to a natural disaster. This level of perceived preparedness is higher than that reported in a previous study (Bell et al., 2024), where nearly half of healthcare workers expressed a lack of confidence in their facilities' readiness. Furthermore, the present study showed that LTC homes that provided emergency training reported higher preparedness. This may suggest a potential relationship between training and readiness, which aligns with national recommendations that emphasize staff training to improve emergency preparedness (Canadian Red Cross & National Institute on Ageing, 2020).

Notably, non-RDs were slightly more confident in disaster readiness than RDs. This aligns with previous research showing that non-clinical staff generally report higher confidence than clinical personnel (Dobalian et al., 2020). This difference may relate to their distinct roles. Non-RDs usually manage kitchen logistics, which can increase their operational confidence. In contrast, RDs generally focus on clinical care and might be more concerned about how emergencies affect complex diets and resident nutrition, leading to a more cautious rating.

Operational Challenges and Utility Disruptions

Staff and food supply shortages were the most common challenges faced by respondents, aligning with previous research (Laditka et al., 2009). To manage staff shortages, participants frequently reported modifying menus to reduce workload and cross-training staff from other departments. Food supply shortages, on the other hand, present different issues. Homes using outside food production, such as cook/chill and retherm systems, are highly vulnerable to supply chain disruptions from extreme weather or road closures. Therefore, these facilities could benefit from securing contingency contracts with

alternative suppliers for shelf-stable products. Notably, four out of ten affected LTC homes were in rural and small towns, where factors such as remoteness and limited access to emergency resources can further complicate logistics and food provision.

Disruptions to electricity were frequently mentioned during natural disasters (Dosa et al., 2008). Ensuring proper energy provision to foodservice operations is vital for practical preparedness in the event of electricity disruptions, as it may directly threaten safe food preservation and residents' nutritional health. These challenges underscore the need for professionals to include regular power infrastructure inspections in their protocols, and to advocate for kitchen infrastructure to be integrated into facility backup power systems. Another important implication related to power loss is the disruption of network connectivity, which could hinder access to essential online food production sheets, menus, and meal tickets. Given that this potential digital vulnerability can persist even after power is restored, foodservice management should maintain printed or offline backups of critical files to ensure continuous food provision.

Water disruptions were also frequently mentioned, with most participants reporting the use of disposable dishes and cutlery to manage the situation. However, this practice requires caution, as Kokura's (2025) findings indicate that prolonged use of disposable tableware and reduced meal variety due to water shortages can negatively impact the overall energy intake of vulnerable residents, potentially increasing their nutritional risk. This highlights the potential need for LTC homes to evaluate their contingency water storage, which may be essential to ensure sufficient water supplies for cooking, cleaning and maintaining adequate resident hydration during an emergency.

Study Limitations

This study has potential limitations. Using convenience and snowball sampling methods to recruit participants may have resulted in findings that are not fully representative

of LTC foodservices throughout Canada. The survey was only available in English, eliminating participation from French speaking individuals. Despite reminders being sent to encourage participation, the period during which data was collected, primarily in the summer, when many professionals were away from their LTC homes, greatly impacted recruitment and the size of the study cohort. Reliance on self-reported data may have introduced biases. The limited cohort size, particularly the low number of homes affected by natural disasters, prevented the identification of statistical associations between variables. The specific components of emergency plans and the content of emergency training provided to staff were not explored, which limits the generalizability of the related findings.

Study Implications

The findings of this study have important practical implications. The differences in preparedness perceptions between RDs and other foodservice professionals highlight the need for improved internal communication regarding emergency response. Additionally, regulatory bodies should consider making practical training a mandatory requirement on top of a formal plan. To help reduce the burden of creating emergency plans from scratch, developing adaptable response templates would be a valuable strategy. These templates would provide a consistent framework for essential procedures and allow each LTC foodservice to customize the content according to local risks and resources to remain operational during natural disasters.

Future Research

Based on these findings, future research should investigate how to develop and implement foodservice emergency preparedness components and training specifically for LTC homes with limited resources and for those located in rural and small towns. Additionally, assessing external evacuation procedures is an important area for future research as they represent a critical component of the broad disaster response. Future studies

should also evaluate how operational barriers, such as energy and water disruptions, and simplified menus could potentially impact residents' nutritional risk. Finally, further research should consider employing qualitative methods such as semi-structured interviews to explore LTC foodservice managers, supervisors and dietitians' experiences regarding real-world barriers and preparedness. This would provide deeper insights into their challenges.

Conclusions

Overall, the results suggest that preparedness for natural disasters among the participating LTC homes may be limited. While most facilities have a formal emergency plan, only half reported providing staff training. Having a plan is a critical first step, but it may be insufficient if staff lack the training to execute it. Therefore, updating emergency protocols and expanding staff training are crucial steps to help enhance resident safety and support the continuity of nutrition care during disasters, particularly for homes operating in rural and small towns or with limited resources.

CHAPTER 5: LONG-TERM CARE FOODSERVICE IN CANADA – EMERGENCY PREPAREDNESS FOR OUTBREAKS

Introduction

Infectious disease outbreaks pose significant challenges to LTC homes. This event is defined as a localized epidemic in which two or more people in the same place manifest the same health condition at the same time (WHO, 2020). LTC homes environments, characterized by shared living spaces and close contact between residents and staff, make them particularly susceptible to the transmission of respiratory and gastrointestinal infections (Leece et al., 2023). Residents are especially prone to negative outcomes following infections, such as increased morbidity, infection incidence, and mortality. This vulnerability is largely due to resident characteristics, including advanced age, comorbidities, and frailty (Leece et al., 2023).

In Canada, LTC residents are at a higher risk of contracting COVID-19 (CIHI, 2025). During the first wave in 2020, more than 80% of the deaths attributed to the virus occurred in LTC homes, exposing critical gaps in the healthcare system (CIHI, 2020b). Pandemic outcomes in LTC homes varied widely across Canada. While some provinces experienced disproportionately high mortality rates during the initial wave, others reported few or no early LTC-related deaths (CIHI, 2020a). However, these patterns changed during later waves, with provinces that initially had recorded only a few cases facing severe outbreaks.

The COVID-19 pandemic forced LTC homes to modify their foodservice procedures and implement necessary infection control measures (Keller et al., 2021). These modifications included establishing physical distancing in dining rooms, transitioning residents to room service, and restricting or limiting visits from family members and volunteers. These changes directly affect residents' ability to consume adequate amounts of food and fluids, which may increase their risk of malnutrition (Keller et al., 2021). Adequate

nutrition is especially crucial during stressful periods, such as outbreaks, to maintain physiological function, boost immune response, and provide energy.

While recent literature has examined foodservice adaptations specifically during the COVID-19 pandemic, research on broader operational outbreak preparedness in Canadian LTC homes, remains limited. Therefore, the purpose of this study was to assess the emergency preparedness procedures and practices reported by a multi-provincial sample of LTC foodservice professionals during infectious outbreaks.

Methods

An exploratory, descriptive and cross-sectional online survey was distributed to a multi-provincial sample of foodservice professionals currently working in LTC homes in Canada. Participants completed consent forms prior to participating in the study. More details are published elsewhere (please refer to methodology from Chapter 4).

Study Population

The target population consisted of foodservice professionals such as managers, supervisors and registered dietitians (RD) currently working in Canadian LTC homes. Participant inclusion criteria were as follows: 1) LTC beds not located in a hospital setting, and 2) the LTC home in operation for at least six months.

Questionnaire

The survey assessed participant demographics (age, gender, province, job role, and RD status) and LTC home characteristics (foodservice type, delivery system, ownership, chain status, and affiliations). Preparedness variables included previous outbreak experiences, existing written procedures, and staff training. Before full distribution, a paper-based version of the survey underwent pilot testing to evaluate its clarity, relevance, and feasibility for the target audience.

Data Collection Procedures

The survey was administered online via Qualtrics XM. Participants were recruited using convenience and snowball sampling. Email invitations and reminders containing the website link address of the survey were sent to relevant professional organizations to be shared with their members over a three-month period (June 23 to September 29, 2025). Participation was anonymous and voluntary.

Data Analysis

Data were analyzed using descriptive statistics (means, standard deviations, frequency, ranges, percentages) and Fisher's exact test. Findings were interpreted with caution given the small sample size ($N < 100$). Where appropriate, data were recoded to support analysis and ensure consistency. The statistical tests were two-sided, with a significance threshold of $p < .05$. The analysis was conducted using the Statistical Package for the Social Sciences (SPSS), version 29 for Windows (IBM, 2022).

Results

Participant Characteristics

Table 5.1 summarizes the characteristics of the respondents. A total of 84 participants were included in the study. Of those, 88% were female, with a mean age of 40.8 years ($SD = 11.4$). Participants were primarily from British Columbia and Manitoba (44% and 24%, respectively), and the largest proportion of LTC homes were in large or metropolitan areas (40.5%), followed by rural and small towns (32%). More than half of respondents were registered dietitians).

Table 5.1 Participant Characteristics

Variable	Overall % (n)
Age (years) [n=83]	
Mean±SD	40.8±11.4
Range	23-64
18-29	16.9 (14)
30-39	33.7 (28)
40-49	27.7 (23)
50-59	14.5 (12)
60-69	7.2 (6)
Registered Dietitian (RD) [n=84]	
Yes	51.2 (43)
No ^a	48.8 (41)
Province (n=84)	
British Columbia	44 (37)
Manitoba	23.8 (20)
Ontario	9.5 (8)
Saskatchewan	8.3 (7)
Alberta	6 (5)
Newfoundland & Labrador	2.4 (2)
Nova Scotia	2.4 (2)
Prince Edward Island	1.2 (1)
Northwest Territories	1.2 (1)
Quebec	1.2 (1)
Location of LTC (n=84)	
Large/Metropolitan	40.5 (34)
Rural and Small Towns ^b	32.1 (27)
Small/Medium Population Centres	22.6 (19)
Other/Unknown ^c	4.8 (4)

Note:

^a Responses included: foodservice manager/supervisor; assistant manager; food service educator for nutrition and food services; healthcare support worker; and owner.

^b Rural and small towns refer to anywhere outside a census metropolitan area or census agglomeration based on Statistics Canada's 2021 (Statistics Canada, 2022a, 2023).

