Food Access and Insecurity in Adults with Mobility Disabilities

by

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A thesis submitted in conformity with the requirements
for the degree of Doctor of Philosophy
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2020

Abstract

People with disabilities experience greater risk of food insecurity compared to people without disabilities. Lower incomes and higher relative expenses are often understood as the major causes of this inequality. Some scholars have also posited that people with mobility disabilities (PWMD) experience greater difficulty procuring or preparing food. Yet, limited research examines upstream factors related to food insecurity risk, lived experiences of food access, or environments that present access barriers among PWMD. Responding to these knowledge gaps, I sought to examine place-based influences on the relationship between mobility disability and food insecurity, questioning environmental, political, and institutional contexts that impact economic and physical access to food. Throughout my work, I use different theoretical approaches to conceptualize disability including, the social model, a critical ableist perspective, and an assemblage perspective. In adopting these perspectives, I challenge how bodies and mobility are typically understood in the food desert literature.

My dissertation contains a scoping review followed by a series of empirical chapters set within a mixed-methods research design. In my scoping review of the literature, I discovered an important and widespread association between disability and food insecurity. In an analysis of microdata from the Canadian Community Health Survey, I examined sociodemographic and geographic risk factors of food insecurity among people with mobility impairment. Across Canada, I found an important inequality in food insecurity between people with and without mobility impairment. Province was associated with risk of food insecurity among people with mobility impairments, potentially reflecting different political and institutional contexts. I then conducted a qualitative study, using mobile go-along interviews with PWMD in Toronto, Canada, to understand lived experiences of food access. I found that food access was often restricted for PWMD related to different systems (e.g., social assistance) and places of access, on food trips, at home, and in food destinations. In subsequent research, I showed how the home acts as an important site shaping physical, social, and economic access to food. Together, my findings suggest the need to address socioeconomic disadvantage among PWMD while considering disabling contexts that limit access to functional housing, outdoor environments, transport systems, and food destinations.

Acknowledgments

This dissertation was five years in the making and could not have been completed without inspiration, support, and encouragement, from others.

I would like to start by thanking Ron Buliung and Kathi Wilson for being my supervisors and mentors throughout this PhD process. I learned a great deal from their experience and research which inspired my thinking on many subjects. I would like to thank them for their insightful comments and suggestions on multiple drafts of this dissertation. Ron, I greatly appreciated our conversations, and your sharing your personal insight and experience on disability with me as well as your passion for your research. Kathi, I greatly appreciated your suggestions on conducting empathetic research and your advice and support throughout.

I would also like to thank members of my PhD committee, Valerie Tarasuk and Michael Widener who provided valuable advice throughout my work. I look up to both of you greatly as scholars and your work has very much inspired my own research. Valerie, I greatly appreciated the time you took to advise me in my quantitative work. I would also like to thank my external reviewers, Rob Wilton, Fiona Moola, and Sarah Wakefield. I greatly enjoyed your insightful comments and our discussion during the final exam.

I very much appreciated the advice and support of John Mossa and Sandra Carpenter, and the board at the Centre for Independent Living in Toronto. Thank you for your encouragement and enthusiasm for this work and your efforts in helping me to recruit participants. John, I greatly appreciated the important information you shared with me on disability concerns and advocacy. I would also like to thank those at Variety Village, the City of Toronto Accessibility Services, the Anne Johnston Health Station, and the STOP community food centre who supported this work.

I am deeply grateful to all those who participated in this research and who provided their time, very personal experiences, and understanding to this work. Their patience and willingness to spend a large portion of their day with me was invaluable.

Financial support for this research was provided by the Canadian Social Sciences and Humanities Research Council (SSHRC). The University of Toronto Mississauga Graduate Expansion Fund provided support for my research and for attending conferences throughout my degree.

Thank you to my colleagues in this PhD process, including the writing group and my accountability group. Thank you, Lea, Ewa, Valentina, and Asya who provided encouraging discussion and great advice. Thank you, Tim for always sharing your incredible work with me.

I would like to give a special thank you to my parents, Harold and Rosalie, who provided me with love and support that allowed me to finish this work. Dad, I greatly appreciated your relating your own PhD experiences and your encouragements to keep working through. Mom, your continuous support over my work was so important to me, and I especially appreciated your support during my writing retreats in Ottawa. To my Bubby, Esther Schwartz, your excitement over my accomplishments always motivated me and I thank you for encouraging me to pursue a PhD.

I would also like to greatly thank my siblings Leah and Josh, and my brother in law Jeff. Leah you have been such an encouraging presence and role model in my life and I greatly appreciated you taking the time to listen to my presentations and celebrating my PhD milestones with me. Jeff, you always provided excellent advice and special shout out (and apologies) for all the tech support you provided me with during this process. Josh, your work ethic was inspiring, especially in using my own study devices. To my niece and nephew Mira and Jake thank you for all the excitement and joy you gave me in this process. I’d like to also thank all my friends for their encouragement and support. Special shoutout to Rachel and Shira for all our work from home times together. Thanks to all of you for getting through this process with me.

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms

ADP: Assistive Devices Program

AODA: Accessibility for Ontarians with Disabilities Act

CCHS: Canadian Community Health Survey

CCAC: Community Care Access Centres

CILT: Centre for Independent Living in Toronto

HFI: Household food insecurity

LHIN: Local Health Integration Network

OAS: Old Age Security

ODSP: Ontario Disability Support Program

PSW: Personal Support Worker

PWMD: People with mobility disabilities

SEM: Social ecological model

SES: Socioeconomic status

TTC: Toronto Transit Commission

Chapter 1
Introduction

1.1 Research problem

Food insecurity, referring to inadequate or insecure access to food because of financial constraints, is a major global problem cutting across lower and higher income countries (Smith et al., 2000; McIntyre & Rondeau, 2016). In Canada, in 2017-18, 12.7% of households experienced some level of food insecurity (Tarasuk & Mitchell, 2020). In other high-income countries, including the United States and within Europe, using different thresholds or measures of food insecurity, 10-15% of the population were found to be food insecure (Loopstra et al., 2015a; Coleman-Jensen et al., 2017; Gundersen & Ziliak, 2018). At this time, food insecurity has also been exacerbated by the COVID-19 pandemic with many experiencing important income shocks and unable to manage on low incomes due to increased expenses (Deaton & Deaton, 2020; Loopstra, 2020). This situation is reinforcing and augmenting existing inequalities, with potentially harmful effects clustering within certain communities, including among persons with disability (Loopstra, 2020), whose lived experience with food insecurity is the primary focus of my dissertation.

Food insecurity is an important indicator of material hardship whose presence indicates limitations in consistently accessing basic needs (Heflin et al., 2009). Additionally, food insecurity is associated with a number of adverse health outcomes, including nutritional inadequacies, chronic conditions, such as poor mental health, diabetes, and heart disease, higher health-care utilization, and higher mortality (Vozoris & Tarasuk, 2003; Stuff et al., 2004; Gundersen & Ziliak, 2015; Kirkpatrick et al., 2015; T. Fitzpatrick et al., 2015; Gundersen et al. 2018). The health effects of food insecurity are not solely related to nutrition but can also relate to stress and mental health, resulting from a lack of control over basic needs (Tarasuk, 2016).

The circumstances that give rise to food insecurity are not fully understood though low socioeconomic status (SES) is the most commonly indicated risk factor. Socioeconomic factors associated with higher risk of food insecurity include low education, unemployment, reliance on social assistance, and renting (compared to household ownership) (Gunderson & Ziliak, 2018; Heflin et al., 2007; Hernandez, 2015; Kirkpatrick & Tarasuk, 2011; St-Germain & Tarasuk, 2020). Demographic risk factors include being younger, having children, particularly for lone parents, ethnicity (non-white in Canada/United States, Indigenous status within Canada), having a chronic illness, particularly mental illness, and disability (Che & Chen, 2001; Gundersen & Ziliak, 2018; Heflin et al., 2007; Hernandez, 2015; Tarasuk et al., 2013; Coleman-Jensen & Nord, 2013).

Though disability is variously conceptualized, defined, and measured in the literature, an association showing increased risk of food insecurity by disability status remains consistent across multiple datasets, age-groups, regions within the United States, and in households with either an adult or child with a disability (Coleman-Jensen & Nord, 2013; Brucker & Coleman-Jensen, 2017; She & Livermore, 2007; Lee & Frongillo, 2001; Heflin, 2017; Brucker, 2016; Huang et al., 2010; Parish et al., 2008; Schwartz et al., 2019a; Schwartz et al., 2019b; Horner-Johnson et al., 2015; Sonik et al., 2016; Bernell et al., 2006). Much of the research about food insecurity and disability has been conducted in the United States. What little research does exist in the Canadian context, suggests an association between disability and higher risk of food insecurity among working-age adults with a disability (Borowko, 2008). In Canada, an estimated 22% of the population above the age of 15 experience one or more disabilities[1], including 9.6% with a mobility disability (Morris et al., 2018). Therefore, people with disabilities represent a sizeable population whose vulnerability to food insecurity should be further explored in the Canadian context.

Understanding the relationship between disability and food insecurity remains a relatively nascent research area and is the primary focus of my dissertation. In this introductory chapter, I highlight how inadequate understandings of both disability and food access have resulted in limited understanding of the relationship between disability and food insecurity. I also discuss the need for social perspectives of disability and a more complex consideration of place effects in food access research. I then outline how these research gaps frame my dissertation's primary research question and sub-questions. Following this, I provide a description of my mixed

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[1] Disability was defined as those experiencing limitations in daily activities due to a long-term physical, sensory, cognitive, or mental health condition.

methods research design, including theoretical perspectives that inform my work; I conclude by summarizing each chapter.

1.1.1 Disability and food insecurity

Explanations for the disability-food insecurity link include reduced financial resources among people with disabilities and high household expenses related to disability, such as equipment, care, and medical needs (Huang et al., 2010; She & Livermore, 2007). In Canada, people with disabilities are more than twice as likely to be classified as low income and to live in inadequate housing, such as a home in need of major repairs (Crawford, 2010). In an American study, She and Livermore (2007) found that working-age adults with a disability have greater expenses, requiring an income two to three times greater compared to those without a disability, in order to avoid food insecurity. However, focusing on reduced financial assets or higher costs alone may fail to consider structural factors that contribute to low incomes, high household expenses, and financial vulnerability among people with disabilities. Some have suggested that limited mobility among people with mobility impairments can pose additional barriers to food security from important limitations in ability to procure food, including transporting or preparing food (Wolfe et al., 2003; Heflin et al., 2019). Yet how people with mobility disabilities experience food access (i.e., physical and economic access), including the relative importance of mobility barriers, remains poorly understood (Shaw, 2006; Webber et al., 2007).

In the food insecurity and disability literature, scholars appear to give less attention to the conceptualization of disability beyond clinical labelling and often consider disability as a barrier to access or cause of socioeconomic inequalities. By not theorizing disability, this literature often ascribes to what is known as an individual or biomedical conceptualization of disability, considering disability as a medical condition of the body that necessarily produces inequalities (i.e., it is the failed body that is the problem, not the context or discrimination) (Schwartz et al., 2019a). In contrast, when disability is theorized or questioned, researchers less frequently focus on individual risk factors (e.g., decreased income or assumed limited ability to travel) and more frequently consider upstream or structural factors in place, including public benefit systems that are difficult to access, or discrimination and inaccessible built environments that pose disabling barriers to food shopping or accessing charitable food sources (Bilyk et al., 2009; Kudlick, 2007; Meyers et al., 2002; McGrath et al. 2017; Shantz, 2011; Waltz et al. 2018).

In my dissertation, I reject essentialist notions of disability, such as the biomedical model, and instead consider social perspectives which can aid in highlighting social processes, including inaccessible built environments, social discrimination, and upstream norms that contribute to inequalities for people with impairments or devalued bodily differences (Goodley, 2014). These perspectives include the social model, a critical ableist perspective, and an assemblage perspective. The social model was used to identify the social discrimination and built environments that result in disability and contribute to inequalities for people with impairments. A critical ableist perspective was used to consider the normative and ableist systems that produce disabling experiences. Finally, an assemblage perspective was used to describe how different material and social elements may be ordered to limit or enhance capacities for food access among people with disabilities. In using social perspectives of disability, disability is considered as culturally and geographically situated (Goodley, 2014; Withers, 2012), highlighting the importance of place in influencing experiences of disability.

1.1.2 Food environments and structures of disadvantage

The concept of food access includes the ability to afford food, aligning with the food insecurity concept, as well as the ability to physically access food, including food that is culturally appropriate, and safe to consume (Usher, 2015). Physical access to food is often thought of through technical and area-based measures. Some scholars use neighbourhoods, or neighbourhood proxies, as bounded spatial units, in work that aims to measure and identify food deserts. In that research, the presence/absence or distances to food stores serves as an indicator or risk factor for food insecurity or poor diet (Walker et al., 2010; Caspi et al., 2012). Researchers applying the food desert concept often consider structural disadvantage, noting that low-income people may have less access to healthy and affordable food or may be less able to overcome barriers of time, money, and distance to access healthy food (Wrigley, 2002).

Despite the political appeal of the food desert concept (largely because on the surface it appears to be an easily communicated/understood concept) and attention from various academic fields, including health and social geography (Donald, 2013; Eisenhauer, 2001; Wrigley, 2002), an inconsistent relationship has been found relating food deserts, variously defined, to food insecurity and dietary outcomes (Carter et al., 2014; Caspi et al., 2012; Garasky et al., 2006; Kirkpatrick & Tarasuk, 2010). Inconsistent effects may result from limitations of using simplified, area-based measures to understand the varied ways in which people access food (McEntee, 2009; Shannon, 2013). Still, the focus on environments in the food desert literature, can provide a useful starting point to consider structural inequalities in access. Understanding environmental influences on food access may be particularly important for people with mobility disabilities whose access may be affected by inaccessible built environments and social discriminatory norms in place (Kitchin, 1998).

A useful conceptualization of environmental influences on food access must improve on some of the weaknesses of the food desert concept, including the failure of much research in this area to communicate population heterogeneity in access, oversimplified understandings of food environments, and implicit ableism in this work. In the food desert literature, food access is often measured by neighbourhood, based on commonly available administrative units such as census areas, postal sectors, or buffer distances (network, or radial), representing areas of different sizes and relevance to neighbourhood residents (Charreire et al., 2010). This ignores differences in mobility practices across the population. For some populations these ‘acceptable’ distances or neighbourhood boundaries could be too far to allow for comfortable or even functional access, depending on an interaction of environmental features, available transportation, or impairment (Shaw, 2006; Rose, 2010). In contrast, many low-income people travel far distances to access food or report complex trips to access affordable foods, including travelling to multiple stores for deals, indicating different motivations for travel (Dachner et al., 2010; United Stated Department of Agriculture, 2013; Shannon, 2015).

Critics of the food desert literature have highlighted the need to look beyond the presence of neighbourhood retail food stores or large-scale supermarkets in understanding environmental influences on access (Shannon, 2013; Usher, 2015). Some have suggested that other dimensions of access, such as the affordability and cultural appropriateness of local foods and temporal access, including appropriate local store times should also be considered (Shannon, 2013; Widener & Shannon, 2014; Usher, 2015). Chen & Kwan (2015) question measures that solely consider access and exposure to food sources near the home, considering the need to focus on people’s complex mobility patterns, accessing food outside the home, including near places of work, or as part of multi-stop trips in completing other errands. Further, within the food desert concept there is an inherent emphasis on physical distance over other factors in place. Yet, access to food can also be constrained through different forms of exclusion and disadvantages as people may be impacted by complex life histories, including adverse past experiences of movement, which are not captured in distance or area-based measures (Rose, 2010; Zenk et al., 2011).

Lastly, the food desert literature includes implicit assumptions about the abilities of the bodies doing the food shopping. Ableism, referring to the definition used by Goodley (2014), considers the ideals in which the contemporary citizen is modeled and rejection or ignoring of bodies who do not meet these norms. There is evidence of ableism in the food access literature through common exclusion of disability from research on food environments (Shaw, 2006), and the use of measures which tend to ignore difference in abilities (Charreire et al., 2010). By using universal measures like walkability, or neighbourhoods with dense access to services or shorter distances to a grocery store, one assumes similar travel times and barriers to travel across the population and that all bodies can or want to walk. Little to no consideration has been given to the diverse ways in which people move their bodies from place to place and at different scales (e.g., within the home, neighbourhood), resulting in varying experiences of food access. These experiences may include emotions tied to place in encountering disabling barriers or in experiences of stress and hardship in travel (Bostock, 2001; Imrie, 2000). When mobility disability is considered in this research, it is often conceptualized as an impediment to access, increasing the likelihood of experiencing barriers (e.g., difficulty walking shorter distances to a store) (Whelan et al. 2002; Shaw, 2006). This essentially treats disability as a problematic category, ascribing to an individual model of disability, ignoring variation in experiences of disability and disabling environmental barriers to access (e.g., lack of curb cuts, inaccessible entrances in grocery stores) or social barriers (e.g., available social benefits) (Imrie & Kumar, 1998). Further, despite an important association between disability and socioeconomic status (Palmer, 2011), physical and economic access barriers have commonly been considered separately, for example, in comparing barriers to food access between lower income and mobility limited populations (Coveney & O’Dwyer, 2009; Whelan et al., 2002). A deeper, theoretically informed conceptualization of the relationship between disability and place is therefore needed to help develop our understanding of how environmental factors interact in varied ways with the body to produce situations of poor access or which alternatively may enable access. In considering food access for people with disabilities, it is important to understand how challenges to food access exist within situations of disadvantage, impacting all aspects of food access from food sourcing, to meal preparation and eating.

1.1.3 Research Questions

As outlined above, the problems my research addresses are the underexamined high risk of food insecurity among people with disabilities and the oversimplification of disability, food access, and mobility in the food access literature. In my dissertation, I specifically ask how place comes to influence physical and economic access to food for people with mobility disabilities. This means understanding how political, economic, institutional, and physical contexts in Canada, and specifically within the City of Toronto, Canada, are formed in interaction with residents, and how they may limit food access among people with mobility disabilities. To answer my research question, I asked the following three sub-questions, each addressing a gap in the food access and disability literature:

1. Are Canadian adults with mobility disabilities at higher risk of food insecurity? If so, what are the geographic and sociodemographic characteristics that are related to higher risk of food insecurity in this population?
2. How do individuals with mobility disabilities experience food access within private residences, neighbourhoods, transportation, and retail spaces in the City of Toronto?
3. How might physical barriers and socioeconomic disadvantage intersect to prevent food access for adults with mobility disabilities?

My dissertation contributes to the literature on disability and food insecurity by considering the varied causes of an important population inequality. In examining food access contexts in an often overlooked population, I expand and develop new thinking about environmental barriers to food access. By examining contextual influences on the relationship between food insecurity and mobility disabilities, I foreground important issues with current social institutions and urban built forms, including within residential environments, transportation systems, and public programs, which can contribute to the production of population health inequalities.

1.2 Research design

My doctoral research was undertaken with the objective of examining place-based influences on the relationship between mobility disability and food insecurity, from large scale political and economic differences across Canada and its provinces to more local scales, including neighbourhoods and food sources, and within the home. To meet this objective a mixed methods research design was used. Using this approach, broad geographic trends, derived from an analysis of microdata from a Canadian national health survey, were considered in relation to personal experiences of food access revealed through in-depth mobile interviews with people with mobility disabilities in the City of Toronto, Canada. A mixed method design permitted me to ground broader trends in food insecurity in personal experiences of food access, and thus enabled development of a scaled (from the body to the nation) understanding of food access and disability experiences. This approach also allowed me to leverage my experience as a trained quantitative public health professional and scholar while expanding my research abilities through learning about the application of qualitative research methods to my research questions.

With regard to my qualitative studies, mobile interviews, including go-along interviews and life space mapping exercises, were used to enhance stationary interviews, encourage critical reflections about place and food access, and to enable greater input from participants in the task of defining meaningful food environments (Kusenbach, 2003; Carpiano, 2009). Go-along interviews specifically allow for the possibility of a greater understanding about spatial practices and the various qualities of embodied and emotional experiences tied to place (Kusenbach, 2003; Carpiano, 2009). In regard to my use of mapping, Powell (2010) states that mapping exercises specifically can be used to “shed light on the ways in which we traverse, encounter, and construct racial, ethnic, gendered, and political boundaries” (p. 553). These exercises can also help to explore the boundaries that are related to difference in ability, including factors at the small scale that act as significant exclusionary forces in everyday life (Matthews & Vujakovic, 1995).

I worked with my research participants to ensure that interviews were accessible and flexible to suit participant’s needs and that participants felt included in the research process. Disability studies scholars have written about the benefits of openly discussing accessibility needs before interviews as well as maintaining some flexibility in interview site and process to suit people’s varying needs (Parent, 2016). Informed by Parent’s (2016) experience, I negotiated the site of interviews and places visited with research participants. I also worked with participants to choose a convenient and appropriate place to conduct interviews. All research activities, including the mapping exercise, were made flexible and modifiable as needed to suit participant abilities, including respecting participant agency in directing me to assist, when needed or desired, in the drawing of life-space maps.

During go-along interviews, I did not consider myself to be a neutral observer, but rather viewed the interview as a co-created experience (Parent, 2016). For example, one participant with an anxiety disorder commented that my presence helped her to feel less anxious than typical when on a shopping excursion. Another participant noted that he received less help than typical from staff in a grocery store due to my presence. As part of this co-created experience, participants were given the option to communicate their typical access experiences without being made to demonstrate them. Before any go-along interviews, I emphasized with participants that they could ask me for help as needed during the interview process. I reflexively considered that this approach might help to work through any perceived power imbalance whereby participants may have felt pressured to demonstrate difficult or dangerous access modes or engage in a more strenuous shopping experience.

1.2.1 Research setting

Through my work, I aimed to understand the relationship between disability and food insecurity within the Canadian context, in presence of a literature largely set in the United States. Though only limited research has been conducted on the association between disability and food insecurity within Canada, differences in context, including a universal single-payer healthcare system in Canada, contrasts with the United States, and may influence this relationship. Further, economic realities in place, including costs of living and variations in public benefit structures may be an influence. These systems differ at the provincial level within Canada with a wide range of disability welfare benefits and general welfare benefits offered across the country (Maytree, 2019). Differences in provincial benefit systems are discussed at greater length in Chapter three.

The City of Toronto was chosen as the site of this study's qualitative analysis as it represents a large urban area that includes a broad diversity of neighbourhood types with a wide range of socioeconomic conditions, diverse ethnic composition, urban and suburban neighbourhoods, and a wide variety of private and public transport options (City of Toronto, 2016). It is also the city where I live. Understanding the city in a personal way allowed me to better understand contexts of food access, including neighbourhoods, public transportation modes, and food access destinations. The City of Toronto is the largest city in Canada with a population of 2.7 million (Statistics Canada, 2019). Food insecurity is a problem in Toronto. The rate of household food insecurity was measured as 13.6% in Toronto, somewhat higher than the province of Ontario rate of 13.3% (Tarasuk & Mitchell, 2020). The qualitative component of my research took place in both urban and suburban neighbourhoods in the city. Use of diverse neighbourhood types was important as both urban and suburban environments may pose unique accessibility challenges, with urban areas often including disabling challenges like crowding, inaccessible and older buildings, and parking challenges, and suburban areas including challenges like farther distances to services (Huang et al., 2012; Mojtahedi et al., 2008).

This research was conducted in the context of ongoing attempts by the City of Toronto and its public transportation service, the Toronto Transit Commission (TTC), to redesign environments and public transportation to be more accessible for individuals with mobility disabilities. Changes have included updates to curbs and sidewalks as well as the TTC's ongoing goal to update the transit system with accessible stations, bus stops, and subway cars (City of Toronto, 2017; Toronto Transit Commission, 2017). Further, In 2005, the province of Ontario adopted the Accessibility for Ontarians with Disabilities Act (AODA), mandating that organizations in the public and private sector follow certain accessible standards, with a goal to achieve 'full' accessibility by 2025 (Government of Ontario, 2015). This context allowed me to question how certain policies may have improved or failed to improve daily mobility and access.

1.2.2 Theoretical framework

The main theoretical perspectives underpinning this work include: 1) Cummins et al.'s (2007) relational view of place and 2) Social perspectives on disability, from Oliver's (1996), social model of disability, Goodley's (2014) critical ableist perspective, and disability applications of an assemblage perspective (Feely, 2016). The use of these different perspectives is a reflection of my evolving research experiences and shifting and growing understanding about place and disability throughout the course of conducting my dissertation research. These perspectives are discussed below, drawing attention to how they helped me to develop some understanding of the relationship between disability and food insecurity.

At the outset of this research, including in this dissertation's scoping review of the literature (Chapter two), I used a social ecological model (SEM) framework to attempt to identify and understand factors in place at various scales that may produce disparities in food access, including at the individual, interpersonal, community, and broad scale social, environmental, and policy levels (McLaren & Hawe, 2005). Using this approach allowed me to unpack and organize my literature review to identify different disabling contexts of access. However, in all subsequent chapters, I came to view place relationally. A relational perspective, as conceptualized by Cummins et al., (2007), considers places, not just based in material environments, defined areas (e.g., census tracts), or measures like distance, but as being formed by the interconnections with and between those who inhabit them, including in the forming of social and power structures. Rather than considering place, or contextual factors, independent from compositional factors (i.e., the sociodemographic composition of people within place), this perspective allowed me to examine how compositional and contextual factors act together to influence health. For example, using this perspective, environments are seen to help shape the identities of those within it, while people in place form the social norms, communities, and organizations that come to inform place context.

Major differences between a conventional and relational understanding of place are explained in Figure 1.1, adapted from Cummins et al., (2007). A relational perspective was taken up as I found it necessary, in describing my qualitative study participant's food environments, to consider the mutually reinforcing relationships between people and contexts, including the role of past experience and the often-unique ways that people described relating to their surroundings, rather than considering these influences as separate. Further, in my research, I came to see that policy environments did not necessarily act as a frame for individual actions and health as considered using a SEM approach. Rather, people connected with policies in varied and individualized ways, for example, depending on knowledge of a disability program or benefit or ability to connect with organizational supports to access certain benefits, indicating that a multiscaled approach was required. In considering how socio-spatial context may influence identity and experience, this perspective aligns well with social perspectives of disability, discussed next.

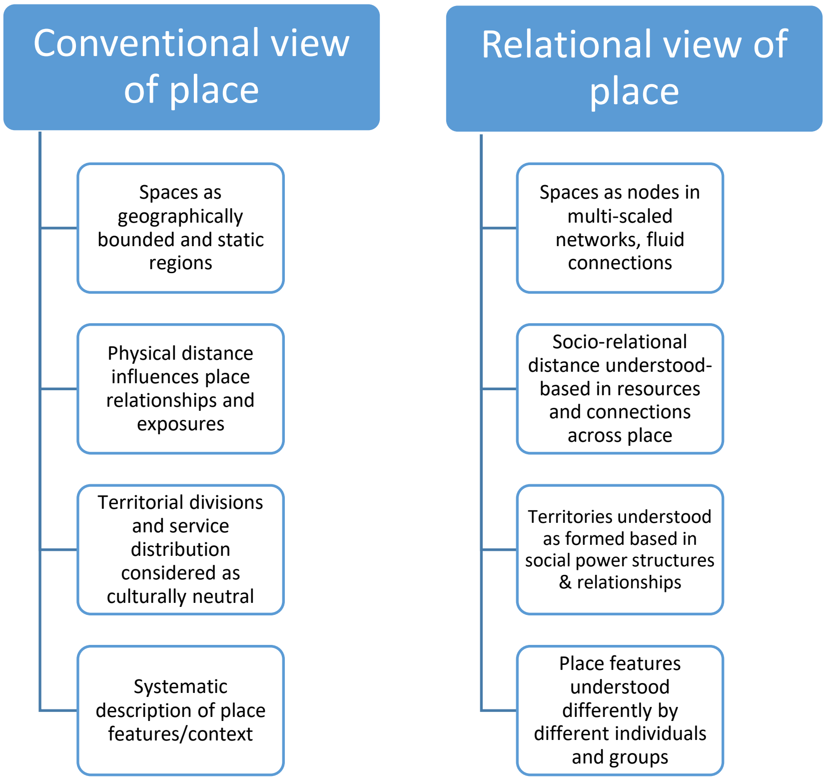


Figure 1.1. Adapted from Cummins et al., (2007) comparing conventional and relational understandings of place

Throughout my dissertation, I made use of the social model (Oliver, 1996), a critical ableist perspective (Goodley, 2014), and an assemblage perspective (Feely, 2016) to theorize disability and food access. I used these perspectives in intersection with a social ecological model perspective and relational view of place to theorize the relationship between place and disability. This theoretical pluralism helped me to question essentialist medical definitions that categorize or label the body and instead support the view that our understanding of disability is historical, spatial, cultural and dynamic (Feely, 2016; Withers, 2012; Oliver, 1996). My conceptualization of disability shifted somewhat over the course of this dissertation. This shift was due, in part, to the appropriateness of different disability models to the given method of analysis and, in part, to the evolution of my thinking on disability. This shifting perspective allowed me to better and more fully understand different aspects of disabling inequalities in food access, including identifying disabling barriers, understanding the systemic source of these barriers, and how barriers intersected to deny capacity. In the remainder of this section, I critically unpack the theoretical approaches to disability that I have adopted in my dissertation.

In a social model approach ‘impairments’, considered as bodily attributes, are defined separately from ‘disability’, or the social discrimination or built environments, that devalue and/or exploit people with mobility impairments and exclude them from social participation, including from places of work, education, and positions of political power (Oliver, 1996). In this model, the ‘problem’ of disability is refocused as social discrimination and adverse built environments (e.g., places with stair access only) rather than the impaired body (Oliver, 1996; Withers, 2012). Though using the social model focuses important attention on disabling norms and environments, its critics suggest that the focus on material barriers and discrimination, limits our ability to understand the role of pain or bodily experience (Hughes & Paterson, 1997; Shakespeare & Watson, 2001; French, 2003). The social model has also been criticized for mainly enabling an understanding of disability focused on the experiences of white males and those with physical disabilities, limiting consideration at the intersection of disability with other axes of identity (Goodley, 2014). Still, others have argued that the social model does not go far enough, suggesting that the notion of impairment needs to be complicated through questioning why certain bodily differences become defined as undesirable, often through the use of distinct and arbitrary cut-offs, and subsequently become the focus of discrimination (Hughes & Paterson, 1997).

Oliver (1996), responds to his critics by stating that pain is not unique to disability and that disability advocacy and research should focus on material and social barriers. He also notes that, if put into practice, a social model could be used to better understand the intersection of disability with other identities, such as race and gender. Considering the strengths and limitations of the social model, for this dissertation’s scoping review and quantitative analysis (see Chapter three) the social model of disability was used, allowing me to interpret population inequalities through understanding the potential role of socio-spatial discrimination of people with disabilities. Though I initially intended to use Oliver’s social model throughout my research, I found that this model did not always adequately describe the systemic barriers faced by participants in my qualitative study or the continued prominence of the biomedical conceptualization of disability in participant’s lives (e.g., based on how disability is understood and defined in many bureaucratic institutions). In describing experiences of food access of people with disabilities, I found that a model of disability was needed which accounted for the pain and frustration that participants experienced and which highlighted structural discrimination. Therefore, in later chapters (four and five), based on an analysis of in-depth qualitative interviews, and with a goal to highlight the role of embodied experiences as well as systemic discrimination, a critical ableist perspective and an assemblage perspective were used instead.

A critical ableist perspective includes as its main focus, the normative social orderings that lead to certain differences being rejected and certain bodies excluded or defined as ‘other’ against an idealized or ‘able’ norm (Campbell, 2009). Using this perspective enabled me to look beyond descriptions of disabling discrimination, as would typically be the case when using the social model. Rather, under the system of ‘ableism’ considered in this perspective, those that do not meet cultural ideals, such as the productive laborer or consumer within Western capitalist societies, are regularly excluded, devalued, and ignored (Goodley, 2014; Campbell, 2009). In Chapter four, I used a critical ableist perspective, mainly in examining the food access trip, aiming to consider the social and cultural values that allow environments or systems regularly used for food access to be created (and continue to exist) to the exclusion of some people (Goodley, 2014).

Scholars using a critical ableist perspective have described the advantages of using an assemblage perspective to consider affective experiences and to understand how capacities of people with disabilities are created within ableist contexts (Goodley et al., 2018; Goodley et al., 2019). The concept of assemblages, elucidated by Deleuze and Guattari (1987), considers the interacting social and material elements that shape capacity for action. Using disability assemblages offers a way to acknowledge how the body is always interacting with its surroundings, which in addition to built environments includes norms of access and material and social resources available to people, like mobility devices, and affective interactions with social contacts, forming embodied experiences and allowing capacity in different circumstances (Feely, 2016; Fritsch, 2010; Stephens et al., 2015; Gibson et al., 2012; Gibson et al., 2017). This perspective notably considers the fluidity and shifting nature of ability, but also considers how capacities may become fixed or limited. For example, disabling assemblages may become fixed through bureaucratic institutions defining disability based on biomedical conceptualizations of disability and which allocate disability benefits or allotted hours of care accordingly, or alternatively may be challenged, through advocacy for change (Feely, 2016). I used assemblages in chapter five to specifically understand the mutually enforcing role of people and place within the home that frame capacity for food access.

Geographers working on disability have contributed to disability studies by demonstrating the important role of space in experiences of disability, including impacts of processes at a range of spatial scales that relate to the production of disability and disability-related inequalities (Park et al., 1998; Imrie & Edwards, 2007; Chouinard et al., 2010; Kitchin, 2001; Dorn & Laws, 1994; Hall & Wilton, 2017). In adopting critical, social models of disability, this body of work has shown that space is not a static container, but rather produced based on relations of power, excluding certain groups like people with disabilities, as well as informing the embodied identity of its inhabitants (Dorn & Laws, 1994; Imrie & Edwards, 2007). The influence of space may be understood differently using the three social perspectives of disability employed in this work. The social model provides one means of understanding the role of space, considering how inaccessible and discriminatory spaces can come to define the impaired body as disabled (Oliver, 1996). However, the social model alone can sometimes deny the embodied subject positions which develop due to social and spatial organizations and representations (Dorn, 1994; Dorn and Laws, 1994). Spaces, such as inaccessible or separate entrances, often communicate difference to the body, actively enforcing whether the body is ‘in place’ or not (Kitchin, 2001). A critical ableist perspective considers that embodied difference is produced, not just in the experience of encountering disabling barriers in space, but in the social and spatial organization of every-day life in an ableist society (Goodley, 2014). These socio-spatial organizations are often self-enforcing and come to define the normative practices or allowable actions in these spaces (Hansen & Philo, 2007). Other scholars have noted that a disability identity may have a ‘recursive relationship’ with space, as spaces organize a specific embodied and disability identity, while bodies perform the actions and habits that constitute these spaces and attribute meanings to them (Imrie and Edwards, 2007). An assemblage perspective helps in understanding the ways that ableist spaces may be fixed or ‘territorialized’ which furthers a disabling assemblage, but also how these orders are contested (Hall & Wilton, 2017; Feely, 2016).

My work uniquely contributes to the geographies of disability literature by applying a social perspective of disability to studies of food access and insecurity. Studies of disability and food insecurity often recognize disability as an individual risk factor, without questioning how this relationship may vary across place (Huang et al., 2010; Wolfe et al., 2003). Geographic studies have considered the relationship between disability and food access, often considering access to a food store (Whelan, 2002; Coveney & O’Dwyer, 2009); yet, these studies similarly consider disability as an individual liability without considering the relationship between disability and structures of disadvantage. Applying critical social theory to the literature examining geographies of food access (e.g., food deserts) and insecurity, provides a critical understanding of the ways in which place may present structural barriers to food access for people with disabilities. Through applying theoretical and methodological pluralism, I further broaden understandings of the different, disabling scales and spaces of food access (i.e., across Canada, in the home, in public spaces, within public transit, and within food destinations) and explore the important relationships between these scales of access. In my work, I apply a social model perspective to the interpretation of quantitative survey analysis. This application of the social model demonstrates the use of positivist research methods in a way that does not oversimplify disabling experiences or ascribe to essentialism (Park et al., 1998), but which instead attempts to examine policies across space that contribute to disabling inequalities. Further, by examining the relationship between broader policies and personal experiences of food access, using a critical ableist perspective, I consider the ways that people with disabilities may experience different social and spatial organizations of their food access in comparison to normative and ableist modes that generally emphasize flexibility and choice in food shopping. Understanding these exclusions and differences, points to systemic ableism in how social assistance benefits, housing, transportation, outdoor environments, and food destinations are designed. I further explore the ways spaces of food access can inform people’s embodied identities and experiences of disability. Shopping and eating are social processes that occur across space, involving encounters, routine, and potential for social interaction and inclusion for people with disabilities (Wiesel et al., 2013; Wilton et al., 2018). In contrast, practices outside established norms in place may get looks or comments (for example, anger from others waiting in line) that disrupts one’s comfort and enforces a sense of difference or excluded ‘otherness’ (Hansen & Philo, 2007; Wilton et al., 2018). In my use of an assemblage perspective, I explore how bodies both interact with normative spaces as well as actively create or challenge them. For example, people with disabilities have some role in shaping the private spaces of their home. Yet, even so, these spaces are affected by outside assemblages, like the Toronto housing market and Toronto’s subsidized housing system that fix these spaces in ways that may deny access. Usage of these three disability models allowed for a broad consideration of the varied spaces of food access and the recursive nature between disability and space.

1.2.3 Disability language

I use person-first language throughout my research. Person-first language (i.e., person with a disability) was first used to reduce stigma and to help question tendencies to define people solely through disabilities (Dunn & Andrew, 2015). However, use of person-first language has also been rejected by some disability scholars and activists who state that its use simplifies disability as an outside factor, ascribing to a medical understanding in which disability is a ‘troublesome condition’ attached to some people (Titchkosky, 2001). Instead, they promote the use of identity-first language (i.e., disabled person), noting how people may be disabled by their environment or based in social discrimination. They also note how this label provides disability as a shared identity for social action.

In choosing to use person-first language, I do not wish to weigh in on the use of either form. Person-first language is commonly used in rights-based discourse (Dunn & Andrew, 2015) and is the preferred term used by the Centre for Independent Living in Toronto (CILT), the organization with whom I partnered for this research. Usage of this language does not indicate acceptance of a biomedical model of disability. The label “person with a disability” may in fact suit critical disability perspectives, like an assemblage perspective, noting how disability often acts in assembled interactions between persons, technologies, and settings to create experiences and capacities.

1.3 Chapter outlines

My dissertation is organized into four main chapters; each chapter contains a research article that has either already been published (Chapters two and three) or is currently under review (Chapters four and five). Collectively, these chapters address different aspects of food insecurity from population trends to individual experience. Chapter three is based on a quantitative analysis of national survey data, while chapters four and five are based on analyses of in-depth mobile interviews with adults with mobility disabilities. The remainder of this chapter provides more detail about the publication status and content of each chapter.

Chapter two: Disability and food access and insecurity: A scoping review of the literature (published in *Health & Place*)

In this chapter, I present an extensive scoping review of the literature based on 106 articles about the relationship between disability, food access, and food insecurity among people with disabilities living in the community. Review findings are summarized using a social ecological model framework with food access considered at the individual, interpersonal, organizational, and environmental levels. Findings show a consistently increased risk of food insecurity among people with disabilities with a higher risk for mental health disabilities, and among women and younger adults with disabilities. Mediators of this relationship were underexplored in the literature. Disability was mainly conceptualized as a problematic category preventing food access while ignoring disabling social and environmental barriers. A social model of disability was seen as important to inform future food access research by acknowledging the role of socio-environmental influences on the production and experience(s) of disability.

Chapter three: Mobility impairments and geographic variation in vulnerability to household food insecurity (Published in *Social Science and Medicine*)

In this chapter, I addressed my first research sub-question, aiming to understand the association between mobility disability and food insecurity within Canada and identify geographic trends in this relationship. By highlighting geographic differences in risk of food insecurity by province and region of residence and urban-rural status, I showed population-level inequalities in risk and the important role of political and economic contexts.

Using data from 217,094 adults from the 2007/08, 2009/10, 2013/14, and 2015/16 Canadian Community Health Survey, multivariate logistic regression models examined associations between mobility impairment and food insecurity, controlling for socio-demographic factors and geography of residence (i.e., province, region, and urban/rural status). Subsequent analysis of 14,353 surveyed adults with mobility impairments examined geographic and socio-demographic factors associated with food insecurity in this population. This work made use of the social model of disability. Mobility ‘impairment’ was used as the exposure of interest as the relevant survey module in the CCHS considers impairment, or reduced ability to walk, rather than self-identification of a disability. I considered here whether people self-reporting impairments could become disabled in relation to discriminatory contexts which, for instance, contribute to increased risk of food insecurity in this population. In this work, I also used a relational perspective to think through and discuss geographic variation in the relationship between mobility impairment and food insecurity, considering how compositional, contextual, and collective influences of place may be interrelated in influencing food insecurity.

In this chapter, the main finding is that adults with mobility impairments had elevated odds of food insecurity, with odds of 3.85 (95% CI: 3.49-4.24) adjusting for age, sex, and geography of residence, and 2.11 (95% CI: 1.89-2.35) adjusting for additional socio-demographic characteristics. Across Canada, mobility impaired adults were seen to experience greater odds of food insecurity. Canadian province or broader scale region of residence was significantly associated with food insecurity among mobility impaired adults, with significantly lower odds for mobility impaired adults living in Newfoundland, Alberta, and Saskatchewan compared to Ontario when adjusting for age and sex, and in Quebec when controlling for additional socio-demographic factors. Socioeconomic factors and age accounted for most variation in food insecurity in this population, suggesting the importance of poverty reduction strategies that reduce vulnerability to food insecurity across the population.

Chapter four: ‘Up until the moment that I’m here at the table, I’m dealing with a lot of barriers’: Experiences of food access among adults with mobility disabilities in Toronto, Canada. (submitted for publication in *Disability & Society*)

My second research sub-question was addressed through a qualitative research study involving mobile interviews focusing on experiences of food access. Interviews were conducted with 23 adults who identified as having mobility disabilities, living in the City of Toronto, Canada. Participants were recruited with the aim to include people with a range of mobility impairments, genders, and socioeconomic backgrounds. For this study, I partnered with the disability organization, CILT, who provided advice on study design and aided in advertising participant recruitment materials. CILT has a stated aim to help people with disabilities in Toronto learn independent living skills and promote social and economic equity and commits to having a majority of its board and staff positions held by people with disabilities (Centre for Independent Living in Toronto, 2017).

For this study, mobile research methods were used to enhance semi-structured, stationary interviews. These mobile methods included go-along interviews, involving accompanying the research participant on a journey to and from a food destination they regularly visit, or if participants preferred, a life space mapping exercise, during which participants drew out, or directed me in drawing, a mental map of their food environment, including routes and places where they accessed food (Huot & Rudman, 2015; Rudman et al., 2016). Mobile research methods were well suited to a relational understanding of place, helping to highlight spatial practices and connections to places related to past experience which may form people's food access environments (Dean, 2016).

In chapter four, the first of two chapters based on this qualitative study, I specifically studied experiences of food access, focusing on barriers and facilitators to access. In this work, I used a critical ableist studies perspective to question the normative orders that exclude people with disabilities from regular systems of food access. In using a relational perspective of place, I also questioned oversimplified measures of food access like the food desert concept. Rather than distance to food sources, socio-relational distances were considered, allowing me to highlight the different routes by which people may be connected or disconnected from different places, including the resources, systems, and relationships that give individuals access across their environment.

Findings from this analysis indicate intersecting disabling barriers to food access, including socioeconomic barriers and physical barriers within the home, neighbourhoods, transportation modes, and within food destinations. This analysis also demonstrates the important role of small-scale barriers and temporal inaccessibility due to construction and inclement weather. From these findings, I suggest that it is critical to improve and enforce accessibility standards in public and private places in coordination with addressing socioeconomic disadvantage of people with disabilities.

Chapter five: Assemblages of enablement/disablement in accessing food: the role of housing and the home (Submitted for publication in *Disability Studies Quarterly*)

In Chapter five, I focused on understanding access to food within the home for adults with mobility disabilities, a scale which is frequently ignored in the food access literature. In this chapter, I addressed my third research sub-question, questioning the relationship between economic and physical barriers to food access. Further drawing on a qualitative study, interviewing 23 adults with mobility disabilities in the City of Toronto, I specifically explored how the setting of the home integrally connects economic and physical barriers to food access. Using an assemblage perspective, the inter-related nature of physical, social, and economic access to food was highlighted, noting how different factors may together work to enable or disable capacity for food access.

In this chapter, the home was seen as an important financial resource, a physical setting of action, and a setting of care and social interaction in shaping access to food. I outline circumstances that disable many from proper housing environments or suitable situations of care. Based on these results, I then suggest the need to address an important disadvantage in food access through appropriate care, facilitating flexible modifications in private and shared housing spaces, and addressing socioeconomic disadvantage of many people with disabilities.

Chapter six: Conclusion

In this concluding chapter, I summarize the key findings from my four original research papers. The interconnected relationship between the social, environmental, and political aspects of food insecurity and disability are highlighted. I underscore how multiple disadvantages are seen to prevent access to food, lead to stress, and contribute to feelings of disablement and exclusion. Policy and programmatic implications are considered, highlighting the need to address the various political and social/institutional constraints that relate to higher likelihood of socioeconomic disadvantage among people with mobility disabilities, contributing to experiences of food insecurity, as well as addressing the environments and inadequate disability systems that may complicate physical access to food.

Chapter 2
Disability and food access and insecurity: A scoping review of the literature

2.1 Introduction

Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life (FAO, 1996). Household food insecurity (HFI) extends beyond measures of hunger, with common measures surveying household conditions from anxiety over having enough money for food to going for days without eating because of financial constraints (Bickel et al., 2000). HFI is associated with a number of adverse health outcomes from poor mental health, to nutritional deficiencies, and chronic illness like diabetes and heart disease (Kirkpatrick & Tarasuk, 2008; Gunderson & Ziliak, 2015; Stuff et al., 2004, Vozoris & Tarasuk, 2003). Food insecurity is a global problem, including within high-income countries in Europe and North America, where between 10-15% of the population experience food insecurity (Coleman-Jensen et al., 2017; Loopstra et al., 2015a; Tarasuk et al., 2014). Certain populations are at greater risk of HFI, including single parent households, families with children, minority populations, immigrants, renters as compared to home-owners, and those with a chronic illness, or a disability (Gorton et al., 2010; Heflin et al., 2007; Kirkpatrick & Tarasuk, 2011).

Poor physical access to food has been considered a risk factor for food insecurity, health, and dietary outcomes (Caspi et al., 2012; Walker et al., 2010). Physical access has been largely conceptualized using the ‘food desert’ metaphor, generally referring to low-income areas with poor geographic accessibility to a grocery store (Wrigley, 2002). This concept posits a relationship between physical and economic access to food, suggesting that low-income individuals living in food deserts have less access to affordable healthy food sources and are therefore likely to eat less healthy foods, or spend more money on food at local stores or more time accessing food sources with a healthier selection (Wrigley, 2002). However, the effect of various measures of the food environment on food insecurity and diet appears to be mixed (Carter et al., 2014; Caspi et al., 2012; Walker et al., 2010). The absence of a clear effect may be due to inconsistencies and limitations in the construction of food desert measures (McEntee, 2009; Shannon, 2013). Critiques of this research centre on themes such as oversimplification of access – frequently excluding affordability of local foods and cultural acceptability, a focus on residential location – thereby failing to consider mobility and temporal variation in access, and dismissal of population heterogeneity in access to food (Usher, 2015; Chen & Kwan, 2015; Shannon, 2013; Widener & Shannon, 2014).

Factors influencing food access will vary across the population depending on culture, socioeconomic status, and importantly, by ability. Persons with disability may have poorer physical access to food (Shaw, 2006). Higher rates of poverty have also been observed among people with disability, suggesting poorer economic access to food (Palmer, 2011; She & Livermore, 2007). A greater consideration of disability can help to understand influences of food access in this population, highlighting heterogeneity and physical and economic influences of food access across the population.

The primary questions motivating this review are: 1) what do we currently know about the relationship between disability and food access and insecurity? and 2) to what extent has disability gone (un)considered in food access research? For the purpose of this review, disability is conceptualized using the social model of disability. The social model distinguishes between impairments, defined as physical or health conditions, and disability, which is a result of the social oppression and discrimination added to impairment through exclusionary social norms and built environments (Imrie & Kumar, 1998; Oliver, 1996). Under the social model, factors rooted in place, such as norms, policies, and the built environment, become important to understanding the normalization of people with disability as excluded, and disability experience(s) more broadly (Imrie, 1996; Kitchin, 1998).

2.2 Review Methodology

A scoping review was considered suitable for reviewing the relationship between disability and food access/(in)security. Scoping reviews are useful for studying novel topics, summarizing what is already known on a subject, identifying gaps, and combining knowledge from multiple study types (Arksey and O’Malley, 2005). In this review, a social ecological model (SEM) approach is used to investigate the dynamic interrelationship between health influences at varying levels, with individual level differences acting within broader social, organizational, and environmental levels, including social norms, political and economic settings, that together result in health outcomes and inequalities (McLaren & Hawe, 2005).

The SEM approach is intersected with the social model of disability to create a more complete picture of the relationship between disability and food access, focusing on how the social and environmental scales not only interact with, but also produce a disabled identity. At the environmental level, the concept of food deserts will be critically explored in relation to food access for people with disabilities.

2.2.1 Search strategy

Five databases were searched corresponding to major fields of study discussing food access (i.e., medicine, nutrition, public health, geography, political sciences, and social sciences). Databases included Medline (Ovid), Scopus, PAIS International, GEOBASE, and Social Sciences Citation Index (SSCI). Databases were searched in October 2018 for articles published over the last 50 years (1966-2018). The search included database specific terms for disability or physical impairments in conjunction with food access, food (in)security, or food deserts anywhere in the article (see Appendix A). Despite a focus on mobility/physical limitations, common measures of disability, such as the activities of daily living scale (ADL), do not specify type or form of disability. The ADL assesses self-reported ability/needing assistance with basic activities like bathing, dressing, and self-feeding. A related instrumental activities of daily living (IADL) scale, includes activities like shopping, preparing meals, and managing finances (Katz, 1983). Therefore, disability was considered broadly, including sensory, mobility, mental, cognitive, and physical impairments in various household members.

Qualitative or quantitative articles were included if they examined how or whether disability is associated with food access or influences of food access among people with disabilities. Articles focusing on the effect of food insecurity and poor nutrition on disability or physical or mental health or on outcomes of nutrition or nutritional behaviours as opposed to physical or economic ability to access food, were excluded as they fell outside the scope of this review which seeks to examine how and when disability influences food access and (in)security. Articles were excluded if they focused on institutionalized populations, as these populations would have markedly different influences of access, or on agricultural production as compared to market access.

Articles that focused solely on health status or older populations without specifying impairment or disability were excluded, so as not to conflate disability with health. The search produced 1714 articles, 1406 remained after duplicate removal. Applying the above inclusion/exclusion criteria left 77 articles. Article references were then scanned for additional articles (*n*=20), and articles known to the author (*n*=9) were added resulting in 106 articles (Figure 2.1). Thirty-two of the 106 articles specifically included statistical tests of the association between disability and HFI (i.e., reduced food access because of financial constraints) and were considered in a separate quantitative analysis. Due to important variation in measures of disability and food insecurity, and underlying study population, results were narratively summarized.

Strength of the evidence was assessed among quantitative studies as low, medium or high by considering sample size, use of a validated food insecurity measure, definition of disability, whether disability was the primary predictor, study generalizability (i.e., use of a representative or convenience sample), and use of appropriate covariates. Qualitative studies were assessed generally based on argument cohesiveness and understanding of disability. Across the literature, diversity of respondents and study settings was critically examined.

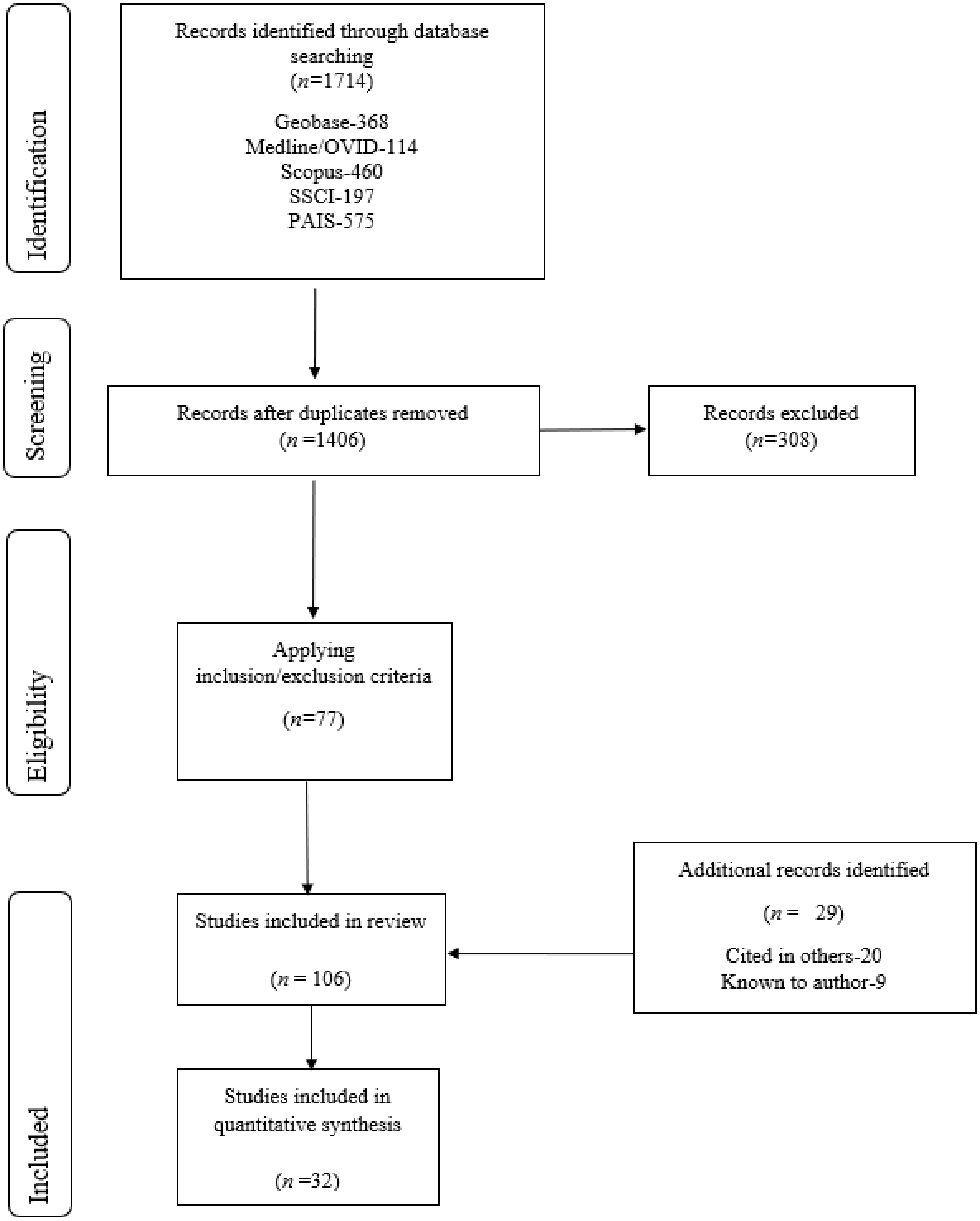


Figure 2.1 Overview of literature search process

2.3 Results

A wide variety of academic fields, ranging from nutrition, public health, geography, disability studies, rehabilitation studies, social sciences, gerontology, agriculture, and economics are represented. A complete list of the 106 articles is included in Appendix B. Most studies were conducted in high-income English-speaking countries, mainly in the United States. Access in urban areas was considered most frequently (*n*=40), while 11 studies looked at access in rural areas. Elderly populations were the most frequently studied (*n*=37), while fewer studies specifically considered access in younger adults (generally age 18-25) (*n*=4), or families with children (*n*=12). Nine articles critically considered their definition of disability (Bilyk et al., 2009; Emmett & Alant, 2006; Kudlick, 2007; Meyers et al., 2002; McGrath et al., 2017; Shantz, 2011; Webber et al., 2007; Stark, 2001; Williams-Forson & Wilkerson, 2011; Spurway & Soldatic, 2016; Waltz et al. 2018). Results from all 106 articles are summarized according to a SEM framework to organize and construct an understanding about relationships between disability and food access at the individual, social, organizational, and environmental levels.

2.3.1 Individual factors

Thirty-two articles examined the quantitative statistical relationship between disability and food insecurity (Table 2.1). By country of origin, 24 were conducted in the United States, while a smaller number were conducted in Canada (*n*=2), Mexico (*n*=2), the U.K. (*n*=1), Malaysia (*n*=1), Ethiopia (*n*=1), and Trinidad and Tobago (*n*=1). Most studies considered country or region-wide representative samples (*n*=23) or food access in urban or suburban populations (*n*=6), one solely included rural populations, although urban/rural differences were considered in two articles. Most authors conceptualized disability as limitations to activities, tasks, or physical functions (*n*=16) or work (*n*=10) (some including multiple definitions). Ten identified specific disabling conditions, one considered access to disability benefits and six did not define disability. Articles frequently used food insecurity scales validated in the study population, such as the 6, 10, or 18 item (30-day or 12-month) core food security module (*n*=16), a number used select questions from the core module (*n*=13) or unvalidated measures of food hardship such as ability to afford meat or fruit (Shahtamasebi et al., 2009). Three studies relied on one question to measure food insecurity or insufficiency (Klesges et al., 2001; Wilmoth et al., 2015; Ghosh and Parish, 2013).

Disability was consistently related to an increase in HFI in all but two articles (Brostow et al. 2017; Klesges et al., 2001) where not all associations were positive. However, these articles included smaller sample sizes or non-generalizable populations. Excluding these findings, effect sizes ranged from an odds ratio (OR) of 1.18 (Brewer et al. 2010) to 5.21 (Brucker & Coleman-Jensen, 2017). Most articles (*n*=20) reported an OR between 1.5 and 2.5, although this varied depending on type of disability, household member with a disability, and population being considered. Most studies were of medium or higher strength of evidence (*n*=21). Although included studies are mainly cross-sectional, four longitudinal studies lend evidence of causality to the relationship between disability and HFI, which is likely bidirectional in nature (Lee & Frongillo, 2001; Venci & Lee, 2018).

Effect sizes were generally smaller among older adults or children with a disability, and higher for adults or young adults with a disability (see Figure 2.2), although one analysis found a stronger association between mental-health disability and HFI among older adults (OR=5.21) compared to younger adults (OR=3.07) (Brucker & Coleman-Jensen 2017). Studies examining the relationship between disability and HFI in low socioeconomic status populations, generally reported smaller effects. In studies stratifying by disability type, effect sizes for a mental health disability were greater than all other disabilities (Brucker, 2016; Brucker & Coleman-Jensen, 2017; Coleman-Jensen & Nord, 2013). Among families with a married male and female, a stronger association was found for disability among females (OR=2.30) compared to male adults (OR=1.70) (Huang et al., 2010). A greater effect was also seen among those living alone (OR=3.00) compared to any household circumstance (OR=1.69) (Chang & Hickman, 2017).

Interaction effects were rarely included. Huang et al. (2010) reported statistically significant interactions between financial resources and disability, indicating that increased income is less protective for people with disability, while access to household assets was more protective. The relationship between disability and HFI would be expected to vary geographically across differences in available disability benefits and policies. However, there were few obvious geographical differences; most studies were based in the United States and used national surveys, a highly aggregate scale of analysis. Certain geographic factors have separately been related to risk of HFI in quantitative analyses, including urban compared to rural status, higher rents, and regional availability of social benefits (Carter et al., 2014; Gorton et al., 2010; Shannon et al., 2015), yet it is unknown how these factors interact with disability. In one study set in Mexico a slightly smaller effect was reported for rural areas compared to urban areas (Magaña-Lemus et al., 2016). In addition to HFI, high levels of malnutrition have been associated with disability in higher and low and middle-income countries (Alavi et al., 2012; Deeming, 2011; Kuper et al., 2015).

Table 2.1: Articles showing a statistical relationship between disability and food insecurity

Article	Setting	Study/Population	Disability measure	Effect Size	Strength of evidence
Klesges et al. 2001	USA, Baltimore	Women 65+, reporting a physical disability (*n*=1,002)	Depression, Level of ADL	White women Depression, OR=1.09* Greater ADL, OR=0.56* Non-white women: Depression OR=1.13*, greater ADL: non-significant (data not shown)	Low: Unvalidated food security measure- 1 item. Unclear measure of disability. Smaller sample. Not main predictor.
Lee and Frongillo, 2001	USA, New York	NHANES-1988-94, age 60-90 (*n*=4,618) and NSENY-1994. Age 60+ (*n*=406)	ADL, IADL	ADL, NHANES, OR=1.94* ADL, NSENY, OR=2.8* IADL, NHANES, OR=1.39 IADL, NSENY, OR=2.17*	Medium: Unvalidated food insecurity module- 1-item (NHANES) or 3-item (NSENY)
Tarasuk, 2001	Toronto, Canada	Women (19-49) with a child<15, using emergency assistance (*n*=153)	General disability or illness, activity limitation due to a health condition	30-d food security Illness or disability OR=2.050*, Activity limitation OR=2.947* 12-month food insecurity: Illness or disability 2.394* Activity limitation 2.485*	Low: Univariate analysis, low generalizability. Small sample size. Not main predictor.
Gulliford, Mahabir, and Rocke, 2003	Trinidad and Tobago	Adults (*n*=531)	ADL	OR=3.12*	Low: Smaller sample, limited covariates. Not main predictor. Food security

					module not validated in the population-6 item
Bartfeld and Dunifon, 2006	USA	CPS 1998-2001. families with children (*n*=70,942)	Household member with a disability	OR =1.99*, 2.109* (Various models)	Medium: Not main predictor, disability not defined.
Bernell, Weber, and Edwards, 2006	USA, Oregon	Oregon Population Survey 2000. (*n*=4,725)	Household member with a disability	Logit coefficients from 0.865 to-0.874*	Medium: Not main predictor, disability not defined.
She and Livermore, 2007	USA	SIPP 1996-99. Working-age adults	Work-limiting disability	Work-limiting disability, <12 months, OR=1.85* Work-limiting disability > 12 months, OR=2.031*	High: Early 5-item food security scale
Parish et al., 2008	USA	NSAF 2002. Families with children (*n*=28,141)	Child with a disability- physical, learning or mental-health condition preventing activity participation	OR for various food hardships=1.78-1.89*	Medium/High: Unvalidated measures of food security-3 separate questions
Parish, Rose, and Andrews, 2009	USA	NSAF 2002. Women age 18-64 (*n*=24,861)	Work-limiting disability	OR =2.07 to 2.2*, across various measures of HFI	Medium/High: Unvalidated measures of food security-3 separate questions
Rose, Parish, and Yoo, 2009	USA	NSAF 2002. Women age 18-64 (*n*=24,861)	Work-limiting disability	Chi squared by model from 804.34 to 1041.54*	Low: Univariate models. Not main predictor. Unvalidated measures of food security -3 separate questions
Shahtahmasebi et al., 2009	UK	Families with children (*n*=8,063)	Child with a disability	Elevated risk*	Medium/Low: Not main predictor. Disability not defined. Unvalidated

					measures of food security
Brewer et al., 2010	Georgia, USA	Older population Age 50+, using community meals (*n*=621)	Weight-related disability, Physical functioning	Physical functioning: OR=1.18, Weight-related OR=1.89*	Medium: Not generalizable, smaller sample, Not main predictor.
Huang, Guo, and Kim. 2010	USA	Panel study of income dynamics, 1997, 1999. Married Families (*n*=3,124)	Work-limiting disability	Male with disability, OR 1.70, Female with disability, OR=2.30*	Medium/High
Norhasmah et al., 2012	Malaysia, Hulu Langat Selangor	Women, urban welfare recipient, age 20-55 (*n*=103)	Household member with a disability	F score=3.690*	Low. Small sample size. Disability not defined
Coleman-Jensen and Nord, 2013	USA	CPS, 2009/10, adults age 18-64, (*n*=55,383)	Household member with a disability by type, work-limiting disability	Physical disability, OR=1.58*, Mental disability, OR=1.60* Vision disability, OR= 1.46* Hearing disability, OR=1.11 Work-limiting, OR=1.58*	High
Ghosh and Parish, 2013	USA	2004, 2008 SIPP families with children (*n*=25,767)	Having multiple children with disabilities-physical or mental condition, or activities of daily living 15+	1.69* for 2 or more children with disabilities (ref=no children with disabilities). 1.18 (reference of 1 child with disabilities).	Medium: Unvalidated measure of food sufficiency-1-item
Horner-Johnson et al., 2015	Oregon USA	Behavioral Risk Factor Surveillance System (*n*=2,872)	Providing care to friend or family with health problems or disability	OR=2.1*	Medium: Unvalidated measure of food security-3-items. Disability/caregiver role unclear.

Wilmoth et al., 2015	USA	SIPP 2001, 2004. Households with an older adult >=65 (*n*=9,528)	Disability status: sensory limitations or ADL or IADL or work-limiting disability	Disability, OR=1.45 Disabled veteran, OR=3.72*, Veteran living with a disabled person, OR=7.91*	Medium/Low: Unvalidated measure of food sufficiency-1-item
Brucker, 2016	USA	NHIS 2011-13. Young adults, 18-25. (*n*=32,795)	Activity limitation, Psychological distress, On SSDI benefits	Disability (general), OR=2.48*. Psychological, OR=5.21*, SSDI benefits, OR=1.79*	High
Brucker and Nord, 2016	USA	2011-14 NHIS, adults age 18-25 (*n*=44,080)	Intellectual and developmental disabilities (IDDs), and other activity limitations	IDDs: 2.9*, other limitation as 3.02*	High
Heflin, 2016	USA	SIPP 2008. (*n*=18,379)	Work-limiting disability	Linear probability coefficient =0.0433*	High: Longitudinal. 5-item food security module.
Magaña-Lemus et al., 2016	Mexico	National Household Income and Expenditure Survey 2011 (*n*=60,000)	Household member with a disability	Linear coefficient =0.033* Just rural- coefficient =0.026*	Medium/Low: Disability not defined, not main predictor.
Moffitt, and Ribar, 2016	USA: Boston, San Antonio, Chicago	Three Cities Study. 1991-2005 Low income families. (*n*=2,458)	Caregiver identified disability	Across various logit model specifications: 0.9327*, 0.6409, 0.6554	Medium: Longitudinal. Incomplete food security module, 4-item adult/child
Sonik et al., 2016	USA	SIPP Households with children (*n*=24,729)	Range of conditions in adults, children	Children with disability, OR =1.73* Adult with disability, OR= 2.19*	High: 5-item shortened food security module.
Vilar-Compte et al., 2016	Mexico City	Older adults, 65+, at senior’s group (*n*=352)	Depression, ADL, IADL	Depression, OR= 2.843*, ADL, OR=2.177*	Low: Not generalizable. Small sample size. Not main predictor.

				IADL, OR=1.785*	
Brostow et al. 2017	USA-nationwide	Male veterans over 50, participants in Health and Retirement study and Health Care and Nutrition Mail survey (*n*=1,254*)*	ADL, psychiatric diagnosis	Older Veterans, 65+: psychiatric diagnosis OR = 4.19*, ADL OR=1.41. Under 65: OR=4.49*, psychiatric diagnosis OR=0.91	Low: Unvalidated food security module-3-items. Not main predictor
Brucker and Coleman-Jensen, 2017	USA	NHIS, 2011-14, 18+, (*n*=426,579)	Functional ambulatory, cognitive, sensory, mental disability	Any disability, OR=2.576* Young adults (18-24): cognitive disability, OR: 2.430*, mental health, OR: 3.074*, Ambulatory 1.71, more than one disability, OR=3.339* Adults (25-61): Cognitive disability, OR =1.93*, Hearing disability, OR=1.43*, Ambulatory disability, OR= 1.55*, Mental disability, OR= 4.58* Older adults (61+): Ambulatory disability, OR= 1.439*, Mental disability, OR= 5.21*, More than one disability, OR=2.07*	High
Chang and Hickman, 2017	USA	NHANES. Age ≥65, household incomes ≤130% of federal poverty level (n = 1,323)	Functional limitations (physical)	OR=1.69*, Living alone: OR=3.38*	Medium/High: smaller sample
Heflin, 2017	USA	SIPP, 2008 panel (*n*=16,247)	Disability, general	Probit model effect dy/dx: 0.0129*	Medium/High: Longitudinal. Disability not defined.

St-Germain and Tarasuk, 2017	Canada	Survey of Household Spending, renter household in government subsidized housing (*n*=455)	Activity reduced from physical or health condition	OR=1.85* (after tax income controlled) OR=1.89 (controlling for after-rent income)	Medium/Low: Smaller sample, Not main predictor.
Tirfessa et al. 2017	Southern Ethiopia	Populations identified with mental illness and controls (*n*=556)	Diagnosis of psychiatric condition and functional limitations	Mental disorders: 2.82*, insignificant when controlled for functional limitations	Medium: non-generalizable.
Glendening et al. 2018	USA cities	Families in emergency shelters (*n*=1,857)	Limitations and conditions in various family members, including work-limiting disabilities	Beta coefficients: Some disability in family 0.41, Some work-limiting disability in family 0.53 Respondent disability limits work 0.54.	Medium: Longitudinal.

*****as significant $p<0.05$. ADL as activities of daily living, IADL as instrumental activities of daily living, SIPP as Survey of Income and Program Participation, CPS as Current Population Survey, NHANES as National Health and Nutrition Examination Survey, NSAF as National Survey of American Families. NHIS as National Health Interview Survey. NSENY as Nutrition Survey of the Elderly in New York.

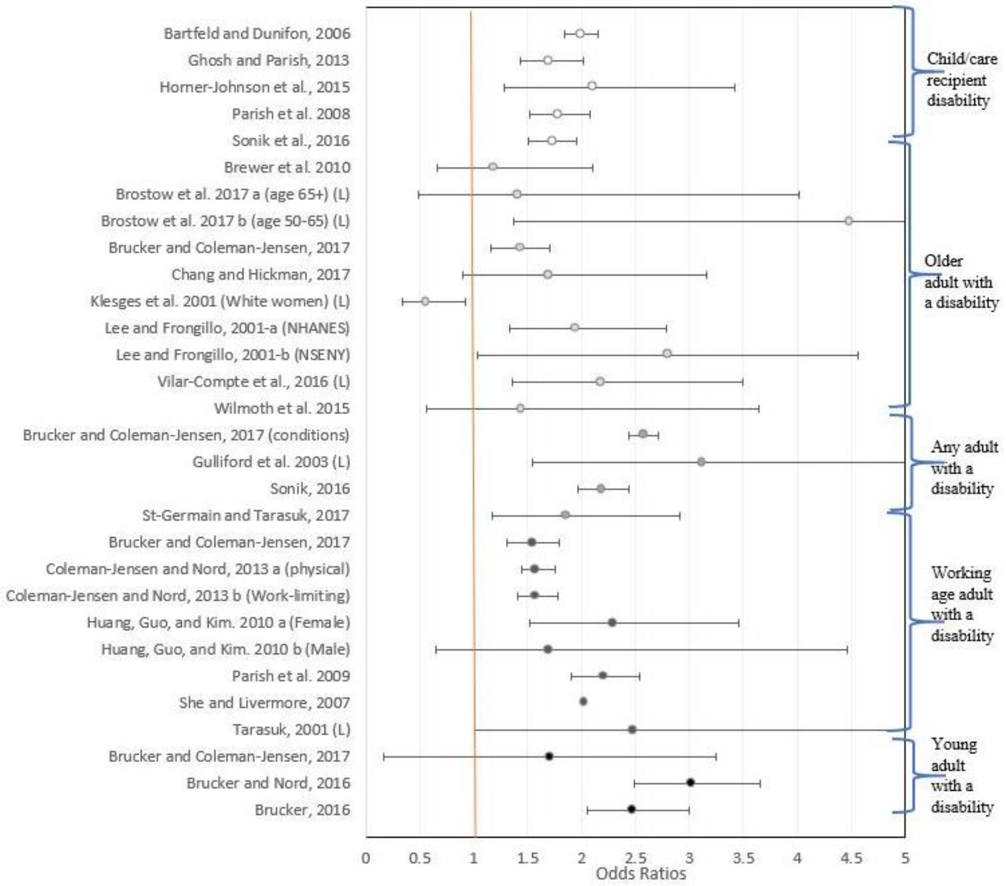


Figure 2.2 Effect size (Odds Ratios) of physical disability (including activity limitations, functional limitations, work-limiting, and generally defined disability) on risk of food insecurity by study, grouped by population of study. (L) Study has a low contribution to the strength of evidence

Risk of HFI has been described as resulting from reduced financial resources, high household expenses, and reduced 'coping' or ability to manage household budgets (Heflin et al., 2007). This model can help to frame an understanding of HFI in people with disability. Globally, people with disability experience higher levels of poverty and unemployment, reducing financial resources for food (Palmer, 2011; She & Livermore, 2007). Research from the United States suggests that people with disability may require an income two to three-times greater to avoid HFI, due to added medical and adaptive equipment expenses, costs for personal assistants, or special dietary needs (She & Livermore, 2007). Huang et al. (2010) found that reduced financial resources and higher expenses did not completely explain the HFI-disability nexus and pointed to 'coping' as an overall challenge. For example, physically demanding, cost-saving strategies, such as 'bargain-hunting' and home-cooking, may be of limited use among some people with disability. In a small sample of foodbank users in Washington State, coping strategies among food pantry-users with disabilities more frequently involved immediate strategies like pawning items, though no differences were observed across strategies like couponing and bargain-hunting (Wood et al., 2009). The literature indicates that difficulty shopping for groceries and preparing food, was a barrier to food access in populations with physical disabilities, leading to the purchase of more highly processed/pre-cooked foods that were more expensive and less nutritious (Bilyk et al., 2009; Burns et al. 2015; Keller et al., 2007a; Nolan et al., 2006). The need to accommodate clinically indicated special dietary requirements, presented an additional challenge (Cuesta-Briand et al., 2011; Wolfe et al., 2003).