^c Responses included: facilities in metropolitan area as well as smaller towns such as Nelson, Salmon Arm, Campbell River, Duncan, Kamloops, Kelowna, etc.

Overview of Participating LTC Homes

Almost 90% of LTC homes reported using traditional cook and serve system (see Table 4.2 in Chapter 4). For meal delivery methods, mobile carts (62.2%) and non-mobile carts (53.7%) were the most frequent options (multiple options could be selected by participants). Over two-thirds of LTC homes were publicly owned and operated on a non-profit basis. Fifty-eight percent were part of a chain and nearly 20% were part of a continuum of care, a system where residents transition between independent living and nursing care within the same organization. Almost 80% had no type of religious or cultural affiliation.

Outbreak Experiences and Operational Challenges

Table 5.2 describes participants' outbreak experiences. Over two-thirds of participants reported a recent outbreak affecting their LTC foodservice. Additional comments provided in open-ended text fields highlighted that respiratory infections, including COVID-19, were the most common etiology of the cases, reported by 85.3% (n = 29) of respondents. Additionally, 35.3% (n = 12) of cases were attributed to gastrointestinal infections; while 8.9% (n = 4) were related to other agents, such as chlamydia, enterovirus, scabies, or measles. The challenges experienced during the outbreak were cited by respondents, with the most common being limited staff support due to staff becoming ill (67.6%). In response, most had to make modifications to their menu (83.3%) and cross-training staff to meet nutrition and hydration needs of residents (50%). Team huddles (short stand-up meetings) were the most common communication channel used to inform changes.

Table 5.2 Outbreak Experiences of Participants

Variable	Overall % (n)
Experienced an outbreak that affected foodservices (in the last 2 years) [n=70]	
Yes	62.9 (44)
No	32.9 (23)
I don't know	4.3 (3)
Experiences during the outbreak (Multiple response) [n=37] ^a	
Limited staff support due to illness	67.6 (25)
Lack of time	45.9 (17)
Food supply chain delays	27 (10)
Limited staff support due to leader challenges	24.3 (9)
Limited physical space to store goods	24.3 (9)
Limited training personnel	24.3 (9)
Food supply shortages	24.3 (9)
Equipment supply chain delays	16.2 (6)
Limited administrative support	13.5 (5)
Limited financial support	13.5 (5)
Other ^b	10.8 (4)
Limited staff support due to ineffective policies	8.1 (3)
Modifications in response to the outbreak (Multiple response) [n=36] ^a	
Menu modifications	83.3 (30)
Cross-training staff to meet nutrition and hydration needs of residents	50 (18)
Immediate role changes of staff to meet critical/essential needs of LTC (without training)	30.6 (11)
Other ^c	11.1 (4)
Switch to tray service	5.6 (2)
Communication of changes to team members (Multiple response) [n=41] ^b	
Huddles	82.9 (34)
Informal verbal communication	65.9 (27)
Email	56.1 (23)
Meetings	46.3 (19)
Bulletin boards	39 (16)
Rounds	36.6 (15)
24-hour report	19.5 (8)
Other ^d	9.8 (4)

Note:

^a Variables were only displayed for participants that confirmed having experienced an outbreak in the last two years.

^b Responses included: "having to reorganize kitchen"; and "slow action on providing measles vaccine records from public health".

^c Responses included: "training staff for emergency preparedness"; "computerized menu platform has been initiated"; "service modifications like room service in disposable products vs dining room experience"; and "wear Personal Protective Equipment (PPE)".

^d Responses included: "written in our communication books"; "staff board, public notices"; "phone calls"; and "posted memo".

Current Status of Outbreak Preparedness and Planning

Table 5.3 shows the foodservice components of preparedness and the practices in place for responding to outbreaks. The contingency menu (84.7%) and staffing guidelines (54.2%) were the most frequently reported components. Additional descriptions in open-ended text fields indicate that contingency menus were designed for at least three days. Staffing guidelines included minimum staffing levels, essential duties, and fan-out call procedures, which provide a structured chain for rapid staff notification. Less common components included meal delivery (44.1%) and dining room modifications (28.8%), both of which predominantly involved the use of tray service to rooms.

Nearly 78% of participants had a formal plan designed to provide foodservices to residents in the event of an outbreak. A formal plan involves documented, structured procedures, as opposed to an informal one. The likelihood of having a formal outbreak plan was similar across professional roles (RDs = 82.6%; non-RDs = 74.3%) and ownership types (private = 81.4%; public = 74.2%), with no statistically significant differences ($p = 0.534$ and $p = 0.546$, respectively).

Of those without a plan, 76.9% indicated that they were not planning to develop one. The main barriers cited were the belief that having a plan was not necessary, time constraints, and not considered having a plan before.

Table 5.3 Components and Plans for Outbreak Preparedness

Variable	Overall % (n)
Components of Preparedness (Multiple response) [n=59]	
Contingency menu	84.7 (50)
Staffing guidelines	54.2 (32)
Meal delivery modifications	44.1 (26)
Dining room modifications	28.8 (17)
Emergency food supplier information	22 (13)
Other ^a	5.1 (3)
Have an Emergency Foodservices Plan tailored to outbreaks (n=58)	
Yes	77.6 (45)
No	22.4 (13)
Resources used to develop plan (Multiple response) [n=42] ^b	
Government/Provincial guidelines	76.2 (32)
Learned experience	64.3 (27)
Industry standards	59.5 (25)
Internal assessments	50 (21)
Consultation with experts	28.6 (12)
Other ^c	4.8 (2)
Plan is revised, reviewed, or updated (n=37) ^b	
Yes ^d	97.3 (36)
No	2.7 (1)
Last revision period (n=30) ^{b,e}	
6–12 months	36.7 (11)
Past 6 months	30 (9)
1–2 years	26.7 (8)
More than 2 years	6.7 (2)
Frequency of revision (n=32) ^{b,e}	
Annually	40.6 (13)
Only as needed	28.1 (9)
Every two years	18.8 (6)
Other ^f	9.4 (3)
Every five years	3.1 (1)
Had to activate or implement the plan in response to an outbreak (in the last 2 years) [n=41] ^b	
No	56.1 (23)
Yes	43.9 (18)
Foodservice staff received training in emergency foodservice procedures (n=50)	
Yes	62 (31)
No	38 (19)
Frequency of training (n=28) ^g	
Annually	67.9 (19)
Biannually	10.7 (3)
Monthly	10.7 (3)
Never	7.1 (2)
Quarterly	3.6 (1)

Continued...

Variable	Overall % (n)
Preparedness of LTC foodservice (n=65)	
Moderately prepared	46.2 (30)
Extremely prepared	24.6 (16)
Slightly prepared	24.6 (16)
Not at all prepared	4.6 (3)

Note:

^a Responses included: “[The] guidelines also indicate meal setup and cleanup procedures, as enhanced cleaning must be implemented. They also cannot clean up until all residents have left their dining tables.”; “Water bottles are disposable for individual residents during outbreaks”; and “[The] on-call manager is always available to support [and address] issues at the site level.”

^b Variables were only displayed for participants that confirmed having a plan.

^c Responses included: "our food service plan is guided by our infection control dept."; and "corporate support".

^d Those that declared they had a plan were asked who was part of the revision team. The responses included: a combination of infection control professionals (IPAC) and directors of care; foodservice managers and supervisors and RDs; regional or provincial Health and Public Health authorities; quality/safety management; and corporate support teams.

^e Variables were only displayed for participants that confirmed the plan is revised, reviewed, or updated.

^f Responses included: "it is still on working progress as we work together with other sectors of the government to plan it accordingly"; "after any use. Reviewed on what went well and could be improved"; and "ongoing updated as standards change, or as clientele changes".

^g Variables were only displayed for participants that confirmed receiving training in emergency foodservice procedures.

Most plans were developed based on government or provincial guidelines (76.2%) or learned experience (64.3%). However, the specific guidelines utilized were not identified in this study. Most respondents said their plans are reviewed annually (40.6%) or as needed (28.1%). Nearly 44% of participants activated their plan within the previous 24 months. Of those, six (37.5%) had to modify their plan, primarily for logistical or dietary reasons.

Sixty-two percent of participants reported providing emergency training to foodservice staff, usually on an annual basis (68%). Interestingly, a significant association

was found between having a formal plan for outbreaks and providing emergency training to foodservice staff ($p = 0.003$). Results indicate that LTC homes with a plan are 11.7 times more likely to provide emergency training to their staff than those without a plan (odds ratio = 11.700; 95% CI [2.144-63.847]). However, no statistically significant association was found between RD status and the provision of emergency training ($p = 0.540$).

Participants were asked to rate the preparedness level of their LTC foodservice operations for an outbreak, and 70.8% identified their homes as moderately or extremely prepared. A significant association was found between having a formal plan for outbreaks and perceived preparedness ($p = 0.043$). Of the LTC homes with a plan, 77.3% were rated as prepared, compared to 46.2% of those without a plan. The absence of a formal plan was associated with significantly lower odds of a home being perceived as prepared for an outbreak (odds ratio = 0.252; 95% CI [0.069-0.924]). Additionally, no statistically significant association was found between RD status and preparedness perception ($p = 0.791$). When looking at preparedness level by location, operations in rural and small towns were rated as the most prepared (81%), despite reporting the lowest staff training rates.

Table 5.4 summarizes pandemic-related experiences. Approximately 62% of respondents were employed in their current role during the pandemic period, which spanned from March 2020 to May 2023. Of those, just over 70% reported ordering extra food items, such as shelf-stable products, nutritional supplements, and disposable tableware, in anticipation of supply chain disruptions. Furthermore, 56% experienced storage limitations when managing these additional supplies.

Among the foodservice experiences reported during the pandemic, staffing constraints were the most common. These included shortages due to COVID-19 illness (88.1%), recruitment and retention challenges (73.8%), and the loss of mealtime assistance from residents' family or loved ones (78.6%). Beyond staffing, the most significant logistical

barrier was the difficulty in obtaining necessary supplies and equipment due to limited availability (66.7%).