2.3.2 Social factors

Social supports from neighbours, family and friends may mediate the relationship between disability and food access (Coveney & O’Dwyer, 2009; Webber et al., 2007). However, quantitative research reports mixed effects in relation to social capital and supports. Older adults with disability and persons with psychosis showed lower risk of HFI in the presence of supports from family or friends (Keller, 2006; Mucheru et al., 2017). In contrast, Lee and Frongillo’s (2001) study of older adults and Chung et al.’s (2012) study on neighbourhood social cohesion did not indicate a protective effect. Varied results in the quantitative literature could reflect differences in the conceptualization and measurement of social support (e.g., frequency of contact, neighbourhood measures), the limited number of studies on this topic, and cultural differences in how support is produced and performed.

In contrast, qualitative research indicates that adequate social supports were able to compensate for inadequate geographical access or poor economic access in several ways including, family, friends and neighbours providing help accessing stores, particularly distant stores with healthier food and cheaper prices, financial help, and food provision, or preparation in times of need (Coveney & O’Dwyer, 2009; Neill et al., 2011; Oemichen & Smith, 2016; Schoenberg, 2000; Smith, 1991; Webber et al., 2007; Wolfe et al., 1996). Living with others, allowed for division of household tasks related to food provision, easing difficult tasks for people with disabilities (Webber et al., 2007). Alternatively, social isolation reduced food access, with effects on motivation to shop for, prepare, and eat food (Locher et al., 1998; Wylie et al., 1999). Relying on others was sometimes problematic as some reported losing control over stores visited and the healthfulness of foods purchased and prepared (Cuesta-Briand et al., 2011). Individuals reported difficulties as they were subject to time constraints of others, reducing ability to engage in time-consuming cost-management strategies like bargain-hunting or couponing (Wolfe et al. 1996).

Social norms and values influence food access patterns. Activities related to food shopping and preparation held social significance as an important source of independence and opportunity to exercise personal choice (Kudlick, 2007; Munoz-Plaza et al., 2013). Some decided to shop alone rather than seek help, while those seeking help commonly reported feeling like a burden on others (Munoz-Plaza et al., 2013; Smith, 1991; Wolfe et al., 1996). Social processes, like gentrification, were also related to higher rent prices and less access to affordable food options for those with limited financial resources (Miewald & McCann, 2014; Whittle et al., 2015). Discrimination and social stigma were evident in discussions about food access and disability. Many services, including welfare benefits and community food programs were stigmatized, influencing when and how people accessed them (Oemichen & Smith, 2016; Wolfe et al., 1996). Some charitable food services justified not addressing the needs of disabled clients (e.g., providing food delivery), stating that services were not meant to ‘pamper’ clients (Waltz et al. 2018). Stigma was more commonly discussed in the context of low and middle-income countries, with reports of extreme poverty and reduced share of household food resources among people with disability (Alavi et al., 2012; Groce et al., 2014; Mander, 2008). Yet, stigma also had severe effects on food access in higher income-countries, where disability was related to social isolation (Locher et al., 1998; Papan & Clow, 2015), and high levels of discrimination related to mental illness (Keller et al., 2007b). Embarrassment over adaptive food eating practices acted as a barrier to eating food outside the home with implications on social participation (Bilyk et al., 2009).

2.3.3 Organizational and Institutional Factors

Institutional policies represent a key influence of food access. In many places, disability benefits are greater than general welfare. However, this difference may be offset by higher costs, particularly when medical expenses, mobility equipment and other aids are insufficient or unsubsidized (She & Livermore, 2007). Problems also arise as benefits fail to keep pace with inflation (Waltz et al. 2018). Disability benefits can reduce food insecurity and housing instability, particularly among more disadvantaged households, but they are often inadequate to prevent HFI across the population (Ghosh & Parish, 2015; Glendening et al., 2018; Wright, 2015). Government-subsidized housing is related to risk of HFI (Kirkpatrick & Tarasuk, 2011). However, little information is available on how housing programs adapt to the needs of people with disability. An American state program facilitating medical expense deductions improved reporting and increased food budgets for adults with disabilities (Adams et al., 2017). Food assistance programs like the Supplemental Nutrition Assistance Program (SNAP) in the United States play a role in reducing risk of HFI, but are often inadequate (Choi et al., 2017; Gorton et al., 2010).

Access to social benefits varied across studied populations. Access to disability benefits could be limited by bureaucratic systems and requirements to prove disability. People who fail to qualify because they are “not disabled enough” or fail to fit within includable types of disability are particularly disadvantaged (Shantz, 2011; Withers, 2012). One report stated that women with disabilities were less likely to access disability benefits (Emmett & Alant, 2006). In contrast, in the United States, households with disabilities were commonly found to access more needs-based benefits like SNAP (Pruitt et al., 2016; Redmond & Fuller-Thomson, 2009; Smith et al. 2017). Another study in the United States showed that identifying as black or being a single mother was associated with increased likelihood of receiving child disability benefits among families with disabled children (Ghosh & Parish, 2015).

Government sponsored community-care could facilitate physical or economic access to food (Ferris et al., 2016; Hall et al., 2003). Community workers in Hamilton, Ontario, Canada described limitations in addressing food insecurity due to limited funds and difficulty coordinating services for clients with complex needs (Keller et al., 2007b). In the UK, service times of government-sponsored personal support workers were often too constrained to provide participants with services like meal preparation (Wylie et al., 1999). Community programs, like meal delivery services (e.g., Meals on Wheels) provided food access for populations with restricted mobility, including housebound older adults (Locher et al., 1998; Sahyoun & Vaudin, 2014). However, these services were sometimes criticized for failing to provide sufficient and culturally appropriate food, and although subsidized, costs sometimes remained prohibitive (Cuesta-Briand et al., 2011; Locher et al., 1998; Radermacher et al., 2010). Increasing meals delivered per day was associated with decreased risk of HFI and reduced worrying about food provision (Gollub & Weddle, 2004). Other programs, like community gardening and congregate meal programs had social benefits but limited improvements to food access for people with disabilities (Porter & McIlvaine-Newsad, 2013; Schoenberg, 2000). While community food programs were considered important in the Netherlands, a shift from welfare to informal care could create inequalities based on differential access to information (Waltz et al., 2018).

2.3.4 Environmental factors

Few quantitative studies explore the relationship between environmental factors, food access or insecurity, and disability. Of these, most focused on environmental barriers for persons with mobility disabilities, although mobility limitations were sometimes considered in a cursory way. For example, LeDoux and Vojnovic (2013), used a limited definition of mobility impairments based on respondent's age, and found that mobility impairments do not impact ability to leave an underserviced neighbourhood for food shopping. Some evidence of environmental effects was observed. Fitch (2004) found that people with disabilities were twice as likely to perceive poor environmental access to a local store. Poor neighbourhood walkability, here defined through a composite score of factors including curb cuts, and crossable intersections, was found to significantly increase food insufficiency related to inability to leave the home (Chung et al. 2012). Among wheelchair users, barriers like a lack of ramps and high curbs, influenced whether food stores could be reached (Meyers et al., 2002).

Qualitative research on this topic often differentiated between three separate barriers: 1. physical (i.e., environments or mobility limitations), 2. financial, and 3. social norms, attitudes, and supports (Coveney & O'Dwyer, 2009; Shaw, 2006; Webber et al., 2007; Whelan et al., 2002, Suarez-Balcazar et al., 2018). These concerns were typically studied independently, without examining relationships between barriers. Although, Webber et al., (2007) noted how limitations from one resource (e.g., geographic access) could be compensated for (or not) based on physical ability or access to financial resources.

Neighbourhood distance to a food source (i.e., food deserts) was the most commonly discussed barrier (Shaw, 2006; Suarez-Balcazar et al., 2018). People with disability also reported concerns related to microgeographies, like a lack of curb cuts on sidewalks, a lack of accessible public washrooms, topography (e.g., slope), and safety (Cannuscio et al., 2014; Huang et al., 2012; McGrath et al., 2017; Meyers et al., 2002; Munoz-Plaza et al., 2013; Shaw, 2006). People with disability frequently reported transportation barriers, including commonly being unable to drive (Shannon, 2015; Webber et al., 2007). This issue was particularly salient in rural areas (Spurway & Soldatic, 2016). Reliance on friends or family to overcome transportation barriers emerged as a compensatory strategy (Coveney & O'Dwyer, 2009; Schoenberg, 2000; Smith, 1991; Spurway & Soldatic, 2016). Others, mostly in urban areas, travelled to food sources by public transportation, walking, or using a mobility assistive device, although these modes limited ability to select stores according to food prices and quality (Munoz-Plaza et al., 2013; Shannon, 2015). Public transportation accessibility, considering routes, onboard accessibility and access/egress of vehicles was rarely considered. Yet, public transportation could be problematic as many vehicles and stations were inaccessible and waiting could be difficult in the absence of seating, or in harsh weather. Carrying groceries and multiple transfers could be difficult, leading some to take multiple smaller trips or adjust routes and store choices (Coveney & O'Dwyer, 2009; Shannon, 2015; Smith, 1991). Few articles considered time varying factors or seasonal effects like weather or icy conditions (Huang et al., 2012; Shaw, 2006).

Environments within and around food sources also presented barriers. Reported accessibility barriers within grocery stores included inaccessible entrances, placement of products, crowds, and the absence of accessible parking; facilitators included electronic mobility-carriers and help from store employees or customers (Huang et al., 2012; Meneely et al., 2009). Surveys of food stores found geographic variation in disability accessibility, showing that chain stores, common in advantaged and suburban neighbourhoods, more often had accessible features like ramps and accessible parking, while convenience stores, more common in the inner-city or underserved, racially divided neighbourhoods, had lower accessibility, and more inaccessible features like narrow aisles (Lopez-Class, 2010; Mojtahedi et al., 2008).

Other food sources were rarely discussed. Some people with disabilities relied on restaurants, despite greater expenses due to difficulty preparing food at home (McGrath et al., 2017). Restaurants were commonly inaccessible; physical features and attitudes of restaurant staff were commonly reported as barriers (Waltz et al. 2018). People with disabilities were overrepresented among foodbank users, despite physical barriers like waiting in long lines for food (Chiu et al., 2016; Miewald & McCann, 2014). Commercial home delivery provided an alternative to physical travel to a store but was criticized as expensive (Keller et al., 2007a). In the home, architectural barriers contributed to activity limitations, including inability to prepare meals or leave the home to access food (Stark, 2001). Housing instability and poverty, more common among populations with disabilities (Heflin et al., 2017), may limit ability to make needed in-home adjustments.

2.4 Discussion

The results of this review demonstrate that disability was consistently associated with increased risk of HFI across different populations and geographic settings, highlighting an important population-level inequality. Higher rates of HFI were associated with economic and organizational barriers (She & Livermore, 2007). Additional social and environmental features limited physical access to food for people with disability, often in conjunction with economic barriers to access (Webber et al., 2007). These findings highlight important interactions, indicating that economic deprivation may be particularly severe among populations with disabilities. Findings also highlight how disabling barriers, such as stigma, and institutional and environmental barriers often reinforce one another, such as discrimination limiting access to social and adaptive resources for individuals with disabilities, particularly those with mental illness (Keller et al., 2007b).

This review was limited to English-language articles, biasing findings toward higher income, English-speaking countries, although evidence exists of important physical and financial barriers to food access for people with disabilities in lower income countries (Groce et al., 2014; Mander, 2008). Populations experiencing more severe disabilities, or mental health disabilities may be harder to reach, and therefore their experiences are less likely to inform studies included in this review and the literature more broadly. As with any review, there is a possibility that some papers have been missed as a result of the search strategy, the selection of the literature databases, and the concentration on peer reviewed research articles.

Strong evidence exists indicating a relationship between disability and HFI. However, factors mediating this relationship are not well understood. Studies included in this review were examined critically, applying a social model of disability lens, identifying four major limitations in understandings of disability and food access at varying levels of the social ecological framework. First, at the individual level, interaction(s) between disability and other forms of social difference have received little attention. Second, disability was rarely critically examined, failing to identify how larger social and institutional contexts influenced disability. Third, at the environmental level conceptualization and measurement of “mobility” and “environment” appeared limited, with mobility at certain scales, such as the household, being largely ignored. Finally, connections between influences at varying levels of the SEM framework were lacking with little consideration given to the relationship between physical barriers to access among people with disability and economic barriers or HFI.

2.4.1 Individual influences

The critical disability studies literature discusses intersectionality, noting how disability interacts with other forms of social difference to produce a unique situation of disadvantage (Goodley, 2014; Williams-Forson & Wilkerson, 2011). Yet, the food access/insecurity literature rarely considers how individual influences of HFI interact with disability. A statistically significant interaction was found between disability and financial resources (Huang et al., 2010), while an increased risk of HFI among women, younger adults with disabilities, and those living alone was also suggested (Brucker & Coleman-Jensen, 2017; Chang & Hickman, 2017). Understanding these interactions will improve population-level understandings of vulnerability and help to identify sociodemographic factors that explain observed relationships between disability and HFI.

2.4.2 Disability and social/institutional contexts

The literature generally fails to critically consider disability. Only nine of 106 articles highlighted the role of environmental and social factors in defining disability. Instead, disability is largely defined according to physical conditions or limitations in completing activities. This approach aligns with a bio-medical conceptualization, treating disability as a problematic category resulting in poor mobility and constraints on food-related activities. Yet, social norms play a key role in the construction of disability which can be seen in experiences of food access. The disability literature notes how social valuing of extreme independence affects who becomes identified as disabled (Gibson, 2006). Some people with disability valued their independence, which they expressed through food provision practices (Munoz-Plaza et al., 2013). Those relying on help for food provision, experienced food access through a lens of discrimination, seeing themselves as a burden on others or as restricted in making their own food choices (Kudlick, 2007; Wolfe et al., 1996). Disability is commonly defined according to activity limitations (e.g., ADL), including food access-related activities such as food shopping and preparation. Inability to engage in these activities is itself ‘disabling’ and part of social understanding of who comes to be defined as disabled (Webber et al., 2007), thus highlighting the recursive nature of the relationship between food access and disability. Further, common measures of disability, do not distinguish between forms of disability. Therefore, differences in barriers across disability types, such as increased social discrimination for individuals with mental health disabilities (Dear et al., 1997) are often ignored. Social and organizational definitions of disability have important impacts on experiences of disability. How bureaucracies define disability has real-world implications in the lives of people with disability, impacting access to social and material supports (Withers, 2012) and therefore, access to food.

There is a need to better examine the relationship between disability and food access in underexamined populations. Much of the work on food access and disability has been conducted in the United States and in older and urban populations, with little work conducted in younger and rural populations. However, different challenges are observed between these populations depending on institutional and social factors that are unique to place. For example, old-age pensions and senior discounts offered in many higher income-countries, may reduce rates of HFI in older adults (Coleman-Jensen and Nord, 2013). Older adults may also experience different physical expectations, including normalized use of mobility assistive devices, influencing experiences of disability.

2.4.3 Disability and environmental barriers

Although physical barriers to access are often assumed to be greater among people with disability (Shaw, 2006), few articles explore environmental barriers to mobility relevant to people with disability and how these factors can produce disability. Common measures of environmental food access (e.g., food deserts, walkability) are based on the idea of a ‘universal disembodied subject’ (Goodley, 2014), assuming similar travel times and barriers to travel across the population, and often independent travel. Focusing on distance to retail destinations fails to consider diverse forms of disability or disabling barriers in outdoor environments and within retail destinations that influence food access activities (i.e., entering a store, moving around it, reaching things on shelves). Some studies have qualitatively considered barriers within and around food stores (Huang et al., 2012). However, these measures may provide an oversimplification of mobility, similar to critiques of mobility in the food desert literature, failing to note how people travel during the course of their day and access food from different places (Chen and Kwan, 2015; Shannon, 2013). Smaller scale, or microgeographies and city-wide factors like urban-sprawl and enacted accessibility legislation, may significantly influence access for people with disability (Hahn, 1986; Imrie, 1996), yet are underexplored.

One geographic scale that is often ignored is within the household. Imrie (2010) notes that the home's social value as a place of comfort, means that inaccessibility within the home can be especially troubling. Factors influencing household food access, including government policy and programs that control, and often limit accessibility adaptations, and accessibility within community housing, are important to understanding mobility influences of food access. The scale of the body, including the role of mobility assistive devices or feeding assistance (e.g., tube feeding) to assist with bodily functions and practices is rarely considered. Yet, access to needed aids may differ across the population, according, to personal resources and available organizational and government supports (Borg et al., 2011).

2.4.4 Completing a social-ecological model framework

The literature has generally failed to conceptualize the relationship between physical and socioeconomic barriers to food access. This review was unable to distinguish between the population-level importance of physical/mobility or economic barriers (e.g., income, food prices) to food access, potentially overemphasizing the role of physical barriers (Shannon, 2015). Studies have attempted to better understand barriers by categorizing them, for example according to physical, financial, or social barriers to food access (Shaw, 2006; Webber et al., 2007). The current writing about barriers essentially silos them while devaluing or ignoring the social and institutional logics, practices and processes that produce them and their interrelationships. For example, in several studies, disability and socioeconomic status were considered separately, with comparisons made between populations with financial difficulties and mobility constraints (Coveney & O'Dwyer, 2009; Whelan et al., 2002). Yet, disability has been closely tied to economic disadvantage (Palmer, 2011). Food insecurity and social exclusion have also been related to a reverse association with disability, with resulting malnourishment contributing to and producing disabling chronic conditions (Lee and Frongillo, 2001), indicating a cycle of poverty, food insecurity, and disability.

2.4.5 Research directions and policy implications

Future research should consider interactions between disability and other individual influences of HFI that together influence food access, and explore this relationship across geographic contexts, noting social and political mediators of this relationship. Research practice must also better consider experiences of people with disabilities, rather than preconceiving disabling barriers. This work may consider identifying the role of microgeographies, and access at different scales, including within the home and broader city. In regard to policy, improved access to disability benefits and accessible housing could reduce risk of HFI across the population. Programs that address medical, equipment, and special dietary expenses would reduce hardships among those with dietary limitations or high medical expenses. Homecare may be an important facilitator to food access, but greater flexibility is needed to allow for provision of food-based services like meal preparation. Finally, provisions for removing disabling barriers at different scales, including programs improving accessibility within the home, food sources, and the broader city should be made a priority.

2.5 Conclusion

Disability emerges as an important influence of food access and insecurity. A more complete understanding of the relationship between disability and food access could arise through greater questioning of upstream influences and different scales of influence. This approach would consider not just greater economic disadvantage or household expenses in people with disability, or assume reduced ‘coping’, but would question why there is greater financial deprivation, including social discrimination and environmental barriers, that prevent financial independence (Oliver, 1996) or increase expenses (She and Livermore, 2007). Intersecting this understanding with a more sophisticated conceptualization of disability would permit closer study of the recursive connections between disability and food insecurity – highlighting the ways in which disability and food insecurity produce and reproduce one another.

Chapter 3

Mobility Impairments and Geographic Variation in Vulnerability to Household Food Insecurity

3.1 Introduction

Over 22% of Canadians 15-years and older have disabilities, defined here as those experiencing limitations in daily activities due to a long-term physical, sensory, cognitive, or mental health condition, with 9.6% having a mobility impairment (Morris et al., 2018). Globally and within Canada, disability is associated with increased poverty (Morris et al., 2018; Palmer, 2011). Certain forms of disability have also been associated with household food insecurity (HFI), while mobility impairment has been associated with HFI in the United States (Schwartz et al. 2019a). HFI, referring to inadequate or insecure access to food due to financial constraints, is an important indicator of material hardship representing lived constraints on a person's ability to access basic needs (Heflin et al., 2009). Moreover, HFI is an important public health problem and is independently associated with poor health outcomes and increased service needs within Canada and the United States, including nutritional inadequacies, higher health-care utilization, and chronic conditions including mental health, diabetes, and heart disease, and higher mortality (Gundersen & Ziliak, 2015; Kirkpatrick et al., 2015; T. Fitzpatrick. et al., 2015; Gundersen et al. 2018).

The circumstances that give rise to HFI are not fully understood, though low socioeconomic status (SES) is the most commonly indicated risk factor. Low income and financial assets, less education, unemployment, renting compared to home ownership, and reliance on social assistance have been associated with HFI (Heflin et al., 2007; Kirkpatrick & Tarasuk, 2011; Che & Chen, 2001). HFI has also been associated with other demographic factors like younger age, ethnicity (non-white in Canada/United States, Indigenous status within Canada), immigration status, lone-parent household, and presence of a chronic condition, mood, or anxiety disorder (Che & Chen, 2001; Gorton et al., 2010; Tarasuk et al., 2013).

Research into the relationship between disability and HFI has typically taken place in the United States, using national or state-wide samples. Smaller scales of analysis and other geographic regions have rarely been studied (Schwartz et al., 2019a). One Canadian population-based study suggests an association between disability and HFI among working-age adults (Borowko, 2008); others detected an association between disability and HFI within sampled adults of lower SES (Tarasuk, 2001; St-Germain & Tarasuk, 2017). Further, this research has rarely conceptualized or questioned its definition of disability, typically defining disability as a medical condition located within the body, while failing to consider social and environmental factors that produce disabling conditions (Schwartz et al., 2019a). This study contributes to the disability-HFI literature by modelling the relationship between mobility impairment and HFI in the Canadian context and by highlighting intersecting socio-demographic characteristics and contexts that may contribute to this relationship.

I conceptualize disability using the social model. This approach differentiates between bodily impairments (e.g., a physical or mental condition) and disability, defined as the social discrimination that prevents people with impairments from fully participating in society (Oliver, 1996). Using this model, understanding how geographic differences can influence whether a person becomes ‘disabled’ through environmental barriers and discriminatory practices becomes important (Butler & Parr, 2005). For example, policies and social norms like workplace anti-discrimination policy and disability accessibility could increase access to employment among disabled persons (Barnes & Mercer, 2005), affecting risk of poverty and therefore material hardships like HFI. This study considers mobility impairment (difficulty or needing support walking) as the exposure of interest rather than disability, as measures of disability used in major Canadian surveys, like the Canadian Community Health Survey (CCHS), do not align with a social model approach (Grondin, 2016). However, individual and contextual influences on potentially disabling outcomes, such as the denial of basic needs like access to food, will be highlighted.

Geographic variation can provide a starting point to understanding the social and environmental factors that disable some from accessing their daily needs. Geographic differences in HFI have been observed across Canada and the United States, by province/state of residence and by urban/rural status (Bartfeld and Dunifon, 2006; Bartfeld et al., 2010; Carter et al., 2014; Tarasuk et al., 2019). Geographic variation in HFI has been attributed to population composition, including age, income, household structures, and ethnicity of area residents, and place-based contextual and collective factors such as tax policy, housing costs, and regional availability of food assistance or social benefits (Bartfeld and Dunifon, 2006; Bartfeld and Wang, 2006; Gorton et al., 2010). This study therefore explores the role of geographic variation in the relationship between HFI and disability at the provincial and regional scale and across the urban/rural divide.

Macintyre et al. (2002) state that geographic influences on health outcomes are best understood through consideration of the interrelated relevance of population composition, place contexts, and collective social norms. Using this framework, population composition (e.g., socioeconomic distribution) would not be dismissed as unrelated to place but rather a potential product of contextual and collective influences, and necessary intervening factors explaining observed relationships. This approach aligns with a social model of disability, seeing the socio-environmental context as both shaping disability, and thereby population composition, as well as vulnerability to HFI in this population. People with disabilities may be particularly vulnerable to contextual factors, including disability supports and benefits, and access to healthcare and homecare - systems that operate at the provincial level within Canada. In Canada, the provinces/territories are responsible for social assistance programs, not including social insurance programs like Old Age Security and the Canada Pension Plan, which operate federally (Government of Canada, 2018a). In Ontario and Western Canada, disability social assistance programs are typically separate systems and offer higher incomes compared to disability allowances or supplements to social assistance found in Eastern Canada. Provincial and disability social assistance systems in Canada are outlined in Appendix C. Other contextual factors that may explain risk of HFI include costs of living and regional economic circumstances. Urban/rural status may additionally influence access to services and costs of living, particularly regarding housing costs.

This study has two main objectives: 1) to examine whether there is an association between adult mobility impairments and HFI within the Canadian context; and 2) to explore how geography and socio-demographic factors influence HFI in populations with mobility impairments. Data for this work have been drawn from the CCHS, a large, representative Canadian health survey to meet these goals. Later, I consider how geographic variation in the relationship between impairment and HFI could be explained by socio-demographic composition and contextual and collective influences, including how political and economic contexts may shape vulnerability to HFI.

3.2 Methods

Participants from the CCHS 2007/08, 2009/10, 2013/14, 2015/16 cycles were included. The CCHS is a survey of Canadians age-12 and older that runs on a two-year cycle, representing approximately 98% of Canadians, excluding individuals living on reserves, certain remote populations, and institutionalized communities (Statistics Canada, 2015). This analysis includes Canadians age 18 and over, including participants from provinces offering both the household food security survey module (HFSSM) and health utilities index module (HUI) – measuring mobility impairments. The HFSSM and HUI were included as mandatory survey content (i.e., asked in all provinces) on certain cycles, though never on the same cycle, with provincial opt-ins available when not included as mandatory. Appendix D indicates data available by province and survey cycle. Only adults were included, representing people more likely to be responsible for household budgets and management. Individual participants who did not complete both the HUI and HFSSM were excluded, leading to a final sample of 217,094 adults.

HFI was measured using the 10-item adult subscale of the HFSSM, considering HFI among adults in the past 12-months. Use of the adult scale ensures comparability between households with and without children. The module questions a range of conditions from being worried about running out of food to skipping meals and not eating for a whole day because of inability to afford food. Respondents were classified as food insecure using Canadian labels and thresholds, if they met the definition for marginal (responded affirmatively to one condition), moderate (2-5 affirmative), or severe food insecurity (6-10 affirmative) (Health Canada, 2007). Marginal HFI was included because of evidence of increased hardship for those responding affirmatively to any of the module’s questions (Coleman-Jensen, 2010). The HUI ambulation module measures mobility impairment through five questions about difficulty walking, needing mechanical or other supports walking, or inability to walk. Responses were categorized as a binary variable (yes/no impairment), with ‘yes’ as any affirmative response to the module’s five questions. Use of the HUI ambulation module may exclude certain mobility restrictions, including limitations in climbing stairs, walking for long distances, general pain, and people with episodic disabilities

(Grondin, 2016). Additionally, mobility impairment in other household members was not captured, which may affect observed associations between impairment and HFI.

For part one of this analysis, logistic regression models were estimated to study the association between mobility impairment and HFI in the full sample. Age and sex are potentially important confounders of this relationship; mobility impairments are more prevalent among the elderly and women (Morris et al., 2018), while the elderly in Canada experience reduced HFI risk (Tarasuk et al., 2014). Therefore, a 'basic' model indicating age and sex-adjusted odds of HFI was included, controlling also for CCHS cycle and geography. Geographic factors included province of residence (the Northern Territories collapsed due to small sample sizes) or Canadian region of residence, and urban/rural status. Exploration at finer geographic scales was not possible due to small sample sizes. Urban and rural status was assigned using Statistics Canada classifications, based on settlement population size and density (Statistics Canada, 2017a). Regions, used to account for small sample sizes in certain provinces, were made up of provincial groupings as follows: Eastern Canada (Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick); Quebec; Ontario; Western Canada (Manitoba, Saskatchewan, Alberta, British Columbia); and the Territories (Yukon, North West Territories, Nunavut). Provinces were grouped based on geographic proximity, alignment in disability/welfare systems, and rates of HFI; higher rates of HFI were observed in Eastern Canada and the Territories, while separate disability welfare systems with greater incomes were seen in Ontario and Western Canada (see Appendix A). Canada's largest provinces, Ontario and Quebec, representing 38.6% and 34.1% of the sample population respectively, were left as separate regions with Ontario used as the provincial/regional reference. Restricted cubic splines, using four percentiles (knots at age 33, 47, 59, 69), were used to account for non-linearity and confounding from age in the association between mobility impairment and HFI (Croxford, 2016). CCHS study cycle (2007/08, 2009/10, 2013/14, 2015/16) was controlled for to account for changes over time and inclusion of data from different provinces in each survey cycle.

A fully adjusted multivariate logistic regression model was estimated, controlling for explanatory variables with known associations with HFI. The fully adjusted model indicates whether mobility impairments are associated with increased odds of HFI after accounting for SES and socio-demographic factors. SES was represented by adjusted household income, respondent education (postsecondary graduate; high school graduate; less than high school), household ownership (yes; no), and main source of household income. An employment variable was excluded due to collinearity with income source. Household income was adjusted for inflation using the Canadian Consumer Price Index to 2009/10 levels, and income above $500,000 was censored to $500,000 to account for right-skewed variation in household incomes. Inflation-adjusted income was further adjusted, dividing by the square root of household size (Fréchet et al. 2010) and then rescaled, dividing by 1000, to allow detection of effects. Statistics Canada imputed incomes were used for participants that did not volunteer income information. Income imputation was controlled for as it was associated with lower HFI risk. Income source was grouped according to wages and salaries; government pension plans (old age security (OAS), and the Canada or Quebec Pension Plan (CPP/QPP); private pension plans (including Registered Retirement Savings Plans, work-related pensions, dividends and interest); employment insurance (EI) and worker's compensation (WC); welfare income (provincial social assistance); and other income sources. Socio-demographic characteristics included immigration within the last 5 years (yes; no), living situation of respondent (living alone; alone with others; with partner; with partner and child(ren); single with child(ren); child with parents; other), and cultural or racial group, according to collapsed survey categories on cultural/racial background including, Aboriginal identity (as defined by the CCHS to include Canadian Indigenous populations); white; Asian or Middle Eastern; black; other or mixed race.

A separate analysis was conducted using data from the 14,353 participants with mobility impairments to explain variation in HFI among mobility impaired adults. Multivariate logistic regression models were estimated examining the relationship between geographic, health, and socioeconomic factors and HFI within this population. Potential covariates included: age group (18-29; 30-44; 45-64; 65+), sex, participation and activity limitations (sometimes; often; never; missing), cultural/racial group (same as above), household type (alone; couple; couple with children; lone parent; other), adjusted household income, main household income source, employment status (part-time, full-time, retired, not in labour force<65, unknown), education of respondent (as above), imputed income, household ownership, immigration within the last 5 years, mood or anxiety disorder diagnosis (yes; no), number of chronic conditions (0, 1, 2, 3+), homecare receipt (yes; no; missing), reported unmet homecare needs (yes; no; missing), urban/rural status, province, region of residence, and survey cycle. The income source covariate was similar to that used in the full sample but the CPP/QPP, which offers a disability pension, was considered separately from OAS. Age groups were used instead of restricted cubic splines to allow description of the association between age group and HFI. Chronic conditions included asthma, arthritis, back problems, hypertension, migraines, chronic obstructive pulmonary disease, diabetes, heart disease, cancer, ulcers, and stroke. Chronic conditions and mood or anxiety disorder were included to evaluate the role of ill health among mobility impaired adults. Receipt of homecare and unmet homecare needs were included because of observations from qualitative studies that difficulties leaving the home or preparing a meal could contribute to HFI (Wolfe et al., 2003). Missing categories were constructed for participation and activity limitation and homecare variables, as they were not captured for each province and survey cycle (see Appendix B for details).

A basic model examined the association between province, urban/rural status, and HFI in adults with mobility impairments, controlling for age group, sex, and survey cycle. The following variables were included in the fully adjusted model: adjusted household income, income source, household ownership, household type, mood or anxiety disorder, number of chronic conditions, unmet homecare needs, and region. Region of residence showed similar explanatory value to models including province. Cultural/racial group, sex, participation or activity limitations, immigration, employment, education, and urban/rural status were not significant though this may be a result of limited power to detect differences in this relatively small sample.

Fully adjusted models were estimated using forward stepwise regression balancing model significance (based on likelihood ratio) with model explanation of variance (logistic rescaled R^2). Variables were tested for multicollinearity. All analyses were conducted using SAS 9.4. Survey procedures were used with bootstrap replication (n=500) using Statistic Canada’s individual bootstrap weights.

3.3 Results

Of the 217,094 Canadian adults sampled, 10.3% experienced HFI. The percent of sampled adults with a mobility impairment was 4.3%, but they comprised 5.2% of marginally food insecure, 6.5% of moderately food insecure, and 12.0% of severely food insecure adults. Table 3.1 highlights the distribution of relevant variables according to severity of HFI.