Table 5.4 COVID-19 Pandemic Experiences

Variable	Overall % (n)
Ordered extra food items in anticipation of food supply chain shortages (n=38) ^a	
Yes	71.1 (27)
No	28.9 (11)
Where stored extra items (Multiple response) [n=21] ^{a,b}	
Dry storage	90.5 (19)
Freezers	66.7 (14)
Refrigerators	47.6 (10)
Other ^c	19 (4)
Experienced storage limitations related to foodservice (n=39) ^a	
Yes	56.4 (22)
No	43.6 (17)
Require special equipment for storage of foodservice supplies (n=38) ^a	
No	92.1 (35)
Yes ^d	7.9 (3)
Foodservice experiences during the pandemic (Multiple responses) [n=42] ^a	
Staff shortages due to COVID-19 illness	88.1 (37)
Restrictions on family/loved ones for resident mealtime help	78.6 (33)
Recruitment, hiring, and retainment challenges	73.8 (31)
Difficulty getting needed supplies/equipment due to availability	66.7 (28)
Modifications in meal service for residents	57.1 (24)
Food supply shortages	50 (21)
Communication challenges related to providing information	42.9 (18)
Menu modifications	42.9 (18)
Immediate role changes of staff to meet critical/essential needs of LTC (without training)	33.3 (14)
Storage space limitations for extra supplies and equipment	26.2 (11)
Cross-training staff to meet nutrition and hydration needs of residents	23.8 (10)
Difficulty getting needed supplies/equipment due to cost	19 (8)
Other ^e	4.8 (2)

Note:

^a Variables were only displayed for participants that were working during the COVID-19 Pandemic.

^b Variables were only displayed for participants that ordered extra items.

^c Responses included: "We have a pandemic storage area"; "Wherever we could find space in the building. We have extremely limited storage at the best of times and was made even worse by having to store extra items"; "Basement"; and "Offices and hallways".

^d Responses included: "More freezer and fridge storage - had to purchase. Purchased many more warmers, insulated dishes, tray trolleys, etc."; "Extra cambro carts"; "Seacan - paper supplies for outbreak".

^c Responses included: "Respiratory/airborne precautions"; and "Repetitive policy change as orders received from MOLTC".

Discussion

The objective of this study was to assess current emergency preparedness of Canadian LTC foodservice operations as reported by a sample of foodservice professionals during outbreaks. In general, many respondents mentioned that their LTC homes have components of preparedness for their foodservice operations, including contingency menus for at least three days, guidelines for lack of personnel, and a formal plan. Nearly two-thirds provide emergency training for staff and most reported feeling prepared for outbreaks that may affect their LTC. Plans are reviewed as needed or annually, and emergency training is provided to staff annually. When an outbreak affected their operations, foodservice teams responded by changing the menu and cross-training staff to meet nutrition and hydration needs of residents. For most, the main challenge faced is limited staff support due to staff illness. Findings from the COVID-19 pandemic indicated that staff shortages and limited help from family during meals, followed by difficulty in acquiring the necessary supplies due to limited availability, were among the main barriers faced in foodservice operations. Regarding supplies, most people had to order extra food items, and many faced some limitations in food storage.

Institutional Emergency Planning

Most participating LTC homes reported having a formal plan designed to provide foodservices to residents during an outbreak, as advocated by professional organizations (Dietitians of Canada & Gerontology Network, 2022). This high rate of formal plans possibly reflects the impact of the COVID-19 pandemic. Although pre-pandemic data were not available for comparison, the pandemic may have forced many LTC homes to rapidly adapt procedures with limited guidance to implement necessary infection control measures. In the open-ended text fields, most respondents noted having a contingency menu for at least three

days. These menus usually offered fewer options, which could ease the burden on staff due to measures like tray delivery to resident rooms and account for potential staff shortages during an outbreak.

Emergency Training for Foodservice Staff

Nearly two-thirds of the respondents indicated that their foodservice staff received emergency training. This finding is important because training is essential for ensuring optimal nutritional care and operational safety in emergency situations. Additionally, the present study shows that LTC homes with formal emergency plans are significantly more likely to provide training, which reinforces the relationship between administrative planning and institutional readiness. On the other hand, the remaining proportion of facilities without training highlights a critical vulnerability in the sector. Foodservice operations without proper training may respond inadequately to outbreaks, which could increase residents' risk of malnutrition and dehydration, while exposing staff to contamination and operational burdens.

Perceived Outbreak Readiness

Most respondents reported confidence in their LTC home's readiness for an outbreak. However, those from facilities without a formal emergency plan perceived their operations as less prepared. These findings suggest that formal emergency plans play an important role in shaping staff confidence and perceived institutional readiness. Therefore, developing and implementing structured emergency plans for outbreaks could be a valuable step to address these gaps, improve staff confidence, and strengthen the overall emergency response.

Personnel Shortages and Mealtime Constraints

The most identified challenge for LTC foodservice was staffing shortages due to illness, which is possibly related to the infectious nature of outbreaks. This issue was also widely reported during the pandemic. Keller et al. (2021) highlighted that staff shortages can directly

reduce mealtime assistance, potentially leading to malnutrition, dehydration, and increased mortality.

Similarly, the present study's findings indicated that the loss of help from family members or volunteers was one of the main barriers to foodservice operations. Family support plays a critical role in LTC homes, and their assistance with eating has been shown to improve residents' food intake compared to staff-only assistance (Wu et al., 2020). However, structural challenges such as underfunding and understaffing can lead to overworked foodservice and care staff who may struggle to meet all residents' needs (Thirsk et al., 2022). This contributes to a heavy reliance on family caregivers to provide basic, unpaid care. Consequently, when outbreak restrictions limit family access to the facility, residents who depend on this assistance may be more susceptible to rushed feeding and poor nutritional outcomes, such as weight loss.

Study Limitations

This study is subject to some potential limitations. Participation from French-speaking provinces may have been affected as the survey was only available in English. Findings may not fully represent LTC foodservices across Canada due to the use of convenience and snowball sampling methods. Although reminders were sent to professional groups to encourage participation, recruitment was greatly impacted, resulting in a small sample size. Therefore, the findings should be interpreted with caution. Furthermore, self-reported data may have introduced response bias. Finally, the survey did not examine the contents of emergency plans and training programs. Specifically, it did not differentiate whether the training was foodservice-specific or if it consisted of general infection control training provided to all facility departments.

Implications of Results

The association between having a formal outbreak plan and providing staff training suggests that written procedures may play an important role in staff education. Therefore, LTC facility administrators should prioritize developing formal outbreak plans and training staff to implement them to better respond to emergencies affecting foodservice operations. Furthermore, adding contingency menus and cross-training to regular operations could help address common challenges, such as staff shortages, sudden role changes without training, and loss of family assistance. These strategies could help reduce the operational burden on foodservice teams during outbreaks.

Future Research

Given the high frequency of staffing shortages and the loss of family mealtime assistance identified in the present study, future research should explore strategies to safely maintain meal support during infectious outbreaks without overloading healthcare staff. Additionally, future studies should use qualitative methods to explore these operational challenges in depth. Specifically, future efforts should focus on how foodservice managers and dietitians adapt to a severe lack of personnel, the factors influencing the practical implementation of written emergency plans during outbreaks, and the components that should comprise these emergency plans and training programs.

Conclusions

In conclusion, the majority of participating professionals reported a basic level of outbreak readiness within their facilities, largely due to previous experiences and staff training. Having a formal outbreak plan may contribute to operational readiness by facilitating staff emergency training. However, notable operational vulnerabilities remain, such as staffing shortages due to illness, which suggests that adherence to written plans may not fully guarantee operational resilience. Ultimately, more qualitative studies are needed to

gain a deeper understanding of the vulnerabilities that LTC foodservices face during outbreak preparedness and response.

CHAPTER 6: GENERAL DISCUSSION

The objective of this exploratory study was to assess the current emergency preparedness procedures and operational practices reported by a multi-provincial sample of Canadian LTC foodservice professionals in the event of emergencies such as outbreaks and natural disasters. The findings showed that most respondents had preparedness measures in place for both types of emergencies, including contingency menus for at least three days, guidelines for personnel shortages, and formal emergency plans. Sixty-two percent of the respondents provided outbreak training for staff, compared to only 52% for natural disasters. Similarly, while 70.8% rated their operations as prepared for outbreaks, 63% felt the same about natural disasters. Notably, 12.7% reported that a natural disaster had affected their foodservice practices in the past two years, compared to 62.9% for outbreaks. In these cases, foodservice teams generally modified the menu, and common challenges included insufficient staffing levels. Additionally, natural disasters presented unique barriers, such as food supply shortages and utility disruptions.

The participating LTC foodservice operations appeared to have similar preparedness measures in place to respond to both natural disasters and outbreaks. A high percentage of respondents reported having a formal emergency plan, as well as individual elements of preparedness such as contingency menus for at least three days and guidelines for personnel shortages. Such measures could be part of a comprehensive plan or exist independently. These findings align with professional recommendations advocating that LTC homes establish emergency plans for different hazards (Dietitians of Canada & Gerontology Network, 2022) and maintain emergency menus (Dietitians of Canada, 2019). Participants commonly reported offering reduced menu options to better manage potential staff shortages and time constraints. Regarding guidelines for personnel shortages, participants mentioned two common measures: hiring staff who live near the facility and implementing fan-out call

procedures, which provide a structured chain for rapid staff notification. Hiring staff who live near the facility would be advantageous for responding to a natural disaster, as it would allow for easier access to the facility in the event of road closures.

Results differed between natural disasters and outbreaks regarding the provision of emergency training to staff. Nearly two-thirds of respondents were provided training for outbreaks, while almost half did so for natural disasters. This difference may be attributed to the higher frequency of outbreaks within LTC environments, where infection control is a requirement for the entire facility. On the other hand, training for natural disasters may be influenced by geographic location, as not every facility has experienced or been affected by such events. Interestingly, this study found that LTC homes with a formal outbreak plan were 11.7 times more likely to provide emergency training to their staff than those without one. A potential explanation for this finding is that a written plan may provide the foundation needed to design staff educational programs, or that these facilities could simply have a stronger overall focus on preparedness. This connection highlights the value of regular emergency training to educate staff and promote readiness in LTC facilities (Canadian Red Cross & National Institute on Ageing, 2020).