Table 3.1: Population characteristics overall and by HFI status

Variable	**Total** **(*n*=217,094)**	**Secure** **(*n*=194,750)***	**Marginal** **(*n*=7150)***	**Moderate** **(*n*=10,200)***	**Severe** **(*n*=5000)***
Mobility impairment					
yes	4.3%	3.9%	5.2%	6.5%	12.0%
Age Group					
18-29	20.7%	19.8%	31.5%	28.3%	25.5%
30-44	26.2%	25.5%	31.1%	32.7%	32.0%
45-64	35.7%	36.3%	27.1%	30.0%	37.7%
65+	17.4%	18.5%	10.3%	9.0%	4.8%
Sex					
female	50.9%	50.4%	53.9%	55.2%	56.0%
male	49.1%	49.6%	46.1%	44.8%	44.0%
Mean adjusted household income (CAD$)	$50,212	$52,980	$31,169	$25,114	$20,202
Cultural/Racial Group					
Aboriginal identity	2.9%	2.4%	4.5%	7.2%	9.7%
Asian/Middle Eastern	11.0%	10.9%	15.1%	12.2%	6.0%
Black	2.6%	2.2%	5.0%	6.4%	9.4%
White	79.9%	81.3%	68.3%	66.7%	70.0%
Other/mixed race	3.5%	3.2%	7.1%	7.5%	4.8%
Income source					
CPP/QPP	4.4%	4.4%	4.1%	5.3%	4.6%
EI/WC	0.9%	0.7%	2.3%	2.8%	3.9%
OAS	2.6%	2.5%	3.4%	3.3%	2.3%
Other	7.2%	6.9%	8.6%	10.4%	9.6%
Private retirement/pension income	10.2%	11.0%	3.9%	2.6%	2.1%
Wages and Salaries	72.4%	73.6%	71.5%	62.8%	49.5%

Welfare	2.3%	1.0%	6.3%	12.8%	28.0%
Imputation					
yes	9.9%	10.2%	8.1%	8.1%	6.0%
Employment					
Employed full-time	54.7%	56.1%	48.8%	41.9%	33.5%
Employed part-time	10.0%	9.9%	11.8%	11.4%	9.9%
Retired	15.4%	16.3%	9.4%	8.3%	4.4%
Not in labour force<65	19.2%	17.0%	29.6%	37.7%	51.5%
Unknown	0.7%	0.7%	0.5%	0.8%	0.7%
Education (respondent)					
Missing	0.9%	0.9%	1.7%	1.4%	1.4%
Less than high school	14.7%	13.7%	19.0%	23.9%	26.6%
High school graduate	24.7%	24.2%	28.1%	30.0%	29.7%
Postsecondary graduate	59.7%	61.2%	51.2%	44.7%	42.3%
Immigration status					
Immigrant<5 years	3.3%	3.0%	7.3%	5.5%	3.0%
Living situation of respondent					
Alone	15.7%	14.8%	17.3%	21.8%	33.5%
Alone (unattached) with others	5.3%	4.7%	9.8%	10.9%	12.4%
Child with parent(s)	10.0%	10.2%	9.5%	8.5%	5.4%
Single with children	4.6%	3.9%	9.1%	10.0%	14.7%
With partner and children	28.0%	28.5%	27.4%	23.4%	14.5%
With partner	29.0%	30.7%	16.6%	14.7%	10.9%
Other	7.4%	7.1%	10.3%	10.7%	8.6%
Household ownership					
yes	72.3%	76.2%	49.0%	36.9%	25.5%
Mood or anxiety disorder					
yes	10.3%	8.7%	16.6%	22.8%	37.5%

Participation/activity limitations					
Missing	0.4%	0.3%	0.4%	0.8%	1.1%
Never	69.6%	71.6%	61.9%	53.6%	38.4%
Sometimes	17.5%	16.9%	22.1%	22.7%	23.7%
Often	12.5%	11.2%	15.7%	22.9%	36.8%
Received homecare					
Not asked/missing	49.4%	49.6%	49.6%	47.8%	45.8%
No	47.8%	47.8%	47.4%	48.1%	48.7%
Yes	2.7%	2.6%	3.0%	4.1%	5.5%
Unmet homecare needs					
Not asked/missing	49.5%	49.6%	49.6%	47.8%	45.9%
No	49.5%	49.6%	48.3%	48.8%	48.1%
Yes	1.1%	0.8%	2.1%	3.4%	6.0%
Chronic diseases (no.)					
1	26.8%	26.9%	25.7%	26.6%	23.1%
2	13.8%	13.5%	14.2%	14.9%	19.9%
3+	9.8%	9.1%	12.2%	14.6%	24.6%
Urban Status					
Rural	18.1%	18.5%	16.3%	14.4%	13.0%
Urban	81.9%	81.4%	83.6%	85.6%	87.0%
Province					
NL	0.8%	0.8%	1.2%	0.6%	0.4%
PEI	0.2%	0.2%	0.3%	0.3%	0.3%
NS	2.8%	2.7%	4.4%	3.5%	3.8%
NB	1.1%	1.1%	1.5%	1.3%	1.7%
QB	34.1%	34.5%	33.8%	30.1%	29.2%
ON	38.6%	38.5%	37.5%	41.2%	42.2%
MB	1.6%	1.6%	1.7%	1.6%	1.3%

SK	2.9%	2.9%	2.5%	2.8%	2.1%
AB	11.0%	11.0%	11.2%	10.7%	9.1%
BC	6.5%	6.5%	5.6%	6.8%	8.6%
Territories	0.3%	0.3%	0.4%	1.1%	1.4%

*rounded to comply with Statistics Canada guidelines

Mobility impaired adults have significantly increased odds of HFI, including when controlling for a broad range of socio-demographic and geographic covariates (see Table 3.2). The basic model, controlling for age, sex, urban/rural status, province, and cycle indicates strongly significant increased odds of HFI among mobility impaired adults (OR=3.85, 95% CI: 3.49-4.24). Increased odds of HFI, compared to Ontario, were seen in the Territories (OR=2.59, 95% CI: 2.30-2.93), and to a lesser extent, Eastern Canada, with the exception of Newfoundland. Urban compared to rural status was associated with increased odds of HFI (OR=1.30, 95% CI: 1.22-1.39).

In the fully adjusted model, the effect size of mobility impairment decreased, but remained high and significant (OR=2.11, 95% CI: 1.89-2.35). Urban/rural status was not included in full models as it was not significant after controlling for income and household ownership. Controlling for region did not strongly influence the effect of mobility impairment. In fully adjusted models, significantly increased odds of HFI were seen in the Territories (OR=1.52, 95% CI: 1.31-1.77) and Eastern Canada (OR=1.25, 95% CI: 1.14-1.37), with lower odds in Quebec (OR=0.73, 95% CI: 0.68-0.79) compared to Ontario. Most covariates aligned with expected results from the literature, including greater HFI risk for living alone, single parents, and those earning low incomes, or on welfare (Heflin et al., 2007; Gorton et al., 2010). Immigration was related to lower odds of HFI, which is in line with other Canadian studies (Tarasuk et al, 2019; Che & Chen, 2001). Lowered adjusted odds among immigrants may reflect the Canadian immigration system which mostly accepts ‘economic immigrants’, those accepted based on education, skills, and language fluency (Government of Canada, 2018b), and adjustment for relevant socioeconomic characteristics. The current immigration system denies opportunity to many, excluding those with lower education, and includes biases based on gender, race/ethnicity, and national origin (Tannock, 2011; Abu-Laban, 1998). This structural discrimination against the unhealthy and more vulnerable might help to explain lower odds of HFI in this population.

Additionally, the CCHS does not distinguish between economic immigrants and refugees, potentially masking detection of effects in a vulnerable subgroup.

Table 3.2: Odds of HFI among adults (age 18+), related to mobility impairment, geographic, and socio-demographic characteristics

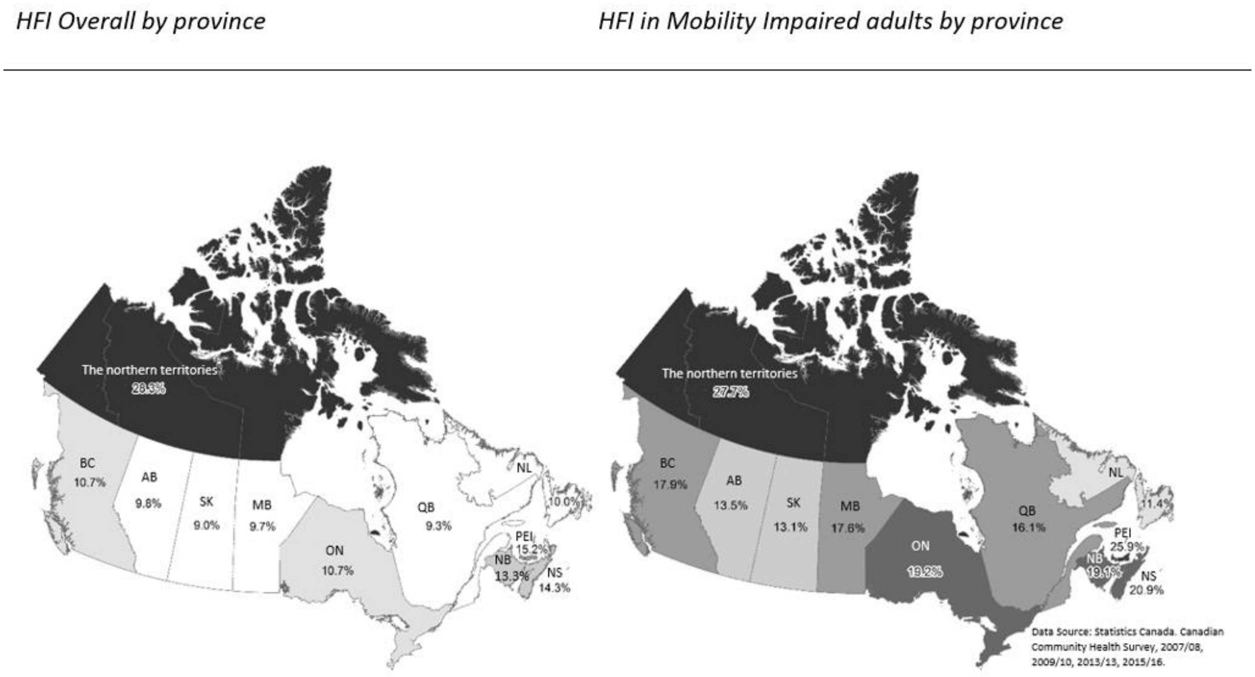
Variable		Basic model	Fully adjusted model
Mobility impairment (ref: no impairment)		**3.85 (3.49-4.24)**	**2.11 (1.89-2.35)**
Age (splines)		**(P<0.001)**	**(P<0.001)**
Sex (F vs. M)		**1.22 (1.16-1.29)**	1.03 (0.98-1.10)
Urban (ref: rural)		**1.30 (1.22-1.39)**	
Region (fully adjusted model)/Province (basic model)			
	ON	1.00	1.00
Eastern Canada	NL	1.05 (0.89-1.24)	**1.25 (1.14-1.37)**
	PEI	**1.66 (1.36-2.02)**	
	NS	**1.56 (1.40-1.75)**	
	NB	**1.41 (1.24-1.62)**	
	QB	0.94 (0.87-1.01)	**0.73 (0.68-0.79)**
Western Canada	MB	0.97 (0.80-1.16)	1.06 (0.98-1.14)
	SK	**0.85 (0.75-0.97)**	
	AB	**0.87 (0.79-0.96)**	
	BC	1.07 (0.96-1.19)	
	Territories	**2.59 (2.30-2.93)**	**1.52 (1.31-1.77)**
Cultural/racial group			

White		1.00
Aboriginal Identity		**1.58 (1.42-1.76)**
Asian/Middle East		**0.82 (0.73-0.93)**
Black		**1.83 (1.55-2.16)**
Other/mixed race		**1.64 (1.41-1.91)**
Living situation		
With partner		1.00
Alone with others		**1.72 (1.50-1.98)**
Alone		**1.51 (1.40-1.63)**
Child		0.88 (0.77-1.00)
Other		**1.62 (1.41-1.87)**
Single with child		**1.66 (1.45-1.91)**
With partner and child		1.09 (0.99-1.20)
Adjusted household income*(per $1000)		**0.96 (0.96-0.97)**
Income source		
Wages and Salaries		1.00
EI/WC		**1.96 (1.60-2.39)**
Other		0.99 (0.87-1.12)
Pensions and Dividends		**0.62 (0.54-0.71)**
Public pensions (OAS/CPP/QPP)		**1.25 (1.10-1.42)**
Welfare		**3.03 (2.68-3.43)**
Imputed income (ref: no)		**0.64 (0.57-0.73)**

Household ownership (ref: no)		0.62 (0.33-1.16)
Education		
Postsecondary graduation		1.00
High school graduation		**1.17 (1.09-1.26)**
Less than high school		**1.43 (1.32-1.55)**
Missing		**1.83 (1.34-2.48)**
Immigration (< 5 years)		
No		1.00
Yes		**0.69 (0.57-0.83)**
Missing		0.88 (0.55-1.41)

*Controlled for cycle 2007/08, 2013/14, 2015/16 (reference 2009/10). Significant results in bold.

Figure 3.1 indicates crude HFI rates by province in the overall sample and among mobility impaired adults. Though crude differences by province likely mask considerable variability within province (i.e., between cities and neighbourhoods), the figure highlights overall trends. HFI is consistently higher among mobility impaired adults, apart from the Territories where underlying rates are high. Geographic trends are similar between maps.



HFI Overall by province

HFI in Mobility Impaired adults by province

Data Source: Statistics Canada. Canadian Community Health Survey, 2007/08, 2009/10, 2013/13, 2015/16.

Figure 3.1 Map of HFI by Province, Overall and Among Mobility Impaired adults, CCHS 2007/08, 2009/10, 2013/13, 2015/16

Models were estimated to explain variation in HFI among mobility impaired adults (Table 3.3). A basic model provides an age/sex-controlled assessment of population risk by province. Province of residence was significantly associated with HFI with reduced odds in Newfoundland (OR=0.44, 95% CI: 0.25-0.78), Alberta (OR=0.57, 95% CI: 0.41-0.78), and Saskatchewan (OR=0.68, 95% CI: 0.49-0.94) compared to Ontario. Urban living showed slightly increased, though non-significant, odds of HFI.

Region was associated with HFI in the fully adjusted model, with significantly lower odds in Quebec (0.61, 95% CI: 0.42-0.90) and lower though non-significant associations in Western Canada (P=0.094) compared to Ontario. Geographic associations were similar to the overall sample. However, notable differences include Western Canada, which showed similar odds to Ontario in the overall sample but reduced odds (though non-significant) among mobility impaired adults, and the absence of an effect in the Territories despite higher odds in the Canadian sample.

In the fully adjusted model, age group and SES explained most of the variation in HFI. Odds of HFI were higher in younger age groups, with highest odds among 30-44-year-olds (OR=4.42, 95% CI: 2.73-7.16) compared to age-65 and over. Middle and younger age groups may experience multiple risks for HFI, including less opportunity to have accumulated experience and assets over time, particularly due to likely onset of impairment at younger ages (Huang et al. 2010), financial stresses related to parenthood/caregiving, and less generous social benefits relative to older adults. Pensions and old age income sources (OAS, CPP/QPP) reduced odds of HFI, with lowest odds among recipients of private pensions, likely reflecting an economically well-off group. This finding may also be, in part, due to uncontrolled age effects. Earners of wages and salaries had similar odds of HFI compared to welfare earners and higher odds compared to EI sources when controlling for other socio-demographic factors. These findings contrast with the protective effect of wages and salaries in the overall population, likely indicating an important disparity in wages, job stability, and employment benefits for mobility impaired adults.

Number of chronic conditions and diagnosis of a mood or anxiety disorder were significantly associated with HFI, indicating the important intersection between mobility impairment and ill health, which has been independently associated with HFI (Tarasuk et al., 2013). Lone parent families and couples with children had elevated, though non-significant, odds of HFI compared to couples without children, suggesting the role of parenthood and caregiving in HFI risk, particularly for lone parents. Participation and activity limitations were not associated with HFI, though only a small percent of the sample (6%) reported never experiencing limitations, potentially precluding detection of an effect. Unmet homecare needs was significantly associated with HFI, highlighting a vulnerable population or suggesting the importance of access to needed services.

Table 3.3: Odds of HFI among adults with mobility impairments (age 18+), related to socio-demographic, geographic, and health characteristics

		Population %	**Basic Model**	**Full Model**
Province/Region (full model)				
	ON	45.6%	1.00	1.00
	NL	0.9%	**0.44 (0.25-0.78)**	0.75 (0.43-1.33)

Eastern Canada: (6.5%)	PEI	0.2%	1.31 (0.72-2.40)	
	NS	3.8%	1.19 (0.88-1.60)	
	NB	1.5%	0.98 (0.65-1.47)	
	QB	26.6%	0.80 (0.60-1.07)	**0.61 (0.42-0.90)**
Western Canada: (21%)	MB	1.9%	0.92 (0.50-1.69)	0.61 (0.34-1.09)
	SK	2.9%	**0.68 (0.49-0.94)**	
	AB	10.1%	**0.57 (0.41-0.78)**	
	BC	6.2%	0.94 (0.66-1.36)	
	Territories	0.2%	1.13 (0.61-2.09)	1.00 (0.39-2.55)
<u>Urban/Rural</u>				
	Rural	19.0%	1.00	
	Urban	81.0%	1.20 (0.97-1.47)	
<u>Age group</u>				
	65+	60.7%	1.00	1.00
	18-29	2.5%	**3.60 (2.25-5.75)**	**3.33 (1.79-6.20)**
	30-44	6.5%	**7.23 (5.25-9.95)**	**4.42 (2.73-7.16)**
	45-64	30.3%	**3.82 (3.18-4.60)**	**2.52 (1.91-3.33)**
<u>Sex</u>				
	Male	40.2%	1.00	
	Female	59.8%	**1.24 (1.03-1.49)**	
	<u>Adjusted household income*(per $1000)</u>			**0.96 (0.95-0.96)**

Income source			
Wages and Salaries	26.9%		1.00
CPP/QPP	16.4%		**0.55 (0.37-0.82)**
EI/WC	1.9%		0.89 (0.49-1.59)
OAS	11.1%		**0.59 (0.38-0.93)**
Other	13.2%		**0.62 (0.41-0.94)**
Pensions/Dividends	23.9%		**0.37 (0.24-0.57)**
Welfare	6.6%		1.28 (0.82-2.00)
Household ownership			
Yes	63.5%		1.00
No	36.3%		**1.93 (1.56-2.39)**
Missing	0.2%		0.27 (0.03-2.59)
Mood or anxiety disorders			
No	76.7%		1.00
Missing	0.4%		0.88 (0.24-3.25)
Yes	22.9%		**1.97 (1.63-2.40)**
Chronic conditions (no.)			
None	9.5%		1.00
1	17.7%		**1.77 (1.10-2.87)**
2	25.3%		**2.23 (1.43-3.48)**
3+	47.5%		**3.03 (1.98-4.65)**
Unmet homecare needs			

No	47.1%		1.00
Unknown	44.2%		1.62 (0.96-2.73)
Yes	8.8%		**2.36 (1.70-3.28)**
Household type			
Couple	35.9%		1.00
Alone	35.6%		1.17 (0.93-1.48)
Couple with children	17.6%		1.39 (0.94-2.06)
Lone Parent	8.5%		1.44 (0.98-2.11)
Other	2.3%		0.59 (0.29-1.20)

*Controlled for cycle 2007/08, 2013/14, 2015/16 (reference 2009/10). Significant results in bold.

3.4 Discussion

Using a representative Canadian sample, mobility impairment in adults was significantly associated with increased odds of HFI, including when controlling for socio-demographic characteristics. High age and sex-adjusted odds of HFI of 3.85 (95% CI: 3.49-4.24) indicate important deprivation among mobility impaired adults within Canada. Effects found in adjusted models are consistent with research from the United States (Coleman-Jensen & Nord, 2013; Brucker & Coleman-Jensen, 2017). The United Nations Convention on the Rights of Persons with Disabilities declares that people with disabilities have the right to an adequate standard of living, including adequate food, clothing, and housing (United Nations, 2006). This study suggests that in much of the country, Canada has fallen short of this goal.

Among mobility impaired adults, SES explained most of the increased odds of HFI. Province of residence was associated with HFI with significantly lower odds in Newfoundland, Alberta, and Saskatchewan compared to Ontario after controlling for age and sex, and significantly lower odds in Quebec after controlling for additional socio-demographic characteristics. Geographic trends in mobility-impaired adults reflected geographies associated with higher odds of HFI in

Canada, though trends differed in Western Canada and the Territories with lower associated odds of HFI.

The social model of disability highlights how contextual factors deny people with impairments equal and full participation in society. This discrimination may be expressed through economic marginalization, inadequate employment, and poor housing (Imrie, 1996). Consistently high rates of HFI across Canada demonstrate the structural disadvantage that accompanies lowered mobility and the frequency by which people with impairments are disabled from accessing basic needs. This should not be dismissed as solely relating to compositional factors, such as high unemployment or low incomes among people with disabilities. While economic factors partially explain findings (Huang et al. 2010), these factors are sensitive to and produced through ableism located within built environments and social structures (Goodley, 2014).

HFI Vulnerability has been conceptualized as increasing with reduced financial resources, high household expenses, and reduced ability to manage household budgets (Heflin et al., 2007). Scales of influence over these factors vary from the household level up to the regional and national level. This study focused on variation between province or region of residence and urban/rural status, exploring how socio-political contexts may enhance vulnerability to HFI. My conception of place and health further highlights how these contexts are interrelated with population composition and collective social norms (Macintyre et al., 2002), including consideration of how context may actively produce compositional identities, such as disability.

3.4.1 Population composition

In the overall sample, accounting for socioeconomic covariates importantly attenuated the effect of mobility impairment on HFI odds, yet an important association remained. This finding supports the role of compositional factors like low income and household ownership’s impact on HFI vulnerability among mobility impaired adults. Residual effects may be related to increased household expenses or barriers that specifically relate to impaired mobility, such as costs of accessible housing and adaptations, medications, or special diets and food delivery systems (She & Livermore, 2007).

Geographic associations were similarly attenuated in the overall sample when controlling for socio-demographic factors. Elevated odds in the Territories were greatly reduced when controlling for income and cultural/racial group. Additionally, urban/rural differences were attenuated when controlling for household ownership, highlighting the importance of housing on vulnerability to HFI (Kirkpatrick & Tarasuk, 2011). However, population socio-demographic composition cannot be separated from place context. Residing in a certain place depends on personal circumstances, preferences, and area suitability. For example, when mobility is limited, deciding to ‘age in place’ requires balancing considerations like access to services, proximity to family and community, and financial resources available for making necessary adaptations or relocation to a suitable environment (Government of Canada, 2016). Individual satisfaction with place of residence may then be more important than broad categories like urban/rural status.

Socio-demographic risk factors in mobility impaired adults can help to highlight disabling contexts. Among mobility impaired adults, similar HFI odds were found for those earning wages and salaries compared to welfare sources. This may reflect the precarious and underpaid nature of employment in this population. Further, high rates of HFI among impaired adults on social assistance suggest the inadequacy of social assistance programs and subsidies for disability related expenses in meeting people’s basic needs. Those with unmet homecare needs experienced increased odds of HFI, which may reflect difficulty accessing services among vulnerable populations at risk of HFI or decreased access to food due to denial of, or poor access to necessary services.

3.4.2 Contextual and collective influences

Geographic variation in HFI is observed in models of mobility impaired adults, highlighting the role of regional contexts, such as available disability social assistance and economic circumstances. These contexts also reflect collective social influences, including the political circumstances guiding the development and sustainability of disability programs and legislation. In Canada, disability assistance is provided through a patchwork of benefits from provincial and federal sources. Benefits vary from monthly payments through CPP/QPP or provincial social assistance, to tax credits and supplemental payments for different medications, adaptations, and services (Government of Canada, 2018a). Across Canada, higher social assistance incomes, compared to general social assistance, are available for people who qualify. Different benefits are available to people by province and based on age, employment histories, income and asset accumulation, and presentation of a disability, including clinical diagnosis and prognosis.

Higher odds of HFI among mobility impaired adults was generally found in regions with high underlying odds of HFI, like the Territories, and Eastern Canada (excepting Newfoundland), and lower in regions with reduced odds, like Quebec (Tarasuk et al., 2019). Residing in Newfoundland, Alberta, and Saskatchewan was associated with reduced odds of HFI relative to Ontario in the unadjusted model. Observed variation is likely influenced by regional policies and contexts. Reduced odds in Newfoundland contrasts with trends seen in the rest of Eastern Canada. This finding is likely attributable to a poverty reduction strategy launched in 2006 that was active during the study period (2009-10 for Newfoundland). Among many policies, this strategy increased the minimum wage, lowered or eliminated provincial taxes on the mid-lowest and lowest earners, raised general welfare rates, and engaged in measures to increase subsidized housing for people with and without disabilities (Loopstra et al. 2015b). In the adjusted model, controlling for sociodemographic characteristics, Quebec was found to have significantly reduced odds of food insecurity. Like Newfoundland, Quebec has engaged in poverty reduction efforts, including increased funding for subsidized housing, minimum wage increases, and supports for families with young children (Government of Quebec, 2004). These programs likely have widespread benefits in populations with and without disabilities. In contrast, mobility impaired adults living in regions with greater socioeconomic vulnerability (e.g., the Territories, Eastern Canada), may experience risk related both to impairment and region of residence.

Comparatively lower odds of HFI among adults with mobility impairments in Alberta and Saskatchewan, as seen in unadjusted models, may be a result of disability social assistance systems that offer greater benefits in comparison to provincial counterparts. In 2014, Alberta's disability social assistance recipients received nearly double the income of general welfare recipients (Maytree, 2018). Reduced odds (though non-significant) in Western provinces in models adjusted for socioeconomic factors, like income, may reflect how improved social assistance programs have unmeasured benefits, beyond income alone. This may reflect compounded advantages of higher incomes, such as alleviating housing insecurity, or in allowing savings for times of need. Seemingly, there are advantages to accessing more generous disability social assistance programs. Yet, this could not be measured directly due to the inability to distinguish between adults receiving disability social assistance (programs or supplements) and general social assistance in the CCHS data. Notably, higher disability assistance in Ontario was not associated with lower odds of HFI. It is also important to consider that some individuals may fail to qualify for more generous disability benefit systems if higher benefits are accompanied by stricter requirements to prove disability, like the Alberta program's requirement to prove inability to earn a living (Government of Alberta, 2019). Neoliberal social and policy contexts characterized by austerity and collective norms questioning 'worthiness' of benefit recipients can influence institutional definitions of disability with important impacts on those excluded (Boisvert & Xing, 2008). Appeal processes accompany provincial disability benefit systems for initially rejected applications, indicating the often-circuitous route to accessing benefits (MCCSS, 2018; Government of Alberta, 2019). Those more informed, or supported by local community organizations, may be able to better maximize benefits. In contrast, OAS and the guaranteed income supplement, which offer higher incomes and is guaranteed for low-income adults above age 65, are associated with greatly reduced odds of HFI.

Social assistance benefits play an outsized role in HFI vulnerability, with nearly 70% of Canadians on social assistance experiencing HFI (Tarasuk et al., 2014). Yet, only 6.6% of mobility impaired adults sampled were welfare recipients, with more receiving federally funded CPP/QPP or OAS benefits. Employment as compared to welfare benefits are accessed differently by region, with less usage of disability employment benefits like EI, WC, and CPP/QPP in Ontario and Western Canada (Stapleton et al., 2013). Differences in HFI odds may reflect regional employment conditions, as employment benefits are generally not available to those who have not engaged in salaried work or who have only held contract positions. Variation in costs of living could also explain regional differences. According to market basket measures of poverty, based on costs of a 'basket' of basic goods and services (Statistics Canada, 2017b), costs of living are lowest in Quebec, which may explain reduced odds of HFI in Quebec after controlling for socioeconomic factors. Reduced odds in Quebec may specifically reflect poverty reduction efforts, including housing programs and subsidized childcare, reducing costs of living across the population (Government of Quebec, 2004). Other barriers, including inaccessible built environments may influence risk. Poor access to disability aids and supportive assistance may reduce ability to engage in labour-intensive budget management strategies that low-income families use to source food at reduced costs (Dachner et al., 2010). At the neighbourhood level, walkability, including inaccessible environments, has been associated with reduced ability to physically access food (Chung et al. 2012). Though it is unknown how physical access may affect economic access to food, some have reported less control over stores visited and less engagement with time-intensive cost-management strategies, like couponing, due to constraints on physical access (Wolfe et al., 1996). Exploring these factors will require examining differences at more local scales or gauging individual experiences.

3.4.3 Policy implications

Findings from this study highlight the potential benefits of more generous disability incomes, like Alberta's social assistance program for severe disabilities, and provincial-wide systems to reduce poverty, active during the study period in Newfoundland and Quebec. Poverty reduction strategies can broadly address some of the needs of mobility impaired adults, including middle and lower-income earners who may not access social assistance. Further, the success of OAS and guaranteed income supplements among older adults suggests the potential benefits of basic income programs with more simplified access in younger populations that experience higher risk of HFI. A brief survey of participants in a basic income pilot in Ontario indicated that among adults with disabilities, many experienced benefits to food access and mental health (Basic Income Canada Network, 2019). However, recent austerity cuts, accompanying a change in government, led to the discontinuation of this program and cancellation of its evaluation. High odds of HFI for mobility impaired adults earning wages and salaries suggest the need to address workplace discrimination. High costs of living could be addressed through support for housing costs, assistive devices, and special diets for mobility impaired adults.

3.4.4 Strengths and Limitations

This study adds to the literature by showing an important association between HFI and mobility impairment using a large representative sample and extends the small body of evidence showing an association between disability or impairment and HFI in Canada (St-Germain & Tarasuk 2017; Tarasuk, 2001; Borowko, 2008). Further, this study uniquely examines risk factors associated with HFI among mobility impaired adults, allowing consideration of intersecting socio-demographic characteristics and geographic contexts that could explain increased vulnerability to HFI. While previous research has considered the role of urban/rural influences on the relationship between disability and HFI (Magaña-Lemus et al., 2016), other geographic influences like province or region of residence have not been considered.

Certain limitations should be noted. The small number of mobility impaired adults sampled in certain regions, like the Territories, may have precluded detection of significant effects. Some provinces were not included in certain cycles, which enhances data variability and influences associations found in certain regions. Province, region and urban/rural status were used as the scale of analysis, reflecting differences in benefit systems and access to resources. However, intra-provincial variation is expected, particularly given Canada’s wide geographic expanse, which could impede detection of effects. Analysis at finer scales was not possible due to small sample sizes. Measurement of mobility impairment was restricted to difficulty walking, excluding certain mobility restrictions, like difficulty climbing stairs and general pain. Important factors like onset or mechanism of impairment (e.g., congenital, acquired through injury) are not captured in this survey. Yet, adults with long-term disabilities are more vulnerable to HFI, likely because of accumulated effects of low incomes and high expenses over time, while the more recently disabled may experience a situation of income fluctuation and instability that could also increase risk (Heflin, 2016; Huang et al. 2010). Inability to measure mobility impairment in other household members may affect observed HFI risk. However, those living in a broad range of household situations, including those living alone, were represented in the overall sample and among those with mobility impairments. Though the CCHS is representative of a large proportion of the Canadian population, it excludes the estimated 50% of First Nations people in Canada living on reserves (Statistics Canada, 2011). This represents a population that is particularly vulnerable to HFI, and therefore could provide an incomplete picture of HFI among Canadians with Aboriginal identity and an underestimate of HFI in Canada (Tarasuk et al, 2014). Survey-derived cultural/racial groupings and immigration status deny diversity within these groups (e.g., between refugees, other immigrants) which could also mask associations.

Causality of the association between mobility impairment and HFI cannot be determined due to the cross-sectional nature of this study. It is possible that ‘reverse causation’ is responsible for observed associations, whereby HFI increases risk of health-related impairment and disability through reducing ability to manage chronic conditions that could result in impairments (e.g., diabetes), stress-related effects on health, and reducing ability to otherwise engage in health protective behaviours like physical activity and maintaining a healthy diet. However, this is not necessarily a fault in this analysis as evidence exists that the relationship between disability and

HFI is bidirectional (Lee & Frongillo, 2001). Rather, observed associations between impairments and HFI highlight an important cycle of poverty that reinforces deprivation and poor health.

3.5 Conclusion

This paper highlights a significant association between mobility impairments and HFI in the Canadian context. This association can be attributed in part to socioeconomic deprivation, suggesting that general poverty reduction programs or higher disability assistance incomes would improve outcomes among mobility impaired adults. Access to basic income supports across the population, like those available with old age, and programs addressing increased expenses (e.g., housing costs, assistive devices, supportive aids) could further reduce risk. Exploration at more refined geographic scales could help to better understand the role of context, considering the important role of people interacting with their neighbourhoods and place of employment, and housing accessibility in observed relationships between mobility impairment and HFI.

Chapter 4
‘Up until the moment that I'm here at the table, I'm dealing with a lot of barriers’: Experiences of food access among adults with mobility disabilities in Toronto, Canada.

4.1 Introduction

Research in the United States and Canada indicate that disability is associated with food insecurity, or an inability to access food because of financial constraints (Coleman-Jensen & Nord, 2013; Gunderson & Ziliak, 2018; Borowko, 2008; Schwartz et al., 2019b). Food insecurity is associated with chronic conditions (e.g., diabetes, cardiovascular disease), mental illness, and increased mortality (Vozoris & Tarasuk, 2003; Gundersen & Ziliak, 2015). Health effects go beyond dietary impacts and include experiences of stress and control over accessing basic needs (Tarasuk, 2016). Explanations for the disability food insecurity link include reduced financial resources among people with disabilities and high household expenses related to disability, such as equipment, care, and medical needs (Huang et al., 2010; She & Livermore 2007). Additionally, some have suggested that limited mobility can pose barriers to food security from important limitations in ability to procure food, including transporting or preparing food (Wolfe et al., 2003; Heflin et al., 2019). Yet, the ways in which people with disabilities experience food access (i.e., physical and economic access) remain poorly understood (Schwartz et al., 2019a; Shaw, 2006; Webber et al., 2007).

In food access research, physical access is often considered through technical measures, like distance to stores or ‘walkable’ neighbourhoods (Walker et al., 2010; Caspi et al., 2012). When disability is considered in this research, it is often conceptualized as an impediment to access, increasing the likelihood of experiencing barriers (e.g., difficulty walking shorter distances to a store), thereby focusing access on the disabled body (Whelan et al., 2002; Shaw, 2006). This conception ignores experiences of difference and emotional experiences in travel, including pain and frustration (Andrews et al., 2012), or environmental barriers to access, including how people react to environments in ways that are context specific and tied to experience (Cummins et al., 2007). Disabling barriers in trips to food sources have been reported, including barriers related to steep topography, cracks in sidewalks, a lack of curb cuts, and food stores lacking accessible features, like accessible parking, entrances, or washrooms (Shaw, 2006; Chung et al., 2012; Huang et al., 2012; Mojtahedi et al., 2008). It is unknown whether these barriers may contribute to food insecurity for people with disabilities. People with disabilities could overcome physical access barriers, like distance, through material and social resources, including access to help and ability to afford public and private forms of transportation (Coveney & O'Dwyer, 2009; Wolfe et al., 1996). Yet, having a physical impairment could sometimes intersect with limited material and social resources and severely limit access to food (Webber et al., 2007), particularly as disability is commonly associated with poverty and more limited social resources (Palmer, 2011).

This study examines food access experiences among working-age adults with mobility disabilities in the City of Toronto, Canada. I aimed to look beyond the effect of the 'disabled body' or oversimplified measures of access, instead focusing on relational distances to food for adults with mobility disabilities, including important interconnections between physical, economic, and social resources that could lead to pathways of disablement (Cummins et al., 2007). A critical ableist perspective was used, considering how experiences of the impaired body arise in relation to specific spaces, political, and institutional contexts, which are created through normative orderings and practices. This includes understanding how built environments and social orderings in Western societies are built around the idea of flexible and independent travel and conform to the needs of 'typical' bodies, to the exclusion of those who do not meet these norms (Goodley, 2014; Campbell, 2009). In describing people with mobility disabilities, I am therefore referring to those who depart from a normative conceptualization of the 'able-bodied' walker and identify as having a mobility disability. I take up person-first, rather than identity-first language (i.e., disabled person) without drawing assumptions regarding the use of either form, but recognize that person first language is typically used in rights based discourse (Peers et al., 2014), and is the preferred term used by my disability partner organization, the Centre for Independent Living in Toronto (CILT) (Centre for Independent Living in Toronto, 2017). This research is part of a broader project which examines the relationship between disability, food access, and food insecurity in the City of Toronto and across Canada (Schwartz et al., 2019a; Schwartz et al., 2019b).

4.2 Methods

Semi-structured mobile interviews were conducted with 23 adults with mobility disabilities. Working age adults (age 18-65) who self-identified as having a mobility disability and lived independently (outside a community facility) in Toronto were eligible for participation, focusing on those at greater risk of food insecurity (Tarasuk et al., 2016) and more likely responsible for household food access. Two participants over age 65 were included in pilot interviews and the analysis due to their relevant experience, including one participant who spoke of the experience of transitioning to receive old age security (OAS) benefits and another with a longer experience receiving OAS. The first wave of participants recruited through CILT, produced eight interviews conducted between November 2017 and February 2018. Fifteen participants were recruited from four additional disability or food advocacy organizations across the city in a second wave, with interviews conducted between April and September 2018. A further wave of recruitment was not pursued as participants represented a diversity of disability experiences and a good cross-section of Toronto neighbourhoods.

Participants completed a questionnaire, followed by a semi-structured stationary interview on barriers to access food (i.e., economic, social, physical), and an optional mobile interview. The questionnaire collected sociodemographic information and included the validated, 10-item household food insecurity survey module, measuring 12-month adult food insecurity and using Canadian thresholds to determine severity (Health Canada, 2007). Mobile interviews consisted of a go-along interview, during which I accompanied the participant on a typical food access journey (generally to and from a grocery store) or if preferred, a mental mapping exercise, in which the participant created a ‘life space map’, or drawing of their local food environment (Huot & Rudman, 2015). Mobile methods can elucidate relational understandings of mobility in every-day routines, allowing participants to emphasize features that are important to them, and encourage reflection and reactions tied to place (Matthews & Vujakovic, 1995; Kusenbach, 2003; Carpiano, 2009). Of the 23 participants recruited, 18 participated in go-along interviews, four in life-space mapping, and one opted to complete a stationary interview alone. The questionnaire, and/or mapping exercise was completed by participants or the interviewer at the participant’s direction. For go-along interviews, participants chose the food access destination, the route, and travel mode. Participants were compensated according to interview type, with go along interviews involving the highest compensation of $30 (CAN) due to its longer time commitment, and travel was reimbursed according to the cost of public transportation.

Interviews were recorded with the participant's permission and transcribed and coded using NVIVO v12. Thematic analysis was used to identify emergent themes using iterative coding to identify overarching themes and insights and to group results. Routes and life-space maps were compared and linked to emergent themes in interviews. All participants were given pseudonyms to protect their identity. Ethics for this study was granted from the University of Toronto, Social Science and Humanities Research Ethics Board, and was subsequently reviewed and approved by CILT.

4.2.1 Geographical context

Toronto, Ontario is the largest city in Canada with a population of 2.7 million (Statistics Canada, 2019). The city includes a densely populated downtown core, the densely populated central-Toronto neighbourhoods, mostly built before World War II, and the inner-suburbs, defined by less dense, automobile-dependent growth. Food insecurity is reported in 13.6% of Toronto households, comparable to a provincial rate of 13.3% (Tarasuk & Mitchell, 2020). Toronto has costly housing which has sharply increased in recent years (Canadian Centre of Economic Analysis, 2018). The city also has planning goals focused on improving neighbourhood and transit (station and vehicle) accessibility (City of Toronto, 2017; Toronto Transit Commission, 2017). The Toronto Transit Commission (TTC) offers Wheel-Trans, a paratransit service, which includes door-to-door transportation for residents with disabilities at the cost of standard public transit fare.

4.2.2 Policy environment

Ontario's social assistance program for people with disabilities, known as the Ontario Disability Support Program (ODSP), offers higher payments compared to the province's general welfare system. Benefits are distributed with a requirement to prove financial need and the presence of a long-term disability (Government of Ontario, 2018). Maximum benefits for a single person on ODSP equaled $14,954 (CAD) in 2018, less than market-based measures of poverty in Toronto ($21,207 CAD) during this time (Maytree, 2019). In 2005, the province adopted the Accessibility for Ontarians with Disabilities Act (AODA), mandating that organizations, both in the public and private sector, follow certain accessible standards, with a goal to achieve ‘full’ accessibility by 2025 (Government of Ontario, 2015).

4.2.3 Participant profiles

Participant characteristics were self-reported in questionnaires. Participants ranged in age, gender, residential location, and presentation of a disability (see Table 4.1). The majority were socioeconomically disadvantaged, with 61% (*n*=14) who were food-insecure and 70% (*n*=16) receiving fixed income from ODSP. Most participants lived alone (74%, *n*=17). All but four were primarily responsible for acquiring household food; these four either shared responsibilities or supplemented household food access. Participants were primarily white (83%, *n*=19) and trended older.

Table 4.1 Participant Characteristics

Variable	**Characteristics**	***N (%)***
Gender	Men	8 (35)
	Women	14 (61)
	Other: Transgender male	1 (4)
Age Distribution	20-29	1 (4)
	30-39	3 (13)
	40-49	2 (9)
	50-59	9 (39)
	60-65	6 (26)
	> 65	2 (9)
Food insecurity	Secure	9 (39)
	Marginal	2 (9)
	Moderate	5 (22)
	Severe	7 (30)

Housing	Toronto-community-housing	9 (39)
	Other-subsidized-housing	3 (13)
	Non-subsidized housing	11 (48)
	Owned	2 (9)
Region of Toronto	Downtown-Toronto	7 (30)
	Central Toronto (Old Toronto, outside downtown)	8 (35)
	Inner suburbs (Etobicoke, North York, Scarborough)	8 (35)
Living situation	Lives Alone	17 (74)
	Lives with partner	2 (9)
	Lives with other family member	4 (17)
Primary mobility Equipment	None	1 (4)
	Walker	9 (39)
	Cane	1 (4)
	Scooter	5 (22)
	Wheelchair electric	5 (22)
	Wheelchair manual	2 (9)
Principal Income source	ODSP	16 (70)
	Employment	2 (9)
	CPP-disability	1 (4)
	Old age security	1 (4)
	Savings/Dividends	2 (9)
	Private disability insurance	1 (4)

4.3 Results

People with disabilities experienced barriers to food access on various fronts. These barriers included economic barriers that prevented people from affording food, physical access barriers that made it more difficult to travel for, prepare, or eat food, and social barriers that denied needed supports. Barriers occurred when systems failed to meet the needs of people with disabilities. These barriers were experienced at many scales, including at the state (or provincial) level, informing policy and practices around social assistance, within the home, on the way to food sources, and within food sources themselves. The next sections outline barriers at each of these scales.

4.3.1 State-level barriers (social assistance)

Mobility disability was related to economic barriers to food access due to restrictive budgets for people on disability income sources and self-reported inability to 'work' or gain full employment because of a disability. Of the 12 participants experiencing moderate or severe food insecurity, 11 identified economic barriers as importantly limiting food access. This was mostly due to inadequate incomes from social assistance programs like the provincial ODSP and the national Canada Pension Plan-Disability (CPP). Of those receiving their primary income from ODSP or CPP, 65% (11 of 17) were food insecure, similar to proportions found among Canadians on social assistance (Tarasuk & Mitchell, 2020). Those earning ODSP who were food secure (*n*=6) were more likely living with others, including two living with at least one parent. Those earning supplemental income from part-time or self-employment (*n*=2) on ODSP were more likely food secure or marginally food insecure. Low incomes from state-level sources or other disability pensions, were often at the forefront of barriers to food access, outweighing all other concerns, as Richard described.

> *Richard: If I… had the assistance with the food shopping… that would be fantastic. But at the end of the day here… what it really boils down to, especially for those who are on some form of assistance or fixed income, it comes down to dollars and cents.*
>
> *-50s, severely food-insecure, walker-user, downtown*

Richard, receiving ODSP, noted that his income was too low to afford quality food or proper housing, making it difficult to access food. Though food shopping was difficult, he described this as separate and unrelated to food security. Limited budgets also made it difficult to afford special diets needed for health. Programs were sometimes available from social assistance sources to supplement extra expenses related to disability (e.g., medical, dietary, mobility devices). A special dietary allowance, accessed by a few participants, supplemented benefits for people with medical dietary restrictions on ODSP. Yet these benefits were sometimes described as inadequate, while some participants with medical dietary requirements had not heard of this allowance. Supplemental benefits for ODSP participants could help to offset costs related to disability. Three participants receiving income from alternative sources, including the CPP alone, a private disability pension, and a participant above age 65 in the process of transferring from ODSP to the old age security benefit, noted that inability to access similar supplemental benefits, for medications, mobility devices, and special diets made it more difficult to afford food and contributed to their experience of severe food insecurity. Though physical barriers may be described separately from economic barriers, related to low social assistance incomes, these barriers may be highly interrelated. For example, all participants experiencing severe food insecurity (*n*=7) reported both important economic and physical barriers to food access, highlighting the multiple barriers faced by the most economically disadvantaged. Limited budgets affected people’s daily food access experiences and ability to overcome barriers. People with very limited economic resources often had the least control over their physical environment, including living in unsuitable housing, inability to afford proper care or transportation, lack of choice in neighbourhood of residence, and limited choice in food sources.

4.3.2 Barriers within the home

The home was the most immediate place from which food was accessed; meaning barriers within the home were particularly salient. One participant lived in a single detached home, while the rest lived-in high-rise apartments (*n*=17) or low-rise (*n*=4) or shared group homes (*n*=1). Barriers were experienced within the personal space of one’s home or apartment but also in common or shared spaces for those living in apartment buildings.

Barriers within personal spaces included small sized residential units, which do not properly fit mobility devices, high shelves, inaccessible sinks, and narrow passageways, making activities like food preparation or moving comfortably within the home more difficult. Amanda described some of the difficulties moving around her small market-rent apartment unit.

> *Amanda: So, at home, I don't use anything (mobility device), I just hang onto the walls. But now, I'm like literally hugging the walls, and like, walking like a snail pace… So, my upper body is incredibly strong, um, there's no concerns there, but like balance, strength, um flexibility, all those things are not up to par because of disabilities... The reason I do*

> *it in my house (ambulate) is because my house is not accessible, like, I live in a shoebox (laughs,) there's no turning radius.*
>
> *-30s, marginally-food-insecure, manual wheelchair-user, downtown*

Because of limited incomes, or restrictions of subsidized housing, many participants, like Amanda, lived in inadequately sized apartments that did not properly fit them with their mobility device. This led to stress and risks to safety in moving around. Some participants, including Amanda, also reported dangers of cooking in inaccessible kitchens, while some avoided cooking altogether because of perceived dangers.

Barriers in shared spaces included heavy doors, a lack of accessible door openers, and features like uncleared or unsafe ramps in front of apartment building or homes. Because most participants lived in apartments, particularly high-rise units, many feared the breaking down of elevators or dealt with slow elevators with long wait times. These breakdowns significantly affected people's ability to leave the home or could force some to take risks, like walking up stairs. Certain participant's apartment buildings permitted entrance or exit but were not fully accessible. In these spaces, front door entrances or lobbies were often inaccessible, while people with mobility disabilities were accommodated through backdoor or side entrances. Backdoor accommodations, already exclusionary, separating people with disability from regular access points (Imrie & Kumar, 1998), could have additional negative consequences. For example, many participants waited in front lobbies to detect the arrival of their rides. This was especially true for rides from Toronto's paratransit system, Wheel-Trans, as rides could arrive within 30 minutes of booking times, and sometimes took longer. Two participants with inaccessible front lobbies were made to wait outside their building in order to detect the arrival of their ride, sometimes waiting up to 30 minutes in freezing temperatures, with potentially important risks to safety. During adverse weather events, construction, or mechanical breakdowns (e.g., of elevators, mobility devices), people may be limited to the home, severely restricting access to food.

> *Cynthia: Remember the ice storm we had, in April? I stayed home, yeah that's when I didn't have food… The worst, probably the worst… I would have to order, and they deliver...*
>
> *Interviewer: from one of the grocery delivery services?*

> *Cynthia: Oh well, you know, like Swiss Chalet or Pizza Pizza (laughs). Yeah if I have to, like I don't want to starve… If I have the money. If I don't then I just wait until the next day, and drink a glass of water*
>
> *-50s, severely food-insecure, walker-user, downtown*

Material or social resources affected whether participants could overcome physical access barriers within the home. Cynthia experienced a severe situation during a spring ice storm when her options were either getting food delivered, if she had the money, or coping with severe hunger. Spending money on fast food delivery was sometimes possible because it required less cash on hand compared to grocery delivery. If participants lived with others, other household members often took over shopping during difficult times. Alternatively, those living alone mostly reported difficulty with getting help.

4.3.3 On the way to food sources

Having a mobility disability is commonly thought to limit physical access to food sources. However, this is an oversimplification, leaving out variation in experience, transportation modes, and the role of disabling barriers on the way. Even so, embodied experiences highlight challenges accessing food with a disability. Brian reported on a discussion with a family-member over his limited ability to travel alone to a discount supermarket within a kilometre of his home.

> *Brian: he basically thought, 'oh Brian you can go to Food Basics anytime you want it's very convenient'. And I said 'Yes, but you're able-bodied, you can handle the wind and the weather, with me and my walker, there's times … if the wind is strong, the wind will blow me off course and I have no one to help me' … so the average person, they'll say it's no big deal, but for me it is.*
>
> *-30s, moderately-food-insecure, walker-user, inner-suburbs*

Brian described how distances commonly thought of as close, as considered here by a member of his family, could be more difficult to travel with a disability. Barriers to travel here were interrelated with other circumstances, like mobility device, weather, and having someone with whom to travel. Alternatively, some participants did not have trouble acquiring food alone.

> *Robert: …I have the best shopping vehicle around that can carry all my groceries, and I can do what a normal person can do in a third of the time with my scooter. Going there and coming back and going in a store… Cuz it's such a big store, right?…I'm able to even pick up all my, tin cans, and stack them on the bottom of the base of the scooter and carry them. Now, how would I normally, bring them home and do all that?*
>
> *-60s, food-secure, scooter-user, downtown*

Participants like Robert, with electric mobility devices, frequently travelled long distances and transported heavy groceries home even in snowy or icy conditions. However other restrictions in spaces could arise in these devices when encountering certain barriers, including reduced ability to traverse narrow spaces, adjust to disruptions (e.g., broken down elevators), or getting stuck.

Barriers in outdoor environments were described as frustrating and dangerous. Experiences of these barriers were also relational, rooted in familiarity with local neighbourhoods and accessible features, like knowledge of accessible washrooms. Participants frequently discussed barriers to access, like old inaccessible buildings and crowded routes in downtown and central-Toronto, and more commonly discussed features like wide and dangerous intersections in the suburbs. City streets built to prioritize motor vehicles could be difficult to traverse with a disability. Rana [60s, moderately-food-insecure, walker-user, inner-suburb] found that her slower walking speed put her at greater risk of being hit. Therefore, despite having a grocery store across the street from her suburban residence, Rana walked far out of the way to cross at a light, more than doubling the time needed to reach a store. People with slower walking speeds are seen to have increased risk of pedestrian injury because of factors like greater difficulty crossing intersections within set walk times and difficulty crossing safely between intersections (Avineri et al., 2012). This relationship could be alleviated with better designs that consider the needs of pedestrians, including greater frequency of lights for crossing and longer walk times at intersections (Liu & Tung, 2014; Retting et al., 2003). As seen here, road designs that do not consider pedestrians can lead to safety risks or long inconvenient detours for those with different ability to walk.

Small-scale barriers could leave people stranded or forced to take risks. Caleb described travelling in his wheelchair along roads or in parking lots because of sidewalks that lacked a curb cut. He compared his experience and fear to the 1980s videogame ‘frogger’ where a frog is trying to cross a road while avoiding obstacles, including cars. Lisa [60s, food-secure, scooter-user, inner-suburbs] recounted once travelling down a sidewalk and then discovering that there was no curb cut to dismount. To get down, she was made to crash her scooter off the sidewalk. In addition to important risks of bodily injury, these situations could require expensive equipment repairs, not fully covered by ODSP. Where curb cuts existed, they could be temporally inaccessible, blocked by objects like ice and snow. Lisa described how cars would sometimes park in front of curb cuts, leaving them inaccessible (see Figure 4.1 for examples). Small features like bumps, cracks, and gradient toward a road could also make sidewalks difficult to traverse. As Caleb described, these 'minor things' could add up.

> *Interviewer: are there improvements that can be made that would help you travel more?*
>
> *Caleb: Well, it's the minor things… like you can't really blame anyone for, but you really want to blame somebody for. Like when there's snow, and the ice, and the fact that the garbage machine… sometimes it drops (the garbage bin) and then it falls down and that blocks my path. I, most of the time, I push it out of the way, but sometimes it's like, there's like a gross puddle or something in front and it's ugh!*
>
> *-20s, food-secure, power wheelchair-user, inner-suburbs*

Caleb cannot anticipate the temporal inaccessibility of sidewalks, which can make travel difficult. These barriers could cause discomfort, producing stress and negative affect in the moment – repeat exposure to such negative experiences and actual and symbolic environmental exclusion could also accumulate, leading to chronic feelings of stress and uncertainty. Imrie and Kumar (1998) similarly describe how encountering small-scale barriers can make outside environments seem dangerous and unwelcoming.

Figure 4.1 Examples of Curb Cuts. Figure 4.1a: curb cuts could easily be blocked by cars, ice, or snow. Figure 4.1b curb cut leads to nowhere

Participants reported that accessibility concerns on streets and sidewalks were complicated further by construction, including risks to safety from uneven paths and inconvenient detours. For example, Barbara [60s, marginally-food-insecure, walker-user, central-Toronto] described her fears crossing a major construction site near her home, noting how bumps in the road made it dangerous to get through with her walker. Winter weather also often imposed severe limitations on movement, dramatically shifting objective and perceived access. Sidewalks were not always cleared of snow, even days after snowfall. People using canes, walkers, or manual chairs feared slipping or getting stuck on snow-blocked sidewalks. Power chairs could often move better than other devices through snow or ice but could also get dangerously stuck in the winter, as Lisa described.

> *Lisa: one time I went out and I was fine getting to the store, but with the groceries I was sinking in. And somebody that knew me stopped and waited with me because they couldn't get (me) out either off the sidewalk. So, I put in a call to Wheel-Trans. They stayed with me till they came and helped push it into the Wheel-Trans... It's tricky cuz you could freeze if something like that happens and you gotta make sure your cell phone's always charged up.*

> *-60s, food-secure, scooter-user, inner-suburbs*

As seen here, these situations could be life or death. Lisa, fearful of travelling alone, relied on her cell phone in case of emergencies. Many participants shopped less in the winter, got help from others, if available, or took different routes, like paths with more foot traffic that were more likely cleared of snow. Participants were more likely to take paid forms of transportation during the winter or order in food.

Grocery delivery was a potentially helpful supplement to travel to grocery store but had a number of challenges. Four participants regularly used grocery delivery. Amanda [30s, marginally-food-insecure, manual wheelchair-user, downtown] described how her pregnancy prevented her from flexibly reaching or turning in her manual wheelchair, which made grocery shopping difficult. She had therefore been using a grocery delivery service almost exclusively during her pregnancy. For others, having food delivered would sometimes be helpful, especially for big orders. However, costs of grocery delivery were prohibitive for many, requiring going out to get food even when difficult. Some delivery services required a minimum order of $50 (CAD), which many participants did not have on hand, and were often from higher-end stores with more expensive products. Additionally, commercial delivery was not always desired. While grocery delivery may have been affordable for Mike [50s, food-secure, walker-user, inner-suburbs], at times where his mobility is more limited, like in wintertime, he preferred going out, avoiding long periods alone at home. Therefore, while grocery delivery was a useful adaptation strategy for some people, it did not replace the desire to go out and comfortably access food and does not ameliorate an obvious disability-related inequality in regard to the options people have for food access travel.

4.3.3.1 *Travelling by paratransit*

Wheel-Trans, Toronto’s paratransit service, offers door to door service for qualifying adults with a disability at the cost of general public transit. In the study sample, Wheel-Trans was the most common travel mode for food shopping, used regularly by 65% of participants (*n*=15), while only three had access to a personal motor vehicle (excluding a wheelchair or scooters). For many, Wheel-Trans was a necessity, without which they could not get around. Participants noted the importance and convenience of door-to-door service, especially in winter. Wheel-Trans was generally considered safe and secure and enabled travelling longer distances. However, relying on Wheel-Trans for food access presented some challenges. The cost of transit was expensive for many, particularly a monthly transit pass (metropass) costing $146.25 (CAD) for adults during the study period while a one-time trip was approximately 3$ (CAD) (Toronto Transit Commission, 2019). Yet, for some with very limited mobility, a monthly pass was a necessity.

> *Julie: I buy a metropass, which is, that's a big chunk of my monthly …basic needs that they give me. But, you know, I have to. I can only, I walk, from here, up to the corner and that's all I can do… so I really have to have a metropass, if I'm gonna go anywhere... so, forever I just buy a metropass, and I just kind of, I don't fucking care (laughs)…but that cuts into my food money.*
>
> *-50s, severely food-insecure, walker-user, central-Toronto*

Julie prioritized her mobility even though the high transportation costs limited her ability to afford food. These priorities reflect common trade-offs many participants had to make around food access. While Julie could supplement her food from community food programs (accessed by Wheel-Trans) and foodbanks, she could not get around to access food (or for other reasons) without paying for transportation.

Participants booked their Wheel-Trans schedules up to a week in advance to get rides at needed times. The closer to the time of travel, the less likely they would get a ride or be able to book at desired times for trips and return trips. This sometimes meant waiting for hours after an event for a return trip. Brian [30s, moderately-food-insecure, walker-user, inner-suburbs] described his frustrations with the booking system, exclaiming 'nobody else plans their life seven days in advance.' For Brian, if an event is cancelled or moved, or a program, like a cooking class he attended, goes long, others (who do not rely on Wheel-Trans) can flexibly adapt but there is no way for him to make alternative plans or change his schedule. Wheel-Trans could arrive anytime within a 30-minute window of booking and would sometimes be later due to delays. Yet, as participants reported, if they were over 5-minutes late for rides, Wheel-Trans would cancel their ride. Missed rides earned system demerit points, as did last minute cancellations, and four missed rides in a month resulted in suspension of monthly service (Toronto Transit Commission, 2018). Participants expressed great fear and anxiety over missing rides, particularly over having rides cancelled if they were late. Trips anywhere required setting aside large blocks of time and waiting became an important component of most people’s shopping trips. Therefore, many shopped at places where they could engage in other activities, like getting a meal or coffee while they waited, or carry out other errands, avoiding specialized stores. Charlie discussed the stress and careful time management involved in scheduling sufficient time to shop without missing his ride.

> *Charlie: …if I'm looking through the shelves and I'm not finding it, and I don't see someone around to ask, then I get a little bit worried and frustrated, that I might get closer to the Wheel-Trans time… I still make the rides, but I just start to feel a bit of pressure, if it's taking longer than I think it should, to get the food, to look for it, or even just waiting in the lineup. Sometimes, well, sometimes it might be my fault for not managing the time, but still I feel the pressure.*
>
> *-40s, food-secure, manual wheelchair-user, inner-suburbs*

Obstacles may come up at multiple points during Charlie’s shopping trip, including long lines and waits and inability to find items or staff, but no matter what he must make his Wheel-Trans ride on time. He must also plan to finish his shopping closer to the arrival of his ride as finishing too early meant that his food may spoil or defrost while waiting.

4.3.4 Barriers at food destinations

Participant’s experienced important barriers to access within food stores. In making choices to shop in discount grocery stores, large chain, specialized, or closer stores, or to use foodbanks, participants balanced available funds and ability, destination accessibility, and food affordability. Most participants preferred discount stores, generally large chain stores that offered cheaper products, due to their restricted budgets. Yet, these stores also tended to have features that were unhelpful for people with disabilities, for example, fewer staff helping in the aisles or checkouts where people are expected to bag their own groceries. Connor [30s, moderately food-insecure, cane-user, central-Toronto] who bagged his own items during our trip to a discount grocery store joked, ‘here, there's no service. You're paying for the discounts right.’ Though, it was sometimes possible to get help above what was offered in these stores, this required asking and waiting for help, which for some induced anxiety.

Large or chain grocery stores were perceived to have more accessible features, such as accessible entrances and wider aisles. Users of wheelchairs or scooters often preferred spacious stores with more room to navigate aisles. Yasmin [50s, severely food-insecure, power wheelchair-user, downtown] shopped in a grocery store close to her downtown apartment with especially narrow aisles (Figure 4.2a). She described the experience as a 'nightmare' and like a game of Jenga where she is trying to avoid knocking things down. Conversely, participants like Rana, mainly using walkers, canes, or manual chairs described difficulty and exhaustion traversing big stores.

> *Rana: going for shopping it's hard because of my, not able to walk in the big mall… so I just pick up a few things and then I'm short… so I'm not able to buy as much as I want.*
>
> *-60s, moderately food-insecure, walker-user, inner-suburb*

Because Rana is frequently too exhausted to get everything that she needs in one trip, she must take multiple smaller trips to the store to get what she needs or make do with less food.

Foodbanks, used by four participants, could be helpful and necessary supplements for some. However, foodbanks limit visits to once or twice per month and only provide for several days' worth of food and so they were rarely reported as a major food source. Food was also described as low quality and lacking in fresh options. This was particularly problematic for participants with special dietary needs, including one participant with kidney problems who could not eat canned foods and so avoided most foodbanks. Though people with disabilities disproportionately use foodbanks (Foodbanks Canada, 2019), the foodbanks were very often inaccessible, as Shirley described.

> *Shirley: Like the Salvation Army one… I had to ask if somebody would carry it down the steps… You know even though they see you with a cane and you're limping…*
>
> *Interviewer: So, you can't go in with your scooter?*
>
> *Shirley: No, no (laughs)… and then you try not to bring a cane because you have to carry all these heavy groceries. How you gonna manage with[out] a cane as well? There's like …you know, the outdoor staircase, the metal ones, then there's another staircase to go up… Yeah, I manage but there will be a time where I won't be able to.*
>
> *-60s, severely food-insecure, scooter-user, downtown*

Because of shocking inaccessibility of major foodbanks, Shirley adopted risk taking as an adaptation tactic, like abandoning her mobility equipment outside and climbing or going down the stairs with heavy groceries to meet her needs. However, she noted that with changing ability, access at major foodbanks may become unavailable to her.

Participants reported regularly encountered smaller scale barriers within various food destinations. A few participants were annoyed by what one participant called ‘choppers’, or gates meant to prevent people from taking carts out of grocery stores (Figure 4.2b). Yasmin [50s, severely food-insecure, power wheelchair-user, downtown] described how these gates would sometimes hit her in the face, while others worried about getting stuck in them. Palettes for loading food or displays and boxes sometimes blocked people from traversing aisles, particularly when stores were crowded. Many had difficulty reaching items that were higher up on shelves. Anna [50s, food-secure, wheelchair-user, central-Toronto] described difficulty reaching higher up plastic produce bags (Figure 4.2c). Accessing food inside the freezer or refrigerated section, often kept behind doors, could be challenging. Sam [40s, severely food-insecure, scooter-user, downtown] had to balance his chair against the door and maneuver to get access to these foods (see Figure 4.2d). While barriers may be considered small, they could add up to important frustration and exhaustion, as Anna explained.

> *Anna: when I first moved to Toronto, I'd pick every single one of these checkouts…But you want to put in self-serve and make the spaces narrower, and I can only go through one in the entire store now and you're not staffing it. That's so frustrating! …And everyone says, ‘…we'll get, someone staffing it’ …but you know what? Perhaps I need to run out the door and catch my bus, or perhaps …that checkout also happens to be the 1-8[item] checkout, but I'm taking 30 items through because it's all you'll offer me. And I get the public going (hissing) behind me, right?*
>
> *-50s, food-secure, power wheelchair-user, central-Toronto*

Rather than allowing disability access in all checkout aisles, participants reported being relegated to a single accessible aisle in which their needs are deprioritized. Further, having the express checkout aisle as the only operable accessible aisle (e.g., wide enough to fit a wheelchair) was not considered in the design, though it was reported as a source of anxiety when participants had large grocery orders. Though technically complying with the AODA guidelines, by providing an accessible option, this ‘checking boxes’ consideration of accessibility fell short in practice, leading to designs that were functionally inaccessible (e.g., by not staffing it), contributing to feelings of exclusion (Ross & Buliung, 2019).

Overall, participants indicated that inconsistent exposure to barriers and functional inaccessibility could be confusing, leading to uncertainty in going out or over what stores could be accessed. For example, Sam highlighted the every-day difficulties accessing food where disability accessibility is not considered or dealing with places that may be temporarily inaccessible due to things like mechanical breakdowns, adverse weather, or failures of disability systems.

> *Sam: So, it's like, when I'm working in a system, up until the moment that I'm here at the table, I'm dealing with a lot of barriers… like if the elevator was broken today …so then I would have to put in a complaint and decide, am I gonna find another way to get up to the second floor (of the grocery store) or am I gonna just cancel my shopping trip? So, I have to, really pace myself in everything I do because, using a wheelchair means I can't just, like depend on things. I can't expect all these things to run smoothly… or by the time I get here, I'm tired and I just want to… it's just, I have to leave ample room for everything I do.*
>
> *-40s, severely food-insecure, scooter-user, downtown*

As Sam expressed, he must constantly plan for small disruptions as well as his own fatigue, which leads to considerable uncertainty. For Sam, everyday small events could add up, affecting whether he can be ‘at the table’, properly participating and able to meet his needs or whether he will be excluded.

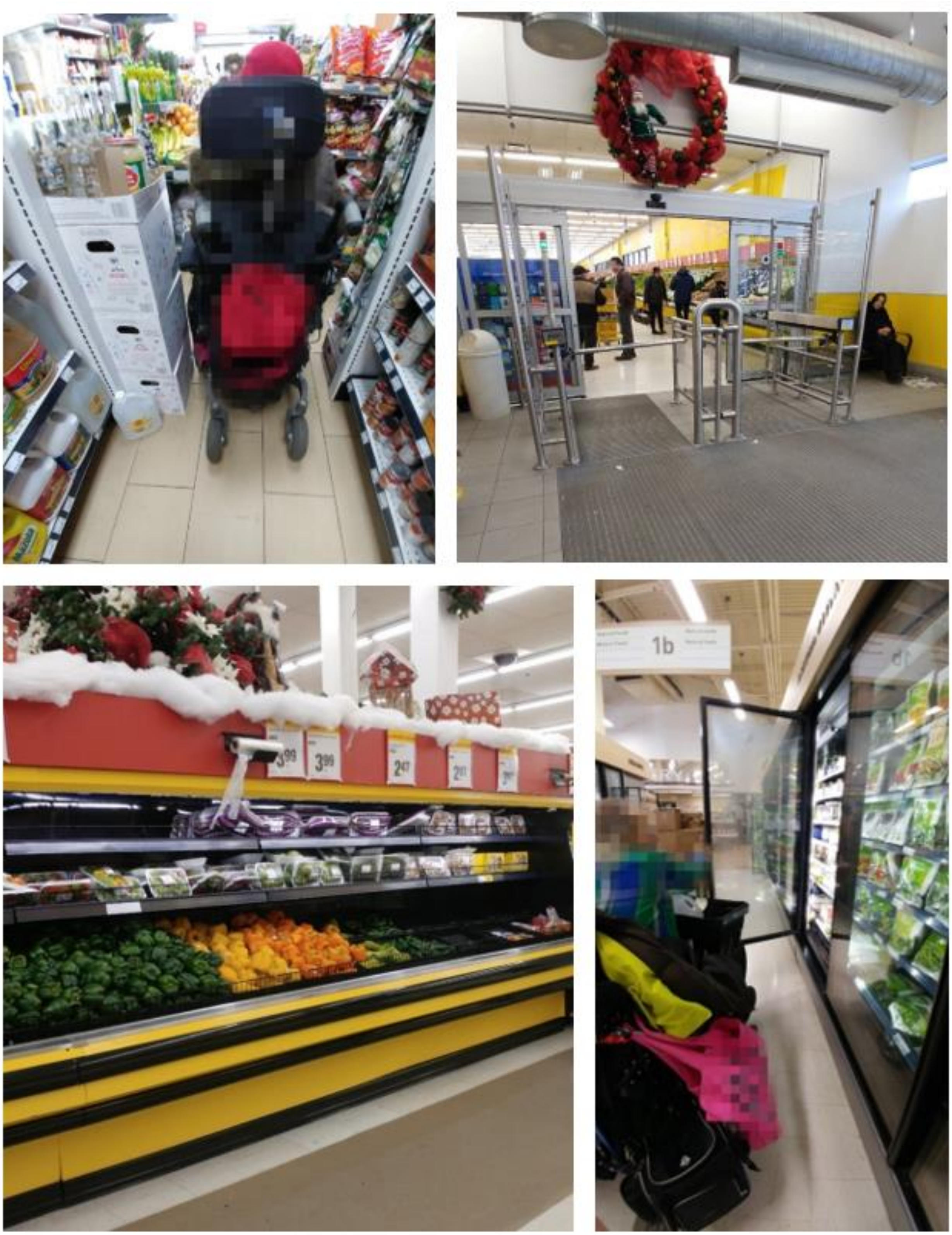


Figure 4.2: Barriers in grocery stores. 4.2a (clockwise) navigating 'Jenga' aisles with Yasmin, 4.2b, 'choppers' at store entrances 4.2c. plastic bags are too high for Anna to reach, 4.2d freezer doors with Sam

4.4 Discussion

Findings from this study highlight food access experiences of adults with mobility disabilities, many of whom reported having low-income, in Toronto, Canada. This research contributes to the food insecurity literature by highlighting an important population inequality and examining the intersection of physical and economic access barriers. Most participants emphasized how their limited or fixed incomes produced a food access problem, reflective of the food insecurity concept. Yet, physical ability, interacting with accessibility barriers in the home, on the way to food sources, and within food sources, complicated access. While experiences varied, accessing food with a disability frequently involved long waits and inflexible schedules, risks to safety, stress, and uncertainty. Physical access also strongly depended on resources available to participants, including mobility devices, financial means, and access to help. Those with limited financial resources were less able to limit exposure to barriers.

Mobile interviews allowed for a more fulsome understandings of embodied and relational experiences tied to place. While other studies considered accessibility at certain stages of the food access journey (Huang et al., 2012; Shaw, 2006; Wolfe et al., 1996), this study produces a more comprehensive understanding of food access: from preparation, to going out, shopping, and returning with food. This included the importance of stress and compromises to well-being (physical and emotional) when modes of access are problematic and physically strenuous (Bostock, 2001; Hamelin et al., 1999). Similar to Webber et al. (2007), I highlighted intersections between limited mobility and socioeconomic disadvantage. However, I understood limited mobility as not just based in the disabled body but related to barriers and treatment of people with disabilities, including overly restricted budgets for adults on ODSP and regularly encountered barriers that compromised people's safety and well-being in accessing food. For example, many participants were limited at times from going out not just because of bodily ability, but because of barriers like unsafe intersections, un-cleared sidewalks, inadequate transportation systems, or exclusionary design more generally.

Participants used a variety of mobility devices, were of different ages, and lived in different parts of the city, providing a diversity of experiences. However, experiences in Toronto, a large metropolitan area with generally good access to grocery stores (Martin Prosperity Institute, 2010) and services like Wheel-Trans available across the city, may not apply to experiences in other place with different mobility services or urban geographies. Participants in this study mostly lived alone and were more likely involved in disability activism, highlighting a unique population. Despite Toronto being a racially diverse city (Statistics Canada, 2019), only four participants included were non-white due to limitations in recruitment. Therefore, intersectional experiences of race and disability have been missed. Throughout, it was important for me to consider my positionality as a non-disabled researcher, questioning how I viewed access barriers. I, therefore, made efforts to elevate the perspectives of participants to define their own food environments and the relative importance of the barriers they faced. Go-along interviews and life space maps aided in this effort by allowing people with disabilities to define the important places and barriers in their own environments that act as barriers to food access.

4.4.1 Disabling experiences of food access

Social structures and environments, that are built for the average person rather than accounting for difference, exclude people that do not conform to ableist standards (Goodley, 2014). In the Western world, adapted for flexibility and independent travel, people are assumed to have control over places and timing of access (Urry, 2004). Yet, this research shows that the ways that people acquired, travelled with, and consumed food differed for people with less financial or social resources or reduced physical ability for travel. Many of the systems used by people with disabilities to access food operated outside regular routes of access, including ODSP, Wheel-Trans, and public areas and food sources with unpredictable accessibility. People with disabilities were therefore left with greater financial and physical vulnerability, reliant on systems that deny functional accessibility in favour of meeting technical requirements, and with the possibility of temporal inaccessibility.

Restrictive budgets limited participant’s food security and physical access to food. Greater incomes could have effectively prevented food insecurity or helped people avoid some physical access barriers, including facilitating paid grocery delivery in times of need or accessing paid forms of transportation, like taxis. Yet, Chouinard and Crooks (2005) describe how ODSP, used by most participants, is purposely inflexible to needs. Under ODSP, clients are responsible for navigating complicated bureaucratic systems, while access to funds and programs, like a special dietary allowance, relied on precise definitions of disability and were dependent on medical practitioners or other professionals for access (Shantz, 2011; Lightman et al., 2009). Though people with disabilities are seen as the ‘deserving poor’, under this system, they are only seen as deserving of poverty incomes which deny their needs (Chouinard & Crooks, 2005). Additionally, many environments impose barriers that require financial means to overcome, leading to a greater need for many to spend for access.

Barriers to access arose when environments or disability systems did not meet the needs of the disabled body or mobility devices. Encountering physical barriers immediately contributed to embodied experiences of physical pain, fear, and exhaustion in the process of accessing food. Over time, barriers led to feelings of uncertainty and risk, influencing perceived control over foods accessed. Because of regularly encountered barriers and limitations of accessible systems, participants were often restricted in both time and space, leading to the labour of having to reorder daily tasks (Dyck, 1995). Examples included: confining movements to familiar places, building schedules to account for long waits, and limiting shopping to periods of better weather. In public spaces, designation as ‘accessible’ often meant that AODA requirements were met. Though the AODA has led to important improvements in accessibility, guidelines were not always enforced, and meeting technical requirements did not always guarantee functional accessibility (McQuigge, 2019), meaning that participants could not be sure that places, even those labelled accessible, would work for them.