Consistent with previous research (Bell et al., 2024), nearly two-thirds of the participants rated their LTC homes as prepared for natural disasters, compared to approximately 71% for outbreaks. It is important to consider the influence of the COVID-19 pandemic on these findings, as recent experience may have increased confidence in outbreak response. A similar trend regarding the role of past exposure was observed for natural disasters, where participants in this study who had previously experienced a natural disaster gave the highest preparedness ratings (88.9%, $n = 8$). Additionally, the results showed that non-RDs perceived their departments as being slightly more prepared for natural disasters than RDs did. This finding aligns with previous research indicating that non-clinical

healthcare staff generally report higher confidence in disaster preparedness compared to clinical personnel (Dobalian et al., 2020). In the present study, this difference may be due to the distinct roles of RDs and non-RDs in kitchen operations and management versus clinical care. For example, foodservice managers and supervisors are directly responsible for kitchen logistics, food inventory, and organizing supplies, which could explain their higher confidence in operational readiness. In contrast, RDs primarily focus on clinical care and may be more concerned about how these emergency procedures will affect complex residents' diets and nutritional outcomes.

In addition to professional roles, geographic location presented some interesting differences related to institutional readiness. The results showed that LTC foodservices in small and medium population centres demonstrated higher adherence to formal preparedness components, such as contingency menus, emergency plans, and staff training, for both types of emergencies. However, operations in rural facilities were frequently rated by respondents as prepared for both types of emergencies, despite reporting the lowest staff training rates. Potential explanations for this contrast involve social and structural factors. Rural facilities with high social capital may rely more on informal support networks, increasing institutional confidence while lowering risk perception and adherence to formal training (Hall et al., 2023). Structural factors, such as limited financial resources and preparedness infrastructure, may also play a role.

More respondents reported experiencing outbreaks compared to natural disasters. Outbreaks are common in LTC homes due to the environment and the compromised health status of the residents. Unlike natural disasters, the main challenge foodservice operations face during outbreaks is limited staff support due to staff illness (Keller et al., 2021). Consequently, these staff shortages directly reduce the personnel available for food production and resident mealtime assistance. Time constraints were also reported, potentially

due to the need to comply with increased infection control measures, such as wearing personal protective equipment, washing hands more frequently, and constantly cleaning dining room equipment. To mitigate these challenges, cross-training staff from different sectors to assist with feeding residents during mealtimes was a common practice.

While the survey explored experiences with specific natural disasters and outbreaks, the findings show that LTC foodservice may be heavily impacted by the disruption of essential services, such as water and electricity (Dosa et al., 2008; Laditka et al., 2009). These disruptions can be a secondary effect of a disaster, such as road closures blocking food supplies or water advisories, even if the event does not directly affect the facility. Furthermore, open-ended responses regarding difficulties in accessing food production sheets, menus, and residents' meal tickets highlight how the reliance on online software creates a modern vulnerability. For facilities that utilize these digital platforms for daily operations, a lost network connection could mean that staff cannot access critical dietary information required for adequate food provision. This issue could occur or persist independently of power restoration, highlighting an urgent need for foodservice management to maintain printed or offline backups of essential production files.

Ultimately, foodservices are essential for emergency preparedness in LTC homes because they ensure that residents receive adequate nutrition during disruptions. Emergencies can affect LTC foodservices and residents in different ways. Natural disasters, for example, present logistical and infrastructural challenges. On the other hand, outbreaks introduce infection control requirements that can affect food provision. Therefore, it is imperative that LTC foodservices are prepared to cope with such events.

Strengths and Limitations

To the best of the author's knowledge, this is one of the few studies providing a multi-provincial assessment of emergency preparedness in LTC foodservices across Canada. Using

an online survey allowed for a broad range of experiences from LTC homes across Canada. This study addresses a significant gap in the literature on foodservice preparedness by providing data that can help inform future policies and emergency foodservice protocols in Canadian LTC facilities.

This study has some limitations. First, since the sample is based on individual respondents, the number of LTC homes represented by these data is unknown. The use of convenience and snowball sampling methods to recruit participants may have affected the generation of a random sample, thus, respondents cannot be considered representative of the region in which they work. The findings are not fully representative of LTC foodservices throughout Canada. Additionally, the survey was only available in English, which limited the inclusion of French speaking individuals. The small cohort size prevented the identification of statistical associations between variables related to experiences with natural disasters. Self-reported data may have introduced response bias, reflecting individual awareness rather than objective institutional assessments. Due to the survey's broad scope, specific components of emergency plans and the content of emergency training programs offered to staff were not explored because both were assessed using single binary questions. The repetition of questions across the natural disaster and outbreak sections, without specifying if the components were specific to a particular type of emergency or general, may have created ambiguity and a perception of redundancy.

Implications of Findings

The findings of this study have important practical implications. They highlight a significant gap in the preparedness of LTC foodservices. Participants rated their LTC homes as more prepared for outbreaks than natural disasters, and staff training was more frequently provided for outbreaks than for natural disasters. This difference could be partly explained by the higher frequency of outbreaks in LTC environments, which may lead to greater

familiarity with managing staff shortages and infection control protocols. In contrast, less common situations, such as natural disasters, present different risks that staff may not be prepared for, even with a formal plan in place. Without proper training, staff may lack confidence, which could compromise their response to such situations.

To address these preparedness and training gaps, at the macro level, health authorities should update regulations to explicitly require a food provision section in emergency plans as well as proper training to apply the plan. Currently, explicit requirements for food provision can be found in provinces such as Newfoundland and Labrador, Ontario, and Prince Edward Island (Department of Health and Wellness, 2018; Government of Newfoundland and Labrador, 2005; Ontario Regulation 246/22, 2022). At the intermediate level, policymakers can enforce this standard by incorporating foodservice emergency preparedness into provincial audits and inspections of LTC homes. British Columbia currently uses such an approach, with checklists for emergency menus and contingency supplies (British Columbia. Ministry of Health, n.d.). Finally, at the micro level, foodservice professionals and family members through facility Family Councils should advocate with facility administrations to ensure food provision is prioritized in emergency preparedness.

Additionally, to reduce the burden of developing emergency preparedness components individually, there is a clear need for adaptable response templates for foodservice departments. These templates can provide a consistent framework for essential procedures and allow each LTC foodservice to customize the content according to its unique geographic risks and resources. This would help ensure that foodservices remain operational during a crisis.

Future Research

Based on the findings and limitations of this study, several areas should be investigated. First, research should examine the specific components of formal disaster plans

and foodservice emergency training programs to identify best practices and ensure effective implementation across LTC homes. Second, from a nutritional perspective, studies are needed to evaluate how operational adaptations during emergencies such as contingency menus with reduced options and shortened mealtimes impact residents' dietary intake and malnutrition risks, using objective metrics like weight loss and dehydration rates. Finally, qualitative research should explore the experiences and perspectives of LTC foodservice managers, supervisors, and dietitians about real-world operational barriers and preparedness. This would provide deeper insights into their challenges with emergency preparedness.

Take-Away Points

Research Objective: To assess the self-reported emergency preparedness procedures and operational practices within a sample of Canadian LTC foodservice professionals during natural disasters and outbreaks.

1. How have foodservice departments in LTC homes responded to emergencies including natural disasters and outbreaks?

- **Natural Disasters:** Menu modification was a universal response among participants to maintain service.
- **Outbreaks:** In addition to modifying menus, homes cross-trained staff to meet the nutrition and hydration needs of residents. During the pandemic, many facilities ordered extra food items.

2. What challenges do foodservice departments experience in response to these events?

- **Natural Disasters:** The primary barriers were staff and food supply shortages, and loss of essential utilities (power, water, etc.).
- **Outbreaks:** The most significant challenge was limited staff support due to staff becoming ill. Pandemic-related issues also included loss of mealtime assistance from family members, and difficulty obtaining necessary supplies and equipment.

3. What procedures and practices do foodservice departments in LTC homes have in place to respond to these events?

- **Formal Plans:** Over 80% of homes had a formal emergency plan for natural disasters, while nearly 78% had one for outbreaks.
- **Plans Development:** Plans were primarily developed using government or provincial guidelines; however, the specific guidelines utilized were not identified in this study. Additionally, outbreak plans were often based on learned experience from previous events.
- **Contingency Practices:** Most homes have contingency menus for at least three days and staffing guidelines. During outbreaks, meal delivery predominantly shifts to tray service.
- **Staff Training:** The majority of facilities provided staff emergency training for outbreaks, compared to almost 50% of homes providing training for natural disasters. LTC homes with a formal outbreak plan had higher odds (11.7) of providing emergency training to their staff than those without one.
- **Preparedness Ratings:** Participants rated their operations as slightly more prepared for outbreaks than natural disasters (71% vs. 63%).

4. How often are emergency procedures and practices updated?

- **Review Frequency:** Foodservice emergency plans are typically reviewed annually for both categories. Outbreak plans are also updated on an “as needed” basis.

5. How often do staff receive training on foodservice emergency preparedness?

- **Training Frequency:** For both emergency categories, staff training is generally conducted on an annual basis.

Summary

The findings showed notable gaps in the emergency preparedness reported by this multi-provincial sample of LTC foodservice professionals regarding outbreaks and natural disasters. While most participants indicated basic readiness for outbreaks within their facilities, largely due to previous experiences and training, their reports suggested they were somewhat less prepared for natural disasters. Furthermore, while having a formal emergency plan is a critical first step, a written plan may not be effective if foodservice staff are not properly trained to execute it. In conclusion, given the increasing frequency of natural disasters, updating foodservice emergency protocols is needed across the LTC sector, particularly in regions more prone to such events. Addressing these operational gaps remains vital to help safeguard the nutritional care, health, and well-being of vulnerable residents during future emergencies.

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APPENDICES

Appendix A - Ethics approval



Research Ethics and Compliance

Human Research Ethics - Fort Garry
66 Chancellors Circle
Winnipeg, MB R3T 2N2
humanethics@umanitoba.ca

RENEWAL APPROVAL

Effective: December 5, 2025

New Expiry: December 8, 2026

Principal Investigator: Christina O Lengyel
Protocol Number: HE2024-0316
Protocol Title: *Emergency Food Service Preparedness in Canadian Long-Term Care*

Office of Human Research Ethics as designated by REB2

Research Ethics Board 2 has reviewed and renewed the above research. The Office of Human Research Ethics (OHRE) is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans- TCPS 2 (2022)*.

Please note the following important information about your renewal approval:

- i. Any changes to the protocol or research materials must be approved by the OHRE **before implementation**.
- ii. Any **deviations** to the research or **adverse events** must be reported to the OHRE immediately through an **REB Event**.
- iii. This renewal is valid for **one year only**. A Renewal Request must be submitted and approved prior to the above expiry date.
- iv. A **Protocol Closure** must be submitted to the OHRE when the research is complete or if the research is terminated.

Appendix B - Email Script Recruitment for Pilot Test

Email Subject Title: Participants Needed to Pilot Test Survey - Emergency Foodservice Preparedness

Dear [participant's name],

My name is Juliana Dullius, and I am Dr. Christina Lengyel's M.Sc. Student.

I am writing to kindly invite you to pilot test a survey examining “Emergency Foodservice Preparedness in Long-Term Care Homes across Canada”, that I am conducting in the Department of Food and Human Nutrition Sciences at the University of Manitoba under the supervision of Dr. Lengyel.

If you decide to take part in the pilot test you may be invited to provide feedback on the survey's clarity, wording, and usability to ensure it is understandable and relevant to the target audience (LTC foodservice professionals). The survey should take approximately 15 minutes to complete.

Attached to this email are:

- The Consent Form
- The Emergency Foodservice Preparedness (EFP) Survey
- The Evaluation Sheet

Please note that the deadline to complete the evaluation of the survey is April 21, 2025. Once completed, please return the signed consent form and the completed evaluation sheet to email_email@myumanitoba.ca.

This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns about this project, you may contact Dr. Christina Lengyel, Principal Investigator (email_email@umanitoba.ca or 000-000-0000) or the Human Ethics Coordinator (humanethics@umanitoba.ca or 204-474-7122).

Thank you for considering this request.

Best Regards,

Juliana Dullius and Dr. Lengyel.

Appendix C - Survey Pilot Test Evaluation Sheet

Research Project Title: Emergency Foodservice Preparedness in Long-Term Care Homes across Canada (Pilot Test)

Thank you for participating in the pilot test of this survey. Your feedback is essential to ensuring that the survey is clear, effective, and aligned with its objectives. Please take a few minutes to complete this evaluation.

1. To what extent did the survey align with its stated objectives?

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

If Disagree or Strongly Disagree, please explain: _____

2. Were any questions unclear or confusing?

☐ None ☐ A few ☐ Several ☐ Many

If applicable, please specify which questions and why: _____

3. Did any questions feel redundant or repetitive?

☐ Yes If yes, please specify which ones: _____
☐ No

4. Were the response choices clear and easy to understand?

☐ Yes
☐ No If no, what improvements would you suggest?

5. Did you notice any spelling, grammar, or formatting errors?

☐ Yes If yes, please specify: _____
☐ No

6. How long did it take you to complete the survey?

_____ minutes

7. How do you rate the length to complete the survey?

☐ Too short ☐ Just right ☐ Too long

8. Are there any topics missing that should be included?

☐ Yes If yes, what do you suggest? _____
☐ No

9. Are there any topics that should be removed?

☐ Yes If yes, what do you suggest? _____
☐ No

10. Do you have any other feedback or suggestions for improvement?

Thank you for your valuable feedback!

Appendix D - Detailed Summary of Changes – Survey

Question/Item	Action Taken	Original Wording	Revised Wording
Objective alignment	Added a brief description of the survey objectives in the introduction text of the survey	Survey objectives were not clearly outlined in the preamble	Purpose of the Study: Considering that emergency foodservice preparedness is critical for Long-Term Care (LTC) homes to ensure, provide and maintain foodservice delivery and nutritional support to residents during natural disasters and outbreaks, this research study aims to examine foodservice emergency preparedness in LTC homes across Canada. Your participation in this study will allow us to examine your facility's emergency preparedness plans, past experiences, and staff communication during emergencies.
Screening questions	Clarified in survey introduction that these questions are solely for eligibility screening	As mentioned in the email invitation, we have some qualifying questions to ask prior to the research questions. These questions are designed to find people working within long-term care (LTC) homes who have a particular set of experiences.	[...] The answers will be used just to confirm eligibility.
Section A			
Questions 7 and 8	Added instruction on how to report partial years	7. How long have you worked in your current LTC home? 8. How long have you worked in your current position?	[...] Please round up to the nearest full year.
Section B			
Question 10	Revised question to include 'select all that apply' to capture multiple systems in use	What type of meal delivery system is used in your home?	[...] (Select all that apply)
Question 11	New question added about LTC home ownership type (e.g., public/private)	This question did not exist	11. Is your LTC home publicly or privately owned? ☐ Public ☐ Private

			☐ I don't know
Question 13	Added a definition popup for "chain" to clarify meaning	Is your LTC home part of a chain?	[...] (<i>A group of LTC homes owned or operated by the same company or organization</i>)
Questions 12 to 16	Added "I don't know" option to increase flexibility	☐ Yes ☐ No	☐ Yes ☐ No ☐ I don't know
Question 15	Reworded to clarify the question	Is your LTC home licensed?	[...] by a provincial or territorial authority?
Question 16	Reworded to clarify the question	Does your LTC home have cultural or religious affiliations?	[...] any specific cultural or religious affiliation (e.g., Catholic, Indigenous, etc.)?
Questions 17 to 21	Added instruction on how to report requested numbers	For the next questions, please fill in the number	[...] (Approximate numbers are fine)
Section C and Section D			
Section C Instructions	Added definition popup of 'natural disaster' at the start of section	No definition of natural disaster provided	<i>Natural disasters refers to events such as floods, wildfires, tornadoes, extreme snowstorms, etc.</i>
Section D Instructions	Added definition popup of 'outbreak' at the start of section	No definition of outbreak provided	<i>An outbreak refers to a sudden increase in cases of an infectious disease, such as respiratory illnesses, gastrointestinal infections, or MRSA.</i>
Question 22 / Question 36	Added "I don't know" option to increase flexibility	☐ Yes ☐ No	☐ Yes ☐ No ☐ I don't know
Question 22a / Question 36a	Reworded to clarify the question	How many times? Why?	How many times? Please describe the events:
Question 26 / Question 40	Added "Not Applicable" option to increase flexibility	☐ [...] ☐ Other (please specify):	☐ [...] ☐ Other (please specify): ☐ Not Applicable
Question 27 / Question 41	Reworded to clarify the question and added "I don't know" option	Does your home have an Emergency Foodservices Environmental Disaster/Outbreak Plan?	Does your LTC home have an Emergency Foodservices Plan tailored to natural disaster/outbreak situations?
Question 28 / Question 42	Reworded to clarify the question and added "Learned experience" and "I don't know" options	What resources were used to develop your LTC home's Emergency Foodservices Natural Disaster plan?	What resources specifically guided the development of your LTC home's Emergency Foodservices Plan for natural disasters?

Question 29 / Question 43	Instructions were updated to better capture the process of revision/update	When was it last revised? (Provide Month/Year)	Are your LTC home's Emergency Foodservices Plan for natural disasters/outbreaks reviewed or updated? ☐ Yes ☐ No ☐ I don't know
Question 29a / Question 43a	A new question was added to better capture the frequency of revision/update of existing plans	These questions did not exist.	When was it last revised? ☐ Past 6 months ☐ 6–12 months ☐ 1–2 years ☐ More than 2 years ☐ I don't know
Question 31 / Question 45	Reworded to clarify the question and added "I don't know" option	In the last 2 years, has your home had to implement its Emergency Foodservices Environmental Disaster plan?	[...], has your LTC home had to activate or implement its Emergency Foodservices Plan in response to a natural disaster/outbreak?
Question 32 / Question 46	Reworded to clarify the question and added "I don't know" option	Has your home's staff received training in emergency foodservice procedures?	Has the LTC foodservice staff at your LTC home received any training in emergency foodservice procedures?
Question 33 / Question 47	Reworded to clarify the question and added "I don't know" option	How often are drills or simulations conducted to test the Emergency Foodservices Environmental Disaster plan?	How often is training in emergency foodservice procedures provided to foodservice staff at your LTC home?
Question 34 / Question 48	Clarified that question is foodservice focused, reduced from 5 to 4-point Likert scale, and added "I don't know" option	How prepared do you feel your LTC home is for any environmental disaster?	Considering your foodservice department's current preparedness (e.g., procedures, training, supplies), how prepared do you feel your LTC home is for natural disasters/outbreaks?
Question 35	Reworded to clarify the question and changed the options to better capture respondents' experiences	What protocols does your LTC home have in place to address [...]? ☐ [...] ☐ Other (please specify):	Does your LTC home have any protocol in place to address [...]? ☐ Yes. Please describe: ☐ No ☐ I don't know

Section E

Section E Instructions	Added conditional question to display Q50–Q53 only if respondent worked in LTC during the pandemic	All respondents received COVID-19 questions	49. Were you working at your current LTC home or in your current role during the COVID-19 pandemic (March 2020 onwards)? ☐ Yes ☐ No
Question 50	Added "I don't know" option to increase flexibility	☐ Yes ☐ No	☐ Yes ☐ No ☐ I don't know
Question 51	Reworded to clarify that question aims for food items only and added "I don't know" option	Did your home have storage limitations?	Did your LTC home experience any storage limitations related to foodservice equipment, supplies, or ingredients?
Question 52	Reworded to clarify that question aims for food items only and added "I don't know" option	Did your home require any special equipment for storage?	Did your LTC home require any special equipment for storage of foodservice supplies or ingredients?
Question 53	Reworded to clarify the question and added "Not Applicable" option	Did your LTC home experience any of the following during the COVID-19 pandemic in foodservices?	Did your LTC foodservice department experience any of the following during the COVID-19 pandemic?
Question 54	Instructions were updated to clarify that responses should focus on foodservice in LTC settings	Over the past few years, what have you learned about emergency preparedness that might be helpful to others?	[...] emergency preparedness in foodservices that might be helpful to others?

Appendix E – EFP Survey

EFP Survey

Welcome to the Emergency Foodservice Preparedness in Long-Term Care Homes Survey

Purpose of the Study Considering that emergency foodservice preparedness is critical for Long-Term Care (LTC) homes to ensure, provide and maintain foodservice delivery and nutritional support to residents during natural disasters and outbreaks, this research study aims to examine foodservice emergency preparedness in LTC homes across Canada. Your participation in this study will allow us to examine your LTC home emergency preparedness plans, past experiences, and staff communication during emergencies.