The presence of separate disability access, like disability checkout aisles, meant that people with disabilities were excluded from regular forms of access, requiring extra work to be recognized and waiting to have their needs met. Separate systems like Wheel-Trans frequently involved long waits and disruptions, which could be especially problematic if trying to conform to restricted schedules, like accessing work or appointments, or travelling with perishable groceries. Though Wheel-Trans was a vital service for many participants, difficulties using Wheel-Trans have been well documented, including important delays and difficulty booking rides at needed times (Angus et al., 2012; Delaire & Adler, 2019). The inflexibility and unreliability of Wheel-Trans restricted temporal and physical patterns of food access. In a world of rideshare and bus tracking, people with disabilities are made to sit and wait for rides for upwards of 30 minutes with little ability to track rides or adjust schedules.

Temporal inaccessibility was a major concern. Participants were made to account for numerous possible disruptions in their day, like personal pain or fatigue, encountering accessibility barriers, adverse weather events, mechanical breakdowns, construction, or disruptions in Wheel-Trans. When things like elevators broke down, there was often no alternative option. Adverse weather, including build-up of snow or ice was an important and consistent barrier to food access, temporarily limiting when people could leave their home. Though inclement weather cannot be avoided, processes like snow removal reflect political decisions. In Toronto, the city is not always responsible for snow removal on sidewalks, which is often the responsibility of individual homeowners or building managers (City of Toronto, 2020) but is responsible for clearing all the streets. This leaves many sidewalks icy and impassable for adults with mobility disabilities, or with major fears for their safety when going out, perhaps a reflection of the prioritizing of the so-called ‘able-bodied’ during periods of challenging weather and at other times.

4.4.2 Practical implications

Food access for adults with disabilities could be improved with greater financial resources to help ameliorate a food affordability problem, and to create income to enable adaptations as needed. This suggests needed increases in ODSP or alternative solutions, like providing basic income for people to more flexibly meet their needs (Basic Income Canada Network, 2019). However, financial ability to adapt does not substitute for a desire for autonomous mobility within non-disabling environments. The current practices regarding access to ODSP benefits, paratransit services, snow removal, and the enactment of AODA guidelines reflects wider issues over whose needs are prioritized. More work is needed to address the financial vulnerability of many with disabilities and integrate considerations of disability and difference in design and management across spaces of food access. The political will must be made to enforce accessibility rules, like the AODA, including during periods of construction, adverse weather events, or mechanical breakdowns. Greater consultation and consideration of disability and prioritizing financial commitment to accessibility would allow for spaces that truly meet people’s need, rather than meeting technical accessibility requirements. These changes could ensure that people with disabilities are ‘at the table’, included and prioritized in systems of food access.

Chapter 5
Assemblages of enablement/disablement in accessing food: the role of housing and the home

5.1 Introduction

Food insecurity, or inability to consistently access food due to financial constraints, is an important social determinant of health, associated with health outcomes like mental illness, diabetes, heart disease, and increased mortality (Gundersen & Ziliak, 2015; Gundersen, Tarasuk et al., 2018; Vozoris & Tarasuk, 2003). Food insecurity is a significant concern in Canada and the United States, with reported population prevalence between 10-15% (Tarasuk & Mitchell, 2020, Gundersen & Ziliak, 2018). Low income and high household expenses are the major causes of food insecurity, reducing economic ability to consistently afford food (Heflin et al., 2007). People at increased risk include single parents, families with children, visible minority populations, home-renters compared to home-owners, and people with a chronic illness or a disability (Gorton et al., 2010; Heflin et al., 2007; Kirkpatrick & Tarasuk, 2011; Tarasuk et al., 2013).

People with disabilities experience significantly increased odds of food insecurity (Coleman-Jensen & Nord, 2013; Gundersen & Ziliak, 2018). This association has been explained through higher unemployment, lower incomes, and higher costs of living related to disability, including costs of medical or personal care and related expenses (She & Livermore, 2007; Huang et al., 2010). Studies in older adults have highlighted the possibility of restricted access to food due to differences in physical ability, including ability to leave the home or prepare meals (Wolfe et al., 2003; Heflin et al., 2019). However, this focus suggests that mobility disability is a problem located within the body of people with disabilities and which necessarily results in barriers, without considering disabling social and environmental barriers to access (Schwartz et al., 2019a). Physical barriers that people with mobility disabilities face in accessing food have been reported, including on routes to stores (e.g., hilly topography, cracks in sidewalks, lack of curb cuts) or within grocery stores (e.g., lack of accessible parking, washrooms, or entrances) (Huang et al., 2012; Shaw, 2006; Chung et al., 2012; Whelan et al., 2002; Coveney & O’Dwyer, 2009). Yet, few studies consider the intersection between economic constraints and physical constraints

(Webber et al., 2007; Shaw, 2006), though socioeconomic disadvantage is more common among people with disabilities (Palmer, 2011). The next section will outline the use of an assemblage perspective to understand disability and capacity to access food, considering the interaction of bodies, resources, and environments which produce situations of ability.

Questions of physical access to food have generally focused on food accessed outside the home, including travel to and from a grocery store, or neighbourhood measures, considering food availability or affordability close to place of residence (Walker et al., 2010; Caspi et al., 2012). Little information is available on access to food within the home, where food access trips often begin and end and where meal preparation and eating often take place (Schwartz et al., 2019a). People with disabilities may experience restrictions to the home, which they may reorder depending on available resources (Dyck, 1995). The home is one of the most common places in which people with disabilities encounter physical accessibility barriers (Altman et al., 2014), including those related to food access (Stark, 2001). If inaccessible, navigating one's own home independently may be particularly humiliating or disheartening as these experiences may not align with ideals of the home, including privacy or sanctuary (Crooks, 2010; Imrie, 2010). People with disabilities may also be economically disadvantaged in the sphere of housing and the home. Inadequate housing situations, which can importantly increase risk of food insecurity, is more common among people with disabilities (Heflin, 2017; Canadian Association for Community Living, 2017). The home, therefore, represents an important setting, highlighting connections between economic and physical constraints on access.

5.1.1 Framing enablement and disablement: an assemblage perspective

In the food access literature, disability has been undertheorized, often relying on a 'biomedical model' that sees disability as a bodily problem which necessarily results in access barriers (Schwartz et al., 2019a). Critical disability theory instead aims to understand how disability is situated based in social, institutional, and political contexts that devalue certain bodily differences and which create barriers for some (Goodley, 2014). The concept of assemblages, elucidated by Deleuze and Guattari (1987), aids this perspective, considering how social bodies emerge through the interaction of their component 'parts', including bodies, material, and social elements, with emergent capacities different from those of their individual parts. An assemblage perspective acknowledges the role of bodily pain and experience, but also examines how the body's capacity is fluid and created in interaction with its setting, including material elements (e.g., mobility devices, built environments), social resources (e.g., affective interactions with social contacts), and normative social orderings (e.g., expectations of independence) (Gibson et al., 2017; Feely, 2016). In an assemblage perspective, places are also considered based on interactions with people and circumstances rather than reducing places to certain features (e.g., cracked sidewalks, accessible entrances) (Stephens et al., 2015). An assemblage perspective has been used to challenge disabling norms, assumptions, and environments in fields such as architecture, education, planning, and rehabilitation (Goodley, 2007; Boys, 2014; Gibson et al., 2012; Gibson et al., 2017; Stephens et al., 2015; Fritsch, 2010; Roets & Braidotti, 2012; Goodley et al., 2018).

An assemblage perspective provides methodological tools to understand factors that limit capacities or act to impose certain behaviours (DeLanda, 2016). A disability assemblage may act in self-enforcing ways. For example, Stephens et al. (2015) explain how institutional guidelines and social norms greatly determine activities and risks that are acceptable for disabled children at school. Within the home, outside norms or policies against risk-taking or moving in socially unacceptable ways (e.g., crawling), the same child may feel enabled even within a less accessible built environment. An assemblage perspective, therefore, does not dismiss the role that medical definitions and institutional boundaries play in the lives of people with disabilities. However, it also acknowledges that these factors may be contested and changing (Feely, 2016; Roets & Braidotti, 2012).

This study examines how people with mobility disabilities are enabled or disabled from accessing food, including the ability to acquire, prepare, and eat food, within the setting of the home, with a focus on access to housing, material environments, and access to care. Drawing upon interviews with 23 participating adults with mobility disabilities in Toronto, Canada, assemblages of capacity to access food are outlined. A discussion of practical implications then considers the marginalization of people with mobility disabilities within the sphere of housing and the home.

5.2 Methodology

5.2.1 Materials and Methods

Semi-structured interviews were conducted with 23 adults with mobility disabilities living in Toronto, Canada. Interviews focused on access to food within different settings, including the home. Participants were recruited through five disability organizations, including the Centre for Independent Living in Toronto (CILT) who provided advice on study design (CILT, 2017). The first wave, taking place from December 2017 to February 2018, included interviews with eight participants recruited through CILT. During the second wave, 15 participants were interviewed between April to September 2018. This wave included a more geographically and culturally diverse sample, recruited through four additional disability or food advocacy organizations across the city. As participants represented a diversity of disability experiences, a further wave of recruitment was not pursued.

Potential participants were screened by phone, including those who self-identified as having a mobility disability, lived independently (i.e., outside an institution), and were between age 18–64. Working-age adults were included, thereby focusing on those at greater risk of food insecurity (Gundersen & Ziliak, 2018) and more likely involved in household food provision and preparation. Two pilot interviews were conducted with participants above age 65 and were included in the final analysis due to relevant experiences, specifically related to changes in access to disability benefits over the age of 65.

Interviews were conducted after obtaining informed consent and consisted of three components, a questionnaire, a stationary interview, and a mobile interview component, including a go-along interview or mental mapping exercise. Findings from the mobile component are discussed in Chapter 4. Questionnaires collected sociodemographic information and information on food insecurity using the 10-item adult validated household food insecurity survey module (HFSSM). The HFSSM measures 12-month food insecurity (Health Canada, 2007), classifying food insecurity according to Canadian criteria: if they met the definition for marginal (responded affirmatively to one condition), moderate (2-5 affirmative responses), or severe food insecurity (6-10 affirmative responses). Interviews discussed social, economic, and physical barriers to food access and sometimes took place (or began or ended) at a person’s home and in 13 cases involved a tour of the participant’s living space. The site of the interview was negotiated between the researcher and participant. Ethics for this study was granted from the University of Toronto, Social Science and Humanities Research Ethics Board, and was subsequently reviewed and approved by CILT.

All participants were given pseudonyms with which to identify them to protect their identity. Interviews were recorded with the participant’s permission and were transcribed and coded in NVIVO 12. Using an assemblage perspective, a thematic analysis was carried out, identifying the material and social codes that defined ability to access food within the home through open coding. The relationships between these codes were then highlighted, included where a disabling order was imposed or challenged.

5.2.2 Study setting and context

Toronto, Ontario, is the largest city in Canada, with a population of 2.7 million (Statistics Canada, 2019). In Toronto, 13.6% of adults experience food insecurity, representing significant poverty, with rates slightly higher than the 13.3% experiencing food insecurity in the province of Ontario (Tarasuk & Mitchell, 2020). Toronto has been experiencing an important housing crisis. From 2006 to 2018, costs of home ownership increased 131% while rental prices have also surged (Canadian Centre for Economic Analysis, 2018). Subsidized housing includes significant waiting lists while wait times have been increasing (City of Toronto, 2019; Canadian Centre for Economic Analysis, 2018).

In 2005, the province of Ontario adopted the Accessibility for Ontarians with Disabilities Act (AODA), with a goal to remove barriers to participation for people with disabilities by 2025. The AODA provides accessibility standards for both public and private institutions (Government of Ontario, 2016). Ontario’s social assistance program for low-income people with disabilities, the Ontario Disability Support Program (ODSP), offers higher benefits compared to non-disability welfare sources. Maximum benefits for a single person in 2018 equaled $14,954 (CAD), significantly below Toronto market-based measures of poverty ($21,207 CAD)[2] (Maytree,

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[2] Market based measures of poverty are based on income needed to afford a ‘basket’ of goods and services that would define a basic standard of living (Maytree, 2019)

2019). Alongside ODSP, programs are available that subsidize costs of medical equipment and care. The Ontario assisted devices program (ADP) provides subsidies for medical and adaptive equipment like ramps and lifts, and repairs based on financial situations of applicants (Ontario Ministry of Health and Long-Term Care, 2019). In Ontario, Local Health Integration Networks (LHINs) provide access to publicly funded in-home care.

5.2.3 Participant profiles

Participants ranged in age, sex, residential location, and presentation of a disability[3] (see Table 4.1). The majority of participants were female and over 50. Participants were mostly white (*n*=19), which does not reflect demographics in Toronto, with a population over 50% non-white (Statistics Canada, 2019). Sixty-one percent of participants (*n*=14) were food insecure, including 30% (*n*=7) that were severely-food-insecure. Most received income from ODSP (*n*=16). Two participants lived in a home owned by them or a person in the household, while the majority lived in rent-subsidized units or Toronto community housing (*n*=12). All were housed at the time of the interview, though one participant was recently homeless. Most lived alone (*n*=17).

5.3 Findings

Among participants, the home was a central setting of food access. Nine participants expressed that barriers within the home, including related to attendant care, act as major barriers to food access. Barriers within the home were related to economic constraints, physical barriers to access, and social supports and care. The following examples highlight the interrelated nature of these barriers and their influence on ability to access food. Richard, who was recently homeless, demonstrates the varied ways in which housing shapes his capacity to access food.

> *Richard: getting back to my …food insecurity situation, I really don't see it changing for the positive until two things happen, 1. I get off of ODSP, or 2. I move into another place, it could for example, be an assisted living place, it could be a uh adequate 1-bedroom, but here again I would have to take into account the size of the unit, the size of the kitchen, accessibility, and so on…*

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[3] Participant characteristics were derived from responses to the questionnaire

> *(later) but I consider this (home) a step up from being in a shelter… what is good here is I have been able to access a personal-support-worker… And believe me we use the full 4-hours (per week) to its maximum.*
>
> *-50s, severely-food-insecure, subsidized-unit, walker-user*

Budgetary constraints, due to limited incomes from ODSP, both disable Richard from affording food and an improved housing situation which could allow him to cook or have greater control over foods accessed. As he finds a shared kitchen in his home generally unusable, he mostly relies on Meals on Wheels for food. His housing options are more limited as he must consider accessibility of the unit and his need for care. However, he also describes an improved situation. Moving from a homeless shelter allowed him to gain access to a personal support worker (PSW) for help around the home, highlighting how housing situations can influence situations of care.

Barbara demonstrates how physical ability to carry out food related tasks is based in interaction with accessible settings of the home and situations of care. After being released from the hospital following a major surgery, Barbara, who lives alone, experienced an important shock when confronted with a different setting.

> *Barbara: before I left… she (the social worker) said 'could you boil an egg', and I said, 'sure, I can boil an egg'. But you're in a hospital, all your needs are being taken care of, you're getting your medicines, whenever you need them. And when you're home, it's a whole other ballgame. I was in such distress. I couldn't do anything. I could barely get out of bed to go to the washroom.*
>
> *-60s, marginally-food-insecure, market-rent, walker-user*

There was an important disagreement between Barbara's institution of care's view of 'ability' and her embodied experience when arriving at home. In the hospital, Barbara believed she could boil an egg. However, outside of a controlled environment with proper treatment and needed support, she was no longer able to care for herself without significant pain and distress. By failing to consider ability as formed in an assemblage of body, setting, and care that determines capacity for household tasks, Barbara was denied proper care. Interestingly, 'boiling an egg' is used as a measure of self-care, highlighting the importance of food-related tasks in how ability/disability and independence is defined and treated in major institutions.

While each participant’s housing situation is unique, the home, as seen here, acts as a nexus in which the economic, physical, and the social interacted. The next sections outline each of the ways in which housing influences food access, assembling to enable or disable capacity, including as a financial resource, a physical setting of action, and a setting of care and social interaction.

5.3.1 Housing-as a financial resource

Participants report complex housing needs, based around an assemblage of abilities, budgetary restrictions, suitability of certain locations, accessibility of places inside and outside of the home, and access to care. These factors interact with the housing market, and subsidized housing system which in turn reflect political priorities.

Though home ownership is associated with decreased risk of food security (Kirkpatrick & Tarasuk, 2011), only two participants lived in a house or apartment that was owned by them or a member of their household; all others were renting. Rent made up a high percent of participant’s expenses, particularly for those on limited ODSP budgets or other public income supports. In Toronto subsidized housing, rents are limited to 30% of monthly income (City of Toronto, 2019). For the 12 participants in subsidized or community housing, subsidies are key to affording basic needs like food. However, many still struggle, with nine out of 12 participants in subsidized housing experiencing moderate or severe food insecurity. For example, Cynthia [50s, severely-food-insecure, subsidized-unit, walker-user], whose main income source is a public disability pension, known as the Canada Pension Plan (CPP), notes that she could not even afford to rent a room in Toronto’s current market on her pension and so considers herself lucky to have accessed subsidized housing. She describes herself as ‘just making it’ with subsidies, but notably, she is severely-food-insecure. For some, like Yasmin, with subsidized rent, household expenses still make up a large share of their budget and are prioritized over expenses like food, which are viewed as more flexible.

> *Yasmin: my method to budgeting is ‘what’s the most important thing?’ Rent, OK, the second most... these are bills with due dates, deadlines, rent and then hydro (electricity), then I have a landline, home phone, then comes cable TV because... I don’t go to*

> *movies... Then, the items in the budget without deadlines is medication, alright need medication. Laundry, washer, dryer. At the bottom, which I call a treat, is food.*
>
> *-50s, severely-food-insecure, subsidized-unit, wheelchair-user*

Though participants in this study have different priorities and flexibilities related to their budgets, housing expenses, including bills with deadlines (e.g., electricity), are often seen as non-negotiable. Several participants on ODSP and living in subsidized housing have housing expenses already deducted from their basic needs allowance, highlighting the inflexibility of these expenses.

In Toronto, various government and community organizations manage access to subsidized housing (City of Toronto, 2019). Across participants, access to proper housing is inconsistent, determined seemingly by chance. Six participants reported being on waiting lists for subsidized housing. Three of those waiting lived in market rentals while the others lived in subsidized housing but were trying to move into accessible locations. Participants required specific forms of housing, ranging from apartment areas without steps, desired by most participants, and wheelchair-accessible apartments, to need for on-site care. Susan, who uses a wheelchair and has limited use of her hands, requires access to housing with available care. She lives in a community-living facility that has available attendants on site but describes difficulties accessing this form of housing.

> *Susan: …I was lucky back then because, I was at [hospital] after my accident… this [unit] became available while I was still there... and I mean basically it's only if someone dies [unit becomes available], because, where am I gonna go from here? Yeah, so it's very hard to get into these buildings.*
>
> *-50s, food-secure, market-rent with subsidized care, wheelchair-user*

Even though Susan deems her support, including flexible access to on-site attendant care, necessary, she describes her current housing situation, accessed over 20-years earlier, as a matter of luck which would not be so easily available today. This aptly describes Toronto subsidized housing, where a decreased supply of new units has led to increased wait times (Canadian Centre of Economic Analysis, 2018). Participants described lengthy times on waitlists, often in years, particularly when requesting accessible apartments or certain locations. Connor shows some of the difficulties getting into suitable housing, including a long application process and the need to prove meeting access criteria. Connor lives in housing lacking important accessibility features, like accessible door openers and without important features for him as someone deaf and blind, yet has trouble getting into a suitable location.

> *Connor: I'm still on the waiting list, they just called for the interview back in June that I didn't get the place. So, hopefully in the future I get that kind of thing, cuz right now my place …they don't work with the deaf-blind anymore, they used to, and they were like (laughs) you've been here a long time, you can stay.*
>
> *-30s, moderately-food-insecure, subsidized-housing, cane-user*

Situations like Connor's highlight the lengthy process trying to access limited accessible housing. Others on waitlists describe confusion in this process, including difficulty reaching the proper organizations, getting on the right lists, and long and confusing processes to establish need, particularly if they request certain features, like accessible apartments. In describing access to housing, it is common for participants to describe the location of housing units, such as proximity to needed services and commercial locations. Housing needs, therefore, do not just include expenses, but meeting accessibility criteria and access to other services. Participants could be left in adverse situations when unable to meet these needs.

5.3.2 Housing environments and food related tasks

Physical structures within personal spaces and shared spaces, for those in apartment buildings, affect different capacities to access food, including whether participants can cook, move about, exit and return home from food access journeys, or feel comfort and security in their own home. While housing environments suitable to participant's bodily needs allow cost savings and feelings of control over foods purchased and consumed, a lack of suitable accessible housing can have severe consequences beyond food access, including important risks to safety and social isolation. One instructive example shows how access to proper housing is integrated with physical accessibility. Yasmin describes being on a waitlist for 20 years to move to another subsidized location, including one suitable to her accessibility needs. Living in improper housing, Yasmin is physically unable to access food at all the times she needs, particularly during times of inclement weather.

> *Yasmin: they call it the ramp from hell. I pray at the top; I crash at the wall. Now someone has done a lawsuit, so they are going to build the ramp up to code. I lived here 20 years, it's very depressing. None of my friends can visit me because the bathroom and the kitchen's not accessible. So, I have made it adaptable… but I cannot keep my wheelchair beside my bed, because the room is small, the doorways are not wide. Um the kitchen as you can see, you open the fridge, you can't get in, and the bathroom, I can't even get my walker in there….*
>
> *(later) …you'll see my ramp from hell, if it rains or snows, I'm a prisoner in my own home.…So, if I had accessible housing, I could probably, I'll probably be happier, and I'll probably be healthier, and then I could probably, you know maybe do a once a week shopping.*
>
> *-50s, severely-food insecure, subsidized-unit, wheelchair-user*

Figure 5.1: Yasmin's 'ramp from hell'

Yasmin’s ‘ramp from hell’ is steeper than accessibility guidelines and provides little clearance between the bottom of the ramp and the wall, leading to crashes in bad weather (Figure 5.1). Yasmin’s experience highlights an assemblage that allows or disallows capacity, where bodies with mobility devices interact with and encounter specific environments, like steep ramps or impassable kitchens, in particularly affective and fluid ways. The ‘ramp from hell’ does not always stop Yasmin from food shopping. Yet, the ramp challenges her sense of security, knowing that sometimes she will not be able to go out, or that when she does, she may experience pain or injury. Features like an inaccessible building ramp seem fixed. Yet, even these features can be adapted and changed as in this situation, where somebody launched a lawsuit to have the ramp built according to accessibility codes. Material settings of the home can therefore be adapted in interaction with users, certain policies, and accessibility guidelines. Yasmin is also able to make minor adjustments in her home to make it ‘adaptable’. For example, she uses a perch chair where she can sit and cook, as her kitchen does not fit her wheelchair (Figure 5.2). These changes allow her baseline access, but incomplete accessibility has a cost. While she abandons her wheelchair and walks as needed, these actions can present risks to her safety. Further, her friends with disabilities, cannot make these adjustments and therefore do not visit, which is socially isolating. The home here, is not a static place, but rather a place infused with meaning. It is also somewhere that informs the identity of its inhabitant-as a ‘prisoner’, disabled from access, or as happy or healthy.

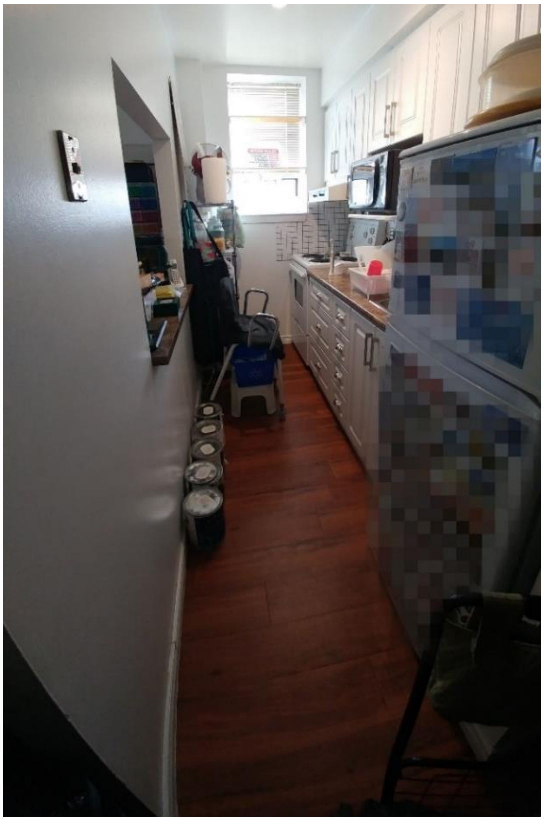

Figure 5.2: Yasmin’s galley kitchen with a perch chair

In subsidized housing or in poorly adapted rentals or homes, typical accessibility features are not always available. Participants expressed concerns related to a lack of door-openers, space to move around the kitchen and the rest of the apartment, high shelves, and a lack of an accessible entrance or ramp which could limit access. For those living in unsuitable housing, environments can prevent capacity or force them to adapt through taking risks, which can have severe consequences. Additionally, Sam [40s, severely-food-insecure, subsidized-unit, scooter-user] living in an accessible apartment, notes how his apartment is designed for manual wheelchairs, excluding his needs as a user of a power scooter. For example, the area below his kitchen sink is designed to fit a manual wheelchair but does not fit his large power chair. Accessibility, therefore, does not always mean accessible for all. The label of ‘accessible apartment’ denies how spaces which allow capacity are formed in interaction with bodies and mobility devices. These labels are built into bureaucratic institutions, determining who gets access (e.g., wheelchair-users). While an accessible apartment provides several advantages, concerns remain because of a lack of flexibility, including barriers to making modifications to suit different needs.

The home is a shifting assemblage, which in theory, can be modified based on the needs of the user. However, these shifts sometimes occur more slowly or become fixed based in institutional inertia. Participants sometimes exert considerable agency through modifying their body, abandoning mobility devices, making small modifications, or appealing for large scales changes. Housing assemblages can also be shifted through construction, weather, and technological breakdowns that deny capacity. Barbara describes how she is using the inaccessible lobby entrance in her building (Figure 5.3), while the back, accessible door, is under construction.

> *Barbara: … There are nine stairs between the driveway and the top of the lobby…*
>
> *(later) …So, everything needs to be carried up stairs… I'm able to um lift the walker up, lift the front wheels up, and let the walker rest on the rear wheels, and go up step by step that way… I do have a little bit of mobility without a walker for a few moments, so I take the walker up first and then I have to go down the stairway and start lifting up each heavy bag of groceries.*
>
> *-60s, marginally-food-insecure, market-rent, walker-user*

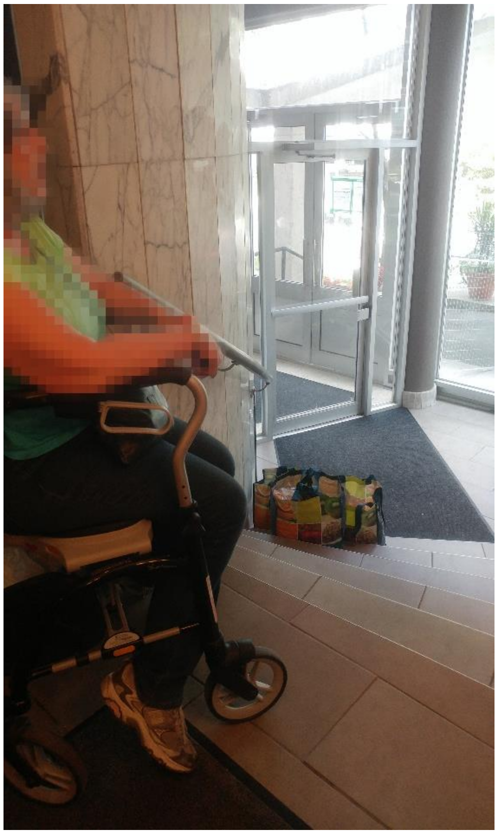

Figure 5.3: Barbara bringing groceries up her lobby’s stairs

Barbara states that she can step her walker and carry groceries up the stairs in her lobby independently but slowly. However, it also appears very dangerous, highlighting how the construction process puts her at risk of falls and injury. Karen [50s, moderately-food-insecure, subsidized housing, scooter-user] similarly describes a construction period in her building that has led to a lengthy lapse in accessibility, including the blocking of an accessible door opener with scaffolding (Figure 5.4a). Additionally, a makeshift ramp at the back entrance of her building (Figure 5.4b), built to accommodate people with disabilities, falls far short. She notes how the back ramp makes her feel unsafe while leaving her building. When participants cannot rely on accessibility, embodied experiences of fear, exhaustion, and frustration are common. The ‘small things’, like a blocked accessible door opener or lacking an alternative accessible entrance during construction, reflect how accessibility is devalued or dismissed during periods of disruption.

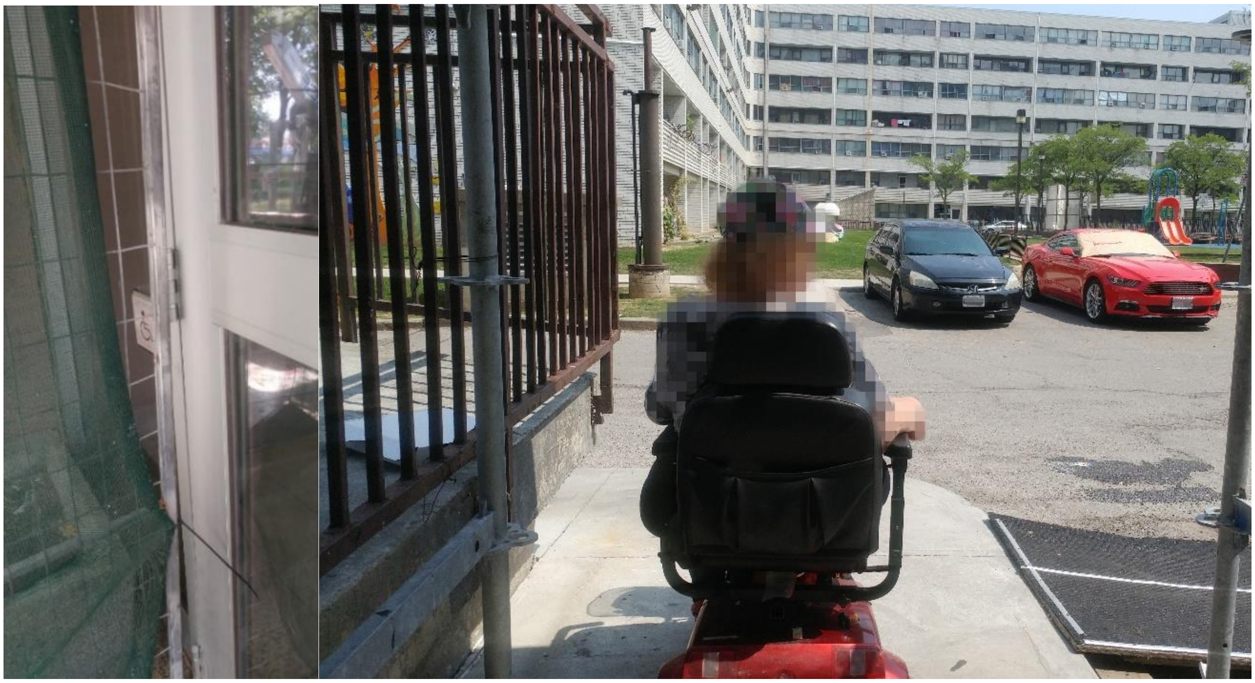

Figure 5.4: Karen’s building construction. Figure 5.4a: blocked door opener during construction. 5.4b: Karen and an unstable makeshift ramp

Most participants reported making small changes in their homes that allow activities (e.g., adding grab bars, moving furniture). However, large scale adaptations are often slower and more difficult to enact. Factors that allow adaptations include available financial resources or organizational supports. Public programs, like the ADP, can help supplement equipment costs and modifications for those unable to afford it. However, the ADP does not always fully cover costs of modifiable equipment, while institutional guidelines limit help provided. Two participants described being initially denied a hospital bed in their home through the ADP and a long, bureaucratic process to establish need before being approved. Different policies also play a role in allowing or denying modifications. Homeowners have more control over their housing environment than renters. Modifications may not be easily permitted in rental units, as one participant described strict building policy against rental unit modifications.

Strong innovation or advocacy by participants is often needed to make modifications. However, this is also a seemingly random process, depending on an assemblage of amenable building managers, legal systems, building structures, or connections with useful organizational supports. The situations of Amanda and Anna offer a contrast. For Amanda enforcing accessibility to allow modifications within and outside her unit has been a long and seemingly fruitless process and her building management has the experience and upper hand in denying her complaint. She was pregnant at the time of the interview and describes how she is unable to make changes, like adding an accessible door-opener, before giving birth.

> *Amanda: I did request different accessible things from my building management, and it hasn't happened. I made these requests when I moved in… two years ago I went to a legal clinic to do the same... But I feel like the landlord is very well known in the city, and so I think they're aware that legal clinics will do nothing. So, I went to a private lawyer because they will bring out human rights... claim and do it through the courts…. The lawyer was like "Ok, your baby's coming in September, I can't fix it by September."*
>
> *-30s, marginally-food-insecure, market-rent, wheelchair-user*

As seen here, accessibility laws, like the AODA, that could be used to enhance accessibility in private or shared spaces lack enforceability. In contrast to Amanda's experience, Anna describes how she was able to redesign her kitchen according to her needs.

> *Anna: and the landlord said well how did you tear your rotator cuff? I said, "well probably reaching cupboards like yours" …he said 'well too bad we can't make this more accessible'. I said 'well, why can't you?'. And he says, "well it's an old building"…I said "yeah, but there's no reason you can't put in a countertop stove or a wall range or something"… So he sort of listened a bit and I said, "can I design it"…Well, he was open to that, so I took pictures of my old kitchen and then I literally, put lines on, put arrows, ideas down on paper, along with some links that I researched online… That's how I have what I have today… So, it's, it ended up working quite well.*
>
> *-50s, food-secure, subsidized-unit, wheelchair-user*

The assemblage that enabled Anna's activity before her renovation involved modifying her body, reaching and finding ways around her inaccessible kitchen in a process that damaged her shoulders. In her conversation with her landlord, the different institutional ideas that prevent changes to housing spaces, including acceptance of structures in 'old buildings', is highlighted. However, apartment environments can also be fluid and adaptable, creating a new assemblage of capacity. Anna's case is rare as she was able to make changes with little financial resources, in part, by helping to design a low-budget renovation herself. She describes some benefits from having her kitchen adapted.

> *Anna: those are the biggest thing that has saved me, budget-wise, because I don't buy out... But again, it comes down to priorities, but it also comes down to ability and that ability didn't exist when I didn't have the fully accessible, like more accessible kitchen. I had to buy a lot of ready-made zappable meals.*
>
> *-50s, food-secure, subsidized-unit, wheelchair-user*

In the past, Anna was unable to cook without risking her safety. She therefore made more expensive and less healthy food purchases, like microwave-ready meals. In her renovated kitchen, she cooks and describes making simple one-pot meals that are healthy and inexpensive, helping her stretch her limited ODSP budget. However, this is not to say that cooking would be enabled for anyone with an accessible kitchen. For some, cooking is a slow and exhausting process, or scary, and other means of accessing food or gaining help is necessary.

5.3.3 Housing and situations of care

An enabling assemblage in the home includes not just the material environment, but social interactions and ability to access care. Though accessible and suitable housing may confer some independence, many participants also require additional supports, including 13 participants accessing professional in-home care. These supports are based in interpersonal relationships, social norms around independence, and political institutions of care. Access to care is often restricted by institutional frameworks determining who is eligible, the amount of care needed, and which tasks are considered necessary.

Social contacts can confer ability, sometimes providing help in completing food related tasks or financial supports in times of need. However, gaining help from social contacts involves complex interpersonal relationships and experiences of vulnerability. Living with partners or other relatives allows sharing of some household tasks. Yet, most participants (74%) live alone. For Sam [40s, severely-food-insecure, subsidized-unit, scooter-user], living with a partner improves his food access as household roles can be negotiated based on pain and ability. When Sam is in pain, his husband, though himself with disabilities, takes on nearly all household tasks.