We appreciate your assistance and support with this project!

On the next pages, you will find:

- Two **screening questions** to confirm your eligibility,
- The **informed consent form**, and
- The **survey questions**.

The survey should take approximately 15 minutes to complete.

This survey is **anonymous**, and your responses will be analyzed in aggregate form only. If you need to pause and return later, please use the same device (computer, phone, or tablet) and the same internet browser (like Chrome or Safari). Your progress will be saved automatically each time you click “Next,” as long as your browser settings stay the same.

Start of Block: Screening Questions

Thank you for agreeing to take part in this research. As mentioned in the email invitation, we have some qualifying questions to ask prior to the research questions. These questions are designed to find people working within long-term care (LTC) homes who have a particular set of experiences. The answers will be used just to confirm eligibility.

I. Are the LTC beds at your care home located within a hospital setting (i.e., fully integrated with hospital operations)? *Note: LTC homes that are adjacent to or physically connected to a small acute care centre are still eligible to participate.*

☐ Yes

☐ No

II. Has your LTC home been in operation for less than six months? *Note: Homes in operation for less than 6 months are not eligible to participate.*

☐ Yes

☐ No

Start of Block: Survey Questions

Section A - Demographic Questions The first few questions allow us to calculate some group-level statistics describing the general characteristics of people who answered our survey. Your responses will not be used to identify you.

1. In what year were you born? _____

2. My gender identity is (select all that apply):
- ☐ Woman
 - ☐ Man
 - ☐ Non-binary/Trans/Gender Diverse
 - ☐ Other (please specify): _____
 - ☐ Prefer not to answer
3. Are you a Registered Dietitian (RD)?
- ☐ Yes
 - ☐ No
4. Which of the following best describes your position/role in the LTC home? (Select all that apply)
In smaller homes, it is common for staff to hold more than one role. Please select all options that best match your primary responsibilities.
- ☐ Foodservice Manager – Oversees the entire food service operation, including budgeting, staffing, regulatory compliance, and setting departmental policies.
 - ☐ Foodservice Supervisor – Supervises daily food service operations, such as scheduling, food safety, and food preparation oversight.
 - ☐ Other (please specify): _____
5. In which province or territory do you currently work within LTC?
- ☐ British Columbia
 - ☐ Alberta
 - ☐ Saskatchewan
 - ☐ Manitoba
 - ☐ Ontario
 - ☐ Quebec
 - ☐ New Brunswick
 - ☐ Nova Scotia
 - ☐ Newfoundland & Labrador
 - ☐ Prince Edward Island
 - ☐ Yukon
 - ☐ Northwest Territories
 - ☐ Nunavut
6. What is the population in the location of your LTC home (approx. population size)?
- ☐ Hamlet (fewer than 300)
 - ☐ Village (300-999)
 - ☐ Town (1,000 – 9,999)
 - ☐ Small city (10,000 – 29,999)
 - ☐ Medium city (30,000 – 99,999)
 - ☐ Large city (100,000 – 999,999)
 - ☐ Metropolitan area (1 million +)
 - ☐ Other (please specify): _____
 - ☐ Unknown
7. How long have you worked in your current LTC home? Please round up to the nearest full year.
- ☐ Less than one year
 - ☐ 1-5 years
 - ☐ 6-10 years

- ☐ 11-15 years
- ☐ 16-20 years
- ☐ 21 years or more

8. How long have you worked in your current position? Please round up to the nearest full year.

- ☐ Less than one year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ 21 years or more

Section B - Characteristics of your LTC Home

Please select the option that best describes your LTC home

9. What type of foodservice operation does your LTC home have? (Select all that apply)

- ☐ Traditional Cook and Serve – Meals are prepared and served at once.
- ☐ Cook/Chill – Food is prepared/cooked, rapidly chilled, and then reheated for service.
- ☐ Retherm from an Outside Facility – Meals are prepared and chilled off-site and reheated on-site for service.
- ☐ Other (please specify): _____

10. What type of meal delivery system is used in your LTC home? (Select all that apply)

- ☐ Mobile Carts (e.g., Suzy Q carts) – Carts that can be moved to serve meals directly to residents.
- ☐ Non-Mobile Carts (e.g., hot holding carts) – Carts that stay in a fixed location for meal service.
- ☐ Insulated Trays – Trays designed to keep food at safe temperatures during transport.
- ☐ Other (please specify): _____

11. Is your LTC home publicly or privately owned?:

- ☐ Public
- ☐ Private

12. Is your LTC home:

- ☐ For-Profit
- ☐ Non-Profit/Charitable

13. Is your LTC home part of a chain (A group of LTC homes owned or operated by the same company or organization)?

- ☐ Yes
- ☐ No

14. Is your LTC home part of a Continuum of Care? (i.e., independent living to assisted living to LTC home)

- ☐ Yes
- ☐ No

15. Is your LTC home licensed by a provincial or territorial authority?

- ☐ Yes
- ☐ No

16. Does your LTC home have any specific cultural or religious affiliation (e.g., Catholic, Indigenous, etc.)?

- ☐ Yes. Please specify: _____
- ☐ No

For the next questions, please fill in the number (Approximate numbers are fine)

17. How many total beds are available in your LTC home? _____
18. How many beds are currently occupied in your LTC home? _____
19. How many of the total beds are reserved for respite care? _____
20. How many beds are currently occupied for respite care? _____
21. How many of your residents are 65 years of age or older? _____

Section C – Foodservice Emergency Preparedness during Natural Disasters.

Natural disasters refers to events such as floods, wildfires, tornadoes, extreme snowstorms, etc.

22. In the last 2 years, has your LTC home had a natural disaster that affected foodservices?
- ☐ Yes (Go to question 22a)
- ☐ No (Go to question 26)
- ☐ I don't know (Go to question 26)

22a. How many times? _____ Please describe the events: _____

23. Did your LTC home experience any of the following in foodservices during the natural disaster?
(Select all that apply)

- ☐ Staff shortages
- ☐ Recruitment, hiring and retainment challenges
- ☐ Food supply shortages
- ☐ Difficulty getting needed supplies/equipment due to cost
- ☐ Difficulty getting needed supplies/equipment due to availability
- ☐ Restrictions on family/loved ones for resident mealtime help
- ☐ Storage space limitations for extra supplies and equipment
- ☐ Communication challenges related to providing information
- ☐ Other (please specify): _____
- ☐ Not Applicable

24. Has the foodservice department you work in had to make any of the following modifications in response to the natural disasters it has experienced? (Select all that apply)

- ☐ Cross-training staff to meet nutrition and hydration needs of residents
- ☐ Immediate role changes of staff to meet critical/essential needs of LTC (without training)
- ☐ Menu modifications
- ☐ Other (please specify): _____
- ☐ Not Applicable

25. Thinking of the last natural disaster your LTC home experienced, how did you communicate changes to your foodservice operation to team members and the facility? (Select all that apply)

- ☐ Bulletin boards
- ☐ Huddles
- ☐ Rounds
- ☐ Meetings
- ☐ Email
- ☐ Informal verbal communication
- ☐ 24-hour report
- ☐ Other (please specify): _____

☐ Not Applicable

26. Does your LTC home have any of the following foodservice emergency preparedness components? (Select all that apply)

- ☐ Staffing Guidelines. Describe: _____
- ☐ Contingency menu. Describe (how many days?): _____
- ☐ Dining Room modifications. Describe: _____
- ☐ Foodservice Delivery Modifications. Describe: _____
- ☐ Emergency Food Supplier Information. Describe: _____
- ☐ Other (please specify): _____
- ☐ Not Applicable

27. Does your LTC home have an Emergency Foodservices Plan tailored to natural disaster situations? [Click for definition]

[Emergency Foodservices Plan tailored to natural disaster situations refers to a plan to provide foodservices to residents during natural disasters (e.g., floods, fires, tornadoes, blizzards, etc.) to ensure their health and well-being is maintained.]

- ☐ Yes (Go to question 28)
- ☐ No (Go to question 27a)
- ☐ I don't know (Go to question 27a)

27a. Are you planning to develop one?

- ☐ Yes (Go to question 32)
- ☐ No. Why? _____ (Go to question 32)

28. What resources specifically guided the development of your LTC home's Emergency Foodservices Plan for natural disasters? (Select all that apply)

- ☐ Government/Provincial guidelines
- ☐ Industry standards
- ☐ Consultation with experts
- ☐ Internal assessments
- ☐ Learned experience
- ☐ Other (please specify): _____
- ☐ I don't know

29. Are your LTC home's Emergency Foodservices Plan for natural disasters revised, reviewed or updated?

- ☐ Yes (Go to question 29a)
- ☐ No (Go to question 31)
- ☐ I don't know (Go to question 31)

29a. When was it last revised, reviewed or updated?

- ☐ Past 6 months
- ☐ 6–12 months
- ☐ 1–2 years
- ☐ More than 2 years
- ☐ I don't know

29b. How frequently is it revised, reviewed or updated?

- ☐ Annually
- ☐ Every two years
- ☐ Every five years
- ☐ Only as needed
- ☐ Other (please specify): _____
- ☐ I don't know

30. Who is part of the revision team? (Provide **only roles or job titles**) _____

31. In the last 2 years, has your LTC home had to activate or implement its Emergency Foodservices Plan in response to a natural disaster?

- ☐ Yes (Go to question 31a)
- ☐ No (Go to question 32)
- ☐ I don't know (Go to question 32)

31a. How many times? _____ Why? _____

31b. Did you need to change the plan when implementing it?

- ☐ Yes. Why? _____
- ☐ No
- ☐ I don't know

32. Has the LTC foodservice staff at your LTC home received any training in emergency foodservice procedures?

- ☐ Yes (Go to question 33)
- ☐ No (Go to question 34)
- ☐ I don't know (Go to question 34)

33. How often is training in emergency foodservice procedures provided to foodservice staff at your LTC home?

- ☐ Monthly
- ☐ Quarterly
- ☐ Biannually
- ☐ Annually
- ☐ Never
- ☐ I don't know

34. Considering your foodservice department's current preparedness (e.g., procedures, training, supplies), how prepared do you feel your LTC home is for a natural disaster?

- ☐ Extremely prepared
- ☐ Moderately prepared
- ☐ Slightly prepared
- ☐ Not at all prepared
- ☐ I don't know

35. Does your LTC home have any protocol in place to address the foodservice needs of residents with special dietary requirements (e.g., modified textures for those with swallowing difficulties) during emergencies?

- ☐ Yes. Please describe: _____
- ☐ No
- ☐ I don't know

Section D – Foodservice Emergency Preparedness during Outbreaks

An outbreak refers to a sudden increase in cases of an infectious disease, such as respiratory illnesses (COVID-19, influenza, measles), and gastrointestinal infections.

36. In the last 2 years, has your LTC home had an outbreak that affected foodservices?

- ☐ Yes (Go to Question 36a)
- ☐ No (Go to Question 40)
- ☐ I don't know (Go to Question 40)

36a. How many times? _____ Please describe the events: _____

37. Did your LTC home experience any of the following in foodservices during the outbreak?

(Select all that apply)

- ☐ Lack of time
- ☐ Limited staff support due to illness
- ☐ Limited staff support due to ineffective policies
- ☐ Limited staff support due to leader challenges
- ☐ Limited administrative support
- ☐ Limited financial support
- ☐ Limited physical space to store goods
- ☐ Limited training personnel
- ☐ Food supply shortages
- ☐ Food supply chain delays
- ☐ Equipment supply chain delays
- ☐ Other (please specify): _____
- ☐ Not Applicable

38. Has the foodservice department you work in had to make any of the following modifications in response to the outbreak it has experienced? (Select all that apply)

- ☐ Cross-training staff to meet nutrition and hydration needs of residents
- ☐ Immediate role changes of staff to meet critical/essential needs of LTC (without training)
- ☐ Menu modifications
- ☐ Other (please specify): _____
- ☐ Not Applicable

39. Thinking of the last outbreak your LTC home experienced, how did you communicate changes to your foodservice operation to team members and the facility? (Select all that apply)

- ☐ Bulletin boards
- ☐ Huddles
- ☐ Rounds
- ☐ Meetings
- ☐ Email
- ☐ Informal verbal communication
- ☐ 24-hour report
- ☐ Other (please specify): _____
- ☐ Not Applicable

40. Does your LTC home have any of the following foodservice emergency preparedness components? (Select all that apply)

- ☐ Staffing Guidelines. Describe: _____

- ☐ Contingency menu. Describe (how many days?): _____
- ☐ Dining Room modifications. Describe: _____
- ☐ Foodservice Delivery Modifications. Describe: _____
- ☐ Emergency Food Supplier Information. Describe: _____
- ☐ Other (please specify): _____
- ☐ Not applicable

41. Does your LTC home have an Emergency Foodservices Plan tailored to outbreaks situations? [Click for definition]
 [Emergency Foodservices Plan tailored to outbreaks situations refers to a plan to provide foodservices to residents during outbreaks (e.g., respiratory infections like COVID-19, influenza, measles, and gastrointestinal infections) to ensure their health and well-being is maintained.]

- ☐ Yes (Go to question 42)
- ☐ No (Go to question 41a)
- ☐ I don't know (Go to question 41a)

41a. Are you planning to develop one?

- ☐ Yes (Go to question 46)
- ☐ No. Why? _____ (Go to question 46)

42. What resources specifically guided the development of your LTC home's Emergency Foodservices Plan for outbreaks? (Select all that apply)

- ☐ Government/Provincial guidelines
- ☐ Industry standards
- ☐ Consultation with experts
- ☐ Internal assessments
- ☐ Learned experience
- ☐ Other (please specify): _____
- ☐ I don't know

43. Are your LTC home's Emergency Foodservices Plan for outbreaks revised, reviewed or updated?

- ☐ Yes (Go to question 43a)
- ☐ No (Go to question 45)
- ☐ I don't know (Go to question 45)

43a. When was it last revised, reviewed or updated?

- ☐ Past 6 months
- ☐ 6–12 months
- ☐ 1–2 years
- ☐ More than 2 years
- ☐ I don't know

43b. How frequently is it revised, reviewed or updated?

- ☐ Annually
- ☐ Every two years
- ☐ Every five years
- ☐ Only as needed
- ☐ Other (please specify): _____
- ☐ I don't know

44. Who is part of the revision team? (Provide **only roles or job titles**) _____
45. In the last 2 years, has your LTC home had to activate or implement its Emergency Foodservices Plan in response to an outbreak?
- ☐ Yes (Go to question 45a)
 - ☐ No (Go to question 46)
 - ☐ I don't know (Go to question 46)
- 45a. How many times? _____ Why? _____
- 45b. Did you need to change the plan when implementing it?
- ☐ Yes. Why? _____
 - ☐ No
 - ☐ I don't know
46. Has the LTC foodservice staff at your LTC home received any training in emergency foodservice procedures?
- ☐ Yes (Go to question 47)
 - ☐ No (Go to question 48)
 - ☐ I don't know (Go to question 48)
47. How often is training in emergency foodservice procedures provided to foodservice staff at your LTC home?
- ☐ Monthly
 - ☐ Quarterly
 - ☐ Biannually
 - ☐ Annually
 - ☐ Never
 - ☐ I don't know
48. Considering your foodservice department's current preparedness (e.g., procedures, training, supplies), how prepared do you feel your LTC home is for outbreaks?
- ☐ Extremely prepared
 - ☐ Moderately prepared
 - ☐ Slightly prepared
 - ☐ Not at all prepared
 - ☐ I don't know

Section E – COVID-19 pandemic in foodservices

49. Were you working at your current LTC home or in your current role anytime during the COVID-19 pandemic (March 2020 to May 2023)?
- ☐ Yes (Go to question 50)
 - ☐ No (Go to question 54)
50. Did your LTC home order any extra food items during the COVID-19 pandemic in anticipation of food supply chain shortages?
- ☐ Yes (Go to question 50a)
 - ☐ No (Go to question 51)
 - ☐ I don't know (Go to question 51)

50a. What extra food and/or food-related items did you order more of (please specify)?

51. Did your LTC home experience any storage limitations related to foodservice equipment, supplies, or ingredients?

- ☐ Yes (Go to question 51a)
- ☐ No (Go to question 52)
- ☐ I don't know (Go to question 52)

51a. Where did you store the extra food-related items? (select all that apply)

- ☐ Refrigerators
- ☐ Freezers
- ☐ Dry storage
- ☐ Off-site storage
- ☐ Other (please specify): _____

52. Did LTC home require any special equipment for storage of foodservice supplies or ingredients?

- ☐ Yes (Go to question 52a)
- ☐ No (Go to question 53)
- ☐ I don't know (Go to question 53)

52a. What kind of equipment did you need for storage of foodservice supplies or ingredients? (Please specify): _____

53. Did your LTC foodservice department experience any of the following during the COVID-19 pandemic? (Select all that apply):

- ☐ Staff shortages due to COVID-19 illness
- ☐ Recruitment, hiring and retainment challenges
- ☐ Cross-training staff to meet nutrition and hydration needs of residents
- ☐ Immediate role changes of staff to meet critical/essential needs of LTC (without training)
- ☐ Food supply shortages
- ☐ Difficulty getting needed supplies/equipment due to cost
- ☐ Difficulty getting needed supplies/equipment due to availability
- ☐ Restrictions on family/loved ones for resident mealtime help
- ☐ Storage space limitations for extra supplies and equipment
- ☐ Communication challenges related to providing information
- ☐ Menu modifications
- ☐ Modifications in meal service for residents
- ☐ Other (please specify): _____
- ☐ Not Applicable

Section F: Last questions!

54. Over the past few years, what have you learned about emergency preparedness in foodservices that might be helpful to others? (Please answer below) _____

55. Is there anything you would like to add about emergency foodservices in LTC that we didn't ask you about?: _____

Appendix F - Email Script Recruitment Organizations Final Survey

Email Subject Title: Request for Support with Survey Distribution - Foodservice Emergency Preparedness in LTC Homes

Dear (organization name),

My name is Juliana Dullius, and I am a master's student in the Department of Food and Human Nutritional Sciences at the University of Manitoba, conducting my thesis research under the supervision of Dr. Christina Lengyel.

I am reaching out to kindly request your permission to distribute a short online survey to your members. The survey aims to assess current foodservice emergency preparedness procedures and practices in Long-Term Care (LTC) homes during emergencies such as natural disasters and infectious disease outbreaks in Canada. We are targeting foodservice managers, supervisors, and registered dietitians working in LTC homes.

We are not requesting access to your member contact list, only your support in distributing the **survey invitation below** through your internal communication channels (e.g., newsletter, email list). The survey is anonymous, takes approximately 15 minutes to complete, and participation is entirely voluntary. We are hoping to gather a national snapshot of how LTC foodservices are currently prepared for emergencies.

This study has received ethics approval from the University of Manitoba, and I've attached a copy of the approval letter for your reference.

If you have any questions or require additional information, please do not hesitate to contact the PI at email_email@umanitoba.ca or 000-000-0000.

Thank you very much for considering this request.

Best Regards.

Appendix G - Email Script Recruitment Participants Final Survey

Email Subject Title: 🇨🇦 Participants Needed - Online Survey About Emergency Foodservice Preparedness in LTC Homes Across Canada

Dear Long-Term Care Foodservice Professional,

I am writing you today to inform you of a research study, Emergency Foodservice Preparedness in Long-Term Care Homes across Canada, that Dr. Christina Lengyel is conducting in the Department of Food and Human Nutrition Sciences at the University of Manitoba.

The purpose of this research is to assess current Long-Term Care (LTC) homes foodservice emergency preparedness procedures and practices during natural disasters and outbreaks.

Your participation in this study will allow us to assess emergency preparedness plans, past experiences, and staff communication during emergencies like natural disasters and outbreaks in LTC homes. The information you and others provide may contribute to the development of a standardized emergency foodservice preparedness template tailored for Canadian LTC homes.

We are contacting LTC foodservice professionals across Canada, asking experts to complete a short survey that should take approximately 15 minutes.

Criteria for participation includes employees of:

- LTC homes that have been in operation for greater than 6 months and
- LTC beds that are not contained within a hospital setting.

Please note that you will be asked these questions again within the online survey so that we can confirm you have the background of the individuals we are seeking.

After you enter the online survey environment and before you begin to answer questions, you will be asked to read an informed consent statement. You will have an opportunity to download the consent form and save it for your reference. This survey is anonymous, and your responses will be analyzed in aggregate form only. All the information will be kept strictly confidential by the researchers. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit without consequence or penalty.