However, “care” can also be complicated, involving an assemblage of personal relationships and gendered household roles. Susan [50s, food-secure, market-rent with subsidized 24h-care, wheelchair-user] negotiates receiving help from her partner while prioritizing her personal relationship. When asked if her partner helps with the grocery shopping, she notes that her partner helps with other tasks in the home (e.g., looking after the plants, changing lightbulbs), but is not involved in her personal care, stating ‘he’s not my personal caregiver, he’s my boyfriend’. Susan shows her desire to avoid always being on the receiving end of help or support from her partner. Her responsibility for household shopping aligns with socially defined gendered roles, with women more likely than men to be responsible for and spend more time in completing food related tasks (Sayer, 2005; Blake et al., 2009). Though food related tasks could be the responsibility of both household members, inability to perform household tasks aligning with social gender roles may be considered disabling (Crooks, 2010). Susan’s ability to manage food-related household tasks with professional personal support therefore has additional advantages, allowing a relationship with her partner as a boyfriend that does not focus solely on care.

Household living situations are tied to financial resources. Living with friends, relatives, or partners provides economic advantages, like splitting housing expenses, including rent, and other household costs. However, resource sharing is not always wholly advantageous. Institutional guidelines for ODSP cuts benefits significantly when sharing (Ontario Ministry of Children, Community, and Social Services, 2018), offsetting economic advantages. Participants expressed anger over this provision, including Sam [40s, severely-food-insecure, subsidized-unit, scooter-user] noting how he and his partner receive the equivalent of one and a half ODSP paychecks on one check in place of full benefits, and Anna [50s, food-secure, subsidized-unit, wheelchair-user] who states that this provision has prevented her from sharing with a friend or finding a partner, leading to distress and loneliness. For Sam, benefits have been cut, essentially penalizing or at least offsetting economic benefits from sharing, which is upsetting and leaves his household severely food insecure. Conversely, for participants sharing resources and living with others, relationships are not always fully advantageous or healthy. Two participants wanted to get out of their living situation but could not because of fears over financial resources or ability to manage living alone. Charlie describes living in a particularly unhealthy situation in which he is verbally abused by his mother.

> *Charlie: … I'm on the list to try and get subsidized housing… I'm hoping to get away from her [mother]… But I see social workers a little bit about that… They try to help me get out, but I want to, I'm just scared about the money. Because that's the one good thing at home… I don't have to worry about food and everything.*
>
> *-40s, food-secure, market-rent, wheelchair-user*

Charlie is limited from leaving home by resource constraints and availability of subsidized housing. He is also fearful about food security and how he will manage his money once he leaves his home. This situation highlights the important problem of domestic abuse, which people with disabilities suffer from disproportionately at the hands of partners, family members, or providers of care (Baladerian, 2009). Financial vulnerability encourages staying in these living situations.

Public institutions often mediate access to care, forming assemblages of ability, but ones which could be particularly fixed in institutional or bureaucratic processes. Thirteen study participants rely on professional help, while three others expressed a need for help but have not been able to access support. As most participants were unable to afford or supplement their own services, support was mainly accessed through the publicly run LHINs, formerly known (and commonly referred to) as the Community Care Access Centres (CCAC). Gaining access to professional care requires self-advocacy, in a process that is often frustrating, uneven, and difficult to navigate. Access to the internet could be one factor complicating access. Two participants lacking internet describe confusion in gaining access to help due to inability to find relevant information. Proper housing also affects assemblages of care. As described above, Richard [50s, severely-food-insecure, shared-home, walker-user] was unable to gain access to a PSW when living in a homeless shelter, highlighting an important gap in care for homeless people with a disability (Hwang et al., 2011). Lisa [50s, food-secure, subsidized-unit, scooter-user], with a bed bug infestation in her building, lost access to needed in-home care as her PSW does not want to come into her place, a situation which she states has caused her to lose weight. Without proper housing, in-home care can be suspended and participants can be disabled from food security.

Professional supports are often restricted by institutional constraints over the number of hours allocated or prescribed allowable tasks. These institutions are often fixed in bureaucratic frameworks or alternatively, subject to idiosyncratic restrictions. Brian describes how public community care has tried to cut his hours of home care service.

> *Brian: ... I had a CCAC care coordinator who said, "well you know there's lots of clients so I'm cutting you down to 5 days a week… you'll have to you know, sink or swim, or find another community agency…you live with your mom, you know, your mom should be doing this". But what was interesting was my mom had also become a CCAC client herself …So I found that there was almost this complete lack of compassion or empathy. And so, we tried it and that put a lot of strain on my mom to get me up in the morning and I had to complain and go to the care coordinator's supervisor and then, they reinstated it. So, for right now I'm getting 7-hours a week… one hour in the morning to get me up.*
>
> *-30s, moderately-food-insecure, owned-apartment, walker-user*

As Brian describes, community care is often inflexible and in many cases at odds with his and his mother's needs. To access care, Brian has had to advocate for himself, proving his need related to austerity, restricted public resources, institutional definitions of need, and the notions of his care coordinator. Participants also describe frustration over the types of services provided, including institutional directives to PSWs regarding the type of help allowed. A provision from the LHINs against providing hot meal preparation was considered particularly frustrating, fixing care assemblages to the exclusion of enabling food access. Under this provision, food preparation is restricted to warming foods, assembling, or making sandwiches, which changes the way participants eat. Because of this provision, Caleb [20s, food-secure, owned house, wheelchair-user] describes buying more microwaveable meals because he is "sick of eating sandwiches". Cooking or preparing a meal is also often deprioritized in relation to other tasks during limited support hours, where baseline activities of self-care, like getting out of bed and getting a shower are considered more important. Similar to work explaining the role of time pressures on food choices for working parents (Devine et al, 2003; Jabs & Devine, 2006), time is described as a limited resource, affecting food preparation and available food choices. Anna describes frustration over these provisions, denying the whole continuum of care.

> *Anna: when I moved to Toronto, and I ...got shown this apartment, my landlord said to me, it's not accessible, not for your needs… I said, I don't know why this wouldn't work. What I never foresaw though was that in Toronto, CCAC gives you zero help to cook meals… so I got to do a shower and I got to do laundry. They said …people have to pay for cleaning. And it almost feels like when they say this stuff, that they're, kind of, wish*

> *they had their own cleaner payed for by the government, but what they fail to recognize is that they physically could do that themselves, I can't. Not only that, I'm on ODSP, I don't have anywhere near the money they have working to pay somebody to come into the house to clean, I could no more do that than fly to the moon.*
>
> *-50s, food-secure, subsidized-unit, wheelchair-user*

Whether Anna's kitchen is 'accessible' depends on an assemblage between her material kitchen and the help she receives, which are in turn constrained by ability to afford care and social expectations around acceptable uses of government resources. A few participants describe how PSWs sometimes ignore LHIN provisions and provide extra care. However, PSWs are often under stress, accessing homes around the city for 30-minute or one-hour sessions. PSWs are also precariously employed and underpaid. Extra tasks and hours, provided to meet client's needs, are often unpaid. In a survey of publicly funded care workers, PSWs are seen to work, on average, two to three unpaid hours per week providing care (Canadian Home Care Association, 2003; Ontario Health Coalition, 2019; Fritsch, 2010). Institutional policies therefore have emotional implications, both on clients who describe frustration in being restricted to certain food or forms of care and PSWs who may feel guilt or use their own time to provide care. Anna, at the time of the study was part of a program that provides funding for her to hire her own PSW. She describes regularly shopping and preparing food with her PSW which has greatly enabled her capacity to access food. This program, known as 'Direct Funding', allows much more flexibility in the number of hours available and flexibility over the type of help provided. However, it is also not feasible for everybody as it requires responsibility for administrative management and accounting for staff.

As seen here, neoliberal norms around independence and austerity delimit bureaucratic public institutions, denying many the supports they need to more easily complete food related tasks. When asked about help from family or friends, some describe their relatives, including adult children, as 'too busy' or living too far away to provide help. Help is often reserved for emergencies. Responses indicate a strong desire to not 'impose' on social contacts. Differences also highlight issues around identity, including gender. While this study's sample is small, access to help appears to be gendered with more male participants receiving help from family or friends. Female participants, regardless of ability, are more likely to carry out tasks like cooking and cleaning for themselves or through paid help. Participants sometimes express pride in their independence to conduct various tasks, including to shop alone, or cook for themselves. However, this sometimes denies access to help when needed or denies help that could prevent risks to safety, like climbing stairs or abandoning mobility devices. Despite prevailing social norms, ideas around independence and available tasks can also be reframed. A few participants describe alternative ideas to independence in carrying out food related tasks.

> *Sam: it's taken me like 10-years of like bodywork and mental health healing, to reach a place where I now feel structured to ask anyone, any potential able-bodied person, is up for grabs and is going to help me and we're gonna get the job done and we're going to do it in a timely manner with some kindness.*
>
> *-40s, severely-food-insecure, subsidized-unit, scooter-user*
>
> *Caleb: …I have a relative that stays with me [when dad is away], and they help me prepare food. But also, there's like food that you can pop in the microwave… I can typically do that without incident [laughs]… it's kind of a newish development, I only started doing that like a couple years ago, cuz a lot of learning, like independence, it's not as straightforward as most people think. Like… I just kind of pick up new ways of doing things and sometimes they work out, sometimes they don't.*
>
> *-20s, food-secure, owned-house, wheelchair-user*

Sam rejects norms and attitudes around dependence as he believes that people should help one another. He describes this help as a requirement and accepts support from his friend network, teaching others how they can best help him, and when able goes around himself, helping others. Caleb has a supportive family network that helps him in times of need. While this may frame Caleb as dependent, it also allows him independence in a way that is enabling, with creativity and exploration and ability to develop new methods of access. Independence can also be redefined through professional support. Two participants engage in cooking with their PSWs, a process in which they seek recipes, purchase food, and give directions to a PSW. Though acknowledging differences, when speaking about this process they often describe themselves as personally cooking. For Susan [50s, food-secure, market-rent with subsidized 24h-care, wheelchair-user], this activity is enabled because of her flexible access to care. She describes herself as sometimes restricted from making what she wants as she must rely on the cooking skills, actions, and attitudes of the PSW. However, Susan adapts recipes for simplicity or tells her PSWs to use their own family recipes and often works together with them, providing suggestions. This experience of cooking represents a novel assemblage based in affective relationships and changing norms around cooking and independence.

5.4 Discussion

Understanding enablement or disablement in the process of accessing food requires rethinking how we view food access, not based solely in personal ability, but as a negotiation between the self and one's setting, political, and socioeconomic circumstances. Grounded in the experience of adults with mobility disabilities, this study demonstrates how the home frames and affects food access, as a financial resource, a physical setting, and a setting of care. The home is an assemblage of these 'parts' constituted by the bodies which reside within them, contest, or change them, but also the particular institutional contexts or social norms that fix them. As an important resource or financial asset, whose type or physical form is based on economic ability or political realities, the home also defines financial resources available for household expenses like food. Physical ability is based in the materiality of the home and how it conforms to bodily needs and mobility devices. The material structure of the home is at once fixed, but also changing and adaptable, based on different social and economic circumstances. Finally, the home is a place of social interaction, framing the household that lives within it, social relationships, and care.

This study contributes to the food access literature which has mainly considered physical access to food as the trip from the home to a store (Wrigley, 2002; Shaw, 2006; Walker et al., 2010), ignoring the place from which food is often accessed and a major setting of food preparation and eating. Research has shown the importance of the home to food insecurity, including the role of high rents, insecure housing, and housing assets (Kirkpatrick & Tarasuk, 2011; St-Germain & Tarasuk, 2020). This study highlights how people with disabilities can be at risk from unsuitable housing situations. An assemblage perspective questions how material wealth and power frame ability, including the institutional and political settings that guide access to care and material basic needs like food. While previous studies have considered the effect of mobility or physical ability to access food separately from economic constraints on access to food (Coveney &

O’Dwyer, 2009; Whelan et al., 2002), analyses within the home highlight the interrelated nature of physical, social, and economic access. Within the scale of the home, structures and modifications are dependent on financial resources or institutional decisions. Many of these decisions are based around simplified understandings of disability, failing to account for difference. This analysis also adds to studies on disabling assemblages (Goodley, 2007; Boys, 2014; Gibson et al., 2012; Gibson et al., 2017; Stephens et al., 2015; Fritsch, 2010; Roets & Braidotti, 2012; Goodley et al., 2018) by considering food insecurity and the integral role of financial resources in fixing assemblages of enablement/disablement. While attempting to explore the broader, upstream influences of food access, the scope of this analysis is necessarily limited to issues directly experienced by participants. Most participants were older and white which restricts understanding of intersections between disability and race, or younger people’s experiences. Further, most participants lived alone, and no participants had dependents, such as children living with them, limiting understanding of experiences caring for others. Home visits had several advantages, allowing greater understanding of accessibility features and highlighting participant’s perspectives. However, not all participants were comfortable having me come to their home, nor was I comfortable going into everyone’s home. This process was negotiated somewhat inconsistently. When homes were not visited, a rich description of home environments was attempted instead.

Through understanding assemblages enabling or disabling food access, this study highlights three key factors that can improve food access among adults with disabilities. These include the need to: 1) consider housing contexts in resource provision for people with disabilities; 2) reconsider ideas around care and independence that prevent access to needed assistance; and 3) reframe issues of ability to perform food-related tasks around broader issues of poverty and housing.

5.4.1 Housing contexts

Accessible housing designs must consider people with disabilities and their embodied experiences of the home. Activities, like ability to cook or clean, are formed in the interaction between disabled bodies, aids (like mobility devices), physically accessible housing contexts, and necessary assistance. Physical accessibility and suitable housing contexts can prevent embodied pain, exhaustion, or fear in performing one’s daily tasks which could lead to enhanced capacity.

The home acts as an assemblage shaped by the priorities and values of builders, designers, and political institutions that set standards (Boys, 2014). Imrie (2005) discusses how housing developers or builders and upstream designers often dismiss the needs of people with disabilities, with many considering people with disabilities as a minority, too small to deserve ‘accommodation’, or as necessarily ‘functionally unable’ to carry out tasks, and therefore unable to accommodate. Similar ideas may inform the treatment of people with disabilities during periods of construction or disruptions, where accessibility is commonly ignored. In Ontario, the Building Code sets standards for disability accessibility (Ontario Human Rights Commission, 2008). If not enforced, factors, like profitability could be prioritized over accessibility. However, Imrie (2005) also describes how instituting technical codes, can fail to consider the varied ways in which people with disabilities interact with their home as guidelines are set with priorities of the builders and other economic considerations in mind. In Ontario, the building standards are often defined around wheelchair-users. However, accessible units, may not fully conform to the needs of all tenants, excluding those with different forms of disabilities and mobility aids. Further, building owners are not required to ‘accommodate the needs of people with disabilities’ if it leads to undue hardship, including excessive costs (Ontario Human Rights Commission, 2008), like retrofitting of old buildings. New housing development in Toronto has greatly favoured more expensive condo units, with fewer affordable rental units being built (Canadian Centre of Economic Analysis, 2018). Therefore, inability to retrofit older building may result in the continued inaccessibility of more affordable housing units.

An assemblage perspective highlights how the home is subject to change. Inclement weather or construction can at times deny people access, including limiting people to the home. For example, construction may allow for the abandoning of accessibility features or places like apartment buildings may not properly clear snow or ramps. In contrast, better access to resources, like institutional supports, could allow modifications within the home. In-home flexibility to change and adapt spaces to one’s needs may represent true accessibility. However, multiple constraints block people from making changes within their home, including low financial resources and inflexible institutional policies, like barriers to modifying rental apartments. Programs like the ADP provide resources for making modifications within the home, such as adding external lifts or ramps (Ontario Ministry of Health and Long-Term Care, 2019). Yet, participants expressed barriers in qualifying for needed resources and proving need within fixed institutional guidelines. Participants also described lengthy and often ineffective legal processes to make needed changes to the home through enforcement of AODA in courts and human rights tribunals. Accessibility policies therefore require greater power of enforcement and programs require more flexible support for those in need.

5.4.2 In home care and independence

In-home care is often required to carry out food related tasks. However, care is often constrained by financial and temporal resources, ideas around who is ‘deserving of help’, gender norms, and stigmatizing norms devaluing dependence. Certain forms of care are usually considered more acceptable, including care based on market transactions, while public institutions of care have seen retrenchments that highlight the exclusion and denial of needs for those who cannot afford help (Lawson, 2007; Aronson & Neysmith, 2001). Greater flexibility in PSW responsibilities, including allowing more support and number of hours, would better allow PSWs to engage in care of the whole body rather than restrictions to certain tasks, like providing showers (Aronson & Neysmith, 2001).

Gibson et al. (2012) note that the goal of much research in rehabilitation is framed around promoting independence for participants with disabilities, while ‘dependencies’ related to disability are devalued. Discriminatory norms serve to limit care among participants of this study, including limiting help sought and provided, and the setting of policies to prioritize certain forms of care to the exclusion of other forms. Care must be considered as part of an assemblage, sometimes enabling ability for many people with disabilities, rather than something to limit or avoid. Gibson et al. (2012) suggest that independence is not an achievable goal for many with disabilities and instead propose the more realistic goal of ‘interdependence’, observing that all people require an assemblage of people, machines, and social structures to carry out daily tasks. Though independence could be desired, a shift from stigmatized norms of dependence could allow better provision of care when in need. New ideas around interdependence are already being formed within care facilities, including ideas presented here on cooking that enable rather than disable. Care relationships should also be acknowledged as affective relationships, involving deep personal connections between care givers and receivers. For some, maintaining personal relationships requires boundaries around care and therefore professional supports can facilitate healthy personal relationships. However, allowing healthy situations of care, further requires addressing the economic and social marginalization of people with disabilities that put some at greater risk of abuse (Baladerian, 2009). Improved care is also dependent on treatment of care workers. PSWs form affective relationships with clients and many struggle to provide proper care within allotted hours (Canadian Home Care Association, 2003; Ontario Health Coalition, 2019, Fritsch, 2010). Better pay and treatment of PSWs, and more realistic assigned tasks could allow both improved care and reduce stress on workers attempting to meet people's needs.

5.4.3 Poverty, disability, and housing

This study importantly elevates the role of stable, affordable, and accessible housing in the lives of people with disabilities. This issue is particularly problematic in Toronto where rental prices and housing have become, for many, unaffordable. While costs of renting have greatly increased, the addition of new affordable or subsidized housing units has slowed (Canadian Centre of Economic Analysis, 2018). In Canada, people with disabilities have poorer access to stable, affordable housing and are more likely to be homeless or live in improper housing in need of major repairs. Further, people with disabilities may face discriminatory screening in applying for housing, denying access to needed accommodation (Canadian Association for Community Living, 2017).

Proper housing shapes whether people feel enabled or constrained in their food access decisions. Yet, access to proper housing was seen by several participants as a matter of luck. A number of participants were on waitlists for suitable housing, living in undesirable locations that prevented food access or compromised their safety. Higher disability benefits could enable people to find proper housing or make necessary adaptations, including ability to change or adapt environments to suit needs. Yet, income from ODSP is frequently inadequate. Since drastic cuts in disability benefits in the late 1990s in Ontario, benefits have only been increased incrementally, often failing to keep up with the rate of inflation (Ontario Ministry of Children, Community and Social Services, 2018; Chouinard and Crooks, 2005) and have therefore decreased over time due to inflationary and consumer pricing effects. This contrast with, among other things, rising housing and transport costs in Toronto over time, factors that impact household budgets and leaving many unable to afford basic needs like food (Ontario Human Rights Commission, 2008). Chouinard and Crooks (2005) note that people with disabilities on ODSP are only considered deserving of an income that leaves them in poverty and subjects them to institutional intrusion. For example, ODSP policies deny sharing of household resources, with implications on isolation, care, and economic freedom. In the absence of stable, affordable housing or sufficient incomes, participants could in some cases be denied access to needed in-home care and accessible housing and were less able to afford or physically access food. However, these pathways of disablement can also be challenged. Addressing disadvantage and thereby allowing more control over housing environments could allow for enabling assemblages within the home, promoting control and capacity over food access.

Chapter 6
Conclusion

Through a series of research papers, situated within a mixed-methods research design, my dissertation explored the relationship between mobility disability and food insecurity in Canada and within the City of Toronto. Food insecurity represents an important material hardship as well as a potential cause of health inequalities, contributing to increased risk of a number of chronic diseases, mental illness, and mortality (Vozoris & Tarasuk, 2003; T. Fitzpatrick et al., 2015; Gundersen et al. 2018). Higher risk of food insecurity among people with disabilities has been observed previously, yet the reasons for this elevated risk are poorly understood (Coleman-Jensen & Nord, 2013; Brucker & Coleman-Jensen, 2017; Huang et al., 2010). In my dissertation, I examined broad geographic trends (inter-provincial variation) in the relationship between food insecurity and disability in Canada. I also studied individual experiences of food access among persons with a mobility disability in the City of Toronto with a view to understanding how social, physical, political, and institutional contexts may place people with mobility disabilities at greater risk of food insecurity. In this concluding chapter, I write about how my research contributes to the literature on disability and food insecurity. To do this, I situate my dissertation within the broader literature on food insecurity and nascent work conducted at the nexus of food insecurity and disability. I then highlight main findings by chapter, discuss the limitations of my work, and consider theoretical and practical implications. I conclude by pointing toward future research possibilities and by writing about the implications of the current COVID-19 pandemic related to the sort of processes and lived experiences that I have studied.

My dissertation draws on the food insecurity literature, focusing on factors that put certain populations at increased risk. Available financial resources (e.g., income, savings, household assets) are the most important drivers of food insecurity, including for people with disabilities (Heflin et al., 2007; Huang et al., 2010), but this understanding does not account for upstream risk factors that may lead to financial vulnerability. Examining additional influences of food insecurity aids in understanding how certain low-income people avoid food insecurity, while others with somewhat greater financial resources can experience severe levels of food insecurity. In understanding influences of food access and insecurity for people with disabilities, I rejected simplified understandings of disability in the food access literature, including views that mobility disability could be understood as a problematic category or inherent impediment to food access (Shaw, 2006; Whelan et al., 2002). Further, rather than simplified understandings of access that locate food access ‘in place’, such as used in the food desert literature, I used a relational view of place to allow for analysis of the complexity of links between place and food access (Cummins et al., 2007). In my view, influenced by the work of Cummins et al., (2007) and Macintyre et al., (2002), population composition (e.g., sociodemographic composition, identities) is related to place, with health outcomes created as an outcome of interacting individual, contextual, and collective influences. In defining underexamined barriers to food access in place, such as available disability benefits and care regimes and accessibility barriers in the home, transportation sources, in outdoor environments, and within food sources, my research demonstrates ableism within the food desert literature, including through the conceptualization and study of food access, which does not account for difference in resources, mobility, and daily movement in the population.

Throughout my dissertation, I move away from an individual, intra-body, bio-medical model of disability (Oliver, 1996). When thinking about disability, I turned toward several perspectives and considered how they might inform one another – these included: the social model of disability, a critical ableist studies perspective, and an assemblage perspective. The social model perspective is used to consider that disability is not monolithic, but rather is created relative to social discrimination and environmental barriers to access (Oliver, 1996). Goodley’s (2014) critical ableist perspectives is used to understand how certain bodies are deprioritized in the context of normative social orderings. In applying an assemblage perspective, I considered the interacting social and material elements that shape capacity. This theory has been used in disability studies to understand the interactions between the disabled body, mobility aids, technologies, other resources, and social norms that limit or enable the body’s capacity (Feely. 2016). In moving this research forward, I used these three theoretical approaches to help me think about upstream risk factors, considering the importance of disabling barriers and structures of disadvantage, rather than assuming limited mobility or low socioeconomic status in people with mobility disabilities (Shaw, 2006; Huang et al., 2010; Heflin et al., 2019). This theoretical pluralism allowed for a more fulsome and nuanced understanding of the varied influences of food access, including the lived experiences of mobility disability and food access in place. In my shifting use of these models, I moved from identifying disabling barriers and potential sources of inequalities, such as inadequate disability benefits, using a social model perspective, to questioning some of the systems that reject disability and create barriers to food access within welfare benefit systems, outdoor environments, transportation, and food sources, using a critical ableist perspective. Finally, I used an assemblage perspective to understand how different barriers to access intersected, limiting capacity to access food. A relational view of place fit well with social perspectives of disability, in which place effects (e.g., social discrimination and adverse built environments) are seen as contributing to disabling experiences, and a disability identity (Hughes & Paterson, 1997; Oliver, 1996).

6.1 Summary of key findings

In this section, I outline some of the key findings of this research, first by chapter, and then provide a discussion of my overarching findings. Four original research chapters were included in this dissertation, each addressing a distinct aspect of the food access experience for people with disabilities. These papers were developed within a mixed-methods design that included analysis of microdata from the Canadian Community Health Survey (CCHS) and qualitative community-based research that involved in depth mobile interviews with people with disabilities throughout the City of Toronto. This design enabled me to move from a quantitative analysis of food insecurity and disability at the national and provincial scales to understand broad societal trends and geographic differences, and ground these larger trends within qualitative individual experience and smaller scales of access, including at the scale of the home.

In the second chapter, which is published in *Health and* Place, I provided a broad scoping review of the disability and food access literature, including 106 articles examining the effect of disability on food access and (in)security. In this review, I found that disability was consistently associated with increased risk of food insecurity in 32 studies conducted across diverse populations and geographic settings. However, only a limited number of studies were conducted in the Canadian context. I also identified certain populations as being at greater risk of food insecurity including younger or working age adults with a disability (compared to older adults) and people with mental health disability (compared to physical and sensory disabilities). I found that factors mediating the relationship between disability and food insecurity were not well understood and that many scholars tended to use an individual model of disability without considering the role of disabling social and environmental barriers. In my view, environmental influences of food access were oversimplified, and there was a need to understand environments outside the trip to food stores, including smaller scale microgeographic barriers like those within the home and wider urban environments. Across studies, different barriers to access (i.e., physical, social, economic) were described in siloed ways. Yet, a cycle of poverty, disability, and food insecurity was suggested in this research (Lee & Frongillo, 2001), underscoring the need to consider the interrelationships between economic and physical barriers to food access.

In my third chapter, published in *Social Science and Medicine,* I demonstrated that the relationship between disability and food insecurity is not monolithic or a necessary result of disability, but rather subject to differences in place, including policy, and programmatic differences. Mobility impairment was measured in this analysis instead of disability as the CCHS's health utilities index module questions limited ability to walk, aligning with the notion of impairment used in the social model of disability. I considered whether these impairments could become disabling, for example through social discrimination that may result in inequalities in food insecurity. Using a logistic regression analysis of microdata from the representative Canadian Community Health Survey, I found a significant association between mobility impairment and food insecurity in Canada. Associations, adjusted for age, sex, and place of residence, including province and urban/rural status, were found, with a significant and very high odds of food insecurity found for Canadian adults with mobility impairments (OR=3.85, 95% CI: 3.49-4.24). Across nearly every region in Canada, people with mobility impairments had higher rates of food insecurity. Among people with mobility impairments, socioeconomic status and age explained much of the variation in risk in food insecurity. Province of residence was also associated with food insecurity among people with mobility impairments, though urban/rural residence was not. Though the causes of these geographic associations could not be determined through my study design, provinces with lower associated odds of food insecurity among people with mobility impairments consisted of those with provincial poverty reduction strategies or higher disability social assistance benefits. In my discussion, I emphasized interconnections between population composition and contexts, indicating how individual socioeconomic status may reflect policy environments. For example, reduced risk in certain populations, like older adults, reflect, in part, political decisions rooted to place, including more generous benefits for adults above age 65 in Canada in the form of old age security and a guaranteed income supplement. The experience among older adults shows the potential of a basic income program for reducing risk of food insecurity across the population. Higher disability social assistance benefits were seen as possibly reducing risk of food insecurity among people with disabilities, with lower odds in unadjusted models in places with greater disability assistance incomes. However, these systems were generally accompanied by stricter requirements to prove disability (Stapleton et al., 2013). Therefore, it is important to consider the varying effects of different policies, including whether outcomes could be worse among those with difficulty qualifying for these higher benefits, or among those who are not considered, “disabled enough” to qualify.

The fourth chapter of my dissertation, submitted for publication in the journal of *Disability & Society*, represents the first of two qualitative/interpretive pieces based on interviews with 23 adults with mobility disabilities in Toronto and considering their experiences of food access. This work describes how inadequate disability social assistance incomes can importantly limit ability to afford food. Yet, physical ability, interacting with accessibility barriers in the home, on the way to food sources, and within food sources, often complicated access. Accessing food in environments designed and built for the hypermobile “able-bodied” subject frequently involved experiencing long waits and inflexible schedules, risks to safety, stress, and uncertainty. In my analysis, physical and economic access were seen by my participants as closely interconnected as physical access to food strongly depended on available resources, including income for accessing private modes of transportation, mobility devices, and access to help. I used a critical ableist perspective in this chapter to frame and shape my understanding about how social structures and environments, built for the normative able-bodied subject, often come to exclude people that do not conform to ableist standards (Goodley, 2014; Campbell, 2009). Many of the systems used by people with disabilities to access food operate outside regular routes of access, including disability social assistance, paratransit services, and public areas and food sources with unpredictable accessibility. I argue that the devaluing of disability is reflected in how many spaces of food access deny functional accessibility in favor of meeting technical requirements of accessibility, and in temporal inaccessibility, whereby accessibility is often suspended in situations of disruption, leading to uncertainty. Toronto’s paratransit service, Wheel-Trans, exemplifies how systems that are separate from normal or most common routes of access can become devalued and impose many unnecessary restrictions, including long waits for rides. Suggestions to improve outcomes include providing greater disability incomes, but also greater power of enforcement of accessibility legislation and improvements in standards to allow for autonomous mobility.

In the fifth chapter, submitted for publication in *Disability Studies Quarterly*, I aimed to understand enablement and disablement in accessing food within the home. This chapter was the second paper based on interviews with 23 adults with mobility disabilities in Toronto. I used an assemblage perspective to help understand the ways in which the home could shape capacity to access food. By analyzing food access within the home, this chapter demonstrates the interrelated nature of physical, social, and economic access to food. For many participants, the home was seen as a central setting of food access, shaping how food was sourced, prepared, and consumed. Over a third of participants described inadequate housing situations related to inaccessible contexts, high expenses, and inadequate situations of care. Limited financial resources often resulted in disadvantageous material structures of the home, particularly in the absence of suitable and accessible subsidized housing. Inaccessible housing situations could require a greater need for professional care, while in contrast, adverse housing situations (e.g., homelessness) could limit ability to access care. This work demonstrates the need to consider housing contexts as integral to assemblages of ability for carrying out food-related tasks. Stable, affordable housing is protective against food insecurity but is more commonly denied for people with disabilities due to a combination of market forces and insufficient income, alongside potentially discriminatory practices (Ontario Human Rights Commission, 2008). Additionally, there is a need to reframe issues of ability to perform food-related tasks around broader issues of poverty and housing. Addressing economic disadvantage and thereby allowing more control over housing environments and situations of care could allow for enabling assemblages within the home, promoting control and capacity over food access.

Overall, through my dissertation work, I found an important population inequality in food access and insecurity. In this work, food insecurity was identified as a common outcome of socioeconomic disadvantage, yet people with mobility disabilities also commonly experienced stress, discomfort, and risks to safety in accessing food with a disability. Adverse experiences of food insecurity and physical access to food both relate to a lack of control over an integral basic need. These experiences could affect diet and nutrition but were also important in that they created stress and contributed to the production of uncertainty in people’s everyday lives.

Across studies, major barriers to food access included inadequate disability benefits, unsuitable housing, inaccessible outdoor environments, and restricted public systems of care. Barriers to food access were created in neoliberal systems which valued austerity and deprioritized disability accessibility. For example, disability benefit systems in Ontario are often inflexible to needs, confining people to poverty incomes and restricting funding to those able to navigate and prove their need within complicated bureaucratic systems (Crooks & Chouinard, 2005; Lightman et al., 2009). In public systems of care, norms promoting independence restricted who was seen as deserving of care and severely limited hours of care and allowable tasks. Housing issues arose related to a lack of affordable and accessible housing in Toronto, and subsidized housing systems which have not kept up with demand for affordable and accessible units (Canadian Centre of Economic Analysis, 2018).

I also discovered important interactions between socioeconomic disadvantage and physical access barriers related to the completion of everyday tasks. In my research, I identified cycles of disadvantage in which socioeconomic circumstances led to a greater physical barriers (e.g., unsuitable housing situations) and made it more difficult to overcome disabling barriers in one’s environment, for example, through accessing supports, private modes of transportation, or grocery delivery services in times of need. This research further found various ways by which people with mobility disabilities are commonly excluded from regular modes of food access. On routes, within food sources, apartment buildings, and homes, participants identified significant accessibility barriers, including overly narrow aisles, steps for entrance or egress, or dangerously steep ramps. Separate and undervalued disability systems permitted functional inaccessibility in spaces of food access even in spaces that participants identified as meeting technical accessibility requirements, like those outlined in the Accessibility for Ontarians with Disabilities Act. Participants noted that this was related to sometimes inadequate standards in the AODA but also because of the deprioritized nature of accessibility concerns, for example, through practices like failing to staff the accessible checkout line. Further, participants experienced important uncertainty in access as various disruptions (e.g., construction, mechanical breakdowns, weather) often resulted in temporal inaccessibility.

Goodley (2014) points out that an historic limitation in disability studies has been the minimal attention given to intersectional aspects of disability. By intersectional, I refer to how unique discrimination may be experienced at the intersection of multiple identities (Artiles, 2013;

Crenshaw, 1990; Carbado et al., 2013). Several intersectional experiences identified in this work are therefore important to highlight. In this work experiences at the intersection of mobility disability and mental health disability and gender were observed. Co-occurring mental health disabilities were very common among participants in this study. Though a clinician might refer to these intersecting experiences as a comorbidity, I specifically described how multiple experiences of discrimination may apply in this population, creating a unique disabling experience. In chapter three, mood and anxiety disorders were associated with two times higher odds of food insecurity among people with mobility impairments, indicating a population experiencing severe risk factors for disadvantage. Among interviewed participants, mental health disabilities could, in some cases, pose difficulties in navigating public benefit systems, including gaining access to needed benefits or access to a publicly funded personal support worker for help within the home. Further, for a few participants who reported having an anxiety disorder, getting help when accessing food could be stressful and so was often avoided, despite need. Certain differences were noted by sex, including differences in observed household tasks between male and female participants, and potential differences in receiving help from friend networks. Female participants were often observed to take on more tasks within the home, particularly related to food, influencing their experiences of food access. Lastly, people with disabilities often trade privacy for access to and use of care-workers and other needed help, exposing them to potential discrimination. One participant, who identified as transgender, described how he was sometimes subject to discrimination from certain workers but he was denied choice in who he could permit to access his home. These examples add further evidence to the importance of understanding variation in disability and food access experiences, noting how some people may be located at the intersection of multiple axes of disadvantage and discrimination, and as a result, experience particularly unique and/or challenging food access barriers and experiences.

6.2 Research Limitations

Through my dissertation, I aimed to broadly understand disabling aspects of food access and food insecurity. Before discussing the key theoretical and practical contributions a few limitations must be acknowledged. First, understanding of the scope of food insecurity among people with disabilities in Canada was limited by the available CCHS data; the CCHS sampling frame excludes First Nations people living on reserves as well as certain remote populations

(Statistics Canada, 2015). Though this is a small percent of the Canadian population, Indigenous and northern communities are at greater risk of food insecurity (Che & Chen, 2001). Survey analyses may therefore provide an underestimate of true food insecurity rates in Canada, particularly in regions with a large indigenous population. It was also challenging to use the CCHS in this context due to its arguably limited conceptualization and measurement of mobility disability. Mobility impairment was considered as the exposure of interest in my quantitative analysis as the CCHS's health utilities index module questions difficulty walking or use of a mobility device, aligning with the social model's understanding of impairment. This module does not measure whether a person considers themselves as having a disability (Oliver, 1996; Grondin, 2016). Further, I could not measure life history or time with a disability from the CCHS, which may relate to risk of food insecurity (Huang et al., 2010). While my analysis attempted to consider the role of different provincial disability social assistance systems, the CCHS does not distinguish between those earning general social assistance or those receiving additional disability supplements or on disability social assistance programs. Therefore, I could not make any firm conclusions regarding the role of disability programs that offer higher benefits, though higher incomes are consistently seen to reduce the risk of food insecurity (Heflin et al., 2007; Huang et al., 2010). Additional factors that may influence risk of food insecurity among people with disability, like cost of living and available financial assets (Huang et al., 2020), are not measured in the CCHS, limiting understanding of HFI influences among people with mobility impairments.