STUDY COMPENSATION

In appreciation for your time, you will have the chance to enter a draw to win Amazon gift cards.

Note: You must fill at least 80% of the questions in the survey to be eligible for the draws.

1) Early Bird Draw: You will be eligible for a 1 Amazon gift card worth \$250 if you complete the survey by July 31, 2025, at 11:59 p.m.

2) Regular Draw: After the survey closes, you will also be eligible for one of the following Amazon gift cards: 5 gift cards of \$20; 2 gift cards of \$50; and 1 gift card of \$100.

SURVEY LINK

If you meet the above criteria and are interested in participating, please click the link below:

https://umnursing.ca1.qualtrics.com/jfe/form/link_link_link

CONTACT INFORMATION

This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns about this project, you may contact Dr. Christina Lengyel, Principal Investigator (email_email@umanitoba.ca or 000-000-0000) or the Human Ethics Coordinator (humanethics@umanitoba.ca or 204-474-7122).

Please note that the survey link will close on September 15th, 2025.

Feel free to share this invitation with other LTC foodservice professionals.

Thank you for considering this request.

Best Regards,

Dr. Lengyel.

Appendix H - Informed Consent



**Department of Food and
Human Nutritional Sciences**

405 Human Ecology Bldg.
Winnipeg, Manitoba
Canada R3T 2N2

Participant Informed Consent Form

Research Project Title: Emergency Food service Preparedness in Long-Term Care Homes across Canada

Principal Investigator: Christina Lengyel, PhD, RD, Professor
Phone: 000-000-0000 Email: email_email@umanitoba.ca

Funder: This study is funded by a Canadian Foundation for Dietetic Research project grant.

Conflicts of Interest and Undue Influence: None of the researchers have any conflicts of interest in this study/research.

You are being invited to participate in a research study. This consent form, a copy of which you can download or print, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, feel free to ask any of the people named above. Please take the time to read this document and any accompanying information carefully. It is very important that you understand:

- what is being asked of you,
- what the risks and benefits of participation are, and
- how the information you provide will be used and stored

Purpose of the Study

Considering that emergency foodservice preparedness is critical for Long-Term Care (LTC) homes to ensure, provide and maintain foodservice delivery and nutritional support to residents during environmental and pandemic emergencies, this research study aims to examine food service emergency preparedness in LTC homes.

Study Procedures

If you decide to take part in the study, you will be asked to complete an online survey through the platform Qualtrics. The survey should take approximately 15 minutes to complete. It covers topics such as your facility's emergency preparedness plans, past experiences, and staff communication during disasters.

Study Risks

This survey is minimal risk, meaning that the risks are no greater than what you might encounter in your daily life.

Study Benefits

Participation in this study reflect on your answers to change procedures on your own workplace. Data from this study will contribute to the development of a LTC foodservice emergency response plan guide for use in Canadian LTC homes.

Compensation

In appreciation for your time, you will have the chance to enter a draw to win Amazon gift cards.

Note: You must fill at least 80% of the questions in the survey.

1) Early Bird Draw: You will be eligible for a 1 Amazon gift card worth \$250 if you complete the survey **by July 31 at 11:59 p.m.** 2) Regular Draw: After the survey closes, you will also be eligible for one of the following Amazon gift cards: 5 gift cards of \$20; 2 gift cards of \$50; and 1 gift card of \$100.

Use and Storage of Information

All the information you provide as a participant in this study is confidential which means we as researchers must keep it safe. We will do our best, however, it is not possible to guarantee absolute confidentiality. We will only share your personal information if required (court order or law).

All information you provide in the survey will be anonymous. Your individual responses cannot be linked with your name or identifying information. All data is collected into a password protected account on Qualtrics.com which is only accessible by Dr. Lengyel. After data collection is complete, all data will be downloaded from the Qualtrics website into an authenticated secure platform (OneDrive storage) on the University of Manitoba server and deleted from the Qualtrics account. Please be aware that data from surveys collected via Qualtrics may be stored on servers located in the USA and is therefore subject to the US Patriots Act. Only authorized personnel (Principal Investigator - Dr. Lengyel and MSc. Student – Juliana Dullius) will have access to the data. All data obtained as part of this research will be kept confidential and individuals will not be identified in any reports or publications. The data will be kept by the University of Manitoba in a secure location for 7 years.

We will collect additional personal information (name and email address) from you to be entered into nine possible draws for your participation (See **compensation section** on the previous page). This personal information will be collected through a different survey than the survey data you provide. Only people on the research team will see the personal information. We will not be able to link your personal information with the survey data you provide. This personal information will be kept by the University of Manitoba in a secure location for 7 years in case the University has to account for the money during a financial audit.

Dissemination

The study results will be shared through 1) the publication of a master's thesis; 2) journal publications and presentations in relevant academic fields; and/or 3) a summarized report of the study results to be sent to interested participants.

Withdrawing

Your participation in this research study is voluntary. You can choose to do only the activities and/or answer only the questions that you are comfortable with. You may withdraw from the study for any reason. You do not have to explain why. You will not be penalized in any way. However, to have the chance to enter a draw to win one of the Amazon gift cards you must fill at least 80% of the questions in the survey. You do not have to respond to any subsequent questions. Should you withdraw partway through the study, all your responses will be destroyed unless you have consented to allowing us to keep it. Due to the nature of the study, once you submit your responses, we will not be able to remove your information as it cannot be linked back to you.

Summary of Results

A summary of the study will be available on the Dr. Lengyel's University of Manitoba [Homepage](#) when the study has finished (November 2026).

Questions or Concerns

Designated University of Manitoba personnel may check that this study is being done safely and properly. To do this, they may review the research records.

This study has been reviewed and approved by a Research Ethics Board at the University of Manitoba. However, this does not mean that participation is risk-free. If you have questions about your rights as a research participant, you may contact the Office of Human Research Ethics at humanethics@umanitoba.ca or (204) 474-7122.

If you have any questions, concerns, or complaints about this study, you may contact any members of the research team listed on the first page or the Office of Human Research Ethics.

Consent:

By participating in this study, I agree that:

- I have read the above information.
- I have had the opportunity to ask and have answered all of my questions.
- I understand what is being asked of me.
- I will be taking part in a research study.
- I may freely stop or leave the research study activities at any time.
- I do not waive my legal rights by participating in the study.

Notice Regarding Collection, Use, and Disclosure of Personal Information

Your personal information is being collected under the authority of The University of Manitoba Act. The University of Manitoba is committed to preserving your right to privacy. The information you provide will be used by the University to support our research. Your personal information will not be used or disclosed for other purposes, unless permitted by The Freedom of Information and Protection of Privacy Act or The Personal Health Information Act. If you have any questions about the collection of personal information: Ph: 204-474-9462 or Email: fippa@umanitoba.ca

If you consent to participate, please click on the “NEXT” button below to begin the survey.

Appendix I – EFP Detailed Cleaning Procedures

Date changed	Changed by	Old value	New value	Comments
2025-10-06	JD	-	-	Exported survey data from Qualtrics and saved raw file in separate folder. Exported Data/ EFP+Survey_October+6,+2025_12.31
2025-10-06	JD	Status, RecipientLastName, RecipientFirstName, RecipientEmail, ExternalReference, DistributionChannel, UserLanguage, Q_RecaptchaScore, SC0, AnsweredQuestions	Deleted variables	Removed unnecessary Qualtrics-generated variables (metadata fields not used for analysis or cleaning). Initial cleaning file created EFP_Dataset_cleaning_working_2025-10-06
2025-10-06	JD	-	-	Excluded cases that did not answer screening questions (QI–QII). Saved file as EFP_Dataset_Qualified_working_2025-10-06
2025-10-13	JD	-	-	Excluded cases that did not qualify based on screening criteria. Saved file as EFP_Dataset_Qualified_final_2025-10-13
2025-10-13	JD	-	-	Excluded qualified cases that did not answer any questions in Sections A–F. Saved file as EFP_Dataset_Qualified_final_v1_2025-10-13
2025-10-15	JD	-	-	Identified 16 potential duplicate cases based on IP, latitude, and longitude. No deletions yet, individual responses examined to confirm validity. Identifiable variables (IPAddress, LocationLatitude, LocationLongitude) were retained temporarily for duplicate detection and will be removed upon finalization. Saved file as EFP_Dataset_Qualified_final_v1_2025-10-15

Continue...

Date changed	Changed by	Old value	New value	Comments
2025-10-31	JD	-	-	Manual review showed that each potential duplicate case (n=16) contained distinct and complete information, so they were kept in the final dataset.
2025-10-31	JD	ResponseId Progress StartDate EndDate RecordedDate IPAddress LocationLatitude LocationLongitude	Deleted variables	Removed Qualtrics-generated variables (fields not used for analysis) and identifiable variables. Saved file as EFP_Dataset_Qualified_final_v1_2025-10-31
2025-11-01	JD	Q48, Q49, Q54.0, Q55, Q71, Q72, Q79, Q80.	Q48_New, Q49_New, Q54.0_New, Q55_New, Q71_New, Q72_New, Q79_New, Q80_New.	Variable recode to reverse scales so that higher numeric values indicate a higher magnitude. Questions: Q29a, Q29b, Q33, Q34, Q43a, Q43b, Q47, and Q48, respectively. Saved file as EFP_Dataset_Qualified_final_v1_2025-11-01
2025-11-01	JD	Duration__in_seconds_	Deleted variable	Removed Duration variable after calculating median and mean survey completion time.
2025-11-03	JD	Q5 (year of birth), age	age, age_group	Calculated age and created age ranges
2025-11-04	JD	-	RD_and_FSupport, Clinical_Dietitian	Created two new categories to represent roles of RD in LTC homes: Foodservices Support and Clinical Dietitian.
2025-11-04	JD	-	-	Created a new variable to group population sizes (Rural: Hamlet, Village, Town; Small/Medium city: Small city, Medium city; Large/Metropolitan: Large city, Metropolitan area; Other/Unknown)
2025-11-04	JD	-	-	Years in LTC home / position Q7 and Q8 <5 years 6-15 years >15 years
2025-11-04	JD	-	-	Recoded other category to Type of foodservice operation

Notes: JD (Juliana Dullius).