Second, interview participants were recruited using advertising materials (i.e., flyers, email, or postage mail-outs) through five disability and/or community organizations in Toronto. Efforts were made to recruit a wide variety of people of different socioeconomic backgrounds, living in different neighbourhoods in Toronto, and with a range of mobility limitations, in order to capture greater diversity of experience. However, by recruiting from the population already working with or receiving support from community organizations, participants likely differed from the overall population with mobility disabilities in Toronto. For example, my sample might include more people involved in disability advocacy and in the disability community more broadly. Many vulnerable and hard to reach populations were likely excluded, such as those with more severe mobility limitations (e.g., homebound) or who were more socially isolated. Participants were generally older, with only six participants below the age of 50. Certain experiences, including related to parenting with a disability were not reported, while only one participant reported on experiences transitioning out of his parent's home. Recruitment methods and time limitations in completing my dissertation limited efforts to recruit a more diverse sample. Though the City of Toronto is a racially diverse city, with resident's over 50% non-white (Statistics Canada, 2019), this study's sample includes limited racial diversity, with 19 of 23 participants identifying as white. This meant that experiences at the intersection of race and disability were largely missed. Results of my qualitative analysis should therefore be interpreted as representing an in-depth account from a particular group of people with mobility disabilities, not accounting for the complete breadth of experience of disability in Toronto.

Lastly, being a non-disabled researcher, I do not understand experiences of having an "impairment" – which in an environment prioritizing normative ideas about "able-bodied" mobility, produces disability, nor have I experienced living with food insecurity. I therefore took several steps to consider my positionality and prioritize the views of people with mobility disabilities in defining food access barriers. Critical disability researchers have emphasized that all research about disability must integrate the views of people with disabilities, using the common refrain "nothing about us without us". This is particularly important to consider in relation to past exploitative disability research (Bridges, 2001; Oliver, 1996). As an 'outsider', it was important for me to develop and engage in respectful relationships, consider input from the disability community, and accurately represent people's voices and experiences, considering participants as active research agents (Bridges, 2001; Stone & Priestly, 1996). In the design of my research, I received input from a disability organization, the Centre for Independent Living in Toronto, who provided suggestions, including related to fair compensation of participants. During interviews, I tried not to assume other people's values and experiences. By using mobile interview methods, I considered people with disabilities as experts of their own environment, elevating personal experiences of food insecurity over what I may have considered as important access barriers going into this work, while also creating a space for participants to define their own relevant food environments. This method helped to identify small scale barriers, like hard to use doors in the fridge and freezer section of grocery stores, that I may not have considered using a sedentary interview process, while also enabling participants to reflect on how these barriers impacted their overall experiences of access. How I was perceived was important during interviews discussing sensitive issues such as food insecurity and disabling barriers, requiring trust and a feeling of mutual understanding. Certain participants were happy to discuss or demonstrate barriers, some in the hope of demonstrating the challenges they regularly experience. Others were more withdrawn and avoided discussing certain issues, particularly sensitive ones around access to care. It was important for me to recognize these limitations in my understanding of disability and to continually reflect on my representations of other's experiences.

6.3 Theoretical contributions and practical implications of this work

My dissertation includes several important theoretical contributions. My research further supports criticism of the food desert literature in terms of assumptions (implicit or otherwise) made about abilities, normative ideas about "able-bodied" mobility, and place-based effects (Shannon, 2013; McEntee, 2009; Schwartz et al., 2019a). By studying food access experiences among people with disabilities, my work disrupts the view of the disembodied subject who can shop at any store and whose major limitation to travel is distance, which is implied in the food desert work. Distance to stores was rarely a limiting factor preventing food access in this study's population. Rather there was considerable population variation in physical access to food, limited by available transportation, ability, and accessibility inside and outside the home. My dissertation findings further demonstrate the need to consider the varied interactions between people and place. In this work, I considered the different ways in which people travel, move, and acquire food, but also consider the structural, social, and economic factors that influence these movements. Notably, I found that economic barriers and physical barriers could be integrally linked for people with mobility disabilities.

A further theoretical contribution includes the use of an assemblage perspective to understand experiences of disability. Though assemblage perspectives have been used previously in disability research (Stephens et al., 2015; Feely, 2016; Goodley et al., 2018), my work was novel in how it applied this to an understanding of food insecurity. By using an assemblage perspective to understand this inequality, I was able to demonstrate the importance of socioeconomic inequalities and structures of power in the lives of people with disabilities, including, how disabling orders were imposed (e.g., in defining allowable care worker's tasks or limiting disability income) and in describing how these orders were contested and challenged. I used assemblages of enablement/disablement to identify the important role of socioeconomic disadvantage in many disabling experiences, including how this disadvantage limited power over environments both within and outside the home.

While the home has previously been considered as an important site of disability accessibility (Dyck, 1995; Crooks, 2010, Imrie; 2010; Stephens et al., 2015), my dissertation addressed the surprising lack of attention given to the home as an important site for understanding food access. While other scholars have considered the importance of the home's location relative to food shopping, my research more specifically considers how the internal and immediate external configuration of the home and how we relate to it, such as a home's site and situation, can impact food access and insecurity. Previously described themes around housing and the home arose in this research, including how the home becomes more salient in the lives of those who are sometimes restricted to the home, as well as how reordering of the home is mediated by living status and socioeconomic circumstances (Dyck, 1995). My work adds to this literature, demonstrating how accessibility within the home is also experienced in relation to systems of power and institutional structures outside the home, including within systems of subsidized housing, policies within rental apartments, and public programs allowing adaptations for individuals without economic means, like Ontario's Assistive Devices Program. My work also emphasizes how public structures of care, such as mediated through Ontario's Local Health Integration Networks, can modify the suitability of housing situations. This dissertation brings into focus how political and institutional frameworks can contribute to the production of inadequate housing supply which can, in turn, enforce important structural inequalities in food access.

Methodologically, this work demonstrates the value of using mobile methods as part of a mixed method design. Parent (2016) describes how mobile methods, such as 'wheeling interviews', with people using wheeled mobility devices, could be used to highlight disability mobility and disturb the normal routes by which we describe travel. By using go-along methods and life space mapping to describe travel by modes like paratransit and to highlight disabling barriers, these methods allowed me to consider the importance of microgeographies in movement, including the small scale features in transportation modes, outdoor environments, and grocery stores that presented barriers on people's trips. As a non-disabled researcher, the go-along interview method provided a critical first-hand perspective which helped me to question my positionality and understanding, as well as allowing greater input from participants with mobility disabilities in interpreting their own food environments. Participants were often highly engaged in the go-along interview method. Certain participants noted that it was nice to have someone with whom to shop, indicating how this interview experience was often friendly and less formal, but also showing how this interview was a co-created experience involving emotional interactions. A few participants were seemingly more relaxed during the journey and shopping trip and were sometimes more willing to discuss barriers they faced than during stationary interviews. Additionally, some participants mentioned that they were happy to have someone see the challenges they go through in their regular spaces of access, while a few, in planning a meeting place, would pick places where they wished to demonstrate certain issues that they faced. This method, therefore, acknowledged participants' agency, allowing them to demonstrate relevant spaces and barriers. As participants pass physical prompts, the go-along method enables consideration of affective experiences on route and reactions tied to place as well as the questioning of people's varied interpretations of their environments (Carpiano, 2009; Kusenbach, 2003). This method was aligned with my goal of accounting for lived experience of food access, allowing me to not just question but also engage in the experience of mobility on the food journey. For example, I was able to get a better sense of the frustration and difficult experiences in place while waiting for a late arriving ride with one participant in a cold grocery-store vestibule. Mobile methods, in this case, allowed for a greater depth in understanding disabling environments which foreground the role of emotional experiences.

6.4 Policy implications and future research directions

Several policy and programmatic implications are suggested by my research. My dissertation suggests the need for poverty reduction strategies which could improve outcomes of food insecurity across the population. Further, disability social assistance was seen as inadequate for many to avoid food insecurity, and in Ontario, these benefits have not kept up with inflation (Ontario Ministry of Children, Community and Social Services, 2018). Raising disability assistance benefits could importantly reduce food insecurity in adults with mobility disabilities. However, it is important that these increases are not accompanied by restrictions in defining disability, limiting who can access these benefits (Boisvert & Xing, 2018). More severe restrictions imposed on individuals to prove that they are disabled, within the context of disability programming that offer greater disability benefits might have diverging impacts, lessening disadvantage importantly in many with disabilities who can access these benefits, but disadvantaging others who cannot. Alternative solutions, like providing basic income supports could more flexibly meet people's needs (Basic Income Canada Network, 2019). Basic income supports across the population, similar to those available with older age in Canada, likely reduce risk of food insecurity, including in people who may struggle to gain access to disability benefits.

My dissertation importantly demonstrates the need to prioritize disability in housing policy, including addressing limited ability to access suitable, accessible housing in the City of Toronto, addressing long wait times for subsidized housing, and promoting programs to better allow flexible accessibility modifications within the home. Participant interviews further show that disability accessibility is often dismissed inside and outside the home, including during periods of disruption. Further, efforts must be made to ensure that disability is always prioritized in design of public and private spaces, including during construction, or in providing contingencies in case of mechanical disruptions. For this to occur more money and political will is needed to enforce and improve guidelines like the Accessibility for Ontarians with Disabilities Act, or to encourage builders/contractors and institutions to build beyond the code or guideline to maximize access, rather than simply meeting a requirement to accommodate.

Lastly, dependencies of certain people with disabilities were frequently shown as devalued. It is important to challenge these norms and acknowledge the ways in which all people rely on one another throughout their daily lives, rather than seeing dependencies as something to limit or avoid (Gibson, 2006). Gibson et al. (2012) suggest that independence is not an achievable goal for many with disabilities and instead propose the more realistic goal of 'interdependence', observing that all people require an assemblage of people, machines, and social structures to carry out daily tasks. Though independence could be desired at times, a shift from stigmatized norms of dependence could allow better provision of care and access to mobility resources when in need.

I have also arrived at the identification of several potential directions for future research. Firstly, my research was unable to evaluate population trends in food insecurity for people on disability social assistance incomes. The CCHS did not allow comparisons between people on general social assistance and disability social assistance (classifying both as earning from social assistance). This made it difficult to understand whether accessing disability social assistance effectively offset higher costs related to disability or whether access to these benefits improved food insecurity outcomes in relation to people on general social assistance. Future research should attempt to evaluate the adequacy of disability income sources, though this may require different data sources. Further research could also explore who may be denied access to disability benefits. This could include understanding whether people with episodic disabilities or with atypical presentations are more commonly denied access (Lightman et al., 2009), or how access to needed benefits are denied to certain people who have mistrust or trouble navigating these systems. Research should also evaluate how systems of subsidized housing meet the needs of people with disabilities. This includes evaluating the waiting times for those requiring accessible units in Toronto’s subsidized housing. In addition, more work is needed to evaluate how subsidized housing units, including those labeled accessible, meet the needs of residents with disabilities.

Similar research evaluating experiences of food access could examine relationships between disability and food access in different environments, including experiences in more rural or exurban environments. People in these environments may have less access to accessible paratransit systems, like Wheel-Trans, or other disability services. Due to differences comparing barriers to access in urban and suburban setting (e.g., crowds and narrow routes compared to road safety issues or greater distance to services), it is likely that novel disabling barriers to food access may be found in different settings.

Two participants in qualitative interviews accessed a program known as direct funding, which uses funding from the provincial government and is administered by CILT, to provide people with money to hire their own personal support workers (PSW). This program provides access to more hours of care work and greater flexibility in care. One participant indicated that using this program has greatly improved her access to food. However, this program also includes major administrative responsibilities which may not be possible for all those requiring extended hours of service. Further, some people using this program may be cut off from care if they are unsure of their rights or are unable to gain access to another care-worker, for example, if their PSW cancels. More work is needed to evaluate the effectiveness of this program and to examine how this system could be improved to the benefit of some who may have challenges under the current model.

In my qualitative studies, I found that disabling barriers become particularly apparent during periods of disruption. My dissertation writing concluded during the COVID-19 pandemic, a period of important disruption in our daily lives. I outline here some potential issues that may arise during the pandemic and highlight potential future research related to this emergency. The COVID-19 pandemic raises novel questions about disability and food access but also enforces many of the issues raised in this paper. These issues include the shifting nature of disability identities, the structures of disability benefits and care-work, the role of grocery delivery services, issues around unsuitable housing, and social norms around care and helping. For example, many more people have become ‘disabled’ or more disabled within the context of the pandemic, including the elderly and those with immuno-compromising conditions who have had their activities limited to the home (Fox, 2020). Others have also required access to social assistance benefits, experienced social isolation, limits in physical access, and fears associated with leaving the home for shopping (Loopstra, 2020), experiences which were described by a number of participants in this study. Broadening the definition of disability, has brought attention to variation in experiences of food access, leading to some calls for social action (e.g., providing hours for seniors or people with disabilities in grocery stores, delivering food to neighbours). What may be a “new reality” spawned by pandemic response, could draw attention to important and disabling inequalities in food access. In particular, action taken by many stores to create separate shopping hours for seniors or people with disabilities highlight how social action can be taken to improve certain people’s food access. The creation of systems like the Canada Emergency Response Benefit (CERB) in response to popular need, may also serve as a model for introducing a basic income program which provides regular and adequate payments with few requirements to prove need (Basic Income Canada Network, 2020). However, it is unknown whether the awareness of economic and mobility disadvantage will inform action when or if things ‘return to normal’.

Further, this pandemic has in many ways exacerbated rather than alleviated population socioeconomic inequalities. An analysis in the UK indicates that people with disabilities have experienced increased rates of food insecurity and have been particularly affected by food shortages in stores and self-isolation during the pandemic (Loopstra, 2020). Many people with disabilities may also have conditions that restrict them to the home during this crisis. Yet, because of inadequate incomes, some who are at higher risk from COVID-19 will be made to shop because of inability to afford delivery or other help. Others who regularly rely on grocery delivery may experience difficulties as food delivery takes a longer time to arrive. Physical distancing may also be different with a wheelchair or mobility device which could include a larger footprint, and therefore result in more difficulty in trying to maintain distance when out. Further, it may be more difficult to get care or needed help from others, for example, in grocery stores, which many participants in this study relied on for accessing items, if some people avoid helping others in following physical distancing guidelines. In Ontario, the higher incomes available from the CERB, are not available to many people on social assistance. The decision by officials to provide these higher incomes, substantially higher than disability and general social assistance, in effect, acknowledges that social assistance incomes in places like Ontario are inadequate, particularly as they have not risen with inflation and are far below the poverty line (Maytree, 2019). Ontario announced the provision of discretionary benefits for people on social assistance to assist with higher costs, like cleaning supplies during the pandemic. Yet this system requires individual requests and so will likely be distributed unevenly, highlighting the inequalities inherent in systems with complicated benefit structures. For this reason, many poverty advocacy groups in Ontario have instead requested a raise in social assistance rates during the pandemic (Income Security Advocacy Centre, 2020).

Inequalities may also exist because of conditions within the home. Being restricted to the home is more severe for people in unsuitable housing situations who may experience prolonged social isolation in inadequate spaces. Some participants in this research regularly relied on help through professional caregivers, from family or friend networks, or sometimes from strangers. Many people in these situations will not have the option to physically distance from others, even if they are at higher risk from infection. Importantly, care-work during this time represents a major concern. Issues of PSWs made to work in multiple places for a small number of hours were highlighted in chapter five. This situation has been observed with terrible consequences in spreading the virus in long-term care homes in Ontario (Stone & Howlett, 2020), but may also occur within the community. PSWs may also work in both long-term care and the community. Therefore, clients who rely on these workers, many who could be at higher risk from infection, may be exposed to higher risk of transmission as these workers may carry the virus from long-term care homes. Moreover, some care-workers may lose employment or hours of work as clients reduce hours or apply restrictive access criteria for accepting services as a protective strategy. These issues further understate how the precarity of care work may reflect on the health and safety of clients and on those providing the care (Fritsch, 2010).

While emergency situations like the current COVID-19 pandemic can bring attention to needs of people with disabilities, they can also enforce important existing inequalities, including in housing, and related to inadequate care work. Future research could highlight these experiences, noting how disability has been treated and prioritized (or not) in this emergency, but also bringing attention to the important inequalities that may continue to exist or which may be enforced during this time.

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Appendices

Appendix A: Search terms by Database

Database	Search terms
Scopus	disab* OR ((physical OR mobility OR function*) w/2 (constraint OR limit* OR impairment)) OR ‘physical capacity’ AND (food w/3 (access OR secur* OR insecur* OR insufficien* OR sufficien*)) OR hunger OR ‘food desert*’
Ovid-Medline	Exp. Disabled Persons OR (mobility or functional or physical) adj2 (limit* or constraint or impair*) AND Exp. Food Supply OR Hunger OR (food adj3 (insecur* or secur* or sufficien* or insufficien* or access or acqui*) OR food desert
SSCI	disab* OR ((physical OR mobility OR function*) NEAR/2 (constraint OR limit* OR impairment)) AND (food NEAR/3 (access OR secur* OR insecur* OR insufficien* OR sufficien*)) OR hunger OR ‘food desert’
GEOBASE	disab* OR (mobil* NEAR/2 limit*) OR (functional NEAR/2 limit*) OR (physical NEAR/2 limit*) OR (mobil* NEAR/2 impair*) OR (functional NEAR/2 impair*) OR (physical NEAR/2 impair*) OR (mobil* NEAR/2 constraint*) OR (functional NEAR/2 constraint*) AND (food NEAR/3 access) OR (food NEAR/3 secur*) OR (food NEAR/3 suffic*) OR (food NEAR/3 insecur*) OR (food NEAR/3 insuffic*) OR Hunger OR ‘food desert*’
PAIS International	disab* OR ((physical OR mobility OR function*) NEAR/2 (constraint OR limit* OR impairment))

	AND (food NEAR/3 (access OR secur* OR insecur* OR insufficien* OR sufficien*)) OR hunger
All limited to English language, peer-reviewed journal articles	

Appendix B: List of reviewed articles

Author	Date	Method	Measure	Geography	Population	Field
1. Smith	1991	Questionnaire/ Interview	Shopping patterns	Winnipeg	Elderly in inner city, inner suburb, and outer suburb, retired, ambulatory	Geography
2. Wolfe et al.	1996	Interviews	Food shopping experiences	New York State	Elderly -rural white/ urban black population	Nutrition Education
3. Locher et al.	1998	Interviews	Food access patterns	Birmingham, Alabama	Urban elderly, meals on wheels recipients	Gerontology
4. Wylie, Copeman, and Kirk	1999	Interviews	Food choices/ nutritional intake	Leeds, UK	Urban elderly	Nutrition
5. Schoenberg	2000	Survey/ interviews	Contributors to nutritional risk	North Florida	Rural elderly, African Americans	Gerontology
6. Klesges et al.	2001	Survey analysis	Influences of food access/nutrition	USA-Baltimore	Women, elderly with disabilities	Public health
7. Lee and Frongillo	2001	Survey analysis	Food insecurity influences	New York State	Elderly Population	Gerontology
8. Stark	2001	Survey	The role of barriers in the home	Missouri and Illinois, USA	People Age 16-80, clients of a medical equipment company	Occupational therapy
9. Tarasuk	2001	Survey analysis	Food insecurity influences	Toronto	Urban, women (age 19-49), emergency food users	Nutrition

10.	Meyers et al.	2002	Longitudinal survey	Barriers/ facilitators to travel	Boston, Durham N.C.	Urban wheelchair users	Social science
11.	Whelan et al.	2002	Focus groups	Shopping behaviours/ attitudes	Leeds, UK	Food desert residents- urban, elderly, single mothers.	Urban studies
12.	Bartfeld	2003	Survey	SNAP usage influences	Wisconsin	Single mothers, food pantry clients	Policy, economics
13.	Gulliford, Mahabir, and Rocke	2003	Survey	Relationship between disability and food insecurity	Trinidad and Tobago	Adults	Epidemiology
14.	Hall, Colantonio, and Yoshida	2003	Survey	Barriers to nutrition	Canada	Women with physical disabilities	Rehabilitation sciences
15.	Wolfe, Frongillo, and Valois	2003	Interviews	Measuring HFI survey module in the elderly	New York State	Elderly-rural white and urban black population	Nutrition
16.	Fitch	2004	Survey	Perception of store convenience	Scotland	Scottish Households	Retail Sciences
17.	Gollub and Weddle	2004	Cross-sectional field study	Comparison between those receiving and not receiving breakfast program	United States- various regions	Seniors with functional limitations using Meals on Wheels	Nutrition, Aging

18.	Bartfeld and Dunifon	2006	Survey analysis	Food insecurity predictors	USA	National Survey	Policy
19.	Bernell, Weber, and Edwards	2006	Survey analysis	Food insecurity influences	Oregon	Oregon residents	Agriculture, Economics
20.	Emmett and Alant	2006	Review	Intersection of women and disability	Internationa l	Women and disability literature	Intersectional
21.	Keller	2006	Interview, questionnaire	Need for food related assistance	Guelph, Ontario	Urban, Elderly population	Nutrition, Gerontology
22.	Nolan et al.	2006	Survey analysis	Food insecurity predictors	Sydney, Australia	Urban population in low-income neighbourhoods	Health Promotion
23.	Shaw	2006	Interviews	Barriers to a healthy diet	U.K.	Shoppers, shopkeepers, community workers, police, urban/ rural	Geography
24.	Heflin, Corcoran, and Siefert	2007	Longitudinal study	Food insecurity influences	Michigan	Mothers on welfare	Social Sciences
25.	Keller et al.	2007	Interviews	Barriers /resources to food access	Ontario	Urban, community living low income elderly, Caucasian	Nutrition, Public Health
26.	Keller et al.	2007b	Focus groups	Food access concerns and roles of community service providers	Hamilton, ON	Urban area, community service providers	Nutrition, Public Health

27.	Kudlick	2007	Personal reflection/Case study	Food shopping experiences	USA	Blind population	Disability studies
28.	She and Livermore	2007	Survey analysis	Relationship between disability and food insecurity	USA	Adults, age 25-61	Social Sciences
29.	Webber, Sobal, and Dollahite	2007	Ethnography, Interviews	Barriers to food access/ food acquisition patterns	Upstate NY (rural, village, /urban location)	Population with/ without disabilities	Nutrition, Disability Studies
30.	Mander	2008	Interviews	Experiences of hunger	Rural India	Single women, disabled, and elderly populations	Economics
31.	Mojtahedi et al	2008	Store survey	Store compliance with accessibility standards	Chicago	Urban/Suburban Stores in Chicago	Rehabilitation sciences
32.	Parish et al.	2008	Survey analysis	Relationship between disability and HFI	USA	Families with children	Social Work, Child Studies
33.	Bilyk et al.	2009	Interviews	Eating patterns, obstacles to food access	B.C.	Long term visually impaired (age 25-50), not living in a community facility	Nutrition, Public Health
34.	Coveney and O'Dwyer	2009	Interviews	Relation between mobility, and food access,	Adelaide, Australia	Urban population without a car	Public Health

35.	Meneely, Strugnell, and Burns	2009	Focus groups	Food shopping experiences	Northern Ireland	Older adults, living independently	Consumer behaviour
36.	Parish, Rose, and Andrews	2009	Survey analysis	Economic hardship by disability status	USA	Women	Social Sciences
37.	Redmond and Fuller-Thomson	2009	Survey analysis	Influences of foods stamp program participation	USA	American community survey, low-income African Americans	Social Work
38.	Rose, Parish, and Yoo	2009	Survey analysis	Relationship between disability and HFI	USA	Women age 18-65	Social Sciences
39.	Shahtahmasebi et al.	2009	Survey	Relationship between disability and HFI	UK	British families	Disability studies
40.	Wood et al.	2009	Survey	Coping strategies	Washington State	Food pantry users with children	Nutrition
41.	Brewer et al.	2010	Survey	Relationship between disability and HFI	Georgia	Older population	Nutrition
42.	Burns et al.	2010	Survey analysis	Influences of poor food access	Melbourne, Australia	Urban residents	Nutrition, Public Health
43.	Gorton, Bullen, and Mhurchu	2010	Review	Food insecurity influences	International	Food insecurity literature	Nutrition
44.	Huang, Guo, and Kim	2010	Survey Analysis	Relationship between disability and HFI	USA	Families	Social Work

45.	Lopez-Class	2010	Food store audits	Neighbourhood comparison of store price/accessibility	East-central New York State	Small urban area, Latino and non-Latino neighbourhood	Public Health
46.	Radermacher, Feldman, and Bird	2010	Focus groups / surveys	Barriers to food access /experiences	Melbourne, Australia	Low-income suburban residents, Older adults in the community	Nutrition, Aging
47.	Cuesta-Briand, Saggers, and McManus	2011	Interviews, focus groups	Food access experiences	Perth Australia	Urban Indigenous/ non-indigenous group in low income area	Public Health
48.	Deeming	2011	Survey analysis	Risk factors associated with food and nutrition security	UK	Age 60 +	Policy
49.	Neill et al.	2011	Photovoice, focus groups	Facilitators/ barriers to food access	Southwestern Ontario	Women, elderly in rural towns	Gerontology, Nutrition
50.	Shantz	2011	Policy analysis	Review of special dietary allowance	Ontario	Ontario policy	Policy
51.	Williams-Forson and Wilkerson	2011	Theoretical analysis	Intersection of food / gender/race/disability studies	International	Literature	Food Studies, Social Sciences
52.	Alavi et al.	2012	Interviews, focus groups, observations	Impact of musco-skeletal impairments on everyday lives	Malawi	Children with musco-skeletal impairments and family	Disability Studies

53.	Chung et al.	2012	Surveys analysis	Influence of neighbourhood measures on food hardships	New York City	Urban elderly population	Public Health, Social Work
54.	Huang et al.	2012	Interviews	Food access patterns	Washington State	Midlife and older adults	Aging
55.	Norhasmah et al.	2012	Surveys	Food insecurity influences	Malaysia	Women, urban welfare recipients	Social Sciences
56.	Yamashita and Kunkel	2012	Spatial analysis	Relationship between elderly populations and access to food	Ohio county	Urban area and surroundings	Gerontology
57.	Coleman-Jensen and Nord	2013	Survey analysis	Relationship between disability and HFI	USA	Population age 18-64	Agriculture
58.	Crabtree and Mushi-Brunt	2013	Survey analysis	Relationship between functional limitations and difficulty grocery shopping	USA	Adult non-drivers	Occupational Therapy
59.	Ghosh and Parish	2013	Survey analysis	Relationship between having multiple children with disabilities and material hardships	USA	Families with children	Disability Studies
60.	LeDoux and Vojnovic	2013	Spatial analysis	Factors influencing outside shopping behaviours	Detroit	Urban residents of lower income neighborhood	Geography
61.	Munoz Plaza et al.	2013	Interviews/ participant observation	Shopping patterns/ strategies	Brooklyn, NY	Urban older adults	Nutrition, Public Health

62.	Porter and McIlvaine-Newsad	2013	Ethnography	Functioning of a community garden	Macomb, Illinois	Rural community garden	Sociology
63.	Cannuscio et al	2014	Surveys, Interviews, Store audits	Shopping patterns and reasoning	Philadelphia, PA	Urban residents	Social Sciences
64.	Groce et al.	2014	Review	Interactions between malnutrition and disability	Literature	International	Public health
65.	Miewald and McCann	2014	Case study	Neighbourhood foodscapes	Vancouver	Urban, low income population	Geography
66.	Sahyoun and Vaudin	2014	Review	Evaluation of home-delivered meal programs	USA	Literature	Nutrition
67.	Burns et al.	2015	Survey	Factors influencing food access	Melbourne, Australia	Urban, Main food shoppers	Nutrition and Public Health
68.	Fitzpatrick, Greenhalgh-Stanley, and Ver Ploeg	2015	Survey	Food desert/ motor vehicle ownership influence on food insufficiency, food spending, participation in SNAP	American urban areas	Urban poor, elderly	Agriculture, Economics
69.	Ghosh and Parish	2015	Survey	Relationship between demographic characteristics and child benefit receipt and hardships	USA	Low income families with children	Disability Studies
70.	Horner-Johnson et al.	2015	Survey analysis	Relationship between HFI and caregiver status	USA	Representative population	Disability Studies

71.	Kuper et al.	2015	Case control study	Relationship between disability and malnutrition	Kenya	Disabled children and family/neighbourhood controls	Disability Studies/Public health
72.	Papan and Clow	2015	Focus groups	Relationship between food insecurity, and health	Atlantic Canada	Food insecure, adult, women,	Gender and Development Studies
73.	Shannon et al.	2015	Survey analysis	Relationship between urban/rural status and food insecurity	Georgia	Older adults, urban and rural	Geography
74.	Whittle et al.	2015	Interviews	Food access strategies	San Francisco	Urban population with HIV	Social Sciences
75.	Wilmoth et al.	2015	Survey analysis	Food insecurity influences	USA	Households with an older adult	Gerontology, Social Work
76.	Wright	2015	Interviews	Experience of living on a disability grant	Mpumalanga, South Africa	Urban/rural Households living on a disability grant	Nursing sciences
77.	Bowen, Bowen, and Barman-Adhikari	2016	Survey	Influences of food insecurity	Chicago	Urban adult population in single room housing	Public Health, Nutrition
78.	Brucker	2016	Survey analysis	Relationship between disability and HFI	USA	Young adults, nationally representative	Disability studies, Public health
79.	Brucker and Nord	2016	Survey analysis	Relationship between intellectual disability and HFI	USA	Adults age 18-25	Disability studies/Public health

80.	Bualar	2016	Interviews	Food access among disabled population/ attitudes of municipal administrators	Thailand	Mayors, food vendors, disabled population	Development studies
81.	Chiu, Brooks, and An.	2016	Interviews	Food pantry user characteristics	North Texas	Food pantry users	Food Studies, Disability Studies, Kinesiology
82.	Ferris et al.	2016	Survey analysis	Predictors of unmet home and community-based service needs	Southeastern Pennsylvania	Older adults	Gerontology
83.	Heflin	2016	Survey analysis	Influences of food insecurity	USA	Representative population	Economics
84.	Magaña -Lemus et al.	2016	Survey analysis	Influences of food insecurity	Mexico	Representative population	Agriculture
85.	Moffitt and Ribar	2016	Longitudinal analysis	Determinants of food insecurity	USA-three cities	Urban-low income families	Economics
86.	Oemichen and Smith	2016	Focus groups	Food access patterns, barriers	Minnesota	Low-income, urban seniors	Nutrition
87.	Pruitt et al.	2016	Survey (NHANES 2005-10)	Influences of food assistance participation	USA	US adults age 20+	Public health
88.	Shannon	2015	Interviews	Influences of food provisioning practices	Minneapolis, Minnesota	Residents of low-income neighborhoods	Geography

89.	Sonik et al.	2016	Surveys	Influences of food insecurity	USA	Households with children	Social Work
90.	Spurway and Soldatic	2016	Interviews	Experience of food insecurity	Western Australia	Rural aboriginal populations with a disability	Social Sciences
91.	Vilar-Compte et al.	2016	Survey	Relationship between disability and HFI	Mexico City	Urban older adults	Health Studies
92.	Adams et al.	2017	Descriptive analysis	Analysis of a policy	USA	State by state comparison of low-income older individuals, and in-depth state-level analysis in Georgia	Policy, food and nutrition
93.	Brostow et al.	2017	Survey	Risk factors for FI among veterans	USA	Male veterans older than 50	Gerontology
94.	Brucker and Coleman-Jensen	2017	Survey analysis	Relationship between disability and HFI	USA	Representative population	Disability studies
95.	Chang and Hickman	2017	Survey analysis	Relationship between disability and HFI	USA	Elderly, low-income population	Nutrition
96.	Choi, Fram, and Frongillo	2017	Survey analysis	Predictors of very low HFI	USA	Representative population	Nutrition
97.	Heflin	2017	Survey analysis	Influences of food insecurity	USA	Representative population	Social Sciences

98. McGrath et al.	2017	Interviews, participant observation	Environmental barriers producing disability	Mid-sized Canadian city	Older adults with age related vision loss	Occupational therapy
99. Mucheru et al.	2017	Survey	Relationship between social dysfunction and HFI	Australia	Adults with psychosis	Nutrition
100. Smith et al.	2017	Survey analysis	Likelihood of using SNAP by demographic characteristics	USA	Adults, low income	Nutrition
101. St-Germain and Tarasuk	2017	Survey analysis	Food insecurity influences for residents in subsidized housing	Canada	Representative population	Nutrition, Public Health
102. Tirfessa et al.	2017	Survey	Relationship between mental disability and food insecurity and mediating role of functional limitations	Rural Ethiopia	Adults with mental illness and controls	Epidemiology
103. Glendening et al.	2018	Survey	Influences of disability benefits on housing and material hardships	USA-12 cities	Families using emergency shelters	Disability studies
104. Suarez-Balaczar et al	2018	Focus groups	Barriers to healthy lifestyle in youth with disabilities and their parents	Urban setting: Chicago-Latino neighbourhood	Families living in a Latino community, accessing services	Occupational therapy/Disability studies

105. Venci and Lee	2018	Survey	Relationship between functional limitations and food insecurity	USA	Adults	Public health
106. Waltz et al.	2018	Interviews and site visits	Barriers to healthy food access	Netherlands	People with disabilities, advocates, and food service providers	Disability studies, public health

Appendix C: Disability and social assistance by province/territory

Region	Province	Percent food insecure*	Estimated social assistance income/ year-1 adult (2009)**	Estimated disability social assistance/ year-1 adult (2009) **	Disability income assistance system
Eastern Canada	NL	13.4%	$10,936	$12,680	Disability allowance for those on social assistance
	PEI	16.2%	$7,681 (2013)	$10,090 (2013)	Social assistance extended benefits
	NS	17.5%	$7,249	$10,485	Social assistance extended benefits
	NB	15.6%	$7,229 (2013)	$9,523 (2013)	Social assistance extended benefits
Quebec	QB	13.5%	$8,336	$12,404	Social solidarity benefit -available for people with work limitations
Ontario	ON	11.7%	$8,551	$14,711	Ontario disability support program (ODSP)-available for people that are limited in work, self care, or participation in community life
Western Canada	MB	12.1%	$7,769	$10,742	Social assistance extended benefits
	SK	12.5%	$10,009	$12,429 Saskatchewan assured income for disability (SAID): $14,844 (2013)	Social assistance extended benefits Or SAID available for those with ‘substantial’ limitations to daily living
	AB	11.5%	$8,255	Personal needs	Social assistance extended benefits

				assistance: $10,754 Assured income for the severely handicapped (AISH): $16,299	Or AISH available for severe disabilities that are work-limiting
	BC	12.7%	$8,866	$12,987	BC disability assistance program for people with prescribed disability
Northern Territories	YK	17.1%	$17,521.00	$20,978.00	Disability allowance for those on social assistance
	NWT	20.4%	$19,740.00	$24,530.00	Disability allowance for those on social assistance
	NT	45.2%	$49,611.00	$52,515.00	Disability allowance for those on social assistance

*Data from Tarasuk et al., 2014, **Data from Maytree (2018): Welfare in Canada reports estimating incomes in 2017 equivalent dollars for a single person, and single person with a disability based on social assistance, potential transfers, and tax credits. Values assume maximum benefits, with no assets or other income sources and are estimated for a person living in the province's largest city. Rates from the Territories reflects higher costs of living. Rates were provided for 2009 except for NB and PEI where rates were provided for 2013 as data for these provinces in the 2009/10 cycle was not included in this analysis. Disability/welfare benefits did not change substantially from year to year in each province, with notable exceptions. Alberta's AISH program increased dramatically over the study period (from 2009-2014) to an estimated $20,280 in 2014. Saskatchewan's SAID program was extended beyond those in extended care in 2012 therefore only 2013 rates are shown.

Appendix D: Survey modules included by cycle

CCHS cycle	HFSSM	HUI	Homecare	Participation/activity limitations	Included in Analysis
2007/08	QB	QB	-	QB	QB
2009/10	All except PEI, NB	All	ON	All	NL, NS, QB, ON, MB, SK, AB, BC, YT, NWT, NT
2011/12	All provinces	-	-	-	Excluded
2013/14	All except BC, MB, NL, YK	All	PEI, QB, ON	All	PEI, NS, NB, QB, ON, SK, AB, NWT, NT
2015/16	All except NL, ON, YK	NT, NWT, YK	All	-	NT, NWT